MILWAUKEE COUNTY'S
GENERAL MITCHELL INTERNATIONAL AIRPORT

Technical Report

MASTER PLAN UPDATE

Prepared for:

Milwaukee County
Department of Public Works -
Airport Division

Prepared by:

PB Americas, Inc.

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EXECUTIVE SUMMARY

CHAPTER 1.0 INTRODUCTION

The Master Plan Update for Milwaukee County's General Mitchell International Airport (GMIA) recommends a program for the improvement of existing facilities and the development of new facilities at the Airport over the next 20 years. This plan updates the analysis and conclusions of the Master Plan that was adopted by the Milwaukee County Board of Supervisors in 1993. The Master Plan Update identifies the type and extent of facilities that are required to meet projections of aviation demand and evaluates a range of alternatives for improving the facilities. The process culminates with the recommendation of a preferred alternative. All functions at the Airport are considered, including the airfield, terminal-related passenger services, cargo, general aviation, airport support and highway/transit access. The Master Plan Update includes substantial input from key stakeholders, including Airport tenants, public oversight agencies such as the Federal Aviation Administration (FAA), other public agencies, selected officials from Milwaukee County and surrounding municipalities, citizens, business groups, and community leaders that have a stake in the future of the Airport.

CHAPTER 2.0 INVENTORY OF EXISTING CONDITIONS

General Mitchell International Airport (GMIA) is the primary air carrier airport for Milwaukee and Southeast Wisconsin and serves many facets of the region's air transportation demand. Currently the airport has 12 passenger airlines, the 128th Wing of the Wisconsin Air National Guard, multiple aircraft maintenance facilities and general aviation. In 2001, the Airport handled approximately 2.8 million enplaned passengers, 107 million pounds of air cargo, and 211,512 aircraft operations. In 2008, there were approximately 4 million enplaned passengers, 183 million pounds of air cargo and 183,278 aircraft operations.

In order to establish a baseline for the Master Plan Update Study, an inventory was conducted through a review of Airport records, field interviews, telephone discussions, and an analysis of existing reports and studies. This information was used throughout the Master Plan Update Study as the need for future aviation facilities was determined and alternative facility locations were examined.

CHAPTER 3.0 ACTIVITY PROJECTIONS

Activity projections were developed to present a forecast of passenger and aircraft activity and were used as the basis for the General Mitchell International Airport Master Plan Update. These projections were essential for determining the future role of the Airport in both the type of aircraft to be accommodated and the type of aviation demand to be served. Furthermore, these projections were highly useful for evaluating the capability of existing Airport facilities and their ability to absorb projected aviation demand. Finally, these projections were used to estimate which airside and landside facilities should be provided at the Airport in future years. The results of the aviation activity projections analysis indicated that GMIA will continue to be a vibrant, growing base for aviation activity over the next twenty years. It is anticipated that growth in air carrier operations and domestic passenger traffic will result due to the addition of carriers such as Southwest and Air Tran and the expansion of Midwest Airlines. As these carriers expand, new markets will open and current ones will grow. General aviation activity will continue at the Airport, but it will grow very slowly, especially in the early part of the forecast period. Cargo operators, large and small, will also grow at GMIA.

CHAPTER 4.0 AIRFIELD DEMAND/CAPACITY AND REQUIREMENTS

The previous Master Plan for GMIA was initiated in 1988 and adopted by the Milwaukee County Board of Supervisors in 1993. That Master Plan identified the need for various airfield capacity improvements, including the realignment and extension of runway 7L/25R (completed; the construction of a 1,000-foot extension to runway 7R/25L; the construction of a 2,850-foot extension to runway 1R/19L (500 feet to the north and 2,350 feet to the south; and decommissioning runway 13/31. Additionally, a new runway to provide capacity during Instrument Meteorological Conditions (IMC) was investigated. Several alternatives were evaluated for the location of a future runway. Alternative C-1, a 7,000-foot runway parallel to and 3,540 feet south of runway 7R/25L, was recommended and ultimately adopted as part of the Airport Layout Plan.

This Master Plan Update Study evaluates the capacity of the existing airfield to determine the timing of the need for the new runway C-1. Capacity analysis was not undertaken to reexamine the need for the runway. The runway extensions included in the previous master plan were re-evaluated for the changes in the aircraft fleet mix projected over the 20-year planning period and were determined to meet future needs.

The findings of the airfield demand/capacity analysis indicate that capacity enhancements will be required during the 20-year planning period. Some key airfield improvements from the previous Master Plan remain valid based on these analyses. The theoretical capacity analysis and the airfield simulations indicate that the "C-1 runway," identified as the major airfield capacity project in the previous Master Plan, will need to be in place at the end of the planning period (2021-2022). The runway extensions to runway 1R/19L will provide additional capacity during the times that the Airport is limited to a north or south operation based on wind and weather. Other airfield improvements, such as future taxiway locations, will need to be determined in the context of the overall airport development plan. Also, runway safety area improvements are needed in conjunction with airfield enhancements to meet FAA requirements. In summary, the key conclusions from these analyses are: 1.) Airfield capacity enhancements, including the C-1 runway, will be required in the 20-year planning period; 2.) Improvements to the runway safety areas are necessary.

CHAPTER 5.0 LANDSIDE FACILITY REQUIREMENTS

The Airport's landside facilities, or those functional areas not related to the movement of aircraft, were evaluated to properly plan for the Airport's future needs. The projections of aviation activity were translated into specific types and quantities of facilities that can adequately serve projected activity levels. These analyses were intended to identify, in general terms, the deficiencies in existing facilities and outline what new facilities will be required to meet projected growth. Alternatives for providing these facilities were then identified in the next element of the planning process. Facility requirements were calculated for the following airport functional areas: Passenger Terminals; Airport Access and Curbfront; Parking (public, rental car, commercial, and employee); Air Cargo; General Aviation; and Support Facilities. It should be noted that the facility requirements represent a level of detail common to a master planning effort, not a level of detail that is equivalent to an architectural or engineering design study.

CHAPTER 6.0 TERMINAL

The primary purpose of this element of the Master Plan Update is to describe the development and evaluation of major alternatives considered for key components of overall Airport development. This section presents alternative physical configurations for the passenger terminal area, including the coordinated development of the following major landside facilities and infrastructure components: Passenger Terminal Facilities, Aircraft Parking, Ingress/Egress and Curbside Roadways, and Vehicular Parking Facilities

CHAPTER 7.0: ENVIRONMENTAL OVERVIEW

The Environmental Overview section of the master plan update provides a desk top review of environmentally sensitive features that may be affected by the recommended development. This Overview is based upon readily available information; it is not intended as a substitute for the "Affected Environment" section of an environmental assessment (EA) or Environmental Impact Statement (EIS). The information in this Overview will serve as a resource when more detailed environmental analysis as may be required by the National Environmental Policy Act (NEPA) and FAA orders, regulations and policies is conducted at a later date.

CHAPTER 8.0 AIRPORT LAYOUT PLANS

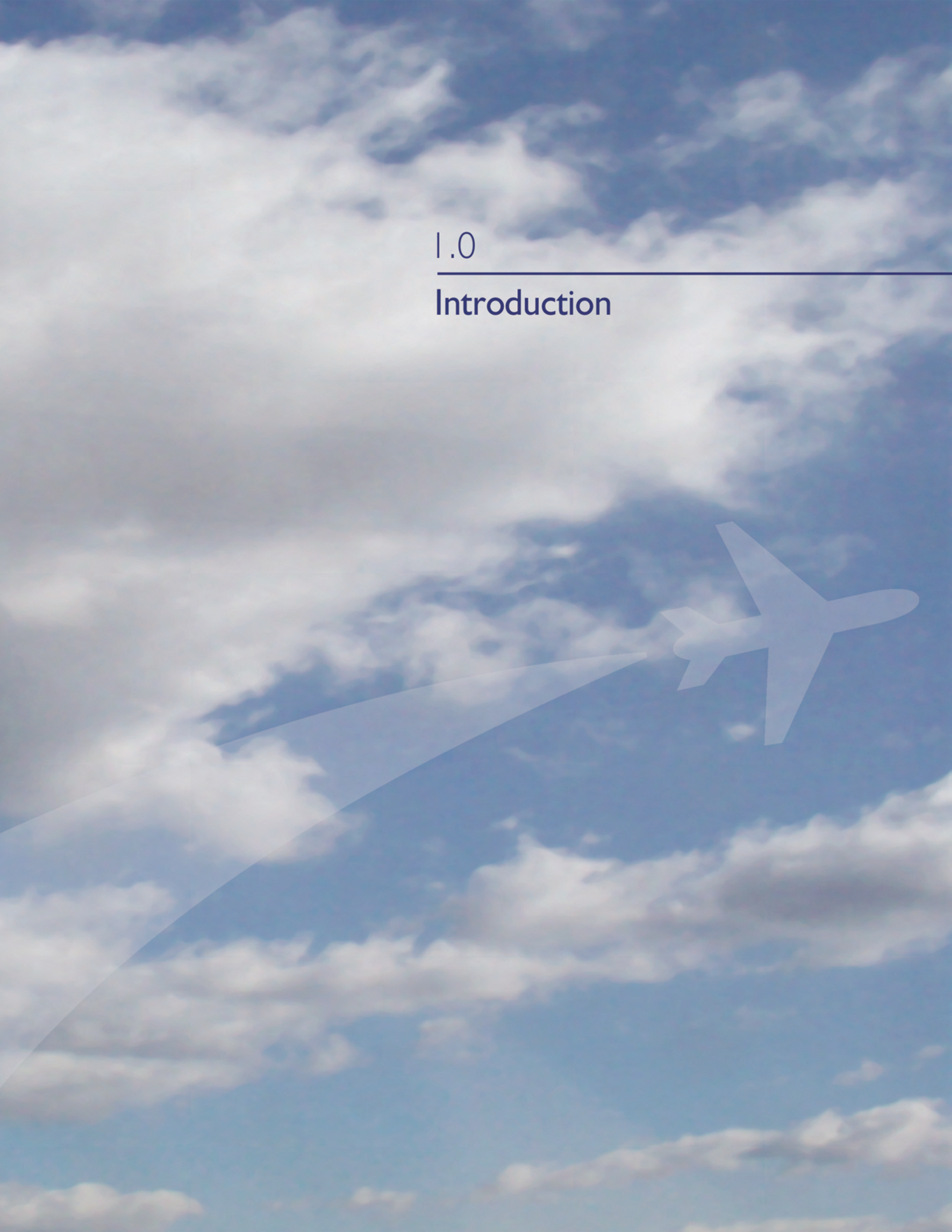
The Airport Layout Plan section of the master plan presents a detailed graphic and narrative description of the selected development concept for the Airport. These plans include the Airport Layout Plan (ALP); Data Summary; Terminal Area Plan; Airspace Plan; Runway Approach Plans; On-Airport Land Use Plan; Property Map (Exhibit A) and the Airport Photograph. Of these plans, the (ALP) must be reviewed and approved by the Federal Aviation Administration prior to implementation. The ALP depicts the overall 20-year development proposed at the Airport. Overall, these plans serve as the Airport's primary planning tool for the long-range development of the airfield and passenger terminal facilities.

CHAPTER 9.0 ECONOMIC FEASIBILITY AND FINANCIAL ANALYSIS

Milwaukee County operates two airports: General Mitchell International Airport (MKE) and Lawrence J. Timmerman Airport (LJT). This section presents a financial plan for the proposed Capital Improvement Plan (CIP) at MKE. This plan incorporates the Airport's on-going CIP and the master plan projects that were recommended in Chapter 8. This financial plan presents an analysis of the financial feasibility of the proposed master plan projects, including a projection of the impact that these projects will have on the Airport's operating revenues and expenses, debt service requirements, rates and charges, cost per enplanement and annual cash flow for the forecast period Calendar Years (CY) 2008 through 2022. The total cost of the 20-year CIP is $1.8 Billion.

1.0

Introduction



1.0 INTRODUCTION

The Master Plan Update for Milwaukee County's General Mitchell International Airport (GMIA) establishes a program for the improvement of existing facilities and the development of new facilities at the Airport over the next 20 years. This plan updates the analysis and conclusions of the Master Plan that was adopted by the Milwaukee County Board of Supervisors in 1993.

A comprehensive undertaking, the Master Plan Update process identifies the type and extent of facilities that are required to meet projections of aviation demand and evaluates a range of alternatives for improving the facilities, consistent with forecast requirements. The process culminates with the recommendation of a preferred alternative. All functions at the Airport are considered, including the airfield, terminal-related passenger services, cargo, general aviation, airport support and access. The Master Plan Update includes substantial input from key stakeholders, including Airport tenants, public oversight agencies such as the Federal Aviation Administration (FAA), other public agencies, selected officials from Milwaukee County and surrounding municipalities, citizens, business groups, and community leaders that have a stake in the future of the Airport.

This Update of the 1993 Master Plan begins with vision. The vision is a collection of statements that provide a composite picture of a GMIA 20 years in the future that meets the many needs of its stakeholders. The vision guides the analyses in the Master Plan Update and is used during the decision-making process to select a preferred development alternative. This chapter presents the vision of GMIA as expressed by the Airport's stakeholders. This chapter also includes an assessment of the Airport's strengths, weaknesses, opportunities, and threats. The assessment is the basis for the visionary statements that were ultimately developed.

1.1 Vision Of The Airport's Future

A vision of the Airport's future was formulated after seeking input from many individuals and groups. Interviews were conducted with 25 key stakeholders, including representatives of the travel, tourism, and transportation industries, and elected officials from the municipalities surrounding the Airport, County Supervisors, and the County Executives of Milwaukee, Racine and Waukesha. A workshop was conducted with the public. Focus groups were organized and meetings were conducted with planning professionals, community leaders and citizens. A brainstorming session with the Technical Advisory Committee (TAC) began the process by soliciting input from agencies that regulate and plan for airport and ground transportation development. Together, these individuals and groups contributed to the template for the Airport's future.

The vision that emerged from this process, in general, reflects two overall themes:

- Continue and enhance those things that the Airport does well now.
- Address new issues and initiatives necessary for the future, as articulated in the Master Plan Update.

Features that should be continued and enhanced are embodied in the following visions which affirm that the Airport:

- *…is customer friendly.* Overall, the Airport offers a pleasing and efficient experience for travelers and employees. The Airport is well-managed and operates efficiently and effectively. It is easy to get around inside the Passenger Terminal Building, which is modern, clean, and offers travelers many and various concessions and amenities.
- *…is readily accessible.* The Airport is very accessible for travelers and business employees with local trips originating from Milwaukee, Ozaukee, Washington and Waukesha Counties.
- *…meets the air travel needs of the southeastern Wisconsin region.* The Airport is an important economic asset to the Metropolitan Milwaukee and southeastern Wisconsin

areas. Additional nonstop flights should be pursued to domestic destinations not currently served. The Airport has capitalized on the growing passenger market of northeastern Illinois.

- Over the 20-year planning horizon and beyond, General Mitchell International Airport should remain the airport of choice for southeastern Wisconsin, and should be a competitive alternative to outlying markets.

- *…operates safely, securely and efficiently.* The Airport must continue to provide a safe, secure and efficient operating environment for passengers, employees, baggage and cargo. The airfield, passenger terminal, parking and aviation support areas are configured and operated to meet these needs. Airport improvements are planned and implemented in a manner that is compatible with, and integrated with, operation of aircraft in both the Milwaukee and Chicago airspace area. Continuation and enhancement of Airport security should be integrated with the overall physical planning and operation of the Airport's facilities. The Airport should continue to meet the standards and requirements of the FAA.

- *…is financially self-supporting, and is a cost-effective place for the airlines to do business.* The Airport is currently self-sustaining, and is viewed by airlines and other tenants as an attractive place to do business. This is due to several factors that include the relatively low operating costs at the Airport (in comparison to competitor airports and other airports with similar size and market characteristics) and the business-like management approach taken by the Airport's administration. Stakeholders describe the Airport's administration as proactive in dealing with issues, cooperative with users and tenants, and efficient in the way the Airport is operated. The need and timing of new and improved facilities should continue to be balanced with the maintenance of reasonable user charges.

- *…reflects the business-like character of Metropolitan Milwaukee.* The planning and implementation of future improvements to the Airport reflect the following features of the Milwaukee region: they are practical, reasonable, and sized and timed correctly to meet the needs of the traveling public in an efficient and cost-effective manner.

- *…is a good neighbor.* Milwaukee County continues its proactive approach in minimizing the impacts resulting from aircraft and airport operations on its neighbors and the environment. Much has been accomplished as a result of several Milwaukee County programs that include: the Airport Noise Compatibility Program (Part 150 Program); the Ground Run-up Enclosure and; the Home Owner Protection Program (HOPP). In addition, Milwaukee County has several environmental programs in place to reduce impacts from the runoff produced from deicing fluids and its impacts on water quality. There is a belief held by some persons living in and representing noise-impacted areas that these programs should continue and that more needs to be done. Communities and citizens located around the Airport are becoming increasingly concerned about potential environmental issues related to deicing, air and water quality, and wetlands protection. This vision holds that future development at the Airport will occur in an environmentally sound manner, balancing development needs with protection of the environment.

- *…develops in a manner that incorporates planning for compatible land uses.* Milwaukee County has acquired land for the purposes of preserving the opportunity for future Airport development, as well as preserving a buffer area between the Airport and its noise-sensitive neighbors. Planning for the compatible development of land areas adjoining the Airport is necessary in order to ensure compatibility with Airport operations and to maximize the economic development potential of these areas for the cities in which they are located. Neighboring cities are concerned about the potential loss of tax base related to Airport expansion. To ensure the best use of the land, the Airport and its neighbors should coordinate efforts for the planning and use of land near the Airport.

- *…is an engine for growth of the economy.* The Airport plays a critical role in maintaining and attracting business to the Metropolitan Milwaukee area, as well as the region. It is a vital part of the infrastructure that supports economic sustainability and future growth.

- Businesses often look at several key factors when selecting their location. One important need is close proximity to an attractive, efficient airport. Another important need is an airport with reliable, affordable, non-stop and direct airline service to destinations of choice. Greater Milwaukee is the home of major medical centers, universities, and corporations whose employees are extensive and frequent business travelers. The existence of a first-rate airport with excellent domestic air service is a business necessity, as well as a central issue in recruiting and retaining top flight employees.

- *…fosters compatible economic development opportunities for adjacent communities and areas.* The Airport has identified and pursued "win-win" decisions regarding the longstanding land use and land development issues. Examples include: the operations and needs of the Air Force Reserve and Wisconsin Air National Guard units; the compatible development and/or redevelopment of land on College and Howell Avenues; and the business park developments in St. Francis and Cudahy.

New features to be incorporated in future plans and policies emphasize that GMIA:

- *…is an integral component of the region's network of other transportation modes.* Although air travelers and employees find travel to and from the Airport readily accessible and convenient from Milwaukee, Ozaukee, Washington and Waukesha Counties, those residing or doing business in the southern counties would benefit from improved access. The quality and convenience of transportation to the Airport ensures that the passengers experience a seamless trip from the point of origin to the gate. Airport access and connections via a variety of transportation modes (high-speed rail service, light rail connector, park-and-ride opportunities, and rubber-tired vehicles) should be explored.

- *…generates employment opportunities.* Future Airport growth should provide employment opportunities at the Airport itself and in related businesses located in the Airport vicinity. Future Airport growth should also promote employment opportunities throughout the regional economy.

Throughout the visioning process, stakeholders affirmed that the Airport is a regional asset and is valued by the public. Fulfillment of the preceding visions will ensure continued support of the Airport by its users, as well as businesses throughout the Airport's expanding air service area. To the greatest extent possible, the Master Plan Update applies the visions to assess the potential for aviation demand, and to screen facility improvement alternatives in order to accommodate this demand.

1.2 Assessment of The Airport's Strengths, Weaknesses, Opportunities And Threats

As part of the early planning process, key stakeholders were asked to assess the Airport's strengths, weaknesses, opportunities and threats to the Airport as a means of uncovering critical issues that should be addressed. Strengths and weaknesses describe existing conditions at the onset of the planning process, whereas opportunities and threats are potential future conditions that the planning effort must anticipate in the development of recommended Airport improvements.

This assessment provided a beginning point for the Master Plan Update, and is used to guide tasks such as the projection of aviation demand and the identification of facility needs and requirements. Many comments were received from GMIA's stakeholders during the course of identifying the Airport's strengths, weaknesses, opportunities, and threats. In some instances, the input that was received was not directly related to the Master Plan Update, although it is relevant to other aspects of the Airport or Airport administration. All pertinent comments are included in the following discussion for the sake of completeness.

1.2.1 Strengths

The Airport has many characteristics that signal its continued role as the airport of choice for southeastern Wisconsin over the next 20 years. These strengths range from the quality of the Airport's facilities and the strength of its economic base, to its reputation as a well-run, efficient facility and an economical place to do business for its airlines. These strengths are:

- *The Airport is efficiently managed and operated.* The Airport has a good relationship with external groups, regional agencies and tenants. It is a relatively low-cost operation for an airport of its size. There is a history and willingness of Airport management to support the needs of the airlines and other operators. It is also known for having exceptional communication with Airport users and the FAA. The Airport's facilities in place today are modern, clean and user friendly.

- *The Airport is expandable.* The Airport can accommodate today's demand for air travel with its runway and taxiway system. The existing Airport infrastructure is generally in good condition and previous planning efforts have designated areas for expansion of the airfield, although conversion of some current Airport tenant's uses would be required for the expansion of the terminal, airfield and support areas.

- *The Airport is accessible to a large majority of its customers.* The Airport is easily accessible to travelers and employees by roadway via Interstates 94 and 43. On-Airport parking is generally available, except during certain peak times, and should continue to improve in the near-term future with the opening and operation of the parking garage addition. The Airport has earned a reputation of being a "hassle-free" travel experience.

- *Air service is reliable and provided to major destinations.* Midwest Express Airlines is a good anchor for reliable air service. Based in the Milwaukee area, Midwest Express (and its subsidiary Skyway) has a strong presence and serves a large number of destination cities throughout the country. Northwest Airlines and the balance of the carriers complement Midwest's operations and provide a competitive air carrier base. Air cargo can be shipped quickly and efficiently because of the presence of multiple cargo carriers at GMIA.

- *The Airport is a good neighbor.* Airport management has been proactive in dealing with community issues, particularly noise mitigation. Other environmental initiatives augment this "good neighbor" perception, including proactive and innovative programs for water quality, surface runoff, and deicing.

- *The Airport has a large, positive impact on the economy and on the region.* The quality and type of air service is a critical factor for business leaders when deciding where their operations will be located. The provision of air service, in addition to the direct and indirect impacts of the employees, businesses and users of the Airport, is a large component of the region's economic health.

1.2.2 Weaknesses

Despite the many and varied strengths that will continue at the Airport into the future, the stakeholders identified a number of weaknesses that can be addressed to ensure that its future remains bright. Many of these weaknesses are addressed in this Master Plan Update. Weaknesses of importance include:

- *Airfield improvements are required.* Similar to many comparable mature airports throughout the country, GMIA's airfield configuration was designed to accommodate the needs of an earlier era of the aviation industry. The number, lengths and placement of the runways and taxiways are less than optimal to accommodate the level and type of operations projected for the 20-year planning horizon, and beyond. In some instances, parts of the airfield do not meet present-day FAA standards for Runway Safety Areas (RSA) and other requirements.

- *Nonstop service to additional domestic markets is needed, as well as lower air fares.* Air carriers have established nonstop and direct service to more than 50 domestic cities, of which 13 are served by multiple carriers, while 32 are served solely by Midwest Express and/or Skyway. The proximity of the Airport to Chicago O'Hare, one of the nation's busiest facilities, with numerous nonstop, domestic and international destinations, results in a percentage of travelers from the Milwaukee region selecting O'Hare as their Airport of choice to reach these destinations. More frequent service within the State of Wisconsin is desirable, especially to Madison, Green Bay, Eau Claire/Chippewa Valley and the Fox River Valley.

- Several attractive destination cities are not currently served nonstop year-round (Miami, New Orleans and Seattle) and other markets are presently underserved (Charlotte, Las Vegas, Los Angeles, San Francisco, Orlando, Fort Myers and Tampa).

- *More low-fare service is needed.* The absence of an established discount fare carrier has resulted in high fares to several markets. New service to unserved and underserved markets is important to both business and leisure travelers originating trips from the Milwaukee Region. The inception of service by AirTran, and potentially other discount carriers, can act to reduce fares.

- *The passenger terminal facility needs to be updated to meet emerging and future needs.* Similar to the airfield, the passenger terminal facility was designed and built to accommodate a differing set of needs. Terminal improvement is necessary to accommodate projected future growth and to incorporate evolving requirements for security. Additionally, airline mergers and acquisitions have resulted in the underutilization of several existing gates. As enhanced security requirements are developed and implemented, additional attention needs to be given to providing amenities within the concourses and within the central terminal for a traveling public with wide ranges of interests and needs.

- *Current environmental concerns could affect the implementation of Airport improvements.* Aircraft noise, land use compatibility, wetland impacts, air quality and runoff from deicing of aircraft and pavement are frequently mentioned as environmental concerns that will continue to require careful attention. Although Airport management has established a reputation for being proactive and innovative in handling environmental issues, Airport neighbors and their representatives still have concerns, particularly about noise, that will be important considerations in planning Airport improvement initiatives.

- *The availability of land areas required for expansion is uncertain.* Although a progression of previous planning activities has identified expansion potential at the Airport, adjacent land areas (both within the Airport property and adjacent to it) are developed, or are constrained by current uses; e.g., College Avenue and other major roads, railroad tracks, and wetlands. Coordination will be necessary with the cities surrounding the Airport, regulatory agencies and the two military facilities in order to address land use and economic development issues. Land use conversion or redevelopment may be necessary in order to provide adequate area to expand the Airport to meet its future demand.

- *There is a lack of high-speed rail service between northern Illinois and southeastern Wisconsin.* Although roadway access to the Airport is good from Milwaukee County and adjacent counties, lack of rail transit makes the Airport less accessible to the southern counties in Wisconsin and the northern counties in Illinois. High speed rail service, with a connecting stop at the Airport, is seen as an opportunity to capture additional market share and business. Other types of rail connections via Amtrak or Metro should be explored.

- *There is no coherent economic development strategy for the region.* With numerous jurisdictions responsible for economic development and quality of life improvements in the Metropolitan Milwaukee areas and adjacent areas, economic development initiatives have been somewhat disjointed and uncoordinated. Although new initiatives such as the Wingspread Accord are making initial attempts to rectify this situation, future decisions regarding development need to be addressed. The implementation timetables for transportation and infrastructure improvements, economic development initiatives and optimization of land use near the Airport need to be discussed and coordinated.

- *Alternative governance structures for a regional asset such as the Airport should be explored.* There is a widespread perception that policy direction of the governance of the Airport does not proportionately represent all of the area served by the Airport. About one-half of the Airport's passengers originate in Milwaukee County. There is a further perception that an alternative governance structure, such as a regional airport authority, may be better suited for the development of a regional asset with enormous direct and indirect impacts on the regional economy.

1.2.3 Opportunities

Change is constant and the nature of airport operations is no exception. Several opportunities that will benefit the future growth of GMIA were identified by stakeholders:

- *Capitalize on the growing northeastern Illinois market.* Regardless of the prospects or the timetables for the planning and implementation of improvements to Chicago O'Hare International Airport (or the potential construction of a new airport in the Chicago region), GMIA is an option for the Chicago region business and leisure travelers as well as air cargo shippers.

- *Enhance the Airport's attractiveness to new entrant, low-fare airlines.* By providing adequate runway capacity, passenger terminal amenities and parking, the Airport will be an increasingly attractive place for new entrant airlines to do business. By continuing to provide a business environment for airlines that features very low operating costs and good airline relations, the opportunity for new or enhanced service by low-fare carriers such as AirTran, Southwest, Jet Blue and others can be realized.

- *Maximize the revenue-producing potential of the Airport property and assets.* The Master Plan Update can provide a basis for the development of traditional and nontraditional uses of underutilized land areas and facilities that will further enhance revenues. By gaining consensus for the optimum use of Airport land, revenue-enhancing strategies can be implemented. These strategies can include redeveloping areas on the Airport and capitalizing on opportunities for joint economic development.

- *Plan for the resolution of long-standing infrastructure needs.* The Master Plan Update can be a catalyst for broadening the discussion of and planning for regional infrastructure improvements. For example, reconstruction of the southeastern Wisconsin freeway system may be identified as a necessity to ensure reliable access to the Airport from the surrounding region. Additionally, synergy can occur between the plans for the Airport and other plans for transportation improvement, economic development, and quality of life enhancement in the region.

- *Identify the optimum governance plan for the Airport in the future.* Alternative governance arrangements for the Airport can be examined. The best method available for operating this major economic asset to the Milwaukee region can be identified.

- *Identify and accommodate needs of travelers with disabilities, and an aging population.* As the general population ages, the Airport needs to anticipate and accommodate these needs (wheelchairs, strollers, heights of ticket counters, pay telephones, motorized carts and signage). It will also be important that airline and airport staffs are trained to assist people with disabilities.

1.2.4 Threats

Although there are many opportunities for the Airport, several important threats to its future need to be addressed. The following items were identified as the most critical threats to be faced:

- *The potential for encroachment by incompatible land uses will need to be addressed.* If not monitored closely, incompatible development can limit the future improvement and development of the Airport, and eliminate the opportunities for increasing its capacity. At present, there are three power plants in the developmental stage within the vicinity of the Airport. Also, retention ponds placed in nearby industrial parks can become wildlife habitats and may attract birds (to the detriment of the safety of aircraft in flight).

- The existence of multiple public jurisdictions in the vicinity of the Airport, each with local land use control, poses the potential problem of incompatible land development. As noted in 1.2.3 Opportunities, however, there is a chance for municipal agencies and jurisdictions to work collaboratively to identify and implement compatible land use planning for areas near the Airport. Several stakeholders that were interviewed indicated their willingness to pursue joint economic development initiatives or similar strategies.

- *New security requirements are emerging and changing the way that Airport managers operate and plan their facilities.* In the aftermath of the events of September 2001, numerous changes have taken place in the ways that airports operate as well as plan for the future. With the Transportation Security Administration (TSA) assuming primary jurisdiction for overall Airport security, new requirements are emerging to reduce risks to the Airport passengers and employees. There must be extensive dialogue and close cooperation between the Airport management and the TSA to ensure that security considerations are integrated into planning for future Airport facilities. The Airport facilities must be planned with sufficient flexibility to accommodate any future TSA changes in procedures and requirements.

- *Air travel may decline if the economy continues to decline, causing Airport improvements to be forestalled.* An extended economic downturn may significantly reduce air travel. Business and leisure travel can decrease, causing a significant loss of passengers and revenue. If this should happen, revenues to fund improvements will decline. Also, key airlines serving the Airport may withdraw or reduce their presence at the Airport.

- *Airline consolidations and other aviation industry upheavals can have a negative impact on Milwaukee.* Mergers, acquisitions, consolidations, bankruptcies and other traumatic events in the airline industry can directly impact the Airport's ability to maximize its potential. An airport that is heavily dependent on a single carrier for the majority of its flights (as well as underwriting its operating costs and capital improvements) can be severely impacted if its major airline is acquired or is consolidated.

- *Airport development needs may have significant effects on community assets, such as the Air Force Reserve or Air National Guard facilities.* Existing operations and future facility needs of the military units based at the Airport must be considered in any long-term plans. In particular, if airfield improvements dictate the replacement, relocation or closure of these facilities, every effort to accommodate them on the Airport property should be made.

- *Increasingly stringent environmental requirements may make needed Airport improvements too expensive.* Existing and future environmental requirements can have extensive, and expensive, ramifications for airport operations and future development. Increasing costs due to environmental regulation could reduce the Airport's attractiveness as a cost-effective place to do business and may affect the viability of future capital improvements.

- *Local opposition to Airport development due to concerns over noise and land use compatibility may delay expansion.* Although the results of the stakeholder interviews indicated widespread recognition of the need for a viable and thriving Airport, public officials and citizens have indicated that aircraft noise is a concern of neighborhoods near the Airport. Airport management's strong track record as a good neighbor has provided a reservoir of good will. Nevertheless, there will be close scrutiny of those proposed Airport improvements which could potentially result in loss of tax base, increases in noise, and emissions impacting air and water quality.

*** * * * * ***

With a vision for the future of the Airport in place, the next step of the Master Plan Update process is an inventory of existing conditions, including the physical facilities as well as the environmental and community setting of this important regional asset. Chapter 2.0 presents the existing conditions at GMIA.

2.0

Inventory of Existing Conditions

2.0 INVENTORY OF EXISTING CONDITIONS

General Mitchell International Airport (GMIA) is the primary air carrier airport for Milwaukee and Southeast Wisconsin. With 15 passenger airlines, the 440th Airlift Wing of the US Air Force Reserves, the 128th Wing of the Wisconsin Air National Guard, and general aviation, the Airport serves many facets of the region's air transportation demand. In 2001, the Airport handled approximately 2.8 million enplaned passengers, 102 million pounds of air cargo, and 211,000 aircraft operations.

In order to establish a baseline for the Master Plan Update Study, an inventory was conducted through a review of Airport records, field interviews, telephone discussions, and an analysis of existing reports and studies. This information will be used throughout the Master Plan Update Study as the need for future aviation facilities is determined and alternative facility locations are examined. The inventory is presented in the following sections:

- *Airport History*
- *Airport Activity*
- *Airport Facilities*
- *Airport Environs*
- *Socioeconomic Setting*

Due to the dynamic nature of the Airport, a "snapshot" of the facilities as they existed in January, 2002, is used. Facilities that were under construction at that time are identified as well.

2.1 Airport History

GMIA is named in honor of General William "Billy" Mitchell, a military aviation pioneer and Milwaukee native. In 1941, Milwaukee officially changed the name of the Airport from Milwaukee County Airport to General Mitchell Field. This name was revised to General Mitchell International Airport in 1986.

Although aviation had made its debut in Milwaukee several years earlier, the Airport was established at its current site in 1926 when Milwaukee County purchased a small airport from Thomas Hamilton for $150,000. A year later, in 1927, Northwest Airlines began passenger air service to Chicago and Minneapolis from the new airport site.

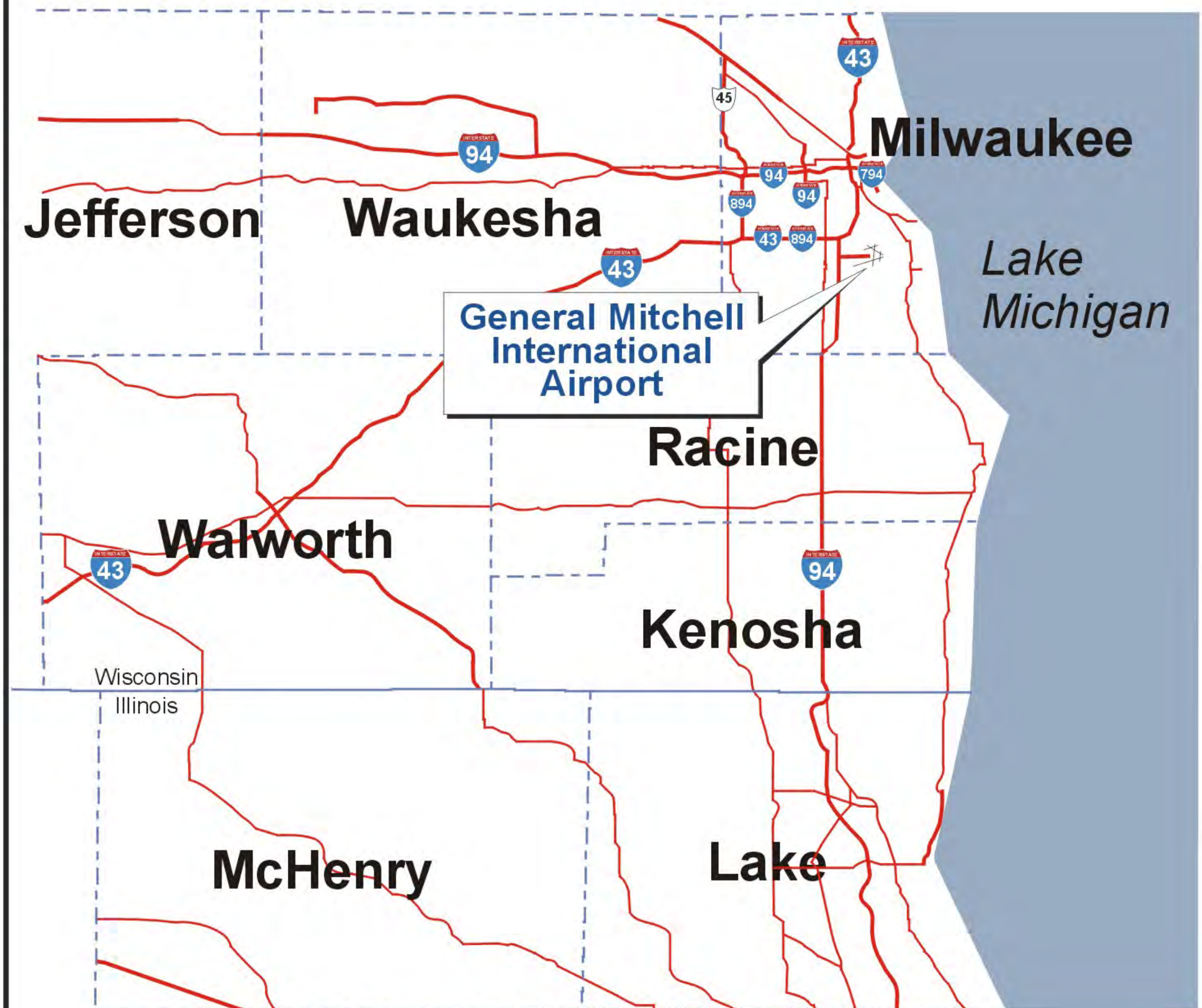
The Works Progress Administration (WPA) constructed a new terminal building on Layton Avenue that opened in 1941. Rapid growth in aviation made this terminal obsolete by the early 1950s. In 1955, a new terminal was constructed on Howell Avenue in the area that today's terminal occupies. This three-concourse terminal included 23 gates and second level aircraft loading.

The ticketing and baggage claim areas of the terminal were expanded between 1983 and 1985. At that time, the terminal configuration was redesigned to incorporate separate curbfronts for arrivals and departures, as well as the second level concession mall. In 1990, Concourse D was expanded by adding 16 gates across the end of the existing concourse. In 2002, the County expanded the Airport's parking garage to provide approximately 3,000 additional public parking spaces as well as a lobby area for rental car counters. An eight-gate addition to Concourse C is currently being designed.

Milwaukee County has continued to own and operate GMIA since 1926. Today, the Airport is governed by the County Executive and a Board of Supervisors consisting of 25 elected members. Organizationally, the Airport is a Division within the County's Department of Public Works. The Airport Director supervises the staff of approximately 175 employees who implement the County's policies and conduct the day-to-day operations and maintenance of both General Mitchell International and Timmerman Field.

2.2 Airport Activity

GMIA serves the primary commercial air transportation requirements of Milwaukee, southeast Wisconsin, and portions of Northern Illinois. As shown on **Exhibit 2.2-1** the Airport is



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

AIRPORT LOCATION

EXHIBIT 2.2-1

located entirely within Milwaukee County. It is approximately five miles south of downtown Milwaukee.

GMIA averages 230 scheduled passenger departures per day and is served by 15 major/national and regional/commuter airlines: Air Canada, AirTran, Air Wisconsin (United Express), American Eagle, America West, ATA Connection, COMAIR (Delta Connection), Continental Express, Delta, Northwest, Midwest Express, Skyway (Midwest Express), US Airways, and US Airways Express.

A summary of key airport activity indicators is provided in **Table 2.2-1**. Between 1990 and 2000, passenger enplanements increased from approximately 2.2 million to 3.0 million, representing an average annual growth rate of 3.2 percent. Passenger activity declined in 2001 due mostly from the impact of September 11, to 2.8 million passenger enplanements. Air cargo tonnage increased during this time period, from approximately 89.4 million pounds in 1990 to 126 million pounds in 2000.

TABLE 2.2-1

General Mitchell International Airport

HISTORICAL AIRPORT ACTIVITY

Year	Passenger Enplanements		Enplaned Cargo (pounds)[1]		Aircraft Operations	
1990	2,213,672	-	89,471,401	-	206,669	-
1991	2,027,689	-8.4%	105,124,545	17.5%	203,242	-1.7%
1992	2,189,052	8.0%	99,074,331	-5.8%	203,030	-0.1%
1993	2,264,402	3.4%	103,579,577	4.5%	201,288	-0.9%
1994	2,563,293	13.2%	120,579,888	16.4%	215,889	7.3%
1995	2,593,359	1.2%	124,165,303	3.0%	204,781	-5.1%
1996	2,732,965	5.4%	129,385,158	4.2%	200,963	-1.9%
1997	2,804,596	2.6%	131,197,846	1.4%	212,609	5.8%
1998	2,790,837	-0.5%	142,476,818	8.6%	219,087	3.0%
1999	2,906,189	4.1%	139,022,866	-2.4%	221,866	1.3%
2000	3,039,962	4.6%	126,095,651	-9.3%	221,855	0.0%
2001	2,811,954	-7.5%	107,097,313	-15.1%	211,512	-4.7%

Source: Airport activity records

Note: [1] Enplaned cargo=Air Freight+Air Mail

2.3 *Airport Facilities*

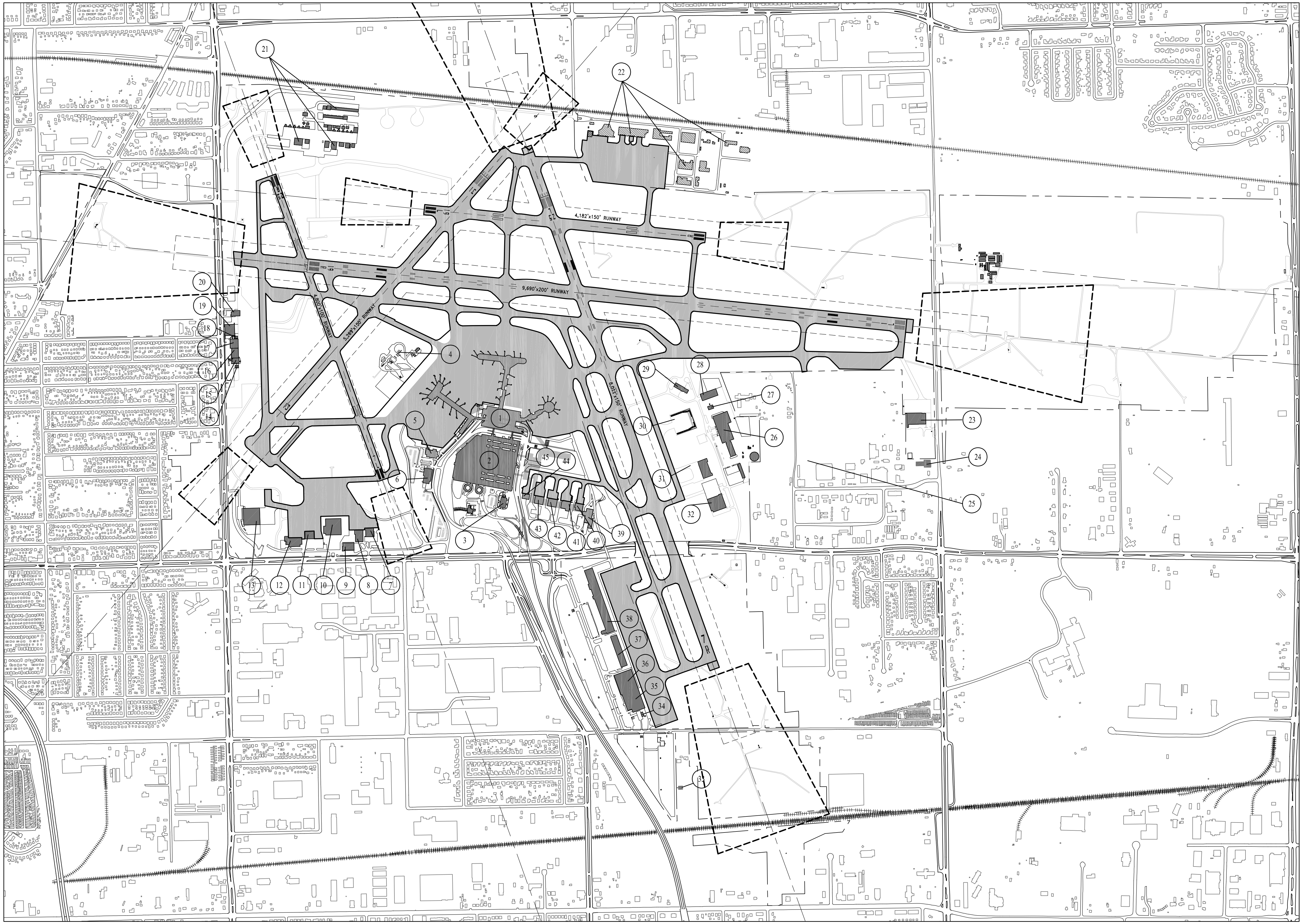
The Airport's existing facilities were identified and documented in the inventory in order to form a database for the airfield, terminal, air cargo, airport support, general aviation and military components of the Master Plan Update Study. Due to the size and complexity of the Airport's facilities, the inventory effort distinguishes between airside facilities (i.e. those facilities directly related to the landing and takeoff of aircraft) and landside facilities, which are classified by their function (i.e. passenger terminal, air cargo, and support).

The Airport encompasses approximately 2,386 acres of relatively flat land within a built-up urban environment. The official elevation of the Airport, based on the highest runway elevation point, is 723 feet above mean sea level (MSL).

The Airport boundaries consist of: to the north, the Airport has a boundary along Layton Avenue; to the east, the Airport is bounded by the Canadian Pacific railroad lines; to the south, the Airport is bounded by College Avenue with Airport owned property lying further south to Rawson Avenue; and to the west, the Airport is bounded by Howell Avenue and the CP railroad line. Primary access to the Airport is via State Trunk Highway (STH) 119, the Airport Spur.

The Airport's facilities, including any planned structures that were under engineering design as of January, 2002, are shown on **Exhibit 2.3-1**. The major airport structures that are located on Airport property are labeled on Exhibit 2.3-1.

Significant ground leases of Airport property are also shown in **Exhibit 2.3-2**. **Exhibit 2.3-3** lists the lessee, lease type (use), commencement and termination dates, and other pertinent remarks for each of the land leases depicted in Exhibit 2.3-2. The numerous FAA NAVAID leases, other minor ground leases, and ground access easements are not depicted in Exhibit 2.3-2.



Fac. No.	Facility Description
1	Passenger Terminal
2	Parking Garage
3	Air Traffic Control Tower
4	Fuel Distribution Facility
5	International Arrivals Terminal
6	Central Utilities Building
7	Coporate Hangar
8	Mountain Aire Cargo Hangar
9	Mountain Aire Cargo Hangar
10	Air Wisconsin Aircraft Maintenance Hangar
11	Vacant
12	Signature Flight Support Ground Maintenance
13	Skyway Airline Aircraft Maintenance Hangar
14	Signature Flight Support Shop
15	Signature Flight Support Terminal
16	Signature Flight Support Hangar
17	Signature Flight Support Hangar
18	Signature Flight Support Shop
19	Signature Flight Support Hangar
20	Coporate Hangar
21	Northeast Hangar Area
22	Wisconsin Air National Guard
23	Coporate Hangar
24	MATC Aviation Education Center
25	United States Air Force Reserves
26	Airport Maintenance Building
27	Airport Maintenance Building
28	Airport Maintenance Building
29	Aircraft Rescue and Fire Fighting (ARFF) Station
30	Ground Runup Enclosure (GRE)
31	Coporate Hangar
32	Coporate Hangar
33	Airport AMTRAK Station
34	Airport Surveillance Radar (ASR)
35	Midwest Express Airlines Maintenance Hangar
36	Midwest Express Airlines Maintenance Hangar
37	Air Cargo Building
38	Air Cargo Building
39	U.S. Postal Service
40	Coporate Hangar
41	Coporate Hangar
42	Coporate Hangar
43	Coporate Hangar
44	Coporate Hangar
45	Northwest Airlines GSE Maintenance Building

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

EXISTING AIRPORT FACILITIES

EXHIBIT 2.3-1

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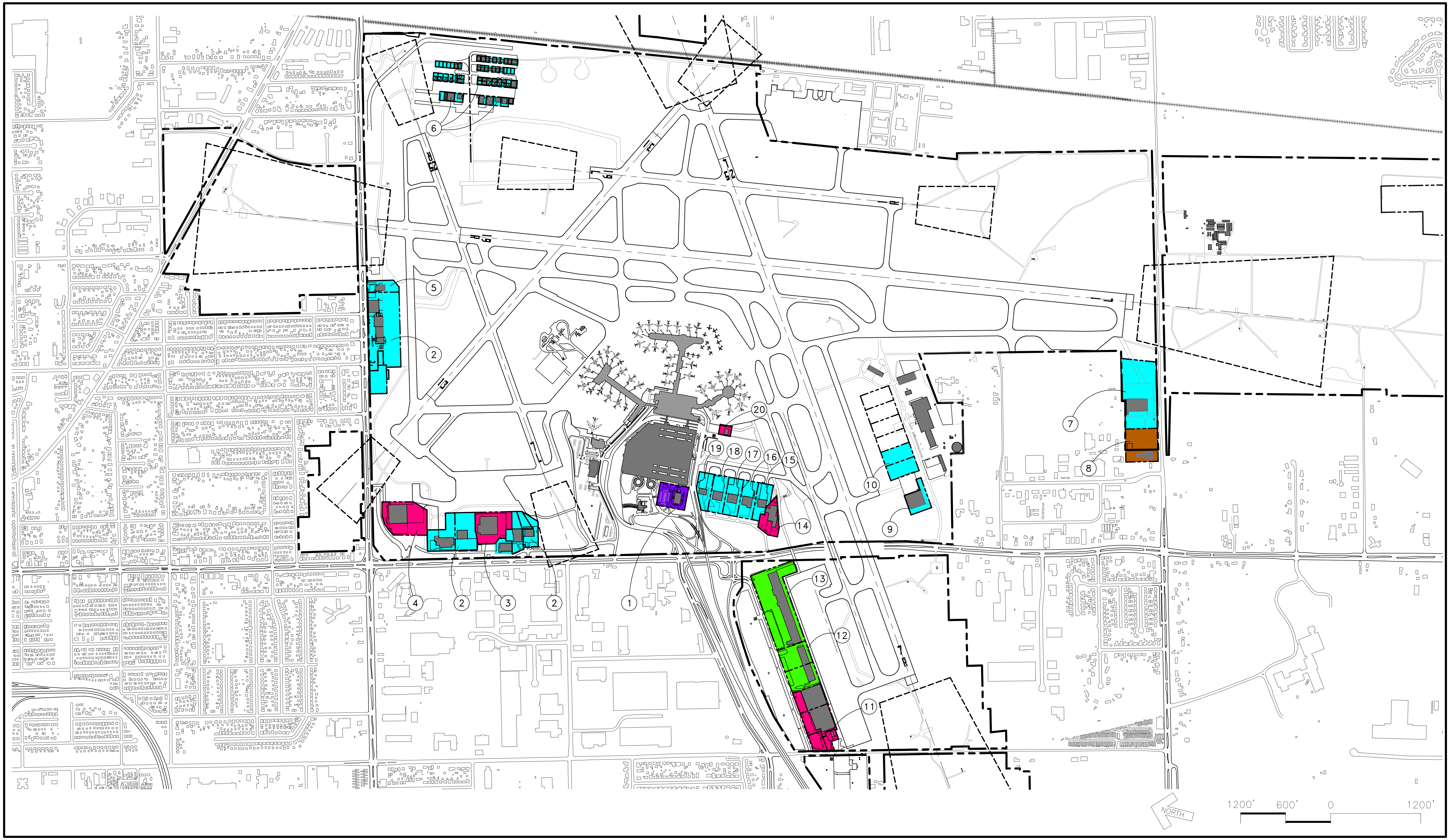
PB Americas, Inc.



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

EXISTING AIRPORT LEASE AREAS

EXHIBIT 2.3–2

Milwaukee\Exhibits\prop_lease.dwg 8/26/02

PB AVIATION, INC.

Land Lease Exhibit No.	Lessee	Ground Lease Type	Land Area	Commencement date	Termination date	Remarks
1	FAA Air Traffic Control Tower	Control Tower	0.42 acres	5/1/1984	9/30/2024	Renewable annually
2	Signature Flight Support	General Aviation	21.95 acres	6/1/1998	5/31/2023	Includes hangars, GA terminal, and fueling parcel
3	Air Wisconsin	Aircraft Maintenance	0.42 acres	4/1/2002	3/31/1934	
4	Astral Aviation	Aircraft Maintenance	5.54 acres	4/1/2002	3/31/1934	
5	Northwestern Mutual Life	General Aviation	1.47 acres	6/1/1983	5/31/2003	Option to renew for four 5-year terms
6	Various Tenants-Small Hangar Plots	General Aviation	6.74 acres	Varies	Varies	Leases continue through 2006
7	Miller Aviation Company	General Aviation	9.53 acres	9/1/1992	8/31/2002	
8	MATC (District 9)	Training/Education	4.34 acres	11/1/1972	10/31/2002	Option to renew for one additional 10-year term
9	Cessna Aircraft Company	General Aviation	2.05 acres	9/11/1989	10/17/2000	Automatic renewal every 5 years through 2025
10	Johnson Controls, Inc.	General Aviation	3.67 acres	2/22/2001	2/21/2006	Option to renew for four 5-year terms
11	Midwest Express Airlines	Aircraft Maintenance	7.55 acres	4/1/1988	3/31/2003	Option to renew for 11 5-year terms
12	Various Tenants-Air Cargo Building	Air Cargo	5.45 acres	Varies	10/31/2008	
13	ADS/Aero Milwaukee	Air Cargo	10.38 acres	11/1/1989	10/31/2009	Third party cargo building
14	U.S. Postal Service	Cargo	2.17 acres	11/1/1985	10/31/2005	Option to renew for two 5-year terms
15	Scott Aviation	General Aviation	1.94 acres	4/1/1997	3/31/2007	
16	Allen Bradley	General Aviation	2.3 acres	6/15/1992	6/14/2002	
17	Harley Davidson and Volare Partners	General Aviation	2.3 acres	4/1/1996	3/31/2006	
18	Scott Aviation	General Aviation	2.3 acres	4/1/1997	3/31/2007	
19	Luetzow Aviation	General Aviation	1.94 acres	10/1/1995	9/30/2005	
20	Northwest Airlines	GSE Maintenance	0.49 acres	10/1/2000	9/30/2020	

Source: GMIA records

2.3.1 Airfield

The Airport’s airside facilities are those dedicated to the movement of aircraft and include runways, taxiways, and aprons. The following sections describe the various elements of the airfield and specifics regarding size and location.

2.3.1.1 Runways

Table 2.3-1 summarizes key data regarding GMIA’s runway system. The Airport currently has five runways. There are two sets of parallel runways: runways 7L/25R and 7R/25L which have a separation of 3,680 feet and runways 1L/19R and 1R/19L which have a separation of 1000 feet. Runway 13/31, a crosswind runway makes up the remainder of the runway system. Runway 1L/19R is 9,690 feet long, runway 1R/19L is 4,183 feet, runway 7L/25R is 4,800 feet, runway 7R/25L is 8,012 feet and runway 13/31 has a length of 5,868 feet. Runway 1L/19R has a runway width of 200 feet while runway 7L/25R has a runway width of 100 feet. All other runways have a runway width of 150 feet.

Runway 7L/25R is restricted to non-jet aircraft and to aircraft with wingspans less than 79 feet (FAA Airplane Design Group II). Runway 13/31 is closed to turbojet aircraft operations, although there are exceptions to this restriction when approved by the Airport. Additionally, turbojet departures from runway 1R are prohibited.

Exhibit 2.3-4 depicts the most recent 10-year annual wind summary for the Airport. The Airport’s existing runway configuration provides 99.99 percent coverage in all weather conditions. In Instrument Meteorological Conditions (IMC), the existing runway system provides 100.0 percent coverage. This wind information provides a basis for analyzing future runway orientations in conjunction with future runway utilizations and airfield system development needs.

2.3.1.2 Taxiways

There are approximately 41,000 linear feet of existing taxiways. Runways 7R/25L and 1L/19R have parallel taxiways while the other runways are linked by connector taxiways. An apron edge taxilane is designated around the terminal area. Additionally, several taxiway restrictions are in place that limit aircraft use by weight.

The Airport has an approved Surface Movement Guidance and Control System (SMGCS) Plan in place that outlines procedures for aircraft and vehicular operations during low visibility conditions. The SMGCS Plan prescribes airfield lighting and marking requirements and taxi routes for low visibility operations.

TABLE 2.3-1

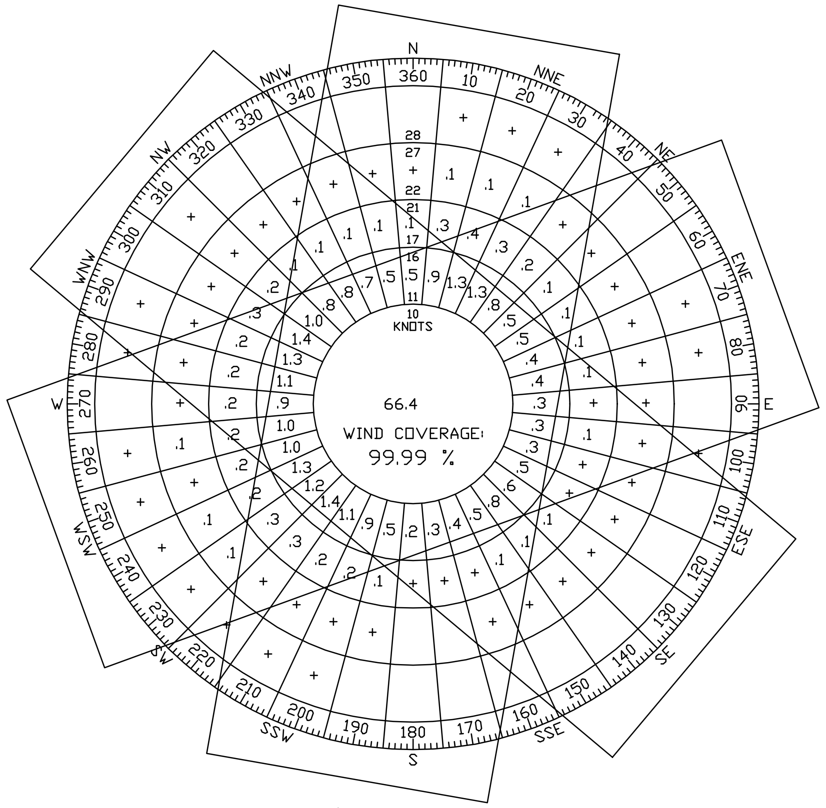
General Mitchell International Airport

EXISTING RUNWAY DATA

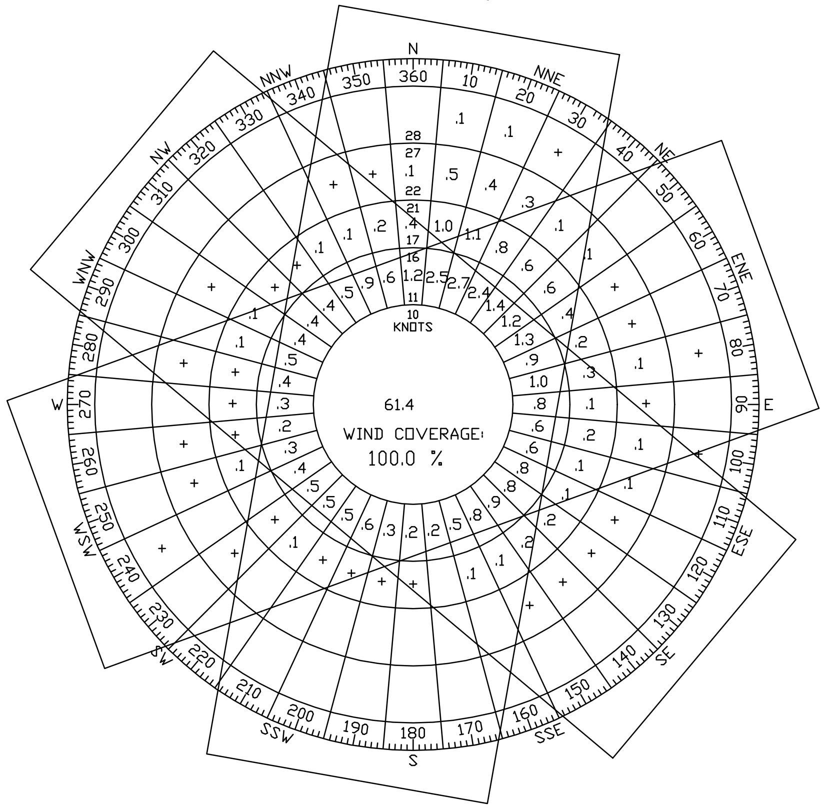
Item	Runway 01L	Runway 19R	Runway 01R	Runway 19L	Runway 07L	Runway 25R	Runway 07R	Runway 25L	Runway 13	Runway 31
Runway Length	9,690 ft.		4,183 ft.		4,800 ft.		8,012 ft.		5,868ft.	
Runway Width	200 ft.		150 ft.		100 ft.		150 ft.		150 ft.	
Obstruction Clearance Slope	50:1	34:1	20:1	20:1	20:1	20:1	50:1	34:1	20:1	20:1
Effective Gradient (%)	0.35%		0.19%		0.03%		0.67%		0.06%	
Runway End Elevation (MSL)	703.6	672.7	677.3	673.9	671.9	674.4	723.1	670.4	671.3	669
True Bearing	N 7° 00’ 00”	N 187° 00’ 00”	N 7° 00’ 00”	N 187° 00’ 00”	N 72° 00’ 00”	N 252° 00’ 00”	N 72° 00’ 00”	N 252° 00’ 00”	N132° 00’ 00”	N 312° 00’ 00”
Runway End Coordinates	N 42° 55’ 52.73” W 87° 53’ 51.02”	N 42° 57’ 27.69” W 87° 53’ 34.77”	N 42° 56’ 21.75” W 87° 53’ 32.50”	N 42° 57’ 02.73” W 87° 53’ 25.47”	N 42° 57’ 09.86” W 87° 54’ 19.15”	N 42° 57’ 24.74” W 87° 53’ 17.59”	N 42° 56’ 22.34” W 87° 54’ 57.03”	N 42° 56’ 47.25” W 87° 53’ 14.81”	N 42° 57’ 29.28” W 87° 54’ 12.29”	N 42° 56’ 50.31” W 87° 53’ 13.89”
Runway Lighting	HIRL, CL, TDZ	HIRL, CL	MIRL	MIRL	MIRL	MIRL	HIRL	HIRL	MIRL	MIRL
Runway Marking	Precision Instrument		Non-Precision Instrument		Basic (BSC)		Precision Instrument		Non-Precision Instrument	
Approach Category (FAR Part 77)	PIR	PIR	C	C	A(V)	A(V)	PIR	C	B(V)	B(V)
Runway Surface	Asphalt-Concrete (grooved)		Concrete		Asphalt		Asphalt-Concrete (grooved)		Concrete	
Pavement Strength (lbs.)										
Single	100,000		85,000		30,000		100,000		80,000	
Dual	185,000		115,000		35,000		185,000		110,000	
Dual Tandem	350,000		180,000		55,000		350,000		170,000	
NAVAIDS	GS/IM/LOC/LOM/ MM/ALS/PAPI	LOC/GS/LOM/MM /ALS/PAPI			VASI	PAPI	DME/GS/LOC/LO M/MM/ALS/ PAPI	LOC/PAPI	VASI	VASI
Approach Lighting	ALSF2	MALSR					SSALR			

Sources: FAA 5010 Forms
GMIA Records

All–Weather Wind Rose



IFR Wind Rose



Source : NOAA, National Weather Service, Mlwaukee, Wi.
Observation Period : January 1992 – December 2001

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

ALL–WEATHER AND IFR WIND ROSE

EXHIBIT 2.3–4

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PB AVIATION, INC.

As operational needs and technologies evolve, the SMGCS Plan is updated and resubmitted to the FAA for approval.

2.3.1.3 *Aprons*

The Airport's passenger terminal apron area consists of approximately 65 acres of concrete. Other apron areas include the seven-acre FBO apron, the 16-acre Wisconsin ANG apron, 38-acre Air Force Reserve apron, and the 22-acre apron serving the Midwest Express maintenance center and the air cargo complex.

2.3.1.4 *Lighting and NAVAIDs*

Lighting and NAVAIDs for each of the five runway ends are also listed on Table 2.3-1. Runways 1L/19R and 7R/25L have high intensity runway lighting (HIRL), while runways 1R/19L, 7L/25R and 13/31 carry medium intensity runway lightings (MIRL). Runway 1L/19R is equipped with center line lighting (CL) but only runway 1L has touch down zone lighting (TDZ).

Instrument Landing Systems (ILS) are in place for runways 1L, 19R, and 7R. The ILS equipment consists of glide slope transmitters (GS), distance measuring equipment (DME) (on 7R/25L only), localizers (LOC), precision approach path indicators (PAPI), approach lighting systems (ALS), location outer marker (LOM), inner markers (IM) and middle markers (MM). Runways 1L and 7R have published NDB/GPS approaches in addition to the ILS. Runway 25L has a nonprecision localizer approach.

2.3.2 *Airspace*

There are three major components of the airspace system which encompasses the Airport: enroute, terminal, and local airport control. Each component has a specific function and is supported in its role by a network of air traffic control facilities and NAVAIDs.

2.3.2.1 *Enroute Control*

Air traffic control for aircraft enroute to the Milwaukee area is the responsibility of the Chicago Air Route Traffic Control Center (ARTCC). Aircraft flying through the region or to an airport in the area typically follow designated routes known as victor airways, or jet routes. These airways are delineated on the ground by a system of radio equipment called VORs (VHF Omni-Directional Range equipment).

2.3.2.2 *Terminal Approach Control Facility*

The FAA Milwaukee Approach Control Facility is responsible for the control of arrivals, departures, and overflights operating 13,000 feet and below and within a 40-mile radius of GMIA. Located at the Airport, this approach facility is also responsible for providing guidance to aircraft overflying the area.

2.3.2.3 *Class C Airspace*

As shown on **Exhibit 2.3-5,** Class C airspace for GMIA includes the airspace from the surface to 4,700 feet above the Airport's elevation. The airspace consists of a vertical cylindrical surface area with a five nautical miles radius, and an outer area with a ten nautical mile radius that extends from 1,900 feet to 4,700 feet above the Airport's elevation on the east and from 2,200 feet to 4,700 feet on the west. Two-way radio communication must be established with the Milwaukee ATCT prior to entry and thereafter maintained while in Class C airspace. Unless otherwise authorized or required by ATCT, no person may operate an aircraft at or below 4,700 feet above the Airport's elevation within four nautical miles of a Class C surface area, or at an airspeed of more that 200 knots.

2.3.2.4 *Air Traffic Control Tower*

The FAA Milwaukee air traffic control tower (ATCT) directs all traffic at the Airport and in the immediate airspace, up to approximately five miles from the tower. The tower is responsible for issuing clearances to aircraft landing or departing the Airport. Timmerman Field also has an ATCT. The tower at Timmerman operates between 0700 and 2100 local time.

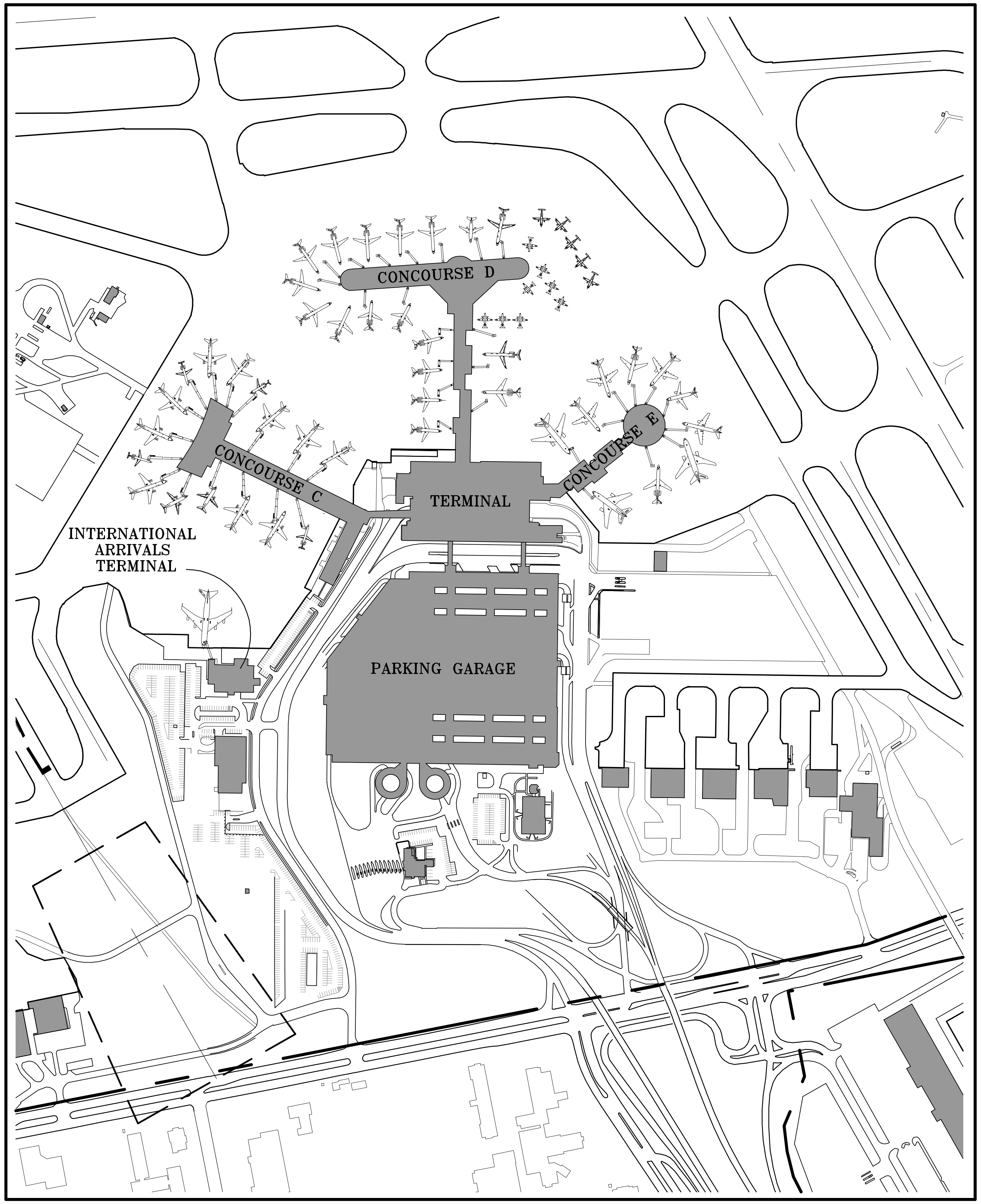
2.3.3 Passenger Terminal Facilities

The passenger terminal consists of ground level ticketing and baggage claim buildings served by separate curbfronts and a second level concession mall that connects to three concourses (C, D, and E). The terminal and concourses consist of approximately 777,000 square feet (sf) and support 42 aircraft gates. The International Arrivals Terminal, which is in the terminal area, but separate from the main terminal building, includes one gate and contains approximately 5,000 sf. The passenger terminal area is depicted in **Exhibit 2.3-6.** The list of airlines and the gate assignments are shown on **Table 2.3-2.**

GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

AIRSPACE

EXHIBIT 2.3-5



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

EXISTING TERMINAL LAYOUT

EXHIBIT
2.3-6

Milwaukee\Exhibits\term_area.dwg 03/03/03

PB AVIATION, INC.

TABLE 2.3-2 *General Mitchell International Airport* *AIRLINE GATE ASSIGNMENTS*		
Signatory Airline	**Gate(s)**	**Non-Signatory Sublease**
Air Canada	D33	
AirTran	E60	
America West	C24, C26	
American Eagle	C20, C21, C22, C23	
Continental Express	E62, E63	
Delta/Comair	C25, C27	
Funjet Vacations	E61	
Midwest Express	D30,D34, D36-49	
Northwest Airlines	E64-69	
Skyway	D52	ATA Connection
United Express	D31, D33, D35	
US Airways/ US Airways Express	D51, D53	

Source: Compiled by PB Aviation, Inc

2.3.4 Parking Facilities

The Airport provides vehicle parking for passengers, visitors, and employees. **Table 2.3-3** summarizes the existing parking facilities at the Airport.

Parking in the terminal area consists of the six-level parking garage and a surface parking lot. The parking garage is linked to the terminal via two enclosed, overhead walkways. Remote parking lots are located across Howell Avenue from the terminal adjacent to the Midwest Express maintenance complex. Shuttle bus service is provided between these lots and the terminal.

TABLE 2.3-3 ***General Mitchell International Airport*** ***AIRPORT PARKING SUMMARY***		
Category	**Type**	**Number of Spaces**
Public Parking		
Hourly	Garage	723
Daily-Garage	Garage	5,202
Daily-Surface	Surface	690
Remote	Surface	3,016

Source: Airport Records

Rental car facilities are located on the lowest level of the parking garage. Spaces are designated for rental car use with queuing lanes for drop-off and booths for the seven rental car agencies. Rental car maintenance and storage are located off-Airport, on privately owned property.

A taxi queuing area is provided adjacent to the surface parking lot in the terminal area. Individual taxis are released to the terminal curbfront for passenger pickup, one at a time.

2.3.5 Air Cargo Facilities

Major air cargo facilities at the Airport are concentrated in the area adjacent to runway 7R/25L between Howell Avenue and 6th Street. The two multi-tenant air cargo buildings are 38,000 sf and 126,000 sf. In addition to integrated cargo carriers, such as FedEx and UPS, several passenger airlines and freight forwarders lease space in the cargo buildings. Adjacent to the cargo buildings are approximately 63,300 square yards of aircraft parking apron.

The United States Postal Service (USPS) operates a 24-hour airport facility next to the corporate hangars along Howell Avenue. This location provides public access from Howell Avenue as well as secure tug access to both the air cargo complex and the terminal. Additionally, a small air cargo operator occupies two hangars along Howell Avenue north of runway 7L/25R.

2.3.6 Airport Access

Ground access to the Airport is provided by a combination of interstate highway and surface roads. The Airport Spur (STH 119) connects I-94 and the Airport terminal road system. The only exit along the Airport Spur Freeway is to Howell Avenue (STH 38). Howell Avenue is a six-lane artery that runs north/south through the Airport separating the terminal and most airfield facilities from the cargo and aircraft maintenance complex. A tunnel is in place for Howell Avenue to pass under runway 7R/25L.

2.3.7 General Aviation

Exhibit 2.3-1 depicts the General Aviation (GA) facilities that are located in several areas around the Airport. The Fixed Base Operator, Signature Flight Support, has operations concentrated north of the airfield, with public access from Layton Avenue. This area includes a GA terminal, itinerant ramp, and aircraft maintenance and storage hangars. A GA hangar complex is located in the northeast quadrant of the Airport. This area includes 40 leased private hangars and T-hangars.

Corporate hangars are located adjacent to the terminal complex along Howell Avenue, south of runway 7R/25L near the ARFF station, and south of the Air Force Reserves on College Avenue.

2.3.8 Military Facilities

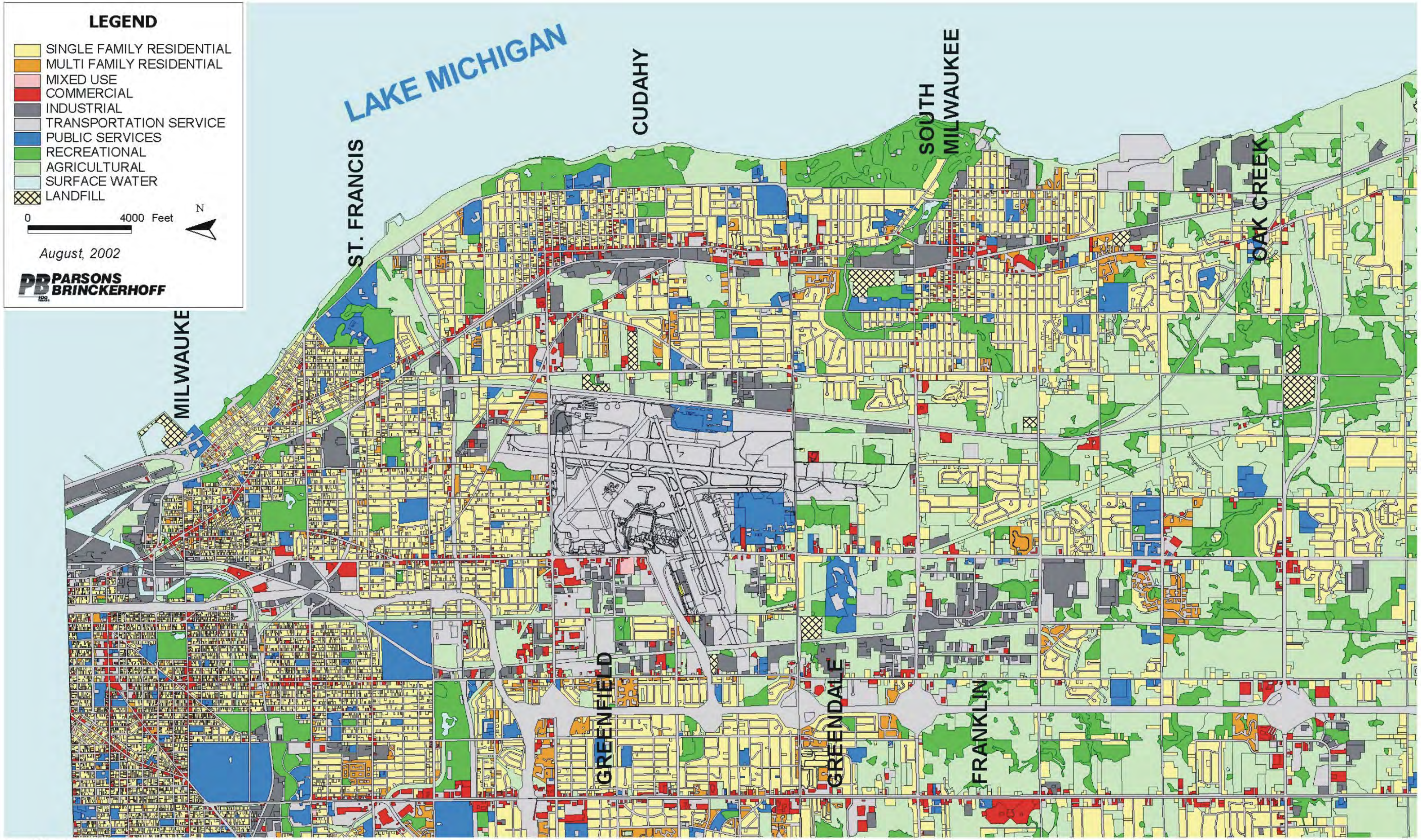
Two military units are located at General Mitchell International: the 128th Air Refueling Wing of the Wisconsin Air National Guard (ANG) and the 440th Airlift Wing of the Air Force Reserves. The ANG occupies approximately 58 acres on the east side of the airfield and operates KC-135 aircraft. The 440th Airlift Wing operates C-130 Hercules aircraft. It should be noted that the 102-acre Air Force Reserve base, located in the southwest quadrant of the airfield, is owned by the Department of Defense.

2.4 Airport Environs

Existing land uses, zoning, and the relationship of the Airport with the surrounding communities define the environs in which the Airport is located. Planned land uses are also considered for compatibility with future Airport development, where appropriate. **Exhibit 2.4-1** depicts the land uses surrounding the Airport. This information was provided by the Southeast Wisconsin Regional Planning Commission (SEWRPC).

Existing land uses surrounding the Milwaukee General Mitchell International Airport is indicated as follows:

- *Single family residential* – includes all types of detached residential units
- *Multi family residential* – includes all types of attached residential units such as duplexes, townhouses, and apartments
- *Commercial* – includes retail, business and office uses
- *Mixed Use* – includes combinations of residential and commercial uses
- *Industrial* – includes manufacturing and warehousing
- *Transportation* – includes the Airport, road right-of-way, and railroads
- *Public* – includes public institutions, and city or county owned properties used for governmental purposes
- *Recreational* – includes publicly and privately owned properties used for parks, golf courses, and conservation areas
- *Agriculture* – land used for raising crops and/or livestock
- *Surface water* – lakes and ponds



Land Use Data Source: Southeastern Wisconsin Regional Planning Commission

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

EXISTING LAND USE

EXHIBIT 2.4-1

Residential uses (both single and multi family) are the predominant land uses north of the Airport. The residential land use pattern forms a dense urban fabric which encompasses the southern portion of the City of Milwaukee and the cities of St. Francis, Cudahy and South Milwaukee.

Commercial uses are located along the heavily utilized transportation networks of the region, with some clustering in dense residential districts. Examples of this pattern are evident in the neighborhoods of South Milwaukee and Cudahy.

The mixed use category is used sparingly in SEWRPC's mapping of land uses and is considered a mixed residential-commercial use.

Industrial uses are primarily located in close proximately to the major interstates and primary access roads. Prominent industrial areas near the Airport include ACE Industrial Park and Mitchell International Business Park in Cudahy.

Public land uses, which includes government owned properties used for government and public activities are spread throughout the region. Large areas of public use are located both north and south of the Airport and include the two military installations at the Airport as well as the Milwaukee Area Technical College campus southwest of the Airport.

Recreational uses are distributed throughout the neighborhoods surrounding the Airport. Regional recreational facilities extend along the Lakefront portions of St. Francis, Cudahy and South Milwaukee. South of the Airport is the Michael F. Cudahy Nature Preserve, a 42-acre park with nature and hiking trails.

With the exception of Lake Michigan, other bodies of surface water around the Airport area are relatively small. There are a few lakes dotted in and around the cities and agricultural spaces.

2.5 Socioeconomic Setting

Socioeconomic data relevant to the Airport were collected for the Master Plan Update. The data present three Metropolitan Statistical Areas (MSAs) defined by the Office of Management and Budget that together comprise the Greater Milwaukee area. The Greater Milwaukee Area includes the metropolitan statistical areas of Milwaukee-Waukesha, Kenosha and Racine. Particular emphasis was placed on population, employment, income, and housing. These factors indicate a solid economic base for continued air transportation demand.

2.5.1 Population

Historical trends and forecasts for population of Greater Milwaukee Area are represented in **Table 2.5-1.** The decade between 1980 and 1990 showed 0.2 percent population growth for the entire region. From 1990 to 2000, population grew at a compounded growth rate of 0.6 percent. Compounded annual growth rates from 1990 to 2000 were 0.5 percent, 1.2 percent and 0.8 percent for the Milwaukee-Waukesha, Kenosha and Racine MSAs, respectively. This compares to growth rates of 0.9 percent and 1.2 percent for the state of Wisconsin and the nation, respectively.

The population for the entire area is expected to grow at an annual compounded growth rate of 0.4 percent from 1999 to 2005 and 0.4 percent from 2005 to 2010. As shown in the table, these growth rates hold steady through 2010 while the growth rate for the State of Wisconsin decreases by 2010.

2.5.2 Employment

The historical and projected civilian labor force for the region is represented in **Table 2.5-2.** As shown, employment grew at an annual compounded growth rate of 1.0 percent for the Milwaukee-Waukesha MSA, 0.2 percent for Racine, 2.1 percent for Kenosha, and 1.0 percent for the region from 1990 through 2000. These growth rates compare to 1.4 percent and 1.3 percent for the state of Wisconsin and the nation, respectively.

TABLE 2.5-1

General Mitchell International Airport

HISTORICAL AND PROJECTED POPULATION

Area	Historical				Projected				Projected [1]	
	1980	1990	1999	2000	2005	2010	1980-1990	1990-2000	1999-2005	1999-2010
Milwaukee County	964,988	959,275	1,006,867	940,164	1,030,851	1,055,561	-0.1%	-0.2%	0.4%	0.4%
Ozaukee County	66,981	72,831	88,331	82,317	85,988	87,214	0.8%	1.2%	-0.4%	-0.1%
Washington County	84,848	95,328	117,712	117,493	122,957	126,455	1.2%	2.1%	0.7%	0.7%
Waukesha County	280,326	304,715	354,295	360,767	364,584	370,678	0.8%	1.7%	0.5%	0.4%
Milwaukee-Waukesha MSA	1,397,143	1,432,149	1,567,205	1,500,741	1,604,380	1,639,908	0.2%	0.5%	0.4%	0.4%
Kenosha MSA	123,137	128,181	144,834	144,834	149,247	152,807	0.4%	1.2%	0.5%	0.5%
Racine MSA	173,132	175,034	185,000	188,831	188,004	190,901	0.1%	0.8%	0.3%	0.3%
GREATER MILWAUKEE	1,693,412	1,735,364	1,897,039	1,834,406	1,941,631	1,983,616	0.2%	0.6%	0.4%	0.4%
State of Wisconsin	4,705,767	4,891,769	5,287,825	5,363,675	- 5,479,000	5,512,313	0.4%	0.9%	0.6%	0.4%
United States	227,224,681	249,464,396	281,421,906	281,421,906	285,981,000	297,716,000	0.9%	1.2%	0.3%	0.5%

[1] Population projections for 2005 and 2010 were based on 1999 population data. As a result, comparisons could not be made between 2000 and 2010.

Sources: U.S. Bureau of Census (United States). Compiled by PB Aviation, Inc.

TABLE 2.5-2

General Mitchell International Airport

CIVILIAN LABOR FORCE AND UNEMPLOYMENT RATES

Year	Civilian Labor Force					
	Milwaukee-Waukesha MSA	Racine MSA	Kenosha MSA	Greater Milwaukee	State of Wisconsin	US (000s)
1991	734,000	89,200	67,900	891,100	2,595,300	126,352
1992	754,300	91,000	70,800	916,100	2,675,300	128,099
1993	761,600	90,800	71,500	923,900	2,727,500	129,185
1994	776,300	91,800	74,000	942,100	2,798,600	131,047
1995	783,900	92,300	75,900	952,100	2,843,900	132,315
1996	805,500	93,900	77,200	976,600	2,927,300	133,945
1997	810,500	93,800	79,000	983,300	2,948,700	136,290
1998	832,800	90,900	84,100	1,007,800	2,952,000	137,665
1999	832,800	90,900	84,100	1,007,800	2,889,800	139,369
2000	802,600	90,900	81,700	975,200	2,934,900	141,500
Annual Compounded Growth						
1990 - 2000	1.0%	0.2%	2.1%	1.0%	1.4%	1.3%
1995 - 2000	-0.1%	-0.6%	1.1%	0.0%	0.1%	1.1%

Year	Unemployment Rates					
	Milwaukee-Waukesha MSA	Racine MSA	Kenosha MSA	Greater Milwaukee	State of Wisconsin	US (000s)
1990	5.0%	6.7%	6.1%	5.3%	5.5%	5.6%
1991	4.8%	7.1%	6.1%	5.1%	5.2%	6.9%
1992	4.4%	6.1%	5.1%	4.6%	4.7%	7.5%
1993	4.6%	5.8%	5.1%	4.8%	4.7%	6.9%
1994	3.5%	4.4%	3.8%	3.6%	3.7%	6.1%
1995	3.4%	4.2%	3.5%	3.5%	3.5%	5.6%
1996	3.6%	4.4%	3.6%	3.7%	3.7%	5.4%
1997	2.8%	4.1%	3.6%	3.0%	3.4%	4.9%
1998	2.8%	4.1%	3.6%	3.0%	3.0%	4.5%
1999	3.8%	4.7%	3.8%	3.9%	3.5%	4.2%

Sources: California Employment Development Department
U.S. Department of Labor, Bureau of Labor Statistics
Compiled by PB Aviation, Inc.

2.5.3 Unemployment

The unemployment rates for the region display a general annual reduction since 1990. The Greater Milwaukee region has a history of lower unemployment rates (except for 1993 and 1999) when compared to the State of Wisconsin and the nation. Within the MSAs, the Milwaukee-Waukesha MSA maintained the lowest unemployment rates through out the 1990s.

The Greater Milwaukee area has a diverse business base. **Table 2.5-3** indicates nonagricultural employment trends for the area and the nation for 1991 and 2001. The majority of people work in the Services sector followed by Trade, Manufacturing, Government, Financial/Insurance/Real Estate and Construction.

The Services and Trade sectors, having a compounded annual growth rate of 3.3 percent and 0.6 percent respectively, employ approximately 33 percent and 21 percent of the labor force, thereby being the two largest sectors in the region. These two sectors are followed by the Manufacturing sector, Government, Finance/Insurance/Real Estate, Transportation/Utilities and Construction.

Comparing the Greater Milwaukee Nonagricultural Employment with that of the nation identifies those sectors whose percent of employment is greater. These industries are considered the primary producing sectors in the region.

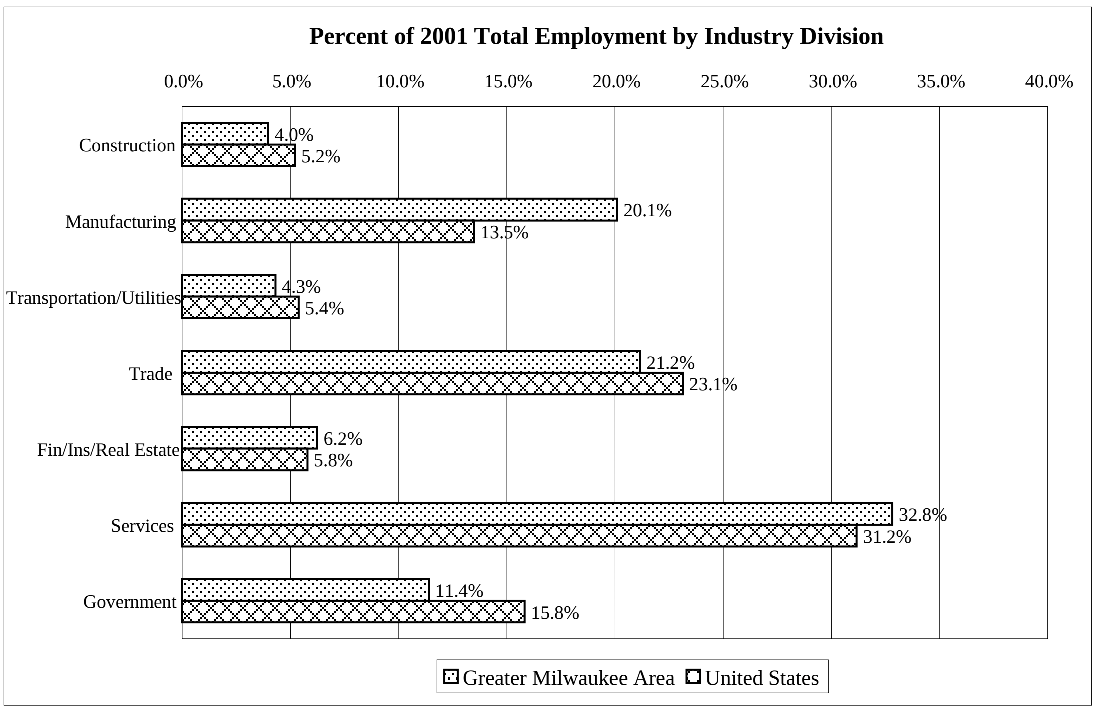
The major employers for the Milwaukee area are listed in **Table 2.5-4**. The table lists all of the companies with 1,000 employees or more. The list of employers establishes the dominance of the Service sector in the region. Noted are major employers such as Wal-Mart, U.S. Bank, Daimler Chrysler Corp., United Parcel Service, Midwest Express Airlines and several hospitals.

TABLE 2.5-3

General Mitchell International Airport

NONAGRICULTURAL EMPLOYMENT TRENDS BY MAJOR INDUSTRY DIVISIONS

	Greater Milwaukee Nonagricultural Employment			United States Nonagricultural Employment (000)		
Industry	1991	2001	Annual Compounded Growth	1991	2001	Annual Compounded Growth
Construction [1]	63,400	40,000	-4.5%	5,834	6,872	1.7%
Manufacturing	202,100	202,100	0.0%	19,075	17,755	-0.7%
Transportation/Utilities	40,600	43,300	0.6%	5,776	7,079	2.1%
Trade	199,900	212,800	0.6%	25,774	30,457	1.7%
Fin/Ins/Real Estate	55,100	62,800	1.3%	6,709	7,624	1.3%
Services	237,900	330,000	3.3%	27,930	41,044	3.9%
Government	101,700	114,600	1.2%	18,306	20,825	1.3%
Total	900,700	1,005,600	1.1%	109,404	131,656	1.9%



[1] Includes mining employment.

Sources:

U.S. Department of Labor, Bureau of Labor Statistics

Compiled by PB Aviation, Inc.

TABLE 2.5-4
General Mitchell International Airport

MAJOR EMPLOYERS

Employer	Product/Service
Allen-Bradley Co. LLC	Relay and Industrial Controls
Aurora Health Care Metro, Inc.	General Medical and Surgical Hospitals
Briggs and Stratton Corp.	Internal Combustion Engines
Case Corporation	Farm and Construction Equipment
Cooper Power Systems	Switchgears and Transformers
Daimler Chrysler Corp.	Automotive Manufacturer
Emerson Electric Co.	Household Appliances
U.S. Bank	National Commercial Bank
Fleming Companies	Grocery Stores
G.E. Medical Systems	X-Ray & Irradiation Equipment
Marks Five Corps	Help Supply Services
Marshall & Ilsley Corp.	Bank Holding Companies
Medical College of Wisconsin Inc.	Health Care/Education
Northwestern Mutual Life	Life Insurance
Parisian Inc.	Department Stores
Quad/Graphics	Commercial Printing
S.C. Johnson and Son Inc.	Chemical and Allied Products-Consumer
St. Joseph's Hospital	General Medical and Surgical Hospitals
The Gap Inc.	Family Clothing Store
Tower Automotive Products Co. Inc.	Motor Vehicle Parts and Accessories
United Parcel Service	Air Courier Service
Wal-Mart Associates	Department Stores
Waukesha Memorial Hospital Inc.	General Medical and Surgical Hospitals
Midwest Express Airlines	Air Transportation

Source: Wisconsin Department of Workforce Development
Compiled by PB Aviation, Inc.

2.5.4 Income

The Greater Milwaukee area has an average cost of living as compared to other metropolitan areas in the state of Wisconsin and the United States. A survey of cost of living conducted by Dowden & Co., a respected research and recruiting firm, is presented in **Table 2.5-5**. As noted in the table, the Milwaukee area has a cost of living of 104.5, compared to the national average of 100 for areas with a population greater than 2 million.

TABLE 2.5-5 General Mitchell International Airport SURVEY OF COST OF LIVING		
Area	State	Cost of Living
Boston	MA	127.4
Chicago	IL	113.9
Detroit	MI	112.7
Seattle	WA	112.6
Lansing	MI	104.9
Madison	WI	104.7
Milwaukee	WI	104.5
Wausau	WI	103.8
Green Bay	WI	99.9
Champaign/Urbana	IL	98.3

Source: Dowden & Co.

2.5.5 Per Capita Effective Buying Income

The effective buying income is the total income a household receives minus personal and real estate taxes. The Per Capita Effective Buying Income is the estimated average amount of personal disposable income per person received during a calendar year for all persons residing in a political jurisdiction. **Table 2.5-6** shows a yearly comparison of effective buying income per capita for the Greater Milwaukee area, the state of Wisconsin and the nation. Evident is a higher disposable income for the Greater Milwaukee area compared to the state and the nation. Further, when detailed into income categories, the air trade area has a higher percentage of disposable income.

* * * * *

The information presented in this chapter serves as a baseline for the projection of aviation activity and the determination of facility requirements presented in the following two chapters. As stated earlier, the inventory is a snapshot as the Airport is continually undertaking improvements.

TABLE 2.5-6

General Mitchell International Airport

PER CAPITA EFFECTIVE BUYING INCOME

Year	Air Trade Area	State of Wisconsin	United States
Historical[1]			
1992	$16,062	$14,690	$15,255
1993	$17,109	$15,645	$16,064
1994	$18,114	$16,532	$16,918
1995	$15,627	$14,435	$14,965
1996	$16,299	$15,058	$15,555
1997	$16,965	$15,708	$16,281
1998	$17,435	$16,189	$16,895
1999	$18,227	$16,848	$17,691
2000	$18,913	$17,490	$18,426
Projected			
2005	$22,514	$20,894	$21,977
	Annual Compounded Growth		
1990 - 1994	-0.7%	-0.4%	-0.5%
1995 - 1998	3.7%	3.6%	4.2%
1998 - 2003	3.5%	3.6%	3.6%
	Percentage of Households (2000 EBI)		
Income Category	Air Trade Area	State of Wisconsin	United States
Less than $20,000	0.0%	0.0%	24.4%
$20,000 - $34,999	26.1%	28.4%	20.7%
$35,000 - $49,999	23.2%	24.2%	16.8%
$50,000 or more	50.7%	47.4%	38.2%
Total	100.0%	100.0%	100.0%

[1] Data beginning in 1995 are not directly comparable to data in previous years due to a change in certain components used in the calculations.

Sources: *Sales & Marketing Management,* Survey of Buying Power
Compiled by PB Aviation, Inc.

3.0

Activity Projections

3.0 ACTIVITY PROJECTIONS

This chapter presents projections of passenger and aircraft activity used as the basis for the General Mitchell International Airport Master Plan Update. These projections are essential for:

- *Determining the future role of the Airport in both the type of aircraft to be accommodated and the type of aviation demand to be served;*
- *Evaluating the capability of existing Airport facilities and their ability to absorb projected aviation demand; and*
- *Estimating the extent to which airside and landside facilities should be provided at the Airport in future years.*

The development of the projections is discussed in the following sequence:

- *Air Transportation Technology and Trends*
- *Annual Passenger Projections*
- *Annual Cargo Poundage Projections*
- *Annual Operations and Fleet Mix Projections*
- *Peak Hour Projections*

The discussion of air transportation technology and trends describes the aviation environment in which the Airport will operate over the next twenty years. It is presented first because it is against this background that the projections were developed.

3.1 Air Transportation Technology and Trends

In planning for future growth at the Airport it is important to understand the context within which the potential increases in air traffic will occur. Trends in aircraft, airline and airport technology routinely affect how airports deliver services. Perhaps the most significant example of how changes in the environment can impact the delivery of airport services is the evolution of security issues since the institution of security screening in the 1970s. Passengers suddenly had to flow through new single points of processing to reach the departure gate after arriving at the airport. Security measures after the crash of a TWA flight off the coast of New York expanded to include the requirement for one-on-one identity checking and eliminated the issuance of advanced boarding passes, necessitating further changes in airline and airport procedures. Since September 2001, security measures have become even more stringent, significantly changing how passengers travel by air.

This section discusses some of the changes on the horizon for the next twenty years that may have an impact on how passengers travel through airports and how airlines process these travelers. The section is organized as follows:

- *Future Patterns of Air Services*
- *Nation-wide Projections of Passenger and Cargo Growth*
- *Future Growth of General Aviation*
- *Technological Trends in Aircraft Development*
- *Future Air Traffic Control Technology*
- *Pertinent Airport Facility Trends*

3.1.1 Future Patterns of Air Services

The profitability of the 1990s in the aviation industry fostered the emergence of a new round of small carriers. These operators are larger than the regional carriers that have been acquired and/or allied with the major carriers, feeding hub systems from small spoke cities. These new carriers, such as AirTran, Spirit, JetBlue, Pan Am are, in some cases, reincarnations of previous carriers, and in some cases, brand new. They tend to operate with the low-fare, no-frills model, and they start out by concentrating on small parts of the country. The degree to which these carriers go head-to-head with major carriers varies, but each is attempting to carve out its own unique sphere. In many cases these carriers are serving smaller cities, carrying connecting traffic through their own mini-hubs or "focus cities." The advent of these new carriers is expanding service across the country and giving travelers a variety of options for fares, routings and carriers. In many cases these carriers are operating with newer aircraft and are appealing to masses of travelers seeking low fares. Several of these carriers have fared well in the recent nine-month period following September 2001. Their emergence is an indication that competition in the industry continues.

The industry is still suffering from the after-effects of the September 11 terrorist attacks. This, combined with a weak economy is depressing traffic, even in the face of low fares. Business travelers have started balking at high fares, and are either traveling at discounted fares, or not traveling at all. Major carriers are wrestling with how to restructure their fare systems to attract these lucrative customers while still achieving yields that will assure profitable operations. Meanwhile, those customers who have returned to the skies in the last few months have done so at low fares.

Regional carriers are continuing the transition to jet aircraft, making them an appealing product for the customer, as well as a cost-efficient business component for their major carrier partners/owners. This trend is very evident at an airport like GMIA. Several carriers at the Airport have transitioned almost completely to the regional jets. American Eagle and its fleet of regional jets has completely replaced American at the Airport. Continental Express provides service for Continental with regional jets. US Airways Express provides several frequencies with regional jets in complement to the major partner’s jet operations at the Airport. Delta has maintained its level of service in large jet aircraft and also provides service on its Comair and Atlantic Southeast partners.

American Trans Air has converted to regional service using Chicago Express on turboprop aircraft. Skyway (soon to become Midwest Connect) has begun transitioning to a regional jet fleet. It still operates primarily turboprop aircraft, but that will change in the next few years. However, there will always be small markets around Wisconsin and Michigan that will support service only on very small aircraft. Therefore, it is unlikely that the turboprop will disappear from scheduled service at GMIA during the forecast period. Whether it will be Midwest Connect providing the service, or another, smaller operator remains to be seen.

3.1.2 Nation-wide Projections of Passenger and Cargo Growth

Strong economic growth drove total domestic passenger growth in the United States by 3.4 percent annually 1990 through 2000. In 2001, passenger traffic declined 6.0 percent. The effects of terrorism and the slow economy will depress total domestic traffic growth in the U.S. until 2003, but it is expected to rebound, growing at 3.6 percent annually between 2001 and 2021. Regional carrier activity in the United States has grown at 8.3 percent annually from 1990 through 2000 while the major carriers grew at 2.9 percent per year. Over the 2001 through 2021 forecast period, regional traffic will grow at 5.0 percent per year, while major carrier enplanements will increase 3.4 percent per year. At GMIA, enplanements grew at 3.2 percent annually from 1990 through 2000, slightly below the 3.4 percent U.S. average. Over that time period, there has been a significant shift from service by major carriers to their regional partners at the Airport.

Domestic cargo on U.S. carriers, as measured by revenue ton miles, grew 5.1 percent per year from 1993 through 2000, and fell 10.1 percent in 2001. Domestic volume is expected to increase at 3.8 percent annually from 2001 through 2021. This lower growth expectation is driven somewhat by the increased security regulations governing the carriage of air cargo.

The year 2001 indicated that the aviation industry was beginning to see a turn-around in its strong financial performance, even before the disastrous happenings of September 11. Total traffic was down in the first quarter, and high-yielding business traffic was falling off. The U.S. and world economic activity slowed in 2001, and aviation suffered accordingly. The outlook is that a rebound will begin in 2003 or 2004.

3.1.3 Future Growth of General Aviation

General aviation has made an extraordinary recovery from its severely depressed state in the early 1990s. Substantial increases in liability costs due to incidents involving aging general aviation aircraft had virtually halted aircraft production. Following the passage of the General Aviation Revitalization Act in 1994, all measures of general aviation activity have increased. According to the FAA, shipments of general aviation aircraft increased from a low of 928 units in 1994 to 2,220 units in 1998, an average annual growth of over 24 percent.

Programs by all segments of the industry are aimed at continuing healthy growth in activity. Manufacturers such as Cessna, Raytheon, Mooney and Piper are introducing new models of general aviation aircraft. Boeing, Airbus, and Fairchild are all marketing business jets. The FAA is promoting safety in general aviation in a variety of areas. Industry and government groups are joining efforts to improve technology in safety, engine reliability and efficiency, dissemination of weather information and navigational improvements.

The concept of “fractional ownership” of business jet aircraft is also expanding that segment of general aviation activity. Fractional ownership allows a corporation or individual to own an interest in an aircraft in a time-share situation. None of the fractional owners is required to provide pilots, maintenance or scheduling of the aircraft. Each fractional owner is entitled to a portion of the aircraft’s time. This allows for use of a business jet without the need for a flight department in a corporation, and without the hassles of ownership for an individual. This concept could increase the use of corporate jets in the future. There is still some debate in the industry as to whether these operations should occur under Federal Aviation Regulation (FAR) Part 91, as they currently do, or under the more demanding FAR Part 135. Upgrading the regulatory classification to FAR Part 135 may dampen the growth of this activity.

Increases in fuel costs and the struggling economy caused a decline in aviation activity in the last two years. Restrictions after September 11 negatively impacted general aviation activity even further. From 1990 through 2000 general aviation activity in the United States grew at an annual rate of 2.4 percent. In 2001 there was a 6.4 percent decline in activity. Nationally, it is expected that general aviation operations will increase at an average annual rate of 1.5 percent 2001 through 2021. General aviation operations at GMIA declined fairly steadily over 1990 through 2001 period, trending downward at an average of 4.9 percent annually. General aviation operations at GMIA declined 13 percent in 2001.

3.1.4 Technological Trends in Aircraft Development

Among the most significant changes in recent years in aircraft development in commercial service in the United States is the emergence and growing role of regional jets. Coupled with partnerships between major and regional carriers the growing use of regional jets, has significantly restructured the route systems of both types of carriers. Regional jets allow longer-range capability, a higher degree of passenger comfort, and a perception of increased safety on the part of travelers relative to non-jet aircraft previously flown by commuters. The regional jet has freed up capacity for the majors, better rationalized fleet mix to market demand, and helped to increase load factors across the domestic system. According to Boeing's Current Market Outlook, the number of these jets in service is projected to grow almost 9 percent annually worldwide over the next twenty years. This is approximately twice the growth rate expected for all commercial passenger aircraft.

Over the forecast period, demand for large, long-range aircraft like the 747 is expected to decline as airlines choose to take advantage of the operational efficiencies offered by intermediate-sized, usually two-engine, newer aircraft. This aircraft type, such as the 757, 767 and Airbus 319/320 has the range to serve U.S. transcontinental markets and many international markets. In addition to the fuel efficiencies of only two engines, these aircraft require a cockpit crew of only two, further contributing to improved operating economics. Also, new versions of aircraft such as the 737 and A318, with seating in the 120-175 seat range, have provided major carriers with the option to economically offer high frequency, which has stimulated additional traffic in the past decade.

3.1.5 Future Air Traffic Control Technology

The FAA has initiated several major programs over the last several years aimed at near-, intermediate- and long-term solutions to increasing congestion and delays. Chief among these programs is the Free Flight Program. This program allows pilots and controllers to work together to manage air traffic more efficiently. It will allow pilots in the future to fly the most direct, cost-effective routes, reducing costs and delays. Some of the developments on-going in the FAA to support Free Flight are:

- *Enhanced Traffic Management System*. This system provides data on National Airspace System (NAS) facilities, airspace structures, airport differences and aircraft distances. It enables traffic management specialists to regulate the flow of air traffic to minimize delays and congestion while maximizing the use of the NAS.

- *Departure Spacing Program*. This program assists air traffic controllers in sequencing departure times for a runway, sequencing departures across departure coordinates, and coordinating arrivals and departures when a common runway is in use. It also provides departure predictions to the traffic management system for use in predicting resource demand.

- *Host Oceanic Computer System Replacement*. This enroute center automation system is the foundation of the FAA's Automated Air Traffic Control environment. It receives, processes, coordinates, distributes and tracks information on aircraft movements throughout the NAS.

- *Weather Assistance Radar Program*. This program is intended to provide next generation weather radar information to air traffic controllers.

In addition to these programs, the FAA is working with the commercial aviation industry on a regular basis to address issues such as delays during peak summer activity periods and during periods of severe weather in large areas of the country.

There has been talk in the industry over the last several years about the potential benefits of privatizing the operation of the nation's airspace. However, at this time there are no signs that indicate a move towards that direction.

3.1.6 Pertinent Airport Facility Trends

Airport facility requirements will be affected by many of the changes discussed above. Additionally, facility requirements at airports today are significantly affected by increasing security provisions, rapid growth in regional jet activity, and improved technologies.

New security provisions are revolutionizing the way which facility requirements are determined. Security requirements will affect all aspects of airport passenger and cargo handling and processing.

Increased service by regional carriers may require different types of ramp and connecting capabilities. As regional equipment evolves, and the desire by carriers to provide a "seamless" travel experience increases, ground-level boarding and unloading of passengers from the ramp become less desirable. The increasing predominance of airline alliances, which can be redefined frequently, may require increased flexibility in the location of carriers at an airport. When an alliance is formed, the involved carriers desire proximate, if not adjacent, ticketing/gating/baggage operations, club facilities, office space, etc. This will increase the need for flexibility in airport signage, assignment of space to carriers by airport management, and lease agreements between airports and carriers.

At large hubs and airports where heavy international traffic continues to grow, there may be an increased demand by air carriers to use technology to help manage their operations and facilitate the flow of customers from curb to plane. Technology such as the following may be considered in order to better manage airport staffing and improve the passenger's experience:

- *Passive video displays or interactive kiosk set-ups for improved communication with passengers regarding flight status, stand-by list status, weather and flight alternatives.*

- *Increased automated check-in capability in the ticket counter area, gate area, and parking lots; and*

- *Automatic recording of passenger information such as: arrivals at the ticket counter; service times at counters, gates and checkpoints; and* overall throughput time of outbound passengers.

3.2 ANNUAL PASSENGER PROJECTIONS

The Master Plan Update Study's projections for the Airport were developed for the years 2006, 2011 and 2021. The base year for passenger volume projections is 2001. For peaking analysis and 24-hour daily schedule development, 2002 data were used. The actual schedule for 2002 was adjusted to represent the most current pattern and distribution of activity. The primary source of data was from GMIA staff and records. Other sources used were Official Airline Guide (OAG) schedule data, U.S. Department of Transportation (DOT) data on origin/destination traffic and activity by carrier, Federal Aviation Administration annual forecasts, and Woods & Poole Economics data on historical and forecast county level socio-economic parameters.

This section is organized as follows:

- *Passenger Projection Methodology*
- *Passenger Projections*
- *O&D Domestic Passenger Market Analysis*
- *Summary of Passenger Projections*

3.2.1 Passenger Projection Methodology

General Mitchell International Airport draws passengers from the greater Milwaukee area, southeastern Wisconsin, and several counties in northern Illinois that are situated as near to GMIA as they are to Chicago O'Hare Airport.

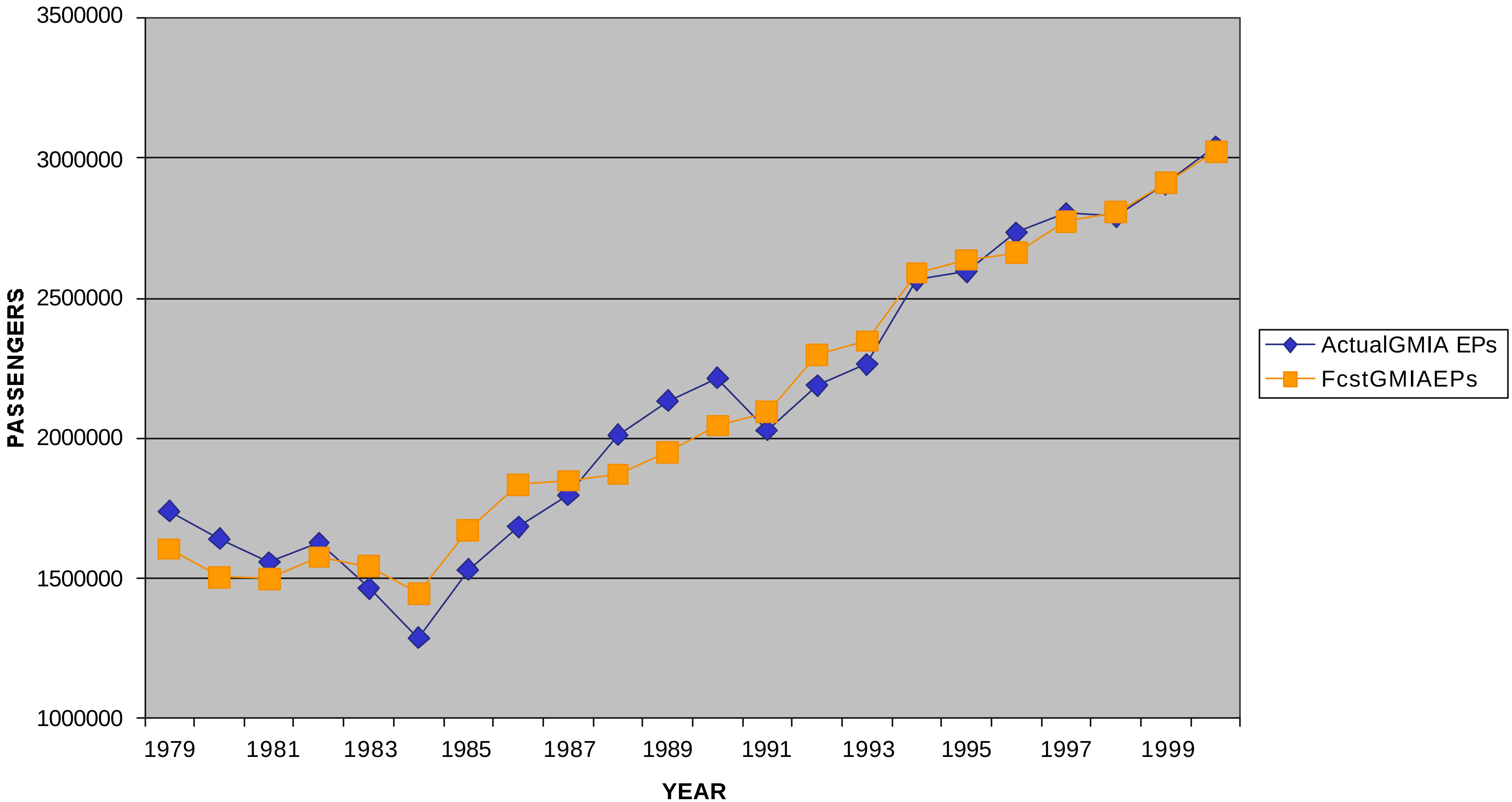
Historical activity at the Airport from 1979 through 2000 served as the basis for projecting passenger traffic through 2021. 2001 data were not included because of the distortions caused by the events of September 11. Adjustments were made later in the forecasting process to account for those changes. Projections were made using regression analysis relating the volume of travel at the Airport to socioeconomic factors in the surrounding region and the cost of air travel at GMIA. In formulating the relationships among these factors, several different measures were used to represent the demand for air travel, the cost of air travel, and the socio-economic activity in the surrounding area.

Air travel demand was represented as total enplaned passengers, and as origin/destination (O&D) passengers. The cost of air travel was represented by airline yield at the Airport. Airline yield is the revenue collected by the airline for carrying one paying passenger one mile. Variables were also included in the analysis to reflect the start-up of service by Midwest Express in 1984, and to account for the impact of the Gulf War.

The socioeconomic factors that were analyzed included population, personal income, per capita income, and employment. The counties analyzed for inclusion in the analysis included the seven counties comprising the area covered by the Southeastern Wisconsin Regional Planning Commission (Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha), and three neighboring counties in Illinois (Lake, McHenry and Winnebego).

In developing the statistical relationships among these variables, both linear and logarithmic formulations were considered. Linear formulations imply that the absolute growth in traffic is related to the absolute growth in the other variables. Logarithmic formulations imply that the rates of traffic growth are related to the rates of growth in the other variables.

The equation chosen was selected for its statistical goodness of fit to the historical data, and for its reasonableness in the implied relationships. This goodness to fit is graphically presented in **Exhibit 3.2-1**. This exhibit displays the close agreement between the actual history, and the passenger traffic predicted for the 1979 through 2000 time period by the chosen equation.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTERPLAN UPDATE

ACTUALvsFORECASTENPLANEMENT

EXHIBIT 3.2-1

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The equation and its statistics are as follows:

LN (GMIA Enplaned Passengers) =
- 2.450
+ 2.347 * LN (10-County Population)
- 0.536 * LN (GMIA Airport Yield)

R-Squared = .945
F Statistic = 162.25
T Statistics:
Population= 5.05
GMIA Yield = -3.35

The positive coefficient of the population variable indicates that Airport traffic increases as the 10-county area's population increases. The negative coefficient for yield indicates that increasing yields at GMIA exert a downward pressure on enplanements, while declining yields exert an increasing pressure on traffic.

Use of this equation without adjustment would have implied that traffic would have continued to grow as population was growing without considering the impacts of the terrorist attacks. Therefore, the forecast of enplanements derived from this formula was adjusted to compensate for this event. Enplanements in 2001 were down 7.5 percent below 2000. Given the state of the economy after September 11, it is assumed that aviation activity will not resume its normal growth until 2003 or 2004. GMIA's 2002 through 2004 traffic was assumed to decline and rebound in the same fashion forecast for the United States as a whole. After 2004, traffic was grown at a rate equivalent to that embodied in the regression analysis.

This preliminary forecast was then adjusted to account for two developments that were not included in historical activity at GMIA; initiation of service by low-fare carrier Air Tran, and the expectation that the increased growth of Midwest Express and Skyway will result in an increase in connecting percentages at GMIA.

3.2.2 Passenger Projections

Over the last ten years, passenger activity at GMIA has grown at an average annual rate of 3.3 percent, compared with 3.5 percent for the nation as a whole. Historical data for passenger activity at the Airport is presented in **Table 3.2-1**. The history and forecast are presented graphically in **Exhibit 3.2-2**. Immediately after deregulation in 1978, GMIA traffic declined. It rebounded significantly when Midwest Express began service in June of 1984. From 1984 through 2001 traffic grew at an average annual growth rate of 4.7 percent, largely on the basis of Midwest activity. Over that same period traffic in the U.S grew just under 3 percent annually.

3.2.2.1 Major Carriers

Major carrier enplanements actually declined from 1996 through 2001 as carriers shifted to providing service to Milwaukee using commuter partners. From 1996 through 2001 major carrier traffic declined 1.8 percent per year. Among the shifts that have occurred are:

- *American to American Eagle*
- *Continental to Continental Express*
- *American Trans Air to Chicago Express*
- *United to United Express*

AirTran initiated service in June 2002 with non-stop service to Atlanta and Orlando. Tampa non-stop service was initiated in fall of 2002. The carrier expects to add service to Fort Lauderdale February of 2003, and to increase service moderately throughout the forecast period after that. The level of traffic expected for the AirTran start-up is consistent with air service studies previously done for the Airport estimating the impact of potential new service by AirTran.

Midwest Express plans to increase connecting traffic at GMIA over the forecast period. Currently, Midwest connects approximately 20 percent of its enplanements at the Airport. The carrier anticipates this connecting percentage growing to 40 percent by 2021.

TABLE 3.2-1

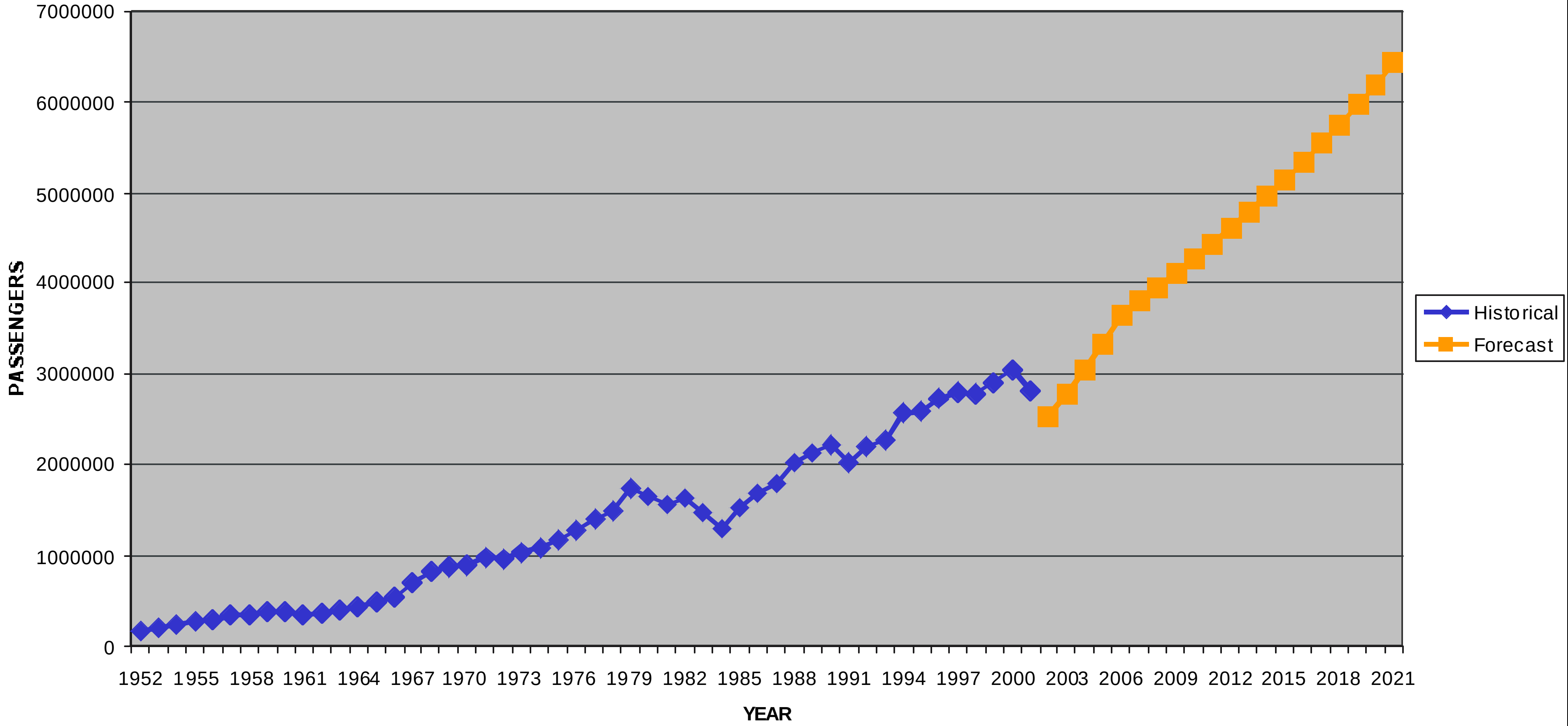
General Mitchell International Airport

PASSENGER ACTIVITY

Year	Total Enplanements	Majors	Commuters	Charter*	Connections Included	Connecting %
1979	1,740,282					
1980	1,642,532					
1981	1,558,549					
1982	1,627,335					
1983	1,463,227					
1984	1,287,663					
1985	1,530,169					
1986	1,682,739					
1987	1,798,679					
1988	2,012,727					
1989	2,132,541					
1990	2,213,672					
1991	2,027,689					
1992	2,189,052					
1993	2,264,402					
1994	2,563,293					
1995	2,593,359					
1996	2,732,965	2,234,052	494,222	4,691	206,693	7.6%
1997	2,804,596	2,232,808	561,616	10,162	199,869	7.1%
1998	2,790,837	2,147,859	636,705	6,273	204,185	7.3%
1999	2,906,189	2,251,887	644,199	10,103	221,291	7.6%
2000	3,039,962	2,327,560	708,415	3,987	234,518	7.7%
2001	2,811,954	2,041,492	735,082	35,380	269,823	9.6%
Forecasts						
2006	3,658,480	2,530,543	1,079,362	48,576	353,585	9.7%
2011	4,434,172	3,064,365	1,313,299	56,508	534,533	12.1%
2021	6,427,713	4,421,221	1,931,108	75,385	1,011,481	15.7%
Average Annual Growth Rates						
1979-1984	(5.8)%					
1984-2001	4.7%					
1996-2001		(1.8)%	8.3%	49.8%	5.5%	
1979-2001	2.2%					
2001-2006	5.4%	4.4%	8.0%	6.5%	5.6%	
2006-2011	3.9%	3.9%	4.0%	3.1%	8.6%	
2011-2021	3.8%	3.7%	3.9%	2.9%	6.6%	
2001-2021	4.2%	3.9%	4.9%	3.9%	6.8%	

* Charter activity not occurring on scheduled carriers such as American Trans Air, Sun Country, or majors.

Source: General Mitchell International Airport
PB Aviation Inc. Analysis



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

GMIAENPLANEMENTS
HISTORICALAND FORECAST

EXHIBIT
3.2-2

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3.2.2.2 Regional Carriers

The growth in regional passengers has been driven by the shifts in service mentioned above, as well as the strong growth of Skyway (soon to become Midwest Connect). Skyway has grown over 12 percent annually in the last five years at GMIA, its market share increasing from 5.3 percent to 9.2 percent over that time. As it transitions its fleet from 19-seat turboprop aircraft to regional jets with 32-50 seats, its strong growth will continue. Over time, Skyway's fleet will be totally regional jet aircraft. However, there will always be small markets in Wisconsin and Michigan that will be fed into Midwest Express' system at GMIA, that will support only a 19-seat type of plane. While it is uncertain exactly who the operator will be, such service will continue to be present at GMIA. It may be operated under contract to Midway Express or Skyway, or it may be an independent operator. Regardless of the specific name of the carrier operating it, Midway Express feels that it will still provide feed to its system at GMIA.

The share of passenger traffic carried by regionals at GMIA has been, and is projected to be, as follows:

- *1996 18.1 percent*
- *2001 26.1 percent*
- *2006 29.5 percent*
- *2011 29.6 percent*
- *2021 30.0 percent*

3.2.2.3 Charter Carriers

Charter activity at GMIA is operated by carriers under contract to tour operators. The specific carriers fluctuate over time as contracts change. Carriers such as American Trans Air and Sun Country have operated both scheduled and charter activity at the Airport over the past several years. Occasionally some of the major carriers will fly unscheduled operations. The service tends to be seasonal, and to vacation destinations such as Las Vegas, Caribbean and Mexican resort areas.

Discussions with operators of these services have resulted in the projections in Table 3.2.1. Traffic volume on charter activities is expected to grow at 3.9 percent per year over the forecast period, which is similar to the growth expected from major carriers at the Airport.

3.2.3 O&D Domestic Passenger Market

The top 30 Origin/Destination (O&D) markets for GMI are presented in **Table 3.2-2**. O&D passengers as recorded by the U.S. DOT are listed for 1979, 1990, 1995 2000 and 2001 for each of these markets. The cities are listed in order of 2001 passenger volume.

Those cities currently receiving non-stop service are marked with an asterisk (*). Those whose non-stop service is seasonal are noted with an "S". Twenty-three of the top markets have non-stop service; three more of the markets have non-stop service on a seasonal basis only. There are four markets that had no non-stop service in 2001.

AirTran initiated non-stop service to Tampa in the fall of 2002. Fort Lauderdale service will start in February, 2003. Miami and Fort Myers are also on AirTran's system, and may ultimately receive non-stop service from that carrier. However, there is no announced plan to do so now.

TABLE 3.2-2

General Mitchell International Airport

ORIGIN / DESTINATION CITY ANALYSIS

2001 Rank			Total Origin / Destination Passengers 1979	1990	1995	2000	2001	Average Annual Growth (%) 1990-1995	1995-2001	Estimated Potential One-Way Passengers per Day 2001	2006	2011	2021
1	Las Vegas	*	41,490	78,730	141,230	341,350	312,450	12.4	14.1	439	571	692	1,003
2	Orlando	*	44,880	144,290	269,630	332,790	293,010	13.3	1.4	412	535	649	941
3	Minneapolis/St. Paul	*	105,640	141,690	184,910	261,820	217,750	5.5	2.8	306	398	482	699
4	Phoenix	*	10,630	85,340	179,990	185,840	198,370	16.1	1.6	279	362	439	637
5	Los Angeles	*	100,990	141,870	137,410	180,470	175,420	(0.6)	4.2	246	321	389	563
6	LaGuardia	*	131,210	162,000	148,220	172,130	158,200	(1.8)	1.1	222	289	350	508
7	Atlanta	*	49,820	93,730	116,360	149,540	144,670	4.4	3.7	203	264	320	464
8	Dallas/Fort Worth	*	44,880	83,370	111,450	146,500	127,870	6.0	2.3	180	234	283	411
9	Denver	*	63,140	91,880	113,850	131,720	126,890	4.4	1.8	178	232	281	407
10	San Francisco	S	61,830	95,610	111,470	172,350	124,300	3.1	1.8	**175**	**227**	**275**	**399**
11	Boston	*	51,930	94,140	139,490	131,650	122,680	8.2	(2.1)	172	224	272	394
12	Ronald Regan N'tl	*	57,790	95,430	110,580	139,370	113,790	3.0	0.5	160	208	252	365
13	Newark	*	21,550	85,940	99,910	123,200	112,540	3.1	2.0	158	206	249	361
14	Philadelphia	*	37,660	75,940	91,030	117,030	106,670	3.7	2.7	150	195	236	342
15	Tampa	S	61,060	105,930	107,290	120,410	96,810	0.3	(1.7)	136	**177**	**214**	**311**
16	Detroit	*	94,030	92,600	102,740	168,120	92,300	2.1	(1.8)	130	169	204	296
17	Ft Myers	S	0	54,280	121,930	99,360	88,910	17.6	(5.1)	125	**162**	**197**	**285**
18	Kansas City	*	41,690	12,360	96,190	77,790	74,080	50.7	(4.3)	104	135	164	238
19	Seattle		20,230	40,740	61,110	82,780	72,080	8.4	2.8	101	132	**160**	**231**
20	Cleveland	*	56,290	56,940	92,980	79,820	65,190	10.3	(5.7)	92	119	144	209
21	Fort Lauderdale		23,570	44,970	80,760	66,930	64,590	12.4	(3.7)	91	118	**143**	**207**
22	San Diego		17,000	49,720	69,270	58,290	53,680	6.9	(4.2)	75	98	119	**172**
23	Cincinnati	*	15,160	19,880	59,670	58,980	48,240	24.6	(3.5)	68	88	107	155
24	St. Louis	*	52,780	40,930	73,110	60,170	48,030	12.3	(6.8)	67	88	106	154
25	Miami		42,210	56,060	60,520	63,720	44,820	1.5	(4.9)	63	82	99	**144**
26	Pittsburgh	*	29,750	36,860	44,870	51,110	43,760	4.0	(0.4)	61	80	97	140
27	Charlotte	*	5,470	25,340	39,250	49,400	43,480	9.1	1.7	61	79	96	140
28	Hartford	*	12,830	25,180	28,310	48,100	43,400	2.4	7.4	61	79	96	139
29	Houston	*	18,490	16,170	26,620	43,030	40,760	10.5	7.4	57	74	90	131
30	Columbus	*	16,550	22,060	51,420	47,750	39,690	18.4	(4.2)	56	73	88	127
Top 30 Markets % of Total			67.9%	68.5%	68.9%	73.1%	72.2%						

* Indicates non-stop service
S Indicates seasonal non-stop service

Bold indicates level of activity to support non-stop service

Source: USDOT O&D Survey
PB Aviation, Inc. Analysis

Seattle is the largest O&D market with no non-stop service. If Seattle were to grow at the average rate embodied in the passenger forecast, it would reach a level where it might support non-stop service by 2011. This assumes two daily departures on 100-seat aircraft, with a 70 percent load factor, or 140 departing passengers per day. Of course there would be the potential for connections adding to this total. On the other hand, this estimate would be offset by the fact that not all of the passengers in a market are likely to be captured by a single carrier.

San Francisco, with seasonal non-stop service, showed strong growth in 2000, but declined in traffic in 2001. Growing at the average rate embodied in the forecast, this market would average 227 departing passengers per day by 2006. This market appears to be able to support year-round daily non-stop service. Several of the carriers at GMIA serve San Francisco via a hub connection, so there is strong competition in this market, even with no non-stop service. Some carriers feel that this competition via hubs would allow carriers to reduce fares in the Milwaukee to San Francisco market to compete with any year-round non-stop service. This fear of cutthroat fare competition is deterring some carriers from providing this non-stop service.

San Diego, the smallest market in the top 30 without non-stop service, might grow to support non-stop service by the end of the forecast period.

Non-stop service at GMIA from 1997 to 2002 is presented in **Table 3.2-3**. There are 50 markets with non-stop service as of April 2002:

- *32 markets are served by only Midwest and/or Skyway*
  (20 by Skyway alone)
- *13 are served by multiple carriers*

Table 3.2-4 presents the characteristics of some of this service. The cities are listed alphabetically. (Because Skyway reports its statistics to the U.S.DOT under as a 298 C carrier rather than T-100, the detailed statistics are not available for Skyway.) For each carrier in each market (except Skyway), annual departures, seats and load factors are recorded for 1997 and 2000. (AirTran, which recently initiated service at GMIA, is not included in this data.)

Service at GMIA has been fairly consistent in these markets in that carriers have not dropped service to any of these to markets over this period. Some markets have seen a transition from the larger carrier to a regional partner, but the service in the markets has remained. Stability of service contributes to customer loyalty over time, possibly deterring passengers from traveling from Milwaukee to Chicago to fly.

TABLE 3.2-3

General Mitchell International Airport

MARKETS SERVED NON-STOP

	1997	1998	1999	2000	2001	2002	2001 O&D Rank
Appleton	ZW YX YX*	ZW YX YX*	ZW YX YX*	ZW YX YX*	ZW YX YX*	YX YX*	
Atlanta	DL YX	DL YX	DL YX	DL YX	DL YX EV	DL YX EV FL	7
Baltimore						YX*	44
Boston	YX	YX	YX	YX	YX	YX	11
Cedar Rapids				YX*			
Charlotte	US	US	US	US	US	US	28
Chicago MDW	TZ	TZ	TZ	TZ	TZ*	TZ*	
Chicago ORD	ZW AA* UA	ZW AA* UA	ZW AA* UA	ZW AA* UA	ZW AA* UA	ZW AA*	75
Cincinnati	DL YX*	DL YX*	DL YX*	DL OH YX*	DL OH YX*	DL OH YX*	23
Cleveland	YX CO* YX*	YX CO* YX*	YX CO* YX*	YX CO* YX*	YX CO* YX*	YX* CO*	21
Columbus	YX YX*	YX YX*	YX YX*	YX YX*	YX YX*	YX*	29
Dallas/Ft. Worth	YX	YX	YX	YX AA*	YX AA*	YX AA*	9
Dayton			YX*	YX*	YX*	YX*	
Denver	ZW YX	ZW YX	ZW YX	ZW YX	ZW YX	ZW YX	8
Des Moines	YX*	YX*	YX*	YX YX*	YX*	YX*	62
Detroit City	P9	P9					
Detroit Metro	NW	NW	NW	NW	NW	NW	16
Escanaba			YX*	YX*	YX*	YX*	
Flint	YX*	YX*	YX*	YX*	YX*	YX*	41
Fort Wayne				YX*			
Ft Meyers	TZ	TZ	TZ	SY	SY	YX	17
Grand Rapids	YX YX*	YX YX*	YX YX*	YX*	YX*	YX*	42
Green Bay	YX*	YX*	YX*	YX*	YX*	YX*	
Hartford		YX	YX	YX	YX YX*	YX YX*	27
Houston IAH	CO	CO	CO	CO CO*	CO CO*	CO*	30
Indianapolis	YX*	YX*	YX*	YX*	YX*	YX*	36
Kansas City	YX	YX	YX	YX	YX	YX	19
La Crosse	YX*	YX*	YX*	YX*	YX*	YX*	
LaGuardia	YX	YX	YX	YX	YX	YX	6
Lansing	YX*	YX*	YX*	YX*	YX*	YX*	84
Las Vegas	HP	HP YX	HP YX SY	HP YX SY	HP YX SY	YX*	1
Los Angeles	YX	YX	YX SY	YX	YX	YX	5
Louisville	YX*	YX*	YX*	YX*	YX*	YX*	60
Madison	YX YX*	YX YX*	YX YX*	YX YX*	YX YX*	YX YX*	
Marquette	YX*	YX*	YX*	YX*	YX*	YX*	
Memphis	NW	NW	NW	NW	NW	NW	43
Minneapolis	YX NW	YX NW	YX NW SY	YX NW SY	YX NW SY	NW YX*	3
Moline, IL			YX*	YX*	YX*	YX*	
Muskegon	YX*	YX*	YX*	YX*	YX*	YX*	
Nashville	YX*	YX*	YX*	YX*	YX*	YX*	35
Newark	YX CO*	YX CO*	YX CO*	YX CO*	YX CO*	YX* CO*	13
Omaha	YX YX*	YX YX*	YX YX*	YX	YX	YX	39
Orlando	YX	YX	YX SY	YX SY	YX SY	YX FL	2
Philadelphia	YX	YX	YX	YX	YX	US* YX* YX	14
Phoenix	YX HP	YX HP	YX HP	YX HP	YX HP	YX HP	4
Pittsburgh	US	US	US	US YX*	US YX*	US YX*	26
Raleigh/Durham	YX	YX	YX	YX	YX	YX*	32
San Francisco	YX	YX	YX	YX	YX		10
South Bend	YX*	YX*					
St Petersburg	TZ	TZ	TZ				
St. Louis	TW YX*	TW N9N YX*	TW YX*	TW YX*	TW YX*	AA* YX*	25
Tampa		YX	YX	YX	YX	YX	15
Toronto				YX*	YX*	AC YX*	
Traverse City		YX*	YX*	YX*	YX*		
Washington DCA	YX	YX	YX	YX	YX YX*	YX	12
Washington IAD			YX US	YX US	YX YX*	YX*	37
Wausau	YX*	YX*	YX*	YX*	YX*	YX*	

Source: General Mitchell International Airport Data
PB Aviation, Inc. Analysis

Legend:

AA* - American Eagle
AC - Air Canada
CO - Continental
CO* - Continental Express
DL - Delta
HP - America West
NW - Northwest
N9N - Trans States Airlines
OH - Comair
P9 - Pro Air
TZ - ATA Connection
UA - United
US - US Airways
US* - US Airways Express
YX - Midwest Express

TABLE 3.2-4

General Mitchell International Airport

AIR SERVICE CHARACTERISTICS

		Midwest Express			Air Wisconsin			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Appleton	1997	608	32,210	35.8%	359	32,210	13.2%			
	2001	505	52,708	43.8%	654	52,708	18.0%			

		Midwest Express			Delta			Atlantic Southeast		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Atlanta	1997	848	65,216	61.3%	1,086	154,218	75.3%			
	2001	964	77,996	61.8%	1,036	147,153	73.9%	337	16,820	39.0%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Boston	1997	1,229	91,300	67.4%
	2001	1,076	97,532	64.6%

		USAirways		
Destination	Year	Departures	Seats	Load Factor
Charlotte	1997	725	73,734	75.5%
	2001	716	85,585	71.3%

		American Trans Air			Chicago Express		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Chicago MDW	1997	789	15,806	52.4%			
	2001				2,052	69,768	62.9%

		United			American Eagle			Air Wisconsin		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Chicago ORD	1997	1,182	143,222	53.9%	3,397	206,345	65.0%	1,935	177,150	51.3%
	2001	378	50,233	57.6%	2,443	119,696	62.4%	1,650	148,362	52.9%

		Delta			Comair			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Cincinnati	1997	1,079	153,183	56.2%						
	2001	1,019	144,698	64.8%	842	42,090	60.1%			

		Midwest Express			Continental (Continental Express)			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Cleveland	1997	776	50,616	53.7%	1,872	76,060	55.8%			
	2001	487	36,480	24.7%	1,668	71,411	57.5%			

		Midwest Express			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Columbus	1997	481	29,436	51.6%			
	2001	282	17,640	35.2%			

		Midwest Express			American Eagle		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Dallas/Ft.Worth	1997	1,234	95,232	60.6%			
	2001	1,182	101,220	54.2%	1,288	64,153	10.3%

		Midwest Express			Air Wisconsin		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Denver	1997	682	42,524	71.5%	1,229	110,978	62.6%
	2001	656	68,492	59.5%	1,072	92,964	69.5%

		Northwest		
Destination	Year	Departures	Seats	Load Factor
Detroit	1997	2,532	386,489	68.3%
	2001	2,369	359,269	54.6%

TABLE 3.2-4 (Continued)

General Mitchell International Airport

AIR SERVICE CHARACTERISTICS

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Ft.Myers	1997	124	10,368	77.8%
	2001	140	15,760	84.2%

		Midwest Express			Sun Country			American Trans Air		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Hartford	1997									
	2001	487	35,268	51.7%						

		Continental			Continental Express		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Houston	1997	362	40,094	52.8%			
	2001	265	31,239	54.0%	422	21,087	76.0%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Kansas City	1997	1,272	82,400	56.9%
	2001	1,594	129,324	55.8%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
LaGuardia	1997	1,349	98,368	75.1%
	2001	1,257	129,708	63.6%

		Midwest Express			America West			Sun Country		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Las Vegas	1997	34	2,912	86.1%	361	46,817	64.4%			
	2001	340	38,640	72.4%	247	30,934	59.2%	350	77,498	87.0%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Los Angeles	1997	608	68,068	80.0%
	2001	595	67,388	72.4%

		Midwest Express			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Madison	1997	610	50,824	40.0%			
	2001	537	58,716	37.0%			

		Northwest		
Destination	Year	Departures	Seats	Load Factor
Memphis	1997	1,055	135,421	69.1%
	2001	1,040	135,327	58.6%

		Midwest Express			Northwest			Sun Country		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Minneapolis	1997	610	50,824	40.0%	2,258	403,360	66.5%			
	2001	537	58,716	37.0%	2,338	393,525	63.7%	448	76,980	40.9%

		Midwest Express			Continental Express		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Newark	1997	1,241	88,668	62.0%	708	35,400	53.5%
	2001	1,131	85,360	54.2%	1,122	55,944	43.5%

		Midwest Express			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Omaha	1997	956	73,008	49.8%			
	2001	1,189	90,916	52.6%			

TABLE 3.2-4 (Continued)

General Mitchell International Airport

AIR SERVICE CHARACTERISTICS

		Midwest Express			Sun Country		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Orlando	1997	469	38,656	72.5%			
	2001	600	69,392	81.0%	294	51,450	62.9%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Philadelphia	1997	749	55,556	68.7%
	2001	966	73,080	54.3%

		Midwest Express			America West		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Phoenix	1997	130	11,732	71.7%	717	93,359	81.8%
	2001	630	72,976	67.2%	704	94,354	72.5%

		USAirways			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Pittsburgh	1997	1,383	155,816	59.5%			
	2001	1,339	157,277	47.5%			

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Raleigh Durham	1997			
	2001	502	32,952	47.3%

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
San Francisco	1997	222	24,612	80.0%
	2001	239	26,804	77.9%

		American Eagle (TWA)			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
St. Louis	1997	2,320	247,638	55.7%			
	2001	2,013	216,233	48.3%			

		Midwest Express		
Destination	Year	Departures	Seats	Load Factor
Tampa	1997	115	9,636	61.7%
	2001	129	11,348	59.1%

		Midwest Express			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Washington DCA	1997	1,052	85,320	65.3%			
	2001	1,019	101,412	57.9%			

		Midwest Express			Skyway		
Destination	Year	Departures	Seats	Load Factor	Departures	Seats	Load Factor
Washington IAD	1997						
	2001	216	18,356	45.6%			

Source: T100 Statistics
PB Aviation, Inc. Analysis

Several markets have registered load factors above 70 percent; Charlotte, Fort Myers, Los Angeles, Orlando and San Francisco. This indicates that these markets may be able to sustain more service. In order to average a load factor this high across a year, many flights must be departing full, and there were passengers who could not be accommodated.

Table 3.2-5 presents the market shares held by the carriers serving GMIA 1996 through 2001. Carriers are listed in order of their percentage share of GMIA's market in 2001. At the lower part of the table is a list of carriers combining major and regional partners. Midwest Express has held the largest share of traffic at the Airport over this period. Skyway's share has grown significantly, representing an average annual growth in traffic of 12.3 percent over this period. The combination of Midwest Express and Skyway represented 36.6 percent of GMIA enplanements in 2001. Northwest's share has declined. Delta's share has remained relatively constant at around 7 percent, and the combined share of Delta and its regional partners has remained constant at 8.0 to 8.6 percent. Sun Country no longer operates as a scheduled carrier at GMIA.

Travel agents serving clients who travel out of GMIA were surveyed to obtain qualitative information on air service at the Airport. The agencies surveyed serve a mix of business and pleasure travelers, with approximately 60 to 65 percent of their business being pleasure travel. They indicated that they frequently experience a shortage of seats in the Ft Myers, Las Vegas and Phoenix markets. Seattle and Miami headed the list of cities where the agents felt that non-stop service was most needed. Their reaction to the start-up of service by AirTran was mixed. The agents indicated that they were uncertain whether service by the low fare carrier would stimulate much new travel that would not have happened otherwise. All of the agents interviewed indicated a high degree of satisfaction with many aspects of travel into and out of GMIA. They liked the cost and convenience of parking, the Airport location and easy access, the range of carriers offering service and, generally, the range of service offered. Many liked the curbside drop-off and pick-up convenience, although it was mentioned that this had become less convenient since September 11.

TABLE 3.2-5

General Mitchell International Airport

CARRIER MARKET SHARE

	Carrier		1	1	1	2	2
		996	997	998	999	000	001
	Midwest Express		2	2	2	2	2
		5.5%	6.2%	6.8%	8.4%	6.9%	7.4%
	Northwest		2	1	2	2	1
		2.5%	2.3%	9.8%	0.8%	1.7%	9.2%
	Skyway		5	6	6	7	9
		.3%	.3%	.2%	.5%	.4%	.2%
	Delta		7	6	7	6	7
		.1%	.2%	.9%	.1%	.8%	.2%
	Sun Country		0	0	4	7	5
		.2%	.2%	.4%	.0%	.5%	.6%
	Air Wisconsin		5	6	5	5	5
		.2%	.6%	.1%	.8%	.2%	.1%
	US Airways		5	5	4	4	5
		.2%	.3%	.2%	.3%	.6%	.0%
	American Eagle		4	4	3	4	4
		.8%	.8%	.9%	.4%	.1%	.1%
	TWA		4	4	4	4	3
		.7%	.9%	.8%	.8%	.4%	.7%
	America West		3	3	2	2	2
		.8%	.8%	.4%	.8%	.6%	.9%
	Continental		2	2	1	2	2
Express		.7%	.0%	.0%	.9%	.3%	.9%
	Chicago Express		0	0	0	0	1
		.1%	.5%	.6%	.8%	.9%	.6%
	Other		0	0	0	0	1
		.0%	.0%	.0%	.2%	.0%	.2%
	Mesa		0	0	0	0	1
		.0%	.0%	.5%	.9%	.9%	.0%
	Comair		1	1	1	1	0
		.0%	.0%	.4%	.5%	.3%	.9%
	Air Canada		0	0	0	0	0
		.0%	.1%	.7%	.7%	.8%	.9%
	United		2	2	1	1	0
		.4%	.5%	.6%	.7%	.4%	.9%
	Continental		1	0	0	0	0
		.8%	.0%	.8%	.8%	.7%	.6%
	Atlantic		0	0	0	0	0
Southeast		.0%	.0%	.0%	.0%	.0%	.2%
	US Airways		0	0	0	0	0
Express		.5%	.4%	.4%	.3%	.2%	.1%
	Casino Express		0	0	0	0	0
		.1%	.1%	.1%	.1%	.1%	.0%
	Scott Aviation		0	0	0	0	0
		.1%	.1%	.1%	.1%	.1%	.0%
	American Trans		6	6	2	0	0
Air		.5%	.3%	.3%	.8%	.0%	.0%
	Metrojet		0	0	0	0	0
		.0%	.0%	.0%	.4%	.2%	.0%
	Mexicana		0	0	0	0	0

Airlines	.0%	.0%	.0%	.0%	.0%	.0%
Pro Air		0	0	0	0	0
	.0%	.2%	.0%	.0%	.0%	.0%
TWA Express		0	0	0	0	0
	.3%	.2%	.0%	.0%	.0%	.0%
United Express		0	0	0	0	0
	.2%	.0%	.0%	.0%	.0%	.0%
Selected Carriers combined with affiliates						
Midwest Express +		3	3	3	3	3
Skyway	0.8%	1.5%	3.0%	4.9%	4.3%	6.6%
Delta + Comair + Atlantic		8	8	8	8	8
Southeast	.1%	.3%	.3%	.6%	.0%	.4%
US Airways + US Airways		5	5	4	4	5
Express	.7%	.7%	.6%	.6%	.9%	.1%
Continental + Continental		3	2	2	3	3
Express	.5%	.0%	.8%	.7%	.0%	.5%
American Trans Air +		6	7	3	0	1
Chicago Express	.6%	.8%	.0%	.6%	.9%	.6%
United +		2	2	1	1	0
United Express	.6%	.5%	.6%	.7%	.4%	.9%

Source: General Mitchell International Airport Data
PB Aviation, Inc.
Analysis

3.3 *Annual Cargo Poundage Projections*

Freight and mail at GMIA have exhibited strong growth over the last few decades. The activity is domestic, as international cargo is usually flown out of Chicago on international flights. Changes to the security environment after September 11 have had an impact on cargo volume at GMIA, as at most airports in the country. However, conversations with several carriers at the Airport indicate that there is still a strong interest by both all-cargo and passenger carriers to pursue freight and mail as valuable business enterprises for the airlines.

Historical and forecast freight and mail volumes are presented in **Table 3.3-1**.

TABLE 3.3-1
General Mitchell International Airport
CARGO ACTIVITY

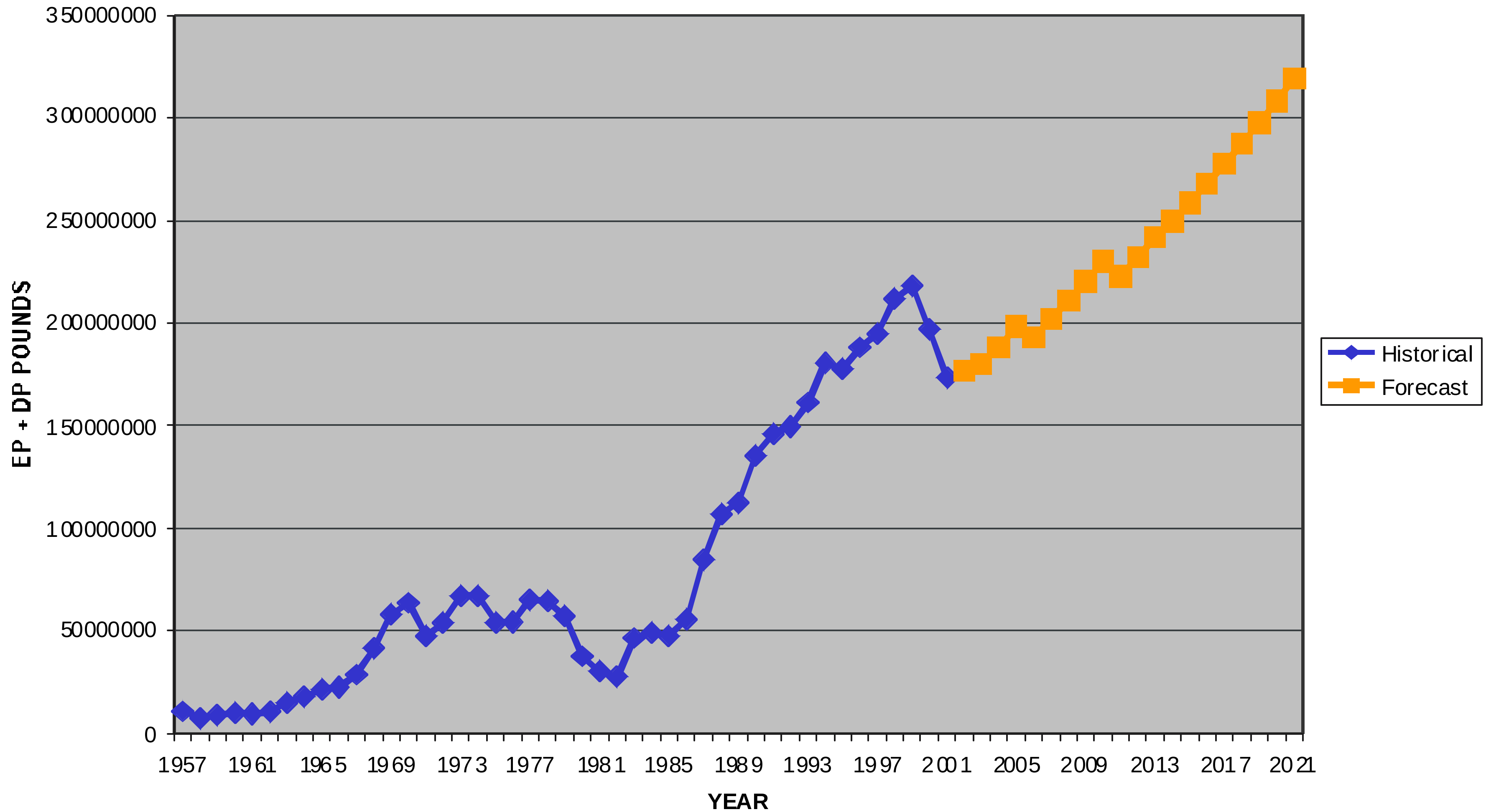
							By Carrier Type			
	Freight			Mail			Freight		Mail	
Year	Enplaned	Deplaned	Total	Enplaned	Deplaned	Total	All Cargo	Passenger	All Cargo	Passenger
1990	72,690,804	62,834,659		16,780,597	25,779,825	42,560,422				
1991	77,835,884	68,238,449	146,074,333	27,288,661	34,701,191	61,989,852				
1992	77,036,035	72,521,625	149,557,660	22,038,296	31,374,522	53,412,818				
1993	85,588,839	75,435,831	161,024,670	17,990,738	25,695,571	43,686,309				
1994	97,793,513	82,718,731	180,512,244	22,786,375	26,224,580	49,010,955				
1995	96,297,410	81,191,395	177,488,805	27,867,893	27,754,699	55,622,592				
1996	99,607,603	88,685,587	188,293,190	29,777,555	28,544,463	58,322,018	169,751,820	18,541,370	5,819,850	52,502,168
1997	103,230,939	91,434,835	194,665,774	27,966,907	27,285,550	55,252,457	173,642,730	21,028,011	4,879,807	50,372,950
1998	115,620,552	96,270,174	211,890,726	26,856,266	24,551,572	51,407,838	192,262,215	19,628,511	6,563,304	44,844,534
1999	115,256,731	102,845,579	218,102,310	23,766,135	20,933,145	44,699,280	199,963,438	18,138,872	6,577,202	38,122,078
2000	102,146,826	94,714,469	196,861,295	23,948,825	20,246,232	44,195,057	181,786,161	15,075,134	6,048,619	38,146,438
2001	88,903,206	84,615,354	173,518,560	18,194,107	14,490,864	32,684,971	162,558,225	10,960,335	3,830,646	28,854,325
Forecasts										
2006	103,546,838	89,637,562	193,184,400	11,866,401	13,762,974	25,629,375	183,774,400	9,410,000	19,222,031	6,407,344
2011	119,299,128	103,273,872	222,573,000	13,557,238	15,724,054	29,281,292	213,814,500	8,758,500	21,960,969	7,320,323
2021	171,163,517	148,171,403	319,334,920	17,696,022	20,524,328	38,220,350	308,691,719	10,643,201	28,665,263	9,555,088
Average Annual Growth Rates										
1996-2001	(2.2)%	(0.9)%	(1.6)%	(9.4)%	(12.7)%	(10.9)%	(0.9)%	(10.0)%	(8.0)%	(11.3)%
2001-2006	3.1%	1.2%	2.2%	(8.2)%	(1.0)%	(4.7)%	2.5%	(3.0)%	38.1%	(26.0)%
2006-2011	2.9%	2.9%	2.9%	2.7%	2.7%	2.7%	3.1%	(1.4)%	2.7%	2.7%
2011-2021	3.7%	3.7%	3.7%	2.7%	2.7%	2.7%	3.7%	2.0%	2.7%	2.7%

Source: General Mitchell International Airport Data
PB Aviation, Inc. Analysis

3.3.1 Freight Poundage

As indicated in **Exhibit 3.3-1**, freight poundage growth at GMIA has followed several different patterns over the years. Freight poundage grew steadily from 1957 through 1971, then fluctuated through 1983, and took off rapidly from 1983 through 1999. From 1999, cargo volume has declined significantly. This erratic pattern made it difficult to fit a socio-economic regression equation to the historical data.

Following the terrorist attacks of September 11, security procedures regarding the carriage of freight changed significantly, as they did on the passenger side of aviation. Passenger carriers wanting to carry freight in the bellies of passenger aircraft were required to conduct background checks on their freight customers. The passenger carriers are restricted to doing business with “known shippers”, i.e., customers with whom they have a working history and whose credit is in good standing. Passenger carriers can no longer accept packages from the unknown walk-up customer. However, in spite of the added security costs associated with carrying belly cargo, and the fact that some of the freight market has simply been placed out of bounds for passenger carriers, these carriers are still interested in carrying as much belly cargo as they can accommodate. Belly cargo is a high profit margin product for the carriers.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTERPLAN UPDATE

GMIAFREIGHT
HISTORICALAND FORECAST

EXHIBIT 3.3-1

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Domestic belly space is available to the carriers at virtually no incremental cost. Space for belly cargo is produced by virtue of flying the aircraft for passenger operations.

3.3.1.1 Freight Poundage Methodology

Various socioeconomic variables were reviewed to determine which best correlated with the historical growth of freight at GMIA. None of the relationships proved statistically strong enough to use to project freight volume. Therefore, recent freight activity at GMIA was compared to cargo activity in the U.S. to see how the Airport had grown relative to the nation as a whole. Historical and forecast data for U.S. cargo is available for revenue ton miles (RTMs) rather than tonnage, so that variable was used. in **Table 3.3-2:**

TABLE 3.3-2

General Mitchell International Airport

RATIO OF GMIA FREIGHT POUNDS TO U.S. CARGO ACTIVITY

Year	All-Cargo Flights (Lbs.)	Passenger Flights (Lbs.)
1996	0.21	0.007
1997	0.20	0.008
1998	0.22	0.007
1999	0.22	0.007
2000	0.19	0.006
2001	0.17	0.005

Source: General Mitchell International Airport
PB Aviation , Inc. Analysis

Given that GMIA freight has declined relative to U.S. cargo activity since 1996, it was assumed that this decline would continue, albeit slowly. By 2006 the ratio of GMIA all-cargo carrier freight pounds to U.S. cargo activity was forecast to be 0.016, and fall to 0.15 by 2011. It is forecast to stay at .015 through 2021. The ratio of GMIA freight on passenger carriers was assumed to fall to .004 by 2006, to .003 by 2011, and to remain there through 2021. Table 3.3-1 indicates that this pattern brings GMIA freight back up to its 2000 level by 2006, and past its 1999 peak by 2011.

3.3.1.2 Freight Poundage Projections

This projection relative to U.S. totals results in an increase in the share of total freight carried by all-cargo carriers. All cargo carriers flew 93.7 percent of total freight in 2001. This share increases to 95.1 percent in 2006, 96.1 percent in 2011, and 96.7 percent in 2021. Passenger carriers' share of freight falls from 6.3 percent in 2001 to 3.3 percent in 2021. Passenger carriers barely return to 2001 volumes by 2021.

Enplaned freight was assumed to be 53.4 percent of total freight as it has been historically, with deplaned freight representing 46.6 percent.

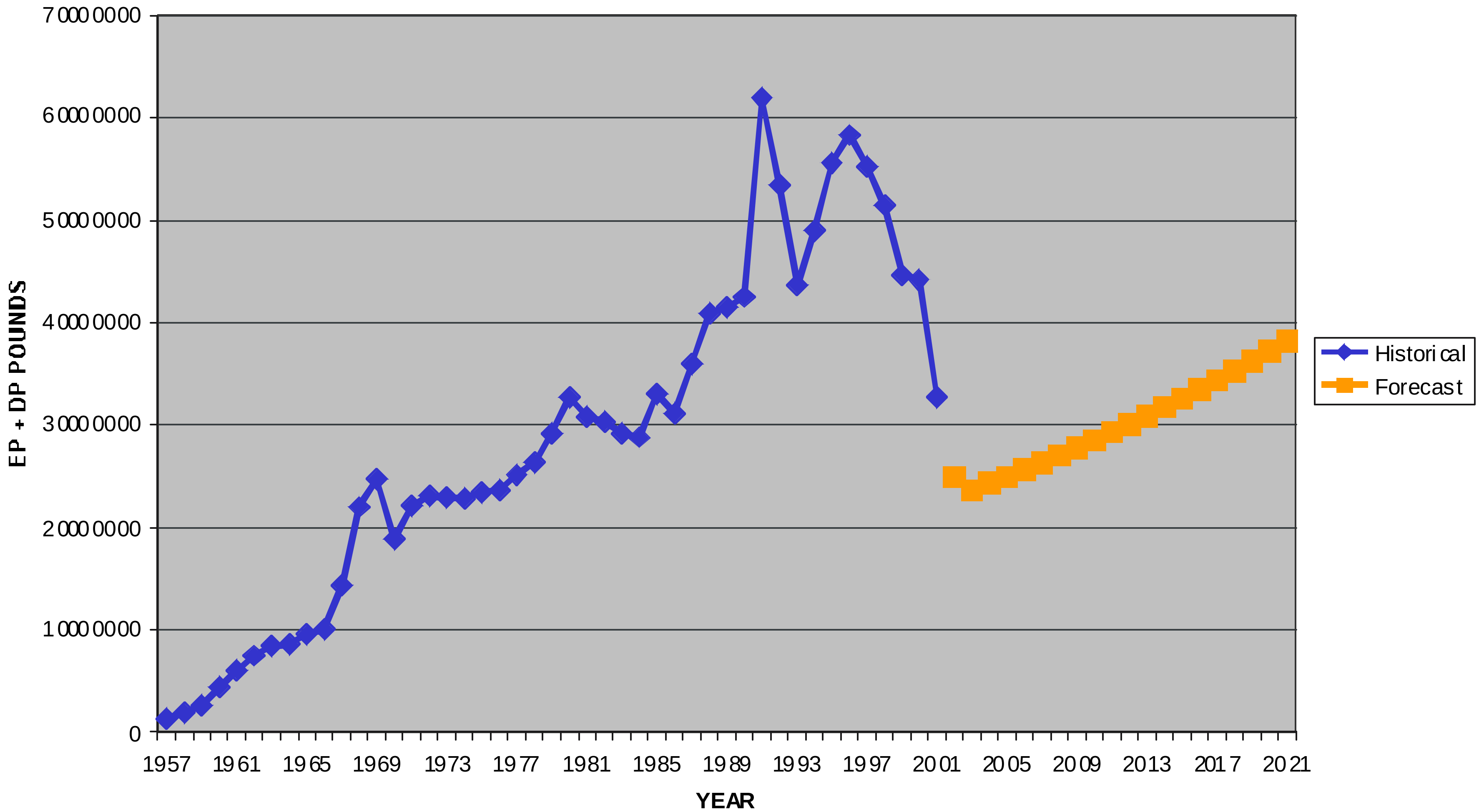
3.3.2 Mail Poundage

As indicated in **Exhibit 3.3-2**, mail volume reached its peak at GMIA in 1991 when it spiked upward for a two-year period. It has been trending down since 1997, and dropped over 26 percent in 2001 from 2000. Overall in the U.S., the FAA is forecasting a 23.8 percent decline in domestic air mail RTMs in fiscal year 2002 versus 2001, and a further decline of 5.0 percent in 2003. This is on top of a 15.2 percent decline in 2001 versus 2000.

The U.S. Postal service has shifted delivery of mail from air to ground for distances up to 1000 miles. Security concerns have caused them to shift all but first class mail under 16 ounces in weight from passenger carriers to all-cargo carriers. These factors have significantly altered the outlook for mail volumes and mode of transit at GMIA for the forecast period.

The erratic behavior of GMIA mail volumes over the last 10 years makes it impossible to relate mail to any socioeconomic variables. Trending volume the way it has been moving since 1996 would result in virtually no mail at GMIA before the end of the forecast period. The FAA forecast of mail assumes a decline in domestic mail carried by air through 2003. The growth that is forecast to resume after that will result in a 2011 domestic mail volume that is over 10 percent below 2001. Thus, the outlook for mail is not a growth scenario.

GMIA mail has been projected using growth rates similar to those in the FAA's projections for domestic mail carried by air. This projection results in a 2006 mail volume that is 21.6 percent below 2001. By 2011, the projection anticipates that mail volume has resumed growing and is only 10.4 percent below 2001. The projection expects that mail volumes will recover to their 2001 volume by 2015.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTERPLAN UPDATE

GMIAMAIL
HISTORICALAND FORECAST

EXHIBIT

3.3-2

Historically, most of the mail at GMIA, 88 percent, has been carrier by passenger carriers. However, recent security measures allow passenger carriers to carry only first class mail, with all mail over 16 ounces going on all-cargo carriers. Thus, the percentage of mail going to passenger carriers has been reduced to 25 percent, which has been the experience at GMIA in recent months.

3.4 Annual Operations and Fleet Mix Projections

The volume projections discussed in the preceding were used to forecast the number of aircraft operations at GMIA through 2021. Along with the operations projections, the mix of aircraft types expected to perform these operations is also projected. As with the volume projections, the primary source of data was GMIA records. Information from aviation industry sources and aircraft manufacturers was used in determining the future configuration of the aircraft fleet.

This section is organized as follows:

- *Passenger Carrier Operations and Fleet Mix*
- *All Cargo Operations and Fleet Mix*
- *General Aviation Operations and Fleet Mix*
- *Military Operations and Fleet Mix*
- *Summary of Operations and Fleet Mix Projections*

3.4.1 Passenger Carrier Operations and Fleet Mix

Passenger carrier operations are presented in **Table 3.4-1**. The table indicates that departures on major carriers have declined since 1996, while commuter departures have grown at an average rate of 6.2 percent annually. This reflects the transition of the major carriers to service on regional jets provided by their respective partners. American has transitioned entirely to American Eagle service at GMIA. Continental has shifted service to Continental Express, United has shifted to United Express, and ATA provides service to Chicago using Chicago Express. Midwest Express continues to expand both major carrier service and service on Skyway. Midwest Express enplanements have grown at an average annual rate of 4.0 percent 1996 through 2001, while Skyway has averaged 12.3 percent growth annually. Charter departures have exhibited erratic growth patterns. This is partly due to reporting conventions that do not separate charter operations on scheduled carriers from their scheduled operations. The charter departures reported in Table 3.4-1 are only those performed by charter carriers. Charter services performed by ATA or Sun Country are included in their respective scheduled operations.

Departures were projected by reviewing historical enplanements per departure, projecting this statistic, and applying it to the enplanement forecast to project departures. On the major carriers, the number of enplanements per departure has declined since 1996. This has been driven by the emergence of Midwest Express as an increasingly larger player in the GMIA markets. Midwest Express' equipment has fewer seats and, therefore, carries fewer passengers per departure than the other major carriers. As Midwest continues to expand at GMIA using its 717 fleet, the number of passengers per departure is expected to grow at the Airport. This assumption is consistent with those made by the FAA in its annual forecasts. Applying this rate of growth in enplanements per departure to the enplanement forecast for the majors results in a departure forecast for the major carriers that increases 2.8 percent annually 2001 through 2006, 2.5 percent per year 2006 through 2011, and 2.4 percent annually thereafter.

Commuter enplanements per departure have grown at 0.3 enplanements per year over the past five years. As Skyway transitions from its fleet of 19-seat aircraft to regional jets, it is expected that this enplanement per year growth will increase to 0.6 enplanements per year. This growth produces a commuter departure forecast growth of 4.8 percent annually 2001 through 2006, 1.4 percent 2006 through 2011, and 1.7 percent thereafter.

TABLE 3.4-1

General Mitchell International Airport

PASSENGER OPERATIONS

	Departures				Enplanements Per Departure			Operations			
Year	Majors	Commuters	Charter*	Total	Majors	Commuters	Charter*	Majors	Commuters	Charter*	Total
1996	33,355	28,882	1,334	63,571	67	17	4	66,710	57,764	2,668	127,142
1997	32,969	31,393	1,494	65,856	68	18	7	65,938	62,786	2,988	131,712
1998	33,266	33,814	1,248	68,328	65	19	4	66,532	67,628	2,496	136,656
1999	34,787	34,666	1,381	70,834	65	19	7	69,574	69,332	2,762	141,668
2000	34,971	37,921	995	73,887	67	19	4	69,942	75,842	1,990	147,774
2001	31,760	38,991	780	71,531	64	19	45	63,520	77,982	1,560	143,062
Forecasts											
2006	36,527	49,393	1,034	86,953	69	22	47	73,054	98,786	2,067	173,907
2011	41,255	52,844	1,130	95,229	74	25	50	82,510	105,687	2,260	190,457
2021	52,460	62,591	1,371	116,422	84	31	55	104,919	125,183	2,741	232,843
Average Annual Growth Rates					Annual Change in the Number of Enplanements Per Departure						
1996-2001	(1.0)%	6.2%	(10.2)%	2.4%	(0.5)	0.3	8.4	(1.0)%	6.2%	(10.2)%	(10.2)%
2001-2006	2.8%	4.8%	5.8%	4.0%	1.0	0.6	0.3	2.8%	4.8%	5.8%	4.0%
2006-2011	2.5%	1.4%	1.8%	1.8%	1.0	0.6	0.6	2.5%	1.4%	1.8%	1.8%
2011-2021	2.4%	1.7%	1.9%	2.0%	1.0	0.6	0.5	2.4%	1.7%	1.9%	2.0%

* Charter activity not occurring on scheduled carriers such as American Trans Air, Sun Country, or majors.

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

The net result as presented in Table 3.4-1 is a passenger operations total growing at 4 percent annually 2001 through 2006, with slower growth thereafter.

The passenger fleet mix forecast is presented in **Table 3.4-2**. The BE1-type aircraft declines significantly as Skyway transitions to regional jets. However, there will always be small cities in Wisconsin and Michigan that will be fed to Midwest Express at GMIA using small equipment, so this type of aircraft will not disappear from the fleet entirely. Regional jets grow from 33 percent of total passenger operations in 2002 to 54.4 percent by 2021. The Boeing 717 will become the workhorse of the GMIA fleet by 2021, with almost 22 percent of total passenger operations. This equipment will be flown by Midwest Express and AirTran. The transition of Skyway to Embraer regional jets and Air Wisconsin to Canadair regional jets will increase this segment of aircraft activity at the Airport. Charter operations are expected to increase seat size by transitioning from 150-seat aircraft to 175-seat aircraft. It is expected that charter operations will be conducted with narrow body aircraft.

3.4.2 All Cargo Carrier Operations and Fleet Mix

Operations by all-cargo aircraft were forecast using freight volume as a base, and projecting all-cargo share of the total volume and all-cargo pounds per operation based upon historical relationships. **Table 3.4-3** presents the history and forecast of these operations.

All-cargo operations increased at 5.1 percent annually from 1996 through 2001. Over this same time period, the volume carried per operation declined 5.8 percent per year. In projecting cargo operations, the average pounds per operation experienced over the last six years was used as the projected pounds per operation. It is believed that cargo carriers will seek improvements to efficiency following the declines in cargo activity in 2001 and continuing into 2002. Therefore, it was assumed that poundage carried per operation would revert to the higher levels carried in the late 1990s. This volume was estimated to be 11,536 pounds per operation. Applying this to the poundage forecast for all-cargo carriers results in the forecast operations in Table 3.4-3. Cargo operations grow very slowly in the 2001 through 2006 time frame as the carriers use existing capacity more efficiently. After 2006, when pounds per departure have reached the 11,536 level, cargo operations begin to grow again at 3.0 and 3.6 percent annually throughout the forecast period.

TABLE 3.4-2

General Mitchell International Airport

PASSENGER FLEET MIX

Equipment	Departures Average Day of the Peak Month				Distribution by Equipment Type			
Type	2002	2006	2011	2021	2002	2006	2011	2021
BE1	54	27	18	18	22.3%	10.8%	6.6%	5.4%
FRJ	37	37	37	37	15.3%	14.9%	13.6%	11.1%
SF3	7	7	7	0	2.9%	2.8%	2.6%	0.0%
ER3	5	15	20	29	2.1%	6.0%	7.4%	8.7%
ERD	5	14	18	24	2.1%	5.6%	6.6%	7.2%
ERJ	8	9	11	22	3.3%	3.6%	4.0%	6.6%
CRJ	18	20	31	41	7.4%	8.0%	11.4%	12.3%
ER4	7	17	21	28	2.9%	6.8%	7.7%	8.4%
DC9	8	0	0	0	3.3%	0.0%	0.0%	0.0%
D9S	30	3	3	3	12.4%	1.2%	1.1%	0.9%
146	8	6	0	0	3.3%	2.4%	0.0%	0.0%
319	2	2	5	9	0.8%	0.8%	1.8%	2.7%
D95	4	4	4	4	1.7%	1.6%	1.5%	1.2%
733	5	5	5	6	2.1%	2.0%	1.8%	1.8%
72S	2	2	2	2	0.8%	0.8%	0.7%	0.6%
M80	22	22	22	22	9.1%	8.8%	8.1%	6.6%
734	1	1	1	2	0.4%	0.4%	0.4%	0.6%
320	2	2	2	2	0.8%	0.8%	0.7%	0.6%
757	4	4	4	4	1.7%	1.6%	1.5%	1.2%
717	10	49	55	73	4.1%	19.7%	20.2%	21.9%
73G	3	3	6	7	1.2%	1.2%	2.2%	2.1%
Total	242	249	272	333	100.0%	100.0%	100.0%	100.0%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

TABLE 3.4-3

General Mitchell International Airport

ALL CARGO OPERATIONS

	Poundage on All Cargo Carriers			All Cargo	Pounds Per
Year	Freight	Mail	Total	Operations	Operation
1996	169,751,820	5,819,850	175,571,670	13,298	13,203
1997	173,642,730	4,879,807	178,522,537	16,030	11,137
1998	192,262,215	6,563,304	198,825,519	16,802	11,833
1999	199,963,438	6,577,202	206,540,640	16,596	12,445
2000	181,786,161	6,048,619	187,834,780	17,360	10,820
2001	162,558,225	3,830,646	166,388,871	17,022	9,775
Forecasts					
2006	183,774,400	19,222,031	202,996,431	17,597	11,536
2011	213,814,500	21,960,969	235,775,469	20,439	11,536
2021	308,691,719	28,665,263	337,356,982	29,245	11,536
Average Annual Growth Rates					
1996-2001	(0.9)%	(8.0)%	(1.1)%	5.1%	(5.8)%
2001-2006	2.5%	38.1%	4.1%	0.7%	3.4%
2006-2011	3.1%	2.7%	3.0%	3.0%	0.0%
2011-2021	3.7%	2.7%	3.6%	3.6%	0.0%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

The cargo operations fleet mix is presented in **Table 3.4-4**. Larger equipment types, such as the A300 through the DC-9 are currently estimated to conduct 36 percent of all-cargo operations. This does not change significantly through the forecast period. Airbus 300 and Boeing 757 types of equipment are expected to replace the Boeing 727, DC-8 and DC-9 fleets of Federal Express and UPS.

TABLE 3.4-4

General Mitchell International Airport

CARGO OPERATIONS FLEET MIX

Equipment Type	Departures Average Day of the Peak Month				Distribution by Equipment Type			
	2002	2006	2011	2021	2002	2006	2011	2021
A300	1	3	5	9	4.0%	11.1%	16.1%	20.0%
B-757		1	3	6		3.7%	9.7%	13.3%
B-727-200	4	3			16.0%	11.1%		
DC-8	1				4.0%			
B-727-100	1				4.0%			
DC-9	1	1			4.0%	3.7%		
330-200	1	1	1	2	4.0%	3.7%	3.2%	4.4%
SA-227-AT	1	1	2	2	4.0%	3.7%	6.5%	4.4%
C-208	7	8	10	12	28.0%	29.6%	32.3%	26.7%
C-402	1	1	1	3	4.0%	3.7%	3.2%	6.7%
PA-31	1	1	2	3	4.0%	3.7%	6.5%	6.7%
CE-310R	3	4	4	4	12.0%	14.8%	12.9%	8.9%
BE-58	3	3	3	4	12.0%	11.1%	9.7%	8.9%
Total	25	27	31	45	100.0%	100.0%	100.0%	100.0%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

However, the large aircraft represent a 37 percent share of total all-cargo operations by 2021, similar to their share today. The smaller types of aircraft are expected to continue operating as they do today; feeding the larger carriers and dispersing inbound cargo to smaller cities in the Wisconsin and Michigan area.

3.4.3 General Aviation Operations and Fleet Mix

Historical and forecast general aviation operations are presented in **Table 3.4-5**. General aviation operations at GMIA have been trending downward since 1990. Throughout the U.S. this activity declined through the 1980s and into the early 1990s as product liability costs discouraged manufactures from building new aircraft. In 1994 the General Aviation Revitalization Act was signed, limiting this liability exposure for aging general aviation aircraft. There was some rebound in activity following the passage of this Act, but GMIA did not rebound as strongly as the rest of the country. Table 3.4-5 indicates that GMIA's share of total U.S. general aviation activity has declined steadily since 1990. The forecast assumes that this decline will level off at 0.08 percent of the U.S. activity throughout the forecast period. This results in a level of activity that does not rebound to the 2000 level by the end of the 2021 forecast period. Activity declines through 2006 as the share continues down from 0.09 percent in 2001 to 0.08 percent. After 2006, there is slight growth, 1.2 percent annually through 2011, and 0.9 percent per year through 2021.

TABLE 3.4-5

General Mitchell International Airport

GENERAL AVIATION OPERATIONS

General Aviation Operations			GMIA %	General Aviation	
Year	GMIA	U.S.Total	of U.S.	Itinerant	Local
1990	65,768	35,293,519	0.19%		
1991	67,519	38,910,962	0.17%		
1992	65,237	38,354,750	0.17%		
1993	63,370	36,600,990	0.17%		
1994	62,336	36,253,861	0.17%		
1995	55,174	35,926,520	0.15%		
1996	48,336	35,298,290	0.14%	41,862	6,474
1997	49,579	36,833,396	0.13%	43,619	5,960
1998	48,809	38,046,632	0.13%	42,279	6,530
1999	45,592	39,999,547	0.11%	39,846	5,746
2000	39,695	39,878,536	0.10%	35,671	4,024
2001	34,520	37,620,027	0.09%	30,883	3,637
Forecasts					
2006	33,379	41,724,000	0.08%	29,374	4,006
2011	35,495	44,369,300	0.08%	31,236	4,259
2021	38,956	48,694,640	0.08%	34,281	4,675
Average Annual Growth Rates					
1990-2001					
2001-2006	(0.7)%	2.1%		(1.0)%	1.9%
2006-2011	1.2%	1.2%		1.2%	1.2%
2011-2021	0.9%	0.9%		0.9%	0.9%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis
FAA Aerospace Forecasts, Fiscal Years 2002-2013, U.S. DOT

GMIA general aviation operations represent a small percentage of general aviation activity in southeastern Wisconsin. **Table 3.4-6** presents FAA reports of general aviation operations at seven area airports around GMIA, 2000 actuals and FAA Terminal Area Forecasts (TAF) for 2015. A GMIA general aviation operation represented 8.2 percent of the area's general aviation operations in 2000, and is forecast to represent 6.7 percent in 2015. Only Hartford Municipal Airport has a smaller share of area activity. If a policy decision were to dictate that GMIA capacity could no longer accommodate general aviation activity, only 6.7 percent of the area's general aviation operations would have to be redistributed among other facilities.

TABLE 3.4-6

General Mitchell International Airport

MILWAUKEE AND GMIA AREA GENERAL AVIATION OPERATIONS

			GA Operations		Share of Area Operations	
Airport	Code	City	Actuals 2000	FAA TAF 2015	Actuals 2000	FAA TAF 2015
West Bend Municipal Airport	ETB	West Bend	51,300	51,300	10.6%	9.3%
Hartford Municipal Airport	HXF	Hartford	15,500	15,500	3.2%	2.8%
Waukesha County Airport/Crites Field	UES	Waukesha	93,828	134,622	19.4%	24.4%
Capitol Airport - Brookfield	02C	Brookfield	53,646	52,590	11.1%	9.5%
Lawrence J. Timmerman Field	MWC	Milwaukee	79,379	89,873	16.4%	16.3%
Kenosha Regional Airport	ENW	Kenosha	92,789	113,566	19.2%	20.6%
John H. Batten Field	RAC	Racine	57,460	57,460	11.9%	10.4%
General Mitchell International Airport	MKE	Milwaukee	39,695	36,841 *	8.2%	6.7% *
		Total	483,597	551,752	100.0%	100.0%

Source: FAA Terminal Area Forecasts (TAF) for all airports except GMIA.
* GMIA Master Plan Forecast

Table 3.4-7 presents the fleet mix forecast for general aviation activity at GMIA. Currently, two-engine jet aircraft dominate the mix at GMIA. This dominance will increase throughout the forecast period. The FAA projects that the size of the U.S. fleet in this category will grow significantly and that utilization of this aircraft type will increase. Some of this growth is driven by increasing trends toward fractional ownership. The presence of piston aircraft in the fleet mix is expected to decline from 46.7 percent in 2002 to 34.7 percent by 2021. The piston fleet in the U.S. is not growing as fast as other equipment types, and surveys indicate that utilization of these aircraft is declining. The same is true for the use of turboprop aircraft.

Equipment Type	Departures (Average Day of the Peak) Month 2002	2006	2011	2021	Distribution by Equipment Type 2002	2006	2011	2021
Single Engine Piston	12	11	11	11	21.7%	20.6%	19.2%	16.4%
Twin Engine Piston	14	13	13	12	25.0%	23.6%	21.8%	18.3%
Single Engine Jet/Turboprop	0	0	0	0	0.7%	0.6%	0.6%	0.5%
Twin Engine Jet/Turboprop	7	7	7	6	13.1%	12.5%	11.7%	10.0%
Twin Engine Jet	21	23	26	34	38.2%	41.2%	45.1%	52.9%
ThreeEngine Jet	1	1	1	1	1.3%	1.4%	1.6%	1.9%
Total	55	55	59	64	100.0%	100.0%	100.0%	100.0%

TABLE 3.4-7

General Mitchell International Airport

GENERAL AVIATION FLEET MIX

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

3.4.4 Military Operations and Fleet Mix

Military operations and fleet mix are presented in **Table 3.4-8**. Operations have fluctuated, declining 1996 through 1998, increasing slightly, then declining significantly from 1999 to 2000, and growing again in 2001. Military operations were forecast to be the average annual operations experienced 1996 through 2000. It was felt that 2001 may be an aberration due to activities surrounding September 11. Historically, all of the military operations have been itinerant operations. The military activity tends to occur on aircraft such as the C-130 and the KC-135.

TABLE 3.4-8

General Mitchell International Airport

MILITARY OPERATIONS AND FLEET MIX

		Fleet Mix	
Year	Operations	C-130	KC-135
1996	5,629		
1997	5,187		
1998	5,030		
1999	5,183		
2000	4,223		
2001	4,885		
Forecasts			
2006	5,050	62.5%	37.5%
2011	5,050	62.5%	37.5%
2021	5,050	62.5%	37.5%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

3.4.5 Other Air Taxi Operations and Fleet Mix

Records submitted by operators at the Airport and those maintained by the tower on operations have different definitions of category of operation. For example, a large cargo operator such as Fed Ex would be included in the Air Carrier category by the tower, and in the Cargo category by the Airport. A small cargo carrier would be classified as Air Taxi by the tower, but as Cargo by the Airport. The tower classifies the operations of Skyway as Air Taxi, but the commuter operations of American Eagle are classified as Air Carrier.

In order to account for all of the operations reported by the tower, it is necessary to estimate a number of "Other Air Taxi" operations. These operations are estimated to have accounted for 5.7 percent of total operations over the last few years. Therefore, the sum of previously estimated operations is increased by this amount to insure that all operations are taken into account. These operations are assumed to have a fleet mix distribution similar to general aviation operations. The projection of other air taxi operations is presented in **Table 3.4-9**.

TABLE 3.4-9							
General Mitchell International Airport							
OTHER AIR TAXI OPERATIONS							
Year	Other Air Taxi	Total Operations	Other as % of Total	Equipment Type	2006	2011	2021
1996	6,558	200,963	3.3%	Single Engine Piston	20.6%	19.2%	16.4%
1997	10,101	212,609	4.8%	Twin Engine Piston	23.6%	21.8%	18.3%
1998	11,790	219,087	5.4%	Single Engine Jet/Turboprop	0.6%	0.6%	0.5%
1999	12,827	221,866	5.8%	Twin Engine Jet/Turboprop	12.5%	11.7%	10.0%
2000	12,803	221,855	5.8%	Twin Engine Jet	41.2%	45.1%	52.9%
2001	12,023	211,512	5.7%	Three Engine Jet	1.4%	1.6%	1.9%
Forecasts							
2006	13,796	243,730	5.7%				
2011	15,087	266,529	5.7%				
2021	18,366	324,460	5.7%				
Average Annual Growth Rates							
1996-2001	12.9%	1.0%					
2001-2006	2.8%	2.9%					
2006-2011	1.8%	1.8%					
2011-2021	2.0%	2.0%					

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

3.4.6 Summary of Operations and Fleet Mix

The summary of operations is presented in **Table 3.4-10**, and graphically in **Exhibit 3.4-1**. Total operations increase at 2.9 percent annually 2001 through 2006. Commuter operations are the largest contributor to this growth. These operations increase from 36.9 percent of total operations in 2001 to 38.6 percent in 2021. While passenger operations show strong growth through 2006, as they rebound from reduced activity in 2001, cargo and general aviation operations do not exhibit this strong rebound. Cargo growth is slow over that period as carriers work to improve the pounds per departure carried to get it to late 1990s levels. General aviation continues its decline through 2006, and rebounds somewhat thereafter.

The fleet mix at the Airport for the forecast period is presented in **Table 3.4-11**. The Boeing 717, flown by Midwest Express and AirTran, will generate the highest share of operations, 15.7 percent, by 2021. Twin-engine jets will conduct 9.4 percent of total operations, these being in the general aviation category. Aging aircraft such as the Boeing 727, DC-8 and DC-9 will be phased out of the fleet at GMIA over the forecast period. Regional jets will grow from an estimated 24 percent of total GMIA operations in 2002 to 39 percent in 2021.

3.5 Peak Hour Projections

Peak activity for passengers and operations are presented in this section. These peaks will vary for different elements of activity at the Airport, such as passenger carriers, cargo activity, and general aviation operations. Each element of activity is discussed in the following sections.

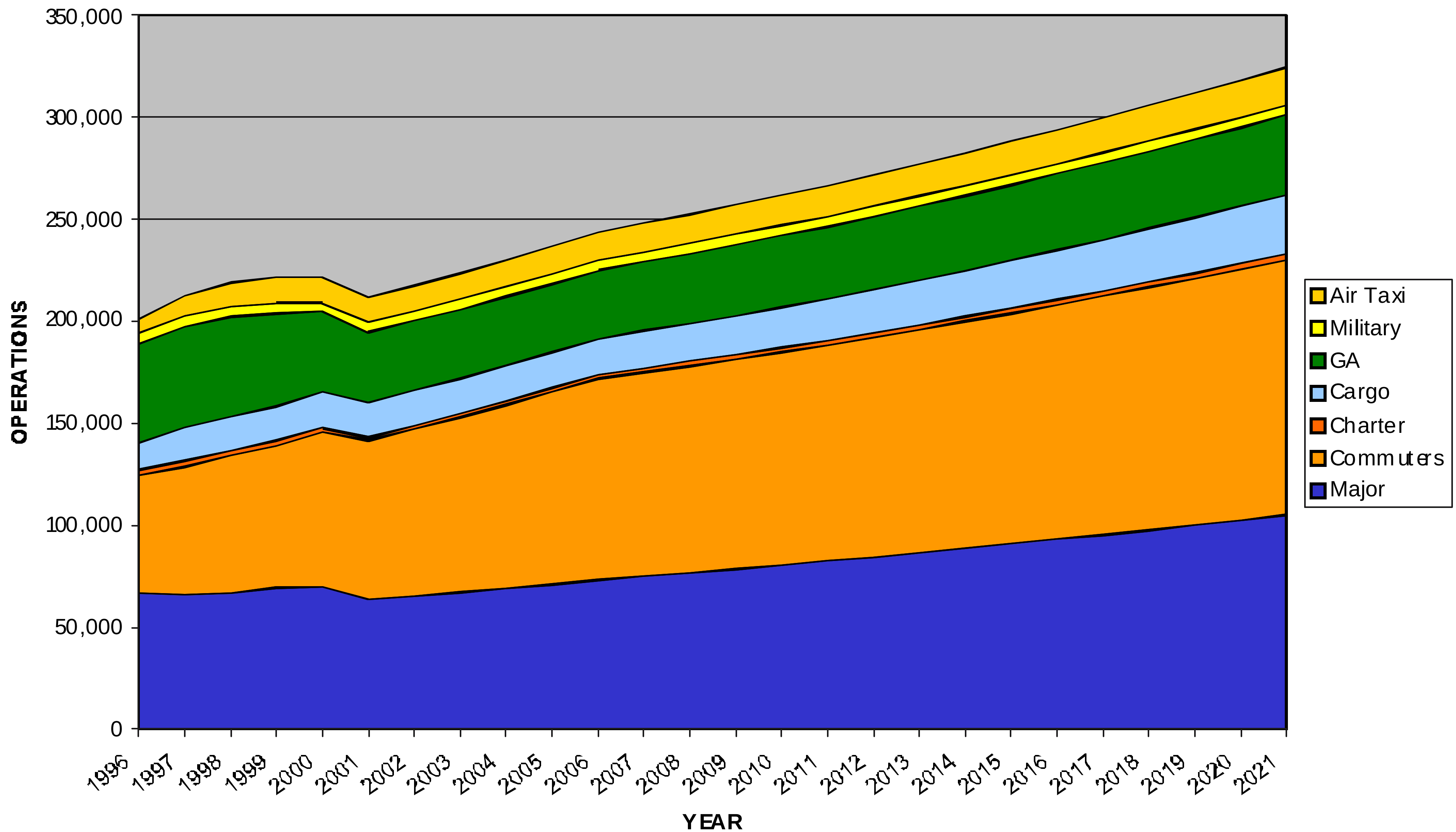
TABLE 3.4-10

General Mitchell International Airport

AIRCRAFT OPERATIONS SUMMARY

	Passenger				General		Other	
Year	Major	Commuter	Charter	Cargo	Aviation	Military	Air Taxi	Total
1996	66,710	57,764	2,668	13,298	48,336	5,629	6,558	200,963
1997	65,938	62,786	2,988	16,030	49,579	5,187	10,101	212,609
1998	66,532	67,628	2,496	16,802	48,809	5,030	11,790	219,087
1999	69,574	69,332	2,762	16,596	45,592	5,183	12,827	221,866
2000	69,942	75,842	1,990	17,360	39,695	4,223	12,803	221,855
2001	63,520	77,982	1,560	17,022	34,520	4,885	12,023	211,512
Forecasts								
2006	73,054	98,786	2,067	17,597	33,379	5,050	13,796	243,730
2011	82,510	105,687	2,260	20,439	35,495	5,050	15,087	266,529
2021	104,919	125,183	2,741	29,245	38,956	5,050	18,366	324,460
Average Annual Growth Rates								
1996-2001	(1.0)%	6.2%	(10.2)%	5.1%	(6.5)%	(2.8)%	12.9%	1.0%
2001-2006	2.8%	4.8%	5.8%	0.7%	(0.7)%	0.7%	2.8%	2.9%
2006-2011	2.5%	1.4%	1.8%	3.0%	1.2%	0.0%	1.8%	1.8%
2011-2021	2.4%	1.7%	1.9%	3.6%	0.9%	0.0%	2.0%	2.0%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTERPLAN UPDATE

GMIA AIRCRAFT OPERATIONS SUMMARY

EXHIBIT 3.4-1

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PB AVIATION, INC.

TABLE 3.4-11

General Mitchell International Airport

AIRCRAFT FLEET MIX SUMMARY

Equipment	Annual Operations				Distribution by Equipment Type			
Type	2002	2006	2011	2021	2002	2006	2011	2021
BE1	29,855	18,857	12,604	12,586	14.9%	7.7%	4.7%	3.9%
FRJ	20,456	25,842	25,908	25,871	10.2%	10.6%	9.7%	8.0%
SF3	3,870	4,889	4,901	0	1.9%	2.0%	1.8%	0.0%
ER3	2,764	10,476	14,004	20,278	1.4%	4.3%	5.3%	6.2%
ERD	2,764	9,778	12,604	16,781	1.4%	4.0%	4.7%	5.2%
ERJ	4,423	6,286	7,702	15,383	2.2%	2.6%	2.9%	4.7%
CRJ	9,952	13,968	21,707	28,668	5.0%	5.7%	8.1%	8.8%
ER4	3,870	11,873	14,704	19,578	1.9%	4.9%	5.5%	6.0%
DC9	4,423	0	0	0	2.2%	0.0%	0.0%	0.0%
D9S	16,586	2,095	2,101	2,098	8.3%	0.9%	0.8%	0.6%
146	4,423	4,191	0	0	2.2%	1.7%	0.0%	0.0%
319	1,106	1,397	3,501	6,293	0.6%	0.6%	1.3%	1.9%
D95	2,211	2,794	2,801	2,797	1.1%	1.1%	1.1%	0.9%
733	2,764	3,492	3,501	4,195	1.4%	1.4%	1.3%	1.3%
72S	1,106	1,397	1,400	1,398	0.6%	0.6%	0.5%	0.4%
M80	12,163	15,365	15,405	15,383	6.1%	6.3%	5.8%	4.7%
734	553	698	700	1,398	0.3%	0.3%	0.3%	0.4%
320	1,106	1,397	1,400	1,398	0.6%	0.6%	0.5%	0.4%
757	2,211	2,794	2,801	2,797	1.1%	1.1%	1.1%	0.9%
717	5,529	34,223	38,512	51,044	2.8%	14.0%	14.4%	15.7%
73G	1,659	2,095	4,201	4,895	0.8%	0.9%	1.6%	1.5%
Single Engine Piston	9,922	9,732	9,723	9,379	4.9%	4.0%	3.6%	2.9%
Twin Engine Piston	11,393	11,117	11,033	10,504	5.7%	4.6%	4.1%	3.2%
Single Engine Turboprop	305	300	301	292	0.2%	0.1%	0.1%	0.1%
Twin Engine Turboprop	5,992	5,894	5,909	5,738	3.0%	2.4%	2.2%	1.8%
Twin Engine Jet	17,439	19,452	22,818	30,347	8.7%	8.0%	8.6%	9.4%
Three Engine Jet	610	680	798	1,062	0.3%	0.3%	0.3%	0.3%
A300	925	1,955	3,297	5,849	0.5%	0.8%	1.2%	1.8%
B-757	0	652	1,978	3,899	0.0%	0.3%	0.7%	1.2%
B-727-200	2,544	1,955	0	0	1.3%	0.8%	0.0%	0.0%
DC-8	694	0	0	0	0.3%	0.0%	0.0%	0.0%
B-727-100	535	0	0	0	0.3%	0.0%	0.0%	0.0%
DC-9	559	652	0	0	0.3%	0.3%	0.0%	0.0%
330-200	467	652	659	1,300	0.2%	0.3%	0.2%	0.4%
SA-227-AT	632	652	1,319	1,300	0.3%	0.3%	0.5%	0.4%
C-208	4,536	5,214	6,593	7,799	2.3%	2.1%	2.5%	2.4%
C-402	406	652	659	1,950	0.2%	0.3%	0.2%	0.6%
PA-31	705	652	1,319	1,950	0.4%	0.3%	0.5%	0.6%
CE-310R	2,333	2,607	2,637	2,600	1.2%	1.1%	1.0%	0.8%
BE-58	1,863	1,955	1,978	2,600	0.9%	0.8%	0.7%	0.8%
C-130	3,157	3,157	3,157	3,157	1.6%	1.3%	1.2%	1.0%
KC-135	1,894	1,894	1,894	1,894	0.9%	0.8%	0.7%	0.6%
Total	200,706	243,730	266,529	324,460	100.0%	100.0%	100.0%	100.0%

Source: General Mitchell International Airport
PB Aviation, Inc. Analysis

3.5.1 Passenger Peaking

In planning airport facilities it is important to identify the times of peak activity and the levels of activity that occur during those time frames. Facilities are designed to accommodate an average day during the peak month, rather than the absolute peak level of activity. Passenger activity on the average day of the peak month, and during the peak hour of activity on that day, is presented in **Table 3.5-1**.

TABLE 3.5-1

General Mitchell International Airport

PASSENGER PEAKING

	Average Day of the Peak Month			Peak Hour			Peak Hour
	2006	2011	2021	2006	2011	2021	(All Years)
Enplanements	11,419	13,840	20,063	1,901	2,045	2,382	0700-0759
Deplanements	11,419	13,840	20,063	1,930	2,171	2,689	2000-2059
Connections (EP)	1,104	1,668	3,157	184	247	375	0700-0759
Connections (DP)	1,104	1,668	3,157	186	262	423	2000-2059

Source: PB Aviation, Inc. Analysis

March has historically been the month of peak passenger activity at GMIA. Over the past several years, just under 9.7 percent of GMIA passengers have traveled in March. This percentage was applied to the annual forecasts to yield the expected passenger volume in March. The March total was divided by 31 to estimate the passenger volume on the average day of the peak month. This process was also followed to estimate connecting passengers on the average day of the peak month.

The peak hour of passenger activity is assumed to coincide with the peak hour of seats arriving and seats departing. The peak hour for departing seats (and enplaning passengers) is 7:00 AM to 7:59 AM. The peak hour for arriving seats (and deplaning passengers) is 8:00 PM to 8:59 PM. These seats were assumed to be filled at 25 percent above the average load factor because this is a period of peak activity. The load factor at GMIA from 1997 through 2000 averaged approximately 61.5 percent, so the load factor used to determine peak passengers was 77 percent. This load factor was applied to the departing seats calculated from the schedules.

3.5.2 Operations Peaking

Various types of activity at the Airport exhibit different peaking characteristics. Passenger and cargo activity, for example, peak in different months and at different times of the day. It is important to identify each of the peaks individually, as each activity element requires its unique set of facilities, as well as some shared facilities.

The peaks for all activity elements are summarized in **Table 3.5-2**, and each element is discussed further in the following sections. It is important to note that operations in the peak hour or on the average day of the peak month are not additive across different activity elements. This is because the peak months differ among elements, and the peak hours differ even within elements. For example, the peak hour for passenger carrier arrivals is 8:00 PM to 8:59 PM. The peak hour for passenger carrier departures is 7:00 AM to 7:59 AM. However, the hour in 2002 with the highest total passenger operations is 3:00 PM to 3:59 PM.

3.5.2.1 Passenger Carrier Operations Peaking

Passenger operations peak in March, as do passenger enplanements. On the average day in March, forecast operations range from 498 in 2006 to 666 by 2021. The hourly distribution of activity for passenger operations is presented in **Table 3.5-3**. Throughout the forecast period arrivals peak in the 8:00 PM to 8:59 PM hour, and departures peak in the 7:00 AM to 7:59 AM hour. However, total passenger operations peak in the 3:00 PM to 3:59 PM hour. Peaking percentages range from 12 percent to 14 percent for the forecast period.

This pattern of departures peaking in the early morning and arrivals peaking in the evening implies a business type of travel, out in the morning, back in the evening. Even if a traveler is not completing a round trip in a single day, this pattern of travel indicates that the GMIA passengers are looking to spend a full day at the other end of the trip rather than in Milwaukee.

TABLE 3.5-2

General Mitchell International Airport

OPERATIONS PEAKING

	Peak Month	Average Day Peak Month			Peak Hour		
		2006	2011	2021	2006	2011	2021
Passenger	March						
Arrivals		249	272	333	30	37	48
Departures		249	272	333	28	33	42
Total		498	545	666			
Cargo	Varies						
Arrivals		27	31	45	7	8	12
Departures		27	31	45	12	14	22
Total		54	63	90			
General Aviation	July						
Arrivals		55	59	64	6	7	7
Departures		55	59	64	7	7	8
Total		110	118	128			
Military	Varies						
Arrivals		8	8	8	1	1	1
Departures		8	8	8	1	1	1
Total		16	16	16			
Other Air Taxi	July						
Arrivals		23	25	30	3	3	4
Departures		23	25	30	4	5	5
Total		46	50	60			

Note: The peaks for the various types of operations as shown here are not additive. As the table indicates, different activity elements peak in different months. Therefore, a sum across monthly peaks is not valid. It is also not valid to sum arrivals and departures for hourly peaks, as the peak arrival hour frequently differs from the peak departure hour.

Source: PB Aviation, Inc. Analysis

3.5.2.2 Cargo Carrier Operations Peaking

Over the past several years, cargo activity has peaked in a variety of different months; November, December, July, twice in August, and in October. However, whatever the peak month has been, it has represented an average of 9.5 percent of annual all-cargo operations. As seen in Table 3.5-2, cargo operations on the average day of the peak month are expected to grow from 54 in 2006 to 90 in 2021.

TABLE 3.5-3

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY PASSENGER OPERATIONS

Hour	2006 Arr.	2006 Dept	2006 Total	2011 Arr.	2011 Dept	2011 Total	2021 Arr.	2021 Dept	2021 Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359									
0400 - 0459									
0500 - 0559	1	9	10	1	9	10	1	8	9
0600 - 0659	7	12	19	8	12	20	11	10	21
0700 - 0759	12	30	42	14	33	47	15	42	57
0800 - 0859	16	20	36	17	20	37	19	23	42
0900 - 0959	12	19	31	12	20	32	17	21	38
1000 - 1059	11	11	22	12	11	23	18	17	35
1100 - 1159	17	6	23	18	7	25	23	12	35
1200 - 1259	19	17	36	22	18	40	27	23	50
1300 - 1359	11	17	28	13	19	32	17	24	41
1400 - 1459	19	11	30	21	12	33	26	18	44
1500 - 1559	17	26	43	20	28	48	21	33	54
1600 - 1659	19	18	37	20	20	40	26	23	49
1700 - 1759	12	15	27	13	18	31	17	23	40
1800 - 1859	16	11	27	16	14	30	21	19	40
1900 - 1959	8	13	21	8	14	22	10	16	26
2000 - 2059	32		32	37	3	40	48	4	52
2100 - 2159	12	14	26	12	14	26	9	17	26
2200 - 2259	6		6	6		6	5		5
2300 - 2359	2		2	2		2	2		2
Total	249	249	498	272	272	544	333	333	666
Peak Hour	32	30	43	37	33	48	48	42	57
Peak Percent	12.9%	12.0%	8.6%	13.6%	12.1%	8.8%	14.4%	12.6%	8.6%

Source: PB Aviation Inc. Analysis

The hourly distribution of cargo activity is presented in **Table 3.5-4**. Cargo flights depart to various cargo hubs and distribution centers in the late evening, from 9:30 PM through midnight. The carriers return in the early morning to disburse cargo for early-in-the-day delivery. The peak arrival hour for cargo operations is 5:00 AM to 5:59 AM, and the peak departure hours are both the 10:00PM to 10:59 PM and 11:00 PM to 11:59 PM hours. Over 25 percent of cargo arrivals occur during the peak, and 45-50 percent of cargo departures occur during the peak hour. Occasionally, unscheduled cargo operations occur during the day. Approximately 10 percent of the cargo operations are of the unscheduled variety.

3.5.2.3 *General Aviation Operations Peaking*

Table 3.5-5 indicates that general aviation operations at their peak grow from 110 operations in 2006 to 128 in 2010. They generally follow the pattern of passenger operations. The peak departure hour is 7:00 AM to 7:59 AM and the peak arrival hour is 8:00 PM to 8:59 PM. Their peaking percentage ranges from 10 to 13 percent over the forecast period.

3.5.2.4 Military Operations Peaking

Military operations are erratic and demonstrate no peaking patterns. Throughout the forecast period it is assumed that they are scattered throughout the day. This is presented in **Table 3.5-6**.

3.5.2.5 Other Air Taxi Operations Peaking

Hourly air taxi operations are presented in **Table 3.5-7**. Arrivals peak in the 8:00PM to 8:59PM hour, and departures peak in the 3:00PM to 3:59PM hour. Peaking percentages range from 13 percent to 20 percent. Peaking percentages seem high because there are so few flights. Moving a single flight into or out of a particular hour swings the peaking percentages widely.

3.5.2.6 Total Peaking

As discussed earlier, and as noted at the bottom of Table 3.5-2, the peaking activities of these elements are not additive because they occur in different months and at different times of the day. However, for planning purposes for the requirements shared by many of these activity elements (runways, airspace, tower support, etc.) it is useful to construct an hourly scenario for a total day indicating what the absolute peak level of activity would be were these activities to coincide. Such an accumulation is presented in

Table 3.5-8, and graphically in **Exhibit 3.5-1**. The individual hourly arrivals and departures for each segment of Airport activity we summed in this table. This summary indicates that the peak arrival hour is 8:00 PM to 8:59 PM, and the peak departure hour is 7:00 AM to 7:59 AM. This is a pattern shared by the passenger and general aviation segments of Airport activity.

TABLE 3.5-4

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY CARGO OPERATIONS

	2006			2011			2021		
Hour	Arr.	Dept	Total	Arr.	Dept	Total	Arr.	Dept	Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359	1		1	1		1	1		1
0400 - 0459	6		6	7		7	8		8
0500 - 0559	7		7	8		8	12		12
0600 - 0659	6		6	6		6	10		10
0700 - 0759	4		4	5		5	6		6
0800 - 0859	1		1	1		1	4		4
0900 - 0959	1		1	1		1	1		1
1000 - 1059							1		1
1100 - 1159		1	1		1	1		1	1
1200 - 1259									
1300 - 1359	1		1	2		2	1	1	2
1400 - 1459									
1500 - 1559		1	1		1	1		1	1
1600 - 1659					1	1			
1700 - 1759							1		1
1800 - 1859									
1900 - 1959								1	1
2000 - 2059									
2100 - 2159		1	1		1	1		3	3
2200 - 2259		12	12		14	14		16	16
2300 - 2359		12	12		13	13		22	22
Total	27	27	54	31	31	62	45	45	90
Peak Hour	7	12	12	8	14	14	12	22	22
Peak Percent	25.9%	44.4%	22.2%	25.8%	45.2%	22.6%	26.7%	48.9%	24.4%

Source: PB Aviation Inc. Analysis

TABLE 3.5-5

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY GENERAL AVIATION OPERATIONS

Hour	2006 Arr.	2006 Dept	2006 Total	2011 Arr.	2011 Dept	2011 Total	2021 Arr.	2021 Dept	2021 Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359									
0400 - 0459									
0500 - 0559		2	2	1	2	3	1	2	3
0600 - 0659	1	3	4	1	3	4	2	3	5
0700 - 0759	3	7	10	4	7	11	4	8	12
0800 - 0859	3	5	8	3	5	8	3	5	8
0900 - 0959	3	4	7	3	4	7	3	4	7
1000 - 1059	2	2	4	2	3	5	3	3	6
1100 - 1159	4	1	5	4	2	6	4	2	6
1200 - 1259	4	4	8	5	4	9	6	4	10
1300 - 1359	3	4	7	3	5	8	3	5	8
1400 - 1459	5	3	8	5	3	8	6	3	9
1500 - 1559	3	6	9	3	6	9	4	7	11
1600 - 1659	4	4	8	4	4	8	4	4	8
1700 - 1759	2	4	6	2	4	6	2	4	6
1800 - 1859	4	2	6	4	2	6	4	3	7
1900 - 1959	2	2	4	2	2	4	2	3	5
2000 - 2059	6		6	7		7	7		7
2100 - 2159	3	1	4	3	2	5	3	3	6
2200 - 2259	2		2	2		2	2		2
2300 - 2359	1	1	2	1	1	2	1	1	2
Total	55	55	110	59	59	118	64	64	128
Peak Hour	6	7	10	7	7	11	7	8	12
Peak Percent	10.9%	12.7%	9.1%	11.9%	11.9%	9.3%	10.9%	12.5%	9.4%

Source: PB Aviation Inc. Analysis

TABLE 3.5-6

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY MILITARY OPERATIONS

	2006			2011			2021		
Hour	Arr.	Dept	Total	Arr.	Dept	Total	Arr.	Dept	Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359									
0400 - 0459									
0500 - 0559									
0600 - 0659									
0700 - 0759									
0800 - 0859	1		1	1		1	1		1
0900 - 0959									
1000 - 1059	1	1	2	1	1	2	1	1	2
1100 - 1159									
1200 - 1259	1	1	2	1	1	2	1	1	2
1300 - 1359									
1400 - 1459	1	1	2	1	1	2	1	1	2
1500 - 1559									
1600 - 1659	1	1	2	1	1	2	1	1	2
1700 - 1759									
1800 - 1859	1	1	2	1	1	2	1	1	2
1900 - 1959									
2000 - 2059	1	1	2	1	1	2	1	1	2
2100 - 2159									
2200 - 2259	1	1	2	1	1	2	1	1	2
2300 - 2359		1	1		1	1		1	1
Total	8	8	16	8	8	16	8	8	16
Peak Hour	1	1	2	1	1	2	1	1	2
Peak Percent	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%

Source: PB Aviation Inc. Analysis

TABLE 3.5-7

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY OTHER AIR TAXI OPERATIONS

	2006			2011			2021		
Hour	Arr.	Dept	Total	Arr.	Dept	Total	Arr.	Dept	Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359									
0400 - 0459									
0500 - 0559		1	1		1	1		1	1
0600 - 0659	1	1	2	1	1	2	1	2	3
0700 - 0759	2	2	4	2	2	4	2	3	5
0800 - 0859	2	2	4	2	2	4	2	2	4
0900 - 0959	2	1	3	2	2	4	2	3	5
1000 - 1059	1	1	2	1	1	2	2	1	3
1100 - 1159	2	1	3	2	1	3	3	1	4
1200 - 1259	2	2	4	2	2	4	3	3	6
1300 - 1359	1	2	3	1	2	3	1	3	4
1400 - 1459	2	1	3	2	1	3	2	1	3
1500 - 1559	1	4	5	1	5	6	2	5	7
1600 - 1659	2	2	4	2	2	4	2	2	4
1700 - 1759	1	1	2	1	1	2	1	1	2
1800 - 1859	1	1	2	2	1	3	2	1	3
1900 - 1959		1	1	1	1	2	1	1	2
2000 - 2059	3		3	3		3	4		4
2100 - 2159									
2200 - 2259									
2300 - 2359									
Total	23	23	46	25	25	50	30	30	60
Peak Hour	3	4	5	3	5	6	4	5	7
Peak Percent	13.0%	17.4%	10.9%	12.0%	20.0%	12.0%	13.3%	16.7%	11.7%

Source: PB Aviation Inc. Analysis

3.6 OTHER GROWTH SCENARIOS

It is possible that some of the assumptions underlying this forecast will not come to pass as expected. If assumptions regarding socioeconomic growth in the area or in the United States are incorrect, activity may grow more quickly or more slowly than expected. Such changes would not necessarily change the character of the forecast, but merely the timing at which milestones are reached. However, there are two assumptions that affect the character of GMIA's evolution, and if those assumptions are incorrect, the character of the operations would be somewhat different. Those assumptions are:

- *The initiation and success of service by AirTran, a low fare carrier serving Florida destinations very popular among GMIA travelers*

- *Midwest* Express/Skyway increase in connections at GMIA

Table 3.6-1 presents the contribution of these two assumptions to the base forecast over the planning period. AirTran enplanements are projected to contribute over eight percent of total enplanements from 2006 through 2021 while the incremental growth in connecting enplanements of Midwest Express and skyway increase from 2.6 percent of total enplanements in 2006 to 13.1 percent of total enplanements in 2021. The corresponding number of aircraft operations for each of these assumptions is also presented in Table 3.6-1. This activity would be at risk if AirTran's entrance into the Milwaukee market fails completely or if the percentage of passengers connecting through GMIA on Midwest Express and Skyway does not develop as projected.

3.7 SUMMARY

In summary, GMIA will continue to be a vibrant, growing base of aviation activity throughout the forecast period. Growth in domestic passenger traffic will come through the addition of carriers like AirTran, and the continued expansion of Midwest Express and Skyway. As these carriers expand, new markets will open and current ones will grow.

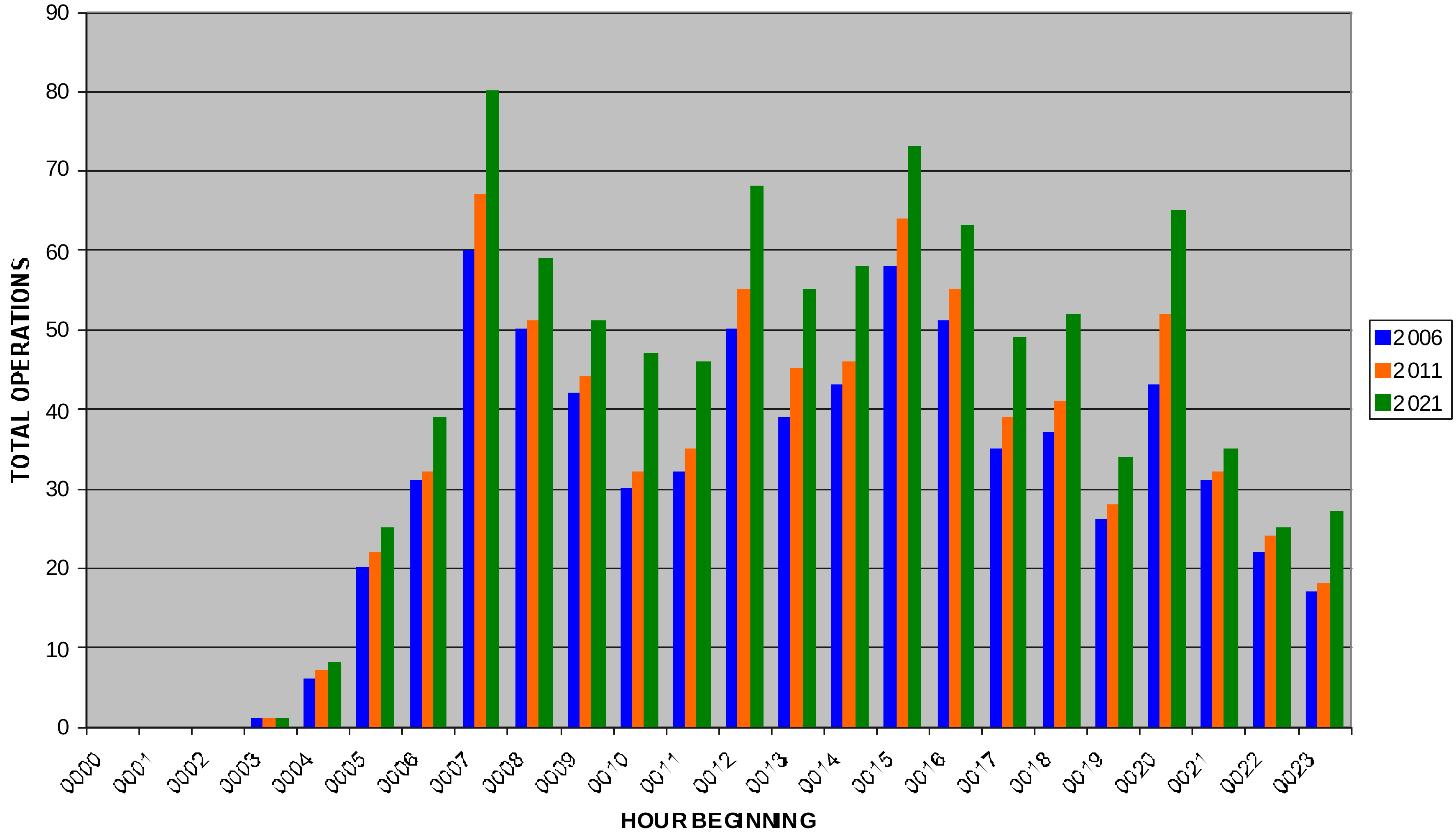
TABLE 3.5-8

General Mitchell International Airport

24-HOUR PEAKING ACTIVITY
SUMMARY OF ALL AIRPORT OPERATIONS

Hour	2006 Arr.	2006 Dept	2006 Total	2011 Arr.	2011 Dept	2011 Total	2021 Arr.	2021 Dept	2021 Total
0000 - 0059									
0100 - 0159									
0200 - 0259									
0300 - 0359	1		1	1		1	1		1
0400 - 0459	6		6	7		7	8		8
0500 - 0559	8	12	20	10	12	22	14	11	25
0600 - 0659	15	16	31	16	16	32	24	15	39
0700 - 0759	21	$\boxed{39}$	$\boxed{60}$	25	$\boxed{42}$	$\boxed{67}$	27	$\boxed{53}$	$\boxed{80}$
0800 - 0859	23	27	50	24	27	51	29	30	59
0900 - 0959	18	24	42	18	26	44	23	28	51
1000 - 1059	15	15	30	16	16	32	25	22	47
1100 - 1159	23	9	32	24	11	35	30	16	46
1200 - 1259	26	24	50	30	25	55	37	31	68
1300 - 1359	16	23	39	19	26	45	22	33	55
1400 - 1459	27	16	43	29	17	46	35	23	58
1500 - 1559	21	37	58	24	40	64	27	46	73
1600 - 1659	26	25	51	27	28	55	33	30	63
1700 - 1759	15	20	35	16	23	39	21	28	49
1800 - 1859	22	15	37	23	18	41	28	24	52
1900 - 1959	10	16	26	11	17	28	13	21	34
2000 - 2059	$\boxed{42}$	1	43	$\boxed{48}$	4	52	$\boxed{60}$	5	65
2100 - 2159	15	16	31	15	17	32	12	23	35
2200 - 2259	9	13	22	9	15	24	8	17	25
2300 - 2359	3	14	17	3	15	18	3	24	27
Total	362	362	724	395	395	790	480	480	960
Peak Hour	42	39	60	48	42	67	60	53	80
Peak Percent	11.6%	10.8%	8.3%	12.2%	10.6%	8.5%	12.5%	11.0%	8.3%

Source: PB Aviation Inc. Analysis



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTERPLAN UPDATE

24-HOUR OPERATIONS PEAKING ACTIVITY

EXHIBIT 3.5-1

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PB AVIATION, INC.

TABLE 3.6-1

General Mitchell International Airport

ALTERNATIVE FORECAST

	Base Forecast		Contributions to Base Forecast		Percent of Total Enplanements in Base Forecast		Operations Impact		Percent of Passenger Operations in Base Forecast	
Year	Total Enplanements	Connections Included	AirTran Enplanements	Incremental Connections	AirTran Enplanements	Incremental Connections	AirTran	Connections	AirTran	Connections
1996	2,732,965	206,693								
1997	2,804,596	199,869								
1998	2,790,837	204,185								
1999	2,906,189	221,291								
2000	3,039,962	234,518								
2001	2,811,954	269,823								
Forecasts										
2006	3,658,480	353,585	305,341	94,289	8.3%	2.6%	8,815	4,139	5.1%	2.4%
2011	4,434,172	534,533	388,616	254,540	8.8%	5.7%	10,464	10,271	5.5%	5.4%
2021	6,427,713	1,011,481	527,407	842,901	8.2%	13.1%	12,516	29,285	5.4%	12.6%

Source: PB Aviation, Inc. Analysis

General aviation activity will continue at the Airport, but it will grow very slowly, especially in the early part of the forecast period. Cargo operators, large and small, will also grow at GMIA.

The next chapter assesses the ability of existing airside and landside facilities at GMIA to accommodate the aviation activity levels that are projected in this chapter. The need for improvements and expanded facilities is determined by the projections in this chapter as well as by known changes to occur in the aviation industry.

4.0

Airfield Demand/Capacity and Requirements

4.0 AIRFIELD DEMAND/CAPACITY ANALYSIS AND REQUIREMENTS

The previous Master Plan for GMIA was initiated in 1988 and adopted by the Milwaukee County Board of Supervisors in 1993. That Master Plan identified the need for various airfield capacity improvements, including:

- *Realignment and extension of runway 7L/25R (completed)*
- *Construction of a 1,000-foot extension to runway 7R/25L*
- *Construction of a 2,850-foot extension to runway 1R/19L (500 feet to the north and 2,350 feet to the south)*
- *Decommissioning runway 13/31*

Additionally, a new runway to provide capacity during Instrument Meteorological Conditions (IMC) was investigated. Several alternatives were evaluated for the location of a future runway. Alternative C-1, a 7,000-foot runway parallel to and 3,540 feet south of runway 7R/25L, was recommended and ultimately adopted as part of the Airport Layout Plan.

This Master Plan Update Study evaluates the capacity of the existing airfield to serve the projected activity described in Chapter 3.0, *Activity Projections*. Future capacity problems are identified and delays are calculated. This, in turn, will establish the timing of the need for the "C-1 Runway", as it has come to be known. Also, the runway extensions included in the previous master plan are re-evaluated for the changes in the aircraft fleet mix projected over the 20-year planning period.

Assessments of airfield demand/capacity and requirements are presented in the following sections:

- *Theoretical Capacity Analysis*

- *Airfield Simulation Analysis*
- *Geometric Design Requirements*
- *Runway Length Requirements*
- *Runway Width Requirements*
- *Airfield Safety Areas Requirements*

4.1 Theoretical Capacity Analysis

The ability of an airfield to accommodate projected air traffic is an important element of every master plan study. Airfield facilities require a significant amount of land. The layout of the airfield must adhere to federal requirements, minimize the opportunity for incursions, and facilitate air traffic management as best possible. Also, the configuration of an airfield is a major determinant of an airport's impact on surrounding communities.

An extensive analysis was undertaken to evaluate the capacity and capabilities of the airfield at the Airport. The capacity of the airfield to accommodate projected levels of activity was evaluated by first assessing the theoretical capacity of the airfield, i.e., the number of operations that the current runway and taxiway configuration could be expected to accommodate. Computer simulations, presented in Section 4.2, were then performed to provide a more detailed assessment of congestion points and levels of aircraft delay.

Airfield capacity has been defined in two ways. One definition, used extensively in the United States in the past, is that capacity is the number of aircraft operations during a specified time corresponding to a level of average delay. This is referred to as practical capacity. Under another definition, capacity is the number of aircraft operations that an airfield can accommodate during a specified time while there is a continuous demand for service. Continuous demand for service means that there are always aircraft ready to take off or land. This definition has been referred to in several ways: as ultimate capacity, saturation capacity, or maximum throughput rate. An important difference between these two measures of capacity is that one is defined in terms of delay, while the other is not.

Capacity is most often expressed in hourly or annual measures. For long-range planning efforts, such as this Master Plan Update Study, the annual operating capacity or annual service volume (ASV) is used to measure an airport's ability to process existing and future demand levels. Hourly capacity is also analyzed, in order to identify any peak-period issues that may arise.

The generally accepted methodology for calculating airfield capacity is based on the FAA's *Airport Capacity and Delay Manual* (FAA Advisory Circular 150/5060-5). The methodology incorporated in the FAA's Advisory Circular and computer model relies upon two general concepts for determining airport capacity: hourly capacity and annual service volume. Hourly capacity is defined as the maximum number of aircraft operations that can take place on a runway system with a specific runway use configuration in a one-hour period. ASV is defined as a reasonable estimate of the annual number of aircraft operations that an airport can accommodate. ASV accounts for differences in runway use configurations, aircraft fleet mix, weather conditions, operational peaking, etc., that would be encountered over a period of one year.

Many factors influence the capacity of an airport, and some are more significant than others. In general, the capacity depends on the configuration of the airfield, the environment in which aircraft operate availability and sophistication of aids to navigation, and air traffic control facilities and procedures.

The airfield capacity analysis conducted for this Master Plan Study considers the following elements:

- *Airfield layout*
- *Meteorology (weather conditions)*
- *Aircraft operational fleet mix*
- *Percentage of arrivals*
- *Touch-and-go operations*
- *Peak hour airfield capacity*

- *Annual service volume (ASV)*

Factors such as runway configuration, weather, and fleet mix were reviewed to determine their influence on operational capacity. Calculated capacity was compared to projected demand to assess the potential need for airfield improvements.

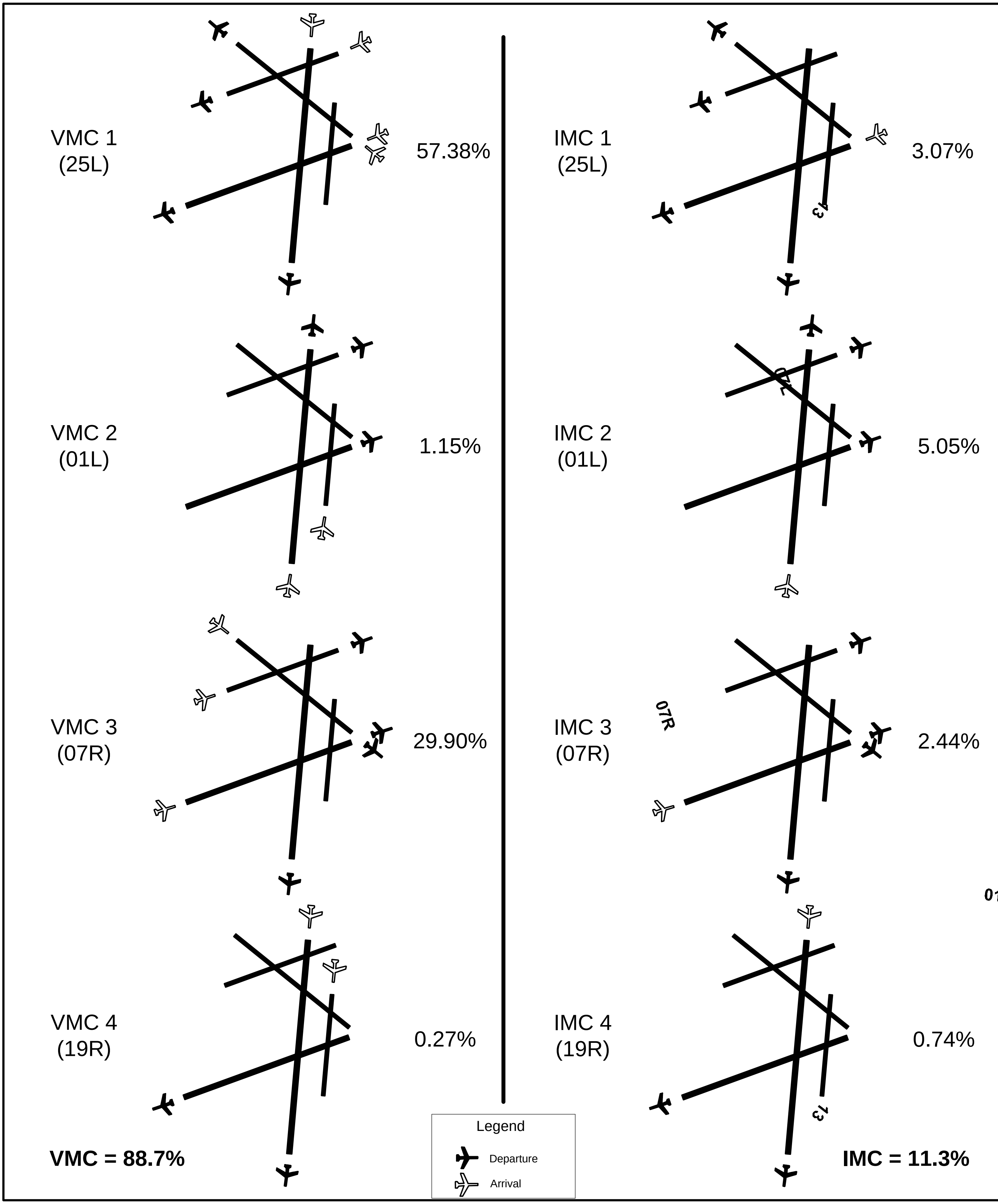
4.1.1 Airfield Layout

The runway/taxiway configuration is described by the physical layout including the number of runways, their orientation, and their locations relative to each other and to other landside facilities. Each runway/taxiway configuration has a different capacity due to operational limitations and restrictions. Capacity differs for each additional runway, depending on its wind coverage and location relative to other existing runways.

Exhibit 4.1-1 shows the runway layout and the predominant runway-operating configuration used at GMIA. GMIA has five runways. Two are sets of parallel runways: runways 7L/25R and 7R/25L, which have a separation of 3,680 feet, and runways 1L/19R and 1R/19L, which have a separation of 1,000 feet. Runway 13/31, a crosswind runway, makes up the remainder of the runway system.

Runway 1L/19R is 9,690 feet long by 200 feet wide. Runway 1R/19L is 4,183 feet long by 150 feet wide. Runway 7L/25R is 4,800 feet long by 100 feet wide. Runway 7R/25L is 8,012 feet long by 150 feet wide. Runway 13/31 is 5,868 feet long by 150 feet wide.

Runway 7L/25R is restricted to non-jet aircraft and to aircraft with wingspans less than 79 feet (FAA Airplane Design Group II). This restriction was the outcome of an Environmental Impact Statement (EIS) for realigning and lengthening runway 7L/25R. Runway 13/31 is closed to turbojet aircraft operations, although there are exceptions to



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

RUNWAY USE CONFIGURATIONS

EXHIBIT 4.1-1

this restriction with prior permission from the Airport. Additionally, turbojet departures from runway 1R are prohibited.

Another runway characteristic considered in the airfield capacity analysis is the availability of taxiway exits within an optimal distance from the threshold. For the primary runways, the exits are located as follows:

- *Runway 19R/1L has seven exits: beginning with the 19R end, the exits are located at the threshold, 1,000, 2,900, 3,700, 4,800, 6,400, 8,200, and 9,600 feet.*

- *Runway 7R/25L has five exits: beginning with the 25L end, the exits are located at the threshold, 2,800, 3,400, 4,000, 4,900, 5,500, 6,650 and 8,000 feet.*

The optimal exiting distance varies depending on the aircraft that use the runway (i.e., the fleet mix). Strategically located exits reduce runway occupancy time, and therefore increase capacity.

A brief explanation for each runway use configuration shown in Exhibit 4.1-1 is described in the following sections and is summarized in **Table 4.1-1**.

TABLE 4.1-1

General Mitchell International Airport

RUNWAY USE CONFIGURATIONS

Runway Use Configuration	Annual Percentage	Arrival Runways	Departure Runways
VMC1	57.38%	25L, 19R, 25R, 31	25L, 19R, 25R, 31
VMC2	1.15%	1L, 1R	1L, 7R, 7L
VMC3	29.90%	7R, 7L, 13	7R, 19R, 7L, 13
VMC4	0.27%	19R, 19L	19R, 25L
IMC1	3.07%	25L	25L, 19R, 25R, 31
IMC2	5.05%	1L	1L, 7R, 7L
IMC3	2.44%	7R	7R, 7L, 19R, 13
IMC4	0.74%	19R	19R, 25L

Note: See Exhibit 4.1-1 for a graphic depiction of this table.
Source: FAA Air Traffic Control Tower Management, 2001 data.

4.1.1.1 VMC1/IMC1

Under these runway use configurations, runways 25L, 25R, 19R, and 31 are in operation. For VMC1, 95 percent of jet aircraft arrive on runway 25L and 85 percent of jet departures occur on runway 19R. The remaining jet aircraft arrive and depart on runways 25L and 19R, respectively. Approximately 70 percent of propeller-driven (prop) aircraft arrive on runway 25L with other arrivals distributed on runways 25R, 19R and 31. The majority of prop aircraft depart of from runway 19R (63 percent) and the remaining prop aircraft departures distributed on runways 25L, 25R and 31.

Under IMC1, all aircraft arrive to runway 25L. Departures under IMC1 remain the same as described in VMC1, above.

4.1.1.2 VMC2/IMC2

Runways 1L, 1R, 7R, and 7L are in operation under this runway use configuration. Except for the one percent of prop aircraft arriving to runway 1R under VMC2, all jet and prop aircraft arrive to runway 1L during VMC2 and IMC2 conditions.

Under VMC2, 70 percent of jet aircraft departures occur on runway 7R with the other jet departures using runway 1L. For prop aircraft, 60 percent depart from runway 7R with the others distributed on runways 1L and 7L.

Under IMC2, 60 percent of jet aircraft departures occur on runway 7R while the remaining departures use runway 1L. The majority of prop aircraft (63 percent) depart from runway 7R. Runways 1L and 7L are used for the remaining prop aircraft departures.

4.1.1.3 VMC3/IMC3

Runways 7R, 7L, 19R and 13 are in operation under this runway use configuration. Under VMC3, all jet aircraft arrivals and 80 percent of jet aircraft departures occur on runway 7R. The other 20 percent of jet departures use runway 19R. Runway 7R is used for

60 percent of prop aircraft arrivals and departures with remainder distributed among runways 7L, 19R, and 13.

Under IMC3, all jet aircraft and prop arrivals occur on runway 7R, which also handles 85 percent of jet aircraft departures. The other jet aircraft depart from runway 19R. For prop aircraft, 75 percent depart from runway 7R and the others are distributed on runways 7L, 19R, and 13.

4.1.1.4 VMC4/IMC4

Runways 19R, 19L, and 25L are in operation under this runway use configuration. All jet aircraft arrivals and departures occur on runway 1L under VMC4 and IMC4 conditions.

For prop aircraft, only two percent of arrivals and two percent of departures occur on runways 19L and 25L, respectively. Ninety-eight (98) percent of prop aircraft operations use runway 19R under VMC4 conditions. Under IMC4 conditions, all prop arrivals and departures use runway 19R with the exception of two percent of departures using runway 25L.

4.1.2 Meteorology (Weather Conditions)

Cloud ceiling and visibility determine the air traffic control (ATC) procedures that can be used at the Airport, and are major determinants of runway capacity and aircraft delay. The most common runway operating configurations (illustrated in Exhibit 4.1-1) are grouped into visual flight rules (VFR) and instrument flight rules (IFR) categories. VFR applies when weather conditions are such that aircraft can maintain safe operations by visual means, i.e., visual meteorological conditions (VMC). Instrument meteorological conditions (IMC) prevail when the visibility or cloud ceiling falls below those minimums prescribed for VMC operations (1,000-foot ceiling, three-mile visibility).

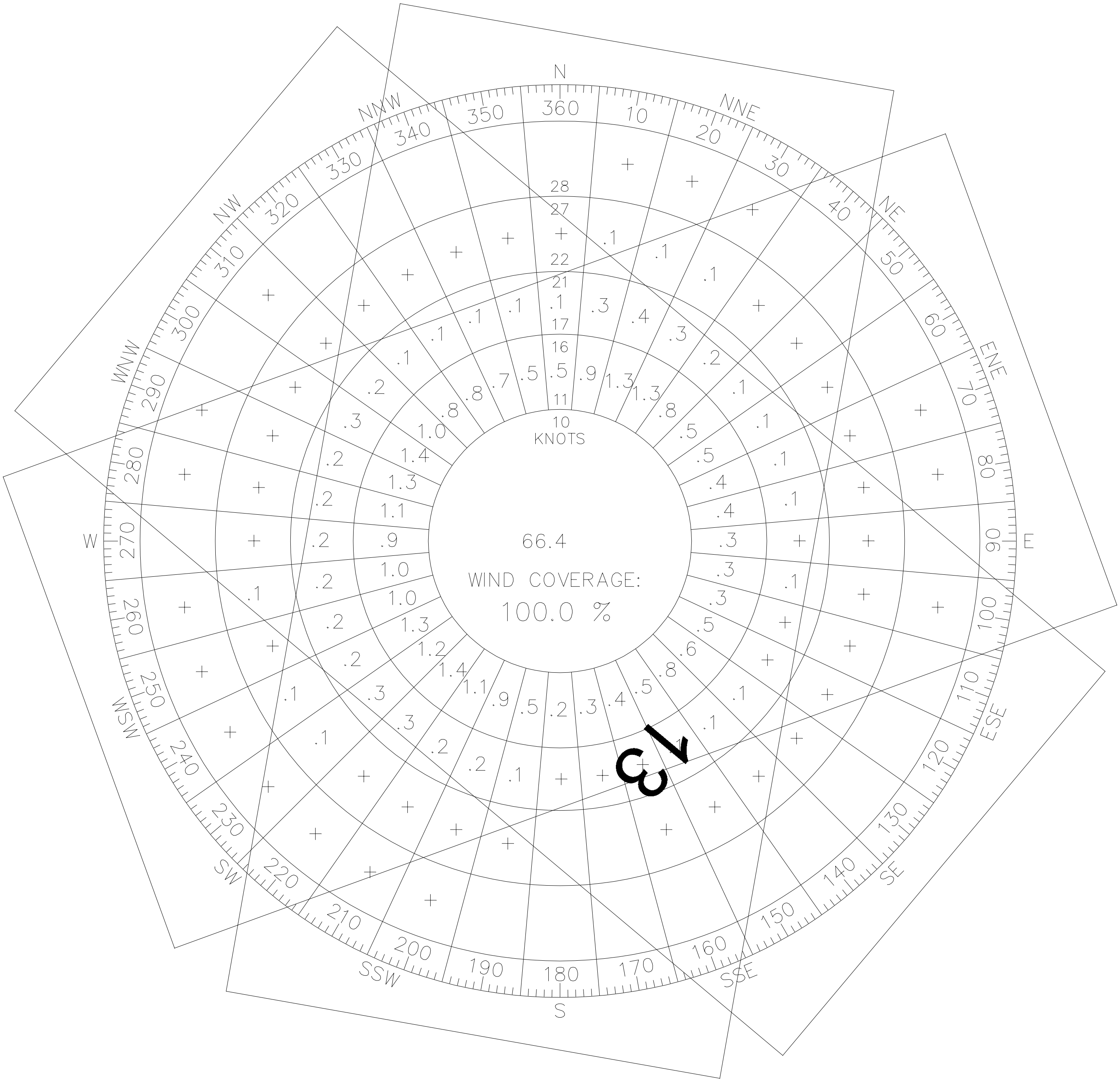
Wind conditions are of prime importance in determining runway use and orientation. Where winds are consistently from one direction, a single runway orientation is adequate. In most areas, however, wind direction is not consistent and a multiple runway orientation is required. The FAA has established criteria that state that the most desirable runway orientation is that which has maximum wind coverage and minimum crosswind components. The minimum required wind coverage for a single runway orientation is 95 percent. For GMIA the maximum allowable crosswind component for each runway wind coverage calculations is 20 knots.

The data required to conduct weather and wind analysis for GMIA were obtained from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Center in Asheville, NC. NOAA maintains a network of weather observation stations that record meteorological conditions at many locations throughout the United States. One such station is located at GMIA. Wind data containing weather observations for the period 1992 to 2001 was used for this analysis.

Wind coverage for the runways was determined through the use of a computerized wind program developed and distributed by the FAA. Wind data for All Weather, VFR, and IFR were analyzed separately. **Exhibits 4.1-2** to **4.1-4** show wind coverage for individual runways and combinations of runways under All Weather, VFR, and IFR conditions, respectively.

The following observations were made from the wind data:

- *VFR weather conditions occur 89.2 percent of the year*
- *IFR weather conditions occur 10.8 percent of the year*
- *Winds in excess of 16 knots occur 6.0 percent of the time during an average year, while winds exceeding 21 knots occur 1.0 percent of the year.*
- *The predominant wind direction is from the west-southwest.*
- *The existing runways provide 100 percent wind coverage under all weather, VFR, and IFR conditions with a 20 knots crosswind component.*
- *The percentages of VFR and IFR conditions provided by the FAA Air Traffic Control Tower management at GMIA are similar to the percentages found in the wind data.*



Runway System Wind Coverage (%)

Runway	Maximum Cross Wind Component	
	13 KNOTS	20 KNOTS
13-31	89.16	98.92
1-19	91.94	99.38
7-25	93.25	99.65
1-19 & 7-25	98.65	99.97
1-19 & 7-25 & 13-31	99.97	100.00

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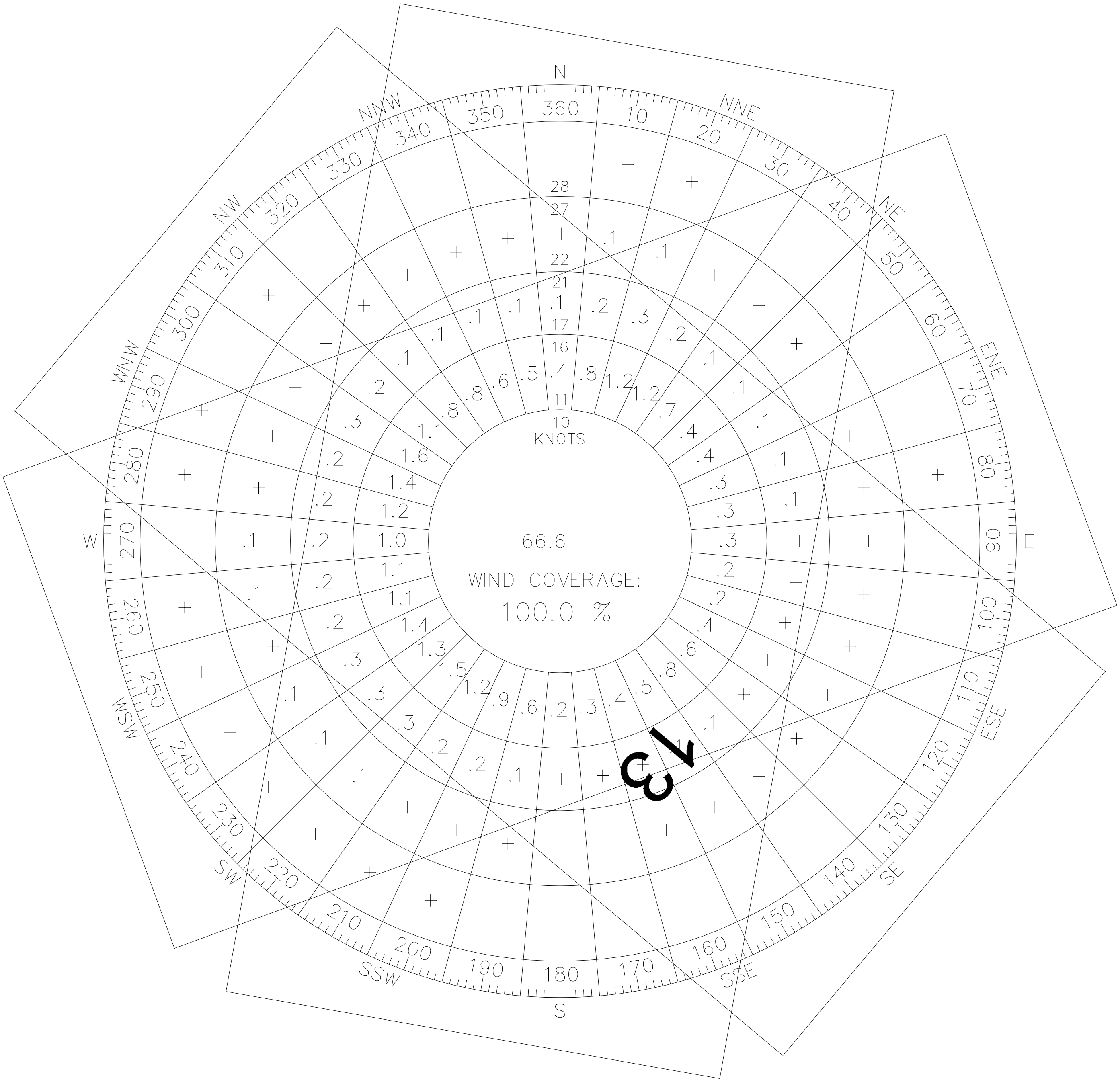
ALL WEATHER WIND ROSE ANALYSIS

EXHIBIT 4.1-2



Runway System Wind Coverage (%)

Runway	Maximum Cross Wind Component	
	13 KNOTS	20 KNOTS
13-31	89.59	99.07
1-19	91.73	99.39
7-25	93.61	99.37
1-19 & 7-25	98.62	99.97
1-19 & 7-25 & 13-31	99.98	100.00

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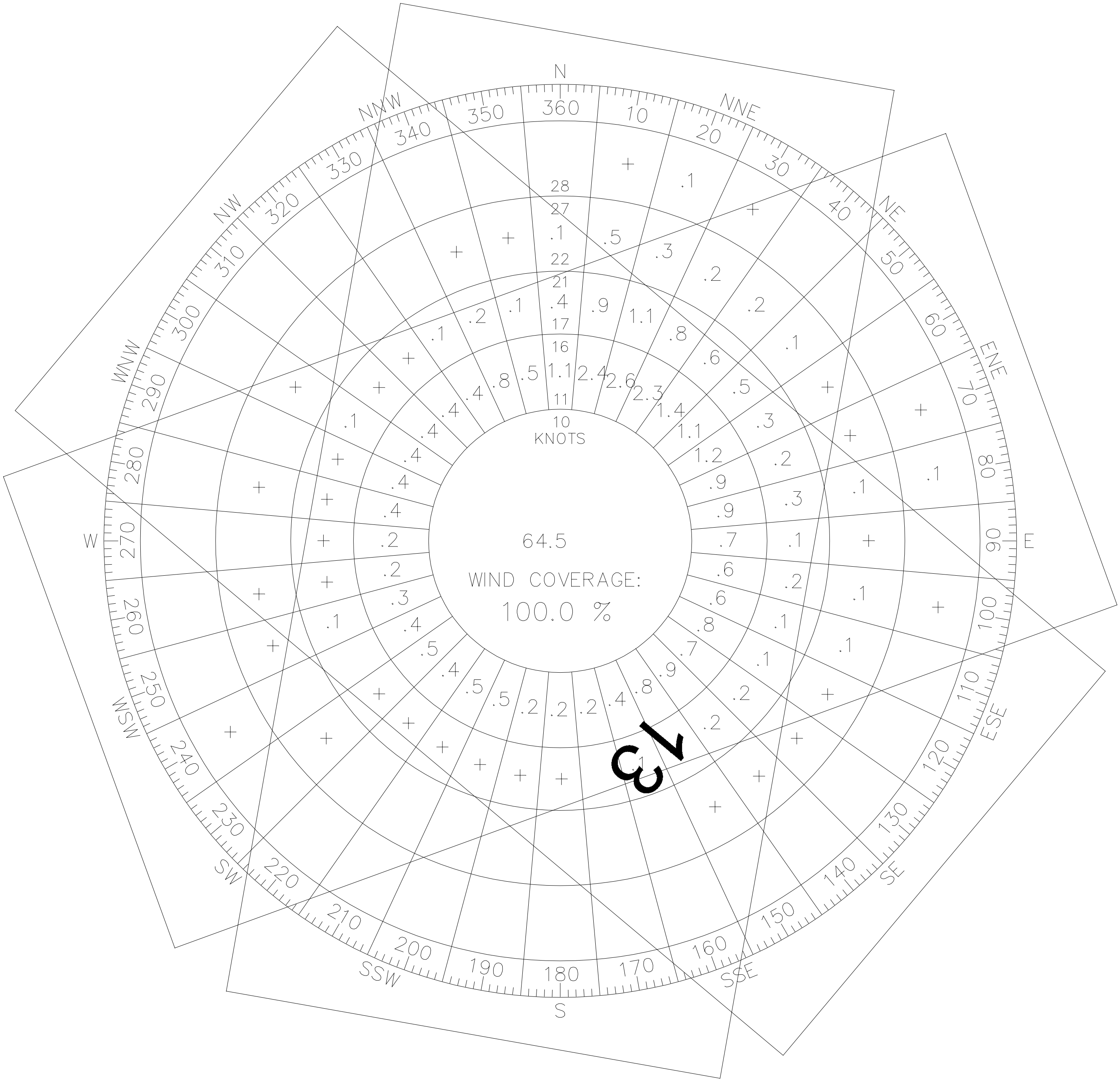
VFR WEATHER WIND ROSE ANALYSIS

EXHIBIT 4.1-3



Runway System Wind Coverage (%)

Runway	Maximum Cross Wind Component	
	13 KNOTS	20 KNOTS
13-31	85.64	97.72
1-19	93.61	99.30
7-25	90.35	99.03
1-19 & 7-25	98.85	99.97
1-19 & 7-25 & 13-31	99.95	100.00

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IFR WEATHER WIND ROSE ANALYSIS

EXHIBIT 4.1-4

contact approach. If the weather conditions at the destination airport are such that the pilot is unable to, or chooses not to, conduct a visual approach, he or she must conduct either a nonprecision or precision instrument approach procedure. A precision approach, such as the Instrument Landing System (ILS), provides both vertical guidance and lateral guidance to the runway. The nonpreceison instrument approaches, such as the terminal VOR, non-directional beacon (NDB), or localizer directional aid (LDA), only provide lateral guidance thus requiring higher weather minima (i.e. better cloud ceiling and visibility) than required when conducting a precision instrument approach.

ILS systems are classified into three categories, each category being defined in term of minimum visibility and decision height altitudes. The categories are listed in **Table 4.1-2**. Minimum visibility is measured in fractions of a mile when measured by human observers or in hundreds of feet when measured by runway visual range (RVR) equipment located on the Airport.

TABLE 4.1-2

General Mitchell International Airport

ILS WEATHER MINIMA

ILS Category	Decision Height	Visibility or RVR
CAT I	200 feet	½ mile or 1,800 feet
CAT II	100 feet	1,200 feet**
CAT IIIa	*	700 feet**
CAT IIIb	*	150 feet**
CAT IIIc	*	***

* No decision height specified. Visibility is the only limiting factor

** No fraction of miles authorized when determining visibility. The runway served by the ILS must have operable RVR equipment

*** No ceiling or visibility specified. Aircraft must be equipped with automatic landing equipment

A Category I ILS provides accurate guidance information in visibilities as low as one-half mile and ceiling as low as 200 feet. These minima are representative of a standard ILS installation.

A Category II ILS permits a properly rated pilot to utilize make an approach to the runway in visibilities as low as 1,200 feet or ceilings as low as 100 feet. The additional equipment required for a Category II installation includes more precise localizer and glide slope monitoring equipment, an inner marker beacon, and additional approach lighting.

A Category III ILS installation is much more expensive since it requires completely redesigned localizer and glide slope equipment. Category III ILS approaches is of three types: IIIa, IIIb, or IIIc. Category IIIc approaches may be conducted when the ceiling or visibility is zero.

At GMIA, runways 19R and 7R have Category I ILS equipment while runway 1L is equipped and certified for Category III ILS approaches. Runway 25L has an LDA which provides nonprecision approach guidance.

4.1.3 Aircraft Operational Fleet Mix

For theoretical capacity calculations, the aircraft mix is the relative percentage of operations conducted by each of the four classes of aircraft (A, B, C, and D) based on takeoff weight (**Table 4.1-3**). The Airport's mix index is obtained by calculating the percentage of Class C aircraft plus three times the percentage of Class D aircraft. For GMIA, the existing and projected aircraft fleet mix by aircraft class is shown in **Table 4.1-4.**

4.1.4 Percentage of Arrivals

The percentage of all aircraft operations that are arrivals has an influence on the capacity of runways. For example, a runway used exclusively for departures will have a capacity different from that of one used solely for arrivals. Based on observations of the runway use and discussions with FAA ATC personnel, 60 percent of total peak hour operations are departures and 40 percent are arrivals.

TABLE 4.1-3 *General Mitchell International Airport* ***AIRCRAFT CLASSIFICATIONS***				
Aircraft Class	Typical Aircraft	Maximum Certified Takeoff Weight (pounds)	Number of Engines	Estimated Approach Speed (knots)
A	C172, C206	12,500 or less	Single	95
B	C44, BE58	12,500 or less	Multi	120
C	C750, CRJ, BRJ, BRJ, B717, B737, DC9	12,500 – 300,000	Multi	130
D	KC-B5, A330	Over 300,000	Multi	140

Source: FAA Advisory Circular 150/5060-5

TABLE 4.1-4 General Mitchell International Airport ***EXISTING AND PROJECTED PEAK HOUR VMC AND IMC FLEET MIX AND MIX INDEX***				
Aircraft Class	2002 VMC IMC	2006 VMC IMC	2011 VMC IMC	2021 VMC IMC
A & B C D	12.2% 9.9% 84.7% 87.0% 3.1% 3.2%	12.2% 9.9% 84.5% 86.8% 3.3% 3.4%	12.2% 10.1% 84.3% 86.3% 3.5% 3.6%	11.0% 9.3% 85.0% 86.7% 4.0% 4.0%
Total	100% 100%	100% 100%	100% 100%	100% 100%
Mix Index	94.0 96.6	94.4 97.0	94.8 97.1	97.0 98.7

Source: PB Aviation, Inc. Analysis

4.1.5 Touch-and-Go Operations

Touch-and-go operations are landings during which the aircraft continue to roll down the runway and take off again. Pilots conducting touch-and-go operations normally stay in the airport traffic pattern. This procedure is usually a training activity. Airport operational capacity can increase with the ratio of touch-and-go operations to total operations; the reason for this increase is that the aircraft in the pattern are continually available for approaches. Touch-and-go operations, however, reduce the availability of the runway for other operations. In instances where commercial operations constitute a substantive portion of the airport's total operations, training by light aircraft in repetitive field operations can actually reduce airport capacity.

There are no touch-and-go operations in peak hour (7:00 AM – 7:59 AM) and the touch-and-go operations outside of the peak hour are less than two percent of total operations. Therefore, the touch-and-go operations are not a factor in the theoretical demand/capacity analysis.

4.1.6 Peak Hour Airfield Capacity

The activity projections presented in Chapter 3.0, *Activity Projections,* were used as part of the demand/capacity analysis. Peak hour capacity was calculated for each of the Airport's runway operating configurations by utilizing the hourly capacity methodology presented in FAA Advisory Circular 150/5060-5. The input assumptions used for these calculations are summarized as follows:

- *Peak hour operations are 40 percent arrivals and 60 percent departures*
- *VMC and IMC fleet mixes as shown in Table 4.1-4*
- *Runway conditions are dry*
- *Percentage of touch-and-go operations is less than 10 percent during the peak hour*

The results of the hourly capacity analysis are listed in **Table 4.1-5**. The numbers in bold indicate that the peak hour demand is at or more than peak hour capacity. This table also compares projected peak hour VMC and IMC activity for GMIA to hourly operational capacities.

As shown, GMIA does not have adequate hourly capacity throughout the 20-year planning period to accommodate projected peak hour VMC and IMC demand, especially in VMC2 and VMC4 runway use configurations. In IMC2 and IMC 4 configurations, the peak hour is at or more than the capacity in 2011. In all IMC conditions, the peak hour demand is at or more than the capacity in 2021.

TABLE 4.1-5

General Mitchell International Airport

AIRFIELD DEMAND/CAPACITY ANALYSIS RESULTS

2.3.2 Runway Use Configuration	**2.3.3 Aircraft Operations**			
	2002	2006	2011	2021
VMC 1				
Peak Hour Demand	56	60	67	80
Peak Hour Capacity	110	110	109	109
VMC 2				
Peak Hour Demand	56	60	67	**80**
Peak Hour Capacity	81	81	80	**80**
VMC 3				
Peak Hour Demand	56	60	67	80
Peak Hour Capacity	108	108	107	107
VMC 4				
Peak Hour Demand	56	60	67	**80**
Peak Hour Capacity	76	76	75	**75**
IMC 1				
Peak Hour Demand	56	60	67	**80**
Peak Hour Capacity	68	68	68	**67**
IMC 2				
Peak Hour Demand	56	60	**67**	**80**
Peak Hour Capacity	67	67	**67**	**67**
IMC 3				
Peak Hour Demand	56	60	67	**80**
Peak Hour Capacity	69	69	69	**68**
IMC 4				
Peak Hour Demand	56	60	**67**	**80**
Peak Hour Capacity	65	65	**65**	**65**

Source: PB Aviation, Inc. Analysis

Bold indicates where Peak Hour Demand is equal to or greater than Peak Hour Capacity

4.1.7 Annual Service Volume

Annual service volume (ASV) is an important indicator of an airport's ability to meet demands placed on its airfield. ASV combines the physical capacity of the airfield, as measured by its hourly capacity, with the characteristics of an airport's users, as measured by peak period operations.

To calculate an airfield's ASV, the percentage of occurrence of different runway operating configurations and their associated hourly capacities must be specified. These percentages, along with ASV weighing factors (derived from the capacity estimate), are used to compute a weighted hourly capacity. Two additional factors—the ratio of annual demand to average daily demand in the peak month of the year (referred to as the D factor) and the ratio of average daily demand to average peak hour demand, for the peak month of the year (referred to as the H factor)—are then used to calculate the ASV (see **Table 4.1-6**).

Typically, when an airfield demand reaches 60 percent of its capacity, enhancements should be planned. When airport activity reaches 80 percent of the capacity, new airfield facilities should be constructed or demand management strategies should be in place. The 60 percent planning ratio and the 80 percent action ratio were applied to the estimated ASV for GMIA to determine a general time frame in which these milestones could be expected to be reached (see **Exhibit 4.1-5**). As shown, GMIA's baseline annual demand is projected to increase from 200,708 operations (57 percent of ASV) in 2001 to 324,460 operations (93 percent of ASV) in 2021. This level of demand, when compared to GMIA's ASV, indicates that implementation of capacity enhancement improvements should begin between 2015 and 2021.

TABLE 4.1-6

General Mitchell International Airport

AIRFIELD CAPACITY

Operation Configuration	Runway Use Percentage (P)	Hourly Capacity (C)	Weighing Factor (W)[1]	Weighted Hourly Capacity (CPW)	Weighted Runway Use Percentage (PW)
VMC 1	57.38%	110	1	63.12	0.57
VMC 2	1.15%	81	15	13.97	0.17
VMC 3	29.90%	108	1	32.29	0.30
VMC 4	0.27%	76	15	3.08	0.04
IMC 1	3.07%	68	20	41.75	0.61
IMC 2	5.05%	67	20	67.67	1.01
IMC 3	2.44%	69	20	33.67	0.49
IMC 4	0.74%	65	20	9.62	0.15
Total	100%			265.17	3.34

The ASV was calculated as follows: [1]

* Runway use percentages (P) were obtained from FAA ATC personnel. Hourly Capacity (C) comes from Table 4.1.5
* ASV weighing factors (W) were assigned to each runway use configuration in accordance with Table 3-1 contained in FAA Advisory Circular 150/5060-5.
* The weighted hourly capacity (C_w) is calculated by dividing CPW by PW, where:

CPW = the sum total of $CPW_1 + CPW_2 + \ldots + CPW_n$, and
PW = the sum total of $PW_1 + PW_2 + \ldots + PW_n$

Thus: CPW = 265.17
PW = 3.34
$C_w = 79.39$

* Daily and Hourly demand ratios, (D) and (H) respectively, were calculated based on guidelines contained in the FAA Advisory Circular 150/5060-5.

D = 335
H=13

* The annual Service Volume (ASV) is calculated as follows:

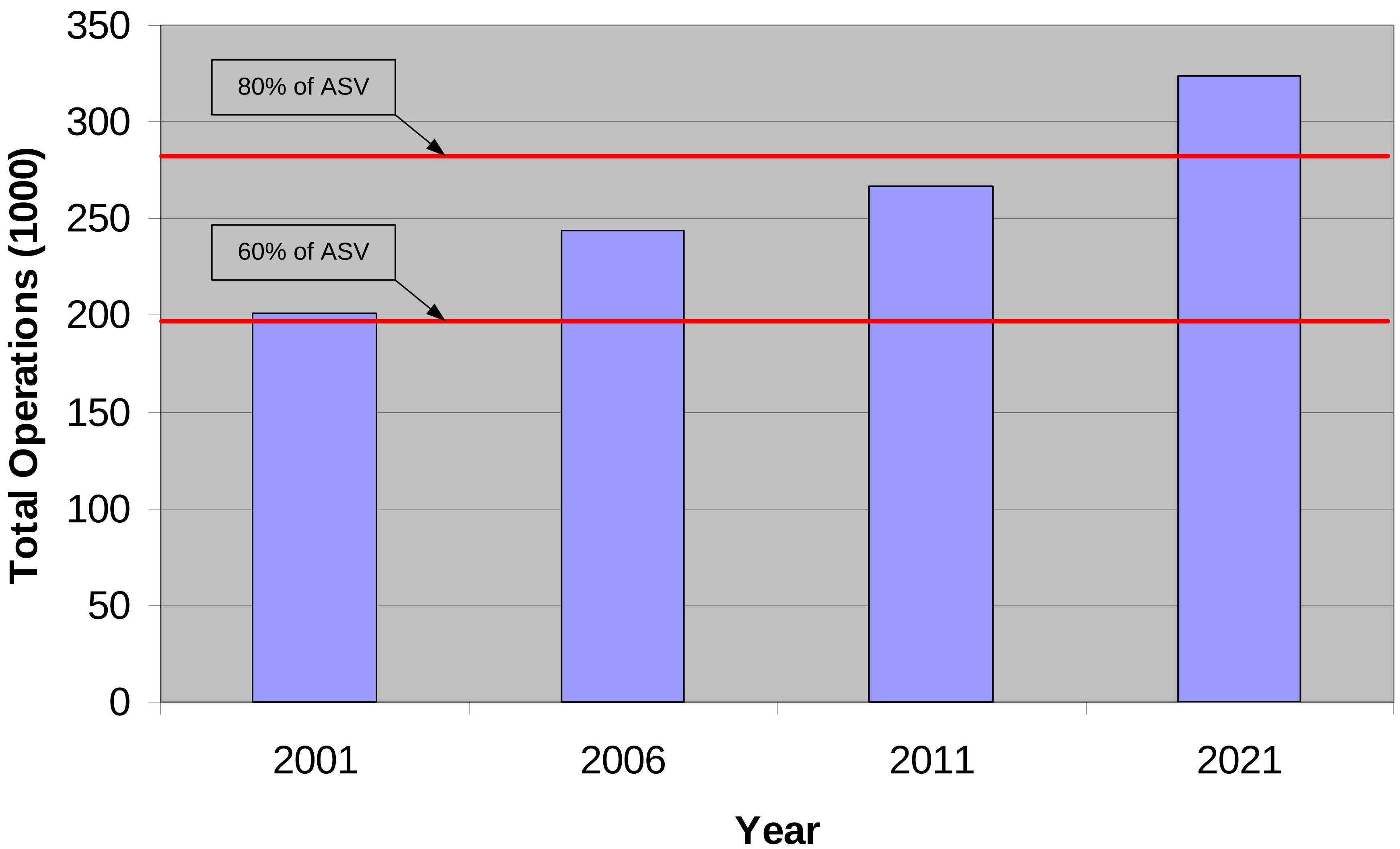
ASV = (C_w)(H)(D)

Thus: ASV = 350,000

[1]FAA Advisory Circular 150-5060-5
Source: PB Aviation, Inc. Analysis

The following equation was used to calculate the ASV for the Airport:

$$\begin{aligned} ASV &= \text{Weighted Hourly Capacity} \times D \times H \\ &= 81.21 \times 330 \times 13 \\ &= 350{,}000 \text{ Annual Operations} \end{aligned}$$



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

AIRFIELD DEMAND AND CAPACITY

EXHIBIT 4.1-5

4.2 Airfield Simulation Analysis

Computer simulations were used to evaluate the capacity of the existing airfield to accommodate projected operations for the existing (2001), 2006, 2011, and 2021 demand levels. The analysis was conducted using the FAA's Airport and Airspace Simulation Model, *SIMMOD PLUS!,* a comprehensive package of airport/airspace simulation development tools to aid in the development of airfield and airspace simulations.

Simulations were conducted for the eight operating configurations in Exhibit 4.1-1. A full day of operations was modeled. Peak hour operations were also analyzed. The airfield simulations measured the amount of aircraft delay that occurs in each of these situations with existing and forecast levels of traffic.

4.2.1 SIMMOD Input

4.2.1.1 Activity Levels and Aircraft

The four schedules that were simulated contained the number of flights depicted by hour in **Exhibits 4.2-1** through **4.2-4**. The total number of daily operations increases from 708 in year 2001 to 960 in year 2021. **Table 4.2-1** presents the maximum number of operations simulated for the peak hour period.

TABLE 4.2-1

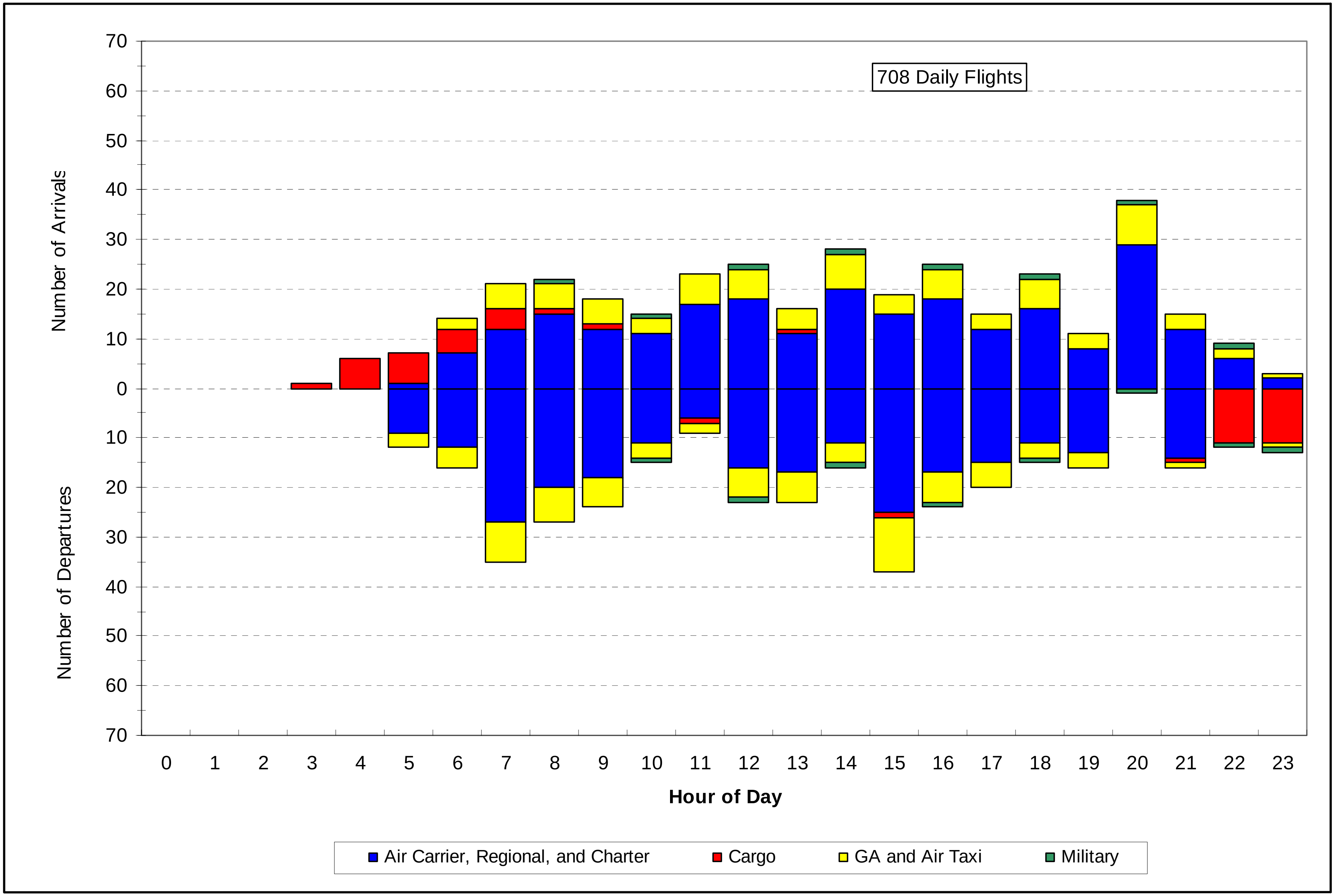
General Mitchell International Airport

SIMULATED ACTIVITY LEVELS

Year	Daily Operations	Peak Arrival and Departure Operations (Hour)
2002	708	56 (07:00-7:59 AM)
2006	724	60 (07:00-7:59 AM)
2011	790	67 (07:00-7:59 AM)
2021	960	80 (07:00-7:59 AM)

Source: PB Aviation, Inc. Analysis

Note: Helicopter operations in each traffic demand projection were removed from the simulation because they do not use a runway.



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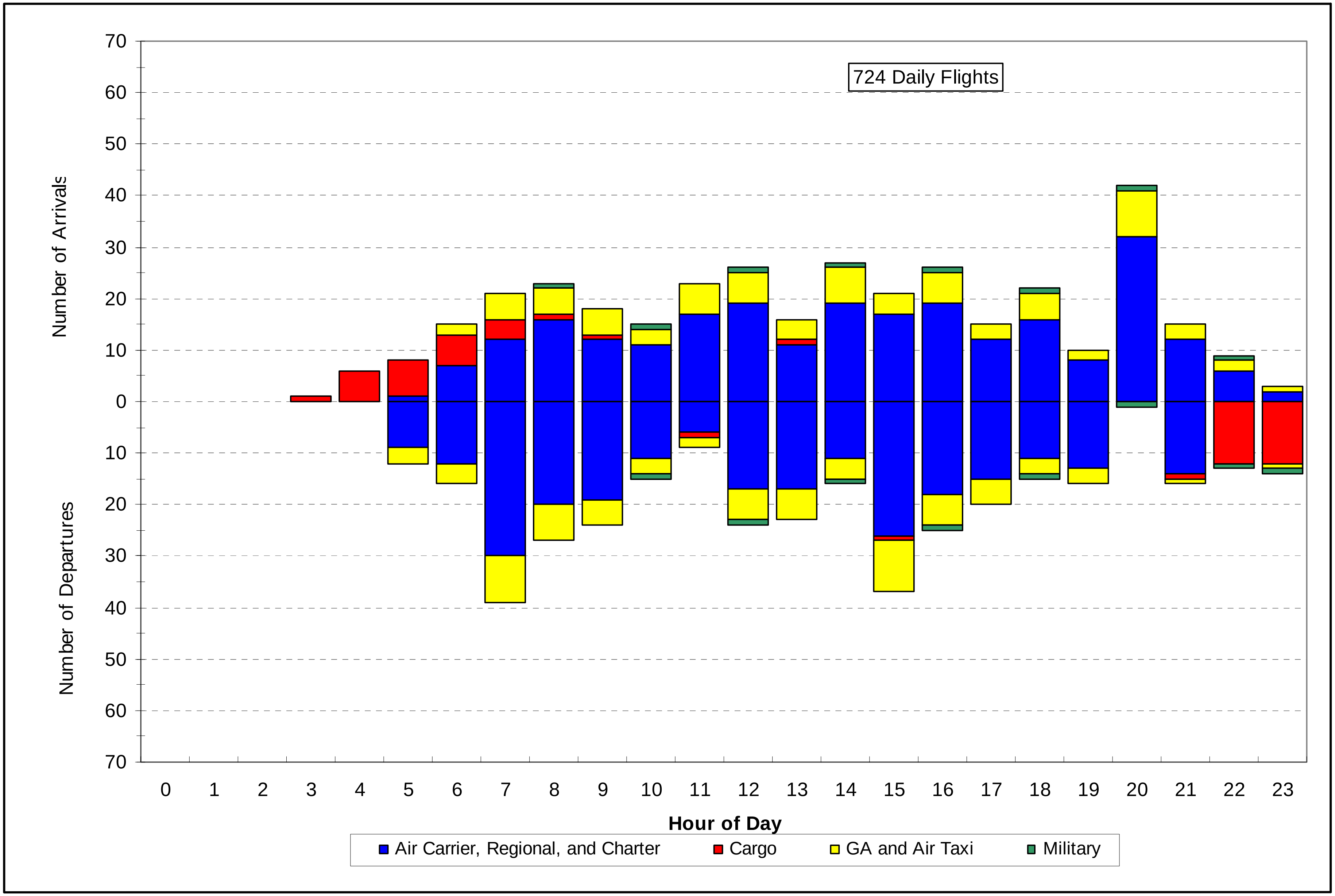
EXISTING DAILY OPERATIONS

EXHIBIT 4.2-1



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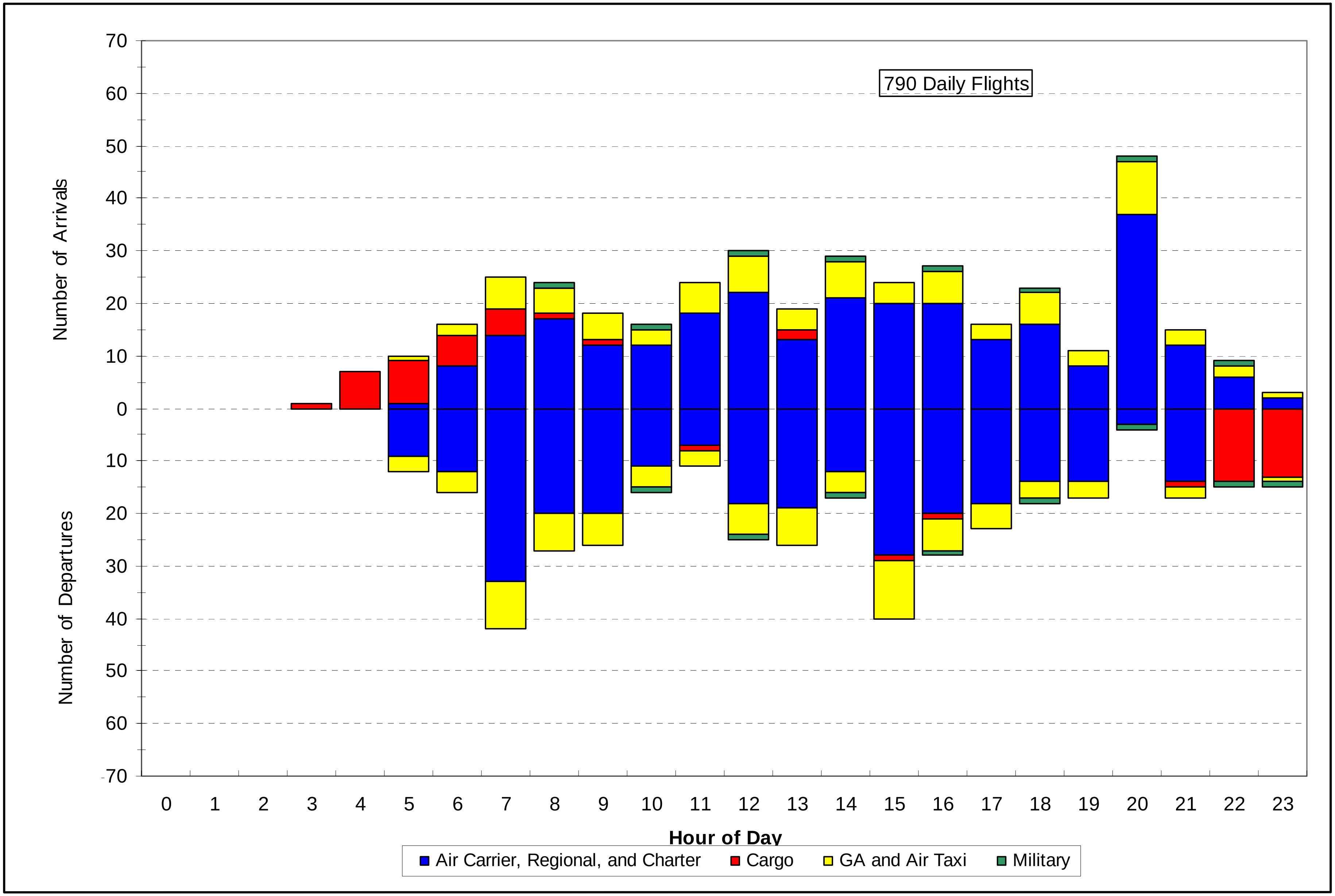
DAILY OPERATIONS IN 2006

EXHIBIT 4.2-2



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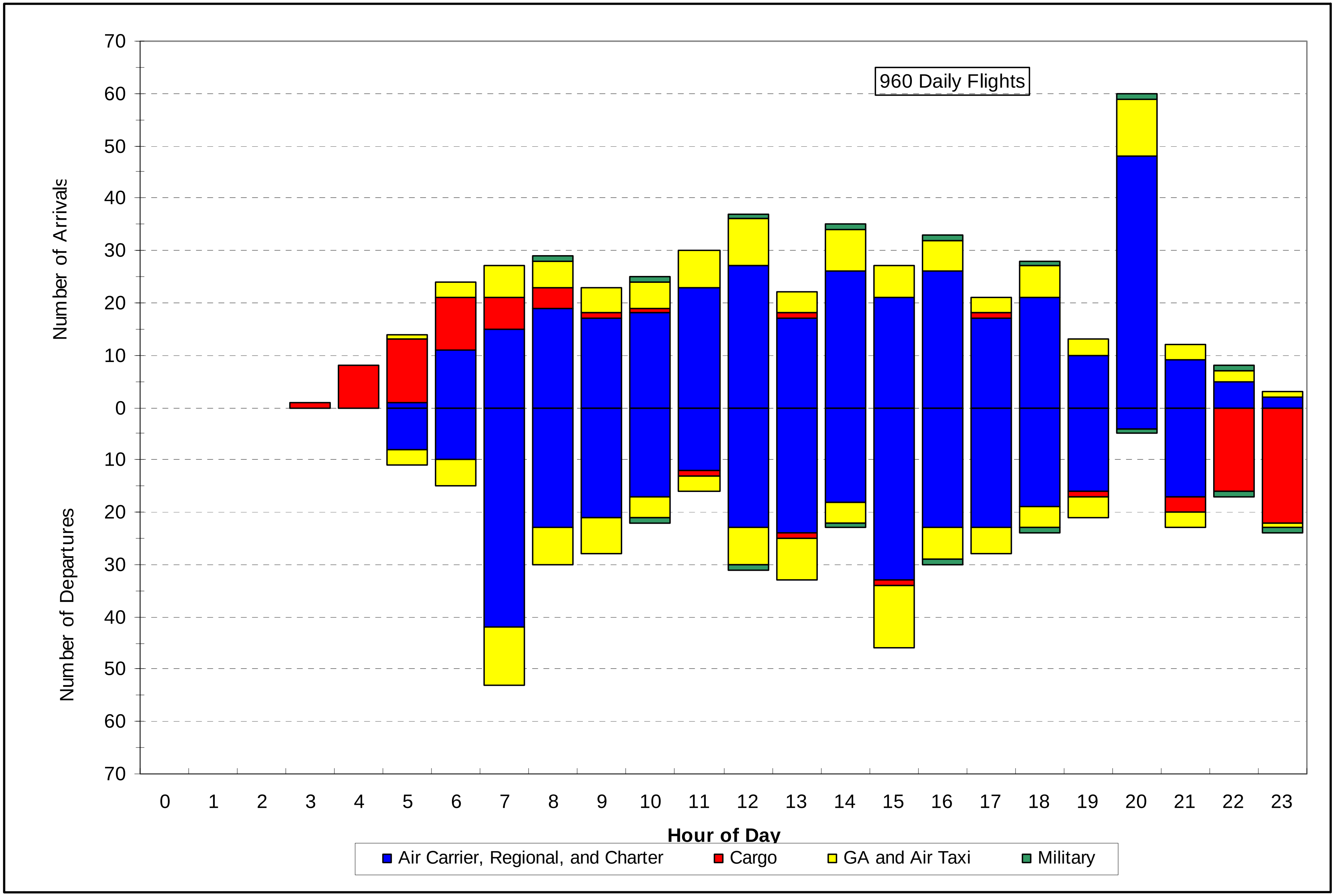
DAILY OPERATIONS IN 2011

EXHIBIT 4.2-3



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DAILY OPERATIONS IN 2021

EXHIBIT 4.2-4

SIMMOD is capable of handling a wide variety of aircraft types. However, aircraft are grouped into aircraft classes defined by the user. Within each class, aircraft generally have the same size, weight, and performance characteristics. For the simulation experiments, the following classes were used:

- *Group 1 –* *General Aviation*: All single-engine piston aircraft.
- *Group 2 –* *Small Aircraft*: Twin turboprop aircraft and single-engine Cessna Caravan turboprops.
- *Group 3 –* *Corporate Jets and Regional Jets*: 328J, CRJ, ARJ, and ERJ
- *Group 4 –* *Large Jets*: B727, various 737 and DC9 models, and MD80
- *Group 5 –* *Boeing 757*
- *Group 6 –* *Heavy Jets*: Includes all wide-bodied aircraft, plus KC-135 military aircraft.

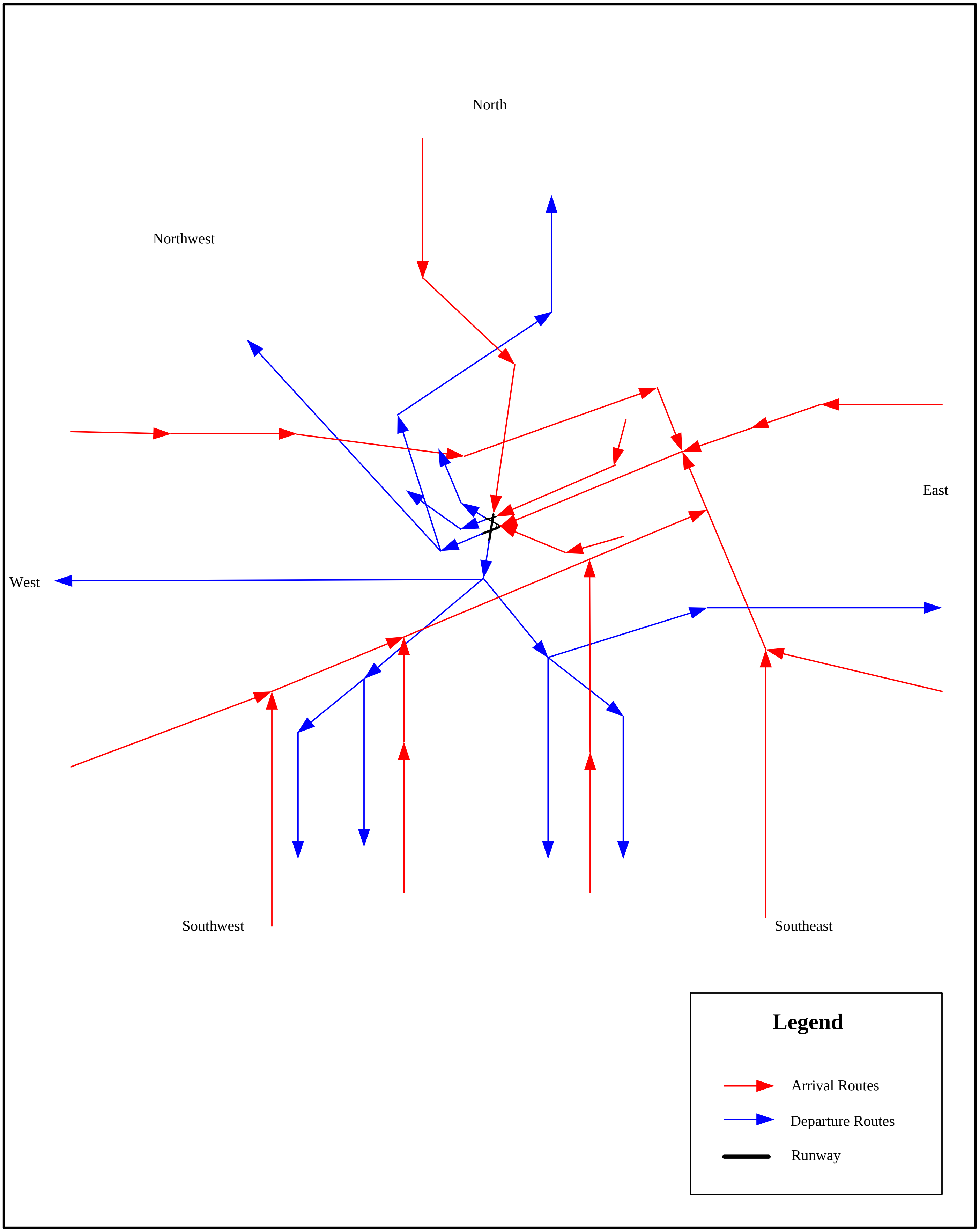
For the simulation analysis, the 757 was classified in a separate category and modeled separately, due to its unique airspace separation characteristics. It should be noted that the aircraft groups used in SIMMOD differ from the FAA's airplane design groups.

4.2.1.2 Airspace

The SIMMOD airspace is composed of an interrelated network of aircraft routes characterized by a series of nodes and links. As each aircraft traverses a link, it is required to maintain minimum separation from preceding and succeeding aircraft, unless the link is defined to allow passing.

Exhibits 4.2-5 through **4.2-8** depict the arrival and departure routes simulated for the analysis. Five approach paths to GMIA were used for all wind and weather situations. These approach paths were:

- *East Route* – Handles all traffic from New York, Boston, Philadelphia, Buffalo, Cleveland, Detroit, etc.
- *Southeast Route* – Handles all traffic from Cincinnati, Columbus, Indianapolis, Charleston, Richmond, etc.
- *Southwest Route* – Handles all traffic from St. Louis, Kansas City, etc.
- *West Route* – Handles all traffic from Denver, Omaha, etc.
- *Northwest Route* – Handles all traffic from Minneapolis, Winnipeg, Duluth, etc.



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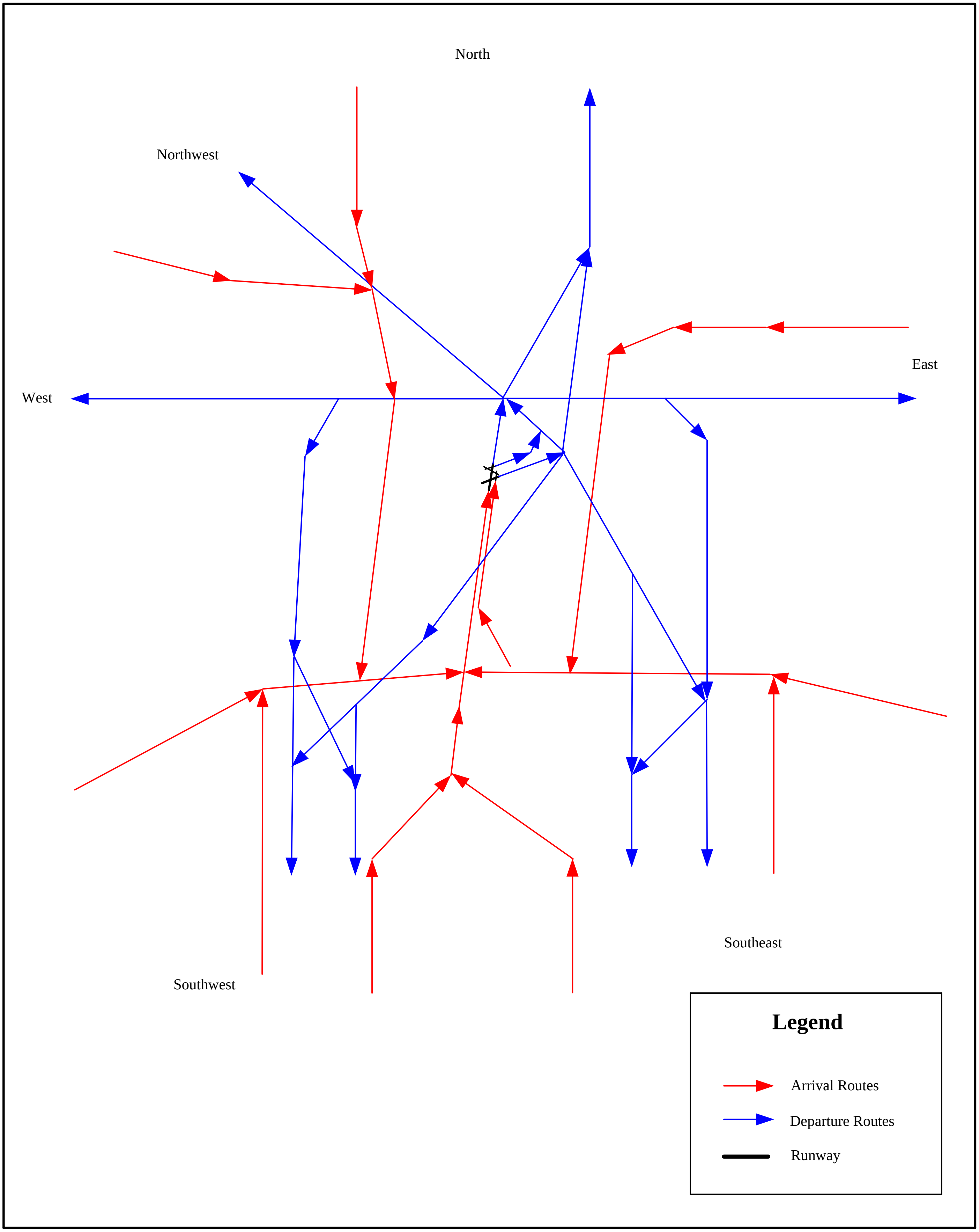
ARRIVAL AND DEPARTURE ROUTES WESTERLY AND SOUTHERLY FLOW (25L)

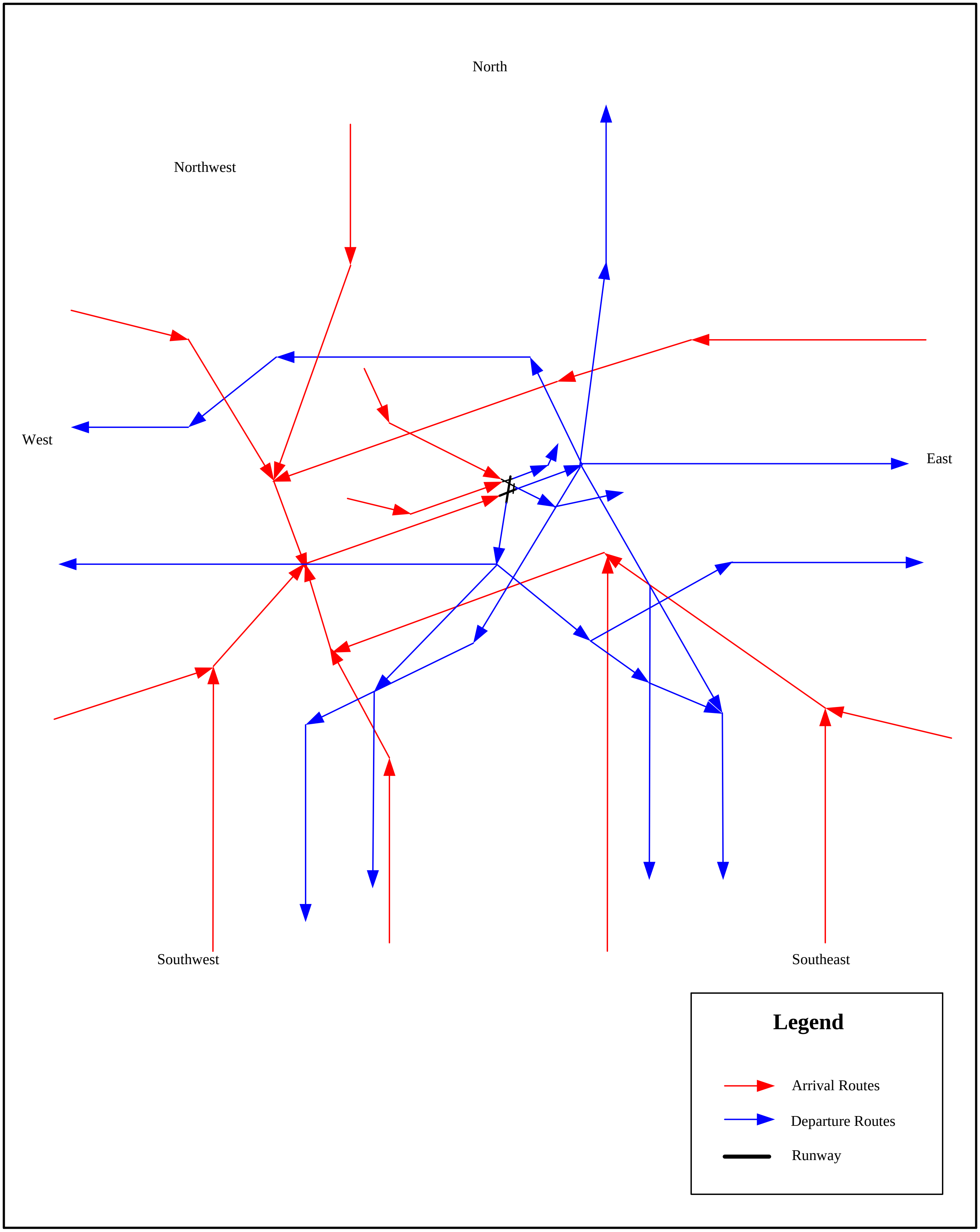
EXHIBIT 4.2-5



G E N E R A L MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

ARRIVAL AND DEPARTURE ROUTES NORTHERLY AND EASTERLY FLOW (01L)

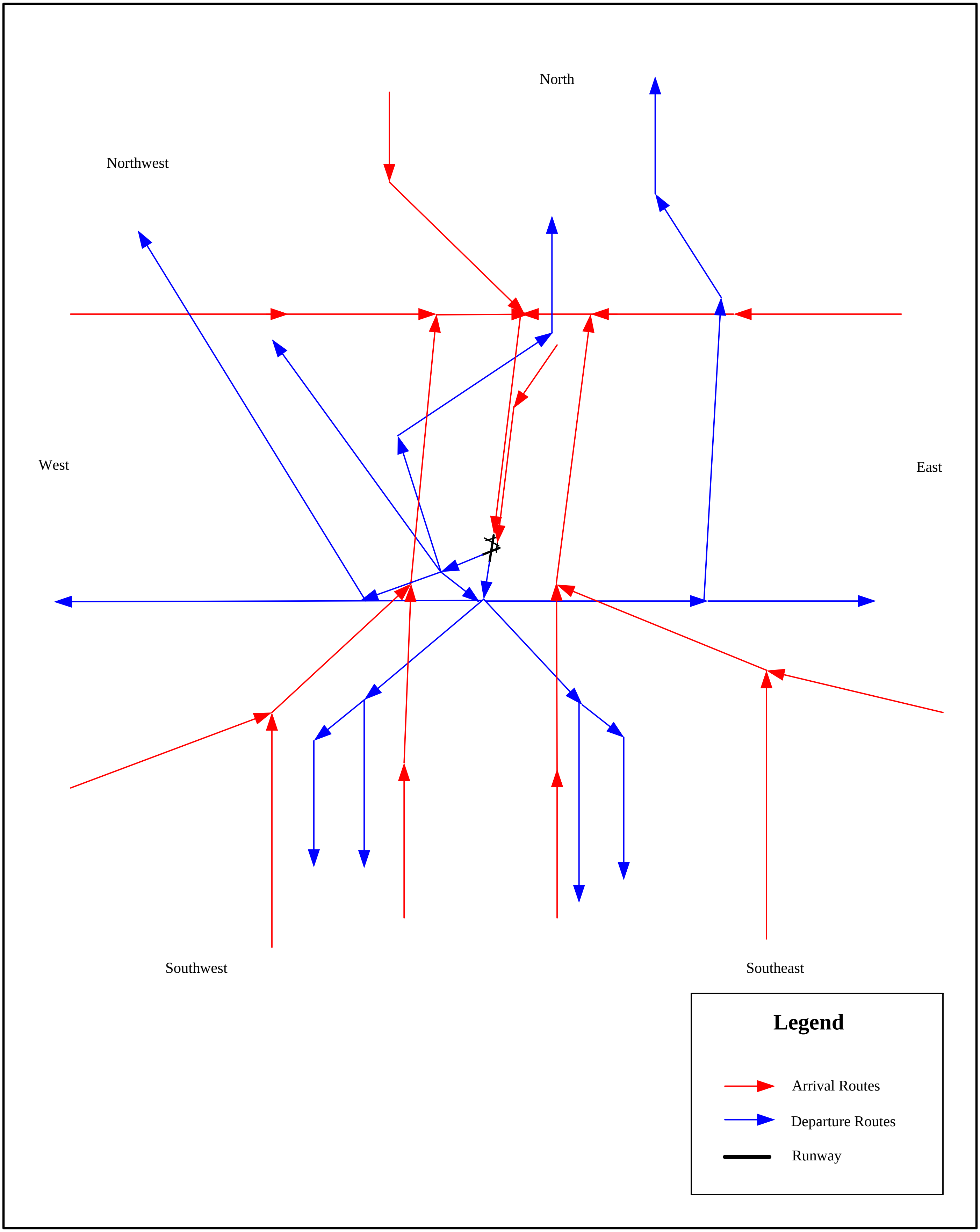
EXHIBIT 4.2-6



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

ARRIVAL AND DEPARTURE ROUTES EASTERLY AND SOUTHERLY FLOW (07L)

EXHIBIT 4.2-7



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

ARRIVAL AND DEPARTURE ROUTES SOUTHERLY (19R)

EXHIBIT 4.2-8

In VFR conditions, arrival routes to runways 25R, 7L, 31, 13, 19L, and 1R are designated for all Group 1 and Group 2 aircraft arrivals. These routes are discontinued in IFR conditions.

Six departure routes from GMIA were included in the simulation. These were the east, southeast, southwest, west, northwest, and north departure routes, with only turboprops using the North departure route.

4.2.1.3 Procedures and Aircraft Separation and Speed

The SIMMOD model gives priority to arrivals, consistent with standard air traffic control procedures. However, if gaps between successive arrivals on the same runway are great enough, departures are interspersed between the arrivals, increasing the overall capacity of the airfield and helping to reduce departure delays.

En-route procedures are designed on a straightforward first-in/first-out regime for aircraft crossing each departure node. The exception is where two paths merge. At that node, the aircraft that proceeds first is always the faster aircraft.

Under VFR conditions, arrivals within three nautical miles of the runway block departure procedures until clear of the runway. Group 1 arrivals clear the runway in 45 seconds, Groups 2 and 3 clear in 50 seconds, Groups 4, 5, and 6 clear in 60 seconds. Departures block subsequent arrivals for a minimum of 45 seconds, and block subsequent departures until the aircraft is three nautical miles beyond the departure runway end.

Under IFR conditions, arrivals within three nautical miles of runways block departure procedures until clear of the runway. Group 1, 2, and 3 arrivals clear the runway in 65 seconds, Groups 4, 5, and 6 clear the runway in 75 seconds. Departures block subsequent arrivals for a minimum of 45 seconds, and block subsequent departures until the aircraft is three nautical miles beyond the departure runway end.

Based on discussions with Air Traffic Control Tower management at GMIA, the separations maintained between aircraft are the same during IFR and VFR conditions. Minimum aircraft separations between aircraft groups (in nautical miles) are shown in **Table 4.2-2**.

TABLE 4.2-2

General Mitchell International Airport

MINIMUM AIRCRAFT SEPARATIONS (NM)

Trailing Aircraft	Lead Aircraft					
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Group 1	3	3	4	4	6	6
Group 2	3	3	4	4	6	6
Group 3	3	3	3	3	5	5
Group 4	3	3	3	3	5	5
Group 5	3	3	3	3	5	5
Group 6	3	3	3	3	4	4

Source: PB Aviation, Inc. Analysis

Average aircraft speeds for all conditions are presented in **Table 4.2-3**.

TABLE 4.2-3

General Mitchell International Airport

AVERAGE AIRCRAFT SPEEDS (KNOTS) – ALL CONDITIONS

Aircraft Class	SIMMOD Link Type						
	1	2	3	4	5	6	7
Group 1	110	100	90	80	90	100	110
Group 2	230	170	120	115	120	170	200
Group 3	250	210	170	135	170	210	250
Group 4	250	210	170	135	170	210	250
Group 5	250	210	170	135	180	210	250
Group 6	250	210	170	140	180	210	250

Source: PB Aviation, Inc. Analysis

4.2.1.4 Runway Utilization

Based on the data provided by FAA Air Traffic Control Tower management at GMIA, the runway end utilization percentages that occur in the simulations under VMC and IMC are listed in **Tables 4.2-4** and **4.2-5**.

TABLE 4.2-4

General Mitchell International Airport

RUNWAY END UTILIZATION – VMC

		VMC1		**VMC2**		**VMC3**		**VMC4**	
	Runways	Arrive	Departure	Arrive	Departure	Arrive	Departure	Arrive	Departure
Jet Aircraft	25L	95%	15%						
	25R								
	7L								
	7R				70%	100%	80%		
	13								
	31								
	1L			100%	30%				
	1R								
	19R	5%	75%				15%	100%	90%
	19R@V*		10%				5%		10%
	19L								
Prop Aircraft	25L	70%	15%						
	25L@T*		5%		2%				2%
	25R	25%	15%						
	7L				8%	20%	20%		
	7R				60%	60%	60%		
	13					20%	5%		
	31	2%	2%						
	1L			99%	30%				
	1R			1%					
	19R	3%	60%				15%	98%	88%
	19R@V		3%						10%
	19L							2%	

* 19R@V and 25L@T indicate departures from taxiway intersections
Source: FAA Air Traffic Control Management

TABLE 4.2-5

General Mitchell International Airport

RUNWAY END UTILIZATION – IMC

		IMC1		**IMC2**		**IMC3**		**IMC4**	
	Runways	Arrive	Departure	Arrive	Departure	Arrive	Departure	Arrive	Departure
	25L	100%	15%						
	25R								
	7L								
	7R				60%	100%	85%		
Jet Aircraft	13								
	31								
	1L			100%	40%				
	1R								
	19R		82%				10%	100%	50%
	19R@V		3%				5%		50%
	19L								
	25L	100%	15%						
	25L@T		5%		2%				2%
	25R	25%	15%						
	7L				5%		10%		
	7R				63%	100%	75%		
Prop Aircraft	13						5%		
	31		2%						
	1L			100%	30%				
	1R								
	19R		60%				10%	100%	88%
	19R@V		3%						10%
	19L								

* 19R@V and 25L@T indicate departures from taxiway intersections
Source: FAA Air Traffic Control Management.

The FAA Controllers are able to separate aircraft landings by concourse because there is ample airfield capacity. As air traffic grows, however, this flexibility will diminish. SIMMOD has the capability to perform dynamic reassignment of aircraft to an available runway; as demand levels increased, this capability was used to model operations in the forecast years. **Exhibit 4.2-9** depicts the airfield network that was used in the simulations.

GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

AIRFIELD NETWORK IN SIMMOD

EXHIBIT 4.2-9

Assumptions concerning arrival runway occupancy time were based on field observations of runway exit utilization and were adjusted based on input from FAA Air Traffic Control management at the Airport. **Tables 4.2-6** through **4.2-9** depict the assumptions that were used to model arrival runway length use for each aircraft class during VMC (dry pavements).

TABLE 4.2-6

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING WITHIN STATED DISTANCE ON RUNWAY 19R–VMC

Aircraft Group	2,900 ft.	3,700 ft.	4,800 ft.	6,400 ft.	8,200 ft.	9,600 ft.
Group 1	5%	15%	60%	20%	0%	0%
Group 2	0%	10%	65%	25%	0%	0%
Group 3	0%	5%	50%	45%	0%	0%
Group 4	0%	5%	20%	50%	20%	5%
Group 5	0%	5%	20%	50%	20%	5%
Group 6	0%	0%	0%	25%	65%	10%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-7

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING WITHIN STATED DISTANCE ON RUNWAY 1L–VMC

Aircraft Group	3,300 ft.	4,900 ft.	6,000 ft.	6,800 ft.	7,700 ft.	8,600 ft.	9,600 ft.
Group 1	10%	50%	40%	0%	0%	0%	0%
Group 2	5%	40%	50%	5%	0%	0%	0%
Group 3	0%	15%	50%	30%	5%	0%	0%
Group 4	0%	10%	45%	30%	10%	5%	0%
Group 5	0%	10%	45%	30%	10%	5%	0%
Group 6	0%	0%	15%	20%	50%	10%	5%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-8

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING WITHIN STATED DISTANCE ON RUNWAY 7R–VMC

Aircraft Group	3,050 ft.	4,000 ft.	4,600 ft.	5,150 ft.	6,900 ft.	8,000 ft.
Group 1	10%	20%	60%	10%	0%	0%
Group 2	5%	15%	50%	20%	10%	0%
Group 3	0%	10%	40%	30%	15%	5%
Group 4	0%	0%	10%	30%	50%	10%
Group 5	0%	0%	10%	30%	50%	10%
Group 6	0%	0%	0%	0%	25%	75%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-9							
General Mitchell International Airport							
PERCENTAGE OF ARRIVALS EXITING WITHIN STATED DISTANCE ON RUNWAY 25L–VMC							
Aircraft Group	2,800 ft.	3,400 ft.	4,000 ft.	4,900 ft.	5,500 ft.	6,650 ft.	8,000 ft.
Group 1	5%	10%	30%	50%	5%	0%	0%
Group 2	0%	10%	15%	40%	25%	10%	0%
Group 3	0%	0%	10%	45%	30%	10%	5%
Group 4	0%	0%	0%	15%	30%	45%	10%
Group 5	0%	0%	0%	15%	30%	45%	10%
Group 6	0%	0%	0%	0%	0%	25%	75%

Source: PB Aviation, Inc. Analysis

Departure runway length usage was observed and confirmed through coordination with FAA Air Traffic Control management. **Table 4.2-10** contains departure runway length usage assumptions for VMC and IMC. Departure runway length usage is expected to be unaffected by wet weather.

TABLE 4.2-10					
General Mitchell International Airport					
TAKE-OFF DISTANCE					
Aircraft Group	2,500 ft.	4,500 ft.	6,500 ft.	8,500 ft.	9,600 ft.
Group 1	65%	35%	0%	0%	0%
Group 2	25%	75%	0%	0%	0%
Group 3	0%	35%	40%	25%	0%
Group 4	0%	25%	50%	25%	0%
Group 5	0%	25%	50%	25%	0%
Group 6	0%	0%	65%	25%	10%

Source: PB Aviation, Inc. Analysis

The following sets of data are used for each aircraft class in IFR weather conditions (wet pavements). During IMC, aircraft generally use more runway length to slow and exit, as reflected in **Tables 4.2-11** through **4.2-14**.

TABLE 4.2-11

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING BY DISTANCE ON RUNWAY 19R–IMC

Aircraft Group	2,900 ft.	3,700 ft.	4,800 ft.	6,400 ft.	8,200 ft.	9,600 ft.
Group 1	0%	5%	50%	45%	0%	0%
Group 2	0%	0%	35%	60%	5%	0%
Group 3	0%	0%	15%	50%	35%	0%
Group 4	0%	0%	10%	30%	50%	10%
Group 5	0%	0%	10%	30%	50%	10%
Group 6	0%	0%	0%	5%	75%	20%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-12

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING BY DISTANCE ON RUNWAY 1L–IMC

Aircraft Group	3,300 ft.	4,900 ft.	6,000 ft.	6,800 ft.	7,700 ft.	8,600 ft.	9,600 ft.
Group 1	0%	30%	50%	20%	0%	0%	0%
Group 2	0%	10%	30%	50%	10%	0%	0%
Group 3	0%	0%	20%	30%	30%	20%	0%
Group 4	0%	0%	10%	20%	30%	35%	5%
Group 5	0%	0%	10%	20%	30%	35%	5%
Group 6	0%	0%	0%	0%	20%	60%	20%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-13

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING BY DISTANCE ON RUNWAY 7R–IMC

Aircraft Group	3,050 ft.	4,000 ft.	4,600 ft.	5,150 ft.	6,900 ft.	8,000 ft.
Group 1	0%	10%	30%	50%	10%	0%
Group 2	0%	5%	20%	35%	40%	0%
Group 3	0%	0%	0%	30%	30%	40%
Group 4	0%	0%	0%	25%	25%	50%
Group 5	0%	0%	0%	25%	25%	50%
Group 6	0%	0%	0%	0%	0%	100%

Source: PB Aviation, Inc. Analysis

TABLE 4.2-14

General Mitchell International Airport

PERCENTAGE OF ARRIVALS EXITING BY DISTANCE ON RUNWAY 25L–IMC

Aircraft Group	2,800 ft.	3,400 ft.	4,000 ft.	4,900 ft.	5,500 ft.	6,650 ft.	8,000 ft.
Group 1	0%	5%	15%	60%	20%	0%	0%
Group 2	0%	0%	10%	40%	35%	15%	0%
Group 3	0%	0%	0%	10%	20%	30%	40%
Group 4	0%	0%	0%	5%	20%	25%	50%
Group 5	0%	0%	0%	5%	20%	25%	50%
Group 6	0%	0%	0%	0%	0%	0%	100%

Source: PB Aviation, Inc. Analysis

4.2.1.5 Taxiway Travel Times and Routes

Aircraft travel times on various airfield segments were measured in order to assign taxi speeds to aircraft on those segments. While some carriers had faster taxi speeds than others, it was generally observed that aircraft in all classes had similar taxi speeds on the same taxiway segments, and that taxi speeds tend to be slower in the terminal area than on the taxiways paralleling the runways. Therefore, aircraft speeds on the taxiway system were estimated to average 25 nautical miles/hour (knots per hour) while taxi speeds in the gate areas were estimated to be 15 nautical miles/hour.

Aircraft routings on the taxiway system are assigned by the model on the basis of the shortest path (based on travel time) from exit taxiway to gate, and from gate to departure runway queue. Head-to-head conflicts were avoided by placing controls in the model.

4.2.1.6 Departure Queues

In SIMMOD, departure queue is used to define an airfield node where aircraft queue to depart on a runway. The following departure queues were included in the simulation for each runway use configuration:

VMC1:	Runway 19R (at Taxiways F and V) Runway 25L (at Taxiways M and T) Runway 25R (at Taxiway F) Runway 31 (at Taxiway M)
IMC1:	Same as the queues under VMC1
VMC2:	Runway 1L (at Taxiways R4) Runway 7L (at Taxiway B) Runway 7R (at Taxiway A5)
IMC2:	Same as the queues under VMC2
VMC3:	Runway 19 (at Taxiway F and V) Runway 7L (at Taxiway B) Runway 7R (at Taxiway A5) Runway 13 (at Taxiway F)
IMC3:	Same as the queues under VMC3
VMC4:	Runway 19R (at Taxiways F and V) Runway 25L (at Taxiway T)
IMC4:	Same as the queues under VMC4

When a departure has been in queue for more than 180 seconds, arrival spacing will be increased to allow the aircraft sufficient separation to depart.

4.2.1.7 Terminal Gate Utilization

To allow the simulation to model the aircraft interactions occurring in the terminal areas, the gate area in the vicinity of Concourses C, D, and E was included in the simulation model. Each individual gate has a capacity of one aircraft, except for Gate 52 used by Skyway, which uses multiple parking positions from a single gate. Gate area characteristics are listed in **Table 4.2-15**.

TABLE 4.2.15

General Mitchell International Airport

TERMINAL GATE CHARACTERISTICS

Concourse	Gate Name	Aircraft Capacity per Gate	Aircraft Accommodated	Aircraft Group	Carrier	Pushback/ Powerback
C	C20-C23	1	Regional Jet	3,4,5	American Eagle	Push
	C24, C26	1	Large	3,4,5	Continental Express America West	Push
	C25	1	Regional Jet	3	Comair	Push
	C27	1	Large	3,4,5	Delta	Push
D	D30, D34, D36-49	1	Large	3,4,5	Midwest Express	Push
	D31, D33, D35	1	Large	3,4,5	United Express	Push
	D33	1	Regional Jet	3,4,5	Air Canada	Push
	D52	16	Small	2,3	Skyway ATA Connection	Power
	D51, D53	1	Large	3,4,5	US Airways US Airways Express	Push
E	E60, E61	1	Large	3,4,5	Funjet	Push
	E62-69	1	Large	3,4,5	Northwest KLM	Push

Source: Airport Records.

Gate assignments for each flight are made at random among the gates available to that airline. Arrivals and departures were paired, which allowed the impacts of delayed arrival times on the scheduled departure time of the outbound flight to be measured. All gates are pushback (i.e., aircraft are pushed backwards by tugs) except Gate D52 where power-in and power-out operations occur. In SIMMOD, aircraft pushbacks block the taxi path adjacent to the gate.

4.2.2 Simulation Results – Aircraft Delays

4.2.2.1 24-Hour Average Aircraft Delay

When using a simulation model, the primary measures of airfield/airspace capacity are arrival airspace delay and departure taxi-out delay (including departure queue delay). Delay is measured as the difference in the amount of time and aircraft actually uses the runway and the time it would have used if it were able to move unimpeded throughout the airfield/airspace system. For example, if there is only one aircraft taxiing out to depart and it obtains immediate departure clearance, the aircraft would have no delay (0.0 minutes delay).

Delay statistics were evaluated for the entire 24-hour traffic demand. **Tables 4.2-16** through **4.2-19** present average daily delays per operation for VMC1, 2, 3, and 4 runway use configurations.

TABLE 4.2-16

General Mitchell International Airport

DAILY AVERAGE DELAYS–VMC1

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.29	0.15
2006	724	1.26	0.55
2011	790	1.87	0.80
2021	960	4.17	6.01

Source: PB Aviation, Inc. Analysis

TABLE 4.2-17 General Mitchell International Airport DAILY AVERAGE DELAYS–VMC2			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.45	1.05
2006	724	1.76	2.05
2011	790	3.08	3.72
2021	960	6.22	13.49

Source: PB Aviation, Inc. Analysis

TABLE 4.2-18 General Mitchell International Airport DAILY AVERAGE DELAYS–VMC3			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.88	0.42
2006	724	2.00	0.60
2011	790	2.89	1.00
2021	960	4.02	6.53

Source: PB Aviation, Inc. Analysis

TABLE 4.2-19 General Mitchell International Airport DAILY AVERAGE DELAYS–VMC4			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.15	3.07
2006	724	1.36	3.50
2011	790	3.27	5.87
2021	960	6.10	17.83

Source: PB Aviation, Inc. Analysis

Tables 4.2-20 through **4.2-23** present average daily delays per operation for runway use configurations under IMC. The delays shown for IMC2 and IMC4 runway use configurations during IMC are considerably higher than VMC because some runways are not available for arrivals and departures. Only a small percentage of the annual operations occur in IMC at GMIA; however, estimates of delay during IMC are very important in the airfield capacity evaluation for the Airport.

TABLE 4.2-20

General Mitchell International Airport

DAILY AVERAGE DELAYS–IMC1

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.20	0.56
2006	724	1.95	1.07
2011	790	2.21	3.03
2021	960	5.33	6.82

Source: PB Aviation, Inc. Analysis

TABLE 4.2-21

General Mitchell International Airport

DAILY AVERAGE DELAYS–IMC2

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	2.08	1.77
2006	724	2.73	2.55
2011	790	4.02	4.71
2021	960	7.71	16.09

Source: PB Aviation, Inc. Analysis

TABLE 4.2-22

General Mitchell International Airport

DAILY AVERAGE DELAYS–IMC3

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	2.33	1.52
2006	724	2.91	2.11
2011	790	3.03	5.63
2021	960	9.86	6.96

Source: PB Aviation, Inc. Analysis

TABLE 4.2-23 General Mitchell International Airport DAILY AVERAGE DELAYS–IMC4			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	708	1.56	3.15
2006	724	1.89	4.42
2011	790	3.77	6.16
2021	960	8.85	18.02

Source: PB Aviation, Inc. Analysis

4.2.2.2 Peak Hour Average Delay

Another measure of delay is the average delay for peak hour operations. **Tables 4.2-24** through **4.2-27** present average delays per operation during peak hour operations for runway use configurations VMC1 through 4.

TABLE 4.2-24 General Mitchell International Airport PEAK HOUR AVERAGE DELAYS–VMC1			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	1.31	0.52
2006	60	1.88	0.62
2011	67	2.72	2.45
2021	80	5.46	7.23

Source: PB Aviation, Inc. Analysis

TABLE 4.2-25

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–VMC2

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	2.27	1.86
2006	60	2.67	2.16
2011	67	4.33	4.88
2021	80	6.74	21.00

Source: PB Aviation, Inc. Analysis

TABLE 4.2-26

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–VMC3

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	1.97	0.46
2006	60	2.13	1.18
2011	67	2.93	2.52
2021	80	4.14	8.43

Source: PB Aviation, Inc. Analysis

TABLE 4.2-27

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–VMC4

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	1.88	3.63
2006	60	1.85	4.50
2011	67	3.76	8.79
2021	80	7.95	19.89

Source: PB Aviation, Inc. Analysis

Tables 4.2-28 through **4.2-31** present average peak hour delays per operation for runway use configurations during IMC. The delays observed during IMC are slightly higher than those simulated for VMC, especially during the IMC configuration 1MC2 and 1MC4 runway use configurations. Arrival and departure delays become unacceptable as peak hour activity levels grow, and particularly during the IMC2 and IMC4 runway use configurations.

TABLE 4.2-28

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–IMC1

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	1.38	0.63
2006	60	2.82	2.03
2011	67	4.01	5.16
2021	80	7.73	8.67

Source: PB Aviation, Inc. Analysis

TABLE 4.2-29

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–IMC2

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	2.52	1.86
2006	60	3.97	2.75
2011	67	4.72	5.02
2021	80	9.68	22.08

Source: PB Aviation, Inc. Analysis

TABLE 4.2-30

General Mitchell International Airport

PEAK HOUR AVERAGE DELAYS–IMC3

Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	2.33	1.80
2006	60	2.91	2.23
2011	67	3.03	6.78
2021	80	7.19	11.65

Source: PB Aviation, Inc. Analysis

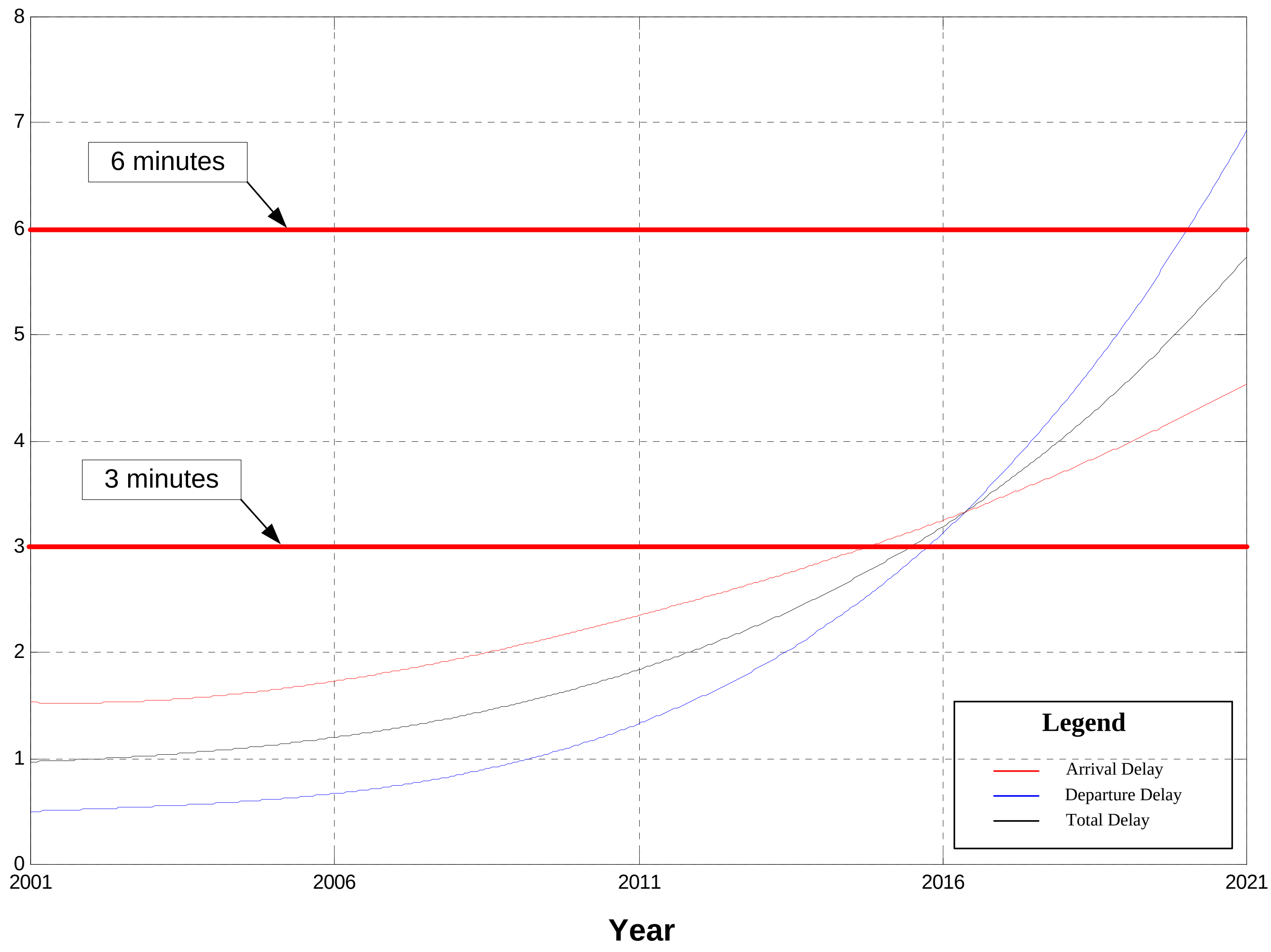
TABLE 4.2-31 General Mitchell International Airport PEAK HOUR AVERAGE DELAYS–IMC4			
Year	Number of Flights	Average Arrival Airspace Delay (minutes)	Departure Taxi-Out Delay (minutes)
2001	56	1.90	5.08
2006	60	2.41	7.53
2011	67	4.28	10.21
2021	80	9.36	22.16

Source: PB Aviation, Inc. Analysis

4.2.3 Summary of Simulation Results

Much like the analysis of the theoretical capacity, the simulations indicate that the airfield at GMIA generally is not capable of accommodating projected demands through the end of the 20-year planning period. However, the simulations indicate some very specific issues that should be addressed in planning for GMIA's future. First, the need for improved runway exits on runway 19R and 7R is clearly evident in the simulations. Second, the simulations demonstrate a need to balance runway use in the future, because the flexibility of FAA ATC personnel to assign a runway based on an aircraft's origin or destination point at the Airport will diminish as traffic levels grow. Third, the simulations show a potential need for capacity enhancements for the VMC2/IMC2 and VMC4/IMC4 runway use configurations. These runway use configurations constitute only 7.21 percent of annual total operations; therefore, capacity improvement for these two configurations should only be considered with facility improvements that provide other benefits as well. Fourth, the simulations project rising levels of arrival and departure delays after the year of 2011. Consequently, the "C-1 runway" will be necessary for decreasing arrival and departure delays.

Exhibit 4.2-10 depicts annual average arrival, departure, and total delays. Generally, annual average arrival airspace delays less than three minutes per operation are considered to be acceptable, while departure taxi-out delays often



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

ANNUAL AVERAGE DELAY

EXHIBIT 4.2-10

reach an annual average of six minutes before delays are considered unacceptable. Annual average arrival delay will be over three minutes around the year of 2015, indicating that capacity enhancement measures should be started before 2015. This time frame is a slightly earlier than the time given in theoretical capacity analysis. Annual average departure delay will reach six minutes and be unacceptable by 2019. This is because departure delay is longer than arrival delay before it is considered unacceptable and because departure flights can operate with less limiting ceiling and visibility conditions.

Also, it is important to note that the delays that were simulated occur as a result of the airfield configuration, airspace procedures, and air traffic demand specific to GMIA and the airspace immediately surrounding it. No attempt has been made to account for delays to aircraft generated by traffic at destination airports. While a number of aircraft departing from GMIA were delayed because of flow controls at the Chicago airports, those delays are not included as part of this study.

4.2.4 Airspace Capacity Issues

The airspace surrounding GMIA is under the operational jurisdiction of the FAA. The efficiency of the use of that airspace is determined by air traffic control procedures implemented for the safety of operations through the airspace.

Air traffic control flow management and traffic separation standards ensure that actual operations do not exceed the airspace capacity. The trade-off of such safety assurance measures is that some aircraft are delayed. For example, an increase in arrival delay is expected at GMIA as traffic levels increase, and arrival delays are likely to become problematic after 2011. Arrival delay is a measurement of aircraft delays in the air and is related to the configuration of the airfield as well as airspace management and air traffic control procedures. Consequently, it may be necessary to look at opportunities for improving airspace procedures during the later part of the planning period. Improvements to airspace management are the responsibility of the FAA, however, and are not addressed within the context of a Master Plan Update.

The FAA through its National Airspace Redesign (NAR) will restructure existing domestic and oceanic airspace to increase its efficiency, while maintaining a high level of safety. The NAR will consist of incremental changes to the national airspace structure, consistent with evolving air traffic and avionics technologies. The particular elements described have the potential to improve airspace capacity for the Airport.

One key element of the NAR is the redesign of traffic routes. Aircraft generally follow airways defined by ground navigational aids. Because these are not direct routes from origin to destination, the time and distance required is increased. Modern avionics such as the global positioning system (GPS) and flight management systems (FMS) can provide more direct and user-preferred routes.

The other key element that is nearing implementation is the consolidation of terminal radar approach facilities. Rather than using separate TRACON facilities at each airport in a particular region, a consolidated facility allows airspace restructuring by improving communications among controllers handling operations over a wide geographic range and increasing their flexibility in merging, maneuvering, and sequencing aircraft to and from the area airports.

4.3 *Geometric Design Requirements*

The planning and design of an airport is typically based on the airport's role and the critical aircraft that are planned to use it. Guidance for the planning and design of the airfield are based on FAA Advisory Circulars that aim to maximize airport safety, economy, efficiency, and longevity.

For geometric design purposes, it is necessary to establish applicable design standards for future runway and taxiway development. Information from FAA Advisory Circular 150/5300-13, *Airport Design*, was used to determine the Airport Reference Code (ARC) for the Airport. The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at an airport (see **Table 4.3-1**). The ARC has two components that reflect an airport's critical aircraft. The first component, designated by a letter, is the approach category of the aircraft as defined by aircraft approach speed. The second component, designated by a Roman numeral, is the airplane design group as determined by aircraft wingspan. Generally, aircraft approach speed applies to runways and runway-related facilities, whereas, aircraft wingspan relates primarily to separation criteria involving taxiways and taxilanes.

TABLE 4.3-1

General Mitchell International Airport

FAA AIRCRAFT CLASSIFICATIONS

FAA Aircraft Approach Category Classification		
Approach Category	Approach Speed (knots)	
A	Less than 91	
B	91 – 120	
C	121 – 140	
D	141 – 165	
E	166 or greater	
FAA Airplane Design Group Classification		
Airplane Design Group	Wingspan (feet)	Typical Aircraft
I	Less than 49	Learjet 24, Rockwell Sabre 75A
II	49 but less than 79	Falcon 50, Rockwell Sabre 80
III	79 but less than 118	727, 737, MD80, DC9
IV	118 but less than 171	757, 767
V	171 but less than 214	747, A330, A340
VI	214 but less than 262	Antonov AN-124, A380 (under design)

Source: FAA Advisory Circular 150/5300-13

Standards at the Airport are based on the current and projected aircraft fleet. It should be noted that the airfield is designed to meet a variety of needs of many different aircraft. As reflected in Table 4.3-1, all series of Boeing’s 747 aircraft fall within an ARC of D-V, while the 767 and 757 are classified as ARC C-IV aircraft.

Forecasts prepared for the Master Plan Update indicate that the **A330-200** will be the critical aircraft, in terms of the airfield geometric requirements, with an ARC of D-V. **Table 4.3-2** shows the applicable FAA design criteria for aircraft in Groups IV, V, and VI.

TABLE 4.3-2

General Mitchell International Airport

AIRFIELD DESIGN REQUIREMENTS

Design Criteria	Group IV (ft.)	Group V (ft.)	Group VI (ft.)
Runway Width	150	150	200
Runway Shoulder Width	25	35	40
Runway Centerline to:			
- Taxiway Centerline	400	400	600
- Aircraft Parking Area	500	500	500
Runway Object Free Area (Width)	800	800	800
- Length Beyond Runway End	1,000	1,000	1,000
Runway Obstacle Free Zone (Width)	400	400	400
- Length Beyond Runway End	200	200	200
Runway Safety Area (Width)	500	500	500
- Length Beyond Runway End	1,000	1,000	1,000
Taxiway Width	75	75	100
Taxiway Centerline to:			
- Parallel Taxiway Centerline	215	267	324
- Fixed or Movable Object	130	160	193
Taxiway Object Free Area (Width)	259	320	386
Taxiway Safety Area (Width)	171	214	262
Runway Blast Pad			
- Length	200	400	400
- Width	200	220	280

Source: FAA Advisory Circular 150/1500-13

4.4 Runway Length

The future fleet mix at GMIA is projected to contain a mix of aircraft types that shift over the planning period. As outlined in Table 3.4-10 of Chapter 3.0, *Activity Projections*, the future aircraft fleet also includes larger aircraft traveling longer distances. This section evaluates the need for longer runways based on the future fleet mix projections.

The most demanding aircraft in the projected fleet, in terms of runway length, is the A330-200, assuming this aircraft is used for longer travel distances. However, this aircraft is projected to be used by cargo carriers at GMIA for flights to their midwest cargo-sorting hubs such as Memphis and Louisville. With a flight distance of approximately about 300 miles, the A330-200 aircraft does not need to carry a full fuel load. Consequently, the existing runway length is sufficient to accommodate the A330-200 at GMIA unless its future uses changes. The narrow-body generation aircraft, such as the B737 and MD80 series, can provide non-stop service from GMIA to the west coast and are expected to be used for the longer stage length flights as anticipated in the forecast.

The Wisconsin Air National Guard's 128th Air Refueling Wing operates KC-135 aircraft from GMIA that carry fuel for in-flight refueling of other aircraft. The previous Master Plan investigated the need for a runway extension to meet the operational requirements of the Air National Guard. The need for such an extension was driven by wind and temperature conditions that occurred on a very limited basis. This, combined with the KC-135 modernization program that upgraded the aircraft engines with quieter and more efficient models, led to a decision to not include a runway extension for this purpose as part of the recommended plan. Consultation with the Air National Guard as part of this Master Plan Update indicated that the additional 1,000-foot extension considered in the previous Master Plan would provide operational flexibility for air-refueling and overseas deployments. Specifically, additional fuel could be carried for the domestic air-refueling missions and overseas destinations could be reached without a refueling stop en-route. The Air National Guard estimates that the 10,600-foot runway length would be used approximately 180 departures per year. This level of operations would not justify a runway extension under normal airport planning criteria (500 operations per year for the critical aircraft). However, national defense may dictate that this issue be reconsidered.

Runway length requirements were determined by the performance characteristics of the wide-body aircraft (KC-135), narrow-body aircraft (B737-800, MD81 and B717), and regional jets (CRJ-200ER and ERJ145) at maximum gross take-off weight for standard day and hot day temperatures. **Table 4.4-1** depicts runway length requirements at maximum gross takeoff weight. As shown, a runway length of 10,600 feet is needed to meet this requirement of the most demanding aircraft, i.e., the KC-135. The 737-800 and MD81 can be accommodated by the runway length currently available at GMIA. Runway 1L-19R, which is 9,690 feet long, is part of the entire runway use configurations at GMIA (refer to Exhibit 4.1-1).

TABLE 4.4-1

General Mitchell International Airport

CRITICAL AIRCRAFT RUNWAY LENGTH REQUIREMENTS

Aircraft Model	Max. TOW (pounds)	Standard Day[1] (feet)	Hot Day[2] (feet)
KC-135	322,500	10,000	10,600
B737-800	172,500	8,800	9,500
MD81	140,000	7,700	8,500
B717	116,000	7,200	7,800
CRJ-200LR	53,000	6,600	7,500
ERJ	42,328	6,000	6,900

Sources: PB Aviation, Inc. Analysis
Aircraft Operating Manuals

Notes: [1] 59° Fahrenheit at sea level
[2] Hot day is defined as standard day + 27 degrees Fahrenheit

4.5 Runway Width

Runway width requirements are based on the ARC standards described earlier. GMIA's longest runway, runway 1L/19R, is currently 200 feet wide and exceeds Group V design requirements. Runways 1R/19L, 7R/25L, and 13/31 are 150 feet wide, which meets Group IV and V standards. Runway 7L/25R is 100 feet wide, the required width for Group II and limited Group III aircraft.

4.6 Airfield Safety Areas

This section presents the FAA's standards as they apply to safety at the Airport. The following airfield safety standards apply and are reviewed in this section:

- *Runway Protection Zone (RPZ)*
  - Runway Object Free Area (OFA)
  - Controlled Activity Area

- *Runway Safety Area (RSA)*

- *Obstacle Free Zone (OFZ)*
  - Runway OFZ
  - Inner Approach OFZ

- *Inner-Transitional OFZ*

4.6.1 Runway Protection Zone (RPZ)

As depicted in **Exhibit 4.6-1**, the RPZ is an area on the ground that is trapezoidal in shape and is centered on the extended runway centerline. The purpose of the area is to enhance the protection of people and property on the ground. This is achieved through airport owner control of property located in RPZs. The RPZ begins 200 feet beyond the end of the runway pavement that is useable for takeoff and landing. It is important to note that the threshold location does not affect the beginning point of the RPZ. The dimensions of the RPZ are contingent on the size of aircraft operating on the runway as well as the type of approach capability. Generally, as aircraft size increases and approach minimums decrease, dimensions of the RPZ increase.

The RPZ contains two sub-areas: the runway OFA and the controlled activity area. The runway OFA is a two-dimensional ground area surrounding the runway. FAA standards do not allow any objects, including parked aircraft, except NAVAIDs and frangible objects with locations fixed by function (e.g., runway visual range – RVR – posts), within the OFA. The runway system was reviewed and the following topographical impacts to runway OFAs were noted:

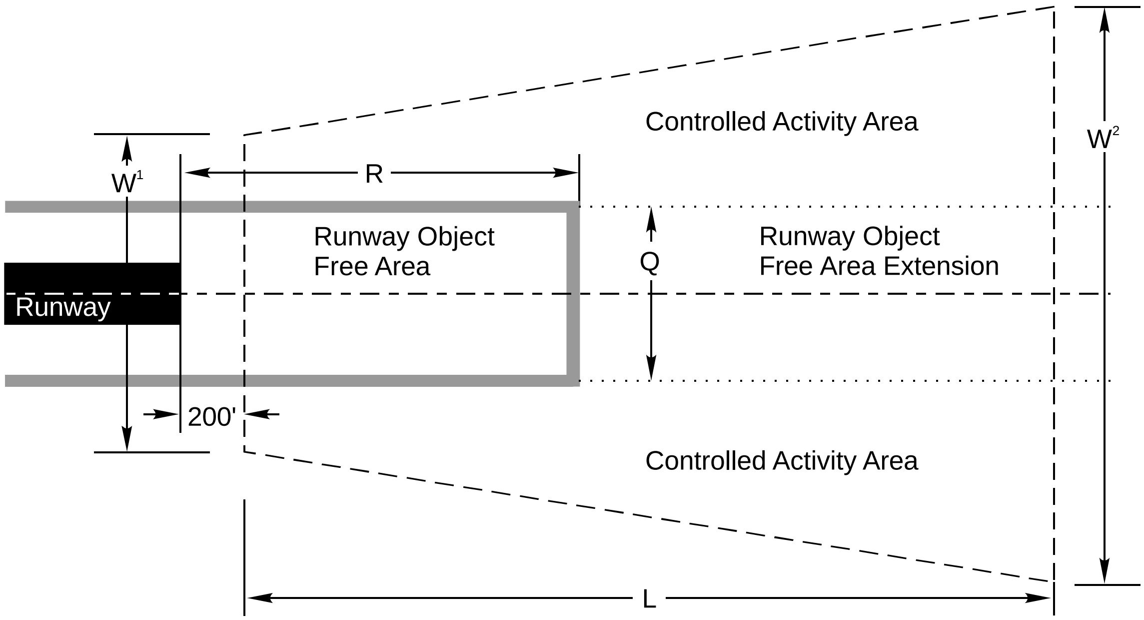
- *Runway 25L*
    - Railroad
- *Runway 7R*
    - 6th Street
- *Runway 19R*
    - Perimeter road and fencing
    - Layton Avenue
- *Runway 1L*
    - Natural terrain
    - College Avenue
- *Runway 13*
    - Layton Avenue
    - Perimeter road

- Access/maintenance roads from the runway end

- *Runway 31*
  - Railroad
  - Transformer
  - Drainage ditch
  - Perimeter road and fencing
  - Access/maintenance roads from the runway end

- *Runways 7L, 25R, 1R, and 19L meet the FAA standards for runway OFAs.*

The controlled activity area is the portion of the RPZ that lies outside the runway OFA. It is recommended that the airport have positive control of this area. It should be free of land uses that create glare, smoke, and activities that attract large amounts of people. While it is desirable to clear all objects from this area, some uses are permitted if they are below the approach surface and do not interfere with NAVAIDs. Other than the objects listed above in the runway OFAs, the RPZ areas meets the FAA recommendations.



Runway	W^1	W^2	L	R	Q
01L	1,000 FT	1,750 FT	2,500 FT	1,000 FT	800 FT
19R	1,000 FT	1,750 FT	2,500 FT	1,000 FT	800 FT
01R	500 FT	700 FT	1,000 FT	1,000 FT	800 FT
19L	500 FT	700 FT	1,000 FT	1,000 FT	800 FT
07R	1,000 FT	1,750 FT	2,500 FT	1,000 FT	800 FT
25L	1,000 FT	1,750 FT	2,500 FT	1,000 FT	800 FT
07L	500 FT	700 FT	1,000 FT	300 FT	500 FT
25R	500 FT	700 FT	1,000 FT	300 FT	500 FT
13	500 FT	700 FT	1,000 FT	1,000 FT	800 FT
31	500 FT	700 FT	1,000 FT	1,000 FT	800 FT

W^1 = Runway Protection Zone - Inner Width
W^2 = Runway Protection Zone - Outer Width
L = Runway Protection Zone - Length
R = Object Free Area - Length
Q = Object Free Area - Width

Source: Advisory Circular 150/5300-13, "Airport Design," Change 6.

GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

RUNWAY PROTECTION ZONE AND OBJECT FREE AREA STANDARDS

EXHIBIT 4.6-1

4.6.2 Runway Safety Area (RSA)

The RSA is a critical two-dimensional safety area surrounding the runway. Based on FAA design criteria, the RSAs for the runways 1L/19R, 1R/19L, 7R/25L, and 13/31 are 500 feet in width and extend 1,000 feet beyond each runway end, while the RSA for runway 7L/25R is 150 feet in width and extends 300 feet beyond the runway ends. The RSA is the most stringently regulated surface associated with a runway. The RSA must be:

- *Cleared, graded, and free of potentially hazardous surface variations*

- *Properly drained*

- *Capable of supporting aircraft rescue and firefighting (ARFF) equipment or an aircraft without causing damage to the aircraft*

- *Free of objects, except for objects mounted on low-impact resistant supports whose location is fixed by function*

The FAA Airports District Office conducted "RSA Determinations" for GMIA as part of its Runway Safety Area Program and found that the following six runway ends, with their respective topographical features, do not meet the current RSA standards:

- *Runway 25L*
  - Localizer
  - Railroad

- *Runway 7R*
  - 6th Street

- *Runway 19R*
  - Perimeter road and fencing

- Layton Avenue

- *Runway 1L*
  - Natural terrain
  - College Avenue

- *Runway 13*
  - Layton Avenue
  - Perimeter road
  - Access/maintenance roads from the runway end

- *Runway 31*
  - Railroad
  - Transformer
  - Drainage ditch
  - Perimeter road and fencing
  - Access/maintenance roads from the runway end

Planning related to airfield improvements must address alternatives for meeting the RSA requirements. Therefore, alternatives will be examined for meeting these requirements. These solutions could include both relocation of object from the existing RSAs or moving the RSA limits through adjustments to the runway length.

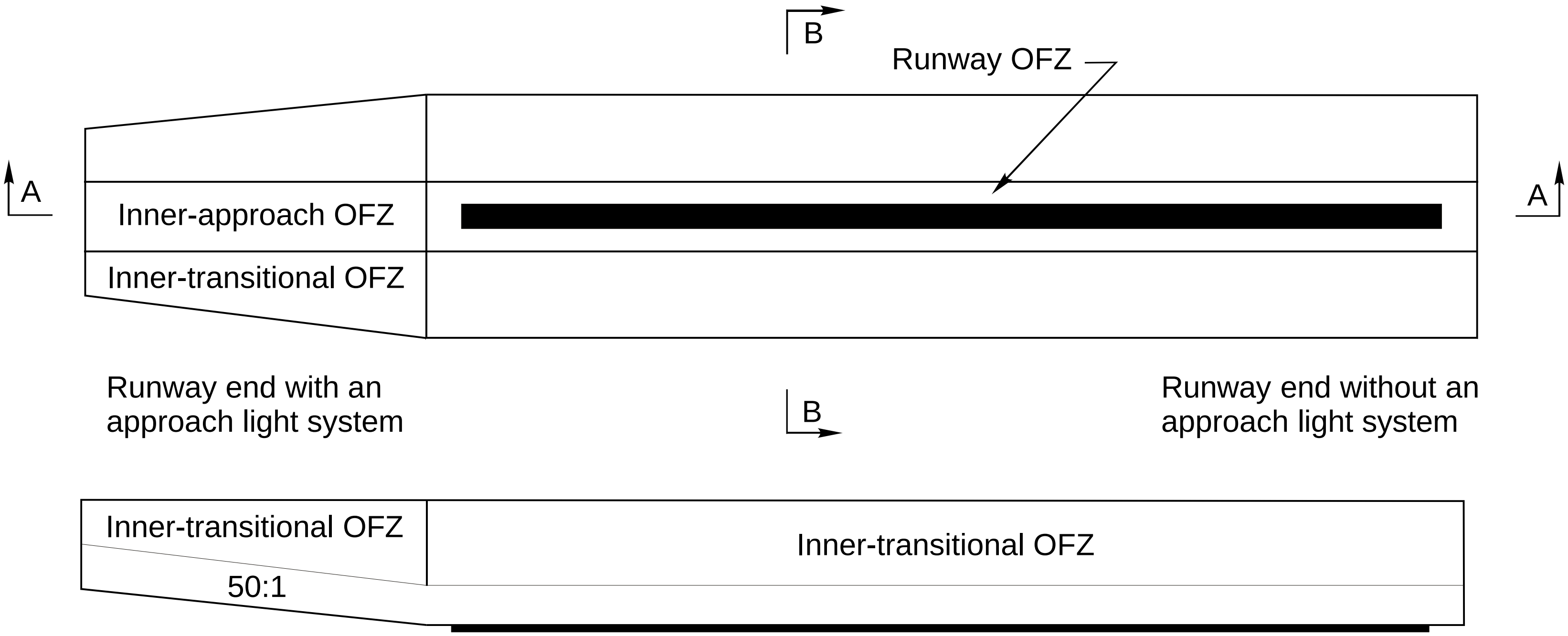
4.6.3 Obstacle Free Zone (OFZ)

The OFZ, depicted in **Exhibit 4.6-2**, is a three-dimensional volume of airspace (as opposed to the RPZ, OFA, and RSA, which are two-dimensional and at ground level) that supports the transition of ground to airborne operations (or vice versa). The standards prohibit taxiing and parked aircraft and other objects, except frangible NAVAIDs or fixed-function objects, from penetrating the OFZ. The OFZ encompasses the runway OFZ, inner-approach OFZ, and inner-transitional OFZ.

The runway OFZ extends 200 feet beyond each end of the runway and measures 400 feet in width.

The inner-approach OFZ is a defined volume of airspace, centered on the approach area that applies only to runways with approach lighting. The inner-approach OFZ begins 200 feet from the runway threshold and extends 200 feet beyond the last unit in the approach lighting system. It is the same width as the runway OFZ and rises at a slope of 50:1 away from the runway. At GMIA, the approach ends of runways 7R, 1L, and 19R are equipped with approach lighting systems.

The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies to runways with lower than the 3/4-statute mile approach visibility minimums, which at GMIA are runways 7R, 1L, and 19R. Currently, no objects violate the runway OFZ, the inner-approach OFZ, or the inner-transitional OFZ for the runways at GMIA.



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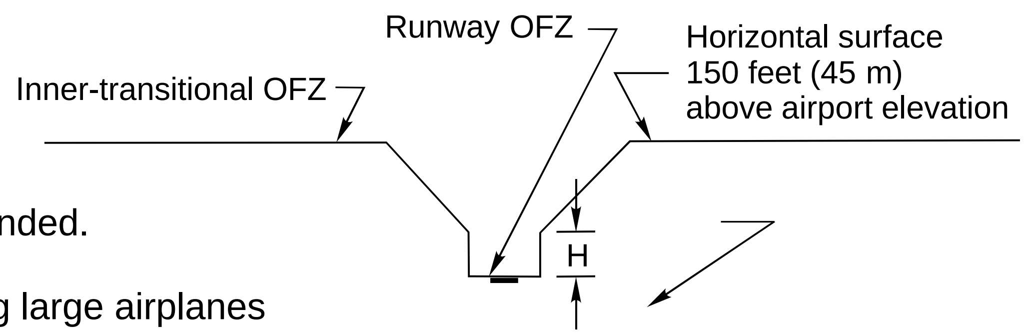


Section B-B

The vertical scale is expanded.

(OFZ) for runways serving large airplanes with lower than 3/4-statue mile (1,200m) approach visibility minimums.

GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

OBSTACLE FREE ZONE

EXHIBIT 4.6-2

4.7 Summary Airfield Capacity

The findings of the airfield demand/capacity analysis indicate that capacity enhancements, will be required during the 20-year planning period. Some key airfield improvements from the previous Master Plan remain valid based on these analyses. The theoretical capacity analysis and the airfield simulations indicate that the "C-1 runway," identified as the major airfield capacity project in the previous Master Plan, will need to be in place within the planning period. The runway extensions to runway 1R/19L would provide additional capacity during the times that the Airport was limited to a north or south operation based on wind and weather. During the alternatives phase of the Master Plan Update, this improvement will be modeled to determine the point at which benefits derived exceed the costs. Other airfield improvements, such as future taxiway locations, will need to be determined in the context of the overall airport development plan. Also, runway safety area improvements are needed in conjunction with airfield enhancements to meet FAA requirements.

In summary, the key conclusions from these analyses are: 1.) Airfield capacity enhancements, including the C-1 runway, will be required in the 20-year planning period; 2.) Improvements to the runway safety areas are necessary.

The next chapter examines facility requirements for landside facilities (i.e., terminal, parking, and general aviation). Those requirements, combined with the results presented in this Chapter, will be used to develop alternatives for meeting the projected facility needs of the GMIA in the future.

5.0

Landside Facility Requirements

5.0 LANDSIDE FACILITY REQUIREMENTS

The capacities and capabilities of the Airport's landside facilities, or those functional areas not related to the movement of aircraft, are evaluated in this element of the Master Plan Update. To properly plan for the Airport's future needs, the projections of aviation activity, presented in Chapter 3.0, *Activity Projections*, are translated into specific types and quantities of facilities that can adequately serve projected activity levels. These analyses are intended to identify, in general terms, the deficiencies in existing facilities and outline what new facilities will be required to meet projected growth. Alternatives for providing these facilities will then be identified in the next element of the planning process.

Facility requirements were calculated for the following airport functional areas:

- *Passenger Terminal*
- *Airport Access and Curbfront*
- *Parking (public, rental car, commercial, and employee)*
- *Air Cargo*
- *General Aviation*
- *Support Facilities*

The facility requirements identified represent a level of detail which is common to a master planning effort, not a level of detail that is equivalent to an architectural or engineering design study.

5.1 Terminal Requirements

This section presents the facility requirements for the passenger terminal at the Airport. The following sections provide the methodology and analysis related to this key part of the Airport:

- *Historical Demand Patterns*
- *Level of Service Standards*

- *Terminal Facility Requirements*

5.1.1 Historical Demand Patterns

5.1.1.1 Annual Passenger Activity

As shown on **Exhibit 5.1-1** annual enplaned passenger activity at General Mitchell International Airport (GMIA) has increased from approximately 2.0 Million Annual Enplaned Passengers (MAEP) in 1991 to approximately 3.0 MAEP in the year 2000. Passenger demand following the September 11, 2001 terrorist attacks was reduced to 2.8 MAEP in the year 2001. Overall growth between 1991 and 2001 resulted in an average annual increase of approximately 3.3 percent. Facilities requirements are usually based on recurring busy periods of demand, such as peak-hour passengers on an average day in the peak month (ADPM). However, airport revenue is in many ways tied to annual passenger and aircraft operational levels. Therefore, estimated growth in annual passengers and aircraft operations is both:

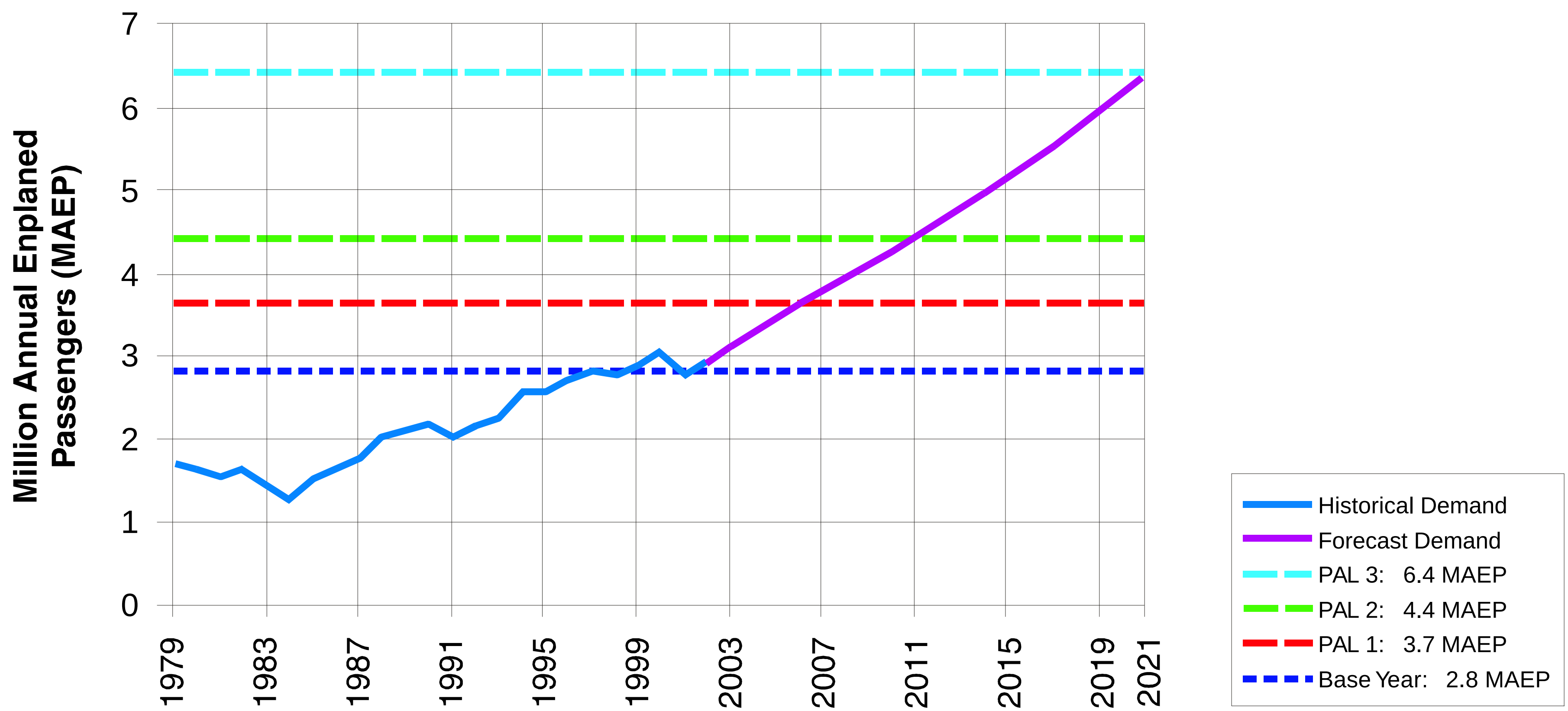
- An important factor in determining the “trigger points” for future terminal improvements (i.e., the dates necessary to begin design and construction) to meet future Planning Activity Levels (PALs), and
- An essential part of assessing the financial viability of a proposed facility improvement.

5.1.1.2 Monthly Demand Pattern

Compared to many U.S. airports, the monthly variation in air passenger traffic at GMIA is relatively moderate. The difference between the highest month (historically March) and lowest month (historically January) is approximately 36 percent. Historically, the highest demand has resulted from the relatively constant year-round business traveler demand plus increased non-business travel during popular vacation travel times. This relatively moderate variation in overall monthly demand has significant benefits in the determination of planning and design demand levels. That is, identifying March as the design peak month does not result in paying a high “premium” over average monthly demand levels.

This monthly demand pattern for calendar year 2000 is presented in **Exhibit 5.1-2**. Note: Calendar year 2000 is the last full year of data not affected by the sharp decline in passenger demand subsequent to the

Historical and Forecast Passenger Demand



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HISTORICAL AND FORECAST PASSENGER DEMAND

EXHIBIT 5.1-1

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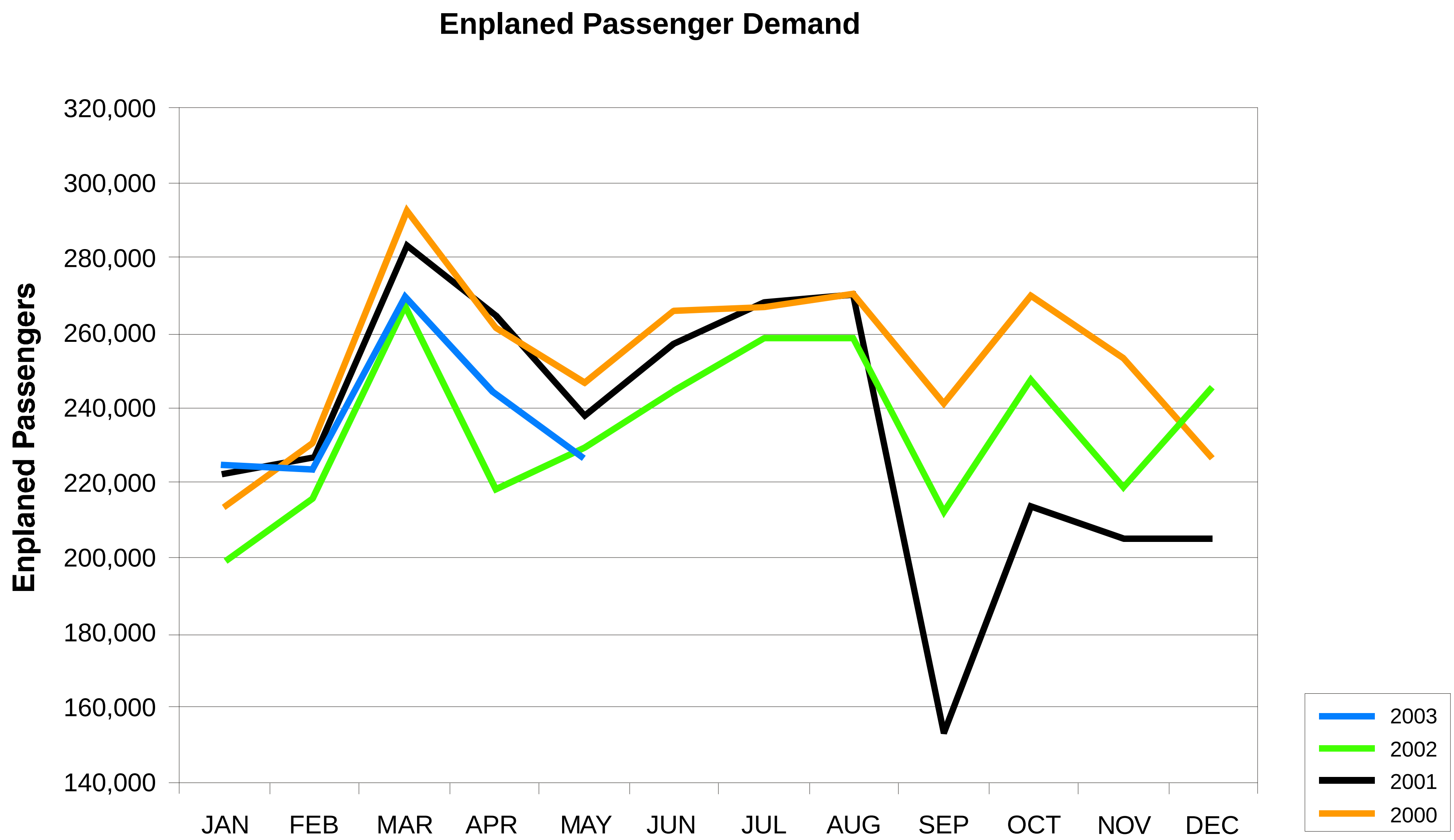


GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

ENPLANED PASSENGER DEMAND

EXHIBIT 5.1-2

September 11, 2001 terrorist attacks. As shown on Exhibit 5.1-2, the historical monthly demand patterns did change significantly after September, 2001.

5.1.1.3 Weekly Demand Pattern

Based on Official Airline Guide (OAG) data, the actual aircraft/arrival departure schedules at GMIA do not vary significantly by day of the week. That is, the total number of available aircraft seats is relatively constant. However, based on direct observation, the peak-period load factors vary significantly by day of the week with load factors on Sundays, Mondays, Thursdays and Fridays being somewhat higher than other days of the week.

5.1.1.4 Daily Demand Pattern

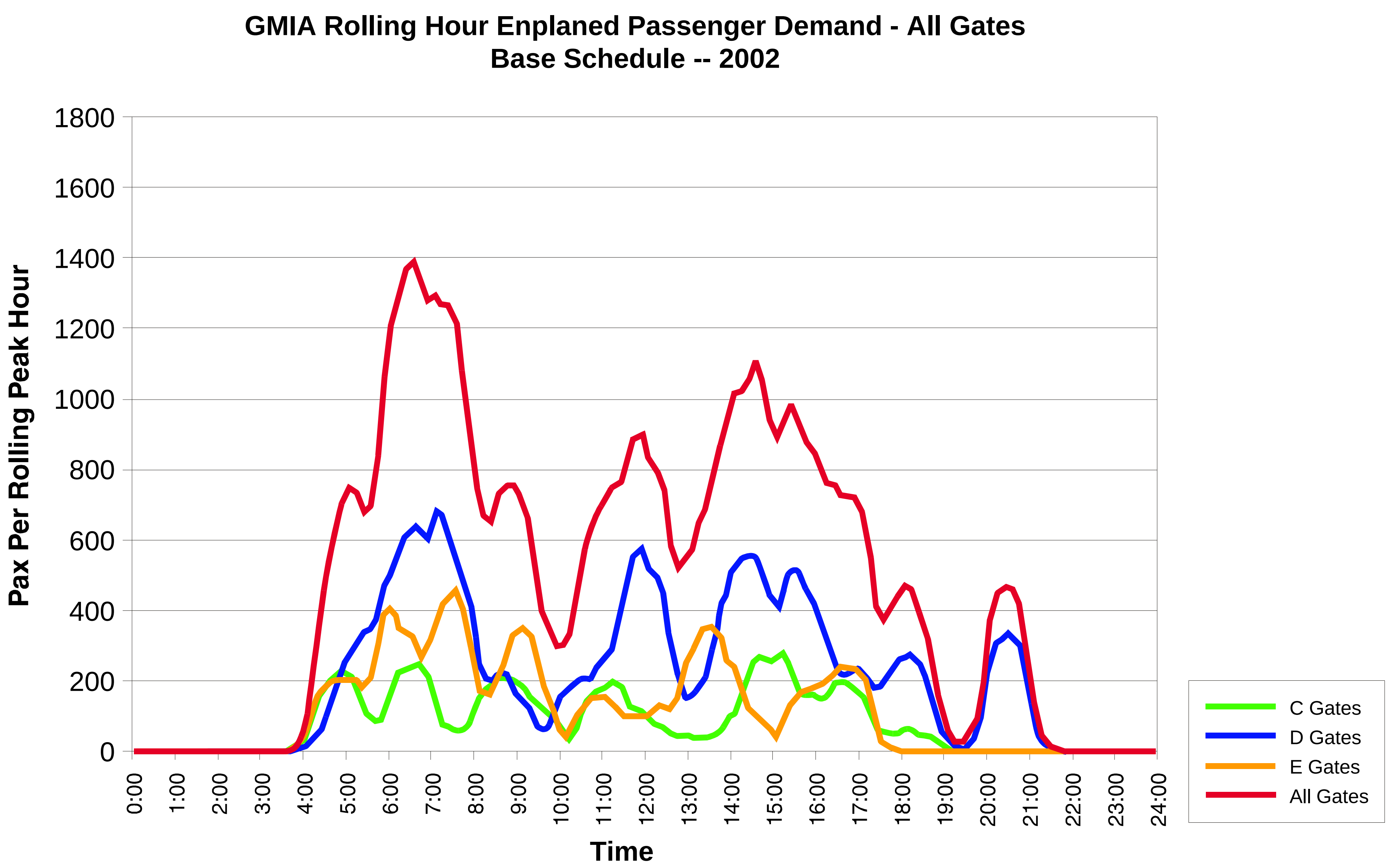
The daily aircraft departure demand pattern at GMIA is relatively peaked because of the Airport's high early morning demand from 0600 to 0800 hours followed by several midday peaks resulting from airline hubbing operations. The domestic aircraft arrival peak occurs from 2000 to 2100 hours and is more spiked than the morning domestic departure peak. Combined peak passenger activity from arriving and departing flights is greatest from 1500 to 1600 hours. Based on the projections presented in Chapter 3.0 *Activity Projections*, it is calculated that passenger load factors during these peak periods are in the range of 77 percent on average days in the peak month.

It is also important to consider whether the demand peaks for different airlines occur simultaneously. Almost all airlines operating at GMIA have departing flights operating during the 6 AM to 8 AM morning peak. Therefore, the enplaning peak demand periods for many individual airlines are almost simultaneous.

The current Average Day Peak Month enplaning, deplaning and total passenger demand pattern at GMIA is presented in **Exhibits 5.1-3** and **5.1-4** respectively.

5.1.1.5 Hourly Demand Pattern

Passenger demand within the enplaning peak hour is not completely uniform. Approximately 26 percent of peak hour enplanements occur within a peak 10-minute period. This is an extremely influential demand level to consider, since many facilities requirements (such as ticketing check-in counter, security screening, vertical transportation, etc.) are dependent on meeting this variation in demand within the peak hour.



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

PEAK-HOUR ENPLANING DEMAND: ALL GATES

EXHIBIT

5.1-3

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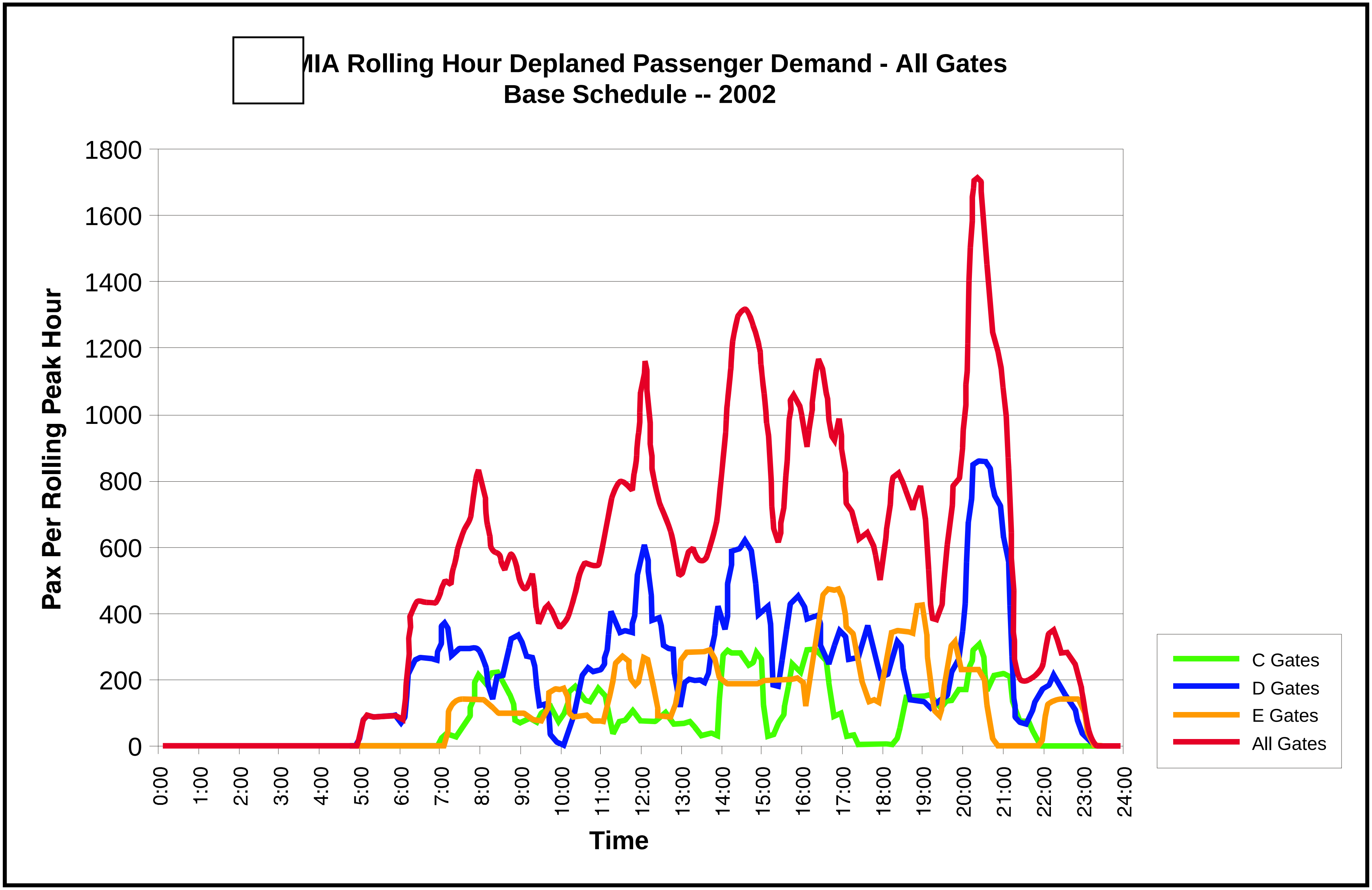
PB AVIATION, INC.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

PEAK-HOUR DEPLANING DEMAND: ALL GATES

EXHIBIT 5.1-4

5.1.1.6 *Peak Period Passenger Demand Levels*

On the basis of the demand patterns described in Section 2.0, demand levels to be used in the development of terminal requirements are presented in **Table 5.1-1**. Estimates of future demand are expressed as Planning Activity Levels (PALs) and are correlated with the overall capacity to meet demand, as opposed to being matched with the anticipated year in which that specific PAL may be reached. This emphasizes the importance of planning to meet actual future demand levels, as opposed to planning for specific years, which may be affected by increases or decreases in the rate of growth in demand. Also, it should be noted that estimates of peak-hour demand have a much more direct influence on the development of facilities requirements. Hence, the estimates of peak-hour enplaning and deplaning demand were set so as to represent a conservative (i.e., reasonably high) level for each component of demand as it changes over time.

5.1.1.7 *Forecast Aircraft Gate Requirements*

The primary determinants of terminal throughput of passengers are:

- The number and type of aircraft gates for boarding and deboarding passengers, and
- The actual demand for air travel

Constructing *more gates* than are necessary to meet demand *will not increase* throughput. However, constructing *fewer gates* than are necessary to meet demand *will reduce* airport throughput.

At some airports the number of remain overnight (RON) off-gate aircraft parking positions can influence thoughput by providing staging areas convenient to the active boarding gates. Historically at GMIA the RON parking demand was accommodated by the active boarding/deboarding gates; consequently, no RON parking positions were required.

More recently, however, approximately 5 RON parking positions have been utilized. Consequently, future requirements presented in this document include an allowance for growth in RON parking as a percentage of contact gates.

TABLE 5.1-1

General Mitchell International Airport

ESTIMATED PASSENGER DEMAND SUMMARY

Million Annual Enplaned Passengers	Planning Activity Levels (PALs)							
	Base Year 2002		PAL 1 2006		PAL 2 2011		PAL 3 2021	
	2.8		3.7		4.4		6.4	
Domestic	2.76	98.25%	3.59	98.25%	4.36	98.25%	6.32	98.25%
International	.04	1.75%	0.07	1.75%	0.08	1.75%	0.11	1.75%
Total	2.8	100%	3.7	100%	4.4	100%	6.4	100%
Average Day Peak Month Enplanements								
Domestic	7,770	98.1%	11,122	97.4%	13,549	97.9%	19,762	98.5%
International	150	1.9%	297	2.6%	291	2.1%	301	1.5%
Total	7,920	100%	11,419	100%	13,840	100%	20,063	100%
Peak-Hour Enplanements (including International)								
Originating	1,340	91.3%	1,720	90.3%	1,800	87.8%	2,010	84.3%
Connecting	130	8.7%	180	9.7%	250	12.2%	370	15.7%
Total	1,470	100%	1,901	100%	2,045	100%	2,382	100%
Peak-Hour Domestic Deplanements								
Terminating	1,420	91.3%	1,740	90.3%	1,910	87.8%	2,270	84.3%
Connecting	130	8.7%	190	9.7%	260	12.2%	420	15.7%
Total	1,550	100%	1,930	100%	2,171	100%	2,689	100%
Peak-Hour International Deplanements								
Terminating	150	100%	150	100%	150	100%	150	100%
Connecting	0	0%	0	0%	0	0%	0	0%
Total	150	100%	150	100%	150	100%	150	100%

Source: PB Aviation, Inc.

The recommended fleet mix and aircraft frontage requirements to meet estimated future passenger demand in peak demand periods are presented in **Table 5.1-2**.

TABLE 5.1-2

General Mitchell International Airport

RECOMMENDED FLEET MIX AND AIRCRAFT FRONTAGE REQUIREMENTS

Type of Aircraft	Base Year	PAL 1 2006	PAL 2 2011	PAL 3 2021
Group V: Jumbo	0%	0%	0%	0%
Group IV: Widebody	5%	10%	12%	14%
Group III: Narrowbody	40%	40%	40%	40%
Group II: Regional/Commuter	55%	50%	48%	46%
Total	100%	100%	100%	100%
Annual Enplaned Passengers/Gate	67,000	76,000	78,000	91,000
Estimated Ramp Frontage (in Linear Feet)	4,520	5,200	6,000	7,400

Source: PB Aviation, Inc.

5.1.2 Level of Service Standards

Level of Service (LOS) standards are planning factors used to represent conditions that affect the quality, as opposed to the throughput, of passenger circulation and processing in the terminal. Quantitative factors such as the extent of area allocated per occupant in a public circulation corridor are used to represent the relatively subjective feelings of spaciousness or overcrowding experienced by passengers in that portion of the terminal. The LOS planning factor is applied to the number of occupants (including passengers, well wishers, greeters and employees) who are simultaneously present in that particular terminal component in the design peak period.

One of the most objective statements of passenger LOS utilized in development of terminal programs was developed by the International Air Transport Association (IATA) in their Airport Development Reference Manual (8th Edition, April 1995). As shown in **Table 5.1-3**, these standards describe a very specific extent of area for various terminal components.

TABLE 5.1-3

General Mitchell International Airport

IATA LEVEL OF SERVICE (LOS) STANDARDS

LEVEL OF SERVICE STANDARDS (IN SQUARE FEET/OCCUPANT)						
LOS CATEGORY	A	B	C	D	E	F
Check-in Queue Area	19.35	17.2	15.05	12.9	10.75	See Note 1
Wait/Circulate	29.03	24.76	20.43	16.13	10.75	See Note 1
Hold Room	15.05	12.9	10.75	8.6	6.45	See Note 1
Bag Claim Area (excluding the claim device)	21.5	19.35	17.2	15.05	12.9	See Note 1
Government Inspection Services (GIS)	15.05	12.9	10.75	8.6	6.45	See Note 1

Source: IATA Airport Development Reference Manual (8th Edition, April 1995)
Note 1: LOS "F" is described as "System Breakdown" by IATA.

The IATA legend describing each LOS is as follows:

A. Excellent level of service; condition of free flow; excellent level of comfort.

B. High level of service; condition of stable flow; very few delays; high level of comfort.

C. Good level of service; condition of stable flow; acceptable delays; good level of comfort.

D. Adequate level of service; condition of unstable flow; acceptable delays for short periods of time; adequate level of comfort.

E. Inadequate level of service; condition of unstable flow; unacceptable delays; inadequate level of comfort.

F. Unacceptable level of service; condition of cross-flows; system breakdown and unacceptable delays; unacceptable level of comfort.

An IATA Level of Service Standard “B” was utilized in the development of facilities requirements as described further in Section 5.1.3. For the categories of space covered by the IATA standards this represents a good level of service for passengers, which is reasonable for an initial statement of overall facilities requirements.

5.1.3 Facility Requirements

In this section, facility requirements are presented for the following major building components:

- *Ticketing/Baggage Check-in*, including check-in queuing, ticketing/baggage check-in counters, airline ticketing offices (ATOs) and outbound baggage handling.
- *Security Screening*, including queuing, Transportation Security Administration (TSA) operations and support areas for checked baggage screening as well as passenger screening checkpoints.
- *Holdrooms*, including seating, gate podiums and backscreens, internal circulation, queuing and an allowance for deplaning circulation aisles.
- *Concessions*, including public access (plus remote support space).
- *Passenger Services*, including restrooms and other non-commercial passenger services.
- *Domestic Baggage Claim*, including inbound baggage handling, claim devices, active claim area and baggage service/storage rooms.
- *Other Airline Space*, including enclosed airline operations, office space, breakroom/ready rooms, clubrooms, etc.
- *Airport and Other Agency Space*, including Airport administration and operations space, Sheriff’s Department facilities, Federal Inspection Services (FIS) space, and other regulatory agency space.

- *Public Circulation*, including horizontal and vertical circulation for all public areas, both pre-and post-security.

- *Building Support*, including space for delivery, building storage, employee breakrooms, shops, trash removal, as well as emergency egress circulation and building utilities such as mechanical, electrical, communications and other infrastructure components.

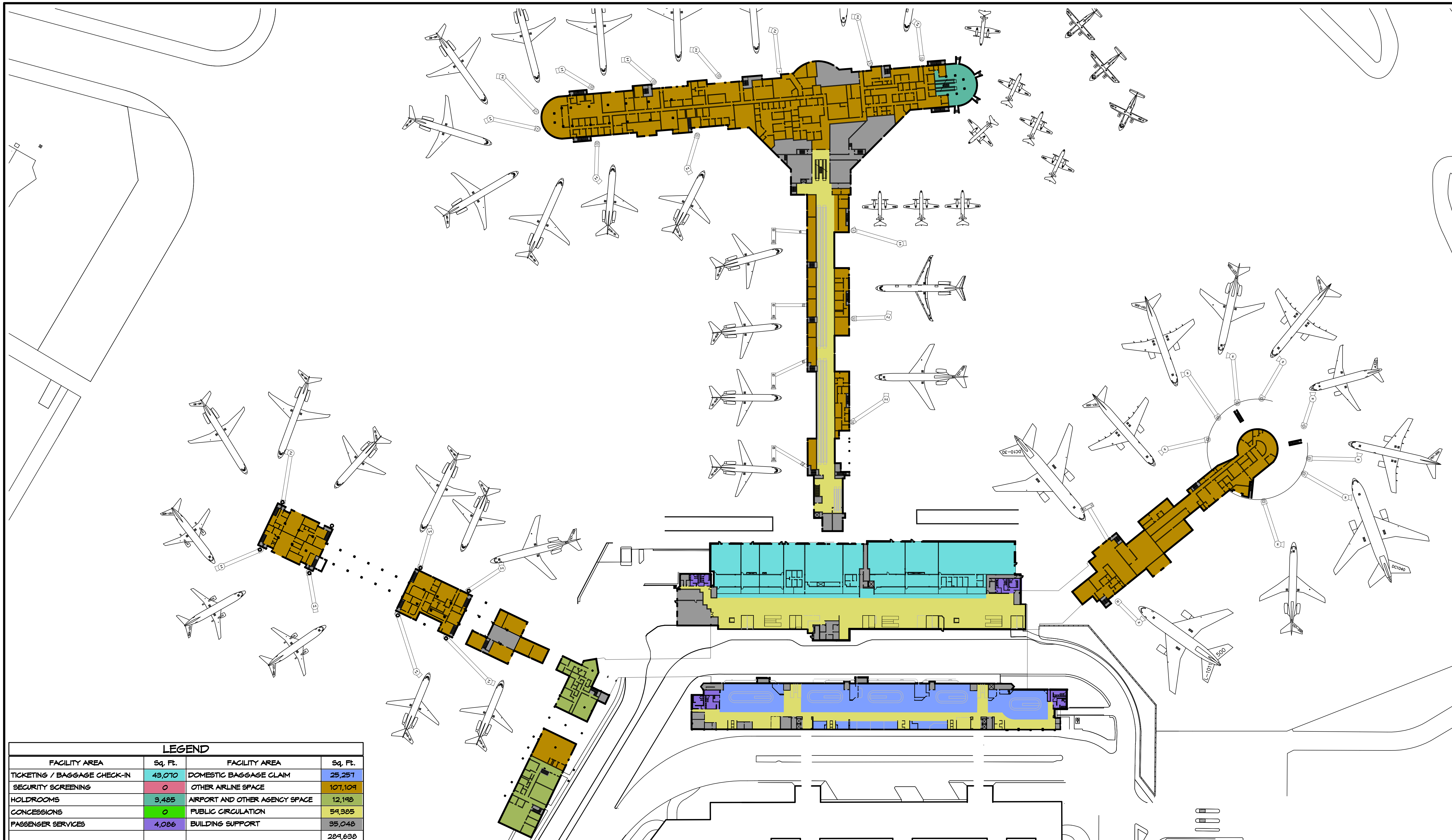
The configuration of each of these building components in the existing terminal is presented in **Exhibits 5.1-5**, **5.1-6** and **5.1-7**.

5.1.3.1 Ticketing/Baggage Check-In

The Ticketing Lobby primarily accommodates enplaning passenger operations. Passengers and well wishers arrive at the terminal via a number of different vehicular access modes (such as private vehicles, taxicabs, courtesy shuttles, etc.) and will utilize different ticket lobby services (such as ticket purchase, ticket reservation changes, issuance of boarding passes, baggage check-in, etc.) Some percentage of the future passengers will also check in at curbside stations immediately outside the ticket lobby.

In an attempt to lower their operating costs, many airlines are currently changing their ticket lobby operations to include greater use of Automated Ticketing Machines (ATMs) and other procedures to reduce staffing and facilities requirements. Consequently, the estimate of overall ticket lobby area requirements includes an allowance for the effects of these alternative processing methods over the long term.

In addition, reflecting the Airport's goal of increasing the efficiency and flexibility of terminal facilities, it is assumed that Common Use Ticketing Equipment (CUTE) will be incorporated in future terminal improvements. This includes ticket counter modules that can support use by different airlines. In calculating future ticket counter requirements, however, no allowance for reduction in ticketing frontage has been incorporated since almost all airlines have departing flights in the morning enplaning peak demand period.



LEGEND

FACILITY AREA	Sq. Ft.	FACILITY AREA	Sq. Ft.
TICKETING / BAGGAGE CHECK-IN	43,070	DOMESTIC BAGGAGE CLAIM	25,257
SECURITY SCREENING	0	OTHER AIRLINE SPACE	107,109
HOLDROOMS	3,485	AIRPORT AND OTHER AGENCY SPACE	12,198
CONCESSIONS	0	PUBLIC CIRCULATION	59,385
PASSENGER SERVICES	4,086	BUILDING SUPPORT	35,048
			289,638

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

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75' 37.5' 0 75' 150'

NORTH

Facilities Areas Ground Level

EXHIBIT 5.1-5

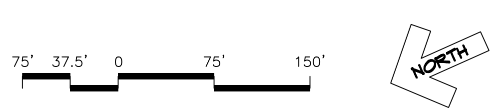
PB AVIATION, INC.

LEGEND

FACILITY AREA	Sq. Ft.	FACILITY AREA	Sq. Ft.
TICKETING / BAGGAGE CHECK-IN	0	DOMESTIC BAGGAGE CLAIM	0
SECURITY SCREENING	10,760	OTHER AIRLINE SPACE	3,260
HOLDROOMS	71,713	AIRPORT AND OTHER AGENCY SPACE	18,946
CONCESSIONS	45,554	PUBLIC CIRCULATION	123,611
PASSENGER SERVICES	16,062	BUILDING SUPPORT	18,552
			308,458

GENERAL MITCHELL INTERNATIONAL AIRPORT

MASTER PLAN UPDATE



Facilities Areas Concourse Level

EXHIBIT 5.1-6

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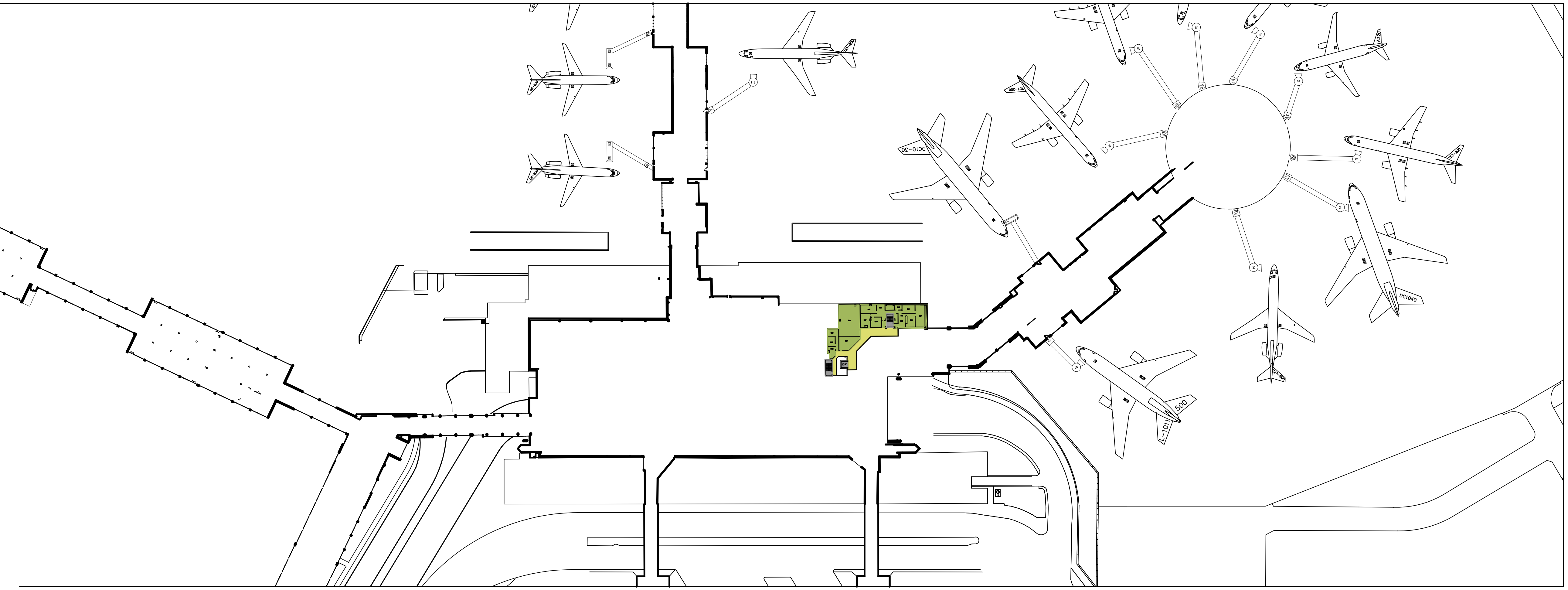
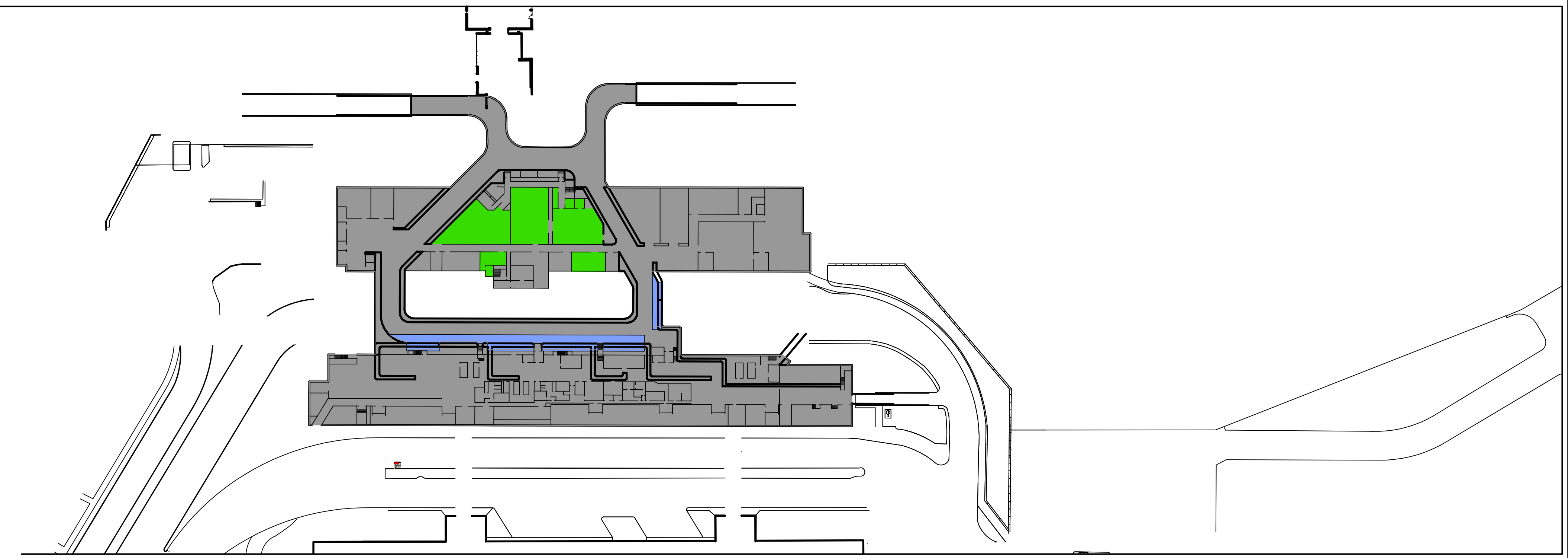
PB AVIATION, INC.



MEZZANINE LEVEL - LEGEND

FACILITY AREA	Sq. Ft.
AIRPORT AND OTHER AGENCY SPACE	4,560
PUBLIC CIRCULATION	1,229
BUILDING SUPPORT	500
	6,289



BASEMENT LEVEL - LEGEND

FACILITY AREA	Sq. Ft.	FACILITY AREA	Sq. Ft.
TICKETING / BAGGAGE CHECK-IN		DOMESTIC BAGGAGE CLAIM	4,353
SECURITY SCREENING		OTHER AIRLINE SPACE	
HOLDROOMS		AIRPORT AND OTHER AGENCY SPACE	
CONCESSIONS	8482	PUBLIC CIRCULATION	
PASSENGER SERVICES		BUILDING SUPPORT	98,264
			111,099

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

75' 37.5' 0 75' 150'

NORTH

Facilities Areas Basement Level and Mezzanine Level

EXHIBIT 5.1-7

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PB AVIATION, INC.

The basic methodology utilized to estimate ticketing requirements at GMIA is to estimate the split between passengers checking bags at curbside versus those using the ticket counter (including passengers checking bags, purchasing tickets, asking for information, etc.)

Estimates of curbside check-in requirements were based on utilization by up to 30 percent of originating passengers. Ticket counter check-in requirements were based on utilization by up to 70 percent of originating passengers. Many airlines are implementing increased use of Automated Ticketing Machines and on-line printing of boarding passes.

Consequently, as shown in the planning factors described below, an allowance for the effects of future increases to airline check-in efficiency is included in the estimate of future check-in counters.

Based on observed processing rates at U.S. airports, the service times for curbside and ticket counter check-in are estimated to be as follows:

- *Ticket Counter Check-in (Domestic flights)*: 2 minutes per transaction per agent.
- *Ticket Counter Check-in (International flights)*: 5 minutes per transaction per agent.
- *Curbside Check-in (only domestic flights are permitted)*: 1 minute per transaction per agent.

Other planning factors utilized are:

- *Peak-Hour Originating Passengers Percentage Chapter 3.0: Activity Projections*: 9.7 percent in PAL 1, 12.1 percent in PAL 2 and 15.7 percent in PAL 3.
- *Peak-Hour Enplaning Load factor Chapter 3.0 Activity Projections*: 77 percent.
- *Passenger Service Goal*: All customers check in within 10 minutes of arriving at ticketing queue.
- *Average Frontage per Airline Agent Position*: 5 feet.
- *Allowance for Effects of Common Use Ticketing Equipment (CUTE)*: 0 percent, since estimates of future ticketing frontage requirements are based on meeting the morning enplaning peak period passenger demand. The primary potential

operational benefits of CUTE are to accommodate non-peak period variations in enplaning demand (such as seasonal variations in specific airline demand peaks.)

- *Allowance for Effects of Future Increases in Airline Check-in Efficiency (such as Automated Ticketing Machines and on-line printing of boarding passes)*: -10 percent in PAL 1, -15 percent in PAL 2 and -20 percent in PAL 3.

- *Allowance for unleased counter frontage to accommodate future new incremental shifts in airline demand*: +10 percent (based on a national average for long-range development requirements to provide more timely response to changing airline demand).

The combined effect of applying these planning factors to the estimated peak-hour enplaning demand is summarized in **Table 5.1-4**.

Ticket lobby area requirements are derived from the ticket counter frontage requirements. Allowances for the depth (perpendicular to the ticket counter frontage) of the various components of the ticket lobby are as follows:

- Check-in Queuing Depth: 15 feet

- Ticket Agent Workspace (including counter depth, agent work area and take-away baggage belt depth): 10 feet

- Airline Ticket Offices (ATOs): 25 feet

- Outbound Baggage Handling: 60 feet

TABLE 5.1-4

General Mitchell International Airport

TICKETING/BAGGAGE CHECK-IN FRONTAGE AND AREA REQUIREMENTS

Components	Base Year 2001	PAL 1 2006	PAL 2 2011	PAL 3 2021
No. of Airline Check-in Positions	83	105	113	132
Overall Ticket Counter Frontage (in linear feet)	460	550	560	620
Check-in Queuing Area (in square feet)	6,900	8,250	8,400	9,300
Agent Workspace (in square feet)	4,600	5,500	5,600	6,200
Airline Ticket Offices (ATOs) Area (in square feet)	11,500	13,750	14,000	15,500
Outbound Baggage Handling (in square feet)	27,600	33,000	33,600	37,200
Total	50,600	60,500	61,600	68,200

Source: PB Aviation, Inc.

Concession, restroom, passenger service and public circulation requirements are as described in separate sections of this report.

5.1.3.2 Passenger and Baggage Security Screening

Transportation Security Administration (TSA) regulations for both passenger screening and checked baggage screening have been established and are being applied to 429 U.S. airports. It is likely that these regulations will evolve as operational feedback is available from the first deployments. Therefore, working assumptions for planning future security screening facilities will likely be refined as the initial TSA deployments are assessed.

Passenger Screening Checkpoints

Working assumptions and planning factors utilized for passenger screening checkpoints are as follows:

- Public Utilization: Only ticketed passengers will be permitted through the checkpoint (i.e., no well wishers or greeters).
- Combined Checkpoint: At some point the TSA, the Airport and/or the airlines may wish to combine several individual screening checkpoints into one combined checkpoint. The potential benefits costs and other operational effects of combining the security checkpoints will be addressed in the next phase of the Master Plan Update.
- Passenger Service Goal: All passengers screened within 10 minutes of arriving at the passenger screening queuing area.
- Throughput: Based on the TSA's goal of increased productivity as described in the BWI pilot program, approximately 210 passengers per hour per security screening lane.
- Screening Area Required: Approximately 1,600 sf per lane, including an allowance for queuing.
- Support Area Required: Approximately 4,000 per checkpoint

Checked Baggage Screening

At the time of this writing, GMIA has completed installation of explosive detection system/explosive trace detection (EDS/ETD) equipment in the ticket lobby. As a next step, the Airport is considering relocation of the EDS/ETD equipment to a "Back-of-the-House" installation to free up space in the ticketing lobby. The following working assumptions and planning factors are proposed for the long-range planning of future checked baggage screening:

- *Utilization*: All baggage checked at curbside or at the ticket lobby check-in counter will undergo in-line “Back-of-the-House” Explosive Detection System (EDS) Primary Screening as well as in-line Explosive Trace Detection (ETD) Secondary Screening. Unresolved alarms will require opening bags with or without the passenger present.

- *Protocols and Throughput*: Assuming in-line automated EDS Primary Screening at a rate of 420 bags per hour, 20 percent of those bags will require EDS Secondary at an average rate of 60 seconds per bag; 1 percent of those bags will require open bag search at a rate of 6 minutes per bag.

- *Passenger Service Goal*: All bags screened within 10 minutes of arriving at the EDS screening location. (Note: TSA has not yet established a goal for this criterion.)

- *Screening Area Required*: Approximately 4,000 square feet per EDS/ETD work station, including an allowance for the TSA screening area and in-line conveyor equipment.

- *Support Area Required*: Approximately 2,000 square feet per screening location.

The combined effect of applying these planning factors to the estimated peak-hour enplaning demand is presented in **Table 5.1-5**.

TABLE 5.1-5

General Mitchell International Airport

PASSENGER AND BAGGAGE SECURITY SCREENING REQUIREMENTS

Components	Existing	PAL 1 2006	PAL 2 2011	PAL 3 2021
No. of Passenger Screening Lanes, based on peak 10-minute demand	10	12	13	14
Passenger Screening Checkpoint and Support Area (in square feet)	20,000	23,200	24,800	26,400
Checked Baggage Screening and Support Area (in square feet)	25,000	33,000	39,000	57,000
Total	45,000	56,200	63,800	83,400

Source: PB Aviation, Inc.

5.1.3.3 Holdrooms

The principal determinant of both the extent and overall configuration of the concourse facilities is the requirement to accommodate the estimated future aircraft fleet (described in Section 2.0). The resulting passenger circulation path to and from these aircraft parking positions requires careful consideration in assessing design alternatives. Industry standards for passenger circulation have been adopted as follows:

- Unassisted Walking Distance from Ticketing to Gates: 800 feet or less preferred, 1,200 feet maximum.

- Level Changes between Ticketing and Gates: 0 preferred, 1 maximum.

Meeting these criteria will be one of the most critical factors in achieving a good level of passenger “acceptance” of the future expansion of the terminal. This is particularly true for the frequent users of the Airport (generally business travelers) who will be evaluating the convenience of future terminal improvements against the relatively short walking distances and travel times in existing Concourses C, D and E, as shown in **Table 5.1-6**.

TABLE 5.1-6

General Mitchell International Airport

COMPARISON OF WALKING DISTANCES

	CONCOURSE C	CONCOURSE D	CONCOURSE E
Average Walking Distance Ticketing to Gates (in feet) – See Note 1	850	1,000	600
Average Walking Time Ticketing to Gates (in minutes) – See Note 2	9.0	9.7	8.8
Level Changes – See Note 3	1	1/2	1

Source: PB Aviation, Inc.
Note 1: Based on walking from mid-point of the ticket counter to the mid-point of holdrooms.
Note 2: Based on an average walking speed of 215 feet/minute and allowing an average of 5 minutes for screening.
Note 3: Two level changes for commuter gates at Concourse D.

Holdroom area requirements for the future terminal improvements are based on the following assumptions:

- Wellwisher Percentage: 0 percent, assume current TSA regulations will continue

- Greeter Percentage: 0 percent, assume current TSA regulations will continue

- Percentage of Enplaning Passengers in Holdroom at Peak: 85 percent

- Area per Occupant: 12.9 square feet based on IATA Level of Service "B"
- Allowance for Gate Podium and Queuing: 200 square feet
- Allowance for Deplaning Aisle: 500 square feet

Applying these planning factors to each of the basic aircraft types in the future fleet mix yields the holdroom area requirements summarized in **Table 5.1-7**.

TABLE 5.1-7

General Mitchell International Airport

HOLDROOM AREA REQUIREMENTS

	Base Year	PAL 1 2006	PAL 2 2011	PAL 3 2021
Total Area (in square feet)	64,000	70,000	82,000	106,000

Source: PB Aviation, Inc.

5.1.3.4 Concessions

Concession development has two significant components:

- Primary Concessions, essentially a central concessions court area conveniently accessible to all enplaning passengers along their circulation path to the holdrooms.
- Secondary Concessions, essentially concession areas conveniently accessible to passengers within close proximity (300 feet) of holdrooms.

The physical relationship between the Ticket Lobby, the Passenger Security Screening location(s) and the holdrooms will greatly influence the type, location, configuration, convenience and financial viability of the Primary Concessions. The proximity of Secondary Concessions to individual holdrooms plus the mode of access to/from these holdrooms will greatly influence the type, location, configuration, convenience and financial viability of the Secondary Concessions. For these reasons, the interrelationship of concessions, security screening and public circulation will have a significant influence on both the level of service to passengers and revenue generation to the Airport.

Concession requirements described in this report are based on the area required to accommodate peak period circulation of passengers, as well as an allowance for the additional demand from employees. For each concession type and location, an estimate was made of the percentage of passengers who would patronize that specific concession (i.e., the "capture rate").

A summary of requirements for concession facilities is described in **Table 5.1-8**.

TABLE 5.1-8

General Mitchell International Airport

CONCESSION AREA REQUIREMENTS

Components	Base Year 2002	PAL 1 2006	PAL 2 2011	PAL 3 2021
Ticket Lobby Concessions (in square feet)	1,000	1,500	2,000	3,000
Central Concessions (in square feet)	23,000	29,000	32,000	37,000
Concourse Concessions (in square feet)	21,000	24,000	28,600	35,700
Baggage Claim Concessions (in square feet)	1,000	1,500	2,000	3,000
Total	46,000	56,000	64,600	78,700

Source: PB Aviation, Inc.

5.1.3.5 Passenger Services

The same working assumptions about basic passenger circulation were applied to the extent and distribution of public restrooms and other non-commercial passenger services.

A summary of Passenger Services requirements is presented in **Table 5.1-9**.

TABLE 5.1-9

General Mitchell International Airport

PASSENGER SERVICES REQUIREMENTS

Components	Base Year 2001	PAL 1 2006	PAL 2 2011	PAL 3 2021
Public Restrooms (in square feet)	18,000	25,400	30,300	44,400
Airport Space (such as Children's Play Areas, First Aid, Lost and Found, etc.) (in square feet)	2,500	2,900	3,400	4,200
Total	20,500	28,300	33,700	48,600

Source: PB Aviation, Inc.

5.1.3.6 Domestic Baggage Claim

Domestic Baggage Claim is an essential operational component for passengers claiming baggage and/or transferring to various ground transportation modes. This space is also an essential part of the Airport's goal of providing a welcoming environment for arriving passengers. For business travelers this arrival experience must include efficiency in transfer to rental cars and other commercial vehicles, but must also acquaint the arriving passenger with the energy and diversity of the Greater Milwaukee Area and the region.

The facilities requirements for domestic baggage claim are primarily dependent on the number, type, and load factor of aircraft arriving in a peak 20-minute period. Since the arriving aircraft schedule can sometimes vary significantly from the existing flight schedule, an allowance for schedule variations is incorporated into the estimate of aircraft arrival demand. In addition, the number of each type of arriving flights that can share a baggage claim device is important to consider, especially in an airport like GMIA where there are many carriers sharing overall market.

To reduce operational problems, it is advisable to provide a sufficient number of claim devices so that different airlines (or different ground handlers) are not required to compete for the operation of a device.

Consequently the following working assumptions were utilized in developing estimates of baggage claim requirements:

- *Checked Bags per Passenger*: 1.25
- *Percentage of total bags displayed in claim device at peak*: 30 percent
- *Depth of Positive Claim*: 15 feet (perpendicular to the baggage claim frontage)
- *Occupancy Time of Device by Aircraft Type*: 40 minutes for Group IV (widebodies), 30 minutes for Group III (narrowbodies), 20 minutes for commuter aircraft

- *Number of simultaneous aircraft on one device by type*: one (1) widebody, two (2) narrowbodies, or three (3) commuter aircraft

The configuration and arrangement of domestic baggage claim devices should be modular (i.e., all devices should provide a minimum of 150 to 160 feet of frontage) so that the devices can be assigned to individual airlines more flexibly. The layout of the devices should be easily comprehensible to arriving passengers who checked bags and should not be in the circulation path of those passengers who do not check bags.

Greeters should be provided with convenient public seating and exhibit areas with a clear view of all major arriving passenger circulation. Areas for restrooms and public circulation are described in other sections of this report.

A summary of domestic baggage claim spaces is presented in **Table 5.1-10**.

TABLE 5.1-10

General Mitchell International Airport

DOMESTIC BAGGAGE CLAIM REQUIREMENTS

Components	Base Year 2002	PAL 1 2006	PAL 2 2011	PAL 3 2021
Domestic Baggage Claim				
No. of conveyors	5	6	7	8
Total Claim Frontage (in linear feet)	670	720	890	970
Total Claim Area (in square feet)	20,400	21,600	26,700	29,100
Inbound Baggage Handling (in square feet)	22,300	23,400	28,100	34,200
Baggage Service Offices (in square feet)	3,600	3,900	4,800	5,300
Ram Action Center (RAC) Area (in square feet)	2,400	2,900	3,200	3,800
Total	48,700	51,800	62,800	72,400

Source: PB Aviation, Inc.

5.1.3.7 Other Airline Space

In addition to the airline ticketing and baggage claim space described above, airline support space includes many specialized functions:

- *Airline clubrooms*
- *Airline offices*
- *Ground handler offices*
- *Breakrooms and ready-rooms*
- *Provisions storage*

- *Enclosed storage*

In addition to the fully enclosed areas described above, airlines will also require exterior covered space for ramp vehicles and other parts and equipment. This covered exterior space is not included in the facilities area tabulation.

The area requirement for enclosed airline operations area is based on a 50 percent increase per gate from the area provided at the existing Terminal.

The area requirements for Other Airline Space are presented in **Table 5.1-11**.

TABLE 5.1-11

General Mitchell International Airport

OTHER AIRLINE AREA REQUIREMENTS (IN SQUARE FEET)

Components	Base Year 2002	PAL 1 2006	PAL 2 2011	PAL 3 2021
Airline Clubrooms (in square feet)	4,000	4,000	4,000	6,000
Airline Operations Space (in square feet)	105,000	120,000	142,500	177,500
Airline Concourse Offices and Customer Service Counters (in square feet)	1,000	1,000	1,500	2,000
Total	110,000	125,000	148,000	185,500

Source: PB Aviation, Inc.

5.1.3.8 Airport and Other Agency Space

In addition to the key operational components described above, the Terminal Area also accommodates several administrative and regulatory support space, including:

- Airport Offices: Space has been allocated for Airport Operations Offices (such as Terminal Operations, Airfield Operations and Sheriff's Department), which require convenient access to both the airside and landside portions of the terminal. In addition, an allowance is included in the program for Other Airport Support Space (such as employee locker rooms, breakrooms, briefing rooms, maintenance shops, delivery docks, trash rooms, etc.)

- Federal Inspection Services (FIS): Facilities are provided for processing of arriving international passengers. At the planning phase, facilities requirements for FIS facilities are essentially a statement that the FIS Guidelines (currently being updated) will be followed for a certain estimated arriving passenger demand level. The demand level established in Chapter 3.0*: Activity Projections* was 150 arriving international passengers per hour for all three future PALs. Consequently, facilities requirements are assumed to remain constant through PAL 2; however, an allowance for a future increase in FIS requirements, even for the same demand level, is included for PAL 3.

- Other Agency Space: Facilities are provided to accommodate other agencies such as the Sheriff's Office, etc.

Area requirements for these components are presented in **Table 5.1-12**.

TABLE 5.1-12

General Mitchell International Airport

AIRPORT AND OTHER AGENCY AREA REQUIREMENTS

Components	Existing Area	PAL 1 2006	PAL 2 2011	PAL 3 2021
Airport Space (in square feet)	35,000	40,000	47,000	59,000
FIS Facilities (in square feet)	15,000	15,000	15,000	30,000
Other Agency Space – Note 1 (in square feet)	1,000	1,000	1,000	2,000
Total	51,000	56,000	63,000	91,000

Source: PB Aviation, Inc.
Note 1: Area for TSA security screening operations and support space are show above in Section 5.1.3.2.

5.1.3.9 Public Circulation and Building Support

In addition to the key operational space described above, there are two categories of space necessary to support terminal operations:

- Public Circulation includes both horizontal and vertical circulation space.
- Building Support includes space for delivery, building storage, employee breakrooms, shops, and trash removal, as well as building utilities such as mechanical, electrical, communications and other infrastructure components.

The area requirements are presented in **Table 5.1-13**.

TABLE 5.1-13 ***General Mitchell International Airport*** ***PUBLIC CIRCULATION AND BUILDING SUPPORT (SQUARE FEET)***				
Components	Base Year 2002	PAL 1 2006	PAL 2 2011	PAL 3 2021
Public Circulation (in square feet)	191,000	221,000	255,000	322,000
Building Support (in square feet)	138,000	159,000	183,000	232,000
Total	329,000	380,000	438,000	554,000

Source: PB Aviation, Inc.

5.1.3.10 Building Area Summary

Area requirements for the major operational components of the Centralized Terminal are summarized in **Table 5.1-14**. As indicated, there is an existing deficiency in the ticketing/baggage check-in, security screening, and baggage claim areas of the terminal.

The total space requirements for the terminal increase from 765,000 square feet in the base year to 1,288,000 square feet in PAL 3.

TABLE 5.1-14 ***General Mitchell International Airport*** ***TERMINAL AREA REQUIREMENTS SUMMARY (IN SQUARE FEET)***					
Major Terminal Components	Existing Area	Base Year 2002	PAL 1 2006	PAL 2 2011	PAL 3 2021
Ticketing/Baggage Check-in	43,100	50,600	60,500	61,600	68,200
Security Screening	10,800	45,000	56,200	63,800	83,400
Holdrooms	73,800	64,000	70,000	82,000	106,000
Concessions	54,000	46,000	56,000	64,600	78,700
Passenger Services	20,100	20,500	28,300	33,700	48,600
Domestic Baggage Claim	29,600	48,700	51,800	62,800	72,400
Other Airline Space	110,400	110,000	125,000	148,000	185,500
Airport and Other Agency Space	50,700	51,000	56,000	63,000	91,000
Public Circulation	185,600	191,000	221,000	255,000	322,000
Building Support	152,400	138,000	159,000	183,000	232,000
Gross Building Area (rounded to nearest 1,000 sf)	731,000	765,000	884,000	1,018,000	1,288,000

Source: PB Aviation, Inc.

5.2 Airport Access and Curbfront Requirements

Access requirements for the Airport are presented for both circulation roadways and the terminal curbfront.

5.2.1 Airport Roadway Access

In order to examine the capacities of the Airport's roadway network, traffic counts were conducted at six locations – for a period of seven consecutive days in November 2002. **Exhibit 5.2-1** depicts these locations. Location 1 was inbound on the Airport Spur which counted Airport traffic prior to the exits for parking and rental car return. Location 2 counted traffic exiting the Airport Spur at Howell Avenue. Location 3 was the ramp from Howell Avenue into the Airport (prior to the turn for parking and rental car return. Location 4 was located on the terminal exit roadway. Location 5 picked up traffic on the Airport spur exiting the Airport prior to the entrance ramp from Howell and Grange Avenues which were recorded as Location 6. Traffic counts on Howell Avenue were obtained from previous studies and Wisconsin Department of Transportation (DOT).

The data collected provided the baseline traffic or a portrayal of "typical" traffic vehicular circulation patterns around the Airport terminal covering all types of traffic for inbound, outbound and through movements. Base year (2001) traffic was adjusted with traffic growth rates based on growth rates of passenger activity forecasts. These data were used to determine Level-of-Service (LOS), a descriptive term used to characterize traffic flow and operations in terms of three variables: speed, density and service flow. Traffic LOS is calculated numerous ways using a number of traffic operating characteristics such as speed, volume, and density as prescribed by the Institute of Transportation Engineer's Highway Capacity Manual (HCM).

The categorical exclusion report for the GMIA parking garage expansion (Mead & Hurt, 1999) states that the Airport Spur (STH 119) and Howell Avenue account for 100 percent of all Airport access and egress traffic; about 75 percent of traffic uses the Airport spur and 25 percent uses Howell Avenue. The airport related traffic volume on

Howell Avenue is estimated as 5 percent of facility volume. About 35 percent of traffic on the Airport Spur that connects the terminal area with I-94 is regarded to be airport related, with the remainder exiting at Howell Avenue. The Airport Spur currently operates at LOS B in the morning rush-hour, the LOS for Howell Avenue in the morning was not cited.

As presented in **Table 5.2-1**, LOS calculations were directly based on volume to capacity ratios (V/C), a calculation that divided peak-hour traffic counts by ideal HCM capacity of the individual lane on the particular roadway segments. Assumed capacity was based on the type of roadway under consideration and multiplied by the appropriate number of lanes. For instance, a roadway that theoretically could handle 1,000 vehicles per hour on a one lane segment and has an observed peak-hour vehicle flow of 500 would yield a V/C ratio of 0.50. Adjustments were made to roadway capacity levels, as appropriate, for the Airport's access roads in accord with several technical publications that show that airport roadways have lower vehicle throughput than standard roads due to driver behavior, numerous weaving movements and low speeds.

TABLE 5.2-1

General Mitchell International Airport

ROADWAY LEVELS OF SERVICE (LOS) AND VOLUME-TO-CAPACITY (V/C) RATIOS

Level of Service (LOS)	Volume-to-Capacity (V/C)Ratio	Description
A	< 0.60	Free Flow Conditions. General level of comfort and convenience provided to motorist is excellent.
B	0.61 - 0.70	Stable flow. The level of comfort and convenience provided is somewhat less than a LOS A
C	0.70 - 0.80	Stable flow with increases in vehicle density noticed. The general level of comfort and convenience declines noticeably at this level.
D	0.81 - 0.90	High density, but stable flow. Restricted speeds and maneuverability severely restricted with generally poor driver comfort levels and convenience.
E	0.91 – 1.00	Operating conditions near or at capacity. Low speeds and maneuverability extremely difficult. Comfort and convenience levels are extremely poor, and driver frustration is generally high.
F	> 1.00	Forced or unstable traffic flow. This condition exists wherever the amount of traffic approaching a point exceeds the facility capacity. Queues and significant driver delays are experienced.

Source: Transportation Research Board, 1985 *Highway Capacity Manual, Special Report 209.*

The resulting 2001 AM peak hour service levels for the Airport's internal circulation roadways are summarized in **Table 5.2-4**. This analysis assumes that traffic volume on all these facilities increases at the rate of airport passenger growth projected in PAL 3, which overstates the likely future traffic volume, particularly on Howell Avenue connections, but provides a worst case scenario.

The Airport Spur connection to the terminal appears to be in sound condition with capacity for future traffic growth projected at the terminal. Howell Avenue, where non-airport traffic dominates appears to have AM peak-hour congestion that could grow worse in the future with added airport traffic and regional background traffic growth under a worst case scenario. In particular ramps between the Airport spur and Howell Avenue appear to have low LOS ratings now that could grow worse in the future.

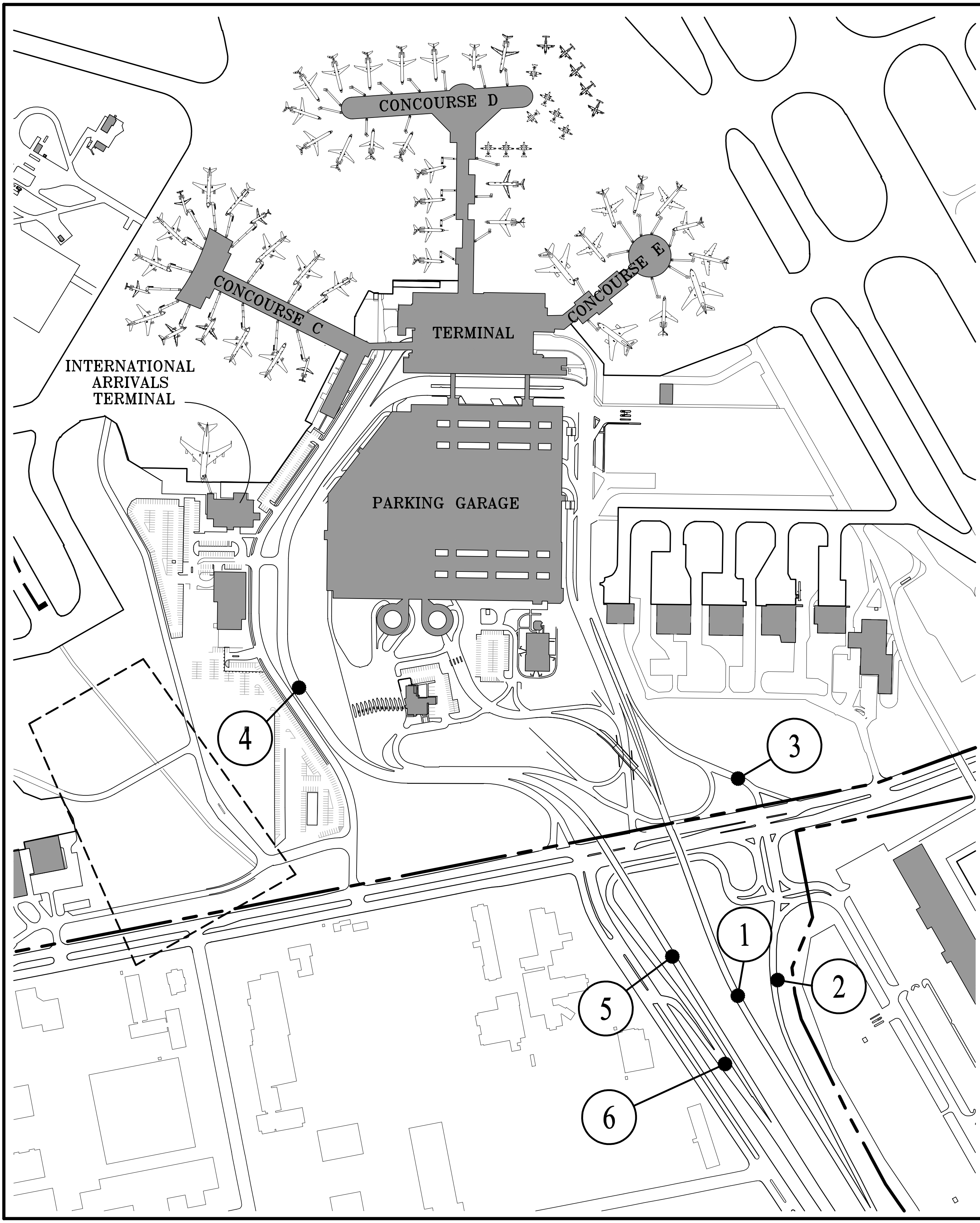
TABLE 5.2-2

General Mitchell International Airport

AM PEAK HOUR ROADWAY LEVELS OF SERVICE

Airport Roadway Segment (1)	Base Year 2001		PAL 1 2006		PAL 2 2011		PAL 3 2021	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Airport Spur Eastbound (STH 119)	0.40	A	0.50	A	0.55	A	0.62	A
Airport Spur Westbound (STH 119)	0.08	A	0.10	A	0.10	A	0.12	A
Ramp from Airport Spur to Howell Ave. (STH 38)	0.95	E	1.10	F	1.20	F	1.30	F
Ramp from Howell Ave (STH 38) to Terminal Loop	0.70	C	0.95	E	0.98	E	1.08	F
Outbound Terminal Roadway	0.33	A	0.42	A	0.44	A	0.49	A
Howell Avenue (STH 38) *	0.64	B	0.82	D	0.87	D	0.96	E

Source: PB Aviation, Inc. Analysis
(1) All roadway segments one-way unless otherwise noted.
* Two-way roadway – LOS considers both directions – AM peak-flow can not be determined – LOS depends on signal timing and are estimates



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

Traffic Count Locations

EXHIBIT
5.2-1

5.2.2 Curfront Requirements

The enplaning and deplaning curbsides are the locations at which passengers transition between vehicles and the terminal. Typically, passengers arrive and depart in one of many different types of vehicles, such as, private cars and taxis, to hotel shuttle buses, parking lot shuttle buses and city buses. Each of these types of vehicles takes up a different amount of space at the curb and each tends to stay or dwell at the curb for varying lengths of time. All of these factors must be taken into account when determining the length of the departure curb in front of the terminal. The mode of transportation at the curb and the average dwell time were based on national averages at U.S. airports confirmed by a survey of curbfront dwell times at GMIA.

The working assumptions and resulting requirements for dropoff curbside frontage are summarized in **Table 5.2-3**.

TABLE 5.2-3 ***General Mitchell International Airport*** ***DROPOFF CURBSIDE ROADWAY REQUIREMENTS***								
Category	Mode Split[1]	Avg. Vehicle Occupancy (not incl. drivers[2])	Avg. Dwell Time (in minutes[3])	Length of Curbside Req'd incl Maneuvering (in feet[4])	Base Year 2001	PAL 1 2006	PAL 2 2011	PAL 3 2021
Enplaning Pax per hour[5]					1,470	1,901	2,045	2,382
Originating Pax per hour[5]					1,338	1,711	1,800	2,001
Wellwishers per hour[6]					74	95	102	119
Vehicle Occupant Demand per hour (not incl. drivers)					1,412	1,806	1,902	2,120
Vehicles Not Using Curbsides								
Garage, Private Car	36.8%							
Garage, RAC	13.8%							
Vehicles Using Curbsides								
Private Car	34.4%	1.5	2	25	275	350	375	425
Taxi	4.5%	1.5	3	25	75	75	75	100
Hotel/Motel Shuttle Bus	4.8%	5	5	40	80	80	80	80
For Hire Shuttle Van	1.9%	3	3	30	30	30	30	30
Limo	2.1%	1.5	3	30	30	60	60	60
Public Bus	0.3%	12	8	55	55	55	55	55
Other	1.6%	1.5	3	40	40	40	80	80
Total: Dropoff Curbside Frontage	100%				585	690	755	830

Source: PB Aviation, Inc.

Notes:
1 Mode Splits based on data from GMIA.
2 Average Vehicle Occupancy based on data from other U.S. airports.
3 Dwell Times based on data from other U.S. airports and direct observation at GMIA.
4 Length of Curbside Required based on data from other U.S. airports.
5 Based on PB Aviation Forecast.
6 Based on observations at other U.S. airports. No data available for GMIA.

The resulting requirements for pickup curbside frontage are summarized in Table 5.2-4.

TABLE 5.2-4 *General Mitchell International Airport* *PICKUP CURBSIDE ROADWAY REQUIREMENTS*								
Category	Mode Split[1]	Avg. Vehicle Occupancy (not incl. drivers[2])	Avg. Dwell Time (in minutes[3])	Length of Curbside Req'd incl Maneuvering (in feet[4])	Base Year 2001	PAL 1 2006	PAL 2 2011	PAL 3 2021
Deplaning Pax per hour[5]					1,550	1,930	2,171	2,689
Terminating Pax per hour[5]					1,411	1,737	1,910	2,259
Greeters per hour[6]					78	97	109	134
Vehicle Occupant Demand per hour (not incl. drivers)					1,489	1,834	2,019	2,393
Vehicles Not Using Curbsides								
Garage, Private Car	36.8%							
Garage, RAC	13.8%							
Vehicles Using Curbsides								
Private Car	34.4%	1.5	2	25	450	550	600	700
Taxi	4.5%	1.5	4	25	75	100	125	125
Hotel/Motel Shuttle Bus	4.8%	5	8	40	80	120	120	160
For Hire Shuttle Van	1.9%	3	4	30	30	30	30	60
Limo	2.1%	1.5	4	30	60	60	60	90
Public Bus	0.3%	12	8	55	55	55	55	55
Other	1.6%	1.5	3	40	40	40	80	80
Total: Pickup Curbside Frontage	100%				790	955	1,070	1,270

Source: PB Aviation, Inc.

Notes:
1 Mode Splits based on data from GMIA.
2 Average Vehicle Occupancy based on data from other U.S. airports.
3 Dwell Times based on data from other U.S. airports and direct observation at GMIA.
4 Length of Curbside Required based on data from other U.S. airports.
5 Based on PB Aviation Forecast.
6 Based on observations at other U.S. airports. No data available for GMIA.

5.3 Parking Requirements

This section reviews the historical and planned parking supply at the Airport. Highlights of the historical trend in parking demand are presented and projections of parking demand are developed for 2006, 2011, and 2021.

5.3.1 Airport Parking Supply

Table 5.3-1 presents a breakdown of the parking supply at the Airport in 2001 and the projected supply over the forecast period. There were 11,704 parking spaces at the Airport in 2001. Of these, 9,553 (81.6 percent) were designated public parking spaces and the remaining 2,151 (18.4 percent) were designated non-public parking spaces. The Garage (hourly and daily) accounted for 62 percent of the public parking spaces, Remote Lots A and B accounted for 31 percent, and the Surface Lot accounted for the remaining 7 percent. The non-public parking spaces were allocated for use by the rental car companies, Airport and tenant employees (including one area designated for employees of Midwest Airlines), service delivery vehicles, taxi staging area, and limousine staging area.

TABLE 5.3-1

General Mitchell International Airport

PUBLIC AND NON-PUBLIC PARKING SUPPLY

Public Parking Facilities	Number of Parking Spaces	
	2001	2003
Garage – Hourly	723	1,252
Garage – Daily	5,202	7,314
Subtotal – Garage [1]	5,925	8,566
Surface Lot [2]	691	575
Remote Lot A [3]	1,611	1,836
Remote Lot B [4]	1,326	1,184
Total Public Parking Spaces	**9,553**	**12,161**
Non-Public Parking Facilities		
Midwest Express Airlines [3]	165	0
Rental Car Parking	400	950
Employee Parking	1,503	1,503
Taxi Staging Area	40	40
Limousine Staging Area	23	23
Delivery Vehicle Parking	20	20
Total Non-Public Parking Spaces	**2,151**	**2,536**
Total Airport Parking Spaces	**11,704**	**14,697**

[1] Phase 1 of the new garage project opened in late November 2002.
[2] The number of spaces in the Surface Lot decreased following the construction of a ground transportation roadway in late 2001.
[3] Parking spaces reserved for Midwest Airlines, located in Remote Lot A, were increased to 225 in 2002. However, the Airport will regain those spaces from Midwest Airlines in February 2003 and revert them to public parking spaces, thereby increasing the number of public parking spaces in Remote Lot A to 1,836.
[4] Historically, Remote Lot B was opened in the Spring and in October through December primarily to serve the overflow traffic from Remote Lot A. Over the forecast period, Remote Lot B will provide 1,184 spaces year-round and an additional 950 spaces during peak parking periods.

Source: General Mitchell International Airport Staff

Several developments have taken place since 2001 and additional developments are planned in the near future, including:

The completion of Phase 1 of the new garage construction project in late November 2002 added 2,951 daily garage parking spaces. In conjunction with this project improvements were made to the existing garage, which resulted in an additional 240 parking spaces.

Following the completion of Phase 1 of the new garage, the number of spaces in the existing garage assigned to the rental car companies was increased from 400 to 950 spaces, effective January 2003.

The above changes resulted in a net increase of 2,641 public parking spaces in the garages, bringing the total number of public parking spaces at the Airport to 12,161, representing a 27 percent increase over public parking spaces available in 2001.

In previous years, parking spaces reserved for Midwest Airlines to use as overflow parking for its maintenance staff were located in Remote Lot A. However, following the reduction of its maintenance staff, Midwest Airlines notified the Airport that it can meet the parking needs of its maintenance staff with the parking spaces located next to the airline's maintenance hangar. Effective February 2003, the Airport regained the 225 spaces assigned to Midwest Airlines, and reverted them to public spaces in Remote Lot A, which increased the number of public parking spaces in Remote Lot A to 1,836.

Historically, Remote Lot B was opened in the spring and in October through December, primarily to serve the overflow traffic from Remote Lot A. Remote B also served as a stand-by lot for use when Remote A was undergoing maintenance work. However, the Airport plans to keep Remote B open to provide 1,184 spaces year-round and an additional 950 spaces during peak periods.

Parking facility planners typically make a distinction between actual parking supply and effective parking supply. Effective parking supply incorporates assumptions about efficiency and an acceptable level of service that the parking provider wishes to offer their customers. Consequently, effective parking supply is usually lower than the actual parking supply to allow for various parking contingencies, including vacancies resulting from improperly parked vehicles, maintenance work, and to provide room for circulating traffic. It is typical for an allowance of 10-15 percent to be allocated to such parking contingencies and for high traffic areas to be allocated a relatively higher allowance.

For the purpose of assessing public parking requirements at the Airport, two alternative levels of service (LOS) were defined: LOS A and LOS B.

LOS A assumes a 15 percent parking contingency allowance in the Garage Hourly facility and a 10 percent allowance in all other parking facilities. Under LOS A, actual public parking supply of 9,553 spaces in 2001 translates into an effective public parking supply of 8,562 spaces. Similarly, actual parking supply of 12,161 spaces in 2006-2021 translates into an effective parking supply of 10,882 spaces.

LOS B assumes a 5 percent parking contingency allowance in the Garage Hourly facility and a 3 percent allowance in all other parking facilities. Under LOS B, actual parking supply of 12,161 spaces in 2006-2021 translates into 11,771 spaces. LOS B provides a smaller parking contingency allowance than LOS A, and therefore represents a relatively lower level of efficiency and service.

Table 5.3-2 presents the breakdown of the effective supply under LOS A and LOS B.

TABLE 5.3-2

General Mitchell International Airport

EFFECTIVE PUBLIC PARKING SUPPLY

Actual Public Parking Supply[1]	2001	2006	2011	2021
Garage – Hourly	723	1,252	1,252	1,252
Garage – Daily (includes New Garage Phase 1)	5,202	7,314	7,314	7,314
Surface Lot	691	575	575	575
Remote Lot A	1,611	1,836	1,836	1,836
Remote Lot B	1,326	1,184	1,184	1,184
All Facilities	9,553	12,161	12,161	12,161
Effective Public Parking Supply – LOS A[2]				
Garage – Hourly	615	1,064	1,064	1,064
Garage – Daily (includes New Garage Phase 1)	4,682	6,583	6,583	6,583
Surface Lot	622	518	518	518
Remote Lot A	1,450	1,652	1,652	1,652
Remote Lot B	1,193	1,066	1,066	1,066
All Facilities	8,562	10,882	10,882	10,882
Effective Public Parking Supply – LOS B[2]				
Garage – Hourly	687	1,189	1,189	1,189
Garage – Daily (includes New Garage Phase 1)	5,046	7,095	7,095	7,095
Surface Lot	670	558	558	558
Remote Lot A	1,563	1,781	1,781	1,781
Remote Lot B	1,286	1,148	1,148	1,148
All Facilities	9,252	11,771	11,771	11,771

[1] See Table 5.3-1

[2] Effective parking supply is defined in terms of acceptable level of service (LOS). Effective supply allows for various parking contingencies, including vacant spaces resulting from improperly parked vehicles or maintenance work, and provision of room for circulating traffic. Typically, more allowance is made for short-term parking areas because of the higher traffic flow. For the purpose of this analysis, LOS A assumes a 15% allowance in the hourly garage facility and a 10% allowance in all other parking facilities. LOS B assumes a 5% allowance in the hourly garage facility and a 3% allowance in all other parking areas.

Source: Unison-Maximus, Inc. Analysis

5.3.2 Historic Public Parking Demand

The historical trend in parking demand, measured in terms of vehicle exits, is presented in **Table 5.3-3**. Annual parking demand increased from 1.43 million vehicle exits in 1996 to 1.53 million in 2000, representing an average annual growth rate of 1.8 percent. However, the terrorist attacks of September 11, 2001 and the U.S. economic downturn, which began in March 2001 had a negative impact on parking activity and contributed to the 13.1 percent decrease in parking demand in 2001 compared to the level of demand in 2000. Over the 1996-2001 period, the Garage accommodated the largest share of vehicle exits, with a high percentage share of 91 percent reported in 1996.

However, the percentage of vehicle exits reported in the Garage has been decreasing in recent years. The security measures implemented following September 11, 2001 contributed to the observed shift in parkers away from the Garage. The heightened security measures, which do not allow non-passengers past security checkpoints in the passenger terminals, may have also contributed to the loss of business from meeters and greeters who would typically have parked in the short-term garage area.

TABLE 5.3-3
General Mitchell International Airport
HISTORICAL PUBLIC PARKING DEMAND - VEHICLE EXITS [1]

Year	O&D Enplanements	Vehicle Count - by facility			Total Vehicle Count	Vehicle/O&D Enplanement
		Garage[2]	Surface Lot	Remote Lot		
1996	2,526,272	1,303,389	80,415	43,105	1,426,909	0.56
1997	2,604,628	1,276,418	77,915	56,778	1,411,111	0.54
1998	2,586,652	1,270,694	87,049	75,414	1,433,157	0.55
1999	2,684,898	1,303,473	91,217	85,226	1,479,916	0.55
2000	2,805,444	1,337,828	103,645	91,580	1,533,053	0.55
2001	2,542,131	1,107,395	144,241	80,016	1,331,652	0.52
Average Annual Growth Rate						
1996-2001	0.1%	-3.2%	12.4%	13.2%	-1.4%	-

[1] Annual parking demand is measured in terms of vehicle exits.
[2] Garage includes hourly and daily garage facilities
Source: General Mitchell International Airport staff.

The demand for public parking comes primarily from the O&D passengers, which constituted approximately 90 percent of enplanements at the Airport in 2001. Table 5.3-3 also shows that the trend in parking demand at the Airport closely mirrored the trend in O&D enplanements during the 1996-2001 period. With the exception of 1998, annual increases in O&D enplanements resulted in an average annual growth rate of 2.7 percent between 1996 and 2000. However, the September 11, 2001 events contributed to the 9.4 percent decrease in O&D enplanements in 2001 compared to enplanements in 2000. During the 1996-2001 period, the ratio of vehicle exits per enplanement was stable, ranging between 0.52 and 0.56 vehicle exits per O&D enplanement. The ratio confirms the close correlation between O&D enplanements and parking demand at the Airport.

5.3.3 Projected Public Parking Demand

The projected public parking demand at the Airport is based on the projected annual O&D enplanements. For the purpose of the forecast, parking demand is defined in terms of peak parking occupancy, which is the highest number of parking spaces utilized at a given time. The annual peak occupancy in each parking facility indicates the number of spaces needed to satisfy parking requirements on the day with the most demand in that facility. The benchmark year is 2001.

It should be pointed out that in 2001, peak parking occupancy occurred in a different month for each of the parking facilities. Airport records show that in 2001, peak parking occupancy occurred in April for the Garage Hourly, in February for the Garage Daily, and March for the Surface Lot. For the Remote lots, peak parking occupancy in the Remote Lot A occurred in October, while in Remote Lot B, peak parking occupancy occurred in December.

The Airport also tracks the total number of parked vehicles in all parking facilities to record the peak parking demand for all public parking at the Airport. Airport records show that during the 1999-2001 period, the typical peak parking occupancy month for the entire Airport was March. The differences in the peak occupancy pattern between individual facilities and for the Airport as a whole mean that it is not valid to sum the peak parking occupancy observed in the individual facilities in 2001 to obtain an overall peak parking occupancy for the year. Consequently, the projection of public parking demand at the Airport was performed at two levels. The first level involves the projection of public parking demand in each individual facility, and the second level involves the overall public parking demand at the Airport, for all Airport public parking facilities considered in total.

Peak parking demand in each facility was compared to the O&D enplanements in 2001 and expressed as a parking demand ratio in terms of spaces per thousand O&D enplanements. The parking demand ratios ranged from 0.26 spaces per thousand O&D enplanements in the Surface Lot, to 2.05 spaces per thousand O&D enplanements in the

Garage Daily. These ratios were then applied to the projected O&D enplanements to estimate the public parking demand in each facility in 2006, 2011, and 2021.

Table 5.3-4 summarizes the public parking demand ratio by facility for the year 2001 and the projected public parking demand by facility.

Parking demand in the Garage Hourly is projected to increase from 723 spaces in 2001 to 1,541 spaces by 2021. Parking demand is projected to reach 11,088 spaces in the Garage Daily by 2021. Parking demand in the Surface Lot is projected to increase to 1,430 spaces by 2021, while parking demand in Remote Lots A and B is projected to reach 3,414 spaces and 2,818 spaces, respectively, by 2021.

As mentioned earlier, peak parking occupancy in each of the facilities occurred in a different month in 2001. The Airport staff tracks a measure of peak parking occupancy that allows for an assessment of overall public parking supply adequacy for all parking facilities at the Airport as a whole. According to Airport records, the annual peak parking occupancy for all parking facilities in total occurred in March during the 1999-2001 period. An overall parking demand ratio was calculated based on the peak parking occupancy of 9,140 spaces reported in March 2001. The resulting ratio of 3.6 spaces per thousand O&D enplanements was applied to the projected annual O&D enplanements to obtain estimates of overall public parking demand for all parking facilities at the Airport for 2006, 2011 and 2021.

TABLE 5.3-4

General Mitchell International Airport

PROJECTED PUBLIC PARKING DEMAND
(BASED ON SPACES PER THOUSAND O&D ENPLANEMENTS)[1]

Parking Facility	Peak Parking Occupancy[2]	Parking Demand Ratio[3]	Projected Parking Demand[4]		
	2001		2006	2011	2021
Garage - Hourly	723	0.28	940	1,109	1,541
Garage - Daily	5,202	2.05	6,760	7,976	11,088
Surface Lot	671	0.26	872	1,029	1,430
Remote Lot A	1,611	0.63	2,094	2,470	3,434
Remote Lot B	1,322	0.52	1,718	2,027	2,818
O&D Enplanements[1]	2,542,131	N/A	3,303,607	3,897,637	5,418,562

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1

[2] Peak parking occupancy or peak demand is the highest number of parking spaces utilized at a given time. The annual peak occupancy in each facility occurred in different months in 2001, as follows:
Garage - Hourly: April
Garage - Daily: February
Surface Lot: March
Remote Lot A: October
Remote Lot B: December
Therefore, the individual peaks and parking demand ratios are not additive.

[3] Parking demand ratio expresses peak demand in each facility in 2001 in terms of space requirement per thousand O&D enplanements in 2001.

[4] Projected parking demand for each facility is calculated as the parking demand ratio for each facility times the projected annual O&D enplanements.

Source: The parking supply and peak occupancy data were obtained from the Airport.

The results presented in **Table 5.3-5** project an increase in total parking demand from 9,140 spaces in 2001 to 19,482 spaces by 2021.

As mentioned previously, the differences in the peak demand pattern means that it is not valid to sum the peak demand in each facility to obtain an overall peak demand for the year. Consequently, the assessment of public parking requirements at the Airport was performed at two levels. The first level examines public parking requirements in each facility, and the second level examines the overall public parking requirements at the Airport. Consistent with the distinction between actual and effective public parking supply, the assessment of public parking requirements was performed with respect to actual public parking supply and parking supply under LOS A and LOS B.

TABLE 5.3-5

General Mitchell International Airport

PROJECTED TOTAL PUBLIC PARKING DEMAND
(BASED ON SPACES PER THOUSAND O&D ENPLANEMENTS)

	2001	2006	2011	2021
O&D Enplanements [1]	2,542,131	3,303,607	3,897,637	5,418,562
Annual Peak Parking Occupancy [2]				
All Facilities	9,140			
Overall Parking Demand Ratio (Spaces/'000 O&D EP) [3]				
All Facilities	3.60	3.60	3.60	3.60
Projected Total Parking Demand – Number of Spaces (Based on 2001 Parking Demand Ratio)				
All Facilities	9,140	11,878	14,014	19,482

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] Peak parking occupancy or peak demand is the highest number of parking spaces utilized at a given time. Annual peak occupancy occurred in March during the 1999-2001 period.
[3] Parking demand ratio expresses overall peak demand in 2001 in terms of space requirement per thousand O&D enplanements in 2001.
Source: The parking supply and peak occupancy data were obtained from the Airport.

The results presented in **Table 5.3-6** indicate that actual parking supply will remain adequate in the Garage Hourly through 2011, but a shortage of 289 spaces is projected in the facility by 2021. Actual parking supply in the Garage Daily will be adequate though 2006, but a shortage of 662 spaces is projected by 2011, which will increase to 3,774 spaces by 2021. Parking shortages are projected in the Surface Lot, and in Remote Lots A and B by 2006 through 2021. For example, a shortage of 297 spaces is projected in the Surface Lot by 2006, and the shortage will reach 855 spaces by 2021.

Table 5.3-7 involves the same comparison of projected parking demand and planned supply, with the assumption that the Airport's goal is to provide the level of service implied by LOS A. Under LOS A, parking shortages are projected in all facilities at each of the planning level, with the exception of the Garage Hourly in 2006. **Table 5.3-8** shows that the situation will improve somewhat if the Airport were to lower the acceptable level of service to LOS B. Under LOS B, the magnitudes of the shortages are lower than they are under LOS A, and parking supply in the Garage Hourly is projected to be adequate through 2011.

TABLE 5.3-6

General Mitchell International Airport

PUBLIC PARKING REQUIREMENTS - ACTUAL

	2001	2006	2011	2021
O&D Enplanements[1]	2,542,131	3,303,607	3,897,637	5,418,562
Actual Public Parking Supply[2]				
Garage – Hourly	723	1,252	1,252	1,252
Garage – Daily (includes New Garage Phase 1)	5,202	7,314	7,314	7,314
Surface Lot	691	575	575	575
Remote Lot A	1,611	1,836	1,836	1,836
Remote Lot B	1,326	1,184	1,184	1,184
2001 Parking Demand Ratios (Spaces/'000 O&D EP)[3]				
Garage – Hourly	0.28	0.28	0.28	0.28
Garage – Daily (includes New Garage Phase 1)	2.05	2.05	2.05	2.05
Surface Lot	0.26	0.26	0.26	0.26
Remote Lot A	0.63	0.63	0.63	0.63
Remote Lot B	0.52	0.52	0.52	0.52
Projected Parking Demand – Number of Spaces[3] (Based on 2001 Parking Demand Ratios)				
Garage – Hourly	723	940	1,109	1,541
Garage – Daily (includes New Garage Phase 1)	5,202	6,760	7,976	11,088
Surface Lot	671	872	1,029	1,430
Remote Lot A	1,611	2,094	2,470	3,434
Remote Lot B	1,322	1,718	2,027	2,818
Actual Supply Adequacy – Surplus (Shortage)				
Garage – Hourly	0	312	143	(289)
Garage – Daily (includes New Garage Phase 1)	0	554	(662)	(3,774)
Surface Lot	20	(297)	(454)	(855)
Remote Lot A	0	(258)	(634)	(1,598)
Remote Lot B	4	(534)	(843)	(1,634)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] See Table 5.3-2.
[3] See Table 5.3-4.

Source: The data for 2001 were obtained from the Airport. The projected parking supply adequacy was based on Unison-Maximus, Inc. analysis.

TABLE 5.3-7

General Mitchell International Airport

PUBLIC PARKING REQUIREMENTS – LOS A

	2001	2006	2011	2021
O&D Enplanements[1]	2,542,131	3,303,607	3,897,637	5,418,562
Effective Public Parking Supply – LOS A[2]				
Garage – Hourly	615	1,064	1,064	1,064
Garage – Daily (includes New Garage Phase 1)	4,682	6,583	6,583	6,583
Surface Lot	622	518	518	518
Remote Lot A	1,450	1,652	1,652	1,652
Remote Lot B	1,193	1,066	1,066	1,066
2001 Parking Demand Ratios (Spaces/'000 O&D EP)[3]				
Garage – Hourly	0.28	0.28	0.28	0.28
Garage – Daily (includes New Garage Phase 1)	2.05	2.05	2.05	2.05
Surface Lot	0.26	0.26	0.26	0.26
Remote Lot A	0.63	0.63	0.63	0.63
Remote Lot B	0.52	0.52	0.52	0.52
Projected Parking Demand – Number of Spaces[3] (Based on 2001 Parking Demand Ratios)				
Garage – Hourly	723	940	1,109	1,541
Garage – Daily (includes New Garage Phase 1)	5,202	6,760	7,976	11,088
Surface Lot	671	872	1,029	1,430
Remote Lot A	1,611	2,094	2,470	3,434
Remote Lot B	1,322	1,718	2,027	2,818
LOS A Effective Supply Adequacy - Surplus (Shortage)				
Garage – Hourly	(108)	125	(44)	(477)
Garage – Daily (includes New Garage Phase 1)	(520)	(178)	(1,393)	(4,505)
Surface Lot	(49)	(354)	(511)	(913)
Remote Lot A	(161)	(441)	(818)	(1,781)
Remote Lot B	(129)	(652)	(961)	(1,752)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] See Table 5.3-2.
[3] See Table 5.3-4.

Source: The data for 2001 were obtained from the Airport. The projected parking supply adequacy was based on Unison-Maximus, Inc. analysis.

TABLE 5.3-8

General Mitchell International Airport

PUBLIC PARKING REQUIREMENTS – LOS B

	2001	2006	2011	2021
O&D Enplanements[1]	2,542,131	3,303,607	3,897,637	5,418,562
Effective Public Parking Supply – LOS B[2]				
Garage – Hourly	687	1,189	1,189	1,189
Garage – Daily (includes New Garage Phase 1)	5,046	7,095	7,095	7,095
Surface Lot	670	558	558	558
Remote Lot A	1,563	1,781	1,781	1,781
Remote Lot B	1,286	1,148	1,148	1,148
2001 Parking Demand Ratios (Spaces/'000 O&D EP)[3]				
Garage – Hourly	0.28	0.28	0.28	0.28
Garage – Daily (includes New Garage Phase 1)	2.05	2.05	2.05	2.05
Surface Lot	0.26	0.26	0.26	0.26
Remote Lot A	0.63	0.63	0.63	0.63
Remote Lot B	0.52	0.52	0.52	0.52
Projected Parking Demand – Number of Spaces[3] (Based on 2001 Parking Demand Ratios)				
Garage – Hourly	723	940	1,109	1,541
Garage – Daily (includes New Garage Phase 1)	5,202	6,760	7,976	11,088
Surface Lot	671	872	1,029	1,430
Remote Lot A	1,611	2,094	2,470	3,434
Remote Lot B	1,322	1,718	2,027	2,818
LOS B Effective Supply Adequacy - Surplus (Shortage)				
Garage – Hourly	(36)	250	81	(352)
Garage – Daily (includes New Garage Phase 1)	(156)	334	(881)	(3,994)
Surface Lot	(1)	(314)	(471)	(872)
Remote Lot A	(48)	(313)	(689)	(1,653)
Remote Lot B	(36)	(570)	(878)	(1,669)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] See Table 5.3-2.
[3] See Table 5.3-4.

Source: The data for 2001 were obtained from the Airport. The projected parking supply adequacy was based on Unison-Maximus, Inc. analysis.

The results of the assessment of overall parking requirements presented in **Table 5.3-9** indicate that actual parking supply will be adequate to meet the projected parking demand through 2006. However, a shortage of 1,853 spaces is projected by 2011, which will increase to 7,321 spaces by 2021. When defined in terms of effective parking supply, shortages are projected by 2006 through 2021 under both LOS A and LOS B. For example, under LOS A, a parking shortage of 8,600 spaces is projected by 2021, while under LOS B, a parking shortage of 7,711 spaces is projected by 2021. The analysis of overall parking requirements assumes that when a parker cannot find a space in one facility, that parker will go to another on-Airport parking facility. The projected shortages in overall parking demand do not take into account potential shortages in the individual facilities.

TABLE 5.3-9

General Mitchell International Airport

TOTAL PUBLIC PARKING REQUIREMENTS

	2001	2006	2011	2021
O&D Enplanements[1]	2,542,131	3,303,607	3,897,637	5,418,562
Actual Public Parking Supply[2]				
All Facilities	9,553	12,161	12,161	12,161
Effective Public Parking Supply-LOS B[2]				
All Facilities	8,562	10,882	10,882	10,882
Effective Public Parking Supply-LOS A[2]				
All Facilities	9,252	11,771	11,771	11,771
2001 Parking Demand Ratio (Spaces/'000 O&D EP)[3]				
Parking Demand Ratio	3.60	3.60	3.60	3.60
Projected Parking Demand – Number of Spaces[3] (Based on 2001 Parking Demand Ratio)				
All Facilities	9,140	11,878	14,014	19,482
Actual Supply Adequacy – Surplus (Shortage)	413	283	(1,853)	(7,321)
LOS A Supply Adequacy – Surplus (Shortage)	(690)	(996)	(3,131)	(8,600)
LOS B Supply Adequacy – Surplus (Shortage)	112	(107)	(2,242)	(7,711)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] See Table 5.3-2.
[3] See Table 5.3-5.

Source: The data for 2001 were obtained from the Airport. The projected parking supply adequacy was based on Unison-Maximus, Inc. analysis.

5.3.4 Project Non-Public Parking Demand

The non-public parking spaces are allocated to Airport and tenant employees, rental car companies, taxi staging area, limousine staging area, and delivery vehicle parking. The projection of parking demand by each category of non-public parkers follows a similar methodology as the one used for the projection of public parking demand presented above. The benchmark year is 2001.

5.3.4.1 Project Employee Parking Demand

In 2001, the Airport provided 1,503 employee parking spaces. Of these, 1,058 spaces are located in the employee parking lot close to the terminal building, while the remaining 445 spaces are located in a designated portion of Remote Lot B. Based on vehicle count by the Airport, peak employee parking occupancy in 2001 was 1,250 spaces or 83 percent of capacity. The projected employee parking demand is based on the projected annual enplanements developed by PB Aviation, Inc. The peak employee parking occupancy in 2001 was expressed as a parking demand ratio in terms of spaces per thousand enplanements in 2001. The resulting parking demand ratio of 0.44 was applied to the projected enplanements to estimate the employee parking demand in 2006, 2011, and 2021. The results presented in **Table 5.3-10** project an increase in employee parking demand from 1,250 spaces in 2001 to 2,857 spaces by 2021.

TABLE 5.3-10

General Mitchell International Airport

PROJECTED EMPLOYEE PARKING DEMAND
(BASED ON SPACES PER THOUSAND ENPLANEMENTS)

	2001	2006	2011	2021
Enplanements[1]	2,811,954	3,658,480	4,434,172	6,427,713
Employee Parking Demand Ratio (Spaces/'000 EP)[2]	0.44	0.44	0.44	0.44
Employee Parking Supply[3]	1,503	1,503	1,503	1,503
Projected Employee Parking Demand[4]	1,250	1,626	1,971	2,857
Employee Parking Adequacy – Surplus (Shortage)	253	(123)	(468)	(1,354)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] Based on vehicle count obtained from the Airport.
[3] See Table 5.3-1.
[3] Based on the 2001 employee parking demand ratio of 0.44 spaces per thousand enplanements.
Source: Unison-Maximus, Inc. analysis

The assessment of employee parking requirements presented in Table 5.3-10 projects a shortage in employee parking of 123 spaces by 2006, which will increase to a shortage of 1,354 spaces by 2021.

5.3.4.2 Projected Rental Car Parking Demand

The Airport is currently served by seven rental car companies: Alamo, Avis, Budget, Dollar, Enterprise, Hertz, and National. In 2001, the rental car companies had use of 400 spaces in the garage. However, the rental car companies indicated to Airport management that the supply was inadequate. In response, the Airport increased the supply of spaces to 950, effective January 2003. The projected rental car parking demand is based on the projected annual O&D enplanements developed by PB Aviation, Inc. For the purpose of this analysis, the current parking supply of 950 ready car spaces was considered the best approximation of peak parking demand by the rental car companies in 2001 and was used to calculate the rental car parking demand ratio. The resulting parking demand ratio of 0.37 spaces per thousand O&D enplanements was applied to the projected enplanements to estimate the rental car parking demand in 2006, 2011, and 2021. The results presented in **Table 5.3-11** project an increase in rental car parking demand from 950 spaces in 2001 to 2,025 spaces by 2021.

TABLE 5.3-11

General Mitchell International Airport

PROJECTED RENTAL CAR PARKING DEMAND (BASED ON SPACES PER THOUSAND ENPLANEMENTS)

	2001	2006	2011	2021
O&D Enplanements[1]	2,542,131	3,303,607	3,897,637	5,418,562
Rental Car Parking Demand Ratio (Spaces/'000 EP)[2]	0.37	0.37	0.37	0.37
Rental Car Parking Supply (ready car spaces)[3]	950	950	950	950
Projected Rental Car Parking Demand[4]	950	1,235	1,457	2,025
Rental Car Parking Adequacy – Surplus (Shortage)	0	(285)	(507)	(1,075)

[1] Based on PB Aviation, Inc. analysis. See Table 3.2-1.
[2] Based on information obtained from the Airport. The actual number of spaces available in 2001 was 400. However, the rental car companies indicated to Airport management that the supply was inadequate. In response, the Airport increased the supply to 950 spaces, effective January 2003. For the purpose of this analysis, the current supply of 950 spaces is considered the best approximation available for peak occupancy.
[3] Based on the 2001 rental car parking demand ratio of 0.34 spaces per thousand enplanements.
Source: Unison-Maximus, Inc. analysis

The assessment of rental car parking requirements presented in Table 5.3-11 projects a shortage in rental car parking of 285 spaces by 2006, which will increase to a shortage of 1,075 spaces by 2021.

5.3.4.3 Projected Taxi Storage Demand

The Airport is currently served by approximately 56 taxicab operators. In 2001, the Airport assigned 40 spaces as taxi staging area. The projected taxi storage demand is based on the projected annual O&D peak enplanements developed by PB Aviation, Inc. For the purpose of this analysis, it was assumed that all available taxi storage spaces are occupied during peak passenger hour. Consequently, it was assumed that the current parking supply of 40 spaces is a reasonable approximation of peak parking demand by the taxicab operators in 2001 and was used to calculate the taxi parking demand ratio in 2001. The resulting parking demand ratio of 0.0048 spaces per peak O&D enplanement was applied to the projected annual peak enplanements to estimate the taxicab storage demand in 2006, 2011, and 2021. The results presented in **Table 5.3-12**, project an increase in taxi storage demand from 40 spaces in 2001 to 82 spaces by 2021.

The assessment of taxi staging area requirements presented in Table 5.3-12 projects a shortage in taxicab staging area of ten spaces by 2006, which will increase to a shortage of 42 spaces by 2021.

TABLE 5.3-12

General Mitchell International Airport

PROJECTED TAXI STORAGE DEMAND
(BASED ON SPACES PER ANNUAL PEAK ENPLANEMENTS)

	2001	2006	2011	2021
Peak O&D Enplanements – Average Day in March[1]	8,272	10,315	12,172	16,906
Taxi Storage Demand Ratio (Spaces/Annual Peak EP)[2]	0.0048	0.0048	0.0048	0.0048
Taxi Storage[3]	40	40	40	40
Projected Taxi Storage Demand[4]	40	50	54	82
Taxi Storage Adequacy – Surplus (Shortage)	0	(10)	(19)	(42)

[1] March is the typical peak passenger month on GMIA. The peak enplanement figure in 2001 was estimated by dividing the March 2001 O&D enplanements by 31. The projected peak enplanements were obtained from PB Aviation, Inc. analysis.
[2] Peak taxi storage assumes that all available taxi staging areas are occupied during peak passenger hour.
[3] See Table 5.3-1.
[3] Based on the 2001 taxi storage demand ratio of 0.0048 spaces per peak enplanement.

Source: Unison-Maximus, Inc. analysis

5.3.4.4 Projected Limousine Storage Demand

In 2001, the Airport assigned 23 spaces as limousine staging area. Limousine service at the Airport is usually by reservation, meaning that the limousine operator would be at the Airport only if a customer had made prior arrangement. The projected limousine storage demand is based on the projected annual peak O&D enplanements developed by PB Aviation, Inc. For the purpose of this analysis, it was assumed that all available limousine storage spaces are occupied during peak passenger hour. Consequently, it was assumed that the current parking supply of 23 spaces is a reasonable approximation of peak parking demand by the limousine operators in 2001 and was used to calculate the limousine parking demand ratio in 2001. The resulting parking demand ratio of 0.0028 spaces per peak O&D enplanements was applied to the projected annual peak enplanements to estimate the limousine storage demand in 2006, 2011, and 2021. The results presented in **Table 5.3-13**, project an increase in limousine storage demand from 23 spaces in 2001 to 48 spaces by 2021.

The assessment of limousine staging area requirements presented in Table 5.3-13 projects a shortage in limousine staging area of six spaces by 2006, which will increase to a shortage of 25 spaces by 2021.

TABLE 5.3-13

General Mitchell International Airport

PROJECTED LIMOUSINE STORAGE DEMAND
(BASED ON SPACES PER ANNUAL PEAK ENPLANEMENTS)

	2001	2006	2011	2021
Peak O&D Enplanements – Average Day in March[1]	8,272	10,315	12,172	16,906
Limousine Storage Demand Ratio (Spaces/Annual Peak EP)[2]	0.0028	0.0028	0.0028	0.0028
Limousine Storage[3]	23	23	23	23
Projected Limousine Storage Demand[4]	23	29	35	48
Limousine Storage Adequacy – Surplus (Shortage)	0	(6)	(12)	(25)

[1] March is the typical peak passenger month at GMIA. The peak O&D enplanement figure in 2001 was estimated by dividing the March 2001 O&D enplanements by 31. The projected peak enplanements were obtained from PB Aviation, Inc. analysis. See Table 3.5-1.
[2] Limousine storage demand ratio calculated as the 2001 limousine storage demand (in terms of number of spaces) per peak enplanement in 2001.
[3] See Table 5.3-1.
[4] Based on the 2001 limousine storage demand ratio of 0.0028 spaces per peak enplanement.
Source: Unison-Maximus, Inc. analysis

5.3.4.5 Projected Delivery Vehicle Parking Demand

In 2001, 20 spaces were designated for use by various delivery services at the Airport. The projected delivery parking demand is based on the projected annual peak enplanements developed by PB Aviation, Inc. For the purpose of this analysis, it was assumed that all available delivery vehicle parking spaces are occupied during peak delivery period, which is assumed to coincide with peak passenger hour. Consequently, it was assumed that the current parking supply of 20 spaces is a reasonable approximation of peak parking demand by the delivery services in 2001 and was used to calculate the delivery vehicle parking demand ratio in 2001. The resulting parking demand ratio of 0.0022 spaces per peak enplanements was applied to the projected annual peak enplanements to estimate the delivery vehicle parking demand in 2006, 2011 and 2021. The results presented in **Table 5.3-14**, project an increase in delivery vehicle parking demand from 20 spaces in 2001 to 44 spaces by 2021.

The assessment of delivery vehicle parking requirements presented in Table 5.3-14 projects a shortage in delivery vehicle parking of five spaces by 2006, which will increase to a shortage of 24 spaces by 2021.

TABLE 5.3-14

General Mitchell International Airport

PROJECTED DELIVERY VEHICLE PARKING DEMAND
(BASED ON SPACES PER ANNUAL PEAK ENPLANEMENTS)

	2001	2006	2011	2021
Peak Enplanements – Average Day in March[1]	9,151	11,419	13,840	20,063
Delivery Vehicle Demand Ratio (Spaces/Annual Peak EP)[2]	0.0022	0.0022	0.0022	0.0022
Peak Delivery Vehicle Parking Occupancy[3]	20	20	20	20
Projected Delivery Vehicle Parking Demand[4]	20	25	30	44
Delivery Vehicle Parking Adequacy – Surplus (Shortage)	0	(5)	(10)	(24)

[1] March is the typical peak passenger month at GMIA. The peak enplanement figure in 2001 was estimated by dividing the March 2001 total enplanements of 283,690 by 31. The projected peak enplanements were obtained from PB Aviation, Inc. analysis. See Table 3.5-1.
[2] Delivery vehicle demand ratio calculated as the 2001 delivery vehicle parking demand (in terms of number of spaces) per peak enplanement in 2001.
[3] Peak delivery parking occupancy assumes that all available delivery vehicle parking spaces are occupied during peak passenger hour.
[4] Based on the 2001 vehicle parking demand ratio of 0.0022 spaces per peak enplanement.

Source: Unison-Maximus, Inc. analysis

5.3.5 Other Factors That Could Affect Parking Demand

There are factors that could affect Airport parking that may not be within the immediate control of the Airport management. Examples of such factors include:

- ***Off-airport Parking.*** Parking customers, like most consumers, may shop around for alternatives to parking at the Airport. Off-airport parking facilities may represent an option for daily and long-term parkers if, among other things, the parking rates and service are attractive. There are five off-airport parking lots within a one-mile radius from the Airport with parking rates ranging from $5.00 to $7.00 per day and complimentary shuttle service 24 hours a day. The Quality Inn Hotel, which is 0.2 miles from the Airport, provides 400 parking spaces. Allright Parking and Exec-Park Valet are also close to the Airport (0.3 miles away), with 1,260 and 150 parking spaces, respectively. Slightly farther from the Airport (0.8 miles away) but most competitively priced with a daily rate of $5.00 is Economy Airport Parking with 580 parking spaces. Thrifty Parking is the farthest from the Airport with a daily rate of $5.00.

- ***Public Transportation***. The Milwaukee County Transit System (MCTS) operates a daily bus route (Route 80) with a stop at the Airport. According to the published MCTS bus schedule, current weekday service leaves the Airport once hourly, with higher frequency service provided on Saturdays. The bus ride from downtown Milwaukee to the Airport takes approximately 33 minutes. However, the Route 80 bus serves mostly Airport employees and very few air travelers. The reasons given for the low ridership among air passengers include inconvenience and travel time. Public transportation service is therefore unlikely to have a significant impact on parking demand at the Airport.

- Additional private sector limousine/shuttle services. The Airport Connection provides limousine and van services to and from the Airport. The limousine or executive car service uses Lincoln Town Cars, while the van service uses eleven-seat passenger vans. The primary advantage of both services is that they are door-to-door. Of the two services, the share-ride shuttle service is more economical in terms of monetary cost. However, the cost advantage of shuttle service must be weighed against the potentially higher time cost involving waiting time and additional drop-off time when multiple destination passengers share a ride.

5.4 Air Cargo Requirements

The projection of enplaned freight, air mail and express mail indicates that cargo will increase from 108 million pounds in 2001 to 188 million pounds in 2021. This section analyzes future air cargo building and apron requirements that support operations by the integrated carriers (FedEx, UPS, etc.), freight forwarders and the passenger airlines.

Future facility requirements are based upon a combination of individual industry standards, utilization rates at the Airport, and air cargo tonnage projections. These utilization rates have been increasing recently, as most of the integrated cargo carriers utilize the airport cargo facilities for ground transportation in addition to air cargo. For the purpose of determining air cargo building requirements at the Airport, a rate of 3.0 square feet per annual enplaned ton is used. Using this requirement, the Airport will need an estimated 257,000 square feet of air cargo building facilities by the end of the planning period. The Airport currently has approximately 164,000 square feet of air cargo facilities. Therefore, an additional 93,000 square feet of air cargo facilities will be required. **Table 5.4-1** presents future building requirements through the planning period.

Air cargo apron space is also required in conjunction with the air cargo buildings. This space includes aircraft parking, as well as container and support equipment storage. There are approximately 63,300 square yards of existing air cargo apron. Based upon observations and inventory, the existing air cargo apron operates near or at capacity.

Future apron requirements were based on the number of cargo operations and future fleet mix that will occupy the apron. As indicated in Table 5.4-1, by the end of the planning period, approximately 32,100 square yards of air cargo apron will be required over what is in place today.

TABLE 5.4-1

General Mitchell International Airport

AIR CARGO SPACE REQUIREMENTS

	2002	2006	2011	2021
Annual Enplaned Air Cargo	49,046	52,365	60,280	85,689
Air Cargo Building Space Required (sf)	147,000	157,000	181,000	257,000
Air Cargo Building Surplus/(Deficit) (sf)	17,000	7,000	(17,000)	(93,000)
Air Cargo Apron Space Required (sy)	63,300	67,400	76,100	95,400
Air Cargo Apron Surplus/(Deficit) (sy)	-	(4,100)	(12,800)	(32,100)

Source: PB Aviation, Inc. Analysis

5.5 General Aviation Requirements

General aviation requirements were developed for the Airport based on the activity projection for this segment of Airport activity. Facility needs were estimated for the following functional areas:

- *Itinerant and based aircraft apron*
- *Fixed-base operator (FBO) Terminal Space*
- *Corporate Hangars*

5.5.1 Itinerant and Based Aircraft Apron

An apron for aircraft parking is required for passenger loading and unloading of visiting aircraft using the FBO terminal. Additional apron space is used for parking aircraft based at the Airport that are not stored in hangars.

Future general aviation (GA) parking apron requirements were based on the peak hour itinerant aircraft projections and the corresponding aircraft apron space required. **Table 5.5-1** shows apron requirements throughout the planning period. As presented, it is anticipated that the existing GA parking apron will meet the requirements through the planning period.

TABLE 5.5-1

General Mitchell International Airport

GENERAL AVIATION FACILITY REQUIREMENTS

	2002	2006	2011	2021
Peak Hour General Aviation Operations	10	10	11	12
Total General Aviation Apron Required (sy)	18,200	18,200	20,020	21,840
Aircraft Parking Apron Surplus/(Deficit) (sy)	7,800	7,800	5,980	4,160
GA Terminal/Administration Space (sf)	4,500	4,500	4,950	5,400
GA Terminal/Administration Surplus/(Deficit) (sf)	1,950	1,950	1,500	1,050

Source: PB Aviation, Inc. Analysis

5.5.2 FBO Terminal Space

The existing FBO terminal and administration building is approximately 6,400 square feet in size and is adjacent to the FBO hangars. Discussions with FBO management indicate that the terminal and administration building operate at 70 percent capacity.

Future terminal and administration building space was projected based on the peak day itinerant aircraft projections (as described in the previous section). Table 5.5-1 also presents space requirements through the planning period. Throughout the planning period, there is a projected surplus of FBO terminal and administration space.

5.5.3 Corporate Hangars

The Airport currently leases space for nine corporate hangars in addition to the smaller general aviation hangar space in the Northeast hangar area. The projections indicate a shift within the GA fleet mix with a greater proportion of turboprop and turbojet activity and less single-engine and light twin-engine activity (see Chapter 3.0, *Activity Projections*, Table 3.4-6). Therefore, the future demand for small hangar space will be limited and there will be a greater demand for hangar space for turboprop and turbojet aircraft typically used by corporate flight departments.

In the alternatives development phase of the Master Plan Update, space should be reserved for three to four additional corporate hangars in addition to space for relocation of existing corporate hangars that may be displaced by expansion of other Airport facilities.

5.6 Support Facility Requirements

Support facility requirements enable normal operation and services of the Airport to go uninterrupted. It is therefore important to assess whether these facilities are capable and suited to perform their respective activities, especially in case of emergency. The supporting facilities that are examined in this section are as follows:

- *Airport Rescue and Firefighting (ARFF)*
- *Airport Maintenance*
- Fuel Storage Facilities

5.6.1 Airport Rescue and Firefighting (ARFF)

The Airport Rescue and Firefighting Facilities (ARFF) requirements are outlined in Federal Aviation Regulation (FAR) Part 139 Subpart D – Operations. These criteria were set forth by the FAA and ICAO Rescue and Firefighting Panel (RFFP II), which conducted studies that identified the practical as well as theoretical fire areas of an aircraft and the corresponding amounts of extinguishing agents required to extinguish the fires. These data led to the development of an “Index” of five airport classes and the corresponding ARFF equipment requirements (**Table 5.6-1**). The applicable airport index is determined by the length of the longest aircraft operated by a passenger air carrier an average of five scheduled departures per day (compiled on an annual basis).

TABLE 5.6-1 ***General Mitchell International Airport*** ***MINIMUM ARFF REQUIREMENTS UNDER FAR PART 139***			
Airport Category	Type Aircraft	Vehicle	Extinguishing Agent
Index A	Less than 90’	One lightweight	500 pounds of dry chemical or 450 pounds of dry chemical and 50 gallons of water for foam production.
Index B	More than 90’ but less than 126’	One lightweight and one self-propelled fire extinguishing vehicle	Same dry chemical requirements as Index A and 1,500 gallons of water for foam production.
Index C	More than 126’ but less than 160’	One lightweight and two self-propelled fire extinguishing vehicles	Same dry chemical requirements as Index A and 3,000 gallons of water for foam production.
Index D	More than 160’ but less than 200’	Same as Index C	Same dry chemical requirements as Index A and 4,000 gallons of water for foam production.
Index E	More than 200’	Same as Index C	Same dry chemical requirements as Index A and 6,000 gallons of water for foam production.

Source: FAR Part 139

The Airport currently has an ARFF index of C with additional equipment available upon request through the Air Force Reserve and Wisconsin Air National Guard to meet Index D. The longest passenger aircraft projected at the Airport having an average of at least five daily scheduled departures is the MD-80 series. The MD-80 has a maximum length of 147.9 feet, placing it in the Index C category. For Index C the ARFF requirement as stated in Table 5.6-1 is one lightweight vehicle and two self-propelled fire extinguishing vehicles. Added to the fire fighting vehicles is an extinguishing agent requirement of 450 to 500 pounds of dry chemical and 3,000 gallons of water for foam production.

The service requirements of FAR Part 139 also specify that at least one firefighting vehicle be capable of reaching the midpoint of the farthest runway from its assigned post, or reaching any other specified point of comparable distance in the movement area which is available to air carriers, and applying extinguishing agent within three minutes from the time of alarm. Within four minutes from the time of alarm, all other required vehicles must reach the above point and begin application of extinguishing agent. The Airport’s existing ARFF station is located so that response times to the midpoint of all existing runways are within allowable limits. The location of the existing station would provide the required coverage with its proximity to the C-1 Runway as midpoint of all existing runways are within allowable limits. The location of the existing station would provide the required coverage with its proximity to the C-1 Runway as well. Therefore no additional ARFF facilities are required during the 20-year planning period.

5.6.2 Airport Maintenance

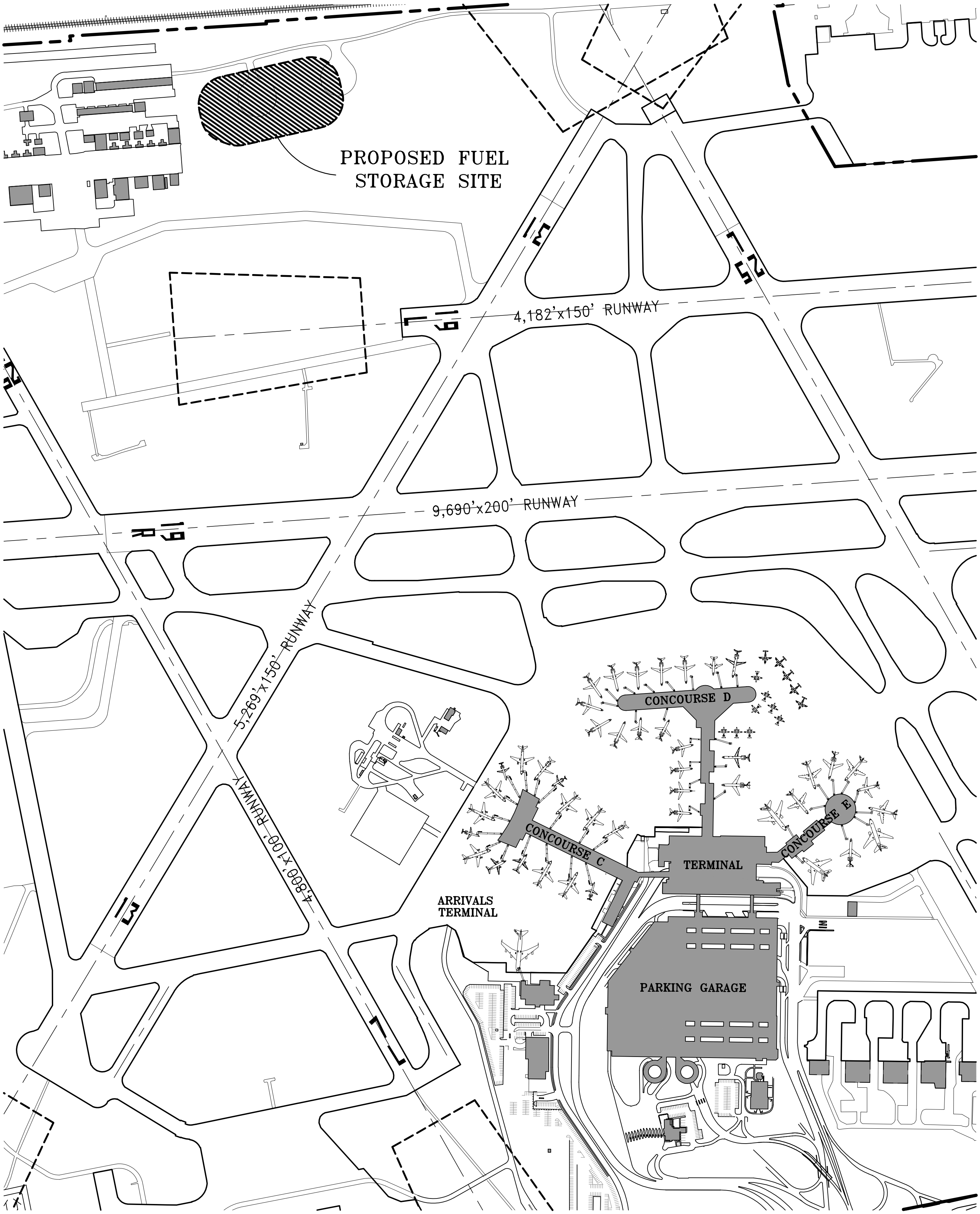
The Airport's maintenance facilities are located south of Runway 7R/25L and include maintenance shops, equipment storage, and facilities shared with the County's road department. Information provided on airport maintenance buildings in FAA Advisory Circular 150/5220-18, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, indicates that maintenance facility needs are related to pavement area, which in turn is related to aircraft operations.

The existing maintenance complex encompasses approximately 27 acres. Based on the increase in pavement area with the C-1 Runway and runway extensions, the Airport's maintenance complex will require approximately 37 acres. This requirement relates directly to the timing of the C-1 Runway.

5.6.3 Fuel Storage Facilities

Currently, jet fuel is transported by pipeline to a privately owned receiving and storage facility south of the Airport on College Avenue. Fuel moves from the pipeline into the 100,000 barrel tank, through a filtration system into a 20,000 barrel tank from which it enters the Airport's hydrant fueling system.

The Airport has initiated a design study for new fuel receiving and storage facilities. Results of this study indicate a need for upgraded storage and filtration. Alternatives for meeting this need include a combination of receiving and distribution tanks with a total capacity of 160,000 barrels. As depicted in **Exhibit 5.6-1**, the site identified for such a facility is 8.8 acres on the east side of the airport. Fuel delivery would be provided by an existing transfer pipeline in the vicinity.



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

Proposed Fuel Storage Location

EXHIBIT 5.6-1

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5.7 Summary of Facility Requirements

The facility requirements presented in this chapter form the basis for the next phase of the master plan. Alternatives to meet the projected demand for each of the functional areas will be developed and undergo preliminary screening based on the visions outlined in Chapter 1.0. The following is a summary of key landside facility requirements:

- As presented in detail, the terminal will require additional space through the planning period. The total terminal area requirement for 2020 is 1,288,000 square feet compared to the existing terminal that comprises 731,000 square feet.

- Although the Airport Spur is projected to have sufficient capacity through the planning period, congestion on Howell Avenue and ramps to and from the Airport terminal loop needs to be addressed in the development of alternatives.

- By 2020, approximately 19,482 public parking spaces, or 8,600 more than the existing number of spaces, are required to meet parking demand at LOS A. Additional parking will also be required for rental car and employee parking as well as additional taxi and limousine staging.

- An additional 93,000 square feet of cargo building space and 32,100 square yards of aircraft apron will be required through the planning period.

- The existing ARFF facility meets response time and equipment requirements and, based on the projected aircraft fleet, will continue to meet the requirements through the planning period.

- The Airport maintenance complex will require additional space commensurate with implementation of the runway extensions and C-1 runway.

6.0

Evaluation of Terminal Alternatives

6.0 EVALUATION OF TERMINAL ALTERNATIVES

The primary purpose of this element of the Master Plan Update is to describe the development and evaluation of major alternatives considered for key components of overall Airport development. The alternatives identified represent a level of detail that is common to a master planning effort, not a level of detail that is equivalent to an architectural or engineering design study.

6.1 Terminal Area Alternatives

This section presents alternative physical configurations for the passenger terminal area, including the coordinated development of the following major landside facilities and infrastructure components:

- *Passenger Terminal Facilities*
- *Aircraft Parking*
- *Ingress/Egress and Curbside Roadways*
- *Vehicular Parking Facilities*

6.1.1 Facilities Requirements

As described in detail in Chapter 5.0 Landside Facilities Requirements, increases in passenger demand over the 20-year period will require an expansion of the passenger terminal to accommodate approximately 70 gates. The overall facilities development will expand to meet Planning Activity Level 3 (PAL 3) requirements. The total area of the terminal facilities will increase to approximately 1,288,000 square feet and will necessitate significant increases in vehicular parking capacity, as well as access/egress roadways and curbside roadway frontage. Each Terminal Area alternative evaluated in this chapter was configured to meet all PAL 3 facilities requirements at an acceptable level of service.

6.1.2 Opportunities and Constraints

The existing terminal area consists of approximately 180 acres between the airfield and the regional access roadway system at Howell Avenue. In discussion with GMIA management and staff, major working assumptions regarding the opportunities for and constraints affecting future development were established to guide the configuration of specific Terminal Area alternatives. As described graphically on **Exhibit 6.1-1**, these working assumptions are:

- **Central Utilities Building.** The existing location of the facility is operationally efficient and the facilities and equipment can be expanded on this site to serve the future terminal area improvements. In addition, based on its proximity to Runway 7L-25R, this site is not considered viable for future expansion of terminal facilities.

- **International Arrivals Building.** Over the 20-year planning horizon, the international arrivals and Federal Inspection Services (FIS) facilities will be combined with the main passenger terminal.

- **Airport Office Wing.** Based on prior planning studies, the conversion of the Airport offices to a passenger concourse is not considered feasible.

- **Main Terminal.** Terminal Area alternatives will explore potential facilities and roadway expansion alternatives.

- **Concourse C.** Maintain through the 20-year planning period with the addition of the "hammerhead" expansion of the concourse. Further expansion of the concourse will only be considered if this is required to reach the Planning Activity Level 3 (PAL 3) aircraft parking requirement for approximately 70 gates.

- **Concourse D.** Will be maintained through the 20-year planning period.

- **Concourse E.** Will be maintained through the 20-year planning period, unless there would be a significant operational benefit from modification or replacement of the concourse.

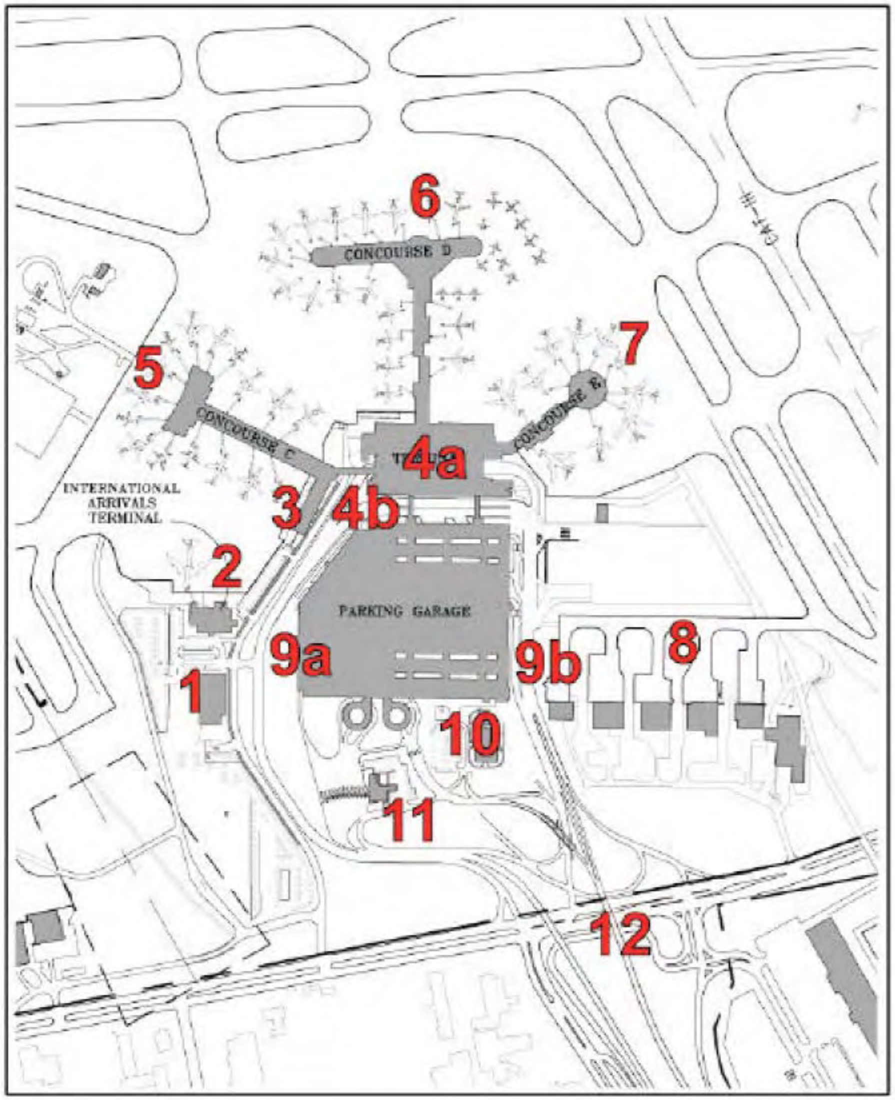
- **Future Development Area.** The area south of the existing Parking Garage is considered available for future terminal/concourse improvements.

- **Parking Garage Expansion.** Assume the Parking Garage expansion Phase 2 (northeast corner of the existing garage) will be implemented. The various Terminal Area alternatives will explore potential sites for further expansion either contiguous with or remote from the existing structure.

- **Air Traffic Control Tower (ATCT).** Consider potential relocation of the ATCT for an alternative use only if this provides a major operational benefit.

- **Parking Fee Collection Plaza.** The existing site is considered operationally viable, but future expansion capability must be considered in overall terminal Area alternatives.

- **Connection to Regional Roadways.** In developing the Terminal Area alternatives, consider the operational effects and extent of potential re-work on the vehicular roadways.



1. **Central Utilities Building:** Existing location is good and facility can be expanded to serve future Terminal Area improvements thru the 20-year planning period.
2. **International Arrivals Building:** Combine w/ future domestic terminal/concourse improvements.
3. **Airport Office Wing:** Based on prior studies, conversion to use as a passenger concourse is not feasible.
4. **Main Terminal:** Develop potential facilities (4a) and roadway (4b) expansion alternatives.
5. **Concourse C:** Maintain thru 20-year planning period w/ addition of hammerhead. Also, consider further expansion of hammerhead, only if required to reach the PAL 3 aircraft gate requirement (approximately 70 gates).
6. **Concourse D:** Maintain thru 20-year planning period.
7. **Concourse E:** Maintain thru 20-year planning period unless significant benefit from modification.
8. **Future Development Area:** Available for future terminal/concourse improvements.
9. **Garage Expansion:** Assume Parking Garage Expansion Phase 2 (9a) will be implemented and Terminal Area Alternatives will explore potential further expansion sites (9b) or remote from the existing garage.
10. **Air Traffic Control Tower (ATCT):** Consider potential relocation for alternative use only if this provides major operational or implementation cost benefit.
11. **Fare Collection Plaza:** Existing location is good, but alternatives must consider future expansion capability.
12. **Connection to Regional Roadways:** Consider effects on operational conditions and extent of potential re-work.

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

WORKING ASSUMPTIONS
TERMINAL AREA ALTERNATIVES

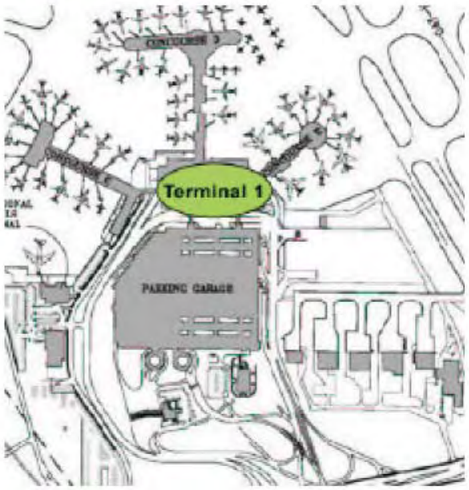
EXHIBIT
6.1-1

6.1.3 Description of Alternatives

Sixteen Preliminary Terminal Area alternatives were developed for evaluation. These alternatives represent a range of physical configurations from the most centralized to the most decentralized use of the available development area. The individual Exhibits depicting these preliminary alternatives are presented in Appendix A, Exhibits A-1 through A-16. As shown on **Exhibit 6.1-2**, the alternatives were grouped into six (6) major "families" (A-F) representing their overall Terminal Area development concepts, as follows:

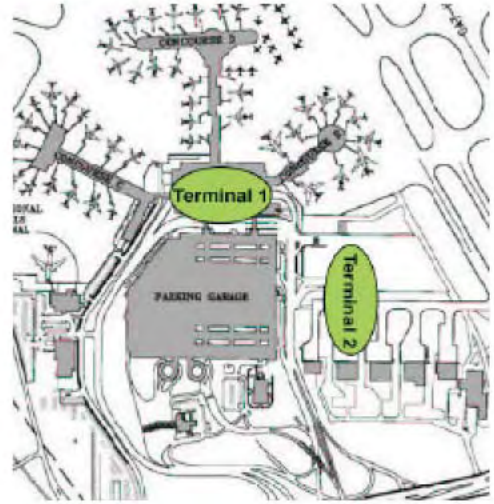
- **Alternatives A1 to A4.** These alternatives are all based on the concept of serving all existing and future concourses from one Central Terminal. The existing passenger terminal would be reconfigured and expanded to provide new ticketing/baggage check-in facilities at the Concourse Level served by a new elevated dropoff curbside roadway. Expanded baggage handling/claim facilities and airline operations space would be developed at the Ground Level, served by an expanded pickup curbside roadway. The variations from Alternatives A1 to A4 represent a range from the most to least centralized arrangement of vehicular parking facilities and the resulting configuration of future concourse development.

ALT. A

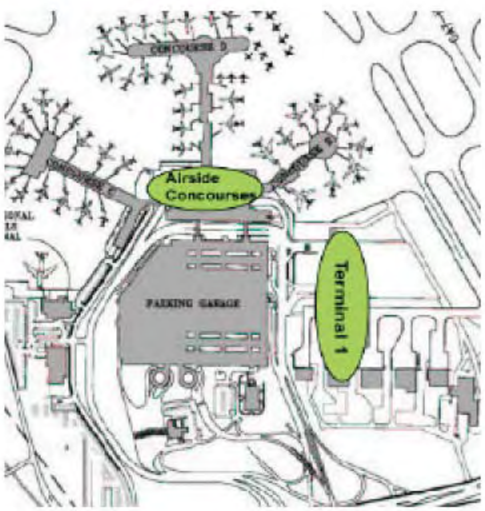


ALT. B

ALT. C

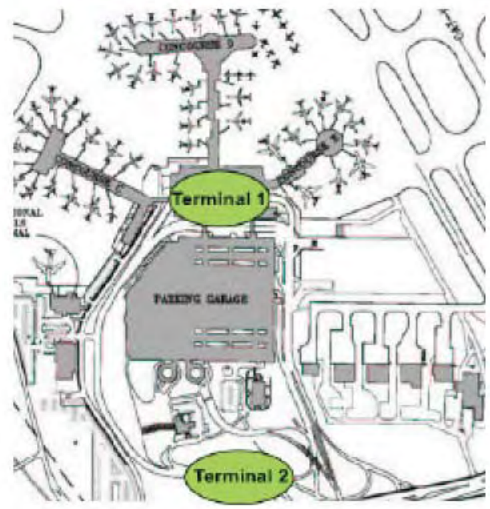


ALT. D



ALT. E

ALT. F



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

MAJOR TERMINAL AREA ALTERNATIVES

EXHIBIT 6.1-2

- **Alternatives B1 to B4.** These alternatives are all based on the concept of serving all existing and future concourses by expanding the existing ticketing and baggage claim facilities to the south. These expanded facilities would be served by extensions of the existing Ground Level dropoff and pickup curbside roadways. The variations from Alternatives B1 to B4 represent a range from the most to least centralized arrangement of vehicular parking facilities and the resulting configuration of future concourse development.

- **Alternatives C1 to C5.** These alternatives are all based on the concept of serving all future concourse development from a new Unit Terminal located south of the existing Parking Garage. The new Unit Terminal would provide fully-independent ticketing/baggage check-in and baggage claim facilities as well as new dropoff and pickup curbside roadways at the Ground Level. The variations from Alternatives C1 to C5 represent a range from the most to least centralized arrangement of vehicular parking facilities and the resulting configuration of future ticketing, baggage claim and concourse development.

- **Alternative D1.** This alternative is based on the concept of serving all existing and future concourses from a new multi-level Central Terminal that would completely replace all ticketing, baggage claim and dropoff/pickup curbside roadways in the existing passenger terminal. Existing Concourses C and D would be modified to be accessible from the new Central Terminal by an Automated People Mover (APM).

- **Alternative E1.** Similar to Alternatives Type C, this alternative is based on the concept of serving all future concourse development from a new Unit Terminal. However, in Alternative E1, the new Unit terminal would be located between the existing Parking Garage and Howell Ave. The new Unit Terminal would provide fully-independent ticketing/baggage check-in and baggage claim facilities. In addition, a multi-level roadway system would serve new dropoff and pickup curbside roadways as well as maintain access/egress from the existing terminal and parking facilities.

- **Alternative F1.** Similar to Alternatives Type C, this alternative is based on the concept of serving all future concourse development from a new Unit Terminal. However, in Alternative F1, the new Unit Terminal would be located west of Howell Ave. The new Unit Terminal would provide fully-independent ticketing/baggage check-in and baggage claim facilities as well as new dropoff and pickup curbside roadways at the Ground Level.

6.1.4 Evaluation Criteria

Three basic types of criteria were used in the evaluation of the Terminal Area alternatives:

- **Level 1 Operational Criteria.** These operational criteria were taken directly from the Visioning Statement outlined in *Chapter 1.0*, *Introduction*, developed by GMIA at the outset of the Master Plan Update. These criteria represent goals for Airport development that are specific to GMIA.

- **Level 2 Operational Criteria.** These operational criteria represent the interests of the Airport, airlines, tenants, passengers and Airport visitors on a wide range of issues necessary to provide an overall balance terminal area complex.

- **Comparative Cost Estimate.** All terminal area alternatives were ranked for their relative implementation cost. These rankings are based on concept-level estimates for overall Capital Development Cost (including A/E design, construction and administrative supervision for all facilities, roadways, infrastructure, and landscaping development of the terminal area alternatives.) Along with the cost of new construction, allowances were included for demolition, relocation and/or modification and re-use of all existing facilities within the Terminal Area.)

6.1.5 Preliminary Evaluation

As shown on **Table 6.1-1**, each of the 16 Terminal Area alternatives was scored and ranked based on Level 1 and Level 2 Criteria and was also evaluated for comparative Capital Development Cost (CDC) over both 10-year and 20-year periods. Facilities development in the 10-year CDC would meet the PAL 1 requirements described in detail in *Chapter 5.0, Landside Facilities Requirements*. Facilities development in the 20-year CDC would meet the total of PAL 1, PAL 2, and PAL 3 requirements.

TABLE 6.1-1
General Mitchell International Airport
GMIA TERMINAL AREA ALTERNATIVES

	TERMINAL AREA ALTERNATIVES																	
LEVEL 1 CRITERIA	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**E1**	**F1**	**BASIS for EVALUATION**	**EVALUATION KEY:**
FACILITIES																		
Efficient & Flexible Terminal Facilities	9	9	9	8	8	8	8	8	6	6	6	6	6	8	5	5	**Centralized passenger circulation vs. Unit Terminals**	**9 to 10 = Excellent**
Simple Wayfinding--Ease of Terminal Use	9	9	9	9	8	8	8	9	9	9	9	8	9	4	8	9	**Clear/horizontal vs. complicated/level change-dependent circulation path**	**7 to 8 = Good**
Improved LOS	6	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6	**Short vs. long circulation path**	**5 to 6 = Fair**
Improved Concession Choice and Revenue	9	9	9	8	8	8	8	8	7	7	7	7	7	8	7	7	**Centralized passenger circulation vs. Unit Terminals**	**3 to 4 = Poor**
Flexible Security Screening Operations	9	9	9	9	8	8	8	8	6	6	6	6	6	9	6	6	**Centralized passenger circulation vs. Unit Terminals**	**1 to 2 = System Breakdown**
Opportunities for New Entrants	8	8	8	9	8	8	8	8	8	8	8	8	9	8	8	9	**Overall ease of providing gates and support facilities at each construction phase**	
Sub-Totals for Facilities Criteria:	**50**	**50**	**50**	**49**	**46**	**46**	**46**	**47**	**42**	**42**	**42**	**41**	**43**	**41**	**40**	**42**		
ACCESS																		
Simple Wayfinding--Ease of Roadway Use	5	6	9	9	4	5	8	8	2	3	8	6	5	9	4	4	**Clear/safe vs. complicated/tight roadway geometry and decision distances**	**9 to 10 = Excellent**
Efficient & Flexible Roadway Use	5	6	9	9	3	4	7	7	2	3	6	6	5	9	4	4	**Simple/shared roadways vs. complicated/special use roadways**	**7 to 8 = Good**
Improved Curbside LOS	5	6	9	9	2	3	6	6	4	5	6	8	6	9	8	8	**Overall curb lengths provided**	**5 to 6 = Fair**
Flexible Utilization of Parking Garage	9	8	6	6	9	8	7	7	9	8	6	6	6	9	9	6	**Centralized/shared use vs. multiple locations of parking garage(s)**	**3 to 4 = Poor**
Flexible Response to TSA Requirements	9	9	9	9	6	6	6	6	6	6	6	6	8	8	8	8	**Generous/flexible separation of parking from high occupancy facilities**	**1 to 2 = System Breakdown**
Opportunities for Future Transit Connection	9	9	9	9	8	8	8	8	7	7	7	7	7	9	7	7	**Centralized Terminal vs. Unit Terminals**	
Sub-Totals for Access Criteria:	42	44	51	51	32	34	42	42	30	32	39	39	37	53	40	37		
Sub-Totals for Level 1 Criteria:	**92**	**94**	**101**	**100**	**78**	**80**	**88**	**89**	**72**	**74**	**81**	**80**	**80**	**94**	**80**	**79**		
Ranking based on Best Level 1 Criteria	**5**	**3**	**1**	**2**	**14**	**9**	**7**	**6**	**16**	**15**	**8**	**9**	**9**	**3**	**9**	**13**		
LEVEL 2 CRITERIA	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**E1**	**F1**	**BASIS for EVALUATION**	
Overall Airline Operations	9	9	9	8	8	8	8	8	8	8	8	6	8	6	8	8	**Centralized/compact versus spread-out/split operations**	**9 to 10 = Excellent**
Overall Airport Facilities Operations	9	9	9	8	8	8	8	8	8	8	8	6	8	6	8	8	**Centralized/compact versus spread-out/split operations**	**7 to 8 = Good**
Coordination w/ Airfield Operations	5	6	9	8	5	6	9	8	5	6	9	7	9	6	7	6	**Independent taxilanes versus pushbacks into taxiways**	**5 to 6 = Fair**
Coordination w/ Regional Access Roadways	5	6	9	9	5	6	9	9	4	5	8	8	8	8	4	4	**Sufficient versus insufficient decision distance and roadway geometry**	**3 to 4 = Poor**
Coordination w/ Overall Airport Development	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	4	**Greenfield development sites versus "domino effects" requiring multiple relocations**	**1 to 2 = System Breakdown**
Operation & Maintenance Cost (O&M)	9	9	9	8	8	8	8	8	8	8	8	7	8	4	6	6	**Compact/easily maintained facilities versus spreadout/labor-intensive facilities and equipment**	
Construction Feasibility	4	4	4	4	6	6	6	6	7	7	8	8	8	6	6	8	**Independent construction sites versus directly adjacent or overhead construction**	
Extent of Temporary Construction	4	4	4	4	6	6	6	6	8	8	9	9	9	6	4	6	**Sufficient versus insufficient clearance from passenger, airline or other airport operations**	
Time to Implement	6	6	6	6	8	8	8	8	8	8	9	9	9	6	6	6	**Possibility of phased incremental versus requirement for major construction increments**	
Sub-Totals for Level 2 Criteria	**59**	**61**	**67**	**63**	**62**	**64**	**70**	**69**	**64**	**66**	**75**	**68**	**75**	**56**	**55**	**56**		
Ranking based on Best Level 2 Criteria	**13**	**12**	**6**	**10**	**11**	**8**	**3**	**4**	**8**	**7**	**1**	**5**	**1**	**14**	**16**	**14**		
Totals for Level 1 + 2 Criteria	**151**	**155**	**168**	**163**	**140**	**144**	**158**	**158**	**136**	**140**	**156**	**148**	**155**	**150**	**135**	**135**		
Ranking based on Best Level 1 + 2 Criteria	**8**	**6**	**1**	**2**	**12**	**11**	**3**	**3**	**14**	**12**	**5**	**10**	**6**	**9**	**15**	**15**		
COST COMPARISON	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**E1**	**F1**	**BASIS for EVALUATION**	
10-Year Capital Development Cost (in $Millions)	**402**	**402**	**402**	**399**	**275**	**272**	**254**	**254**	**270**	**267**	**270**	**268**	**267**	**671**	**438**	**415**	**See Cost Estimate Sheets**	
20-Year Capital Development Cost (in $Millions)	**795**	**803**	**805**	**802**	**657**	**661**	**641**	**644**	**644**	**649**	**650**	**657**	**653**	**1,167**	**830**	**820**	**See Cost Estimate Sheets**	
Ranking Based on Least 10-Year Cost	**11**	**11**	**11**	**10**	**9**	**8**	**1**	**1**	**6**	**3**	**6**	**5**	**3**	**16**	**15**	**14**		
Ranking Based on Least 20-Year Cost	**10**	**12**	**13**	**11**	**7**	**9**	**1**	**2**	**2**	**4**	**5**	**7**	**6**	**16**	**15**	**14**		

A first draft of the Preliminary Evaluation Matrix was reviewed by GMIA management and staff and then discussed with the consultant team. GMIA comments have been incorporated into Table 6.1-1. Preliminary Findings about specific alternatives are as follows:

- **Alternatives A3, A4, B3, B4 and C3.** The preliminary evaluation indicated that these alternatives warranted further consideration in the Final Evaluation phase. Each alternative will be studied to assess specific operational performance, mitigate weaknesses and better define the comparative costs and implementation challenges.

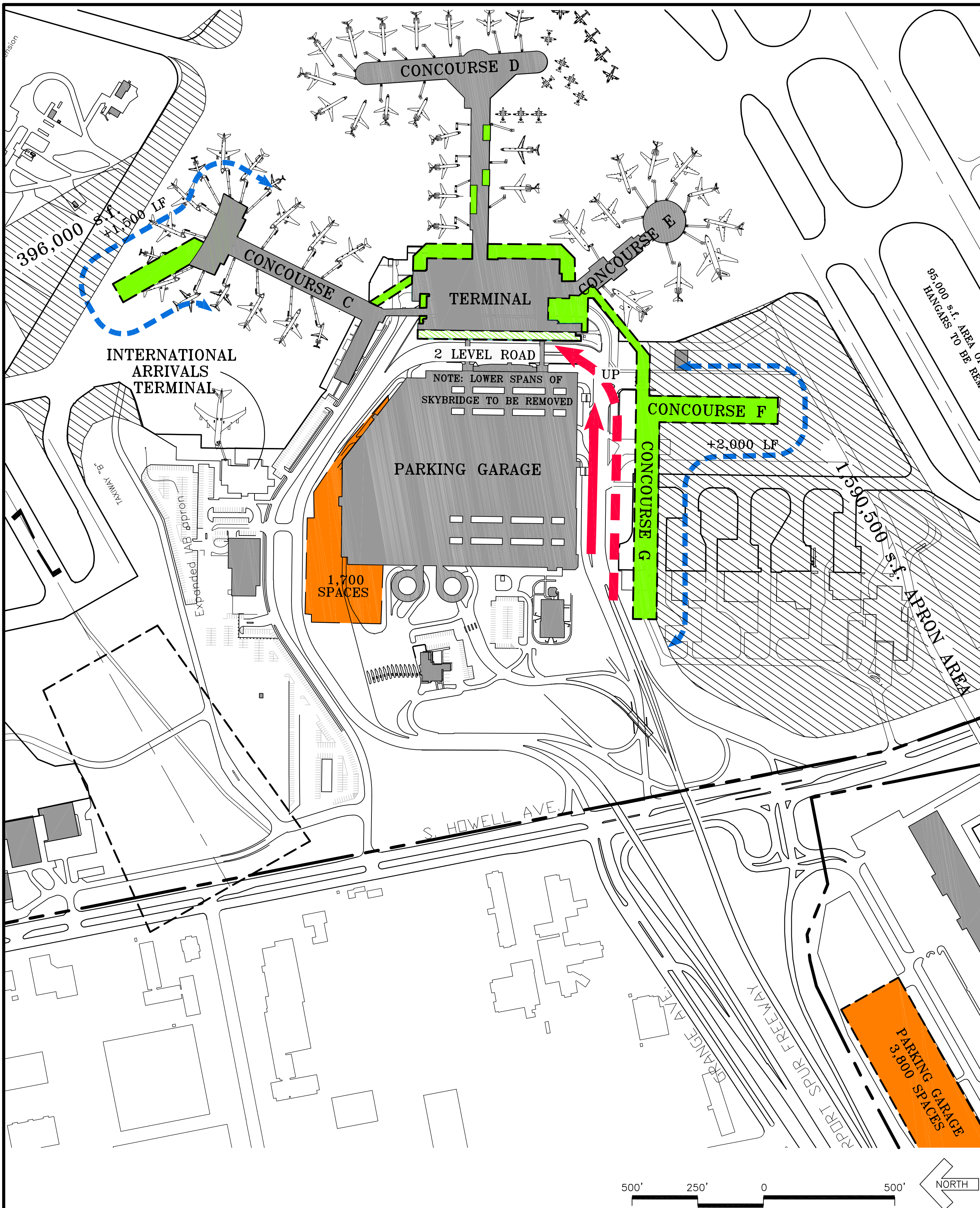
- **Alternatives A1, A2, B1, B2, C1 and C2.** Each of these alternatives includes a substantial southward expansion of the existing parking garage which would significantly reduce the land area available for vehicular access, terminal facilities and/or aircraft parking. Therefore, these alternatives received lower scores in several criteria representing vehicular access, terminal facilities and airfield operations. Essentially, expanding the existing Parking Garage southward was considered a "fatal flaw" of these concepts. Therefore these alternatives were not recommended for further evaluation.

- **Alternatives D1, E1 and F1.** Each of these alternatives provided some benefits relative to specific criteria, but overall received relatively low scores on operational criteria and were all comparatively high in development cost. Therefore these alternatives were not recommended for further evaluation.

- **Alternatives C4 and C5.** Each of these alternatives was compared quite closely with Alternative C3. Alternative C4 had two significant operational deficiencies, i.e. the underground connector corridor and the extremely tight aircraft taxiing and parking configuration. Similarly, Alternative C5 had significant operational deficiencies in providing access, egress and curbside roadways which could work well with the existing access roadways. For these reasons, Alternatives AC4 and C5 were not recommended for further evaluation.

6.1.6 Refinement of Alternatives

As shown on **Exhibits 6.1-3 thru 6.1-7** respectively, Alternatives A3, A4, B3, B4 and C3 were selected for Final Evaluation. Each alternative was refined to optimize its performance based on the assessments made during the Preliminary Evaluation. Specific refinements include:



GENERAL MITCHELL INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

FINAL TERMINAL AREA

ALTERNATIVE A3

EXHIBIT

6.1-3

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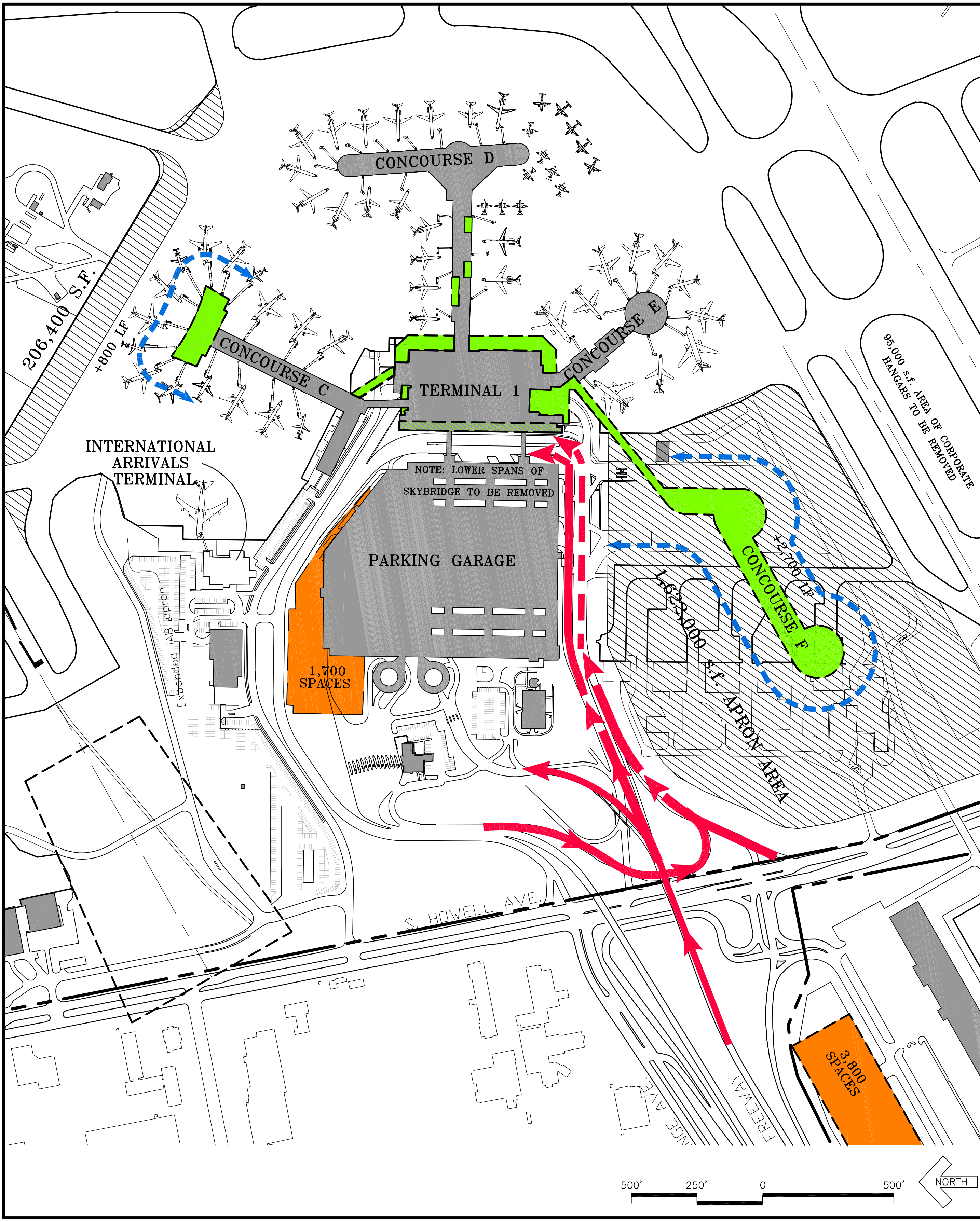
PB AVIATION



GENERAL MITCHELL INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

TERMINAL AREA ALTERNATIVE A4

EXHIBIT

6.1-4

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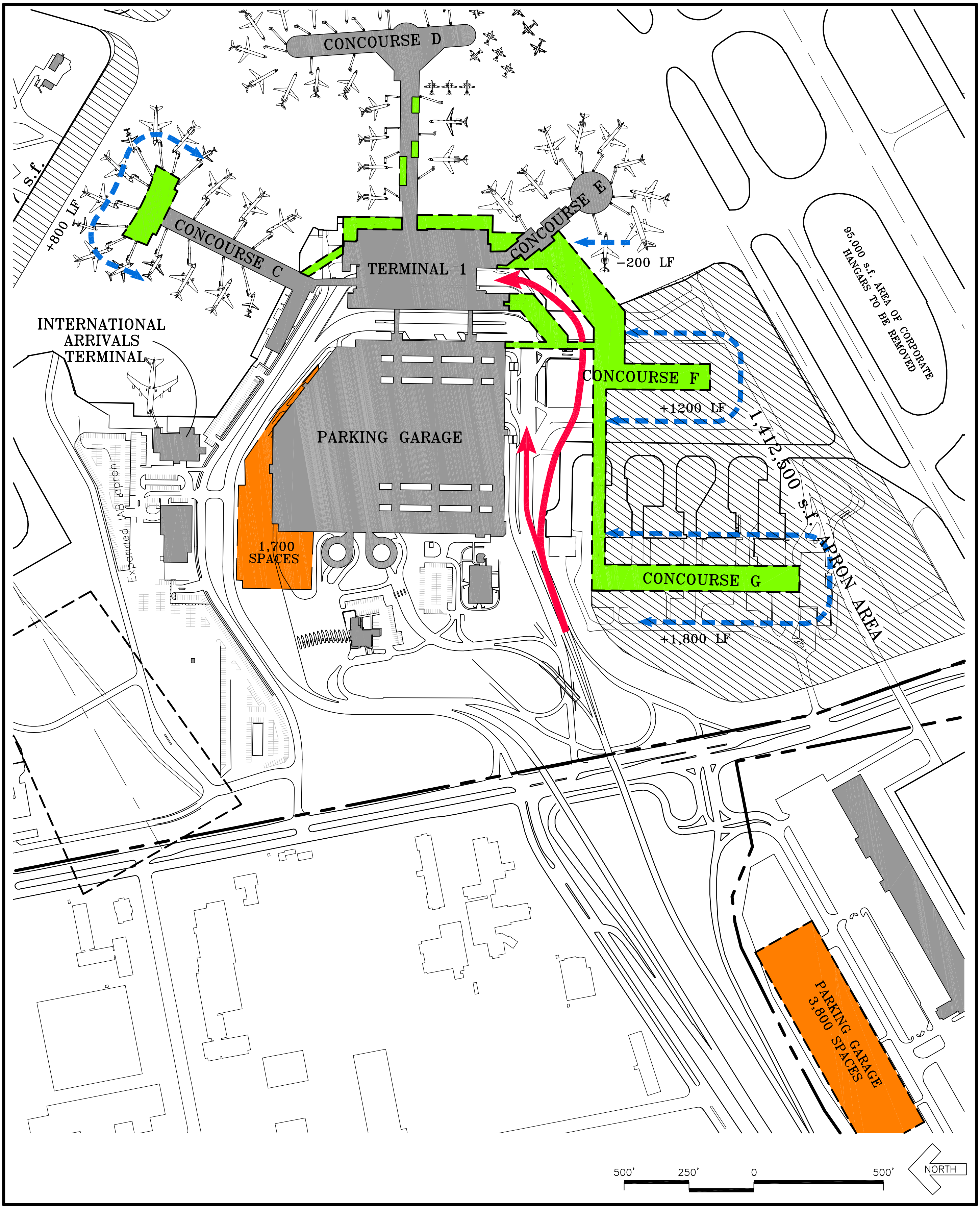
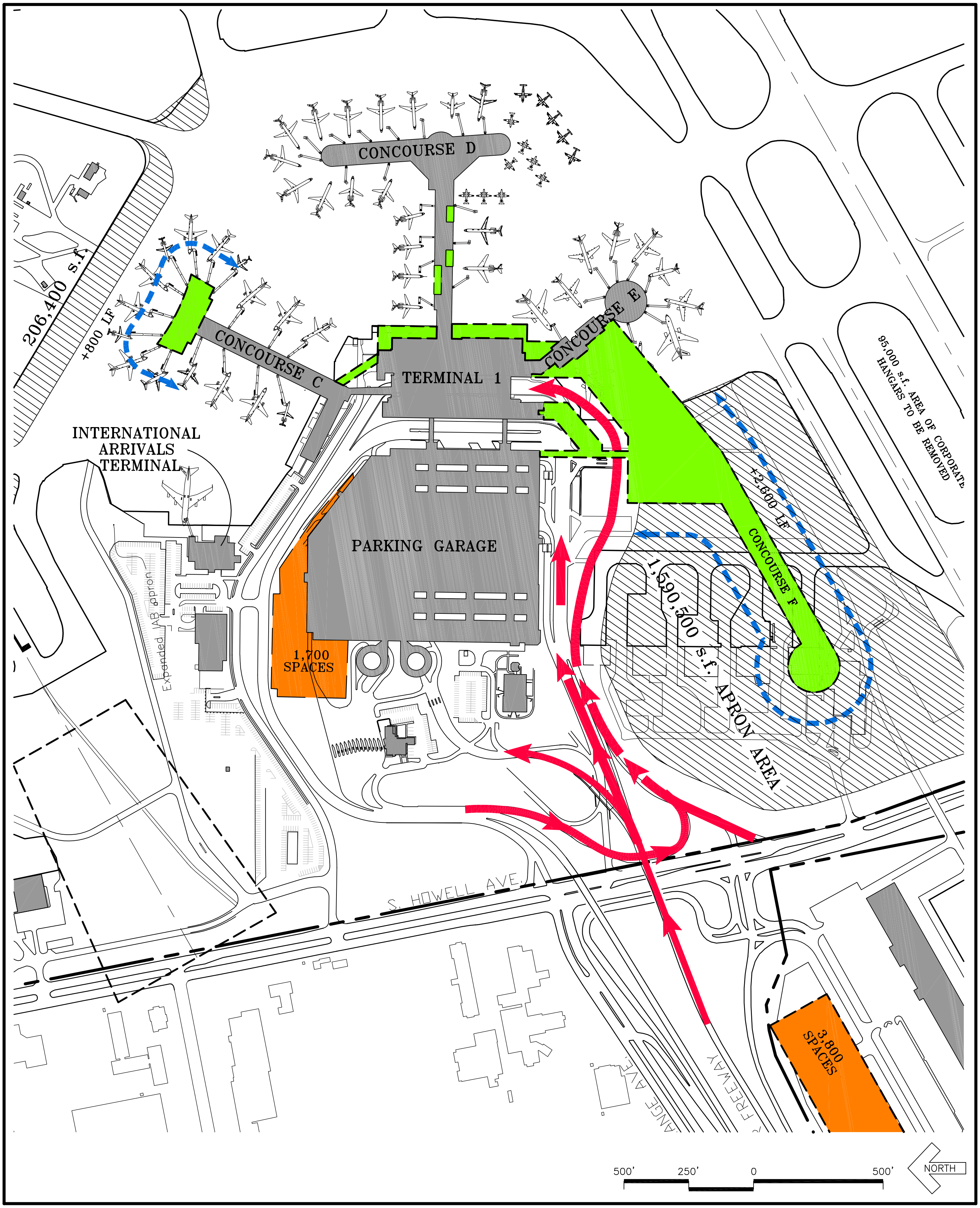


GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

TERMINAL AREA ALTERNATIVE B3

EXHIBIT 6.1-5



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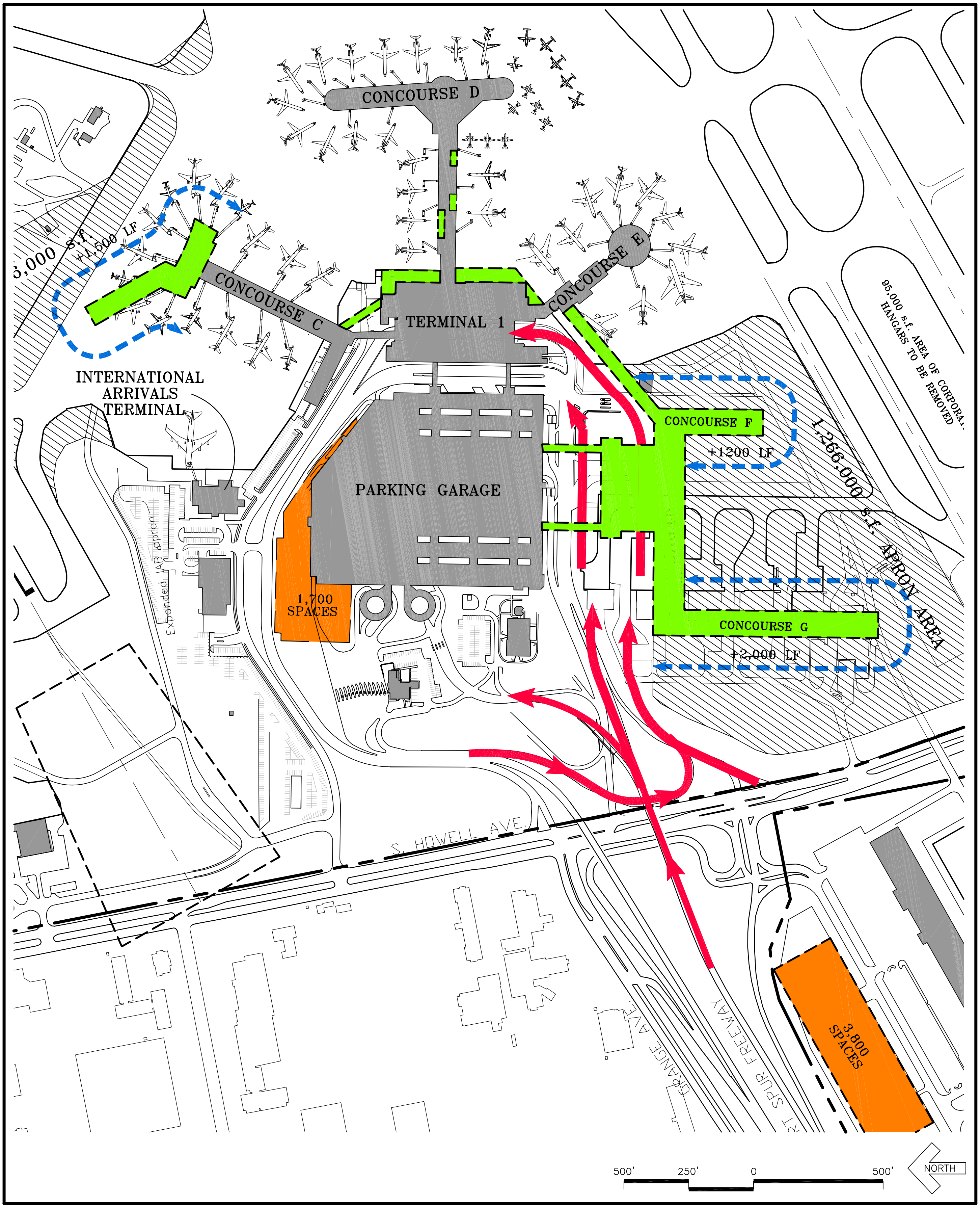
TERMINAL AREA ALTERNATIVE B4

EXHIBIT 6.1-6



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

TERMINAL AREA ALTERNATIVE C3

EXHIBIT 6.1-7

Milwaukee\Term-Bldg\Term_C3.dwg 02/25/05 PB AVIATION

- **Alternatives A3 and A4.** Since these alternatives require significantly more complicated construction phasing, more detailed diagrammatic floor plans than are normally associated with a Master Plan Update were prepared to assess both construction feasibility and access roadway capacity. The more detailed examination confirmed that additional roadway capacity could be provided, but that this would come at the cost of additional construction complexity and extent of temporary construction. In addition, based on review comments from the Preliminary Evaluation, the underground pedestrian connector in Alternative A4 was changed to a Concourse Level connector.

- **Alternatives B3 and B4.** Relatively few changes were made to the original configurations.

- **Alternative C3.** The lengths and locations of future Concourses F and G were modified to provide a better balance between aircraft parking and aircraft taxiing capacity.

6.1.7 Final Evaluation

As shown on **Table 6.1-2**, the final five alternatives were evaluated based on Level 1 and Level 2 operational criteria with additional input based on the following specific operational criteria:

- **Construction Feasibility, Extent of Temporary Construction and Time to Implement.** As shown on **Exhibits 6.1-8 and 6.1-9,** double-decking the roadways in Alternatives A3 and A4 would require a significantly more complicated construction phasing scheme than the phasing for other alternatives. Consequently, the scoring for these criteria was refined by consideration of the more complicated construction phasing and its disruptive effects on Airport, airline and passenger activities.

- **Simple Wayfinding – Ease of Terminal Use.** As shown on **Table 6.1-3**, a comparison of the number of level changes made by enplaning and deplaning passengers was prepared and used to guide the scoring on this criterion.

- **Improved Level of Service (LOS).** As shown on **Table 6.1-4**, a comparison of the average walking distance resulting from each alternative was prepared and used to guide the scoring on this criterion.

TABLE 6.1-2
General Mitchell International Airport
DETAILED EVALUATION SCORING MATRIX

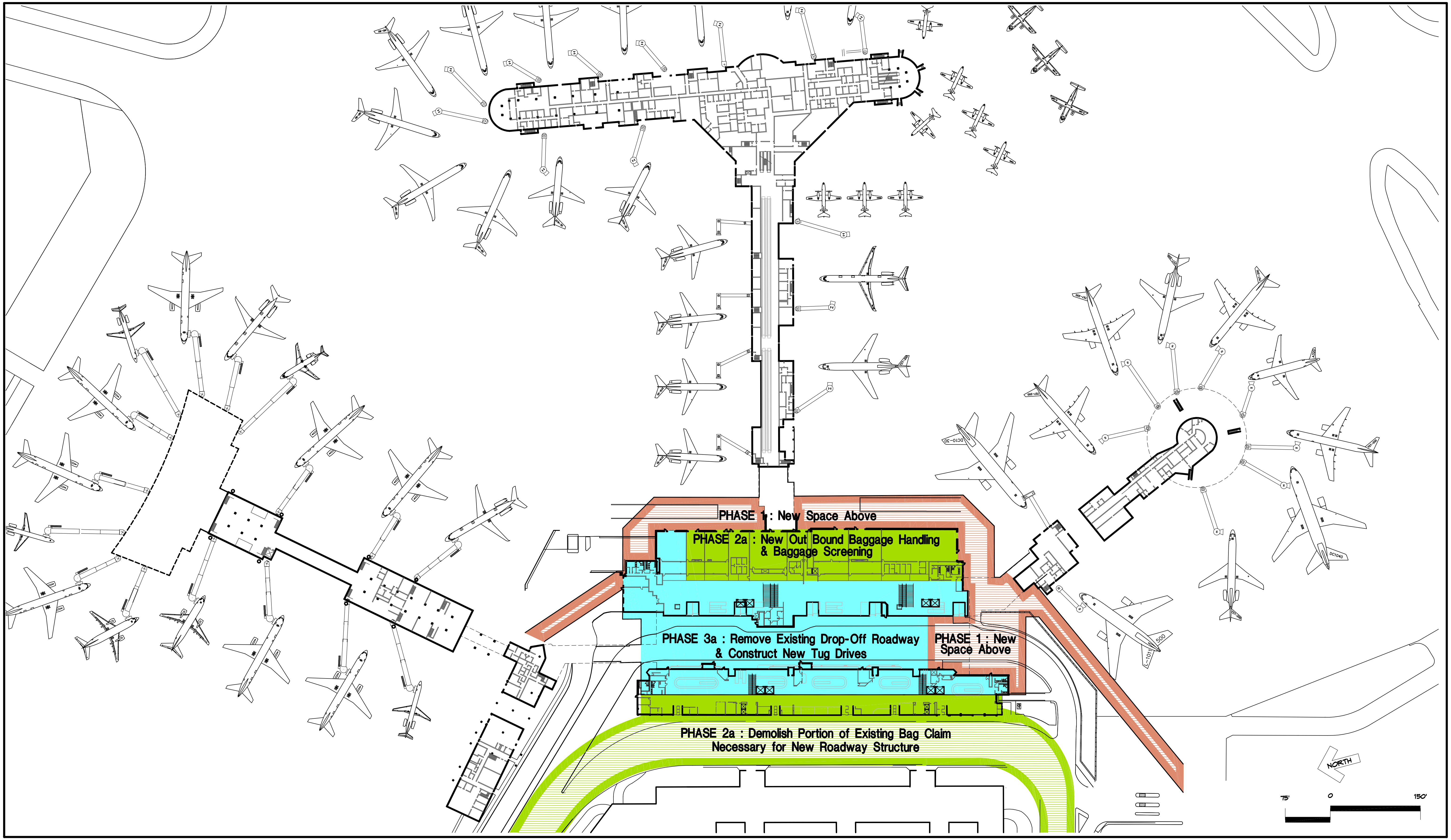
LEVEL 1 CRITERIA	FINAL EVALUATION TERMINAL AREA ALTERNATIVES A3	A4	B3	B4	C3	BASIS for EVALUATION	EVALUATION KEY:
FACILITIES							
Efficient & Flexible Terminal Facilities	9	8	8	8	6	Centralized passenger circulation vs. Unit Terminals	9 to 10 = Excellent
Simple Wayfinding--Ease of Terminal Use	9	9	8	9	9	Clear/horizontal vs. complicated/level change-dependent circulation path	7 to 8 = Good
Improved LOS	6	6	6	6	6	Short vs. long circulation path	5 to 6 = Fair
Improved Concession Choice and Revenue	9	8	8	8	7	Centralized passenger circulation vs. Unit Terminals	3 to 4 = Poor
Flexible Security Screening Operations	9	9	8	8	6	Centralized passenger circulation vs. Unit Terminals	1 to 2 = System Breakdown
Opportunities for New Entrants	8	9	8	8	8	Overall ease of providing gates and support facilities at each construction phase	
Sub-Totals for Facilities Criteria:	50	49	46	47	42		

ACCESS							
Simple Wayfinding--Ease of Roadway Use	9	9	8	8	8	Clear/safe vs. complicated/tight roadway geometry and decision distances	9 to 10 = Excellent
Efficient & Flexible Roadway Use	9	9	7	7	6	Simple/shared roadways vs. complicated/special use roadways	7 to 8 = Good
Improved Curbside LOS	9	9	6	6	6	Overall curb lengths provided	5 to 6 = Fair
Flexible Utilization of Parking Garage	6	6	7	7	6	Centralized/shared use vs. multiple locations of parking garage(s)	3 to 4 = Poor
Flexible Response to TSA Requirements	9	9	6	6	6	Generous/flexible separation of parking from high occupancy facilities	1 to 2 = System Breakdown
Opportunities for Future Transit Connection	9	9	8	8	7	Centralized Terminal vs. Unit Terminals	
Sub-Totals for Access Criteria:	51	51	42	42	39		
Sub-Totals for Level 1 Criteria:	101	100	88	89	81		
Ranking based on Best Level 1 Criteria	1	2	4	3	5		

LEVEL 2 CRITERIA	A3	A4	B3	B4	C3	BASIS for EVALUATION	
Overall Airline Operations	9	8	8	8	8	Centralized/compact versus spread-out/split operations	9 to 10 = Excellent
Overall Airport Facilities Operations	9	8	8	8	8	Centralized/compact versus spread-out/split operations	7 to 8 = Good
Coordination w/ Airfield Operations	9	8	9	8	9	Independent taxilanes versus pushbacks into taxiways	5 to 6 = Fair
Coordination w/ Regional Access Roadways	9	9	9	9	8	Sufficient versus insufficient decision distance and roadway geometry	3 to 4 = Poor
Coordination w/ Overall Airport Development	8	8	8	8	8	Greenfield development sites versus "domino effects" requiring multiple relocations	1 to 2 = System Breakdown
Operation & Maintenance Cost (O&M)	9	8	8	8	8	Compact/easily maintained facilities versus spreadout/labor-intensive facilities and equipment	
Construction Feasibility	4	4	6	6	8	Independent construction sites versus directly adjacent or overhead construction	
Extent of Temporary Construction	4	4	6	6	9	Sufficient versus insufficient clearance from passenger, airline or other airport operations	
Time to Implement	6	6	8	8	9	Possibility of phased incremental versus requirement for major construction increments	
Sub-Totals for Level 2 Criteria	67	63	70	69	75		
Ranking based on Best Level 2 Criteria	4	5	2	3	1		

Totals for Level 1 + 2 Criteria	168	163	158	158	156		
Ranking based on Best Level 1 + 2 Criteria	1	2	3	3	5		

COST COMPARISON	A3	A4	B3	B4	C3	BASIS for EVALUATION	
10-Year Capital Development Cost (in $Millions)	402	399	254	254	270	See Cost Estimate Sheets	
20-Year Capital Development Cost (in $Millions)	805	802	641	644	650	See Cost Estimate Sheets	
Ranking Based on Least 10-Year Cost	5	4	1	1	3		
Ranking Based on Least 20-Year Cost	5	4	1	2	3		



GENERAL MITCHELL INTERNATIONAL AIRPORT

TERMINAL AREA ALTERNATIVE TYPE A
Ground Level Construction Phasing

EXHIBIT 6.1-8

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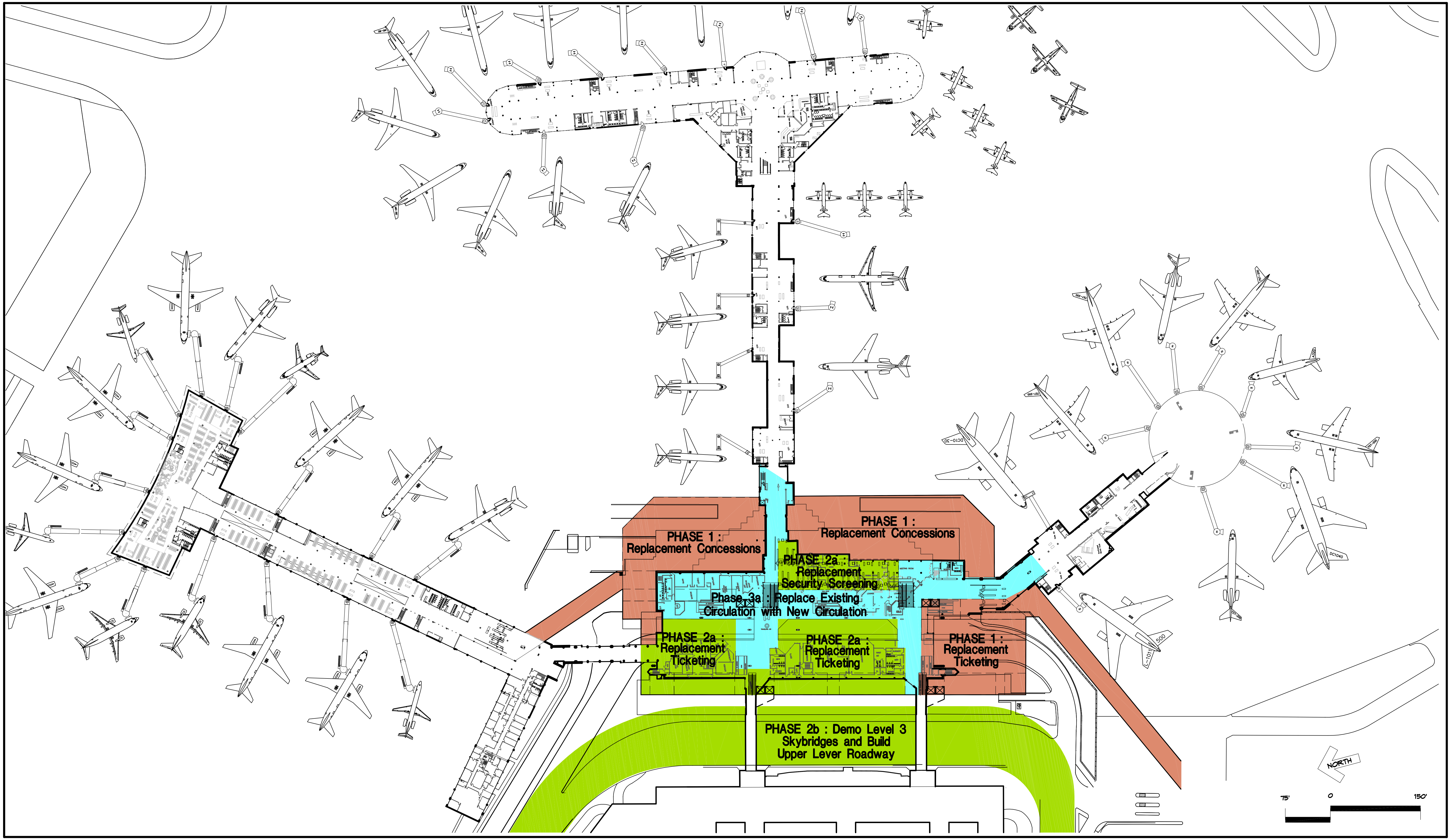

GENERAL MITCHELL INTERNATIONAL AIRPORT

TERMINAL AREA ALTERNATIVE TYPE A

Concourse Level Construction Phasing

EXHIBIT

6.1-9

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PB AVIATION

TABLE 6.1-3
General Mitchell International Airport
WALKING DISTANCE COMPARISON

ALT. NO.	CONCOURSE	NO. OF GATES	UNASSISTED WALKING DISTANCE [1]					ASSISTED TRAVEL DISTANCE		TOTAL TRAVEL DISTANCE [4]		RANK BY BEST AVG. UNASSISTED WALKING DISTANCE (Total Ticketing to Gates) [1]	RANK BY BEST AVG. TOTAL TRAVEL DISTANCE (Total Ticketing to Gates) [4]
			Ticketing to Security [2]	Security to Gates [3]		Total Ticketing to Gates		Moving Walkways	Automated People Movers (APMs)				
				Avg.	Max.	Avg.	Max.			Avg.	Max.		
EXISTING	**ALL**	**42**	**290**	**600**	**1,250**	**890**	**1,490**			**890**	**1,490**		
	C	8	500	320	520	820	1,020		-	820	1,020		
	D	24	240	810	1,250	1,050	1,490	-	-	1,050	1,490		
	E	10	240	340	480	580	720	-	-	580	720		
A4	**ALL**	**71**	**270**	**830**	**1,330**	**1,100**	**1,600**			**1,320**	**2,080**	**1**	**4**
	C	16	270	900	1,130	1,170	1,400	200	-	1,370	1,600		
	D	24	270	890	1,330	1,160	1,600	-	-	1,160	1,600		
	E	10	270	650	790	920	1,060	-	-	920	1,060		
	F	21	270	800	1,210	1,070	1,480	600	-	1,670	2,080		
C3	**ALL**	**71**	**430**	**720**	**1,330**	**1,150**	**1,730**			**1,260**	**1,930**	**2**	**2**
	C	20	600	900	1,130	1,500	1,730	200	-	1,700	1,930		
	D	24	340	890	1,330	1,230	1,670	-	-	1,230	1,670		
	E	9	340	650	790	990	1,130	-	-	990	1,130		
	F	6	400	200	400	600	800		-	600	800		
	G	12	400	400	700	800	1,100	300	-	1,100	1,400		
A3	**ALL**	**71**	**270**	**880**	**1,550**	**1,150**	**1,820**			**1,370**	**2,220**	**2**	**5**
	C	20	270	1,000	1,550	1,270	1,820	200	-	1,470	2,020		
	D	24	270	890	1,330	1,160	1,600	-	-	1,160	1,600		
	E	9	270	650	850	920	1,120	-	-	920	1,120		
	F	12	270	860	800	1,130	1,070	600	-	1,730	1,670		
	G	6	270	860	1,250	1,130	1,520	700	-	1,830	2,220		
B3	**ALL**	**71**	**420**	**740**	**1,330**	**1,160**	**1,730**			**1,300**	**2,000**	**4**	**3**
	C	16	600	900	1,130	1,500	1,730	200	-	1,700	1,930		
	D	24	340	890	1,330	1,230	1,670	-	-	1,230	1,670		
	E	9	340	650	790	990	1,130	-	-	990	1,130		
	F	10	400	250	500	650	900		-	650	900		
	G	12	400	700	1,000	1,100	1,400	600	-	1,700	2,000		
B4	**ALL**	**71**	**420**	**770**	**1,330**	**1,190**	**1,730**			**1,230**	**1,930**	**5**	**1**
	C	16	600	900	1,130	1,500	1,730	200	-	1,700	1,930		
	D	24	340	890	1,330	1,230	1,670	-	-	1,230	1,670		
	E	8	340	650	790	990	1,130	-	-	990	1,130		
	F	23	400	600	110	1,000	510		-	1,000	510		

Source: PB Aviation

FOOTNOTES:

(1) Excluding moving walkways or Automated People Movers (APMs)
(2) Measured from midpoint of ticket counters to midpoint of Security Screening Area
(3) Measured from midpoint of Security Screening Area to the Loading Bridge Boarding Door
(4) Including moving walkways or Automated People Movers (APMs)

TABLE 6.1-4
General Mitchell International Airport
COMPARISON OF NUMBER OF ENPLANING AND DEPLANING LEVEL CHANGES

	CIRCULATION PATH SPLITS			EXISTING TERMINAL CONFIGURATION			ALTS. A3 & A4 (DOUBLE-DECK ROADWAY)			ALTS. B3 & B4: (EXTEND EXISTING TERMINAL)			ALT. C3: (UNIT TERMINAL w/ ROADWAY SIM. TO EXISTING)			ALT. C6: (UNIT TERMINAL w/ SINGLE ROADWAY)		
	ENPLANING CIRCULATION																	
	% of Passengers	Split for Use of Ticketing/Bag Check-in	% of Passengers	Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes		
				Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total
ENPLANING CIRCULATION																		
From Garage--Public Parking	37%																	
Use Ticketing/Bag Check-in		65%	24%	0.75	2.00	2.75	1.25	1.00	2.25	0.75	2.00	2.75	0.75	2.00	2.75	0.75	2.00	2.75
No Ticketing/Bag Check-in		35%	13%	0.75	0.00	0.75	1.25	1.00	2.25	0.75	0.00	0.75	0.75	0.00	0.75	0.75	0.00	0.75
From Garage--RAC Dropoff	14%																	
Use Ticketing/Bag Check-in		65%	9%	1.00	2.00	3.00	1.50	0.50	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00
No Ticketing/Bag Check-in		35%	5%	1.00	0.00	1.00	1.50	0.50	2.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
From Dropoff Curbsides	49%																	
Use Ticketing/Bag Check-in		75%	37%	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
No Ticketing/Bag Check-in		25%	12%	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
AVG. NO. of ENPLANING LEVEL CHANGES	100%		100%	0.42	1.15	1.60	0.67	0.44	1.10	0.42	1.15	1.60	0.42	1.15	1.60	0.42	1.15	1.60
	DEPLANING CIRCULATION																	
	% of Passengers	Split for Use of Bag Claim	% of Passengers	Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes			Avg. No. of Level Changes		
				Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total	Primarily Via Elevators	Primarily Via Escalators	Total
DEPLANING CIRCULATION																		
To Garage--Public Parking	37%																	
Use Bag Claim		65%	24%	1.75	1.00	2.75	1.75	1.00	2.75	1.75	1.00	2.75	1.75	1.00	2.75	1.75	1.00	2.75
No Bag Claim		35%	13%	0.75	0.00	0.75	0.75	1.00	1.75	0.75	0.00	0.75	0.75	0.00	0.75	0.75	0.00	0.75
To Garage--RAC Pickup	14%																	
Use Bag Claim		65%	9%	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
No Bag Claim		35%	5%	1.00	0.00	1.00	1.50	0.50	2.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
To Pickup Curbsides	49%																	
Use Bag Claim		75%	37%	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
No Bag Claim		25%	12%	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
AVG. NO. of DEPLANING LEVEL CHANGES	100%		100%	0.57	0.82	1.40	0.59	0.98	1.60	0.57	0.82	1.40	0.57	0.82	1.40	0.57	0.82	1.40
AVG. NO. of ENPLANING + DEPLANING LEVEL CHANGES						1.5			1.35			1.5			1.5			1.5

Source: PB Aviation

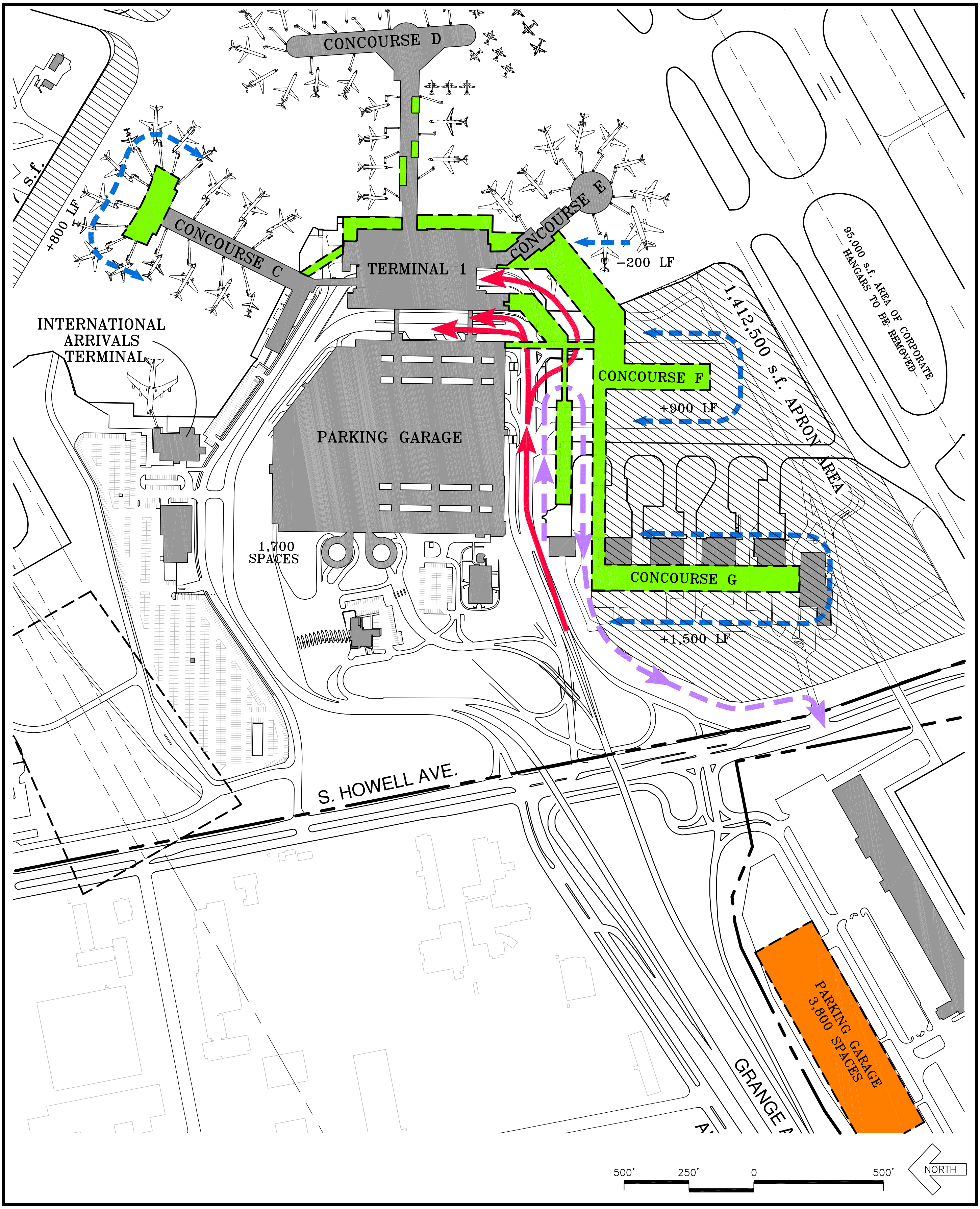
The Level 2 evaluation indicates that the five alternatives are comparable in the overall evaluation, with each slightly better or worse in the individual categories. The exception is capital development cost. Alternatives B3 and B4 are approximately $100 million less expensive the A Alternatives, primarily related to the cost of constructing a two-level roadway and reconstructing the existing terminal while it must remain active.

6.1.8 Refinement of the "B" Alternatives

With the projected number of vehicles passing through the terminal area, the curbfront roadways in Alternatives B3 and B4 will reach capacity by the end of the planning period. Adding additional lanes with this configuration is not possible because of the parking garage to the east and the terminal itself to the west. In order to reduce the throughput traffic some segment of traffic must be removed from the mix.

To address this problem several alternatives were considered. All commercial transportation could be shifted to the future remote parking garage where passengers would transfer to a shuttle bus to the terminal. This mode shift reduces passenger convenience and increases travel time to and from the terminal and therefore was not considered further.

A terminal-area ground transportation center was also evaluated. This concept was designed to take advantage of the approximately 250 feet between the south face of the parking garage and the proposed concourses. With this option, a separate curbfront and waiting area would be located along the entrance roadways to the curbfront, as depicted in **Exhibit 6.1-10**. This would allow commercial vehicles to drop off on one side and pick up on the other and circulate out via a separate road to Howell Avenue. However, moving from baggage claim to this center significantly adds to walking distances and level changes (over the departure roadway). The route for commercial vehicle to the Airport Spur westbound to I-94 is also more complicated as this traffic would have to exit onto Howell Avenue and then cross to the Airport Spur.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

TERMINAL AREA ALTERNATIVE B3
Ground Transportation Refinement

EXHIBIT 6.1-10

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PB AVIATION

The third option is to modify to parking garage in order to add an additional curbfront and lanes on the ground level. This would require the removal of the second floor of the parking garage above the new curbfront area (the first 40 feet of the second floor) in order to provide adequate van and bus clearances. Preliminary investigations by structural engineers responsible for the garage expansion confirm that this type of modification to the garage is feasible. Commercial vehicles would be the likely group to be assigned to this curbfront. The new curbfront would provide waiting areas for passengers along with 3 lanes for traffic, as shown in **Exhibit 6.1-11**. The existing rental car center, which includes the counters and offices, would remain in place.

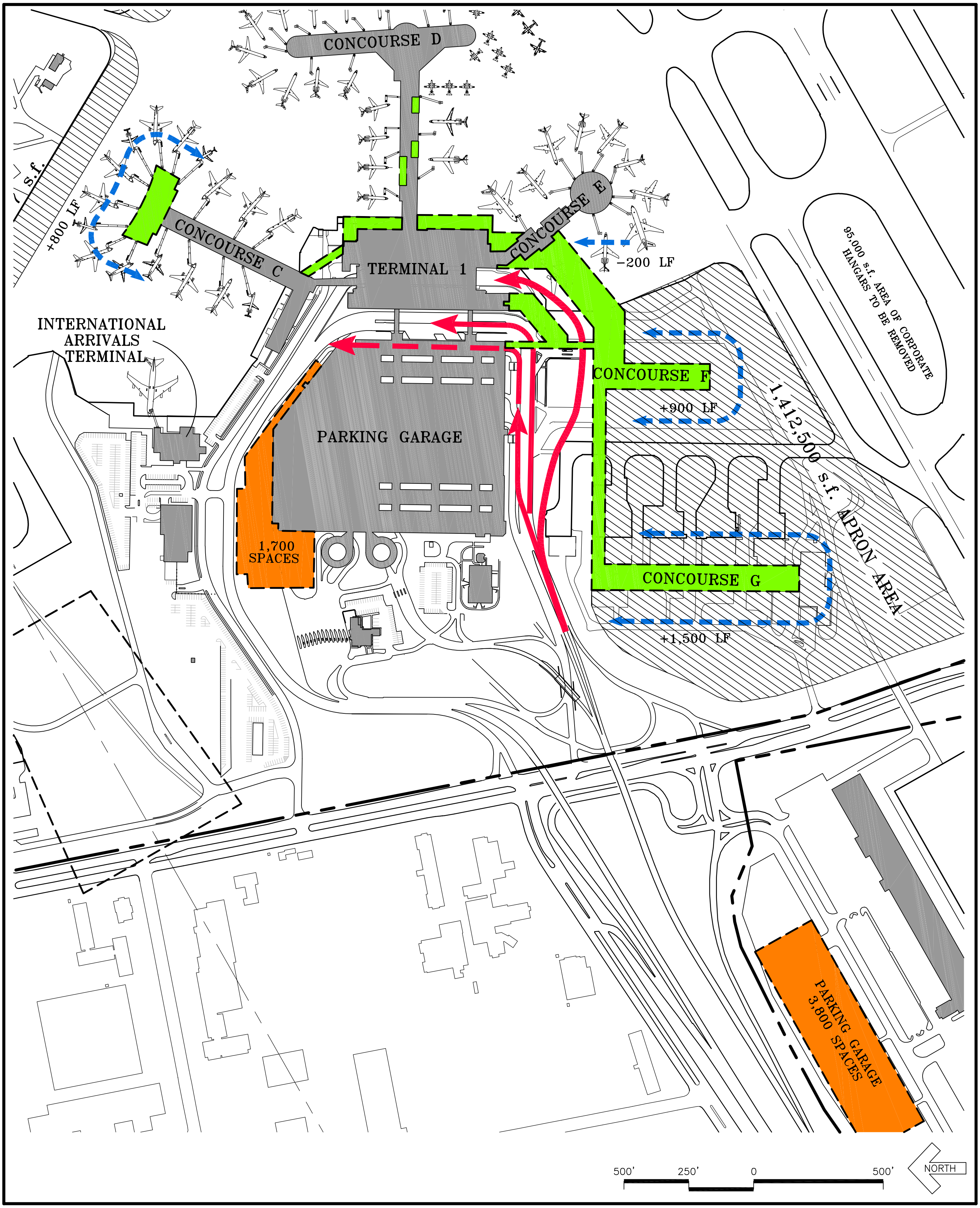
This alterative was selected as it provides the necessary capacity at a lower capital cost than the A alternatives while not significantly decreasing the level of service for the passenger.

Alternative B3 was selected over Alternative B4 to be carried forward as the preferred terminal development plan. As previously noted, both alternatives were comparable in level of service, customer convenience, constructability and implementation costs. The differentiating factor was the greater ability of Alternative B3 to be incrementally expanded over time as demand warrants. The remainder of the Master Plan Update will use be based on Alternative B3.

6.1.9 Long Range Terminal Development

While the Master Plan Update includes facilities to be developed over the 20-year planning period, it is important to think beyond that time frame so that the development plan does not preclude or limit options for expansion beyond 20 years. In developing the terminal alternatives for the Master Plan Update, it was determined that the existing terminal area can accommodate the PAL 3 facility requirements. But beyond that level of activity, it becomes difficult to accommodate more terminal related facilities within the existing terminal area. Therefore, it is important to identify where the next terminal facilities should be located so that land is reserved or developed in such a way to allow for a future terminal.

The land area between Runway 7R/25L and the future C-1 Runway would be the next logical area where terminal facilities could be sited. A prototype terminal on this site is depicted in **Exhibit 6.1-12**. It is important to note that this concept is presented only to illustrate that a terminal facility could function at this location on the airfield. The ultimate design will be determined by passenger demand and facility requirements of the terminal tenant.



GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

TERMINAL AREA ALTERNATIVE B3
Garage Curbfront Refinement

EXHIBIT 6.1-11

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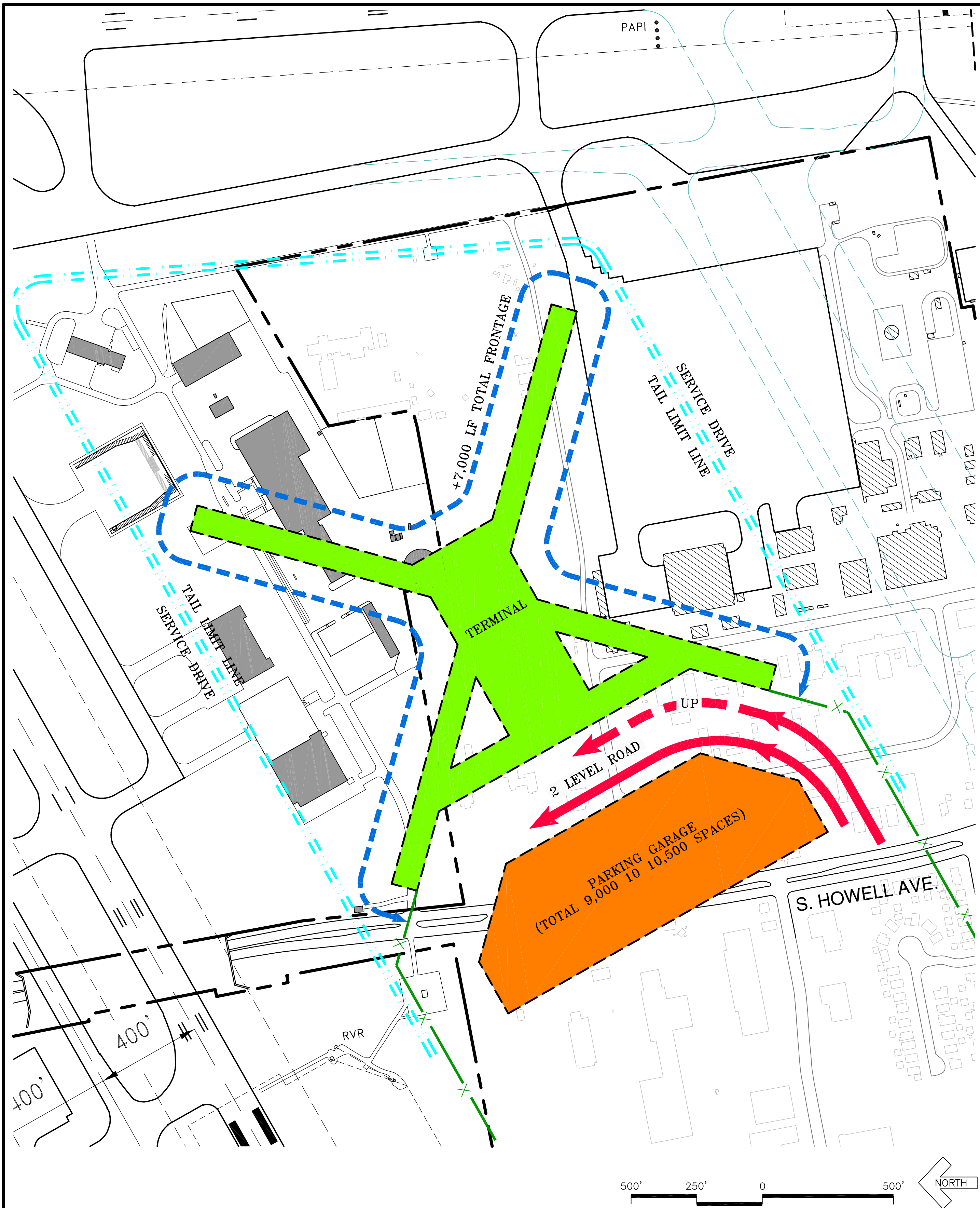

GENERAL MITCHELL INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

LONG RANGE TERMINAL LOCATION

EXHIBIT 6.1-12

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PB AVIATION

7.0

Environmental Overview

7.0 ENVIRONMENTAL OVERVIEW

This Chapter provides an overview of environmentally sensitive features that may be affected by the recommended development. This Overview is based upon readily available information; it is not intended as a substitute for the “Affected Environment” section of an environmental assessment (EA) or Environmental Impact Statement (EIS). Federal Aviation Administration (FAA) guidance does not require substantial investigations such as cultural resource studies or wetland delineations in order to define environmental factors during the master planning process. The information in this Overview will serve as a resource when more detailed environmental analysis as may be required by the National Environmental Policy Act (NEPA) and FAA orders, regulations and policies is conducted at a later date.

The primary elements of the recommended development are summarized below (more detailed descriptions can be found in Chapter 8.0 Airport Layout Plans):

A. Proposed Runway 7R-25L: an Environmental Impact Statement (EIS); land acquisition; avigation easements; demolition of structures; site preparation/drainage; relocation of College Avenue; installation of a Category I instrument landing system; perimeter fence; runway, taxiway, perimeter road and South Howell Tunnel construction

B. Terminal Modernization: Phase I – Central Terminal, Phase II – South Terminal, Phase III – Ground Access, and parking garage walking connector

C. Air Cargo Facilities: site preparation/drainage and construction of air cargo warehouse, air cargo apron, and truck/employee parking

D. Existing Runway 7R-25L Safety Area Improvements: avigation easements, site preparation/drainage, construction of taxiway connector between Runways 25 and 31, shifting Runway 7R 529 feet, installation of Category I instrument landing system, relocation of 6th Street, and construction of perimeter road and perimeter fence. An environmental assessment has been completed for these projects.

E. Concourse F: site preparation/drainage, relocation of ground service equipment facilities, construction of Concourse F and aircraft apron

F. Runway 1L-19R Safety Area Improvements: an extension of the Extended Runway Safety Areas (ERSA) for Runway 1L and 19R in the amount of 600 feet and 500 feet, respectively.

G. Parking Garage Expansion: site preparation/drainage and construction

H. Remote Parking Structure, including: site preparation/drainage and construction of parking structure

I. Remote Employee Parking: site preparation/drainage and construction of grade level parking lot

J. Airport Maintenance Building: site preparation/drainage and construction of maintenance building, storage yards, and parking

K. Runway 7R Extension: Environmental Impact Statement, site preparation/drainage, construction of runway extension and associated taxiways, and installation of Category I instrument landing system

L. Concourse G: site preparation/drainage; relocation of 5 corporate hangars including the U.S. Post Office, and Federal Inspection Service (FIS) Building; and, construction of Concourse G, aircraft apron, new Post Office, Post Office truck apron and parking, corporate hangars, aircraft apron and access road

M. Runway 1R-19L Extension: a 500 feet runway extension, 200 foot blast pad and CAT-I Instrument Landing System (ILS)

N. Taxiways S and T Extension: site preparation/drainage and construction of Taxiways S and T

O. Fuel Farm: dedicated space for a 1.6 million gallon above ground fuel storage tank, fuel truck loading/unloading rack with secondary containment, and fuel piping distribution system.

Table 7.1-1 identifies the primary elements of the recommended development and the environmental resources that have the potential to be impacted by each element.

More information on each resource is offered in section 7.1 below. Section 7.2 identifies the environmental resource categories that are not expected to be affected by the proposed development with a brief explanation supporting that conclusion.

Table 7.1-1

Environmental Resources That May Be Impacted By Recommended Development Projects

Environmental Resource Category	**Recommended Development Projects** (See Descriptions on Pages 7-1 and 7-2)														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Air Quality	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Biotic Resources	◆										◆		◆	◆	
Coastal Barriers															
Coastal Zone Management	◆		◆	◆				◆	◆			◆	◆	◆	
Compatible Land Use	◆										◆		◆		
Construction Impacts	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Section 4(f) Resources	◆			◆							◆				
Federally Listed Endangered or Threatened Species															
Energy Supplies, Natural Resources and Sustainable Design															
Environmental Justice															
Farmlands															
Floodplains	◆		◆			◆		◆		◆		◆	◆	◆	
Hazardous Materials	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Historic, Archaeological, Architectural, Cultural Resources															
Induced Socioeconomic Impacts	◆			◆							◆		◆		
Light Emissions and Visual Effects															
Noise	◆										◆		◆		
Social Impacts	◆			◆							◆		◆		
Solid Waste															
Water Quality	◆		◆	◆				◆	◆			◆	◆	◆	
Wetlands	◆												◆		
Wild and Scenic Rivers															

7.1 Resource Categories with Potential Impacts

As noted in **Table 7.1-1**, each element of the recommended development plan the potential for impacting air quality. This is because each element involves has one or more of the following: dust from construction, construction vehicle emissions, and changes in aircraft movement patterns. Based on the analysis included in **Attachment A** and discussed below, the level of the potential impacts is not expected to reach the threshold of significance established by the FAA.

The United States Environmental Protection Agency (USEPA) establishes National Ambient Air Quality Standards (NAAQS) for six principal air pollutants, commonly referred to as the “criteria’ pollutants. The six criteria pollutants are carbon monoxide, lead, nitrogen dioxide, particulate matter, sulfur dioxide and ozone. The USEPA also designates whether an area is in attainment with the NAAQS. On December 22, 2008, the EPA announced that certain areas in Wisconsin did not meet the EPS’s daily standards for fine particle pollution, also known as PM 2.5.

Recently, the WDNR reclassified the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha from non attainment to attainment for the 1-hour ozone standard. Support for this reclassification was based on the WDNR’s findings which indicated that monitoring data for years 2003 through 2005 showed these counties met the required attainment levels for 1-hour ozone standard two years ahead of a 2007 mandate for PM 2.5 attainment. Recent PM 2.5 measurements continue to show attainment for PM 2.5. Such WDNR action was enforced by a Findings of Fact dated February 10, 2009. As of February 2009, the General Mitchell International Airport (MKE) is now located in an attainment area for the following NAAQS pollutants: 1-hour ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter 10 (PM 10), particulate matter 2.5 (PM 2.5), and lead. MKE is located in a non-attainment area for 8-hour ozone NAAQS.

Ozone is found in two regions of the Earth’s atmosphere – at ground level and in the upper regions of the atmosphere. While upper atmospheric ozone forms a protective layer from the sun’s harmful rays, ground level ozone is the primary component of smog, which, at certain levels, can have an effect on lung function and can have harmful effects on plants and ecosystems. Ground level ozone is not emitted directly into the air, but forms through a reaction of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. (www.epa.gov/ttn/naaqs/standards/ozone/data/2007_06_o3factsheet.pdf)

The typical sources of emissions at MKE include: aircraft and ground service equipment operations; surface vehicular traffic; heating, ventilation and air conditioning equipment; utility plants; and chemical solvents. Of these, the aircraft and ground service equipment are the major sources of emissions.

The impact on air quality related to the recommended development is assessed by evaluating the impact of the proposed development on the NAAQS. The proposed development’s "build" and "no-build" emissions, including reasonably foreseeable direct and indirect emissions, are inventoried. Normally, further analysis would not be required for pollutants whose emissions do not exceed General Conformity thresholds. The General Conformity threshold for NO_x is 50 tons per year and the threshold for VOC is 100 tons per year. The analysis included in Appendix A suggests that the aircraft and ground service equipment emissions generated by the recommended development would produce an increase of only 5.8 tons per year of NO_x and only 4.0 tons per year of VOC.

The air quality analysis included in this study is based upon a variety of assumptions including, but not limited to, numbers or aircraft operations, types of aircraft/aircraft engines, the ultimate layout of runways and taxiways, ultimate facility designs and project phasing. As the planning, design and approval processes continue to evolve, additional, more detailed information will become available and additional analyses will be completed closer to the time the developments actually occur, particularly in conjunction with the preparation of the EIS for the new runway.

The WDNR, Bureau of Air Management is responsible for maintaining an air emissions inventory, environmental analysis, statewide air quality monitoring, compliance and enforcement of state air quality regulations, developing the State Implementation Plan (SIP), and issuance of construction permits and operations permits for air pollution sources.

7.1.1 Coastal Zone Management

Milwaukee County is one of fifteen Wisconsin counties in the coastal zone administered by the Wisconsin Department of Administration, Bureau of Intergovernmental Relations. The Wisconsin Coastal Program is a networked program implemented in partnership with the WDNR and other state agencies with management authority in the coastal zone. The Wisconsin Coastal Management Council, appointed by the governor, with representatives from local governments, state agencies, Native American tribes, and interest groups, sets the policy direction for the program.

There are no specific requirements other than compliance with Wisconsin regulations pertaining to water quality, wetlands, biotic communities, endangered species, and cultural resources. For more information on those resources, see sections 7.1.12, 7.1.13, 7.2.1 and 7.2.5 below.

7.1.2 Compatible Land use

A land use compatibility assessment determines the suitability of existing and planned land uses in the vicinity of the Airport. Non-compatible land uses generally include residential areas and noise sensitive facilities, such as schools, churches, hospitals, and libraries. Noise related impacts are discussed in Section 7.8.

On-Airport land uses within the airport boundary include the terminal area, air cargo, military, and general aviation. Specific uses within the terminal area include passenger amenities such as restaurants and retail shops, rental car facilities, airline ground support facilities, parking and shuttle bus service areas, and surface parking lots. Each of these uses is compatible with current and future airport activity.

Off-Airport land uses outside the airport boundary are made up of numerous land use types including residential, commercial/retail, government/institutional, industrial, agricultural, recreational, open lands, communication/utilities, transportation, and community facilities. As shown on page 16 (**Exhibit 7.1-8**), these land uses exist around all sides of the Airport. The largest concentration of residential land use occurs on the north and east sides of the Airport. These areas are known locally as the cities Cudahy and St. Francis. Additionally, the development of the Runway 7R-25L will create a non compatible land use in the Oak Creek Neighborhood in the vicinity of Uncas Park. After the implementation of the new runway, this neighborhood is anticipated to experience noise levels equal to or greater than 70 DNL. Residential homes within the 65 DNL noise contour or greater are considered non compatible land uses by FAA regulation and may be either acquired or sound proofed by the Airport to reduce the noise. The Airport's recently completed FAR Part 150 Noise Analysis Study provides additional details regarding planned noise mitigation measures, but it does not address noise from the proposed new runway 7R-25L since that runway is not scheduled for construction until after 2020. With the exception of the residential land uses, the other land uses around the airport are compatible with airport related activity/operations and no impacts to existing land uses (other than residential) are anticipated.

7.1.3 Construction Impacts

The impacts of construction activities typically include construction and heavy equipment operation noise, dust, air emissions and the potential of water runoff pollution. Many of the specific types of impacts that could occur and permits or certificates that may be required are covered in the descriptions of other appropriate impact categories. Construction impacts are temporary in nature and, in many cases, can be mitigated through adjustments in design or scheduling through the implementation of impact reduction strategies such as those outlined in the FAA Advisory Circular 150/5370-10C, *Standards for Specifying Construction of Airports*.

Construction impacts alone rarely result in significant NEPA impacts. In the unexpected circumstance where a construction impact would create significant consequences that cannot be mitigated, the Airport, in conjunction with the FAA, would consult with regulatory agencies that have concerns to explain the reasons why such impacts cannot be avoided or mitigated to insignificant levels and identify appropriate levels of mitigation.

Construction of the recommended development plan requires a Clean Water Act section 402 National Pollutant Discharge Elimination System (NPDES) permit. Local construction permits will also be required.

7.1.4 Department of Transportation Act, Section 4(f).

Examples of Section 4(f) resources include publicly-owned parks, recreational areas, wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance as determined by the official having jurisdiction over those resources. Section 4(f) resources in the area of the Airport are described below. In all cases, analysis of the potential impacts would be included in the EIS that will be prepared in conjunction with the construction of the proposed Runway 7R-25L and the extension to the existing Runway 7R, which will become Runway 7C after Runway 7R-25L is built.

- **New Coeln House, 5905 S. Howell Avenue**: is located off Airport property approximately 1,500 feet southeast of Runway 7R. The New Coeln House is listed on both the National Historic Register and the Wisconsin State Historic Register. The New Coeln House (building) was accepted into both registers for its Italianate architecture dating back to 1875. According to the Wisconsin Historical Database and street-level photography, this house is currently used as a restaurant. Based on the recommended development plan identified as items A through O, no impacts to The New Coeln House are anticipated since the affected area of these projects is to the south of this site.

- **Cudahy Nature Preserve, 501 E. College Avenue**. Approximately 42 acres at the south end of Mitchell International Airport, the Cudahy Nature Preserve is a classic old-growth sugar maple-beech forest and a high-quality natural area, harboring at least four state-listed threatened plant species. The wildflower display here during the spring migration period has a great variety of native ephemerals. In the woods you may find Blue Jay, Northern Cardinal, Red-eyed Vireo, White-breasted Nuthatch, Downy Woodpecker, and Black-capped Chickadee, while in the grassy area to the east you may find Eastern Meadowlark, Bobolink, Dickcissel, and Savanna Sparrow. There is a potential for aircraft noise impacts associated from aircraft operating from the proposed Runway 7R-25L.

There is also a potential for temporary impacts to the access to the Preserve when College Ave is relocated. There may be temporary noise and dust impacts to the Preserve when the service road associated with the Runway 1L safety area improvements is constructed. These potential impacts should be assessed during the preparation of the EIS for the new runway.

- **Cudahy Park, 3000 East Ramsey Avenue**. This 17.61 acre park has shrubbery, trees, trails, tot lot, and facilities for playing baseball and basketball. The Cudahy Park will not be directly impacted from the recommended development; however, aircraft related operations will be located closer to the park's location and there is a potential for aircraft noise impacts associated from aircraft operating from the proposed Runway 7R-25L. This potential impact should be assessed during the preparation of the EIS for the new runway.

- **Runway Dog Exercise Area, 1214 East Rawson Avenue**. This double-gated fenced area offers a wide space for dogs to exercise. The area is southeast of the Cudahy Nature Preserve. Beyond the gravel parking lot are trails 1/4, 1/2, and 3/4 miles long. There is a potential for aircraft noise impacts associated from aircraft operating from the proposed Runway 7R-25L. This potential impact should be assessed during the preparation of the EIS for the new runway.

- **Maitland Park, 6001 South 13th Street.** This 26.9 acre park with evergreen, shade and ornamental trees is used for exercising dogs, tobogganing and sledding. There is a potential for aircraft noise impacts associated from aircraft operating from the extension of existing Runway 7R (this Runway would become Runway 7C after the proposed Runway 7R-25L is constructed.) This potential impact should be assessed during the preparation of the EIS for the extended runway.

- **Holler Park, 5151 S. 6th Street**. Approximately 16 acres, Holler Park is just west of Mitchell International Airport. The park offers a lagoon for fishing and watching some interesting dragonflies. A small but good-quality oak woodland with nature trails provides a very nice display of native spring wildflowers. Some of the resident birds include Red-eyed Vireo, White-breasted Nuthatch, American

Robin, Downy Woodpecker, and Blue Jay. The park attracts spring and autumn migrants as well. With the possible exception of temporary, construction related airborne dust, noise and traffic, the recommended development would not have any other impacts to Holler Park.

- **Uncas Park**. Located at South 3rd Street and West Uncas Avenue, this park is owned by the Milwaukee Public School District and will be acquired for the new runway 7R-25L which is not anticipated to be constructed until after the planning period, 2020. However, a 4(f) statement will be required as part of the EIS for the new runway.

7.1.5 Floodplains

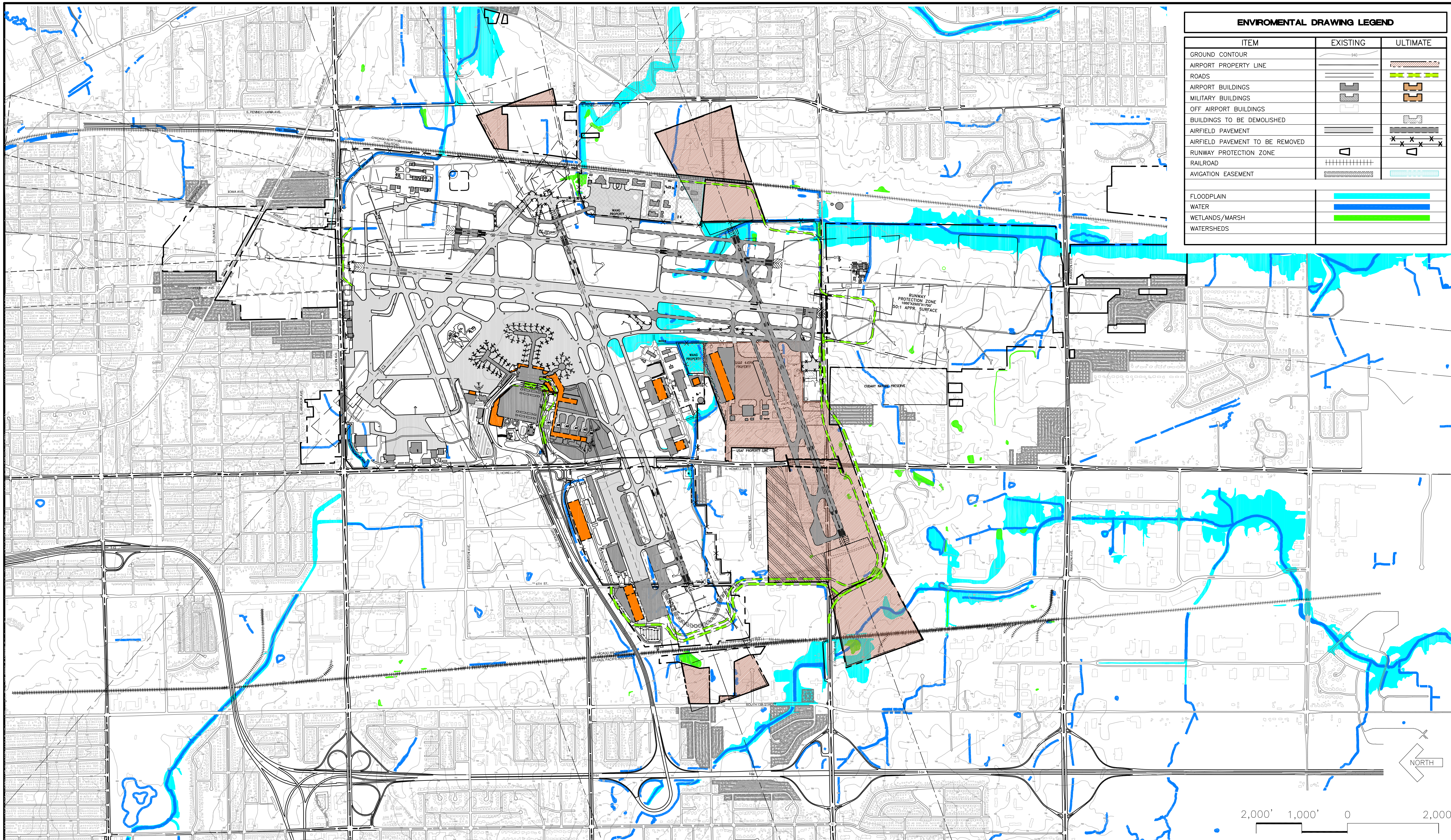
Based upon information received from the Southeastern Wisconsin Regional Planning Commission (SEWRPC), there are likely impacts to floodplains resulting from:

- The construction of the new Runway 7R-25L, particularly related to the runway safety area for Runway 25L (a floodplain is indentified in the property to be acquired for the Runway Protection Zone. This floodplain is associated with an unnamed drainage ditch at the east end of Runway 25L. Impacts to floodplains for the new runway will be addressed in the EIS for the new runway.
- The construction of the extension to Runway 1R-19L, including the new taxiway system supporting the extension of Runway 1R. The source of the floodplain in this area is from an unnamed drainage ditch near the intersection of Taxiway S and T.

Similarly, there are floodplains in the vicinity of the following development:

- Airport Maintenance Building
- Corporate Hangar Area Apron
- Intersection of the extensions to Taxiways S and T

The actual extent of the impacts to these floodplains cannot be determined until the designs of the improvements are finalized. During the environmental review and design phases, the Airport will seek opportunities to avoid the floodplains where possible, minimize unavoidable impacts, and develop appropriate mitigation strategies. **Exhibit 7.1-1** depicts the location of floodplains on Airport property and their proximity to surrounding areas.



GENERAL MITCHELL INTERNATIONAL AIRPORT

MASTER PLAN UPDATE

WETLANDS AND FLOODPLAINS

EXHIBIT 7.1-1

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7.1.6 Hazardous Materials, Pollution Prevention, and Solid Waste

A hazardous waste database search, referenced by address, was conducted for General Mitchell International Airport (the Airport) through Environmental Data Resources, Inc (EDR) in July, 2006. The result of the database search provides a list of hazardous waste records at the Airport and the surrounding area. A copy of the report is on file at the Airport. A copy of the search Executive Summary and DataMap are included in **Attachment B**.

Table 7.1-2 starting on page 16 identifies sites of potential interest in the vicinity of the recommended development. These sites are primarily in the vicinity of the four project elements below:

- A. Proposed Runway 7R-25L
- C. Air Cargo Facilities
- D. Existing Runway 7R-25L Safety Area Improvements
- L. Concourse G

An explanation of the purposes of each of the databases (in the order presented in the EDR Executive Summary) is located in Attachment B.

To the extent possible, the Airport will attempt to avoid hazardous waste sites and environmentally contaminated property. If avoidance isn't possible, the Airport will minimize the use of contaminated property as much as possible. The Airport may hire a competent specialist to complete an Environmental Due Diligence Audit (EDDA) before acquiring any land. An EDDA is a systematic investigation of real property to determine if activities involving hazardous materials have occurred at a site or resulted in environmental contamination. An EDDA is also a form of pre-acquisition protection against CERCLA/RCRA liability and a defense in lawsuits addressing contaminated lands. FAA Advisory Circular (AC) 150/5100-17, *Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects,* and FAA Order 1050.19, *Environmental Due Diligence Audits in the Conduct of FAA Real Property Transactions,* provide FAA guidance on this.

7.1.7 Noise

The effect of aircraft noise on people who live and work near airports is an issue of national concern. Expansion of U.S. airports to meet growing transportation demands, combined with increased residential development in many communities, has created the need to coordinate airport planning with community development planning. Table 7.1-2 depicts the average Day-Night Level (DNL) contours for the 5-, 10- and 20-year planning period. The number of dwelling units, affected population and size of the area affected by each contour are shown in the table below for each contour interval (65, 70 and 75 DNL). The Airport Part 150 Noise Study and the information related to numbers of dwellings and people impacted from that study is reproduced here. The information for the 2021 Noise Contour was produced by the Part 150 consultant for this chapter for consistency purposes. As shown in Exhibit 7.1.8, the 2021 Noise Contours reflect the 65, 70 and 75-DNL for the Airport.

TABLE 7.1-2

General Mitchell International Airport

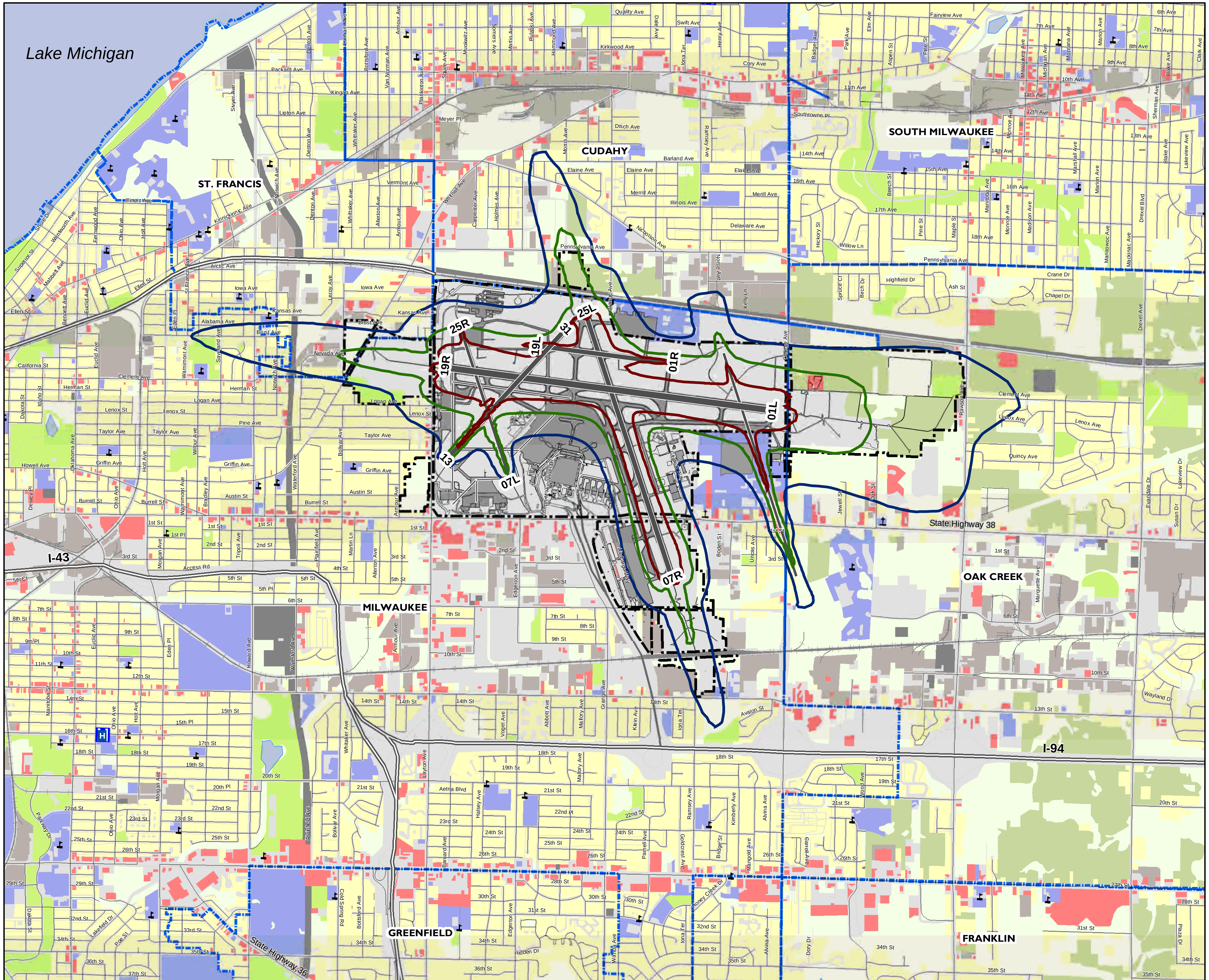
HOUSING AND POPULATION CHANGES

Year	Contour Range DNL	Area (sq. miles)	Number of Dwelling Units[1]	Population
20-Year (2021)	75 & Greater	0.7	56	27
	70 – 75	1.6	133	316
	65 – 70	3.8	973	2,350
	Total	**6.1**	**1,162**	**2,693**
10-Year (2009)	75 & Greater	0.9	0	0
	70 – 75	1.5	0	0
	65 – 70	3.5	920	2,220
	Total	**5.9**	**920**	**2,220**
5-Year (2004)	75 & Greater	0.9	0	0
	70 – 75	1.7	15	36
	65 – 70	4.3	1,350	3,150
	Total	**6.8**	**1,365**	**3,186**

Source: FAR Part 150 Noise Analysis prepared by Bernard Dunkelberg, 2007.

Exhibit 7.1-8

Future 2021 Noise Contours w/Generalized Existing Land Use



Legend

- 65 DNL
- 70 DNL
- 75 DNL
- RESIDENTIAL
- COMMERCIAL
- GOVERNMENT/INSTITUTIONAL
- INDUSTRIAL
- AGRICULTURAL
- RECREATIONAL
- OPEN LANDS
- COMMUNICATION/UTILITIES
- TRANSPORTATION
- COMMUNITY FACILITY
- CORPORATE BOUNDARY
- AIRPORT BOUNDARY
- hospitals
- schools
- churches

Source: Milwaukee County, 2003

North

0 1,500 3,000 6,000 Feet

MILWAUKEE COUNTY'S GENERAL MITCHELL INTERNATIONAL AIRPORT

The 20-year (2021) 65, 70 and 75 DNL noise contours reflect the long term noise effects likely under the implementation of the Preferred Alternative including the new runway. There are a total of 1,162 dwelling units and 2,693 people within the combined 20-year contours. The total size of the 20-year contours encompasses an area of approximately 6.1 square miles (3,906 acres).

Most of the dwellings (83%) and people (87%) within the 2021 Noise Contours are located between the 65 and 70 DNL. Eleven percent of the dwellings and thirteen percent of the people are located within the 70 DNL and five percent of the dwellings and 1 percent of the people are located within the 75 DNL.

The 10-year (2009) 65, 70 and 75 DNL noise contours encompass an area of approximately 3.5 square miles in size. A total of 920 dwelling units are located within the 10-year contours. The population located within the 10-year contours totals 2,220 people. All of these affected dwelling units and people are located between the 65 DNL and 70 DNL contours. There are no churches or schools within the 2009 65-DNL noise contour.

The 5-year (2004) 65, 70 and 75 DNL noise contours encompass an area of 6.8 square miles and affect approximately 1,365 total dwelling units that represent a total population of approximately 3,186 persons. As shown in Table 7.1-1, most of the dwellings and people are located between the 65 DNL and 70 DNL. There are 15 homes and 36 people located between the 70 DNL and 75 DNL and no homes or people are located within the 75 DNL. There are four schools, two churches and one historical structure within the 5-year 65 DNL noise contour.

It is important to note that there will be fewer dwellings and people within the noise contours in 2021 than in 2004 but additional dwellings and people will be impacted between 2009 and 2021 due to the new runway 7R-25L The Airport has an ongoing mitigation program.

7.1.8 Secondary (Induced) Impacts

Induced impacts are linked to impacts to other resource categories through cause-and-effect relationships. Airport projects causing noise changes or requiring more land could cause local land use changes. As a result, the changes in the distribution of residents and their housing requirements could occur. These changes could, in turn, cause impacts that alter demands on fire and police protection, educational or utility services, businesses, and job opportunities in the airport area which may result in a resident relocation.

The recommended development involving the proposed Runway 7R-25L and the extension of the existing Runway 7R (to become Runway 7C after the new Runway 7R-25L is completed) have the potential to create secondary impacts due to relocation of surface roads and the relocation of businesses and residences. These impacts will be addressed in the future EIS required for the new runway.

7.1.9 Social Impacts

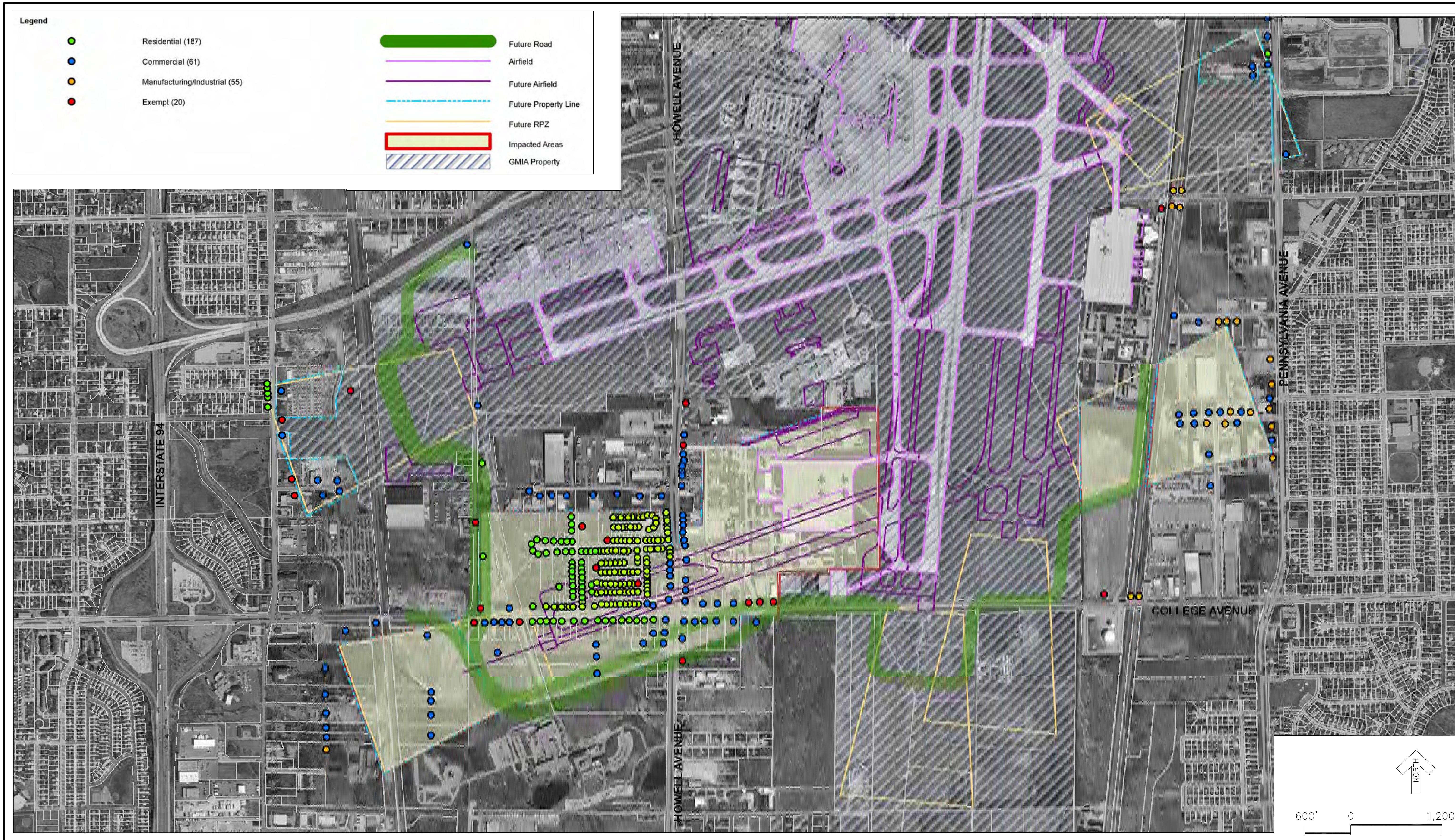
Social impacts are those associated with relocation or any other community disruptions that may be caused by the Airport development recommendations. Types of social impacts considered include the following:

- Relocation of any residence or business
- Surface transportation pattern alterations
- Disruption or division of established communities
- Disruption of orderly, planned development
- Appreciable changes in employment
- Social impacts caused by the construction of the proposed Runway 7R-25L will be addressed in the EIS for that runway.

As shown on **Exhibit 7.3-1,** implementation of the recommended development will cause relocation of residential units, commercial units, industrial units and other various properties including in the 440th Airlift Wing of the Air Force Reserve, government property, State property, City of Milwaukee and City of Oak Creek property, St. Stephen's Congregational, and Milwaukee Area Technical College. **Table 7.3-1** presents the number of units and the acres of land that will be acquired.

TABLE 7.3-1 ***General Mitchell International Airport*** ***AREA AFFECTED BY ALTERNATIVE C-1 DEVELOPMENT***		
Zoning	**Number of Units**	**Acres**
Residential	187	75
Commercial	61	91
Industrial	55	103
Misc.*	20	346
TOTAL	**323**	**614**
*included in Misc. is the 440th Source: Norris and Associates, 2006		

The proposed Runway 7R-25L will involve the relocation of the Milwaukee Area Technical College (MATC) aviation building to a different location on the airfield. The acquisition of Uncas Park, a local park within the neighborhood is discussed further in the Section 4(f) section of this chapter. In addition to these highlighted properties, the proposed action will also displace a number of commercial businesses along Howell Avenue that will need to be relocated.



GENERAL MITCHELL INTERNATIONAL AIRPORT MASTER PLAN UPDATE

IMPACTED PROPERTIES MAP

EXHIBIT 7.3-1

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Another aspect of social impacts is the alteration of surface transportation patterns. The extension of the existing Runway 7R-25L (will become Runway 7C-25C after the proposed Runway 7R-25L is completed) and the construction of the proposed Runway 7R-25L will require the relocation of 6th Street. The construction of the proposed Runway 7R-25L will also require an additional new tunnel on Howell Avenue (this will be a component of the RSA project). These social impacts will have to be further analyzed in the future EIS for the new runway.

Other social impacts include the following categories:

- **Children's Environmental Health Risks and Safety Risks.** Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, defines the risks to children's safety that is attributable to products or substances that the child is likely to touch or ingest. Examples include the air we breathe, the food we eat, the water we drink or use for recreation, and the soil we use to grow food. The recommended development is not expected to cause a disproportionate risk to children's health or safety. However, the appropriate analyses will be conducted in concert with the preparation of the future EIS.
- **Socioeconomic Impacts**. Induced or secondary impacts are those factors that affect surrounding communities, such as shifts in patterns of population movement and growth, public service demands, and changes in business and economic activity caused by the airport development. Induced impacts would normally not be significant, except where they are also significant in other categories, especially noise, land use, or direct social impacts. The recommended development is expected to result in minor shifts in patterns of population movement and growth, public service demands, or changes in business and economic activity in the neighborhood where the proposed Runway 7R-25L will be located. As discussed in Chapter 2, Inventory, the socioeconomic data relevant to the Airport were collected for this Master Plan. Chapter 2 presents the Metropolitan Statistical Areas (defined by the Office of Management and Budget) data for the counties of Milwaukee-Waukesha, Kenosha and Racine. Chapter 2 places particular emphasis on population, employment, income, and housing. These factors indicate a solid economic base for continued air transportation demand. Refer to

Chapter 2 for a more complete write-up of socioeconomic conditions. The positive business and economic activity caused by airport development should out-weigh the negative effects of the relocation of the commercial and industrial business along Howell Avenue.

7.1.10 Water Quality

As depicted in Exhibit 7.1-11, runoff from the Airport drains into two waterways (Oak Creek and Wilson Park Creek), and then into the Oak Creek watershed or Kinnickinnic River watershed, and eventually both watersheds drain into Lake Michigan. On-Airport property, Wilson Park Creek is primarily a concrete lined ditch. Off-Airport property, this Creek retains a mix of concrete lined walls along with other natural features. The Airport has three main discharge points which are regulated through a NPDES permit which is valid until June 30, 2011.

The Storm Water Management Plan (SWMP) for the Airport was initially completed in 1994 and updated in 2003. The SWMP evaluated both existing conditions and modeled future development. The future developments were subcategorized into three time frames: early-out, near-term, and long-term. The early-out time frame included the Concourse C expansion and a ground run-up enclosure (GRE). The near-term included the Taxiway V extension and the addition of a small building. To date, both the early-out and near-term projects have been completed. The long-term projects included the Proposed Runway 7R-25L, corporate hangars, and future terminals.

The amounts of additional impervious areas associated with each time frame are 9.2 acres for the early-out, 9.6 acres for the near-term, and 282.5 acres for the long-term. The SWMP evaluated the effect of each development scenario from a storm water perspective using a SWMM model. As expected, the overall effect of early-out and near-term projects were minor compared to the long-term projects. Options to address storm water quantity included onsite underground structures located at various locations around the Airport, onsite short-duration detention and offsite detention ponds with pump stations

To address storm water quality the study examined several Best Management Practices (BMPs) while addressing the Airport's particular needs and constraints for impervious areas associated with passenger terminals (100 percent impervious). The SWPPP recommended commercially available water quality control devices. For taxiway and runway expansion projects the report recommends grass swales and vegetated filter strips. In conclusion, the report factored into account future expansion in accordance to the GMIA Master Plan Update and no further SWMP modification to the plan is needed.

Based on information from the Southeastern Wisconsin Regional Planning Commission, the WDNR and the US Army Corps of Engineers, there are series of unnamed drainage ditches in the vicinity of the following recommended developments:

- Proposed Runway 7R-25L: in the property south of College Avenue to be acquired for the Runway Protection Zone, and in the vicinity of the proposed Runway 25L
- Air Cargo Facilities: along the southern border of the new apron
- Remote Parking Structure: along northern border of development
- Concourse G: along northern edge of corporate aviation ramp
- Extension of Runway 1R-19L: intersecting the proposed runway extension and two parallel taxiways
- Extensions to Taxiways S and T: in the area south of the intersection of the two taxiways

The future Environmental Impact Statement will address potential wetlands impacts as well as indentifying strategies to avoid the wetlands. minimize any unavoidable impacts to the wetlands and prepare an appropriate mitigation plan.

A National Pollution Discharge Elimination System Permit for construction will be needed.

7.1.11 Wetlands

Based on information from the Southeastern Wisconsin Regional Planning Commission, the Wisconsin Department of Natural Resources and the US Army Corps of Engineers, there are wetlands in the vicinity of the following recommended developments:

- Proposed Runway 7R-25L: in the property south of College Avenue to be acquired for the Runway Protection Zone, along and between the proposed service road and relocation of College Avenue,

- Extension of Runway 1R-19L: on Airport, along the proposed parallel taxiway east of the extended runway and just south of the intersection with proposed Runway 25L

Exhibit 7.1-13 reflects the location of known wetlands (depicted in green) on Airport property. The future Environmental Impact Statement will address potential wetlands impacts as well as indentifying strategies to avoid the wetlands. minimize any unavoidable impacts to the wetlands and prepare an appropriate mitigation plan.

7.2 Resources Categories without Potential Impacts

7.2.1 Environmental Justice

Environmental justice analysis considers the potential of Federal actions to cause disproportionate and adverse effects on low-income or minority populations. Environmental justice ensures no low-income or minority population bears a disproportionate burden of effects resulting from Federal actions. As shown in **Figures 7.2-1** and **7.2-2**, low income and minority populations are not located near the Airport. As a result, the recommended development plan is not anticipated to impact low income and minority populations.

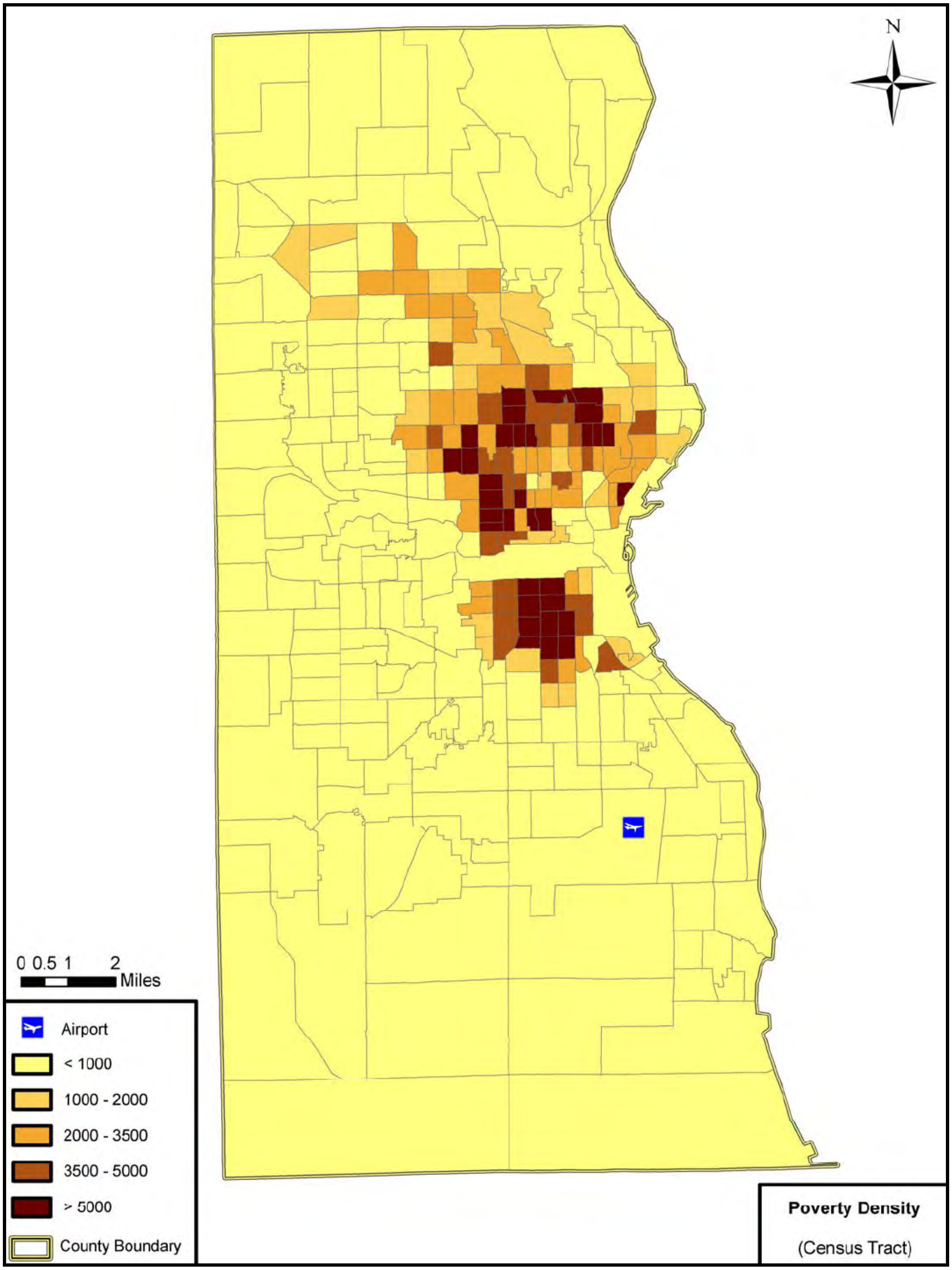

Figure 7.2-1 Environmental Justice-Low Income (Poverty) Map

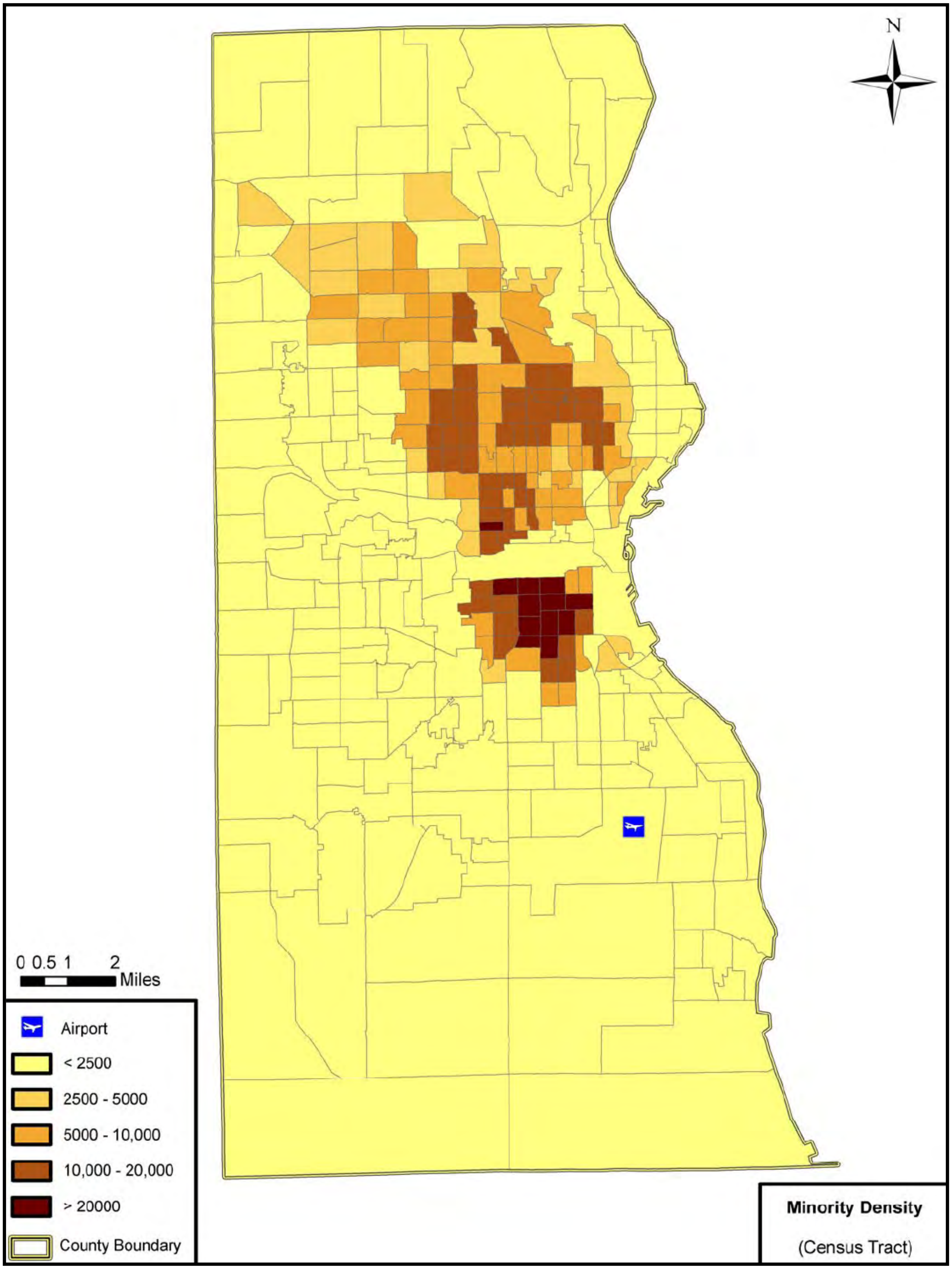

Figure 7.2-2 Environmental Justice-Minority Population Map

7.2.2 Biotic Resources

The term "biotic resources" means various types of flora (plants) and fauna (fish, birds, reptiles, amphibians, marine mammals, coral reefs, etc.) in a particular area. The term also means rivers, lakes, wetlands, forests, upland communities, and other habitat types supporting flora and aquatic and avian fauna.

Since the recommended development as currently conceived is located in previously disturbed areas, the expectation of impacting biotic resources other than streams and wetlands is minimal. (See the discussion on streams and wetlands in Sections7.1.12 and 7.1.13 respectively.) A detailed list of state threatened and endangered species is included in **Attachment C**.

7.2.3 Coastal Barriers

The U.S. Fish and Wildlife Service (FWS) Administers the Coastal Barrier Resources Act (CBRA) Program. There are no CBRA resources in Milwaukee County. (http://www.fws.gov/habitatconservation/coastal_barrier.htm)

7.2.4 Farmlands

The recommended development will not require the acquisition of farmland or the conversion of farmland to a non-agricultural use; therefore, no impacts will occur.

7.2.5 Federal Listed Endangered Species and Threatened Species

In a letter dated November 26, 2007, the US Fish and Wildlife Service stated that "due to the project type, location and on-site habitat, no federally-listed species would be expected within the project area. A copy of the US Fish and Wildlife Service letter is included in **Attachment D**.

7.2.6 Historical, Architectural, Archeological and Cultural Resources

According to Airport staff, there are no historic or cultural resources documented within the boundary of the project area. However, the FAA will require a Section 106 consultation with the State Historic Preservation Officer during the preparation of the Environmental Impact Statement for the new runway..

As noted in Section 7.1.5, one historic structure is located near the limits of the development area. Known as The New Coeln House, this structure is listed on both the National Historic Register and the Wisconsin State Historic Register for its Italianate architecture dating back to 1875. According to the Wisconsin Historical Database and street-level photography, this house is currently used as a restaurant. Based on the recommended development plan no impacts to The New Coeln House are anticipated since the affected area by these projects is to the south of this site. Additional consultation related to the New Coeln House will take place during the preparation of the Environmental Impact Statement.

7.2.7 Light Emissions and Visual Impacts

The lighting associated with the recommended development is not expected to create an annoyance to people in the vicinity of the Airport. Avoiding such an annoyance will likely be provided for in the design of the lighting elements. Similarly, the recommended development is not expected to create any visual impacts. However, light emissions and visual impacts will be evaluated in the Environmental Impact Statement.

7.2.8 Natural Resource and Energy Supply

If any major modifications to facilities and equipment requiring increased utility usage, power companies or other suppliers of energy shall be contacted to determine if projected demands can be met by existing and planned source facilities. The proposed development at the Airport is not expected to have an effect of any magnitude on the demand for stationary facilities. There would be some increase in energy demand due to additional runway and taxiway lighting; airfield lighting, terminal heating, and terminal air conditioning. However, this increase would be minimal in the total system usage. WE Energies is the Airport's electric and natural gas provider. We Energies serves more than 1.1 million electric customers in Wisconsin and Michigan's Upper Peninsula and more than one million natural gas customers in Wisconsin. WE Energies has the capacity to provide electric and natural gas for the Airport well into the future.

As discussed in Chapter 5, Facility Requirements, jet fuel is transported by pipeline to a privately owned receiving and storage facility south of the Airport on College Avenue. The Airport has initiated a design study which evaluated the need for new fuel receiving and storage facilities. Results of this study indicate a future need for upgraded storage and filtration infrastructure. Alternatives for meeting this need include a combination of receiving and distribution infrastructure with a total capacity of 160,000 barrels.

7.2.9 Solid Waste

A number of landfills exist in the airport region. Veolia Environmental Services (VES) serves the Airport's solid waste needs. The closest VES landfill to the Airport is Onyx Emerald Park Landfill, LLC located in the City of Muskego. This landfill handles the majority of the Airport's solid waste disposal and is prepared to handle future solid waste disposal needs for the Airport though the 2010 planning phase. **Figure 7.2-3** depicts the proximity of landfills to the Airport. According to measurements, landfills range from as few as 13 miles to as many as 45 miles away from the Airport. No landfills are located near the proposed development area; therefore, no impacts to birds or other fowl at these landfills are anticipated.

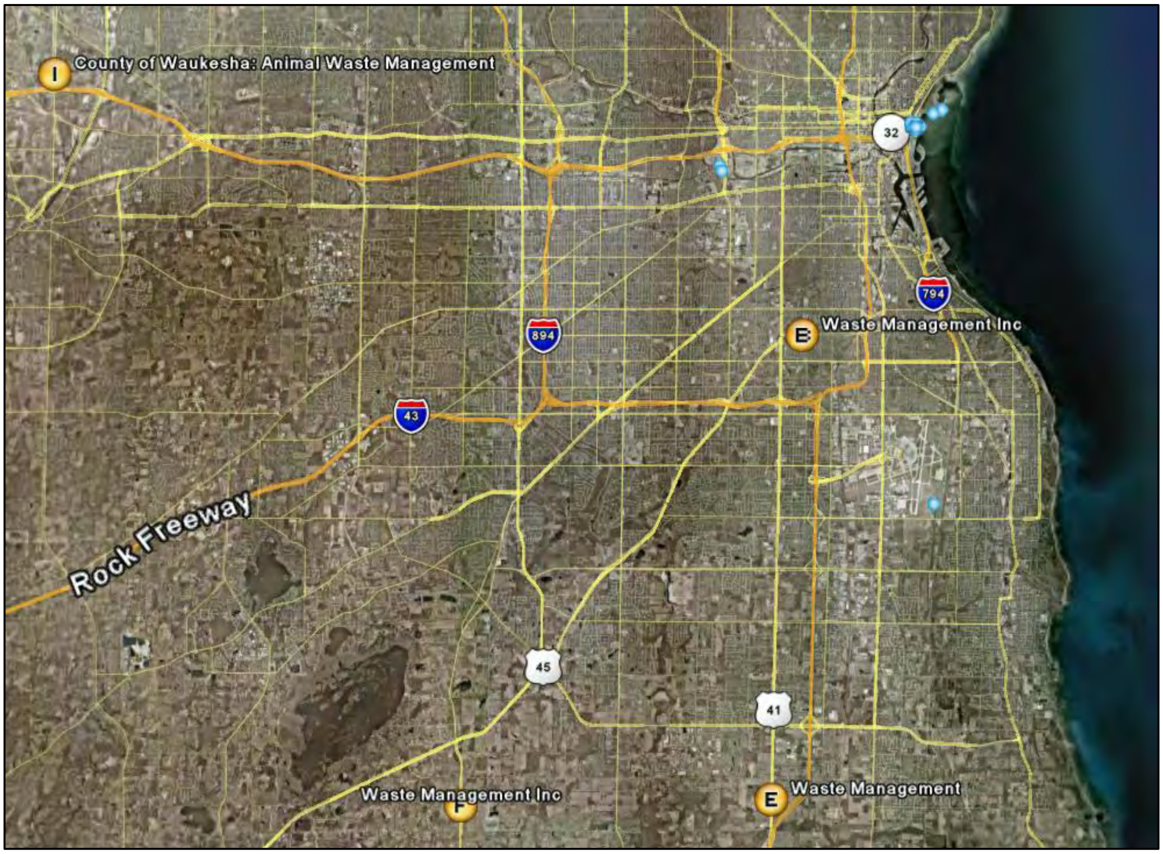

Figure 7.2-3: Milwaukee Area Landfills

7.2.10 Wild and Scenic Rivers

According to the U.S. Department of Interior (http://www.rivers.gov/wsr-wolf.html), the only national wild and scenic river located in the State of Wisconsin is the Wolf River, located approximately 130 miles north of Milwaukee; therefore, no impact from the projects proposed in the Master Palan Update will occur on a national wild and scenic river.

Attachement A:

Air Quality Analysis

BEFORE THE
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

IN THE MATTER of Redesignating the)
Counties of Kenosha, Racine, Milwaukee,)
Ozaukee, Washington, and Waukesha, to)
Attainment of the One-Hour Ozone Ambient)
Air Quality Standard)

FINDINGS OF FACT, CONCLUSIONS OF LAW AND DECISION

FINDINGS OF FACT

The Department of Natural Resources, hereinafter DNR, finds that:

1. The primary and secondary ambient air quality standards for ozone are set forth in s. NR 404.04(5), Wis. Adm. Code, and are specific levels of air quality which are deemed necessary to provide adequate protection for public health and welfare.

2. Section NR 404.04(5), Wis. Adm. Code, establishes the primary and secondary ambient air quality standards for the 1-hour ozone standard at 0.12 parts per million (ppm; 235 micrograms per cubic meter) measured as the maximum hourly average concentration. The 1-hour ozone standard is attained at a site when the expected number of days per calendar year with maximum hourly average concentrations above the designated level (0.12 ppm) is equal to or less than one as determined by the methodology of part 40 of the Code of Federal Regulations (CFR), Appendix H. The State 1-hour ozone ambient air quality standards are identical to the previously promulgated federal 1-hour ozone national ambient air quality standards (NAAQS).

3. In 1991, as required by the 1990 Clean Air Act Amendments, U.S. Environmental Protection Agency (USEPA) identified all areas violating the 1-hour ozone as of November 6, 1991, as nonattainment areas (56 FR 56850). For Wisconsin, USEPA designated and classified the counties of Kenosha, Racine, Milwaukee, Waukesha, Ozaukee, and Washington as severe nonattainment; Sheboygan County as serious nonattainment; the counties of Manitowoc and Kewaunee as moderate nonattainment; Walworth County as marginal nonattainment; and Door County as rural transport (marginal) nonattainment. In 1992, USEPA reclassified Sheboygan County to moderate nonattainment.

4. The DNR proposed to designate the same 11 counties designated by USEPA on November 6, 1991 to nonattainment for planning purposes under s. 144.371, Stats., [subsequently renumbered to s. 285.23, Stats.,] and ch. NR 401, Wis. Adm. Code. The DNR held hearings on January 12, 1993 in Sheboygan and January

13, 1993 in Milwaukee. After reviewing and addressing the comments from these hearings and the associated public comment period, the DNR then issued a decision dated August 14, 1993 designating all 11 counties as ozone nonattainment areas for state purposes.

5. Subsequently, in 1996, USEPA redesignated the counties of Walworth, Kewaunee and Sheboygan to attainment of the 1-hour ozone standard. In 2003, USEPA redesignated Manitowoc and Door Counties to attainment of the 1-hour ozone standard.

6. The DNR previously proposed redesignation of the Milwaukee-Racine area (Kenosha, Milwaukee, Ozaukee, Racine, Washington, and Waukesha Counties) to attainment of the 1-hour standard based on the 1999 – 2001 monitoring data. The area subsequently measured a violation for the period 2000 – 2002 and was not redesignated to attainment.

7. On June 15, 2005 the USEPA revoked the 1-hour ambient air quality standard for ozone for all areas of the nation, except the 8-hour ozone nonattainment Early Action Compact Areas. USEPA retained the former 1-hour ozone designations and classifications as of June 15, 2004 in subpart C of 40 CFR Part 81 solely for purposes of the anti-backsliding provisions of 40CFR 51.905. In a series of federal Circuit Court decisions (South Coast Air Quality vs EPA, Docket 04-1200 U.S. Ct. of App. (D.C. Circ.) on December 22, 2006 and June 8, 2007), USEPA was directed to expand the scope of the anti-backsliding provisions in Section 172(e) of the Clean Air Act [42 USC 7502(e)] that applied to areas not meeting the 1-hour standard. The court's ruling requires that states implement Clean Air Act provisions for severe or extreme 1-hour ozone nonattainment areas including new source review, section 185 penalty provisions, rate of progress milestones, conformity demonstrations and attainment contingency plans in 1-hour ozone nonattainment areas. The decision impacts the Milwaukee-Racine 1-hour severe nonattainment area.

8. Based on 2003 through 2005 monitoring data, the Milwaukee-Racine ozone nonattainment area again attained the 1-hour ozone standard, two years ahead of the mandated 2007 attainment date. The area continues to measure attainment of the 1-hour ozone standard.

9. The DNR is proposing to redesignate the Milwaukee-Racine nonattainment area (Kenosha, Milwaukee, Racine, Ozaukee, Washington and Waukesha Counties) to attainment of the 1-hour ozone standard under state law.

CONCLUSIONS OF LAW

DNR concludes that:

1. DNR has the authority to designate areas of Wisconsin as being in nonattainment or attainment of an ambient air quality standard or to reclassify a nonattainment area as an attainment area under s. 285.23, Wis. Stats., and ch. NR 401, Wis. Adm. Code.

2. The DNR complied with the procedural requirements under s. 285.23, Wis. Stats., and ch. NR 401, Wis. Adm. Code, for redesignating Milwaukee-Racine Severe Nonattainment Area to attainment for the 1-hour ozone standard.

DECISION

DNR hereby redesignates the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha from nonattainment to attainment of the 1-hour ozone standard.

Dated at Madison, Wisconsin February 10, 2009

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

By Matt Frank
Matt Frank, Secretary

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which request to review DNR decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is issued to file your petition with the appropriate circuit court and serve the petition on DNR. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is issued to have a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

Draft

GENERAL MITCHELL INTERNATIONAL AIRPORT (GMIA)

COMPARISON OF EMISSION INCREASES UNDER PROPOSED EXPANSION PLAN WITH GENERAL CONFORMITY THRESHOLDS

Prepared by:

PB Americas, Inc

October 2007

INTRODUCTION

Airports can be a potentially significant source of air pollution. Emissions released from aircraft operations, ground service equipment, motor vehicle operations, on-site power generating equipment, airport building heating systems and maintenance operations can affect local and regional pollutant levels. Projects that will change or expand airport operations must be planned to ensure that future operations will comply with applicable air quality regulations.

REGULATORY SETTING AND REQUIREMENTS

National ambient air quality standards (NAAQS) are concentrations set for each of the criteria pollutants specified by the United State Environmental Protection Agency (USEPA) that have been developed to protect human health and welfare. The federal Clean Air Act (CAA) defines nonattainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS.

The CAA requires that a State Implementation Plan (SIP) be prepared for each nonattainment area, and a maintenance plan be prepared for each former nonattainment area that subsequently demonstrated compliance with the standards. The SIP is a state's plan on ways it will meet the NAAQS under the deadlines established by the CAA. USEPA's Conformity Rule requires SIP conformity determinations on plans, programs, and projects before they are approved or adopted, i.e., eliminating or reducing the severity and number of violations of the NAAQS, and achieving expeditious attainment of such standards (40 CFR Part 93). In addition, Federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment.

As of March 2009, the General Mitchell International Airport (GMIA) is located in an area that is designated as an attainment area for the following pollutants: 1-hour ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter 10 (PM 10), particulate matter 2.5 (PM 2.5), and lead. MKE is located in a non-attainment area for 8-hour ozone NAAQS. As such, the USEPA's General Conformity Rule (40 CFR Part 93) must be complied with prior to the approval of the airport's proposed Master Plan by the Federal Aviation Administration (FAA). The applicable significant threshold limits for General Conformity for a moderate ozone nonattainment area are 50 tons per year for volatile organic compounds (VOCs) and 100 tons per year for nitrogen oxides (NOx). If the estimated emissions generated by the proposed expansion plan are less than these threshold limits, a detailed air quality conformity determination is not required.

PROPOSED ACTION

The proposed Master Plan for GMIA includes development of new terminals with new gates (jetways), new or extended runways and taxiways, and new buildings and maintenance facilities. Other elements of the development plan include additional parking facilities and roadway improvements.

Of all emission sources associated with airport operations (aircraft and ground support equipment operations, vehicular traffic on airport roadways and within parking facilities, HVAC systems of the airport buildings, and aircraft maintenance activities), the major source of emissions are aircraft operations (landings, takeoffs, and taxiing), diesel-fuel ground support equipment operations (GSE), and auxiliary power units (APUs)

REGULATORY COMPLIANCE

In order to compare the amounts of emissions that would be generated by the proposed expansion of airport operations under the Master Plan with the General Conformity threshold limits for the applicable pollutants, an analysis was conducted to estimate airport emissions under 2021 future No Build and Future Build conditions. Due to ozone non-attainment status of the area, emissions of ozone precursors (VOCs and NOx) were estimated. The estimated impacts of the airport expansion under the Master Plan (i.e., the differences in VOC and NOx emissions between future No Build and Build alternatives) are compared with the General Conformity thresholds for these pollutants.

EMISSION SOURCES

For the purpose of this analysis, only the major sources of emissions at the airport were considered. These include emissions from aircraft, GSE and APUs. Annual emission rates associated with these operations were estimated for the 2021 No Build and 2021 Build Alternatives. Less significant emission sources (relative to emissions from aircraft, GSE, and APUs), such vehicular traffic on airport roadways, parking lots, HVAC systems, and aircraft maintenance operations that have not yet been defined and/or quantified as part of the Master Plan were not included in this analysis.

Aircraft emissions were estimated based on combinations of specified airframes and aircraft engines. Aircraft types for each category were obtained from the Master Plan. For aircraft types that are not included in the Federal Aviation Administration’s (FAA) Emission and Dispersion Modeling System (EDMS 5.0.2) database, similar ones were substituted. Aircraft engines for specified airframes used in this analysis were default engines provided in the EDMS database. Emission rates were estimated using projected yearly (annual) LTO cycle information under 2021 future airport operations from the Master Plan.

ANALYSIS

The most recent version of FAA’s EDMS model (Version 5.0.2) was used for all emission estimates. EDMS default assignments of GSE and APU operations were used for each specific airframe, and default operational times for each complete LTO cycle for each type of GSE and APU were utilized.

Aircraft activity is expressed in the EDMS model as landing-takeoff (LTO) cycles. Each LTO cycle consists of taxiing, queuing, takeoff, climb out, approach, and landing. Times in mode (TIMs) are the durations per LTO cycle that an aircraft spends in each of the four modes of aircraft operation: takeoff, climb out, approach and idle. Takeoff, climb out, approach, and the landing roll portion of the idle mode (TIMs) used in this analysis are those specified in EDMS for each engine type. The airframes, engines, and activity levels (annual LTO values) used in this analysis for the 2021 No Build and Build alternatives are provided in Table AQ-1.

Five runways were considered under the 2021 No Build Alternative -- Runways 1R-19L, 1L-19R, 7C-25C, 7L-25R, and 13-31, and six runways were considered under the 2021 Build alternative -- Runways 1R-19L, 1L-19R, 7C-25C, 7L-25R, and 13-31, plus the newly designated parallel Runway 7R-25L.

Runway utilization data for the No Build and Build alternatives, which were developed for the Master Plan and are the same as those used in the noise analysis of airport operations, are presented in Tables AQ-2 and AQ-3, respectively. Figures showing the relative locations of each of these emission sources along with taxiways leading to and from the runways and gates under both alternatives are provided in the Attachment to this report.

EMISSION ESTIMATES

The EDMS 5.0.2 emissions module includes the ability to consider configuration changes and aircraft queuing -- with emissions computed for each individual aircraft operation. The performance based modeling option was used to compute each aircraft's flight emissions based on factors related to aircraft airframes, engines, weights, weather conditions and runway orientation. The model generates output that includes information based on time, fuel burned, aircraft positions and velocities, weather at various altitudes, and weight adjustments for consumed fuel. These values are then fed into the emissions module, which estimates emissions based on engine-related parameters, weather parameters, and fuel burned.

EDMS 5.0.2 uses, for emission inventory purposes, dynamic performance-based aircraft modeling (in-air and runway movement), sequence modeling (for taxi times), and hourly weather data. The dynamic flight profile generator computes profiles for all EDMS aircraft. Hourly weather directly affects aircraft performance, aircraft emissions, and the selection of the active airport configuration. The airport configuration, in turn, affects taxiing times and runway usage.

Table AQ-1
Aircraft Operations under 2021 No Build and Build Alternatives

Aircraft/Engine Type	Annual LTO Cycles (Arrivals and Departure)
Air Carrier Operations	
A319-100 Series/ CFM56-5B6/P	3,082
A320-100 Series/ V2527-A5	649
Boeing 717-200 Series/ BR700-715C1-30	25,470
Boeing 727-200 Series / JT8D-15 Reduced emissions	649
Boeing 737-300 Series/ CFM56-3-B1	2,109
Boeing 747-400 Series / PW4056 Reduced emissions	649
Boeing 737-700 Series / CFM56-7B22	2,433
Boeing 757-300 Series/ PW2040	1,460
Boeing DC-9-30 Series/ JT8D-7B Reduced emissions	973
Boeing DC-9-50/ JT8D-17 Reduced emissions	1,460
Boeing MD-81/ JT8D-209	7,625
Air Taxi/Commuter Operations	
DeHavilland DHC-6-100 Twin Otter/ PT6A-20	6,327
Bombardier Challenger 600 / CF34-3A	14,276
Bombardier Challenger 600 / CF34-3B	10,058
Embraer ERJ145/ AE3007A	9,734
Embraer ERJ145/ AE3007A	8,436
Bombardier Challenger 601 CF34-3A LEC II	7,625
Bombardier Challenger 600 / CF34-3B	12,978

Table AQ-1 (Continued)
Aircraft Operations under 2021 No Build and Build Alternatives

Cargo Operations	
A300B2-100 Series/ CF6-80C2A5 1862M39	2,920
A330-200 Series/ PW4168A Talon II	649
Boeing 757-200 Series/ PW2037	1,947
Cessna 441 Conquest II/ TPE331-8	1,298
Cessna 208 Caravan/ PT6A-114	3,894
Cessna 441 Conquest II/ TPE331-8	973
Cessna 441 Conquest II/ TPE331-8	1,298
Piper PA-31T Cheyenne/ PT6A-28	973
DeHavilland DHC-6-100 Twin Otter/ PT6A-20	649
General Aviation (GA) Operations	
Cessna 208 Caravan/ PT6A-114	4,705
Cessna 208 Caravan/ PT6A-114	162
Gulfstream G300/ SPEY MK511-8	5,191
Cessna 441 Conquest II/ TPE331-8	1,298
Gulfstream G500/ BR700-710A1-10	15,736
Military Operations	
Lockheed C-130 Hercules/ 501D22A	1,622
Boeing KC-135 Stratotanker/ JT3D-7 Series Smoke fix 14-70 KC	973

Table AQ-2

Annual Average Daily Arrival Runway Utilization (Percent of Total LTOs) Under 2021 No Build Alternative

Aircraft Category	Runway End									
	1R	19L	1L	19R	7C	25C	7L	25R	13	31
Air Carrier/Cargo Jet	0.0	0.0	15.4	12.0	24.6	47.9	0.0	0.0	0.0	0.0
Air Taxi/Commuter	0.0	0.0	14.1	10.8	23.7	48.0	0.9	1.8	0.4	0.2
GA Jet	0.0	0.0	17.0	12.9	23.4	46.2	0.0	0.1	0.0	0.4
GA/Small Cargo	0.0	0.0	47.4	21.9	5.4	8.4	3.8	11.5	1.0	0.6
Military	0.0	0.0	12.7	10.7	20.0	47.3	0.0	9.3	0.0	0.0

Annual Average Daily Departure Runway Utilization (Percent of Total LTOs) Under 2021 No Build Alternative

Aircraft Category	Runway End									
	1R	19L	1L	19R	7C	25C	7L	25R	13	31
Air Carrier/Cargo Jet	0.0	0.0	10.8	52.0	20.4	16.3	0.1	0.1	0.2	0.1
Air Taxi/Commuter	0.0	0.0	10.4	48.2	24.4	16.0	0.3	0.2	0.2	0.3
GA Jet	0.0	0.0	8.7	58.2	18.3	13.9	0.1	0.08	0.3	0.4
GA/Small Cargo	0.0	0.0	6.3	40. 5	12.7	29.0	4.7	4.2	0.9	1.9
Military	0.0	0.0	13.0	50.0	12.3	13.0	0.0	0.0	11.7	0.0

Table AQ-3

Annual Average Daily Arrival Runway Utilization (Percent of Total LTOs) Under 2021 Build Alternative

Aircraft Category	Runway End											
	1R	19L	1L	19R	7R	25L	7C	25C	7L	25R	13	31
Air Carrier/Cargo Jet	13.6	0.0	1.9	12.0	23.4	45.5	1.2	2.4	0.0	0.0	0.0	0.0
Air Taxi/Commuter	12.4	0.0	1.7	10.8	22.5	45.6	1.2	2.4	0.9	1.8	0.4	0.2
GA Jet	14.9	0.0	2.0	12.9	22.2	43.9	1.2	2.3	0.0	0.1	0.0	0.4
GA/Small Cargo	41.7	0.0	5.7	21.9	5.1	8.0	0.3	0.4	3.8	11.5	1.0	0.6
Military	5.9	0.0	0.8	21.5	20.5	34.1	1.1	1.8	0.0	14.3	0.0	0.0

Annual Average Daily Departure Runway Utilization (Percent of Total LTOs) Under 2021 Build Alternative

Aircraft Category	Runway End											
	1R	19L	1L	19R	7R	25L	7C	25C	7L	25R	13	31
Air Carrier/Cargo Jet	0.0	0.0	10.8	52.5	0.0	0.0	20.4	15.8	0.1	0.1	0.2	0.0
Air Taxi/Commuter	0.0	0.0	10.4	48.2	0.0	0.0	24.4	16.0	0.3	0.2	0.2	0.2
GA Jet	0.0	0.0	8.7	58.2	0.0	0.0	18.3	14.0	0.1	0.1	0.3	0.4
GA/Small Cargo	0.0	0.0	6.3	40.5	0.0	0.0	12.7	29.0	4.7	4.2	0.9	1.9
Military	0.0	0.0	11.7	46.7	0.0	0.0	11.7	11.7	0.0	0.0	11.7	0.0

Taxipaths are a new concept for this version of the EDMS model. These are sets of taxiways that are used to link aircraft with gates and runway ends. To define a taxipath, a set of taxiways must be defined. Detailed modeling of aircraft movements on the ground gives more accurate estimates of taxiing times and location of emission sources. The model uses a modification of the WWLMINET' Airport Model to determine overall delays for each hour based on airport capacity. In addition, the Delay & Sequencing module uses airport layout information, such as gates, runways, taxiways, taxipaths, and configurations, to compute emissions from the ground movement of aircraft.

Runways in EDMS no longer have a queue. Instead, queuing delays are computed by the sequencing model, and delayed aircraft back up along the taxiways defined in their taxipath. The latest version of EDMS uses hour of the day, ceiling, visibility and temperature as activation parameters to determine which configuration is active. Runway configurations determine the runway assigned to each aircraft operation.

The following approach was used to estimate aircraft emissions:

1. Dynamic performance-based aircraft modeling (in-air and runway movement) option, sequence modeling (for taxi times), and hourly weather data were selected for the analysis of the aircraft emissions under future 2021 No Build and Build airport operations. Aircraft-related settings for the airport layout that are used for dispersion modeling were used for estimating emission rates.
2. The EDMS EPA's AERMET meteorological preprocessor, incorporated in the AERMOD modeling software, which uses hour-by-hour meteorological variability conditions, was used.
3. Given the fact that actual data related to taxiway configurations and placement has not as yet been developed, the following assumptions were made:
    - Taxiways and their connection to the runways ends were configured randomly based on the airport layout; and
    - These taxiways were grouped into taxipaths.
4. A total of 17 taxiways and 14 taxipaths were configured for the 2021 No Build conditions, with five runways in operation; 21 taxiways and 21 taxipaths were configured for the 2021 Build conditions, with 6 runways (with the addition of the new parallel 7L-25R runway) in operation. The same pattern of taxiway and taxipath uses was assumed to both future No Build and future Build conditions. (The only difference, therefore, between the two alternatives is that the Build alternative has the additional taxiways and taxipaths associated with the new runway.)
5. Because gate locations and assignments (for the aircraft under future airport operations) have not as yet been developed for air carrier and air taxi/commuter operations, gates were assigned for this analysis based on airport layout and terminal configuration on a random basis. Even though cargo, general aviation, and military aircraft would not use terminal gates under future operations under the Master Plan, but designated areas, it was assumed, for the purposes of

estimating emissions, that all aircraft categories would have gates located in these designated areas.

6. A total of seven gates were specified for the analysis of the No Build and Build alternatives. Separate runway configurations (one for each alternative), based on the airport runway utilization data, were developed.
7. Arrival and departure LTO cycles were specified separately, based on the total LTO cycles specified in the Master Plan. The idle mode was separated into Taxi In and Taxi Out modes by the model. In addition, a startup mode has been added by the model.

The analysis used the same types of aircraft, GSEs, APUs, and LTO cycles for each aircraft, together with the same taxiway (taxipaths) configuration for both alternatives and all runways, except that the new runway (7L-25R) that would be in operation under Build alternative only. The only difference in emissions generated under these alternative would be emissions associated with operations of the proposed 7L-25R runway, including emissions from aircraft moving along taxiways (taxipaths) leading to and from this runway.

The differences in estimated annual emission rates for VOCs and NOx between the Build and No Build alternative represent the project's impact on emission rates. These differences were compared to the applicable General Conformity significant threshold limits.

RESULTS

A summary of VOC and NOx emission rates estimated for the emission source categories considered under the 2021 No Build and Build alternatives are provided in Tables AQ-4 and AQ-5, respectfully. A detailed emission inventory by source category, including aircraft emissions and GSE by mode, is provided in the attachment to this report. A comparison of the changes in annual emission rates between the Build and No Build alternative and the Conformity threshold limits are provided in Table AQ-6.

The result of this analysis is that exceedances of the NOx and VOC Conformity Threshold Limits are not predicted for as a result of the airport expansion project. The analysis demonstrates that the proposed expansion of the airport could be approved by the FAA without requiring a detailed air quality analysis under the General Conformity Rule.

Table AQ-4
Summary of Emissions Generated by Aircraft and GSE Operations under 2021 No Build Alternative (tons/year)

Emission Source Category	Pollutants	
	VOC	NOx
Aircraft	235.6	750.6
GSE	8.3	23.7
APUs	3.9	36.9
Total	**247.8**	**811.2**

Table AQ-5
Summary of Emissions Generated by Aircraft and GSE Operations under 2021 Build Alternative (tons/year)

Emission Source Category	Pollutants	
	VOC	NOx
Aircraft	239.5	756.4
GSE	8.3	23.7
APUs	3.9	36.9
Total	**251.8**	**817.0**

Table AQ-6

Comparison of the Difference in Emissions of NO2 and VOC between No Build and Build Alternatives with Conformity Threshold Limits (tons/year)

Estimated Emissions	VOC	NO2
Build	251.8	817.0
No Build	247.8	811.2
Difference	4.0	5.8
Conformity Threshold Limits	**50**	**100**

Attachment B:

Hazardous Materials, Pollution Prevention and Solid Waste

As noted in Section 7.1.7, an explanation of the purposes of each of the databases (in the order presented in the EDR Executive Summary) is provided below:

- **CERCLIS-NFRAP (Comprehensive Environmental Response, Compensation and Liability Information System):** Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA’s knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.
- **RCRAInfo:** RCRAInfo is EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984.
- **ERNS:** The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.
- **HMIRS:** The Hazardous Materials Incident Report System contains hazardous material spill incidents reported to the Department of Transportation. The source of this database is the U.S. EPA.
- **FINDS:** The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. The source of this database is the U.S. EPA.

- **BRRTS:** BRRTS is a tracking system of contaminated sites. It holds key information for finding out more about a site or an activity. Activity types included are:
  - Abandoned Container - An abandoned container with potentially hazardous contents recovered from a site. No discharge to the environment occurs. If the container did release a hazardous substance, a spill would be associated with the site.
  - Superfund - is a federal program created by Congress in 1980 to finance cleanup of the nation's worst hazardous waste sites.
  - VPLE - Voluntary Property Liability Exemptions apply to sites in which a property owner conducts an environmental investigation and cleanup of an entire property and then receives limits on their future liability.
  - General Property - Environmental actions which apply to the property as a whole, rather than a specific source of contamination, such as the LUST or environmental repair site. Examples would be off-site letters, municipal liability clarification letters, lease letters, voluntary party liability exemption actions, and general liability clarification letters
- **WI ERP:** Emergency Repair Program Database. Non – leaking underground storage tank sites with contaminated soil and/or groundwater. Often these are historic releases to the environment.
- **WI WDS:** The Registry was created by the WDNR to serve as a comprehensive listing of all sites where solid or hazardous wastes have been or may have been deposited.
- **LUST:** The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the WDNR's LUST Database.
- **UST:** The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and

Recovery Act (RCRA). The data come from the Department of Commerces' List: All Underground Storage Tanks Except for Fuel Oil.

- **AST:** The Aboveground Storage Tank (AST) database contains registered ASTs. The data come from the Department of Industry, Labor & Human Resources' List: All Aboveground Storage Tanks Except for Fuel Oil.
- **SPILLS:** The Spills Database from the WDNR identifies sites of discharge of a hazardous substance that may adversely impact or threaten to adversely impact public health, welfare or environment.
- **CRS:** A Closed Remediation Site is parcel of land at which the groundwater has become contaminated and which is affected by a particular type of legal restriction. Specifically, certain steps have been taken to stabilize/remediate the contamination, and the state is satisfied that no further efforts are necessary provided that the property is not used for certain purposes.
- **WI WRRSER** The WRRSER provides information about location, status, and priority of sites or facilities in the state which are known to cause of have a high potential to cause environmental pollution.

In addition to the information in Table 7.1-2, the Air Force Reserve Base at 300 E. College Avenue is listed as a Small Quantity Generator site that generates, transports, stores, treats and/or disposes of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

As depicted in Table 7.1-2, each of the elements of the recommended development plan has the potential to involve hazardous materials and pollution prevention. The reason for this notation is that each element will involve construction equipment that uses gasoline or diesel fuel. In addition, some elements will involve the use of paint, solvents, and other potentially hazardous materials. As a general rule, these impacts can be avoided through the use of care and appropriate best management practices.

Table 7.1-2

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
29	~~4850 S. Pennsylvania Ave.~~ ~~Roadrunner Freight Systems~~		◆			◆				◆						
29	~~4850 S. Pennsylvania Ave.~~ ~~Site Name Not Reported~~										◆					
~~32~~	~~2401 Edgerton~~ ~~Wetzell Brothers Inc.~~		◆			◆										
34	4960 S. Pennsylvania Ave. Intl. Delivery Solutions	D	◆			◆										
47	301 Air Cargo Way Northwest Airlines	C	◆			◆										
47	351 Air Cargo Way United Parcel Service	C	◆			◆										
50	~~1871 E. Grange Ave.~~ ~~WI ANG Base~~												◆			
50	~~1871 E. Grange Ave.~~ ~~Site Name Not Reported~~															
50	~~1891 E. Grange Ave.~~ ~~WI ANG Base~~									◆						
50	~~1901 E. Grange Ave.~~ ~~WI ANG Base~~												◆			
50	~~1919 E. Grange Ave.~~ ~~WI ANG Base~~		◆			◆		◆					◆		◆	◆
51	500 Air Cargo Way Overflow Parking Lot	C	◆			◆										
51	555 W. Air Cargo Way Midwest Express Airlines	C				◆				◆						
51	555 W. Air Cargo Way Site Name Not Reported	C										◆				
55	5607-5675 S. 6th St. GMIA PRO	L						◆								
55	5727 S. 6th St. Nauman Property	L								◆						

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
62	210 E. Citation Way Cessna Citation Service Center	L	◆			◆							◆			◆
62	210 E. Citation Way Site Name Not Reported	L									◆					
62	300 E. Citation Way Johnson Controls	L														◆
62	5700 S. Howell Ave. America West Airlines	L	◆			◆										
62	5800 S. Howell Ave. Milwaukee County CAMD	L	◆			◆	◆						◆			
62	5800 S. Howell Ave. Site Name Not Reported	L									◆	◆			◆	
62	5880 S. Howell Ave. St. Stephen's Parish	L								◆					◆	
62	5880 S. Howell Ave. Site Name Not Reported	L									◆					
62	5881 S. Howell Ave. Site Name Not Reported	L										◆				
62	5917 S. Howell Ave. Preston Trucking	A								◆				◆		
62	5917 S. Howell Ave. Site Name Not Reported	A			◆						◆					
62	5934 S. Howell Ave. National Car Rental	A	◆			◆				◆				◆		◆
62	5934 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	5975 S. Howell Ave. Tax Airfreight Inc.	A	◆	◆	◆	◆				◆						
62	5975 So. Howell Ave. Site Name Not Reported	A									◆					
62	5979 S. Howell Ave. Clark Oil Station No. 1178	A	◆			◆				◆					◆	

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
62	5979 S. Howell Ave. Site Name Not Reported	A									◆					
62	6023 South Howell Site Name Not Reported	A			◆											
62	6026 S. Howell Ave. Site Name Not Reported	A											◆			
62	6039 S. Howell Ave. La Maachia Prop.	A	◆			◆				◆			◆			
62	6039 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	6050 S. Howell Ave. United Rentals (N.A.)	A				◆				◆						◆
62	6050 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	6060 S. Howell Ave. United Rentals (North America)	A	◆													
62	6100 S. Howell Ave. Bel Aire Enterprises	A								◆					◆	
62	6100 S. Howell Ave. Back of Lot	A											◆			
62	6100 S. Howell Ave. Site Name Not Reported	A										◆				
62	6110 S. Howell Ave. Battery Medics	A						◆								
63	6055 S. 6^{th} St. Lindner Terminal	D							◆							
63	6055 S. 6^{th} St. Site Name Not Reported	D											◆			
67	400 W. Boden St. Associated Bag Company	A	◆			◆										
68	211 W. Boden St. Radyne Corp.	A	◆			◆										

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
70	6160 S. 6th St. Kathleen Putnam	A											◆			
70	6161 S. 6th St. USF Holland Inc.	A	◆		◆	◆										
71	6178 S. 1st St. Basement	A											◆			
72	6231 S. Howell Ave. Site Name Not Reported	A										◆				
72	6280 S. Howell Ave. Budget Rent A Car	A	◆			◆				◆						
72	6280 S. Howell Ave. Dollar Rent A Car	A														◆
72	6280 S. Howell Ave. Site Name Not Reported	A									◆	◆				
72	6319 S. Howell Ave. Site Name Not Reported	A									◆					
72	Howell & College Ave. Site Name Not Reported	A											◆			
77	513 W. College Ave. Site Name Not Reported	A									◆					
77	6th St. & W. College Ave. Former Salvage Yard	A						◆								
78	110 W. College Ave. Speedway 7510	A	◆													
78	110 W. College Ave. Site Name Not Reported	A											◆			
79	300 E. College Ave. Tenneco/Mitchell Field	A					◆	◆					◆		◆	
79	300 E. College Ave. USAF	A	◆	◆		◆										◆
79	300 E. College Ave. Site Name Not Reported	A									◆	◆				

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
79	402 E. College Ave. Site Name Not Reported	A											◆			
79	422 E. College Ave. Milwaukee Area Tech. Coll.	A	◆			◆										
80	530 E. College Ave. Altria Corporate Services	A						◆		◆						
80	530 E. College Ave. Tenneco Inc.	A	◆			◆				◆			◆		◆	
80	530 E. College Ave. Morris Philip Av. Services	A	◆			◆										
80	530 E. College Ave. Site Name Not Reported	A									◆					
81	1600 E. College Ave. Milwaukee City College	A						◆								
81	1701 E. College Ave. Shell Oil Company	A	◆			◆										
81	1701 E. College Ave. UNO-VEN/UNOCAL	A						◆		◆			◆			
81	1701 E. College Ave. Site Name Not Reported	A									◆					
81	1702 E. College Ave. Site Name Not Reported	A									◆					
83	6418A S. Howell Ave. Kevco Inc.	A	◆			◆										

As noted in Section 7.1.7, an explanation of the purposes of each of the databases (in the order presented in the EDR Executive Summary) is provided below:

- **CERCLIS-NFRAP (Comprehensive Environmental Response, Compensation and Liability Information System):** Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.
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  - General Property - Environmental actions which apply to the property as a whole, rather than a specific source of contamination, such as the LUST or environmental repair site. Examples would be off-site letters, municipal liability clarification letters, lease letters, voluntary party liability exemption actions, and general liability clarification letters
- **WI ERP:** Emergency Repair Program Database. Non – leaking underground storage tank sites with contaminated soil and/or groundwater. Often these are historic releases to the environment.
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- **LUST:** The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the WDNR's LUST Database.
- **UST:** The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and

Recovery Act (RCRA). The data come from the Department of Commerces' List: All Underground Storage Tanks Except for Fuel Oil.

- **AST:** The Aboveground Storage Tank (AST) database contains registered ASTs. The data come from the Department of Industry, Labor & Human Resources' List: All Aboveground Storage Tanks Except for Fuel Oil.
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- **CRS:** A Closed Remediation Site is parcel of land at which the groundwater has become contaminated and which is affected by a particular type of legal restriction. Specifically, certain steps have been taken to stabilize/remediate the contamination, and the state is satisfied that no further efforts are necessary provided that the property is not used for certain purposes.
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In addition to the information in Table 7.1-2, the Air Force Reserve Base at 300 E. College Avenue is listed as a Small Quantity Generator site that generates, transports, stores, treats and/or disposes of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

As depicted in Table 7.1-2, each of the elements of the recommended development plan has the potential to involve hazardous materials and pollution prevention. The reason for this notation is that each element will involve construction equipment that uses gasoline or diesel fuel. In addition, some elements will involve the use of paint, solvents, and other potentially hazardous materials. As a general rule, these impacts can be avoided through the use of care and appropriate best management practices.

Table 7.1-2

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
29	~~4850 S. Pennsylvania Ave.~~ ~~Roadrunner Freight Systems~~		◆			◆				◆						
29	~~4850 S. Pennsylvania Ave.~~ ~~Site Name Not Reported~~										◆					
~~32~~	~~2401 Edgerton~~ ~~Wetzell Brothers Inc.~~		◆			◆										
34	4960 S. Pennsylvania Ave. Intl. Delivery Solutions	D	◆			◆										
47	301 Air Cargo Way Northwest Airlines	C	◆			◆										
47	351 Air Cargo Way United Parcel Service	C	◆			◆										
50	~~1871 E. Grange Ave.~~ ~~WI ANG Base~~												◆			
50	~~1871 E. Grange Ave.~~ ~~Site Name Not Reported~~															
50	~~1891 E. Grange Ave.~~ ~~WI ANG Base~~									◆						
50	~~1901 E. Grange Ave.~~ ~~WI ANG Base~~												◆			
50	~~1919 E. Grange Ave.~~ ~~WI ANG Base~~		◆			◆		◆					◆		◆	◆
51	500 Air Cargo Way Overflow Parking Lot	C	◆			◆										
51	555 W. Air Cargo Way Midwest Express Airlines	C				◆				◆						
51	555 W. Air Cargo Way Site Name Not Reported	C										◆				
55	5607-5675 S. 6th St. GMIA PRO	L						◆								
55	5727 S. 6th St. Nauman Property	L								◆						

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
62	210 E. Citation Way Cessna Citation Service Center	L	◆			◆							◆			◆
62	210 E. Citation Way Site Name Not Reported	L									◆					
62	300 E. Citation Way Johnson Controls	L														◆
62	5700 S. Howell Ave. America West Airlines	L	◆			◆										
62	5800 S. Howell Ave. Milwaukee County CAMD	L	◆			◆	◆						◆			
62	5800 S. Howell Ave. Site Name Not Reported	L									◆	◆			◆	
62	5880 S. Howell Ave. St. Stephen's Parish	L								◆					◆	
62	5880 S. Howell Ave. Site Name Not Reported	L									◆					
62	5881 S. Howell Ave. Site Name Not Reported	L										◆				
62	5917 S. Howell Ave. Preston Trucking	A								◆				◆		
62	5917 S. Howell Ave. Site Name Not Reported	A			◆						◆					
62	5934 S. Howell Ave. National Car Rental	A	◆			◆				◆				◆		◆
62	5934 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	5975 S. Howell Ave. Tax Airfreight Inc.	A	◆	◆	◆	◆				◆						
62	5975 So. Howell Ave. Site Name Not Reported	A									◆					
62	5979 S. Howell Ave. Clark Oil Station No. 1178	A	◆			◆				◆					◆	

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
62	5979 S. Howell Ave. Site Name Not Reported	A									◆					
62	6023 South Howell Site Name Not Reported	A			◆											
62	6026 S. Howell Ave. Site Name Not Reported	A											◆			
62	6039 S. Howell Ave. La Maachia Prop.	A	◆			◆				◆			◆			
62	6039 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	6050 S. Howell Ave. United Rentals (N.A.)	A				◆				◆						◆
62	6050 S. Howell Ave. Site Name Not Reported	A									◆	◆				
62	6060 S. Howell Ave. United Rentals (North America)	A	◆													
62	6100 S. Howell Ave. Bel Aire Enterprises	A								◆					◆	
62	6100 S. Howell Ave. Back of Lot	A											◆			
62	6100 S. Howell Ave. Site Name Not Reported	A										◆				
62	6110 S. Howell Ave. Battery Medics	A						◆								
63	6055 S. 6th St. Lindner Terminal	D							◆							
63	6055 S. 6th St. Site Name Not Reported	D											◆			
67	400 W. Boden St. Associated Bag Company	A	◆			◆										
68	211 W. Boden St. Radyne Corp.	A	◆			◆										

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
70	6160 S. 6th St. Kathleen Putnam	A											◆			
70	6161 S. 6th St. USF Holland Inc.	A	◆		◆	◆										
71	6178 S. 1st St. Basement	A											◆			
72	6231 S. Howell Ave. Site Name Not Reported	A										◆				
72	6280 S. Howell Ave. Budget Rent A Car	A	◆			◆				◆						
72	6280 S. Howell Ave. Dollar Rent A Car	A														◆
72	6280 S. Howell Ave. Site Name Not Reported	A									◆	◆				
72	6319 S. Howell Ave. Site Name Not Reported	A									◆					
72	Howell & College Ave. Site Name Not Reported	A											◆			
77	513 W. College Ave. Site Name Not Reported	A									◆					
77	6th St. & W. College Ave. Former Salvage Yard	A						◆								
78	110 W. College Ave. Speedway 7510	A	◆													
78	110 W. College Ave. Site Name Not Reported	A											◆			
79	300 E. College Ave. Tenneco/Mitchell Field	A					◆	◆					◆		◆	
79	300 E. College Ave. USAF	A	◆	◆		◆										◆
79	300 E. College Ave. Site Name Not Reported	A									◆	◆				

Table 7.1-2 (continued)

Environmental Database Search Summary

ID	Site Description	Development Elements	ENVIRONMENTAL DATABASES													
			RCRA - SQG	ERNS	HMIRS	FINDS	BRRTS	WI ERP	WI WDS	LUST	UST	AST	SPILL	CRS	WI WRRSER	TIER 2
79	402 E. College Ave. Site Name Not Reported	A											◆			
79	422 E. College Ave. Milwaukee Area Tech. Coll.	A	◆			◆										
80	530 E. College Ave. Altria Corporate Services	A						◆		◆						
80	530 E. College Ave. Tenneco Inc.	A	◆			◆				◆			◆		◆	
80	530 E. College Ave. Morris Philip Av. Services	A	◆			◆										
80	530 E. College Ave. Site Name Not Reported	A									◆					
81	1600 E. College Ave. Milwaukee City College	A						◆								
81	1701 E. College Ave. Shell Oil Company	A	◆			◆										
81	1701 E. College Ave. UNO-VEN/UNOCAL	A						◆		◆			◆			
81	1701 E. College Ave. Site Name Not Reported	A									◆					
81	1702 E. College Ave. Site Name Not Reported	A									◆					
83	6418A S. Howell Ave. Kevco Inc.	A	◆			◆										

Attachment C:

Biotic Resources:

Wisconsin Threatened and Endangered Species

Wisconsin
Endangered and Threatened Species
Laws & List

PUBL-ER-001 2004
REV February 2004

Definitions

Wisconsin Endangered Species: Any species whose continued existence as a viable component of this state's wild animals or wild plants is determined by the Department to be in jeopardy on the basis of scientific evidence.

Wisconsin Threatened Species: Any species which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

State Laws

Endangered and Threatened Species Laws (State Statute 29.415 & Administrative Rule NR27)

Animals - It is illegal to take, transport, possess, process or sell any wild animal that is included on the Wisconsin Endangered and Threatened Species List without a valid permit.

Plants - No one may process or sell any wild plant that is a listed species without a valid permit. On public lands or lands you do not own, lease, or have the permission of the landowner, you may not cut, root up, sever, injure, destroy, remove, transport or carry away a listed plant without a permit. There is an exemption on public lands for forestry, agriculture and utility activity.

Permits - No one is exempt from these laws, but an Endangered or Threatened Species "Scientific" Permit or an Incidental Take Permit can allow you to conduct certain activities under specified conditions. The Department of Natural Resources may issue these permits, under specified terms and conditions to take, transport, possess, or export listed endangered or threatened species. Permit information and applications are available from the Bureau of Endangered Resources (address below).

Violations

Endangered and Threatened Animals: If the state law is violated unintentionally, the violator is subject to a fine of no less than $500 and no more than $2,000 and the court shall revoke all hunting privileges for one year. If the law is violated intentionally a person may be fined no less than $2,000 and no more than $5,000 or may be imprisoned for 9 months, or both. The court shall revoke all hunting privileges for three years. Violations of Federal Laws will result in additional penalties.

Endangered and Threatened Plants: If the state law is violated unintentionally, the person in subject to a fine of $1,000 or less. If the law is violated intentionally, the person is subject to a fine of $1,000 or less and/or 9 months imprisonment.

Report violations of wildlife laws to the toll-free Wisconsin Emergency Hotline: (1-800-847-9367).

Wisconsin Department of Natural Resources
Endangered Resources Program
P.O. Box 7921
Madison, WI 53707-7921
Telephone: (608)-266-7012
FAX: (608)-266-2925
Website: http://dnr.wi.gov/

Wisconsin Endangered and Threatened Species List

Effective Dates of Listing

(A) October 1, 1972
(B) October 1, 1975
(C) May 1, 1978
(D) October 1, 1979
(E) November 1, 1981
(F) December 1, 1982
(F) December 1, 1982
(G) April 1, 1985
(H) August 1, 1989
(I) August 1, 1997
(J) October 1, 1999

MAMMALS

ENDANGERED

(A)	American Marten	*Martes americana*

THREATENED

(J)	Gray Wolf*	*Canis lupus*

BIRDS

ENDANGERED

(D)	Piping Plover**	*Charadrius melodus*
(H)	Trumpeter Swan	*Cygnus buccinator*
(H)	Yellow-throated Warbler	*Dendroica dominica*
(I)	Snowy Egret	*Egretta thula*
(B)	Peregrine Falcon**	*Falco peregrinus*
(H)	Worm-eating Warbler	*Helmitheros vermivorus*
(D)	Loggerhead Shrike	*Lanius ludovicianus*
(F)	Red-necked Grebe	*Podiceps grisegena*
(H)	Caspian Tern	*Sterna caspia*
(D)	Forster's Tern	*Sterna forsteri*
(D)	Common Tern	*Sterna hirundo*
(H)	Bewick's Wren	*Thryomanes bewickii*
(D)	Barn Owl	*Tyto alba*

THREATENED

(I)	Henslow's Sparrow	*Ammodramus henslowii*
(D)	Red-shouldered Hawk	*Buteo lineatus*
(D)	Great Egret	*Casmerodius albus*
(I)	Yellow Rail	*Coturnicops noveboracensis*
(I)	Spruce Grouse	*Dendragapus canadensis*
(H)	Cerulean Warbler	*Dendroica cerulea*
(H)	Acadian Flycatcher	*Empidonax virescens*
(H)	Yellow-Crowned Night-Heron	*Nyctanassa violaceus*
(H)	Kentucky Warbler	*Oporornis formosus*
(H)	Osprey	*Pandion haliaetus*
(D)	Greater Prairie-Chicken	*Tympanuchus cupido pinnatus*
(H)	Bell's Vireo	*Vireo bellii*
(H)	Hooded Warbler	*Wilsonia citrina*

REPTILES & AMPHIBIANS

ENDANGERED

(F)	Blanchard's Cricket Frog	*Acris crepitans blanchardi*
(D)	Slender Glass Lizard	*Ophisaurus attenuatus*
(A)	Queen Snake	*Regina septemvittata*
(B)	Massasauga Rattlesnake	*Sistrurus catenatus*
(A)	Ornate Box Turtle	*Terrapene ornata*
(D)	Western Ribbon Snake	*Thamnophis proximus*
(D)	Northern Ribbon Snake	*Thamnophis sauritus*

THREATENED

(B)	Wood Turtle	*Clemmys insculpta*
(D)	Blanding's Turtle	*Emydoidea blandingii*
(I)	Butler's Garter Snake	*Thamnophis butleri*

FISHES

ENDANGERED

(H)	Skipjack Herring	*Alosa chrysochloris*
(D)	Crystal Darter	*Crystallaria asprella*
(D)	Gravel Chub	*Erimystax x-punctata*
(D)	Bluntnose Darter	*Etheostoma chlorosomum*
(D)	Starhead Topminnow	*Fundulus dispar*
(D)	Goldeye	*Hiodon alosoides*
(D)	Striped Shiner	*Luxilus chrysocephalus*
(I)	Black Redhorse	*Moxostoma duquensnei*
(D)	Pallid Shiner	*Notropis amnis*
(D)	Slender Madtom	*Noturus exilis*

THREATENED

(D)	Blue Sucker	*Cycleptus elongatus*
(D)	Black Buffalo	*Ictiobus niger*
(D)	Longear Sunfish	*Lepomis megalotis*
(H)	Redfin Shiner	*Lythrurus umbratilis*
(D)	Speckled Chub	*Macrhybopsis aestivalis*
(H)	River Redhorse	*Moxostoma carinatum*
(H)	Greater Redhorse	*Moxostoma valenciennesi*
(H)	Pugnose Shiner	*Notropis anogenus*
(A)	Ozark Minnow	*Notropis nubilus*
(D)	Gilt Darter	*Percina evides*
(H)	Paddlefish	*Polyodon spathula*

INSECTS

ENDANGERED

(H)	Pecatonica River Mayfly	*Acanthametropus pecatonica*
(I)	Red-tailed Prairie Leafhopper	*Aflexia rubranura*
(H)	Flat-headed Mayfly	*Anepeorus simplex*
(H)	Swamp Metalmark	*Calephelis mutica*
(H)	Northern Blue Butterfly	*Lycaeides idas*
(H)	Giant Carrion Beetle**	*Nicrophorus americanus*
(H)	Powesheik Skipperling	*Oarisma powesheik*
(H)	Extra-striped Snaketail Dragonfly	*Ophiogomphus anomalus*
(I)	Saint Croix Snaketail Dragonfly	*Ophiogomphus susbehcha*
(H)	Silphium Borer Moth	*Papaipema silphii*
(H)	Phlox Moth	*Schinia indiana*
(I)	Warpaint Emerald Dragonfly	*Somatochlora incurvata*
(I)	Hine's Emerald Dragonfly**	*Somatochlora hineana*
(H)	Regal Fritillary	*Speyeria idalia*
(H)	Knobels Riffle Beetle	*Stenelmis knobeli*
(I)	Lake Huron Locust	*Trimerotropis huroniana*

THREATENED

(I)	Spatterdock Darner Dragonfly	*Aeshna mutata*
(H)	Frosted Elfin	*Incisalia irus*
(I)	Prairie Leafhopper	*Polyamia dilata*
(H)	Pygmy Snaketail Dragonfly	*Ophiogomphus howei*

SNAILS

ENDANGERED

(H)	Midwest Pleistocene Vertigo	*Vertigo hubrichti*
(H)	Occult Vertigo	*Vertigo occulta*

THREATENED

(H)	Wing Snaggletooth	*Gastrocopta procera*
(H)	Cherrystone Drop	*Hendersonia occulta*

MUSSELS

ENDANGERED

(H)	Spectaclecase	*Cumberlandia monodonta*
(H)	Purple Wartyback	*Cyclonaias tuberculata*
(H)	Butterfly	*Ellipsaria lineolata*
(H)	Elephant-Ear	*Elliptio crassidens*
(H)	Snuffbox	*Epioblasma triquetra*
(H)	Ebonyshell	*Fusconaia ebena*
(C)	Higgins Eye**	*Lampsilis higginsi*
(H)	Yellow/Slough Sandshell	*Lampsilis teres*
(H)	Bullhead	*Plethobasus cyphyus*
(H)	Rainbow	*Villosa iris*
(H)	Winged Mapleleaf**	*Quadrula fragosa*

THREATENED

(H)	Slippershell mussel	*Alasmidonta viridis*
(H)	Rock-Pocketbook	*Arcidens confragosus*
(H)	Monkeyface	*Quadrula metanevra*
(H)	Wartyback	*Quadrula nodulata*
(H)	Salamander Mussel	*Simpsonaias ambigua*
(H)	Buckhorn	*Tritogonia verrucosa*
(H)	Ellipse	*Venustaconcha ellipsiformis*

PLANTS

ENDANGERED

(E)	Carolina Anemone	*Anemone caroliniana*

(D)	Hudson Bay Anemone	*Anemone multifida*
(D)	Lake Cress	*Armoracia lacustris*
(G)	Purple Milkweed	*Asclepias purpurascens*
(D)	Green Spleenwort	*Asplenium trichomanes-ramosum*
(D)	Alpine Milk Vetch	*Astragalus alpinus*
(E)	Prairie Plum	*Astragalus crassicarpus*
(G)	Coopers Milk Vetch	*Astragalus neglectus*
(I)	Prairie Moonwort	*Botrychium campestre*
(E)	Moonwort	*Botrychium lunaria*
(G)	Goblin Fern	*Botrychium mormo*
(D)	Floating Marsh Marigold	*Caltha natans*
(G)	Wild Hyacinth	*Camassia scilloides*
(E)	Crow-spur Sedge	*Carex crus-corvi*
(I)	Smooth-sheathed Sedge	*Carex laevivaginata*
(D)	Hop-like Sedge	*Carex lupuliformis*
(D)	Intermediate Sedge	*Carex media*
(I)	Schweinitz's Sedge	*Carex schweinitzii*
(E)	Brook Grass	*Catabrosa aquatica*
(D)	Stoneroot	*Collinsonia canadensis*
(D)	Hemlock-parsley	*Conioselinum chinense*
(E)	Beak Grass	*Diarrhena americana*
(D)	Lanceolate Whitlow-cress	*Draba cana*
(I)	Neat Spike-rush	*Eleocharis nitida*
(I)	Wolf Spike-rush	*Eleocharis wolfii*
(D)	Angle-stemmed Spikerush	*Eleocharis quadrangulata*
(D)	Harbinger-of-Spring	*Erigenia bulbosa*
(D)	Chestnut Sedge	*Fimbristylis puberula*
(E)	Umbrella Sedge	*Fuirena pumila*
(D)	Northern Commandra	*Geocaulon lividum*
(G)	Pale False Foxglove	*Agalinus skinneriana*
(H)	Bog Rush	*Juncus stygius*
(H)	Prairie Bush Clover*	*Lespedeza leptostachya*
(E)	Dotted Blazing Star	*Liatris punctata*
(D)	Auricled Twayblade	*Listera auriculata*
(I)	Fly Honeysuckle	*Lonicera involucrata*
(E)	Smith Melic Grass	*Melica smithii*
(D)	Large-leaved Sandwort	Moehringia macrophylla
(I)	Mat Muhly	*Muhlenbergia richardsonis*
(I)	Louisiana Broomrape	*Orobanche ludoviciana*
(H)	Fassett's Locoweed*	*Oxytropis campestris*
(D)	Small-flowered Grass-of-Parnassus	*Parnassia parviflora*
(E)	Smooth Phlox	*Phlox glaberrima*
(E)	Butterwort	*Pinguicula vulgaris*
(D)	Heart-leaved Plantain	*Plantago cordata*
(H)	Eastern Prairie White-fringed Orchid*	*Platanthera leucophaea*
(I)	Western Jacob's Ladder	*Polemonium occidentale lacustre*
(D)	Pink Milkwort	*Polygala incarnata*
(G)	Spotted Pondweed	*Potamogeton pulcher*
(E)	Rough White Lettuce	*Prenanthes aspera*
(D)	Great White Lettuce	*Prenanthes crepidinea*
(D)	Pine-drops	*Pterospora andromedea*
(D)	Small Shinleaf	*Pyrola minor*
(E)	Small Yellow Water Crowfoot	*Ranunculus gmelinii*
(I)	Lapland Buttercup	*Ranunculus lapponicus*
(D)	Lapland Rosebay	*Rhododendron lapponicum*
(D)	Wild Petunia	*Ruellia humilis*
(D)	Sand Dune Willow	*Salix cordata*
(I)	Satiny Willow	*Salix pellita*
(I)	Hall's Bulrush	*Scirpus hallii*
(G)	Netted Nut-rush	*Scleria reticularis*
(G)	Small Skullcap	*Scutellaria parvula*
(E)	Selago-like Spikemoss	*Selaginella selaginoides*
(I)	Fire Pink	*Silene viginica*
(E)	Blue-stemmed Goldenrod	*Solidago caesia*
(D)	Lake Huron Tansy	*Tanacetum bipinnatum ssp.huronese*
(D)	Hairy Meadow Parsnip	*Thaspium barbinode*
(E)	Foamflower	*Tiarella cordifolia*
(I)	Purple False Oats	*Trisetum melicoides*
(D)	Dwarf Bilberry	*Vaccinium cespitosum*
(D)	Mountain Cranberry	*Vaccinium vitis-idaea*
(D)	Squashberry	*Viburnum edule*
(D)	Sand Violet	*Viola fimbriatula*

THREATENED

(D)	Northern Monkshood*	*Aconitum noveboracense*
(E)	Muskroot	*Adoxa moschatellina*
(G)	Round Stemmed False Foxglove	*Agalinus gattingeri*
(G)	Yellow Giant Hyssop	*Agastache nepetoides*
(D)	Small Round-leaved Orchis	*Amerorchis rotundifolia*
(G)	Prairie Indian Plaintain	*Arnoglossum plantagineum*
(I)	Dwarf Milkweed	*Asclepias ovalifolia*
(G)	Wooly Milkweed	*Asclepias lanuginosa*
(E)	Prairie Milkweed	*Asclepias sullivantii*
(H)	Pinnatifid Spleenwort	*Asplenium pinnatifidum*
(G)	Forked Aster	*Aster furcatus*
(G)	Kitten Tails	*Besseya bullii*
(G)	Sand Reed	*Calamovilfa longifolia*
(I)	Large Water Starwort	*Callitriche heterophylla*
(H)	Calypso Orchid	*Calypso bulbosa*
(H)	Carey's Sedge	*Carex careyana*
(D)	Beautiful Sedge	*Carex concinna*
(H)	Coast Sedge	*Carex exilis*
(H)	Handsome Sedge	*Carex formosa*
(G)	Garbers Sedge	*Carex garberi*
(D)	Lenticular Sedge	*Carex lenticularis*
(E)	Michaux's Sedge	*Carex michauxiana*
(H)	Drooping Sedge	*Carex prasina*
(H)	Prairie Thistle	*Cirsium hillii*
(D)	Dune Thistle*	*Cirsium pitcheri*
(D)	Rams-head Ladys-slipper	*Cypripedium arietinum*
(D)	White Ladys-slipper	*Cypripedium candidum*
(D)	English Sundew	*Drosera anglica*
(D)	Linear-leaved Sundew	*Drosera linearis*
(E)	Pale Purple Coneflower	*Echinacea pallida*
(G)	Beaked Spike Rush	*Eleocharis rostellata*
(E)	Thickspike Wheatgrass	*Elymus lanceolatus ssp. psammophilus*
(D)	Western Fescue	*Festuca occidentalis*
(D)	Blue Ash	*Fraxinus quadrangulata*
(G)	Yellowish Gentian	*Gentiana alba*
(I)	Cliff Cudweed	*Gnaphalium saxicola*
(G)	Round Fruited St. John's Wort	*Hypericum sphaerocarpum*
(D)	Dwarf Lake Iris*	*Iris lacustris*
(H)	Slender Bush Clover	*Lespedeza virginica*
(H)	Bladderpod	*Lesquerella ludoviciana*
(E)	Broad-leaved Twayblade	*Listera convallarioides*
(D)	Brittle Prickly Pear	*Opuntia fragilis*
(E)	Clustered Broomrape	*Orobanche fasciculata*
(D)	Marsh Grass-of-Parnassus	*Parnassia palustris*
(E)	Wild Quinine	*Parthenium integrifolium*
(E)	Sweet Coltsfoot	*Petasites sagittatus*
(D)	Tubercled Orchid	*Platanthera flava*
(H)	Bog Bluegrass	*Poa paludigena*
(E)	Braun's Holly Fern	*Polystichum braunii*
(D)	Prairie-parsley	*Polytaenia nuttallii*
(D)	Algal-leaved Pondweed	*Potamogeton confervoides*
(G)	Sheathed Pondweed	*Potamogeton vaginatus*
(E)	Seaside Crowfoot	*Ranunculus cymbalaria*
(E)	Bald Rush	*Rhynchospora scirpoides*
(E)	Hawthorn-leaved Gooseberry	*Ribes oxyacanthoides*
(I)	Flat-leaved Willow	*Salix planifolia*
(I)	Tussock Bulrush	*Scirpus cespitosus*
(I)	Plains Ragwort	*Senecio indecorus*
(I)	Snowy Campion	*Silene nivea*
(D)	Dune Goldenrod	*Solidago simplex var. gillmanii*
(I)	Clustered Bur Reed	*Sparganium glomeratum*
(E)	False Asphodel	*Tofieldia glutinosa*
(D)	Snow Trillium	*Trillium nivale*
(E)	Spike Trisetum	*Trisetum spicatum*
(E)	Marsh Valerian	*Valeriana sitchensis*

*** also Federally Endangered*
* *also Federally Threatened*

A Reminder

The Department of Natural Resources reminds you that the Endangered and Threatened Species list is only a first step toward identifying a problem that exists. It doesn't tell what the problem is or what to do about it. Moreover, it does not guarantee survival of the plants and animals listed. The real work follows listing. The Bureau of Endangered Resources formulates management plans to aid the recovery of listed species. DNR resource managers put the plans to work in the field, while conservation wardens enforce laws protecting endangered resources.

A Request

The Bureau of Endangered Resources welcomes observations of endangered and threatened plants and animals. We are also interested in observations of species of special concern (species about which some problem of abundance or distribution is suspected but not yet proven). If you would like to obtain reporting forms for submitting observations and/or a list of special concern species, please contact us at the address or phone number in the box at right.

Henslow's Sparrow

Help Us Protect Wisconsin's Natural Diversity!

The Wisconsin Endangered Resources Program is funded primarily by contributions to the tax checkoff on the Wisconsin state income tax form, the purchase of Endangered Resources License Plates, or through donations sent directly to the Bureau of Endangered Resources. Your support is vital. Help us continue recovery efforts for endangered species, preservation of rare plants and animal communities and educational efforts to protect our rich natural heritage. Remember to designate a gift on your tax form, order a license plate or send a contribution to the address below.

For further information, contact:

Wisconsin Department of Natural Resources
Endangered Resources Program
P.O. Box 7921
Madison, WI 53707-7921
Telephone: (608) 266-7012
FAX: (608) 266-2925

If you would like an application form for an Endangered Resources license plate, send a request to the above address or to:

Wisconsin Department of Transportation
Special Plates Unit
P.O. Box 7911
Madison, WI 53707-7911

This publication has been made possible by contributions to the Endangered Resources Fund and the purchase of Endangered Resources License Plates.

ENDANGERED
RESOURCES

Attachment D:

Coordination Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Green Bay ES Field Office
2661 Scott Tower Drive
New Franken, Wisconsin 54229-9565
Telephone 920/866-1717
FAX 920/866-1710

November 26, 2007

Mr. Barton F. Gover
PB Americas, Inc.
2333 Alumni Park Plaza, Suite 330
Lexington, Kentucky 40517

re: Master Plan Update
General Mitchell International Airport
Milwaukee County, Wisconsin

Dear Mr. Gover:

The U.S. Fish and Wildlife Service (Service) has received your letter dated November 15, 2007, requesting comments on the subject project. You asked that we provide information on federally-listed threatened and endangered species in the project area. Our comments follow.

Federally-Listed Species, Candidate Species, and Critical Habitat

Due to the project type, location, and onsite habitat, no federally-listed species would be expected within the project area. This precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended. Should additional information on listed or proposed species or their critical habitat become available or if project plans change or if portions of the proposed project were not evaluated, it is recommended that you contact our office for further review.

For future reference, we encourage you to visit the Service's Region 3 Section 7 Technical Assistance web site at http://www.fws.gov/midwest/endangered/section7/s7process/. There, you will find guidance to assist you in fulfilling the requirements for consultation under Section 7 of the Endangered Species Act, including a step-by-step explanation of the section 7 process, species distribution lists, species life history information and conservation measures, and examples of typical letters.

We appreciate the opportunity to respond. Questions pertaining to these comments can be directed to Mr. Joel Trick 920-866-1737.

Sincerely,

Louise Clemency

Louise Clemency
Field Supervisor

WISCONSIN HISTORICAL SOCIETY

Headquarters Building
816 State Street
Madison, WI 53706-1482
608-264-6400

December 13, 2007

Mr. Barton F. Gover
PB Americas, Inc.
2333 Alumni Park Plaza, Suite 330
Lexington, KY 40517

RE: General Mitchell International Airport Master Plan Update

Project Submittal Process Notification

Dear Mr. Gover:

Thank you for the information provided in your correspondence dated November 15, 2007 to Mr. Ellsworth H. Brown, The Ruth and Hartley Barker Director, Wisconsin Historical Society. It was forwarded to the Division of Historic Preservation and Public History for response.

Please be advised that in prior correspondence, we informed all state and federal agencies, including the Federal Aviation Administration, that the Wisconsin § 106 review process had changed as of August 1, 2002. The materials you recently submitted for our review do not comply with our new process guidelines.

For detailed information on the new process, please visit the Office of Preservation Planning's "The Wisconsin NHPA § 106 Review Process" web site at:

http://www.wisconsinhistory.org/hp/protecting/106_intro.asp

It may be necessary to obtain the services of a qualified consultant to complete this research. When the necessary research has been completed, complete parts II and III of the form, sign and date the form, and return it to our office with the required supporting documentation for our review and comment.

For specific questions about this issue, please contact Dan Duchrow by email at Dan.Duchrow@wisconsinhistory.org or by telephone at (608) 264-6505.

Thank you for your attention to this matter.

8.0

Airport Plans

8.0 AIRPORT LAYOUT PLANS

This chapter presents a detailed graphic and narrative description of the selected development concept for General Mitchell International Airport (MKE). The plans package presented in this chapter will serve as the Airport Division's primary planning tool for the long-range development of MKE's airfield and passenger terminal facilities.

The Future Airport Layout Plan (ALP) shows a conceptual layout of the airfield, landside, and ground access areas necessary to support the design year 2022 aviation activity projections. The ALP package includes the following 22 drawings:

1 of 21: Title Sheet
2 of 21: Existing Airport Layout Plan
3 of 21: Future Airport Layout Plan
4 of 21: Airport Data Summary
5 of 21: Terminal Area Plan
6 of 21: Airspace Plan
7 of 21: Inner Approach Plan Runway 7L
8 of 21: Inner Approach Plan Runway 25R
9 of 21: Inner Approach Plan Runway 7C
10 of 21: Inner Approach Plan Runway 25C
11 of 21: Inner Approach Plan Runway 7R
12 of 21: Inner Approach Plan Runway 25L
13 of 21: Inner Approach Plan Runway 19L
14 of 21: Inner Approach Plan Runway 1R
15 of 21: Inner Approach Plan Runway 19R
16 of 21: Inner Approach Plan Runway 1L
17 of 21: Inner Approach Plan Runway 13
18 of 21: Inner Approach Plan Runway 31
19 of 21: On-Airport Land Use Plan

20a of 21: Exhibit A Airport Property Map

20b of 21: Exhibit A Airport Property Map

21 of 21: Airport Photograph

8.1 Airport Design Standards

The MKE airport plans package was prepared using Federal Aviation Administration (FAA) standards and guidelines for use in the design of civil airports. The design standards are set forth in FAA Advisory Circular 150-5300-13 *Airport Design (Change 11).* In addition the airport layout plan package was prepared in accordance with the FAA Great Lakes Region ALP Checklist (2007).

One of the key factors of the airport design advisory circular was to organize the airport design standards by Airport Reference Codes (ARC). The ARC incorporates the operational and physical characteristics of the critical aircraft approach category and an airplane design group. The aircraft approach category, based on the aircraft approach speed, relates to the operational requirements of the aircraft while the airplane design group, based on aircraft wingspan, relates to the physical requirements of the aircraft.

The ARC is based on the most demanding aircraft that is anticipated to serve the Airport during the twenty-year planning period. For MKE the critical aircraft was determined to be the Boeing 747-400 which will remain in service through the twenty-year planning period. The 747-400 is classified under Approach Category D and Airplane Design Group V. The applicable recommended airfield design standards for ARC D-V are shown in **Table 8-1**. Except where noted, all aeronautical and airfield design standards applicable to ARC D-V have been incorporated into the proposed airfield geometry.

Table 8-1

Recommended FAA Airfield Design Standards

(Design Group V)

Design Element	Design Standard (Feet)
• Runway Width	150
• Runway Centerline to Parallel Taxiway Centerline:	400
• Runway Safety Area Width:	400
• Taxiway Width:	75
• Taxiway Centerline to: Parallel Taxiway/Taxilane Centerline:	267
• Taxiway Fixed or Movable Object:	160
• Taxiway Safety Area Width:	245
• Taxilane Centerline to Taxilane Centerline:	245
• Taxilane Fixed of Movable Object:	138

Since the north airfield taxiway system is only used by General Aviation Aircraft types, the perimeter taxiways ‘C’, ‘D’, and ‘H’ will comply with Design Group III object clearance standards which require an object clearance of 93 feet from the centerline of each existing taxiway. Design Group III includes the Boeing BBJ (B-737) which is considered to be the typical largest corporate aircraft that will operate from the north airfield during the twenty-year planning period.

The narrative description on the recommended Airport development program includes 14 major projects. The priority and development staging for each project is depicted on the relevant drawings and discussed in the following three sections:

- Airport Layout Plan (Drawings 1, 2, 3, 4 and 5)
- Runway Approach Plans (Drawings 6 through 18)
- Airport Land Use Plan (Drawings 20, 21 and 21)

8.1.1 *Airport Layout Plan*

The Airport Master Planning process culminates with the FAA's approval of the ALP. For the County of Milwaukee Department of Public Works / Airport Division (Airport Division), the ALP serves as a "*blueprint*" for the future renovation and development of MKE. The ALP drawings that describe the 20-year development program for MKE are discussed below.

Drawing 1 of 21 Title Sheet: The Title Sheet of the ALP Plans Package contains the following information:

- Project Title: Airport Layout Plans
- Facility Name : General Mitchell International Airport (MKE)
- Airport Sponsor: County of Milwaukee DPW / Aviation Division
- Sponsor Address: 5300 S. Howell Concourse C, MKE, Milwaukee, WI 53207
- Location Maps: Shows location of MKE in Southern Wisconsin
- Index of Drawings: Nineteen drawings
- FAA Approval: Greats Lakes Region Office of the FAA
- WTD/BA Approval: Chief Airport Engineer
- Airport. Div. Approval: Airport Director

Drawing 2 of 21 Existing Airport Layout Plan: The existing ALP is included as a reference plan to complement the Future ALP since the level of proposed development obscures pertinent existing detail in some locations on the Airport.

Drawing 3 of 21; Future Airport Layout Plan, 4 of 21; Airport Data Summary, and 5 of 21; Terminal Area Plan: As the focal point of the Plans Package, the Future Airport Layout Plan

(ALP), Airport Data Summary, and Terminal Area Plan (TAP) delineate all future aeronautical requirements of the Airport.

The improvements presented on the Future ALP and Future TAP are based on the Master Plan Update analysis. Many of these improvements are consistent with the 1992 MKE Airport Master Plan Update. Several of the recommended airfield and terminal area improvements from the 1992 Master Plan Update have been implemented. The remaining major recommendations have either been incorporated into the Future ALP or superseded by current master plan recommendations. These recommendations are described in the following paragraphs.

The design year 2022 Airport Development Program indicated on the Future ALP and TAP are intended to be implemented in three phases. The assignment of projects to each development phase is flexible, as a number of factors influence whether a project will take place at a specific time. For example, some items in Phase I may actually occur in the Phase II time frame. This could be due to project approval delays, Federal and local funding issues, shifts in market demand, aircraft operational activity levels that differ from forecasts, policy issues, and other operational considerations that are unique to the development of a public airport.

The first two phases, which encompass ten years, are proposed to support projects that have been identified to meet a proven need, or those with a high probability of occurrence. The remaining, long-range aviation development projects depict airfield and landside development projects that are related to projected 20-year aviation activity demands described in Chapter 3.0. The three development phases included in the Future ALP are:

- Phase I - 2008-2012
- Phase II - 2013-2017
- Phase III - 2018-2022

The three development phases are carried into and discussed in the financial feasibility plan (Chapter 9.0) following this chapter. This chapter presents brief conceptual level descriptions of the 14 major capital improvement projects. The proposed projects are depicted in

Exhibit 8-1. The estimated construction costs and detailed phasing (by year) for each project is presented in the 20-year financial development plan that is described in the following Chapter 9.0.

* NOTE: The Primary Capital Improvement Projects Includes Associated Implementation Projects. See Section 8.2 For Detailed Project Descriptions.

(X) PRIMARY CAPITAL IMPROVEMENT PROJECTS *

PROJECT No.	PROJECT DESCRIPTION	TARGET YEARS
A-1 thru A-11	RUNWAY 7R-25L	2015 – 2021
B-1 thru B-4	TERMINAL MODERNIZATION	2015 – 2018
C-1 thru C-9	AIR CARGO FACILITIES	2009 – 2021
D-1 thru D-6	RUNWAY 7R-25L & 1L-19R RSA IMPROVEMENTS	2008 – 2013
E-1 thru E-5	CONCOURSE F	2010 – 2012
F-1 thru F-2	PARKING GARAGE EXPANSION	2012
G-1 thru G-3	REMOTE PARKING STRUCTURE	2009 – 2010
H-1 thru H-2	REMOTE EMPLOYEE PARKING **	2015 – 2021
I-1 thru I-3	AIRPORT MAINTENANCE FACILITIES	2017
J-1 thru J-6	RUNWAY 7R EXTENSION (ULTIMATE 7C)	2016 – 2020
K-1 thru K-13	CONCOURSE G	2017 – 2021
L-1	RUNWAY 1R-19L EXTENSION	Beyond Planning Period
M-1 thru M-4	CONNECTOR TAXIWAYS	2010 – 2011
N-1	FUEL FARM	Beyond Planning Period

** REMOTE EMPLOYEE PARKING SITE IS UNDER REVIEW

PROJECT DEVELOPMENT LEGEND

PROJECT Color	PROJECT DESCRIPTION
	ULTIMATE PAVEMENT
	ULTIMATE BUILDING
	ULTIMATE LAND ACQUISITION

GENERAL MITCHELL INTERNATIONAL AIRPORT
MASTER PLAN UPDATE

CAPITAL DEVELOPMENT PLAN

EXHIBIT 8–1

Milwaukee\MP_2007\Capital-Improvement-r.dwg 9/23/08

PB Americas, Inc.

8.2 Capital Development Plan

The MKE Master Plan Study Update was initiated in 2001 with assumed project implementation dates to follow attainment of activity levels that would trigger the need for development, and to follow various Federal, State and local approval processes. The actual start of the proposed airfield and landside development projects may very due to the timing of activity levels and the multiple government approvals required for project implementation. A summary of the following 14 major Capital Improvement Projects is presented in **Table 8-2.**

TABLE 8.2-1 General Mitchell International Airport CAPITAL IMPROVEMENT PROGRAM						
NO.	PROJECT DESCRIPTION	TARGET YEAR	UNITS	QUANTITY	UNIT COST	TOTAL COST
A	**Proposed Runway 7R-25L**					**$234,064,547**
1	Environmental Impact Statement (EIS)	2015-16	LS	1	$6,000,000	$6,000,000
2	Land Acquisition	2017-18	Acres	420	$295,268	$124,012,618
3	Demolition of Structures	2018-19	Each	307	$31,822	$9,769,265
4	Site Preparation/Drainage	2018-19	Acres	316	$18,886	$5,967,940
5	Relocate College Avenue	2018-19	SY	43,000	$69	$2,972,768
6	South Howell Tunnel (1,100' X 200')	2018-2019	LS	1	$40,000,000	$40,000,000
7	Perimeter Road	2018-19	SY	26,000	$49	$1,284,439
8	CAT-I Navigation System	2020	Each	2	$2,000,000	$4,000,000
9	Perimeter Fence	2020-21	LF	16,000	$62	$993,450
10	Runway Construction	2020-21	SY	116,700	$209	$24,341,833
11	Taxiway Construction	2020-21	SY	102,000	$144	$14,722,234
B	**Terminal Modernization**					**$53,237,608**
1	Phase I Central Terminal	2015-17	SF	65,000	$430	$27,959,058
2	Phase II South Terminal	2017	SF	48,000	$430	$20,646,689
3	Phase III Ground Access	2018	SY	13,600	$49	$671,860
4	Parking Garage Walking Connector	2018	SF	18,000	$220	$3,960,000
C	**Air Cargo Facilities**					**$30,088,212**
1	Environmental Assessment	2009	LS	1	$400,000	$400,000
2	Phase I- Site Preparation/Drainage	2012	Acres	20	$18,886	$377,718
3	Phase I- Air Cargo Warehouse	2012	SF	60,000	$150	$9,000,000
4	Phase I- Air Cargo Apron	2012	SY	49,000	$138	$6,744,585
5	Phase I- Truck/Employee Parking	2012	SY	6,600	$34	$224,718
6	Phase II-Site Preparation/Drainage	2020	Acres	20	$18,886	$377,718
7	Phase II- Air Cargo Warehouse	2021	SF	50,000	$150	$7,500,000
8	Phase II- Air Cargo Apron	2021	SY	39,000	$138	$5,368,139
9	Phase II- Truck/Employee Parking	2021	SY	2,800	$34	$95,335
D	**Runways 7R-25L & 1L-19R RSA Improvements [1]**					**$52,559,150**
1	Re-Route 6th Street to New Alignment	2008-10	LS	1	$3,029,400	$3,029,400
2	Shift Rwy 7R 539 ft West & Construct New 25L T/W N	2008-10	LS	1	$12,010,097	$12,010,097
3	Construct College Ave. Tunnel Under 1L RSA	2009-12	LS	1	$25,595,507	$25,595,507
4	Remove Pavement on 25L - Remark & Relight	2009-2012	LS	1	$1,247,198	$1,247,198
5	Phase 2: Extend: Rwy 1L 300 ft., Twy R 300 ft., & Rwy 19R Per. Rd.	2009-13	LS	1	$6,247,628	$6,247,628
6	25L RPZ Land Acquisition	2010-13	Acres	15	$295,288	$4,429,320
E	**Concourse F**					**$52,764,623**
1	Site Preparation/Drainage	2011-12	Acres	19	$18,886	$358,832
2	Relocate GSE	2011-12	SF	6,000	$50	$300,000
3	Construct Concourse F	20011-12	SF	90,000	$430	$38,712,542
4	Aircraft Apron	2010-11	SY	96,600	$138	$13,296,468
5	Fuel Hydrant	2010-11	Each	6	$16,130	$96,781
F	**Parking Garage Expansion**					**$28,284,822**
1	Site Preparation/Drainage	2012	Acres	7	$18,886	$132,201
2	Parking Garage Construction	2012	Space	1,700	$16,560	$28,152,621
G	**Remote Parking Structure**					**$109,506,156**
12	Site Preparation/Drainage	2015-16	Acres	11	$18,886	$207,745
2	Phase I- Construction	2015-16	Spaces	3,800	$16,560	$62,929,388
3	Phase II- Construction	2020-21	Spaces	2,800	$16,560	$46,369,023

H	**Remote Employee Parking**					**$1,100,664**
1	Site Preparation/Drainage	2009	Acres	11	$18,886	$207,745
2	Grade Level Parking Lot	2010	Spaces	600	$1,488	$892,919
I	**Airport Maintenance**					**$2,453,824**
1	Site Preparation/Drainage	2017	Acres	4	$18,886	$75,544
2	Construct Maintenance Building	2017	SF	20,000	$107	$2,139,943
3	Storage Yards/Parking	2017	SY	7,000	$34	$238,337
J	**Runway 7R Extension (Ultimate 7C)**					**$13,465,391**
1	Environmental Impact Statement (EIS)	2016	LS	1	$2,000,000	$2,000,000
2	Land Acquisition Runway Protection Zone	2018	Acres	19	$295,268	$5,610,092
3	Site Preparation/Drainage	2019	Acres	12	$15,106	$181,271
4	Runway Construction (461 ft. x 150 ft.)	2020	SY	7,680	$209	$1,601,930
5	Taxiway Construction	2020	SY	6,250	$144	$902,098
6	Aircraft Hold Apron	2020	SY	22,000	$144	$3,168,000
7	Relocate CAT-I ILS	2020	LS	1	$2,000	$2,000
K	**Concourse G**					**$132,522,407**
1	Site Preparation/Drainage	2017	Acres	28	$18,886	$528,805
2	Demolation of 5 Hangars & US Post Office	2017	SF	100,000	$21	$2,107,683
3	Construction of Concourse G	2020-21	SF	160,000	$430	$68,822,298
4	Federal Inspection Service Facilities in Concourse G	2020-21	SF	40,000	$200	$8,000,000
5	Aircraft Apron	2020-21	SY	94,000	$138	$12,938,592
6	Post Office Site Preparation/Drainage	2020-21	Acres	4	$18,886	$75,544
7	Construction of US Post Office [2]	2020-21	SF	40,000	$150	$6,000,000
8	Post Office Truck Apron & Parking	2020-21	SY	7,000	$34	$238,337
9	Corporate Hangar Area Site Preparation/Drainage	2020-21	Acres	18	$18,886	$339,946
10	Construct Corporate Hangars [2]	2020-21	Each	5	$6,000,000	$30,000,000
11	Corporate Hangar Apron	2020-21	SY	21,300	$138	$2,931,830
12	Corporate Hangar Access	2020-21	SY	7,000	$49	$345,811
13	Fuel Hydrant System	2020-21	Each	12	$16,130	$193,563
L	**Runway 1R-19L Extension**					**Beyond planning period**
M	**Connector Taxiways**					**$10,835,790**
1	Site Preparation/Drainage	2010-11	Acres	55	$18,886	$1,038,724
2	Taxiway R Extension to Rwy. 1L	2020-21	SY	34,000	$144	$4,907,411
3	Taxiway T Extension to Rwy 1L	2020-21	SY	24,000	$144	$3,464,055
4	Taxiway V Relocation to 307 ft. Seperation - Rwy 7L	2010-11	SY	6,600	$144	$950,400
5	Taxiway H Extension to Rwy 31	2010-11	SY	3,300	$144	$475,200
N	**Fuel Farm**					**Beyond planning period**
					Total Capital Project Costs	**$720,883,195**
	OTHER COSTS					
	Mobilization	5%				$36,044,200
	Design & Program Management	20%				$144,176,600
	Contingencies	20%				$144,176,600
	Total Other Costs					**$324,397,400**
					Total Program Costs	***$1,045,280,595***

Source: PB Americas, Inc. and Norris & Associates, Inc.

SY: Square Yards
SF: Square Feet
Estimates based on 2007 dollars
[1] Mead & Hunt RSA Costs
[2] Project funded by others
Revised: March 26, 2008

A. Proposed Runway 7R-25L

The development of Runway 7R-25L that is proposed to have a length of 7,000 feet and be located 3,540 feet south of Existing Runway 7R-25L (future 7C-25C) includes the following implementation projects:

A-1 **Environmental Impact Statement (EIS) (2015-2016):** The EIS approval process is required by the FAA before the implementation of the runway development project can begin. This study requires approximately two years too complete. Major environmental issues to be assessed include the relocation of approximately 192 residential properties, and the relocation of East College Avenue which will impact the Milwaukee Area Technical College (MATC).

A-2 **Land Acquisition (2017-2018):** In preparation for the construction of the Proposed Runway 7R-25L, this project requires the acquisition of approximately 420 acres of developed land that is required for the proposed 7,000 feet by 150 feet runway, and the associated Group V parallel taxiway system. Properties to be acquired include the recently closed 102-acre 440th U.S.A.F. Reserve base, the approximately 192 single-family homes located on the north side of East College Avenue, approximately 30 commercial properties, and approximately 37 industrial properties. In addition approximately 16 additional public owned properties will be required or their functional use will be impacted by the land acquisition program.

A-3 **Demolition of Structures (2018-2019):** After sufficient land is acquired to initiate the construction of Runway 7R-25L, the demolition of approximately 307 structures will be required. This will include military, commercial, and residential structures. The approximately 90 acres of property located outside the object free areas that are not required to be removed in this project will become a part of the proposed MKE Aviation Related Commercial Land Use Development Area.

A-4 **Site Preparation / Drainage (2018-2019)**: This task will require the removal of all USAF facilities, power poles, roadways, and underground utilities that are within the approximately 316-acre object free area and runway protection zones associated with the proposed Runway 7R-25L. This project also includes site grading of the Runway 7R-25L and the construction of a surface drainage system.

A-5 **Relocate East College Avenue (2018-2019):** To provide for the construction of Runway 7R-25L approximately 5,400 linear feet (43,000 square yards) of East College Avenue will require relocation. The relocated roadway will be located 800 feet to the south and parallel to Runway 7R-25L and tie back in with East College Avenue at the south end of 6th Street.

A-6 **South Howell Avenue Tunnel (2018-2019):** A 1,100 foot x 200 foot section of the existing four-lane South Howell Avenue will require a tunnel under the proposed Runway 7R-25L. This tunnel will pass under the proposed 150 foot wide runway; a 75 foot wide parallel taxiway located 400 feet north of the runway, and an airfield service road located 400 feet south of the runway.

A-7 **Perimeter Road (2018-2019):** For airfield safety, maintenance, and security purposes, a 6,400 foot two-lane (26,000 square yards) airfield perimeter security and airfield service road is required to be constructed 400 feet from the centerline and south of proposed Runway 7R-25L.

A-8 **CAT-I Navigation System (2020):** Instrument landing systems required for both ends of Runway 7R-25L include: Glide Slope (GS) Localizer (LOC), Runway Visual Range (RVR), Approach Lighting System (ALS), Precision Approach Path Indicator (PAPI), Middle Marker (MM), and Outer Marker (OM).

A-9 **Perimeter Fence (2020-2021):** For airfield safety and security purposes the proposed runway will require approximately 16,000 linear feet of ten feet high perimeter fence. The fence will parallel the relocated East College Avenue and be located approximately 750 feet south of the centerline of Runway 7R-25L.

A-10 Runway Construction (2020-2021): The construction of the proposed 7,000 feet x 150 feet Runway 7R-25L will include approximately 116,700 square yards of concrete pavement. This project also includes jet blast pads off of the ends of the runways, runway edge lighting, markings, signing, and ground cover.

A-11 Taxiway Construction (2020-2021): Three sections of 75-foot wide connector taxiways (102,000 square yards) are required to support Runway 7R-25L. This includes the parallel taxiway, two high-speed exit taxiways, and the terminal connector taxiway located 600 feet east of Runway 1L-19R

B. Terminal Modernization

The main terminal improvement program is related to TSA passenger security requirements and growth in scheduled passengers. This project includes the relocation of passenger security areas, concession areas, ticketing areas, baggage claim areas, and terminal access roadway improvements

B-1 Phase-I Central Terminal (2015-2017): This 65,000 square foot project includes the expansion of the main terminal ticketing lobby, baggage claim area, concessions areas, and TSA passenger security areas.

B-2 Phase-II South Terminal (2017): This 48,000 square foot project includes the expansion of the main terminal to the south of Concourse E. Projects include the expansion of second level concessions areas, airline operations areas, baggage claim, and curb-side check-in areas

B-3 Phase III Ground Access (2018): This project requires that approximately 1,700 linear feet (13,600 square yards) of the existing six lane terminal roadway system be expanded. This project also includes the roadway tie-ins with the main parking structure and the ticketing and baggage claim curb fronts.

B-4 Parking Garage Walkway Connector (2018): This 18,000 square foot project includes an enclosed overhead passenger walkway that will connect the second level of the parking garage with the new south terminal expansion project.

C. Air Cargo Facilities

To accommodate the projected growth of air cargo tonnage, the proposed air cargo apron and warehouse projects are recommended to be developed west of the existing air cargo area.

C-1 Environmental Assessment (EA) (2009): The EA approval process is required by the FAA before the air cargo facility project can begin. Potential environmental issues related to this project may include the clean-up and removal of the existing public parking Lot B.

C-2 Phase I Site Preparation/Drainage (2012): This project requires that approximately 20 acres of land located west of the existing air cargo center be cleared, graded, and a surface drainage system installed.

C-3 Phase I Air Cargo Warehouse (2012): To accommodate the projected growth in air cargo tonnage, a new 60,000 square foot multi-story air cargo warehouse is proposed to be constructed west of the existing air cargo warehouse.

C-4 Phase I Air Cargo Apron (2012): This 49,000 square yard aircraft parking apron will support approximately two additional wide-body air cargo aircraft.

C-5 Phase I Truck/Employee Parking (2012): This 6,600 square yard project will include an area for 30 air freight trucks and 60 employee parking spaces.

C-6 Phase II Site Preparation/Drainage (2020): This second phase of the air cargo warehouse development project requires that approximately 20 acres of land located west of the Phase-I air cargo project be cleared, graded, and a surface drainage system installed.

C-7 Phase II Air Cargo Warehouse (2021): This 50,000 square foot air cargo warehouse expansion project will be located west of the Phase-I air cargo warehouse project.

C-8 Phase II Air Cargo Apron (2021): This 39,000 square yard apron expansion project will be located west of the Phase-I apron project and south of the existing air cargo apron that parallels Taxiway A. This apron expansion project will provide space for the parking for approximately two air cargo aircraft.

C-9 Phase II Truck/Employee Parking (2021): This 2,800 square yard project will include an area for 20 air freight trucks and 25 employee parking spaces.

D. Runway 7R-25L & 1L-19R RSA Improvements

The existing Runway 25L Extended Runway Safety Area (ERSA) is 600 feet by 500 feet and the FAA requires that the ERSA be 1,000 feet by 500 feet. The following project descriptions discuss the recommended solution which includes the relocation of the Runway 25L threshold by 539 feet, and the extension of Runway 7 by 539 feet. This results in an interim runway length of 8,012 feet.

D-1 Relocate 6th Street (2008-2010): For future access to the mid-field area from the existing terminal complex, as well as to support the existing commercial businesses located along 6th Street, it is recommended that a 6,400 foot by 24 foot (17,400 square yards) section of 6th Street be relocated around the proposed Runway 7R ERSA and tie in with relocated East College Avenue. The existing Amtrak Airport Rail Station and passenger parking area will be maintained and access to the rail station will be from the proposed relocated 6th Street. The impacted public parking spaces in overflow lot 'B' will be relocated to the proposed expanded terminal area parking structure.

D-2 Shift Runway 7R 529 Feet West and Construct Taxiway N for 25L (2009-2010): This 9,000 square yard paving project includes the extension of Runway 7R and parallel Taxiway 'A' to the west. This project also includes lighting, pavement marking, striping, signing and ground cover. Associated with this project is the relocation of Taxiway N from the WANG apron to the relocated threshold of Runway 25L, and Runway 31.

D-3 **Construct College Avenue Tunnel Under 1L RSA (2009-2012):** This project includes the construction of a 560 feet long by 100 feet wide two-bore tunnel under College Avenue.

D-4 **Remove Pavement on Runway 25L - Remark & Relight (2009-2013):** This project will includes the removal of approximately 21,000 square yards of pavement as well as the lighting and marking for the relocated Runway 25L threshold and relocated Taxiway N.

D-5 **Phase 2 Extend Runway 1L 300 feet, Taxiway R 300 feet & Runway 19R Perimeter Road (2009-2013):** The 300 feet by 200 feet extension of Runway 1L and Taxiway R also includes a new perimeter road around the 1,000 feet long by 800 feet wide Runway Object Free Area (OFA), and the installation of in-pavement approach lighting system in the 300 feet runway extension so as to provide a 300 feet displaced landing threshold.

D-6 **Land Acquisition 25L RPZ (2010-2013):** This project includes the acquisition of approximately 15 acres of property located east of the Chicago-Northwestern Railroad and within the relocated 25L Runway Protection Zone.

E. Concourse F

To provide for increased passenger activity, a two-level 7-gate (6-narrowbody and 1-widebody) aircraft concourse is proposed to be constructed west of existing Concourse E.

E-1 **Site Preparation/Drainage (1011-2012):** Approximately 19-acres of land located southwest of the existing terminal will require clearing, grading and the installation of a surface drainage system.

E-2 **Relocate GSE (2011-2012):** The existing airline owned Ground Service Equipment (GSE) facility that is located in the southwest terminal area is proposed to be relocated to a site on the north side of the terminal apron in the west section of the existing employee parking lot. The facility will include a 2,000 square foot single-story building with a 4,400 square yard equipment storage apron and employee parking area.

E-3 **Construct Concourse F (2011-2012):** This two-level seven-gate concourse will be 450 feet long by 100 feet wide and contain 90,000 square feet of hold rooms, concessions, and airline operations space.

E-4 **Aircraft Apron (2010-2011):** In support of the new seven-gate Concourse F, the Concourse F aircraft parking apron will be expanded to the west by 96,600 square yards. This Group IV (112.5 feet object clearance from taxilane centerline) apron expansion project will tie into Taxiway ‘A’.

E-5 **Fuel Hydrant System (2010-2011):** This project will include seven additional fuel pits for Concourse F and the proposed fuel transfer system will connect with the existing Concourse E fuel hydrant system.

F. Parking Garage Expansion

To accommodate projected increases in air passengers, the Master Plan Update recommends the expansion of the existing multi-story parking garage. The project will include 1,700 additional parking spaces. This project will also include modification of the garages entrance and exit roadways.

F-1 **Site Preparation/Drainage (2012):** This project includes the clearing, grading, and surface drainage system for approximately seven acres of land.

F-2 **Parking Garage Construction (2012):** This project includes the construction of 1,700 additional parking spaces in the six story garage as well as the expansion of the entrance and exit roadways and exit plaza.

G. Remote Parking Structure

In support of projected increases in air passengers, the Master Plan Update recommends that a new multi-story public parking garage be constructed in the existing grade level lot A with public access from Air Cargo Way. This parking garage is intended to also replace the resulting loss of grade level parking spaces in lots A and B.

G-1 **Site Preparation/Drainage (2015-2016):** This project includes clearing, grading, and a surface drainage system for approximately 11 acres of land.

G-2 **Phase I Construction (2015-2016):** This project includes the construction of a multi-story parking structure that will contain 3,800 spaces. Also included are the associated entrance and exit roadways, toll plazas, signing, lighting, and landscaping.

G-3 **Phase II Construction (2020-2021):** This project includes the expansion of the Phase-I multi-story parking garage by 2,800 additional spaces. Also included are the associated entrance and exit roadways, toll plaza, signing, lighting, and landscaping.

H. Remote Employee Parking

For long-range employee parking requirements, it is recommended that a surface lot containing 600 spaces be developed on airport property. A suitable location for the remote employee parking lot has not been determined at this time. For long-range capital funding purposes, the proposed employee parking lot project H will be maintained as a future capital improvement project and the specific location of the parking lot will be determined during the development of Runway 7R-25L.

H-1 **Site Preparation/Drainage (2010):** This project includes the clearing, grading, and surface drainage system for approximately 11 acres of land.

H-2 **Grade Level Parking Lot (2010):** This project includes the construction of 1,400 grade level employee parking spaces. Also included are security fence, toll plaza, bus stop shelters, striping, lighting, and landscaping.

I. Airport Maintenance

To accommodate additional airfield and terminal area development projects, it is recommended that a new airport maintenance and equipment storage building be constructed on the south side of the existing airport maintenance building No. 26.

I-1 **Site Preparation/Drainage (2017):** This project includes the clearing, grading, and surface drainage system for approximately 4 acres of land.

I-2 **Construct Maintenance Building (2017:** This project includes the construction of a one-story 20,000 square feet metal airfield maintenance and equipment storage building.

I-3 **Storage Yard/Parking (2017):** This project includes 7,000 square yards of equipment storage yards, employee parking, site access road, lighting, and security fencing.

J. Runway 7R Extension (Ultimate 7C)

To provide additional runway length for projected aircraft operations on existing Runway 7R-25L, it is recommended that Runway 7R be extended to its maximum length of 8,473 feet. Due to the location of the CMSPP Railroad, the maximum additional length that can be achieved is 461 feet.

J-1 **Environmental Impact Statement (EIS) (2016):** An environmental approval process is required by the FAA before the implementation of the runway development project can begin. This study requires approximately one year to complete.

J-2 **Land Acquisition Runway Protection Zone (2018):** This project requires that approximately 19 acres of commercial property located east of the CMSPP Railroad be acquired.

J-3 **Site Preparation/Drainage (2016):** This project includes the clearing, grading, and surface drainage system for approximately 12 acres of land.

J-4 **Runway Construction (2020):** Runway 7R is proposed to be extended 461 feet by 150 feet to the west. This runway extension includes a 200 foot by 200 foot blast pad, lighting, striping, signing, and ground cover.

J-5 Taxiway Construction (2020): This project includes the extension of Taxiway 'A'- 731 feet by 75 feet, the construction of a150 feet by 431 feet aircraft hold apron, lighting, signing, striping, and ground cover.

J-6 CAT-I Navigation System (2020): This project includes the relocation of the existing Runway 7R Glide Slope, Localizer, PAPI, RVR, and Approach Lighting System.

K. Concourse G

In support of projected increases in air passengers, a two-level 600 foot by 100 foot double sided concourse containing twelve additional aircraft gate positions is recommended to be developed west of Concourse F. The south end of Concourse G will also be utilized for the international arrivals aircraft gate and passenger processing facility (FIS).

K-1 **Site Preparation/Drainage (2017):** This project includes the clearing, grading, and surface drainage system for approximately 28 acres of land located southwest of Concourse F.

K-2 **Demolition of Hangars and U.S. Post Office (2017):** In preparation of the development of Concourse G, the five existing corporate hangars (buildings 40, 41, 42, 43, and 44) and the U.S. Post Office that are located in the southwest terminal area will be removed. This project contains approximately 100,000 square feet of building space.

K-3 **Construction of Concourse G (2020-2021):** This project includes 160,000 square feet of concourse hold rooms and airline operations space as well as the 700 feet by 50 feet connector walkway and moving sidewalks that will connect the central terminal and Concourse G.

K-4 **Relocate Federal Inspection Facilities (FIS) (2020-2021):** This project includes the 40,000 square feet of U.S. Customs facilities that are required to process a single flight of 300-400 international passengers. The existing FIS facility located on the north terminal apron will be utilized for the expansion of airport management and terminal support purposes.

K-5 **Aircraft Apron (2020-2021):** The proposed apron area for the 12-gate Concourse G will require approximately 94,000 square yards of concrete. The Group V aircraft parking apron for the FIS gate position will tie directly into Parallel Taxiway 'A'. Apron Taxiway 'B' is restricted to Group IV aircraft.

K-6 **U.S Post Office Site Preparation / Drainage (2020-2021):** To provide for the development of Concourse G, the existing U.S. Postal Service facility that is located in the southwest terminal area is recommended to be relocated to the southwest air cargo area just west of the Airport Surveillance Radar (ASR). This project will require clearing, grading, and the installation of a surface drainage system for approximately four acres of land.

K-7 **Construction of U.S. Post Office (2020-2021):** This proposed 40,000 square foot single level facility will require an FAA determination of potential impacts to the signal quality of the adjacent ASR. The U.S.P.S. will be responsible for the development of the post office.

K-8 **Post Office Truck Apron & Public Parking (2020-2021):** This project requires 7,000 square yards of pavement for mail trucks, employee parking, public parking, and vehicle access from relocated 6th Avenue.

K-9 Corporate Hangar Site Preparation/Drainage (2020-2021): It is recommended that the recently closed USAF apron area on the south airfield be utilized for future corporate hangar development and general aviation aircraft parking. In preparation for this hangar development project, approximately 18 acres of land will require clearing, grading and a surface water drainage system. The corporate hangar relocation project includes the reuse of existing USAF hangar No. 217. This existing two-way aircraft access maintenance hangar contains approximately 70,000 square feet and includes maintenance shops and administration offices. The south airfield corporate hangar development project will be developed by individual corporate aircraft operators or Fixed Base Operators (FBO's).

K-10 Construct Corporate Hangars (2020-2021): The replacement of the five corporate hangars that will be displaced by the development of Concourse G are recommended to located on the existing U.S.A.F. south airfield apron. These replacement corporate hangars are to be constructed by corporate aircraft operators.

K-11 Corporate Hangar Apron (2020-2021): This project includes 21,300 square yards of concrete apron located on the north side of the existing USAF apron area. This apron expansion will include Group III aircraft apron taxiway object free area (93 feet) clearance criteria.

K-12 Corporate Hangar Access (2020-2021): This project includes a 1,800 linear foot two-lane access road from South Howell Avenue to the existing south airfield service road. Auto parking for the proposed corporate hangar area and site access includes 7,000 square yards of pavement.

K-13 Fuel Hydrant System (2020-2021): This project will include twelve additional fuel pits. The proposed Concourse G fuel transfer system will tie into the adjacent Concourse F fuel hydrant system.

L. Runway 1R-19L Extension

For long-range north-south airfield capacity considerations beyond the 20-year planning period, the 4,143 feet by 150 feet Runway 1R-19L is recommended to be extended to an ultimate length of 7,000 feet.

This project includes a 2,500 foot by 150 foot extension of Runway 1R, and a 500 feet extension of Runway 19L. With the upgrading of the existing 4,183 feet by 150 feet general aviation runway to a Group V air carrier runway requires the complete reconstruction of the existing 4,183 foot long runway and the associated taxiway connector system. The crossing of the proposed extension of Runway 1R with the proposed Runway 7R-25L, requires that in order to maintain the minimum FAA 0.8 percent grade change between runway development projects, results in the section of new runway between the south edge of the intersection of Runway 7C-25C and 1R-19L, be reconstructed to the new 0.8 percent grade. Also, this new 7,000 foot runway will be equipped with CAT-I instrument landing systems on both ends.

M. Connector Taxiways

At such time as the runway capacity of the south airfield requires
head-to-head aircraft movements between the terminal apron, the proposed Runway 7R-25L, and the south airfield corporate aviation development area, it is recommended that parallel Taxiways ‘R’ and ‘T’ be extended approximately 3,500 feet to the threshold of Runway 1L. Taxiway ‘T’ will be located 400 feet from the centerline of Runway 1L-19R, and parallel Taxiway ‘R’ will be located 267 feet from Taxiway ‘T’.

M-1 **Site Preparation / Drainage (2020-2021):** This project will require the clearing, grading, and surface drainage system for approximately 55 acres of land.

M-2 **Taxiway ‘R’ Construction (2020-2021):** This 4,000 feet by 75 feet parallel taxiway extension will start near the Taxiway connector ‘S’ and connect with the previous 300 foot extension of Runway end 1L. This project will include 34,000 square yards of concrete pavement, lighting, signing, striping and ground cover.

M-3 **Taxiway 'T ' Construction (2020-2021):** This 2,500 feet by 75 feet parallel taxiway extension will start near the Taxiway connector 'S' and connect with the previous 300 foot extension of Runway end 1L. This project will include 24,000 square yards of concrete pavement, lighting, signing, striping, and ground cover.

M-4 **Taxiway V Relocation (2020-2021):** This project includes the relocation of approximately 700 linear feet of Taxiway 'V' beginning at Taxiway 'D' and extending to the threshold of Runway 7L. This project will result in a parallel taxiway 'V' separation distance of 307 feet from Runway 7L-25R. This total project will require approximately 90,400 square yards of pavement.

N. Fuel Farm

The long-range jet-fuel storage requirements for MKE have been projected to be approximately 160,000 barrels. An 8.8 acre site has been reserved by the Airport Division for the development of four 40,000 barrel above-ground fuel storage tanks, secondary truck unloading docks, and for a fuel piping system that will connect to the existing mid-field fuel distribution system. Bulk jet fuel delivery is to be via the existing underground fuel line located along the west side of the Chicago Northwestern Railroad. This project is not required within the 20-year planning period.

8.3 Runway Approach Plans

These drawings (sheets 6 -18 of 21) depict both plan and profile views of the approaches to the ten existing and four proposed runway ends. These drawings document existing and proposed man-made structures, objects of natural growth and terrain which represent obstructions to navigable airspace. The plans depict existing and ultimate approach slopes along with roads and railroads shown on the profile to highest elevation plus the added elevation specified by FAA guidelines. Obstructions to runway approaches are based on the criteria outlined in Federal Aviation Regulations (FAR) Part 77 *Objects Affecting Navigable Airspace*, and FAA Order 8250.3B *United States Standards for Terminal Instrument Procedures* (TERPS).

The specific airspace obstructions to FAR Part 77 where derived from FAA Airport Obstruction Chart (OC) No. 262, published in July, 2001, and from an airspace obstruction survey for MKE that was performed in March, 1999. This airspace obstruction survey was performed by Aero Metrics, Inc. for the Milwaukee County, Wisconsin.

Drawing 6 of 21 Airspace Plan

This 1 inch =2,000 feet FAR Part 77 airspace plan shows the five airspace control surfaces depicted over a USGS base map. The Part 77 obstruction control services include: Primary, Approach, Transitional, Horizontal, and Conical services for the existing five runways, the proposed Runway 7R-25L, and the proposed extensions of Runway 1R and 19L.

Drawing 7 & 8 of 21 Approach Plans for Runway 7L-25R

Runway 7L-25R is recommended to continue to support small general aviation aircraft and maintain visual approach procedures.

- The visual approach to Runway 7L has a 20:1 OCS and the obstruction analysis identified three obstructions. The flag pole is recommended to be relocated and the two lighted hangars are recommended to be waived.

- The visual approach to Runway 25R has one obstruction to the 20:1 OCS and this two-foot violation of a street light located outside the RPZ is recommended to continue to be waived

Drawings 9 & 10 of 21 Approach Plans for Runway 7C-25C

Existing Runway 7L-25R (Ultimate Runway 7C-25C) is recommended to have a 1,000 foot extension to Runway 7C.

- The obstruction analysis for this ultimate 50:1 precision approach OCS for 7C identified five obstructions. These trees and poles are recommended to be removed or lowered to comply with the OCS.

- The obstruction analysis for 25C identified eight obstructions to the existing 50:1 OCS. These obstructions include railroad tracks, lighted poles, and trees. The proposed relocated threshold for 25C will remove these obstructions to the FAR Part 77 50:1 obstruction control surface

Drawings 11 & 12 of 21 Approach Plans for Future Runway 7R-25L

The airspace obstruction analysis for Runway 7R-25L did not identify obstructions to the ultimate 50:1 approach surfaces.

- After 7R-25L is constructed and the existing roadways and structures are removed, no obstructions to the Runway 7R precision 50:1 OCS have been identified.

- After 7R-25L is constructed and the existing roadways and structures are removed, no obstructions to the Runway 25L precision 50:1 OCS have been identified.

Drawings 13 & 14 of 21 Approach Plans for Runway 1R-19L

Runway 1R-19L currently has visual approach surfaces with 20:1 Obstruction Control Surfaces (OCS).

- The ultimate plan for 1R-19L is to lengthen the runway to 7,000 feet, provide GPS precision approach capability, and provide 50:1 obstruction control surfaces. The obstruction analysis for the ultimate 50:1 OCS for 1R did not identify any airspace obstructions.

- The obstruction analysis for the ultimate 50:1 OCS for Runway 19L identified several trees that are recommended to be removed.

Drawings 15 & 16 of 21 Approach Plans for Runway 1L-19R

Runway 1L-19R currently has precision approaches with 50:1 OCS's. The approach to Runway 19R will not change and the threshold to Runway 1L will be extended to the south by 300 feet. The arrival threshold for Runway 1L will not change and will result in a 300 feet displaced threshold. The departure threshold for Runway 1L will begin at the new 300 feet runway extension.

- The obstruction analysis for 1L identified one tree that penetrates the 50:1 OCS and this tree is recommended to be removed.

- The obstruction analysis for 19R identified 15 trees and obstruction lighted poles in the OCS. Also a major high tension electric transmission tower (lighted) was identified that has an 18-foot violation to the OCS. The plan shows the trees and poles to be removed and the transmission tower is recommended to continue to be waived.

Drawings 17 & 18 of 21 Approach Plans for Runway 13-31

Runway 13-31 is recommended to be maintained as a general aviation runway with visual approach procedures:

- The visual approach to Runway 13 has a 20:1 OCS and the obstruction analysis identified a roadway and several trees. The existing displaced threshold is to remain therefore no obstructions are within the relocated 20:1 Part 77 displace threshold obstruction control surface.

- The visual approach to Runway 31 has a 20:1 OCS and the obstruction analysis identified five obstructions to the OCS. With the proposed relocation of the threshold of Runway 31, no obstructions to the Part 77 20:1 obstruction control surface will exist.

8.4 Airport Land Use Plans (Drawings 19, 20 and 21)

The recommended MKE land use plans are depicted on the following three drawings:

Drawing 19 of 21 On-Airport Land Use Plan

The Airport Land Use Plan provides the MKE Airport Division with data to assist in establishing a vision for the aeronautical and non-aeronautical land uses that are located on airport property.

The recommended on-airport land use categories for MKE include:

Airfield:

- Airfield Operating Areas
- Runway Protection Zones & Object Free Areas
- Navaid Critical Areas

Terminal Area

- Air Carrier Apron Areas
- Terminal Facilities
- Public Parking & Terminal Access

Air Cargo Areas

- Air Cargo Aprons and Warehouses
- Freight Forwarders
- US Postal Service
- Express Freight

Airfield & Terminal Support Areas

- Flight Kitchens
- Rental Car Storage Areas
- Air Carrier Aircraft Support Areas
- Taxi & limo Stating Areas
- Fuel Farm
- Airport Grounds Maintenance
- ARFF
- Air Traffic Control Tower
- FAA Navaid Maintenance
- Airport Security
- Aircraft Engine Run-Up Areas
- Employee Parking

Airport Reserve Areas

- o Airport Noise Buffer
- o Surface Drainage
- o 4-F Lands
- o Green Space
- o Community Compatible Development Areas
- o Community Recreational Areas

Aviation Related Commercial Development Areas

- o Revenue Generating Uses
- o Hotel & Related Air Traveler Services
- o Restaurants
- o Airline Administration
- o FAA and Other Government Offices
- o Free Trade Zones
- o Aviation Warehousing
- o Agriculture
- o Airline Aircraft Maintenance Hangars

Military Operations Areas

- o Military Aircraft Aprons
- o Military Hangars
- o Military Support Facilities
- o Military Fuel Storage

General Aviation Areas

- Corporate Hangars
- Fixed Base Operator (FBO) Terminals
- FBO Based & Transient Aircraft Aprons
- T-Hangars

Drawings 21a & 21b of 21 Exhibit A Airport Property Map

The airport property map depicts the existing and ultimate airport property boundaries beginning with the initial land purchase in 1946. The Airport Property Map also depicts the detailed history of the Federal financial participation in the individual parcels as well as land acquisition with State, County, and Local funds. This includes existing and ultimate fee simple land acquisitions as well as noise mitigation program easements.

Descriptions of the potential land acquisition parcels 1 thru 309 that may be impacted by the construction of Runway 7R-25L are included as **Appendix E** which is attached to the end of this Master Plan Update Report.

The determination of the exact amount of Fee-Simple land to be acquired acquisition versus Avigation Easements to be acquired by Milwaukee County will be determined during the Runway 7R-25L land acquisition program process.

Drawing 21 of 22 Airport Photograph

The Airport Photograph is at the same scale (1 inch=600 feet) as the Airport Layout Plan (ALP) and depicts the Airport and the surrounding areas at the time the MKE Airport Master Plan Update was undertaken. The Airport Photograph is dated June 7, 2002.

9.0

Economic Feasibility and Financial Analysis

9.0 *ECONOMIC FEASIBILITY AND FINANCIAL ANALYSIS*

Milwaukee County (the County) operates the Airport System, which is comprised of General Mitchell International Airport (MKE) and the Lawrence J. Timmerman Airport (LJT). This chapter presents a financial plan for MKE's proposed Capital Improvement Plan (CIP). The plan incorporates the Airport's on-going CIP and the master plan projects that were discussed earlier in Chapter 8 of this report. In addition, the financial plan presents an analysis of the financial feasibility of the proposed master plan projects, including a projection of the impact that these projects will have on the Airport's operating revenues and expenses, debt service requirements, rates and charges, cost per enplanement and annual cash flow for the forecast period Calendar Years (CY) 2008 through 2022. Listed below are various sections of this chapter and a description of the content of each:

- 9.1 – Overview of the calculation of the master plan project cost in future dollars.
- 9.2 – Overview of the financial plan for the CIP for the three planning periods; Phase I (CY 2008 – 2012), Phase II (CY 2013 – 2017) and Phase III (CY 2018 – 2022).
- 9.3 – Overview of MKE's current financial framework, including a discussion of the airline lease and the rates and charges methodology.
- 9.4 – Discussion pertaining to the projection of operating and maintenance expense, including the underlying assumptions.
- 9.5 – Discussion pertaining to the calculation of the projected airport system revenues including a discussion of the underlying assumptions.
- 9.6 - Analysis of the impact of the CIP on annual debt service.
- 9.7 – Analysis of the impact of the CIP on Airline rates and charges and cost per enplanement.
- 9.8 – Discussion pertaining to the impact of the CIP on the Airport's annual cash flow and debt service coverage.
- 9.9 – Identify alternatives for the new Airline Use and Lease Agreement.

9.1 Calculation of Master Plan Project Cost

The Master Plan projects as presented and described in Chapter 8 are listed on **Table 9.1-1**. This table, in the first numerical column, shows the master plan project construction costs in 2007 dollars. The second numerical column shows the total project costs including soft costs, which are mobilization, design, program management, and contingency. In the third numerical column are the total project costs escalated to their years of completion.

Table 9.1-1
General Mitchell International Airport
PROPOSED MASTER PLAN PROJECTS
ESCALATED COSTS

NO.	PROJECT DESCRIPTION	TOTAL CONSTRUCTION COST IN 2007 DOLLARS [1]	TOTAL PROJECT COSTS IN 2007 DOLLARS [2]	TOTAL MASTER PLAN COSTS IN ESCALATED DOLLARS [3]	PROJECT COMPLETION DATE	MAJOR CATEGORY
A	Proposed Runway 7R-25L	$234,064,547	$336,693,593	$527,912,399	2021	Airfield
B	Terminal Modernization (Phase I, II, and III)	$53,237,608	$77,194,532	$121,515,179	2017/2018	Terminal
C	Air Cargo Facilities (Phase I & II)	$30,088,212	$43,447,908	$67,927,614	2012/2021	Air Cargo
D	Runways 7R-25L & 1L-19R RSA Improvements	$52,559,150	$76,210,768	$88,266,524	2013	Airfield
E	Concourse F	$52,764,623	$76,508,704	$90,346,912	2012	Terminal
F	Parking Garage Expansion	$28,284,822	$41,012,992	$51,953,874	2012	Landside & Parking
G	Remote Parking Structure (Phase I & II)	$109,506,156	$158,783,926	$264,375,498	2016/2021	Landside & Parking
H	Remote Employee Parking	$1,100,664	$1,595,963	$1,813,840	2010	Landside & Parking
I	Airport Maintenance	$2,453,824	$3,558,044	$5,689,075	2017	Landside & Parking
J	Runway 7R Extension (Ultimate 7C)	$13,465,391	$18,624,817	$30,193,120	2020	Airfield
K	Concourse G	$132,522,407	$192,157,490	$361,879,989	2021	Terminal
M	Connector Taxiways (V&H and T&R)	$10,835,790	$15,711,896	$27,231,257	2011/2021	Airfield
Total Master Plan Project Costs		$720,883,195	$1,041,500,633	$1,639,105,281		

[1] Includes only hard construction cost figures.
[2] Includes both hard and (where applicable) soft costs figures. Soft costs include 5% mobilization, 20% for design and program management and 20% for contingencies.
[3] Assumes professional labor to escalate annually at 3.4%, construction labor to escalate annually at 3.3%, and land to escalate annually at 3.5%, equipment to escalate annually at 1.9% and materials to annually escalate at 6.4%.
All project dollars escalated to year of project completion.

9.2 Development of Financing Plan

The Airport currently has an ongoing CIP totaling approximately $219.6 million. In order to develop a financing plan for MKE, the Airport's ongoing CIP must be added to the

Master Plan CIP shown in **Table 9.1-1**. The combination of the Airport's on-going CIP and the Master Plan CIP is estimated to cost approximately $1.9 billion during CYs 2008 – 2021 shown in **Table 9.2-1**. This table provides a summary of the combined CIP grouped by major project category and development phases: Phase I (2008 – 2012), Phase II (2013 – 2017) and Phase III (2018 – 2022) as defined in chapter 8.

The CIP shows Airfield projects totaling $825.5 million or (44%) of the total CIP, Terminal projects totaling $650.4 million or (35%), Landside and Parking projects comprising $378.8 million or (20%) and various other airport projects totaling $4.0 million.

TABLE 9.2-1
SUMMARY OF COMBINED CAPITAL IMPROVEMENT PROJECTS
General Mitchell International Airport
For Calendar Years 2008 - 2021
($ in millions)

Major Project Category	2008	2009-2012	2013-2017	2018-2021	Total
Airfield Projects	$14.1	$177.6	$152.7	$481.1	**$825.5**
Terminal Projects	3.4	163.6	115.4	368.0	**650.4**
Landside and Parking Projects	6.4	99.9	145.0	127.5	**378.8**
Other Projects	0.7	3.2	0.1	0.0	**4.0**
Grand Total CIP	**$24.6**	**$444.3**	**$413.2**	**$976.6**	**$1,858.7**

9.2.1 Potential Funding Sources

The funding plan focuses on optimizing the use of all available sources of funding, including federal Airport Improvement Program (AIP) funds, Federal Highway Administration funds, passenger facility charges (PFCs) and local and state grants that are potentially available to the Airport. The strategy is to maximize the use of all funding sources based on the eligibility of the projects. Funding requirements remaining after applying the various available sources of equity funding will be funded through the issuance of debt.

Table 9.2-2 provides a summary of the planned funding requirements, based on the composition of projects in the proposed CIP. The funding plan anticipates using: AIP grants totaling $228.4 million; PFCs totaling $268.5 million comprised of $163.9 million of PFC enhanced bonds and $104.6 million that will be applied on a pay-as-you-go basis; State of Wisconsin grants and other funds, including TSA moneys totaling $61.0 million. The balance of the project costs not funded through other sources will be funded with General Airport Revenue Bonds (GARBs) totaling $1.3 billion. The following is a brief discussion of each funding source.

TABLE 9.2-2
SUMMARY OF COMBINED CAPITAL IMPROVEMENT PLAN FUNDING SOURCES
General Mitchell International Airport
For Calendar Years 2008 - 2021
($ In millions)

Funding Source	2008	2009-2012	2013-2017	2018-2021	Total
AIP Grants / Noise Discretionary	$10.1	$102.0	$46.3	$70.0	**$228.4**
Passenger Facility Charges:					
Pay-As-You-Go PFCs	9.0	42.8	22.7	30.0	**104.6**
PFC-Backed Bonds	0.0	101.1	31.7	31.1	**163.9**
State Grants	1.7	15.7	6.0	8.0	**31.4**
Other Funds / TSA Funds	2.0	27.7	0.0	0.0	**29.6**
General Airport Revenue Bonds (GARBS)	2.0	155.0	306.4	837.4	**1,300.7**
TOTAL CIP FUNDING SOURCES	**$24.8**	**$444.3**	**$413.1**	**$976.5**	**$1,858.7**

9.2.1.1 Airport Improvement Program Grants

The AIP was authorized by the Airport and Airway Improvement Act of 1982 (AIP Act). The AIP Act provides funding for airport planning, development and noise compatibility projects for public use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). The AIP program contains two principal sources of AIP grants: 1) entitlement funds which are apportioned among commercial airports based on passenger enplanements and cargo activity and, 2) discretionary funds which are distributed to airports to fund projects that enhance safety and security, preserve existing infrastructure, provide additional airfield capacity, and improve compatibility with neighboring communities. Under current law each medium and large hub airports' apportionment of AIP entitlement funds is reduced by 50% if the airport collects a $3.00 PFC and 75% if the airport collects a $4.50 PFC. MKE is currently classified as a medium hub airport based on its calendar 2007 enplanements meeting the requirement of being between 0.25% and 0.99% of the total U.S. passenger enplanements.

The Airport and Airway Safety and Capacity Expansion Act of 1987 authorized the Federal Aviation Administration (FAA) to administer the Letter of Intent (LOI) program. The LOI was developed to provide an airport a multi-year commitment of funding, pending annual appropriations made by the U.S. Congress. An LOI is typically reserved for projects that are determined by the FAA to have a positive effect on the nation's air transportation capacity and are estimated to have a benefit-cost ratio of at least 1.0 or a net present value of at least zero. The Airport has not previously applied for an LOI.

The Master Plan contains a Proposed Runway 7R-25L with an estimated cost of approximately $528 million. The current funding plan assumes, based on LOI funding for new runways at other airports, that MKE could potentially receive an LOI for $100 million over a period of approximately seven to nine years. This funding plan further assumes that Airport management will apply other funds, if needed, to get the full benefit of the LOI. These other funds, if used, would be reimbursed after the Airport receives the LOI grant receipts. The current funding plan anticipates a combined use of AIP grants including, LOI, and noise discretionary funds totaling $228.4 million.

9.2.1.2 Passenger Facility Charges

MKE currently has the authority to collect PFCs up to approximately $16.8 million with an end date of April 1, 2025 at a rate of $3.00 per qualifying enplanement. However, the funding plan anticipates that Airport management will obtain approval from the FAA to collect at the rate of $4.50 per enplanement effective in CY 2009. The plan anticipates using a portion of this funding source on a pay-as-you-go basis and the remaining amount to pay debt service for GARBs issued to pay for PFC-eligible projects. The plan anticipates the issuance of PFC-enhanced bonds for $163.9 million of project costs and $104.6 million of PFCs applied on a pay-as-you-go basis.

9.2.1.3 State Grant Funding

The State of Wisconsin provides matching funds for projects that receive AIP grants from the FAA. Generally, if the Airport receives an AIP grant for 75% of the cost of a project, the State of Wisconsin will provide a grant of 12.5% of the cost provided that the Airport provides the remaining 12.5% of the funding. It is assumed that MKE will receive approximately $31.4 million in State of Wisconsin grant funds including approximately $2.4 million per year during CY 2017 to 2021 when the new runway is being constructed.

9.2.1.4 Other Funds Transportation Security Administration/Airport Surplus Funds

The current funding plan estimates that additional funds will be available from the Airport Surplus Funds (ASF) and the Transportation Security Administration Funds (TSA). The ASF represents excess money generated from the airport operations after all obligations are met. The TSA was formed following the events of September 11, 2001, to assist in providing security for the U.S. transportation system. The funding plan assumes approximately $20.6 million of TSA and $9.0 million in ASF funds.

9.2.1.5 General Airport Revenue Bonds

The funding plan assumes applying various equity sources first before utilizing debt funds. However, it will be necessary to issue additional debt in order to fully fund the CIP projects. Therefore, the plan anticipates issuing GARBs in the amount of $1.3 billion in order to meet the remaining funding requirements of the CIP. The GARBs will be payable from general airport revenues.

9.3 Airport System Financial Framework

The County operates the Airport System, which is comprised of MKE and the LJT Airport, as an Enterprise Fund in accordance with generally accepted accounting principles (GAAP) for governmental entities.

The Airport System currently operates under a residual rate methodology agreement with 12 air carriers, which captures the cost related to the airport operations though six cost/revenue centers. The six cost/revenue centers are:

- Airfield
- Terminal
- Apron
- Roads and Grounds
- Air Freight
- Flexible Response Security

The airlines serving the Airport through the payment of rates and charges are required to pay for all costs of operating the Airport that are not paid from other sources. The Airport Use and Lease Agreement (AUA) requires that all revenues earned at the Airport, such as revenues from the Airport's concession program, be applied against the costs of operating the Airport prior to the calculation of the airline rates and charges.

The current AUA is scheduled to expire on September 30, 2010. However, the financing plan developed in this document assumes that the current cost center structure and rates and charges methodology will exist throughout the forecast period. However, during the forecast period this report assumes that, when necessary, Airport management may be required to make changes to the rate methodology that are beneficial to the Airport and the airlines currently providing service.

Therefore, this report includes certain adjustments to the rate methodology that are believed to be necessary and in the best interest of the parties. However, such changes when made do not change the basic residual nature or intent of the AUA.

Airline Rates and Charges Methodology

The primary airline rates and charges for the use of the Airport and its facilities are landing fees, terminal rates, apron fees and flexible response security charges. The airline rates and charges are calculated using a cost center residual methodology, whereby the airlines are responsible for paying landing fees, terminal rentals, and apron rentals to recover the annual net deficits in the Airfield, Terminal, and Apron cost centers. The methodology for calculating each of the rates is briefly described below.

a) *Landing Fees*. The Signatory Airlines are responsible for paying landing fees in an amount necessary to recover the Airfield net deficit, which is defined as total annual Airfield expenses minus a credit for non-airline airfield revenues. Airfield expenses consist of:

- Operation and Maintenance (O&M) expenses
- Depreciation (principal payments on General Obligation (GO) bonds issued before 2000)
- Principal and Interest on bonds issued in 2000 and after.

The Airfield expenses listed above are reduced by the following revenue credits to arrive at the Airfield net deficit:

- Military landing fee revenue
- General aviation revenues
- Air cargo rents

The non-signatory airlines are charged a landing fee that is 120% of the fee charged to signatory airlines, and non-signatory cargo carriers are charged a landing fee that is 105% of the fee charged to signatory airlines.

b) *Terminal Rents*. The Signatory Airlines pay annual terminal rent in an amount necessary to recover the Terminal net expense. The Terminal net deficit is calculated by aggregating all expenses for the Terminal cost center and the Roads and Grounds cost center and deducting certain revenues that are used to offset these expenses as listed below.

- Annual Terminal O&M expenses

- Annual Terminal Cost Recovery Amount
- Depreciation (principal payments on GO bonds issued before 2000)
- Principal and Interest on bonds issued in 2000 and later

The Terminal net deficit is computed by reducing the Terminal expenses listed above by the following revenue credits:

- Non-airline terminal rentals
- Concession revenues
- Public Parking revenues
- Other airline revenues, including Utility Resale and Passenger Service Fee revenues.

Rental charges for Terminal space occupied by the signatory airlines are based on a unit of measure called the Equivalent Rental Unit (ERU).

The number of ERUs leased by the signatory airlines is determined by multiplying the square footage of each type of space by weighting factors ranging from 0.20 to 1.10 that are based on the relative cost of providing that type of space. The Terminal net deficit is divided by the number of ERUs leased to airline tenants to derive the airline terminal rental rate. All non-signatory airlines are charged a terminal rate that is 120 percent of the rate charged to signatory airlines for a similar space.

c) *Apron Fees*. Signatory airlines pay annual Apron fees equal to the net deficit for the Apron cost center. The net deficit is calculated as total Apron expenses (O&M expenses, interest, and depreciation) minus non- airline revenues and adjustments. The Apron fee rate is calculated as the Apron net deficit divided by the linear footage of gate positions. Non-signatory airlines pay an apron fee rate that is 120 percent of the rate charged to signatory airlines.

d) *Flexible Response Security Charges*. Flexible Response Security Charges revenue represents amounts collected from the airlines to recover the cost of services provided by the County Sheriff's Department.

9.4 Projected Airport Operating and Maintenance Expenses

The projected O&M Expenses for the forecast period are summarized on **Table 9.4-1.** Based on available information, the O&M Expense projections were developed using the following assumptions:

- Latest estimate of CY 2008 budget provided by MKE staff were used as the base.
- General inflation factor averaging 3.1% annually for each expense category.
- Escalated O&M Expenses for new projects based on historical spending per appropriate unit of measure escalated at the rate inflation.
- Other professional judgment and assumptions as deemed appropriate.

As a result, total O&M Expenses are projected to increase from $52.1 million in CY 2008 to a total of $282.2 million for Phase I compared with $367.3 million in Phase II and $487.7 million for the Phase III. The planning periods for Phase I and II comprise over 50% of the total O&M expenses for the forecast period, which is attributed to the anticipated completion of the following: Baggage Claim Area Renovation in CY 2010, as well as the completion of Concourse F, the Parking Garage Expansion, and the Cargo Apron Expansion in CY 2012. The key project during Phase II is the completion of the Remote Parking Garage Phase I in CY 2016. The remainder of the increase was attributed to the completion of two key long-term projects, consisting of the New Runway and Concourse G that are scheduled for completion during CY 2021.

TABLE 9.4-1
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED OPERATING AND MAINTENANCE EXPENSES
FOR CALENDAR YEARS 2008 - 2022
($ in Millions)

Cost Center	Projected Operating and Maintenance Expense				Avg. Ann. Grth Rate	Avg. Ann. Grth Rate	Avg. Ann. Grth Rate	Avg. Ann. Grth Rate
	2008 [1]	2008-2012	2013-2017	2018-2022	2008 - 2012	2013-2017	2018-2022	2008-2022
Terminal	$31.3	$172.5	$233.2	$328.7	5.8%	8.6%	7.6%	6.8%
Airfield	$17.0	$90.8	$111.7	$131.7	3.7%	3.3%	6.8%	4.4%
Apron	$1.4	$7.9	$10.2	$13.1	7.9%	3.2%	8.6%	6.0%
Flexible Response Security	$2.4	$10.9	$12.2	$14.2	-1.5%	3.0%	3.1%	1.7%
Total O & M Expenses	$52.1	$282.2	$367.3	$487.7	4.9%	6.7%	7.3%	5.9%

[1] CY 2008 Budget provided by MKE staff.

9.5 *Projected Airport System Revenues*

The projected Airport System Revenues are shown on **Table 9.5-1**. The Airport System Revenues consist of all monies received by the Airport System from any source, including all rates, fees, charges, rents and other income derived by Milwaukee County (the County) from the ownership or operation of the Airport System. This does not include any grants and any other non-operating revenues. The MKE staff provided the CY 2008 Budget as the base for the revenue projections. In addition, the following assumptions were used to forecast the Airport System Revenue projections:

For Airline Revenues the forecast was based on:

- Impact of debt service being rate based for selected projects
- Increase in O&M related expenses proportionate to completed projects
- Offset by changes in non-airline revenue credits

For non-Airline revenues the forecast was based on:

- CPI escalation factors of 2.5% between years 2008 – 2012 and 3.0% for the remainder of the forecast period.
- Annual growth of both origin and destination enplanements for car rental and public parking revenues and total enplanements for merchandising, food and beverage concession revenues.
- Anticipated changes in annual minimum guarantees on concessions contracts.
- Impact of introduction of new concession concepts.

Based on these assumptions Airport System Revenues are projected to increase from $73.0 million in CY 2008 to a total of $418.1 million in Phase I, $627.4 million in Phase II and $942.1 million in Phase III, which represents an average annual increase of 10.8% during the master plan period. The significant portion of the increase in Airport System Revenues occurs during Phase III, resulting from the completion of the New Runway and Concourse G during CY 2021. This is followed by Phase II which totals $627.4 million, which is attributed to the completion of Phase I of the Remote Parking Garage in 2016 and completion of the first two phases of the terminal modernization program in 2017.

TABLE 9.5-1
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED AIRPORT SYSTEM REVENUE
FOR CALENDAR YEARS 2008 - 2022
($ in Millions)

Airport Revenues	Projected Airport System Revenues 2008 [1]	2008 - 2012	2013-2017	2018-2022	Avg. Annual Growth Rate 2008-2012	Avg. Annual Growth Rate 2013-2017	Avg. Annual Growth Rate 2018-2022	Avg. Annual Growth Rate 2008-2022
Airfield								
Landing Fees								
Signatory Landing Fees	$12.3	$52.6	$92.1	$131.0				
Non-Signatory Landing Fees	1.4	8.6	16.0	22.7				
Total Landing Fees	$13.7	$61.2	$81.8	$134.8	-6.8%	3.1%	56.8%	16.3%
General Aviation and Other								
Hydrant Fueling Revenues	$0.2	$0.4	$0.1	$0.0				
Hangar Rentals	0.5	2.5	2.8	3.3				
Fuel and Oil Revenue	0.2	1.3	1.2	1.3				
Fixed Base Operator	0.4	2.3	2.6	3.0				
Total GA and Other	$1.3	$6.4	$7.0	$7.9	0.0%	2.1%	3.0%	1.9%
Air Cargo Rentals	$0.6	$3.1	$3.6	$4.1	2.5%	3.0%	3.0%	2.9%
Total Airfield Revenues	$15.6	$70.7	$118.7	$165.7	-5.7%	3.0%	53.2%	15.4%
Terminal								
Signatory Airlines								
Space Rentals	$5.0	$17.7	$29.3	$96.5				
(Over)/Under recovery	0.0	0.0	0.0	1.0				
Other Charges and Fees	0.5	2.8	3.4	4.1				
Total Signatory Airlines	$5.5	$20.5	$32.8	$101.6	-4.3%	32.4%	31.7%	15.8%
Concessions								
Car Rental	$7.6	$43.2	$59.5	$81.5				
Gifts & Novelty	1.5	9.2	15.4	22.5				
Food & Beverage	2.0	13.5	20.4	31.8				
Other	1.5	8.4	11.7	16.4				
Total Concessions	$12.5	$74.3	$106.9	$152.3	8.1%	6.9%	7.1%	7.6%
Public Parking	$26.3	$155.7	$239.8	$363.2	7.9%	8.6%	9.1%	8.8%
Total Terminal Revenues	$44.3	$250.6	$379.5	$617.1	6.7%	10.4%	12.7%	9.8%
Apron								
Signatory Apron Fees	$1.2	$7.8	$13.7	$20.9				
Non - Signatory Apron Fees	0.1	0.4	0.5	0.6				
Total Apron Revenues	$1.3	$8.2	$14.2	$21.5	10.0%	2.4%	27.9%	13.9%
Other								
Flexible Response Security	$1.9	$10.3	$11.9	$13.8				
Other Revenues/Services	3.0	$15.9	$18.2	$21.1				
Total Other Revenues	$5.0	$26.1	$30.1	$35.0	2.7%	3.0%	3.2%	3.0%
PFC Revenues [2]	$6.9	$62.5	$85.0	$102.8	22.1%	5.7%	3.0%	8.5%
TOTAL AIRPORT REVENUES	$73.0	$418.1	$627.4	$942.1	6.1%	7.6%	15.3%	11.0%

[1] CY 2008 Budget provided by MKE staff.
[2] As defined by the Indenture these PFC revenues are solely for the repayment of eligible PFC debt service.

9.6 Projected Debt Service

The projected annual Debt Service for the forecast period is summarized in **Table 9.6-1**. The annual debt service is projected to increase significantly during the planning period resulting from the issuance of five (5) separate financings totaling approximately $1.9 billion in GARBS and an additional $180.7 million in PFC backed bonds, which include financing costs. The timing of the bond financings were based on the cash flow requirements of the master plan projects and to minimize the capitalized interest requirements. The annual debt service is projected to increase from $18.4 million in CY 2008 or an aggregate of $118.7 million during Phase I to an aggregate of $419.2 million in CY during Phase III. The five bond financings are summarized below:

- Issuance of approximately $47.0 million of GARBs in CY 2009 to fund vacant land acquisition for C1 runway, Phase 1 development of Sixth Street parking and design costs for main electric service feed and the baggage claim relocation.
- Issuance of approximately $270.5 million of GARBs in CY 2010 to fund Phase 1 of the cargo apron expansion, the design and construction for Phase 2 of the parking structure and a portion of the new Concourse F project.
- Issuance of approximately $230.7 million of GARBs in CY 2015 to fund Phase 1 of the remote parking garage and a portion of Phase 1 of the terminal modifications.
- Issuance of approximately $679.0 million of GARBs in CY 2017 to fund a portion of the new runway 7R-25L, Phases 2 and 3 of the terminal modifications and Concourse G.
- Issuance of approximately $766.4 million of GARBs in CY 2020 primarily to fund the remainder of the new runway 7R-25L, Phase 2 of the cargo apron expansion, Concourse G and phase 2 of the remote parking garage.

The assumptions used for all bond sizings were a 6% interest rate, 25-year bond term, capitalized interest for GARB bonds for an average of 2.8 years, cost of issuance at 1.5% of par amount, and funded debt service reserve equal to one year maximum annual debt service.

TABLE 9.6-1
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED ANNUAL DEBT SERVICE
FOR CALENDAR YEARS 2008 - 2022
(In Millions)

DEBT SERVICE	Projected Annual Debt Service			
	2008 [1]	2008-2012	2013-2017	2018-2022
GO BONDS				
Existing G.O. Bonds [2]	$1.5	$7.2	$3.4	$0.0
General Airport Revenue Bonds [3]				
Prior GARB Bonds	16.9	81.1	73.6	66.4
Future GARBs [4]				
Series 2009 Bonds	0.0	13.4	18.4	18.4
Series 2010 Bonds	0.0	16.9	109.8	109.8
Series 2015 Bonds	0.0	0.0	21.5	92.9
Series 2017 Bonds	0.0	0.0	1.5	64.7
Series 2020 Bonds	0.0	0.0	0.0	67.0
Total GARBs	$16.9	$111.4	$224.9	$419.2
Total Debt Service	$18.4	$118.7	$228.2	$419.2
Cost Center Allocation				
Terminal	$17.3	$113.2	$201.4	$326.7
Airfield	0.8	4.6	22.7	85.2
Apron	0.2	0.8	4.1	7.2
Total Debt Service	$18.4	$118.7	$228.2	$419.2

[1] CY 2008 Budget provided by MKE staff.

[2] Excludes GO bond debt service paid with PFCs because the corresponding PFCs are not included in Airport System Revenues.

[3] Includes GARB debt service paid with PFCs because the corresponding PFCs are included in Airport System Revenues.

[4] Debt Service on future GARB issues reflects the Airport System's most recent Master Plan CIP and is projected in order to include the best available information in the financial analysis. The most recent CIP funding plan assumes that additional bonds will be sold in 2009, 2010, 2015, 2017 and 2020. Debt service for Future GARBs in 2009, 2015, and 2020 reflects capitalized interest for 2 years. Debt servi for the Future GARB in 2010 reflects capitalized interest for 3 years. Debt service for the Future GARB in 2017 reflects capitalized interest for 5 years. All debt service projections assume a 25-year bond amortization period, 6.0% annual interest and 2% cost of issuance.

9.7 Projected Airline Rates and Charges

The Airport's current AUA is scheduled to expire September 30, 2010. As previously discussed in this chapterthe current rate methodology is a cost center residual, which means that the Airport's intent is to offset all Airport System revenues against the various airline cost centers in determining the annual rates and charges. During the initial projection of the impact of the CIP on the rates and charges, it became clear that maintaining the current methodology would result in the terminal cost center showing a net surplus in several years due to the projected increase in non-airline revenue credits growing at a faster rate than the terminal expenses. To this end, we have assumed that the Airport management and the airlines will retain the existing residual methodology in the new AUA and make the following adjustment to the current allocation by assuming a portion of the non-airline revenue credits, net of related O&M expenses, will be reallocated to the airfield cost center. All projections discussed below are based on this assumption.

Table 9.7-1 summarizes the net deficit from operating the Airfield and provides a summary of the average projected landing fees for the each phase of the planning period. The landing fees are projected to increase from an average landing fee of $1.63 in Phase I to $2.97 in Phase III. The landing fee rates range from a low of $0.43 in 2020 to a high of $10.39 in CY 2022. The lower landing fee in 2020 is due to reallocating a portion of the net revenue credits from the terminal cost center based on the assumption noted above. The specifics of the calculation will be further discussed below in the terminal rate calculation. The higher landing fee rate is primarily due to the completion of the new runway.

The average landing fee rates noted on Table 9.7-1 are all proportionately lower after CY 2009 due to the assumed change in the allocation of net non-airline revenue credits. The aggregate amounts that were determined to be available for transfer to the airfield cost center (the public parking net) are shown on this table under credits.

TABLE 9.7-1
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED AVERAGE LANDING FEE
FOR CALENDAR YEARS 2008 - 2022
($ In Millions) [4]

Landing Fee Calculation	Projected Average Landing Fee Costs				Avg. Annual Growth Rate	Avg. Annual Growth Rate	Avg. Annual Growth Rate	Avg. Annual Growth Rate
	2008 [2]	2008-2012	2013-2017	2018-2022	2008-2012	2013-2017	2018-2022	2008-2022
Airfield Expenses								
O&M Expense	$17.0	$90.8	$111.7	$131.7	3.7%	3.3%	6.8%	4.4%
Depreciation	-0.6	0.8	1.1	0.7		-10.0%	-10.0%	n.a.
Prior GARB Bonds	0.1	0.3						
Future GARBs:								
Series 2009 Bonds	0.0	1.1	2.8	2.8				
Series 2010 Bonds	0.0	0.0	18.2	18.2				
Series 2015 Bonds	0.0	0.0	0.1	0.7				
Series 2017 Bonds	0.0	0.0	0.0	49.7				
Series 2020 Bonds	0.0	0.0	0.0	13.8				
Depreciation and Debt Service	(0.5)	2.2	22.6	86.2		0.3%	96.4%	n.a.
Deposits to Coverage Fund	0.0	0.1	0.9	0.0				
Deposits to O&M Reserve Fund	0.0	0.4	1.0	1.3				
Total Airfield Expense	$16.4	$93.6	$136.2	$219.2	6.0%	1.9%	36.7%	13.8%
Less Credits:								
General Aviation Revenues	$1.1	$5.9	$6.7	$7.6	2.2%	2.5%	3.1%	2.6%
Air Cargo Rentals	0.2	1.0	1.0	1.0	0.8%	0.8%	0.8%	0.8%
Public Parking (Net) [1]	0.0	27.7	31.8	74.3				
Military Landing Fees	0.1	0.5	0.6	0.7	2.2%	2.5%	3.1%	2.6%
Other Non-Airline Revenue	0.8	4.0	4.1	4.6	-1.5%	2.5%	3.1%	1.5%
Total Credits	2.2	39.1	44.2	88.3	52.1%	-7.1%	-30.2%	2.1%
Airfield Net Deficit	14.2	54.5	92.1	131.0	-11.3%	3.1%	56.7%	14.7%
Total Landed Weight (1,000 lbs)	6.4	33.5	38.4	44.1	2.6%	2.8%	2.9%	2.8%
Average Signatory Landing Fee Rate [3]	**$2.24**	**$1.63**	**$2.40**	**$2.97**	-13.6%	0.3%	52.4%	11.6%

[1] Represents net public parking revenues (gross revenues reduced by a proportionate amount of roads and grounds expense) transferred from the Terminal Cost Center.
[2] CY 2008 Budget provided by MKE staff.
[3] Represents the average landing fee for each period, except for CY 2008.
[4] Except for the signatory landing fee rate, which is the whole dollars per thousand lbs of landed weight.

The Terminal rental rates are summarized on **Table 9.7-2**. The average Terminal rental rates are projected to increase from $18.44 per ERU in CY 2008 or an average rate for Phase I of $16.05 per ERU to an average rate for Phase III of $74.11 per ERU. The Terminal rental rate ranges from a low of $7.62 per ERU in CY 2009 to a high of $144.92 per ERU in CY 2022. The low rate is primarily the result of the higher non-airline credits, which results in a lower terminal deficit, which would exist under the current AUA. In contrast, the higher rate in CY 2022 is the result of an increase in terminal requirement primarily due to a sharp increase in annual Debt Service resulting from the completion of the terminal and public parking master plan projects. In general, the average terminal rates are higher than historical trends due to the proposed change in reallocation of a portion of the non-airline revenue credits and the completion of the terminal and public parking master plan projects. The adjustment in the non-airline credits was calculated based on the following assumptions:

1. A minimum terminal rate beginning in 2010 based on the most recent historical trends.
2. All excess non-airline credits could be used to offset airfield expense to arrive at a lower landing fee.
3. A level terminal rate consistent with the amount of total terminal expense anticipated during a specific period.

TABLE 9.7-2
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED AVERAGE TERMINAL RENTAL FEE
FOR CALENDAR YEARS 2008 - 2022
($ In Millions) [5]

Terminal Rental Fee Calculation	Projected Average Terminal Fee 2008 [1]	2008-2012	2013-2017	2018-2022	Avg. Annual Growth Rate 2008-2012	Avg. Annual Growth Rate 2013-2017	Avg. Annual Growth Rate 2018-2022	Avg. Annual Growth Rate 2008-2022
Terminal Expenses								
O&M Expense	$31.3	$141.2	$233.2	$328.7	5.8%	8.6%	7.6%	6.8%
Prior GARB Bonds	9.9	37.1	37.3	28.6	-2.7%	-7.0%	-4.1%	-4.4%
Future GARBS:								
Series 2009 Bonds	0.0	0.2	0.6	0.6				
Series 2010 Bonds	0.0	0.0	59.9	59.9				
Series 2015 Bonds	0.0	0.0	17.0	84.9				
Series 2017 Bonds	0.0	0.0	0.0	7.4				
Series 2020 Bonds	0.0	0.0	0.0	42.7				
Depreciation	2.5	8.2	6.5	3.8	-8.6%	-10.0%	-10.0%	-9.6%
Capital Cost Recovery	2.0	3.1	0.0	1.0				
Depreciation and Debt Service [2]	14.4	48.6	121.2	228.8	-7.0%	13.2%	24.2%	13.6%
Deposits to Coverage Fund	0.0	0.0	7.2	0.0				
Deposits to O&M Reserve Fund	0.3	1.7	4.3	5.4	42.9%	45.5%	48.7%	17.0%
Total Terminal Expense	$46.0	$191.5	$365.9	$562.9	2.6%	10.5%	15.1%	9.6%
Less Credits:								
Other Charges and Fees	$0.5	$2.3	$3.4	$4.1	5.1%	3.7%	3.7%	4.1%
Concessions								
Car Rental Concessions	$7.6	$35.6	$59.5	$81.5	6.3%	6.9%	5.8%	6.4%
Gifts & Novelty	1.5	7.7	15.4	$22.5	9.4%	6.9%	6.9%	9.3%
Food & Beverage	2.0	11.6	20.4	31.8	14.2%	6.9%	10.7%	10.4%
Public Parking	26.3	129.4	239.8	363.2	7.9%	8.6%	9.1%	8.8%
Net adjustment to Parking Revenues [3]		-27.7	-31.8	-74.3	n.a.	n.a.	n.a.	n.a.
Other Terminal Revenues	4.5	19.8	30.0	37.5	4.1%	4.5%	4.7%	4.4%
Total Credits	$42.3	$178.8	$336.6	$466.4	2.7%	8.2%	11.4%	8.1%
Terminal Net Deficit	$3.7	$16.4	$29.3	$96.5	1.8%	35.6%	32.1%	18.7%
Forecast Equivalent Rental Units	200,640	1,023,351	1,129,258	1,302,111	2.4%	2.7%	3.5%	2.5%
Projected Average Terminal Rental Fee [4]	**$18.44**	**$16.05**	**$25.96**	**$74.11**	-0.6%	31.9%	27.7%	15.9%

[1] CY 2008 Budget provided by MKE staff.
[2] Debt service is charged for the Series 2000A and Series 2003A Bonds, and for the portions of the Series 2004A, Series 2005A, 2005B, and 2006B Bond debt service, as well as debt service for future anticipated bond issues, that will not be paid with PFCs.
[3] Represents the total adjustments to parking revenues based on maintaining terminal rates at a predetermined level.
[4] Represents an average rate for the period, except for CY 2008.
[5] Except for the terminal rental fee, which is the whole dollars per equivalent unit.

Finally, the average Apron rates for each planning phase are shown on **Table 9.7-3.** During the forecast period there are five (5) apron projects scheduled to be completed, which will add approximately 2,860 linear feet at MKE. The resulting impact on the average apron fee is projected to change from $256.64 per linear foot during Phase I to an average of $556.45 per linear foot during Phase III. The range in price per linear foot during the master plan period is $227.11 in CY 2008 to a high of $943.68 in CY 2022, following the full completion of all apron projects scheduled during this period.

TABLE 9.7-3
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED AVERAGE APRON FEE
FOR CALENDAR YEARS 2008 - 2022
($ In Millions) [3]

Apron Fee Calculation	Projected Airline Apron fees				Avg. Annual Growth Rate	Avg. Annual Growth Rate	Avg. Annual Growth Rate	Avg. Annual Growth Rate
	2008 [1]	2008-2012	2013-2017	2018-2022	2008-2012	2013-2017	2018-2022	2008-2022
Apron Expenses								
O&M Expense	$1.4	$6.6	$10.2	$13.1	7.9%	3.2%	8.6%	6.0%
Depreciation	0.1	0.2	0.3	0.3	0.0%	0.0%	0.0%	0.0%
Prior GARB Bonds	0.0	0.2	0.2	0.1	n.a.	-18.7%	n.a.	n.a.
Future GARB Bonds		0.0	3.5	6.7	n.a.	n.a.	53.7%	n.a.
Depreciation and Debt Service	0.1	0.4	4.0	7.1	18.1%	-0.9%	50.5%	36.1%
Deposits to Coverage Fund	0.0	0.0	0.0	1.0				
Deposit to O&M Reserve	0.0	0.1	0.1	0.2	n.a.	3.4%	6.9%	n.a.
Total Apron Expense	$1.4	$7.1	$14.3	$21.5	8.4%	2.0%	27.9%	13.2%
Less:								
Non-Airline Credits	$0.2	$0.6	$0.6	$0.6	-4.2%	-5.9%	4.1%	-1.6%
Apron Net Deficit	$1.3	$7.8	$13.7	$20.9	9.6%	2.4%	28.5%	14.0%
Linear Feet	5,648	30,400	33,640	37,200				
Average Apron Fee [2]	**$227.11**	**$256.64**	**$401.31**	**$556.45**	4.9%	2.4%	21.2%	10.7%

[1] CY 2008 Budget provided by MKE staff.
[2] Apron fees represent an average for specified period, except for CY 2008.
[3] Except for the apron fee, which is the whole dollars per linear feet unit.

Table 9.7-4 shows the projected cost per enplanement resulting from the proposed CIP including the master plan projects. The cost is projected to fluctuate from $5.07 in CY 2008 to $21.75 per enplanement in CY 2022. The cost projected after completion of the CIP during CY 2022 in today's dollars would equal approximately $14.11.

TABLE 9.7-4
MILWAUKEE COUNTY AIRPORT SYSTEM
PROJECTED AIRLINE COST PER ENPLANED PASSENGER
FOR CALENDAR YEARS 2008 - 2022
(in millions)

Year		Landing Fees [1]	Terminal Rents & Charges	Apron Fees	Total Airline Payments [2]	Enplaned Passengers	Cost Per Enplaned Passenger
2008		$15.0	$3.7	$1.3	$20.0	4.0	$5.07
2009		$16.5	$1.5	$1.4	$19.4	4.1	$4.71
2010		$9.1	$3.6	$1.5	$14.2	4.3	$3.33
2011		$7.7	$3.6	$1.8	$13.1	4.4	$2.96
2012		$9.2	$4.0	$1.9	$15.0	4.6	$3.27
2013		$23.2	$4.0	$2.6	$29.8	4.8	$6.24
2014		$16.3	$4.0	$2.7	$23.0	5.0	$4.64
2015		$16.3	$4.0	$2.7	$23.0	5.1	$4.48
2016		$12.9	$4.0	$2.8	$19.7	5.3	$3.69
2017		$25.8	$13.4	$2.9	$42.0	5.5	$7.59
2018		$16.2	$13.4	$2.9	$32.6	5.8	$5.67
2019		$8.2	$13.4	$3.0	$24.6	6.0	$4.12
2020		$3.7	$13.4	$3.1	$20.2	6.2	$3.27
2021		$6.0	$15.4	$3.9	$25.2	6.4	$3.92
2022		$96.2	$40.9	$8.0	$145.1	6.7	$21.75
Average Annual Growth:							
Phase I	(2008 -2012)	-11.5%	1.8%	9.6%	-6.9%	3.9%	-10.4%
Phase II	(2013 -2017)	2.6%	35.6%	2.4%	9.0%	3.8%	5.0%
Phase III	(2018 -2022)	56.0%	24.9%	22.8%	28.1%	3.8%	23.4%
Total	(2008 -2022)	14.2%	18.7%	14.0%	15.2%	3.8%	11.0%

[1] Exclude landing fees paid by cargo carriers and military aircraft.
[2] Airline payments projected based on amounts to be included in the airline rate base, which exclude debt service costs paid with PFCs.

9.8 Projected Annual Discretionary Cash Flow and Debt Service Coverage

Table 9.8-1 shows the impact on MKE's average annual net discretionary cash flow and debt service coverage resulting from the full implementation of the CIP. The annual net discretionary cash flow fluctuates between a low of $0.4 million in CY 2008 and a total of $10.8 million in Phase I, $20.0 million in Phase II to a high of $30.0 million in Phase III. The annual debt service coverage for CY 2008 is budgeted to be 1.49 with the average annual debt service coverage for each phase ranging from a low of 1.33 to a high of 1.49 and is projected to consistently exceed the current debt service coverage requirement of 1.25 throughout the forecast period.

TABLE 9.8-1
MILWAUKEE COUNTY AIRPORT SYSTEM
CASH FLOW AND AVERAGE DEBT SERVICE COVERAGE
FOR CALENDAR YEARS 2008 - 2022
(In Millions)

Cash Flow and Debt Service Coverage	Cash Flow and Average Debt Service Coverage 2008 [1]	2008-2012	2013-2017	2018-2022
AIRPORT SYSTEM REVENUES [2]				
TOTAL REVENUES	$73.0	$418.1	$627.4	$942.1
O&M EXPENSES	$52.1	$281.2	$367.3	$487.7
NET REVENUES	$21.0	$136.8	$260.1	$454.4
NET DISCRETIONARY CASH FLOW				
Net Revenues	$21.0	$136.8	$260.1	$454.4
Less: Debt Service				
G.O. Bonds	$1.5	$7.2	$3.4	$0.0
Prior GARB Bonds	16.9	81.1	73.6	66.4
Future GARBs:				
Series 2009 Bonds	0.0	13.4	18.4	18.4
Series 2010 Bonds	0.0	16.9	109.8	109.8
Series 2015 Bonds	0.0	0.0	21.5	92.9
Series 2017 Bonds	0.0	0.0	1.5	64.7
Series 2020 Bonds	0.0	0.0	0.0	67.0
Less: Deposits to O&M Reserve Fund	0.3	2.1	3.6	5.2
Less: Deposits to Coverage Fund [3]	0.0	0.2	8.4	0.0
Less: Reimbursement of Tax Levy	2.0	5.1	0.0	0.0
Net Discretionary Cash Flow	$0.4	$10.8	$20.0	$30.0
COVERAGE CALCULATION [4]				
Net Revenues	$21.0	$136.8	$260.1	$454.4
Add Other Available Funds:				
Prior GARB Bonds	4.2	20.3	18.4	16.6
Future GARBs:				
Series 2009 Bonds	0.0	3.4	4.6	4.6
Series 2010 Bonds	0.0	4.2	27.5	27.5
Series 2015 Bonds	0.0	0.0	5.4	23.2
Series 2017 Bonds	0.0	0.0	0.4	16.2
Series 2020 Bonds	0.0	0.0	0.0	16.7
Net Revenues plus Other Available Funds	$25.2	$164.7	$316.3	$559.1
Debt Service:				
Prior GARB Bonds	16.9	81.1	73.6	66.4
Future GARBs:			0.0	0.0
Series 2009 Bonds	0.0	13.4	18.4	18.4
Series 2010 Bonds	0.0	16.9	109.8	109.8
Series 2015 Bonds	0.0	0.0	21.5	92.9
Series 2017 Bonds	0.0	0.0	1.5	64.7
Series 2020 Bonds	0.0	0.0	0.0	67.0
Total GARB Debt Service	$16.9	$111.4	$224.9	$419.2
AVERAGE DEBT SERVICE COVERAGE [5]	**1.49**	**1.48**	**1.41**	**1.33**

[1] CY 2008 Budget provided by MKE staff.
[2] In the Supplemental Resolutions for the Series 2004A, 2005A, 2005B, 2006A and 2006B Bonds, PFC revenues are pledged to the payment of those bonds to the extent that the projects funded with the bond proceeds are approved for PFC funding. Therefore, PFCs projected to be used to pay debt service on those bonds are included in Airport System Revenues. Projected PFC revenues shown on this table also include PFCs anticipated to be used to pay debt service on two future bond issues projected during the forecast period.
[3] Increases to the Coverage Fund Balance not funded with PFCs.
[4] Debt service coverage is calculated as Airport System Revenues (including PFCs pledged for debt service), plus other Available Funds, divided by annual GARB debt service. Other Available Funds, as defined in the Bond Resolution, include amounts on deposit in the Coverage Fund and the Surplus Fund. However, Other Available Funds included in the debt service coverage calculation shall not exceed 25% of annual debt service costs.
[5] Debt service coverage represents an average for the specified period, except for CY 2008.

9.9 Rate Methodology Alternatives for New Airline Use and Lease Agreements

Unison reviewed several AUAs from other airports in an effort to identify some of the more recent trends pertaining to AUAs. The results of this review identified the following trends that should be considered by the Airport:

1. Term of the AUA – The more recent AUAs tend to have shorter lease periods. This trend seems to provide both the airport operators and the airlines more flexibility to manage and react to the many uncertainties of the industry.
2. Pre-funded CIP – Allows for the airport operator and the airlines to agree on a multi-year CIP as a condition to the AUA.
3. Establish fund liquidity – AUAs are beginning to include provisions which provide assurances that the rate methodology will produce adequate liquidity levels. This matter is becoming increasingly important to the rating process.
4. Establish discretionary funds – This fund is established at airports to allow the airport operator additional flexibility to address emergencies without relying on external funding sources. This is a typical designated use of the funds.

As with any airport, the AUA has to be tailored to meet the specific needs of that airport.

Appendix A

GLOSSARY OF TERMS

Air Carriers: The commercial system of air transportation, consisting of the certificated air carriers, air taxis (including commuters), supplemental air carriers, commercial operators of large aircraft, and air travel clubs.

Aircraft Operation: The airborne movement of aircraft in controlled or noncontrolled airport terminal areas and about a given en route fix or at other points where counts can be made. There are two types of operations - local and itinerant. An operation is counted for each landing and each departure, such that a touch-and-go flight is counted as two operations. (FAA Stats)

Airport: An area of land or water that is used or intended to be used for the landing and taking off of aircraft, and includes its buildings and facilities, if any. (FAR 1)

Airport Elevation: The highest point of an airport's usable runways, measured in feet above mean sea level. (AIM)

Airport Layout Plan (ALP): A scale drawing of existing and proposed airport facilities, their location on an airport, and the pertinent clearance and dimensional information required to demonstrate conformance with applicable standards.

Airport Master Plan (AMP): A long-range plan for development of an airport, including descriptions of the data and analyses on which the plan is based.

Airport Reference Code (ARC): A coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at an airport. (Airport Design AQ)

Airport Reference Point (ARP): The latitude and longitude of the approximate center of the airport.

Airport Use Agreement: Legal contract for the air carriers' use of the airport and leases for use of terminal facilities.

Air Taxi/Air Charter Operation: Includes operations which are not major air carrier operations, but which are performed in revenue service, on aircraft with fewer than 60 seats. This includes carriage of passengers in unscheduled, on-demand operations; and cargo operations. Also includes operations of some corporate aircraft carrying passengers in unscheduled, on-demand operations.

Ambient Noise Level: The level of noise that is all-encompassing within a given environment for which a single source cannot be determined. It is usually a composite of sounds from many and varied sources near to and far from the receiver.

Approach Protection Easement: A form of easement which both conveys all of the rights of an avigation easement and sets specified limitations on the type of land uses allowed to be developed on the property.

Approach Speed: The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration. (AIM)

Apron: A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

Area Navigation: A method of navigation that permits aircraft operations on any desired course within the coverage of station-referenced navigation signals or within the limits of self-contained system capability.

Avigation Easement: A type of easement which typically conveys the following rights:

- A right-of-way for free and unobstructed passage of aircraft through the airspace over the property at any altitude above a surface specified in the easement (usually set in accordance with FAR Part 77 criteria).

- A right to subject the property to noise, vibrations, fumes, dust, and fuel particle emissions associated with normal airport activity.

- A right to prohibit the erection or growth of any structure, tree, or other object that would enter the acquired airspace.

- A right-of-entry onto the property, with proper advance notice, for the purpose of removing, marking, or lighting any structure or other object that enters the acquired airspace.

- A right to prohibit electrical interference, glare, misleading lights, visual impairments, and other hazards to aircraft flight from being created on the property.

Based Aircraft: Aircraft stationed at an airport on a long-term basis.

Blast Fence: A barrier used to divert or dissipate jet blast or propeller wash.

Building Restriction Line: A line which identifies suitable building area locations on airports.

Ceiling: Height above the earth's surface to the lowest layer of clouds or obscuring phenomena. (AIM)

Charter Operations: Defined by the FAA as being a type of Air Taxi operation typically above 60 seats non-scheduled to include vacation tour groups and non-scheduled air freight operations.

Circling Approach/Circle to land Maneuver: A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or not desirable. (AIM)

Clearway: A defined rectangular area beyond the end of a runway cleared or suitable for use in lieu of runway to satisfy takeoff distance requirements. Also known as a Runway Protection Zone (RPZ).

Combining District: A zoning district which establishes development standards in areas of special concern over and above the standards applicable to basic underlying zoning districts.

Commercial Activities: Airport-related activities which may offer a facility, service or commodity for sale, hire or profit. Examples of commodities for sale are: food, lodging, entertainment, real estate, petroleum products, parts and equipment. Examples of services are: flight training, charter flights, maintenance, aircraft storage and tie-down. (CAC)

Commercial Operator: A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. (FAR 1)

Commuter Airlines: A category of airline classified according to the type of aircraft used (maximum of 60 seats) and their operating frequency (at least five scheduled round trip flights per week between two or more points).

Compatibility Plan: As used herein, a plan, usually adopted by an Airport Land Use Commission, which sets forth policies for promoting compatibility between airports and the land uses which surround them. Often referred to as a Comprehensive Land Use Plan (CLUP).

Concession Agreement: An agreement between the airport and a concession regarding the conduct of business on airport property.

Control Zone: Controlled airspace surrounding one or more airports, normally a circular area having a radius of five statute miles plus extensions to include instrument arrival and departure paths. Most control zones surround airports with air traffic control towers and are in effect only for the hours when the tower is operational.

Controlled Airspace: Any of several types of airspace within which some or all aircraft may be subject to air traffic control. (FAR 1)

Day-Night Average Sound Level (DNL): The noise metric adopted by the U.S. Environmental Protection Agency for measurement of environmental noise. It represents the average daytime noise level during a 24-hour day, measured in decibels and adjusted to account for the lower tolerance of people to noise during nighttime periods. The mathematical symbol is Ldn.

Debt Service Coverage: The requirement that the airport's revenue, net of operating and maintenance expenses be equal to a specified percentage in excess of the annual debt service (principal and interest payments) for revenue bond issues.

Decibel (dB): A unit measuring the magnitude of a sound, equal to the logarithm of the ratio of the intensity of the sound to the intensity of an arbitrarily chosen standard sound, specifically a sound just barely audible to an unimpaired human ear. For environmental noise from aircraft and other transportation sources, an A-weighted sound level (sometimes abbreviated dBA) is normally used. The A-weighting scale adjusts the values of different sound frequencies to approximate the auditory sensitivity of the human ear.

Decision Height: With respect to the operation of aircraft, the height at which a decision must be made, during an ILS or PAR instrument approach, to either continue the approach or to execute a missed approach.

Declared Distances: The distances the airport owner declares available for the airplane's takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- *Accelerate-stop distance available (ASDA):* The runway plus stopway (SWY length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff; and

- *Landing distance available (LDA):* The runway length declared available and suitable for a landing airplane.

Deed Notice: A formal statement added to the legal description of a deed to a property and on any subdivision map. As used in airport land use planning, a deed notice would state that the property is subject to aircraft overflights. Deed notices are used as a form of buyer notification to ensure that those who are particularly sensitive to aircraft overflights can avoid moving to the affected areas.

Density of Use: As used in airport land use planning, the term refers to the number of dwelling units per gross acre for residential land uses or the number of people per acre with regard to other land uses.

Designated Body: A local government entity, such as a regional planning agency or a county planning commission, chosen by the county board of supervisors and the selection committee of city mayors to act in the capacity of an airport land use commission.

Displaced Threshold: A landing threshold that is located at a point on the runway other than the designated beginning of the runway (see Threshold). (AIM)

Experimental Aircraft Association: A not-for-profit organization operated exclusively for educational, recreational, and charitable purposes drawing upon the surrounding community for its membership and activities which include youth programs and public services.

Easement: A less-than-fee-title transfer of real property rights from the property owner to the holder of the easement.

Equivalent Sound Level (Leq): The level of constant sound which, in the given situation and time period, has the same average sound energy as does a time-varying sound.

FAR Part 77: The part of the Federal Aviation Regulations which deals with objects affecting navigable airspace.

FAR Part 77 Surfaces: Imaginary airspace surfaces established with relation to each runway of an airport. There are five types of surfaces: (1) primary; (2) approach; (3) transitional; (4) horizontal; and (5) conical.

FAR Part 91-General Operating & Flight Rules: This Federal Aviation Regulation (FAR) prescribes rules governing the operation of aircraft with the US.

FAR Part 139-Certification & Operations: Land airports serving certain air carriers. The regulation governs the certification and operation of land airports which serve any scheduled or unscheduled passenger operation of an air carrier that conducted with an aircraft having and seating a capacity of more than 30 passengers.

FAR Part 150: The Aviation Safety and Noise Abatement Act of 1979 require the FAA to establish regulations that set forth national standards for identifying airport noise and land-use incompatibilities and to develop programs to eliminate them.

Federal Aviation Administration (FAA): The U.S. government agency which is responsible for ensuring the safe and efficient use of the nation's airports and airspace.

Federal Aviation Regulations (FAR): Regulations formally issued by the FAA to regulate air commerce.

Final Approach (IFR): The flight path of an aircraft which is inbound to an airport on a final instrument approach course, beginning at the final approach fix or point and extending to the airport or the point where a circle-to-land maneuver or a missed approach is executed.

Findings: Legally relevant conclusions which expose a government agency's mode of analysis of facts, regulations, and policies, and which bridge the analytical gap between raw data and ultimate decision.

Fixed Base Operator (FBO): A business which operates at an airport and provides aircraft services to the general public, including but not limited to sale of fuel and oil; aircraft sales, rental, maintenance, and repair; parking and tie-down or storage of aircraft; flight training; air taxi/charter operations; and specialty services, such as instrument and avionics maintenance, painting, overhaul, aerial application, aerial photography, aerial hoists, or pipeline patrol.

Fractional Aircraft Ownership:
An aircraft ownership system that is based on a user paying an annual fee to an aircraft leasing company for access to a varied selection of corporate aircraft types. Aircraft operating fees are also paid for the specific type of aircraft and the number of hours flown.

Frangible NAVAID: A navigational aid (NAVAID) which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft. The term NAVAID includes electrical and visual air navigational aids, lights, signs, and associated supporting equipment.

Fuel Flowage Fees: Fees levied by the airport operator per gallon of aviation gasoline and jet fuel sold at the airport.

GPS: A space-base radio positioning, navigation and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system.

General Aviation: That portion of civil aviation which encompasses all facets of aviation except air carriers. (FAA Stats)

General Obligation Bonds: Bonds that are issued by states, municipalities, and other general-purpose governments and backed by the full faith, credit, and taxing power of the issuing government agency.

Glide Slope: An electronic signal radiated by a component of an ILS to provide vertical guidance for aircraft during approach and landing.

Global Positioning System (GPS): A satellite-based radio positioning, navigation, and time-transfer system developed and used by the U.S. Department of Defense. This technology may eventually become the principal system for air navigation throughout the world.

Helipad: A small, designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters. (AIM)

Heliport: A site used for the landing and taking off of helicopters which consists of a takeoff and landing area, helipad/helideck, approach-departure paths, heliport imaginary surfaces, a functioning wind cone, and sufficient lighting.

HIRL: High Intensity Runway Lights

Infill: Development which takes place on vacant property largely surrounded by existing development, especially development which is similar in character.

Instrument Approach Procedure: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority (refer to Nonprecision Approach Procedure and Precision Approach Procedures). (AIM)

Instrument Flight Rules (IFR): Rules governing the procedures for conducting instrument flight. Generally, IFR applies when meteorological conditions with a ceiling below 1,000 feet or visibility of less than 3 miles prevail. (AIM)

Instrument Landing System (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids: (1) localizer; (2) Glide Slope; (3) Outer Marker; (4) Middle Marker; (5) Approach Lights. (AIM)

Instrument Operation: An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility. (FAA ATA)

Instrument Runway: A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved. (AIM)

Inverse Condemnation: An action brought by a property owner seeking just compensation for land taken for a public use against a government or private entity having the power of eminent domain. It is a remedy peculiar to the property owner and is exercisable by that party where it appears that the taker of the property does not intend to bring eminent domain proceedings.

Large Airplane: An airplane of more than 12,500 pounds maximum certificated takeoff weight. (Airport Design AC)

Localizer (LOC): The component of an ILS which provides course guidance to the runway. (AIM)

Limited Part 139-Operating Certificate: A certificate issued under the FAR Part 139 for the operation of an airport serving unscheduled air carrier operations.

Major Airlines: Major airlines are airlines with gross operating revenues during any calendar year of more than $1 billion; national airlines gross between $100 million and $1 billion; and regional airlines gross under $100 million.

Military Operation: An aircraft operation conducted by either a fixed-wing or rotor-wing military aircraft.

Minimum Descent Altitude (MDA): The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided. (FAR 1)

MIRL: Medium Intensity Runway Lights

Missed Approach: A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. (AIM)

National Transportation Safety Board (NTSB): The U.S. government agency responsible for investigating transportation accidents and incidents.

Navigational Aid (NAVAID): Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (AIM)

Noise Contours: Continuous lines of equal noise level usually drawn around a noise source, such as an airport or highway. The lines are generally drawn in 5-decibel increments so that they resemble elevation contours in topographic maps.

Noise Level Reduction: A measure used to describe the reduction in sound level from environmental noise sources occurring between the outside and the inside of a structure.

Nonconforming Use: An existing land use which does not conform to subsequently adopted or amended zoning or other land use development standards.

Nonprecision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided. (FAR 1)

Nonprecision Instrument Runway: A runway with an approved or planned straight-in instrument approach procedure which has no existing or planned precision instrument approach procedure. (Airport Design AC)

Obstruction: Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used therein, the height of which exceed standards established in Subpart C of Federal Aviation Regulations Part 77, Objects Affecting Navigable Airspace.

Overflight: Any distinctly visible and audible passage of an aircraft in flight, not necessarily directly overhead.

Overflight Easement: An easement which describes the right to overfly the property above a specified surface and includes the right to subject the property to noise, vibrations, fumes and emissions. An overflight easement is used primarily as a form of buyer notification.

Overflight Zone: The area(s) where aircraft maneuver to enter or leave the traffic pattern, typically defined by the FAR Part 77 horizontal surface.

Overlay Zone: See Combining District.

Peaking Operation:
Peak hour aircraft operational projections are required to determine the peak period capacity of a runway system, as well as for determining the size of the various functional areas of a passenger terminal.

Planning Area Boundary: An area surrounding an airport designated by an ALUC for the purpose of airport land use compatibility planning conducted in accordance with provisions of the State Aeronautics Act.

Precision Approach Category I (CAT I) Runway: A runway with an instrument approach procedure which provides for approaches to a decision height (DH) of not less than 200 feet (60m) and visibility of not less than ½ mile (800m) or Runway Visual Range (RVR) 2400 (RVR 1800 with operative touchdown zone and runway centerline lights).

Precision Approach Category II (CAT II) Runway: A runway with an instrument approach procedure which provides for approaches to a minima less than CAT I to as low as a decision height (DH).

Precision Approach Category III (CAT III) Runway: A runway with an instrument approach procedure which provides for approaches to minima less than CAT II.

Precision Approach Procedure: A standard instrument approach procedure where an electronic glide slope is provided. (FAR 1)

Precision Instrument Runway: A runway with an existing or planned precision instrument approach procedure. (Airport Design AQ)

Public Airport: An airport that is open to the general public with or without a prior request to use the airport.

Referral Area: The area around an airport defined by the planning area boundary adopted by an Airport Land Use Commission within which certain land use proposals are to be referred to the commission for review.

Reliever Airport: An airport designated as having the function of relieving congestion at a commercial service airport and providing more general aviation access to the overall community.

Revenue Bonds: Bonds which are payable solely from the revenues derived from the operation of a facility which was constructed or acquired with the proceeds of the bonds.

Rotorcraft:
A heaver-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors.

Runway Blast Pad: A surface adjacent to the ends of runways provided to reduce the erosive effect of jet blast and propeller wash.

Runway End Identifier Lights (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

Runway Protection Zone (RPZ): A trapezoidal shaped area off runway end to enhance the protection of people and property on the ground.

Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Safety Zone: For the purpose of airport land use planning, an area near an airport in which land use restrictions are established to protect the safety of the public from potential aircraft accidents.

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection.

Single-Event Noise: As used herein, the noise from an individual aircraft operation or overflight.

Aircraft Landing Gear:
Single-Wheel: The main landing gear consists on a single wheel under each wing. Single-wheel landing gear are typically used on single-engine aircraft weighing less than 20,000 pounds.

Dual-Wheel: The main landing gear consists of two wheels under each wing. Dual-wheel landing gear are typically used on multi-engine aircraft weighing between 20,000 pounds up to 200,000 pounds.

Dual-Tandem: The main landing gear consists of four wheels under each wing. Dual-Tandem landing gear are typically used on multi-engine aircraft weighing over 200,000 pounds.

Small Airplane: An airplane of 12,500 pounds or less maximum certificated takeoff weight. (Airport Design AC)

Sound Exposure Level (SEL): A time-integrated metric (i.e., continuously summed over a time period) which quantifies the total energy in the A-weighted sound level measured during a transient noise event. The time period for this measurement is generally taken to be that between the moments when the A-weighted sound level is 10 dB below the maximum.

Straight-In Instrument Approach: An instrument approach wherein a final approach is begun without first having executed a procedure turn; it is not necessarily completed with a straight-in landing or made to straight-in landing weather minimums. (AIM)

TAF- Terminal Area Forecast: An annual FAA forecast of aviation activity throughout the US used in the FAA's planning and decision making. The TAF is a subset of approximately 900 airports in the National Plan of Integrated Airport Systems (NPIAS) database that contains over 4000 airports.

Taking: Government appropriation of private land for which compensation must be paid, as required by the First Amendment of the U.S. Constitution. It is not essential that there be physical seizure or appropriation for a taking to occur, only that the government action directly interferes with or substantially disturbs the owner's right to use and enjoyment of the property.

Taxilane (TL): The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

Taxiway (TW): A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Safety Area (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Terminal Instrument Procedures (TERPS): Procedures for instrument approach and departure of aircraft to and from civil and military airports. There are four types of terminal instrument procedures: precision approach, nonprecision approach, circling, and departure.

Threshold (TH): The beginning of that portion of the runway usable for landing. In some instances the landing threshold may be displaced. (see Displaced Threshold) (AIM)

Threshold Lights: Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway end.

Touch-and-Go: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. (AIM)

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach. (AIM)

Utility Runway: A runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight or less.

Vertical Flight: Aircraft flight operations by vertical lift aircraft. Typically, vertical lift aircraft include helicopters, tilt rotors, ducted-fan vehicles, and directed-thrust type propulsion systems.

Visual Approach: An approach where the pilot must use visual reference to the runway for landing under VFR conditions.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. VFR applies when meteorological conditions are equal to or greater than the specified minimum, generally, a 1,000-foot ceiling and 3-mile visibility.

Visual Runway: A runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on a FAA-approved airport layout plan or by any planning document submitted to the FAA by competent authority.

Zoning: A police power measure, enacted primarily by units of local government, in which the community is divided into districts or zones within which permitted and special uses are established, as are regulations governing lot size, building bulk, placement, and other development standards. Requirements vary from district to district, but they must be uniform within districts. A zoning ordinance consists of two parts: the text and a map.

Glossary Sources

FAR 1: Federal Aviation Regulations Part 1, Definitions and Abbreviations

AIM: Airmen's Information Manual (1993)

Airport Design AC: Federal Aviation Administration, Airport Design Advisory Circular 150/5300-13 (1993)

FAA ATA: Federal Aviation Administration, Air Traffic Activity

FAA Stats: Federal Aviation Administration, Statistical Handbook of Aviation

NTSB: National Transportation and Safety Board