PLANNING REPORT NO. 38
(2nd Edition)

A REGIONAL AIRPORT SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

Special acknowledgement is due Mr. Otto P. Dobnick, SEWRPC Principal Planner, for his contribution to the conduct of this study and the preparation of this report.

Cover photograph courtesy of Mr. Robert T. McCoy and General Mitchell International Airport.

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A REGIONAL AIRPORT SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010

Prepared by the

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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STATEMENT OF THE CHAIRMAN

This report documents the findings and recommendations of a new regional airport system plan for the seven-county Southeastern Wisconsin Region. The plan produced by that program recommends a coordinated set of airport facility improvements designed to serve the air transportation needs of the Region. The new plan refines and details the second generation regional airport system plan as adopted in 1987. This new plan supersedes the second generation regional airport system plan and provides a revised and updated guide to long-range airport facility development in Southeastern Wisconsin.

The new plan continues to recommend a basic system of 11 essential public use airports to meet the commercial, business, personal, and military aviation needs of the Region. For each of the 11 airports in the basic system, a specific level of improvement is recommended which will enable the airport to safely and efficiently accommodate its share of the total aviation activity of the Region. With respect to airfield facilities, recommended improvements for each airport include needed land acquisition; runway, taxiway, and apron construction; airfield pavement maintenance; and navigational aids. Recommended terminal facility improvements include terminal and administration buildings, aircraft storage and maintenance hangars, service roads, and automobile parking areas. The plan also recommends land use restrictions in the vicinity of each airport, required both to achieve the safe operation of the airport and to minimize conflicts with surrounding land uses, together with certain restrictions on the operations of aircraft at certain airports located in or near urbanized areas.

This report, in addition to describing the recommended new regional airport system plan, presents the findings of new inventories of existing airport facilities and aeronautical activity sets forth airport system development objectives, principles, and standards; presents pertinent new forecasts of the demand for scheduled air passenger, general aviation, and air cargo service; presents analyses of the capacity of existing and planned airport facilities; compares those estimates of capacity to the existing and forecast aviation demand; and identifies and evaluates alternative facility and service improvements designed to alleviate any deficiencies so identified. In addition to describing the improvements needed at the individual public use airports in the new plan, the report presents the estimated capital costs thereof and identifies the actions which must be taken by each of the units and agencies of government concerned to carry out the recommended plan over time. As such, the airport planning data and information collected and analyzed for this new plan constitute a benchmark by which the success of the original and second generation regional airport system plans, the adequacy of existing airport facilities, and the need for airport facilities in the future can be measured.

As is true of all Commission plans, the new regional airport system plan is entirely advisory to the local, State, and Federal units of government concerned. Within the context of the overall regional planning program, the plan described in this report meets applicable Federal update planning requirements for system level planning. As such, it provides a sound basis for the preparation of airport facility master plans necessary for the approval of State and Federal grants in support of airport improvements, and investment in airport improvement, within the Region.

In its continuing role as a center for areawide planning within Southeastern Wisconsin, the Regional Planning Commission stands ready to provide such assistance as may be requested of it to the various levels, units, and agencies of government concerned in the adoption and implementation of the new regional airport system plan.

Respectfully submitted,

David B. Falstad
Chairman

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INTRODUCTION

BACKGROUND

The Southeastern Wisconsin Regional Planning Commission, which exists pursuant to Section 66.945 of the Wisconsin Statutes, is the official areawide planning agency for the seven-county Southeastern Wisconsin Region. The Commission is charged by law with the duty and function of preparing a comprehensive plan for the physical development of the Region. The permissible scope and content of that plan, as outlined in the enabling legislation, extends to all phases of regional development, implicitly emphasizing, however, the preparation of plans for the use of land and for supporting transportation and utility facilities.

The Regional Planning Commission places great importance upon the preparation of a comprehensive plan for the physical development of the Region in the belief that such a plan is essential if land use development is to be properly coordinated with the development of supporting transportation, utility, and community- facility systems; if the development of each of these individual functional systems is to be coordinated with the development of the others; if serious and costly environmental and developmental problems are to be minimized; and if a more healthful and efficient regional settlement pattern is to be evolved.

By the end of 1993, the adopted regional plan consisted of 24 individual plan elements, including, importantly, an airport system plan. The Commission adopted a first-generation airport system plan in March 1976. That plan is documented in Southeastern Wisconsin Regional Planning Commission Planning Report No. 21, A Regional Airport System Plan for Southeastern Wisconsin, December 1975. That initial plan had a 1995 design year. The Commission adopted a second-generation regional airport system plan in June 1987. That plan is documented in Southeastern Wisconsin Regional Planning Commission Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010, May 1987. The second-generation plan had a 2010 design year.

Of the 24 individual plan elements that in 1994 comprised the comprehensive plan for the Region, four are land use-related, including the regional land use plan and the regional park and open space plan; ten are environment-related, including the regional water quality maintenance plans and several watershed development plans; two are community development plans for the Kenosha and Racine urbanized areas; and eight are transportation-related, including the highway and transit system plan, several specific transit system development plans, and the currently adopted regional airport system plan. The regional airport system plan reevaluation must be carried out within the context of the comprehensive regional plan in order that the regional airport system plan may be properly coordinated with the other regional plan elements.

Need for Reevaluation of the Regional Airport System Plan

In 1993, the City of Kenosha considered the potential development of the Kenosha Regional Airport as a major commercial air cargo facility. Since that airport was recommended in the adopted regional airport system plan to be developed as a General Utility Stage II facility, its conversion to a Transport facility would require an amendment of the adopted Regional Airport System Plan.

The Wisconsin Department of Transportation in 1993 initiated work on the preparation of a new State airport system plan. Since the regional airport system plans historically were incorporated into the State plans, amendment of the adopted regional transportation system plan was indicated in order to maintain consistency between the regional and State plans.

The Regional Planning Commission was also aware of certain issues concerning the development of airport facilities in various areas of the Region, including Burlington, Elkhorn, Hartford, and West Bend, which, for proper resolution, required analyses within the context of an amended regional airport system.

Accordingly, the Commission, late in 1993, initiated work on the preparation of a reevaluation of the Regional Airport System Plan for Southeastern Wisconsin. That plan, which would retain a design year 2010, is documented in this report.

Purpose of the Regional Airport System Plan

The regional airport system plan herein documented is thus a refinement of the adopted second-generation system plan and is based upon a careful reevaluation of that second-generation plan, using forecasts to the design year 2010. It recommends a coordinated set of airport facility and service improvements that will provide the seven-county Southeastern Wisconsin Region with an airport system able to serve the business, commercial, sport, and personal general aviation needs of the area, as well as the scheduled air carrier, cargo, and military aviation needs, in an efficient and cost-effective manner. The plan is based on inventories and analyses of the existing airport facilities and aviation demand in the Region and the evaluation of alternative airport improvements which would adequately meet the existing and probable future aviation needs. The findings of the supporting inventories, analyses, forecasts, and evaluation of alternatives, as well as the recommended plan, are summarized in this planning report.

The plan; the supporting inventories, analyses, forecasts, and evaluations; and this report were prepared by the staff of the Southeastern Wisconsin Regional Planning Commission under the guidance of a 21-member advisory committee composed of local, State, and Federal public officials and of knowledgeable citizens concerned with aviation and with the development, operation, and maintenance of airport facilities.

The plan has been prepared in sufficient depth and detail to provide a sound basis for the review, by the Commission and by the Federal and State agencies concerned, of Federal and State grant applications in support of airport facility improvements and for the preparation of airport master plans; for the approval of Federal and State grants-in-aid; and for prudent local capital investment. The plan considers and recommends not only the number, type, size, role, and location of airports needed to serve the Region to the plan design year 2010, but also the general runway orientation and approximate length for each existing and proposed airport in the plan; specifies navigational aid and site requirements in sufficient detail to permit the advance reservation of land for needed facilities or facility expansion; recommends appropriate land uses in the vicinity of all public use airport facilities in the plan; and recommends the means of implementing those improvements. The plan recognizes the interrelationships existing between land use and surface transportation and airport facility development and relates each individual airport to all other airports in the regional system.

THE REGION

The Southeastern Wisconsin Region is composed of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties. Together, these seven counties have an area of about 2,689 square miles, or about 5 percent of the total area of the State. In 1992, these counties had a resident population of 1.84 million persons, or about 37 percent of the total population of the State. The seven counties in 1992 provided about 997,400 jobs, or about 39 percent of the total employment of the State, and contained real property worth about $62.8 billion as measured in equalized valuation, or about 41 percent of all the tangible wealth of the State as measured by such valuation. There were 154 general-purpose local units of government in the seven-county Region in 1992. The Region contains the largest city in the State.

There are three urbanized areas, as defined by the U. S. Bureau of the Census, within the Southeastern Wisconsin Region: the Kenosha, Milwaukee, and Racine urbanized areas. Each of the areas comprises a large central city with a resident population of at least 50,000 persons and the surrounding area contiguous to the central city which is devoted to intensive urban use. The intent of the U. S. Bureau of the Census in defining urbanized areas is to identify those areas which function as an urban entity and, as such, represent a "true physical city."

REGIONAL PLANNING IN SOUTHEASTERN WISCONSIN

As has been already noted, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) is charged by law with the function and duty of preparing a comprehensive plan for the physical development of the Region. The Commission exists to serve and assist the local, State, and Federal units of government in finding practical solutions to developmental and environmental problems which transcend the geographic boundaries and fiscal limitations of individual municipalities and counties. The planning for the orderly physical and economic development of the seven-county Southeastern

Wisconsin Region by the Commission is entirely advisory; participation by local units of government in the work of the Commission is on a voluntary, cooperative basis.

The work of the Commission is seen as a continuing planning effort providing information of value to public and private agencies for making development decisions and for preparing plans and plan implementation programs at the local, State, and Federal levels. It emphasizes close cooperation among the governmental agencies and private enterprises responsible for land use development within the Region and for the design, construction, operation, and maintenance of the supporting public works facilities within the Region.

The size and complexity of the Region make it impractical to prepare and adopt an entire comprehensive development plan for the Region at one time. The Commission has, therefore, prepared individual plan elements which together comprise the required comprehensive plan. Each element is intended to deal with an identified areawide developmental or environmental problem. The individual elements are coordinated by being related to a common, areawide land use plan which makes up the most basic regional plan element. As noted earlier, by the end of 1993 the adopted regional plan consisted of 24 individual plan elements which can be grouped into four functional categories: 1) land use, housing, and community-facility planning, 2) environmental planning, 3) community-assistance planning, and 4) transportation planning. Some of these plan elements have particularly important implications for airport system planning and development, including the regional land use plan, the water resource management plans for the major watersheds of the Region, the regional surface transportation system plan, and, particularly, the regional airport system plan itself.

The regional land use plan has particularly important implications for airport system planning and development because future land use development will influence the need for, and location of, airport facilities. Moreover, the environmentally sensitive lands identified in this plan, including woodlands and wetlands, constitute both constraints upon, and opportunities for, sound airport development. The watershed plans have important implications for airport system planning and development because floodlands and floodland management planning in the Region may affect the expansion and improvement of existing airports and the possible location of new airports. The regional surface transportation system plan has important implications for airport system planning and development since airports must have adequate access and since it is highly desirable for all modes of transportation to interconnect and function efficiently as an integrated system. The regional airport system plan is itself important because it provides the framework within which all airport facilities planning and development must take place.

THE AIRPORT PLANNING PROCESS

The airport planning process is a cooperative effort among the various levels, units, and agencies of government responsible for the planning, design, operation, and maintenance of airport facilities and the users of the aviation system, who create the demand for such facilities. Through the Federal Airport and Airway Development Act of 1970, a national airport planning process was created, calling for participation by every affected element of government, the aviation industry, and the user community. This airport planning process was reaffirmed under the Federal Airport and Airway Improvement Act of 1982, as amended by the Airport and Airway Safety and Capacity Expansion Act of 1987.

The airport planning process consists of a hierarchy of efforts which produce long-range airport system and facility development plans. At the broadest, most general level of the hierarchy is a national airport system plan. Successive plans in the hierarchy include statewide airport system plans, regional or metropolitan airport system plans, and, finally, local airport master plans.

Each succeeding plan in this hierarchy is more detailed and exact, provides a greater amount of information specific to each airport facility, and encompasses a more limited geographic area. Indeed, each type of airport system or facility plan is designed to address the requirements and needs of a certain geographic area or political jurisdiction, whether it be the entire nation, a particular state, a metropolitan area, or an individual airport facility service area.

The National Plan of Integrated Airport Systems (NPIAS) was originally a ten-year plan continually updated and published by the Federal Aviation Administration (FAA). The plan identifies the development of public use airports considered to be in the national interest and thus eligible for Federal financial assistance in support of planning and development. The plan is based on information

developed as a result of state and regional airport system planning, master planning, and national forecasts and information. The FAA recommends that there be a clear identification in the state and regional system plans of which airports and airport developments are recommended for inclusion in the NPIAS. The initial national airport system plan was published in 1972. Plan updates have been issued since at two-year intervals. The most recent update was published in 1995 as a five-year plan.[1]

Statewide airport system plans identify the general location and characteristics of new airports and the general expansion needs of existing airports to meet statewide air transportation development objectives. These plans are normally prepared by state transportation agencies. The initial State airport system plan for Wisconsin was completed in 1976 and was prepared concurrently with the first regional airport system plan for the Southeastern Wisconsin Region.[2] A second-generation State airport system plan was completed in 1978.[3] A directive supplementing the second-generation State airport system plan was prepared in December 1989, which revised the recommended classifications for some airports in the State plan.

Regional or metropolitan airport system plans identify the airport needs for the larger regional and metropolitan areas of the United States. These plans are normally prepared by regional or metropolitan planning organizations and are intended to address the special needs, concerns, and issues of large urbanized and urbanizing regions such as Southeastern Wisconsin. As was noted above, the initial regional airport system plan for Southeastern Wisconsin was prepared concurrently with the initial State airport system plan for Wisconsin and formally adopted by the Regional Planning Commission in March 1976.[4] A second-generation regional airport system plan was completed and formally adopted by the Commission in June 1987.[5] Like the initial plan, the second-generation regional airport system plan was prepared concurrently with the second-generation State airport system plan to ensure that the State and regional recommendations for specific airports remained consistent. Following completion, the regional plans are certified to all of units and agencies of government concerned with air transportation development in the Region. The Federal Aviation Administration recommends that regional and metropolitan plans be incorporated into State airport system plans. Accordingly, it has always been the intent that the regional airport system plan for Southeastern Wisconsin not only comprise a plan for the Region, but also comprise an integral part of the Wisconsin State airport system plan.

The last and most detailed element of the airport planning hierarchy consists of the airport master plans prepared for each specific airport. Airport master plans present site-specific recommendations for the long-range development of each airport in the system. Master plans are required for the sound expansion of existing airports and for the proper siting and development of new airports, regardless of size or functional role. In large metropolitan areas such as Southeastern Wisconsin, aviation planning should be accomplished within the framework of a regional or metropolitan airport system plan which identifies the function that each local airport is to perform in the overall system. Airport master plans are undertaken by the operators of individual airports, usually with the assistance of a consultant.

The preparation of airport master plans constitutes an important step in the implementation of the regional airport system plan. The original and second-generation airport system plans for Southeastern Wisconsin recommended that airport master planning efforts be undertaken for each of the airports identified in the system plan.

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[1]*See U. S. Department of Transportation, Federal Aviation Administration, National Plan of Integrated Airport Systems (NPIAS): 1993-1997, April 1995.*

[2]*See Wisconsin Department of Transportation, Wisconsin State Airport System Plan, May 1976.*

[3]*See Wisconsin Department of Transportation, Wisconsin Airport System Plan: 1986-2010, December 1986.*

[4]*See SEWRPC Planning Report No. 21, A Regional Airport System Plan for Southeastern Wisconsin, December 1975.*

[5]*See SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010, May 1987.*

As of July 1993, airport master plans have been completed for, and adopted by, the local governing bodies responsible for the Kenosha Regional,[6] West Bend Municipal,[7] and Hartford Municipal[8] Airports and for Waukesha County-Crites Field.[9] In addition, airport layout plans, an important element of the airport master planning process, have been completed for Batten Airport in the City of Racine, originally named Horlick-Racine Airport, then renamed John H. Batten Field from 1989 to 1995, and East Troy Municipal Airport. An updated airport layout plan for Waukesha County-Crites Field was completed in 1993. During 1991, work was begun on an updated airport master plan for the Kenosha Regional Airport and on an initial airport master plan for Capitol Airport, in the City of Brookfield. Preparation of an airport master plan for this Waukesha County airport was recommended in the regional airport system plan. As of December 1993, much of the work on the Capitol Airport master plan was completed, issues raised in the planning process were being reconciled by the parties involved, and work on the new master plan for Kenosha Regional Airport was under way.

In 1977, technical work was completed on an airport master plan for General Mitchell International Airport in Milwaukee, but the plan was never adopted by the Milwaukee County Board of Supervisors.[10] During 1987, Milwaukee County began an update of the master plan for Mitchell International, with specific consideration being given to the potential need for additional airfield capacity. In September 1993, this master plan was adopted by the Milwaukee County Board of Supervisors.[11]

From time to time, airport owners and local units of government responsible for airport facility development in and around Southeastern Wisconsin have prepared special-purpose airport studies. A number of such efforts have been conducted. The first such effort, completed in 1968, recommended various terminal facility improvements at General Mitchell International Airport in Milwaukee.[12] The second such study, completed in 1977, recommended a land use development plan for the area surrounding Mitchell International, which is impacted by the noise generated by the operation of that airport.[13] The third such study, examining alternative methods of reducing aircraft noise near Mitchell International, was completed in 1981.[14] This noise and land use compatibility study was prepared under the Federal Aviation Regulation (FAR) Part 150 program, which establishes a standard method for developing and documenting an airport noise-control program. Part 150 studies address the problems created for land uses surrounding airports by the noise associated with the airport operations and allow the airport to become eligible for Federal funding in partial support of noise-control measures. Such studies are intended to have a five-year planning horizon. The Part 150 study for Mitchell International Airport was revised

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[6]*See Mead and Hunt, Inc., Consulting Engineers, Kenosha Municipal Airport Master Plan Study: Final Report, Madison, Wisconsin, September 1976.*

[7]*See R. Dixon Speas Associates, West Bend Municipal Airport Comprehensive Master Plan: Final Report, Minneapolis, Minnesota, October 1976.*

[8]*See Ralph Burke Associates, Hartford Municipal Airport Master Plan Study: Final Report, Minneapolis, Minnesota, February 1981.*

[9]*See R. Dixon Speas Associates, Master Plan, Waukesha County Airport: Final Report, Minneapolis, Minnesota, February 1976.*

[10]*See R. Dixon Speas Associates, Airport Master Plan, General Mitchell Field: Final Report, Minneapolis, Minnesota, January 1977.*

[11]*See Howard Needles Tammen & Bergendoff, General Mitchell International Airport-Milwaukee, Wisconsin-Airport Master Plan Update, Milwaukee, Wisconsin, April 1992.*

[12]*See Arnold Thompson Associates, Inc., Airport Facility Consultants, General Mitchell Field, Passenger and Air Cargo Facilities Master Plan, White Plains, New York, October 1968.*

[13]*See SEWRPC Community Assistance Planning Report No. 15, Off-Airport Land Use Development Plan for General Mitchell Field and Environs— 1977, May 1977.*

[14]*See CH_2M-Hill, Engineering Consultants, Airport Noise Abatement Plan Report, Milwaukee County General Mitchell Field, Milwaukee, Wisconsin, June 1981.*

International Airport was revised and updated in 1988,[15] and again in 1993.[16] As part of the Milwaukee County noise-compatibility program for Mitchell International, the development of a residential sound insulation program as part of a full homeowner's protection plan was undertaken. This program was documented in a special report completed in 1992.[17] An initial Part 150 noise study for Kenosha Regional Airport was also begun in 1992.

In 1986, the Illinois Department of Transportation initiated a major study to determine the need for additional air carrier airport capacity in the greater Chicago region, defined as including portions of Southeastern Wisconsin and Northwestern Indiana. Milwaukee County's General Mitchell International Airport was one of the existing airports to be examined under the study. The study recommended that both short-term and long-term options for sufficient airport capacity continue to be considered, including support for Mitchell International's role as a supplemental airport for the greater Chicago area and preparation of a master plan for a new supplemental airport to the south of Chicago and an analysis of alternative sites. A final report for this study was published in 1988.[18]

In 1989, work was begun on the Illinois-Indiana Regional Airport Site Selection and Master Plan Study, as recommended under the Chicago airport capacity study as the next logical step toward investigating the need for additional airport capacity in the Chicago metropolitan area. During this work, alternative site selection was narrowed to five locations. In 1991, a major report summarizing these alternative sites was published.[19] As of December 1993, the provision of additional capacity at Chicago's O'Hare International Airport or the development of a new supplemental airport somewhere in the Chicago region remained a controversial issue, with no consensus on the issue having been reached among City of Chicago, area suburban, and state officials in Northeastern Illinois and Northwestern Indiana. Nevertheless, State of Illinois officials did decide to fund fully, and proceed with, the preparation of an airport master plan for a new supplemental airport facility located near Peotone, Illinois, about 40 miles south of the Chicago central business district.

During the fall of 1989, a new survey of enplaning passengers using scheduled airline flights at General Mitchell International Airport was conducted by the Regional Planning Commission. The purpose of this survey was to collect updated information concerning the number and type of trips made by passengers at Mitchell International. During 1990, the findings of this survey were published.[20]

STUDY ORGANIZATION

The regional airport system plan reevaluation for Southeastern Wisconsin employed a seven-step planning process. The seven steps were: 1) study organization, 2) formulation of objectives and standards, 3) inventories, 4) preparation of air transportation demand forecasts, 5) analyses of capacity versus demand, 6) design, test, and evaluation of alternative system plans, and 7) plan selection and adoption.

The plan, including its supporting inventories, analyses, forecasts, evaluations, and this report, were prepared by the staff of the Southeastern Wisconsin Regional Planning Commission. Commission staff work under the program was centered in the Transportation Planning Division, supplemented by staff skills in the other planning divisions and support divisions of the Commission.

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[15]*See CH2M-Hill, Engineering Consultants, General Mitchell International Airport, FAR Part 150 Airport Noise Compatibility Plan, Milwaukee, Wisconsin, January 1988.*

[16]*See Coffman Associates, Inc., General Mitchell International Airport F.A.R. Part 150 Noise Compatibility Study, Milwaukee, Wisconsin, October 1993.*

[17]*See Harris Miller Miller & Hanson Inc., General Mitchell International Airport: Development of Residential Sound Insulation Program, Lexington, Massachusetts, August 1992.*

[18]*See Peat Marwick Main & Co., Chicago Airport Capacity Study: Final Report, San Francisco, California, August 1988.*

[19]*See TAMS Consultants, Inc., Site Selection Report-Abstract: Illinois-Indiana Regional Airport, Chicago, Illinois, November 1991.*

[20]*See SEWRPC Technical Report No. 32, General Mitchell International Airport Enplaning Passenger Survey Findings: 1989, August 1990.*

To provide technical guidance in the preparation of the airport system plan, the Technical Coordinating and Advisory Committee on Regional Airport System Planning, which guided the preparation of the first- and second-generation regional airport system plans, was reactivated. This Committee consisted of representatives from both private and public agencies concerned with airport system development and aviation problems within the Region. An important function of the Committee, in addition to providing the necessary technical and policy guidance, was to help familiarize local elected officials with the study and its recommendations and to generate better understanding of study objectives, plan recommendations, and plan implementation procedures among such officials. The Committee had a particularly important role in selecting the final plan and assuring its financial and administrative feasibility. The full membership of this Committee is set forth on the inside front cover of this report.

This reevaluation of the second-generation regional airport planning effort was conducted concurrently with an effort by the Wisconsin Department of Transportation, Bureau of Aeronautics, to revise the State airport system plan. The two planning efforts were closely coordinated and made consistent with respect to objectives, data collection efforts, and plan recommendations. The Commission staff served on a technical advisory group for the State plan revision, together with staff from the Wisconsin Department of Transportation and the Federal Aviation Administration.

SCHEME OF PRESENTATION

The major findings and recommendations of this revised regional airport system plan are documented and presented in this planning report. The plan presented in this effort supersedes the previous, second-generation, regional airport system plan adopted in 1987 and this report replaces SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010.

Chapter II of this report presents the recommendations of the current regional airport system planning effort and assesses the extent to which master planning and implementation activities have been carried out since the 1987 effort. This chapter also identifies the airport-related issues pertinent to this planning effort. Chapter III presents the inventory findings concerning the existing regional air transportation system, including the airports and their facilities, aircraft, airspace, and the Federal Aviation Administration airport classification system. Chapter IV presents inventory findings concerning the existing aeronautical activity patterns in Southeastern Wisconsin, including air carrier activity, general aviation activity, business and corporate activity, military activity, and other general aviation activity, such as helicopter and ultralight operations. Chapter V discusses the legal and institutional issues associated with airport planning. Chapter VI presents airport system plan objectives, principles, and standards. Chapter VII presents the air transportation demand forecasts. Chapter VIII presents the findings and conclusions of the deficiency analyses of the existing airport system as compared with existing and future air travel demand. Chapter IX documents the design and evaluation of alternative airport system improvements. Chapter X presents the reevaluated second-generation regional airport system plan. Chapter XI summarizes the actions necessary to implement the recommended plan. The concluding chapter provides a summary of findings and recommendations of the entire study and update process.

SUMMARY

The regional airport system plan presented in this report is a reevaluation of the second-generation, long-range, areawide plan, covering a period of about 15 to 20 years. It recommends a coordinated set of improvements of airport facilities and services that will provide the seven-county Southeastern Wisconsin Region with an airport system able to serve the business, commercial, sport, and personal general aviation needs of the area, as well as the scheduled air carrier and military aviation needs, in an efficient and cost-effective manner. The plan is based on thorough inventories and analyses of the existing airport facilities and aviation demand in the Region, careful consideration of probable future aviation demands, and the evaluation of alternative airport improvements that would adequately meet the existing and probable future aviation demands. The plan recommendations and the findings of the supporting inventories, analyses, forecasts, and evaluation of alternatives are summarized in this planning report.

This plan updates the second-generation regional airport system plan, completed in 1987. This plan has been prepared in sufficient depth and detail to provide a sound basis for the review of Federal and State grant applications in support of airport facility improvements by the Commission and by

the Federal and State agencies concerned, as well as for the preparation of airport master plans and the implementation of airport improvements. The plan considers and recommends not only the number, type, size, role, and location of airports needed to serve the Region to the plan design year 2010, but also the general runway orientation and approximate length for each existing and proposed airport in the plan, specifies navigational aid and site requirements in sufficient detail to permit the advance reservation of land for needed facilities or facility expansion, recommends appropriate land uses in the vicinity of all public-use airport facilities, and recommends the means for implementation of the recommended public-use airport facility improvements. The plan recognizes the interrelationships existing between land use and surface transportation and airport facility development, relating each individual airport to all other airports in the regional system.

This report, in addition to describing the recommended airport system plan, presents the findings of new inventories of existing airport facilities, aviation services, and aeronautical activity; new forecasts of demand for scheduled air passenger, general aviation services, and air cargo service; analyses of the capacity of both existing and planned airport facilities and a comparison of that capacity to existing and forecast aviation demands; and an evaluation of alternative facility and service improvements designed to alleviate any deficiencies which have been identified. In addition to describing the needed improvements at the individual public-use airports constituting the recommended regional airport system, this report presents estimates of the costs thereof and recommendations concerning the means of implementing the recommended improvements.

There were three principal reasons for a reevaluation of the Regional Airport System Plan. First, the potential development of the Kenosha Regional Airport as a major commercial air cargo facility by the City of Kenosha would require a reclassification of this airport and an amendment to the adopted Regional Airport System Plan. The second reason was to maintain consistency with the new, updated Statewide airport system plan for which work was begun in late 1993. Third, the Commission was aware of issues concerning the development of airport facilities in various areas of the Region, including Burlington, Elkhorn, Hartford, and West Bend, for which proper resolution required analyses within the context of an amended regional airport system.

The new regional airport system plan for Southeastern Wisconsin was developed through the application of a seven-step planning process. The seven steps were: study organization; formulation of objectives and standards; inventories; preparation of air transportation demand forecasts; analyses of capacity versus demand; alternative system plan design, test, and evaluation; and plan selection and adoption. An alternative futures approach was used to forecast aviation activity. The use of this planning approach enabled the performance of alternative systems to be tested and evaluated under a wide range of conditions, culminating in the selection of a system plan that could be expected to work well under widely varying future conditions.

The technical work for this regional airport system plan was performed by the Commission staff. The work of the study was guided by a technical coordinating and advisory committee consisting of representatives from both private and public agencies concerned with airport system development within Southeastern Wisconsin.

Chapter II

EXISTING REGIONAL AIRPORT SYSTEM PLAN

INTRODUCTION

The existing regional airport system plan is a second-generation plan completed in 1987 and documented in SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010. The purpose of this chapter is to review the recommendations of the regional airport system plan as adopted in 1987 and to document the extent to which these plan recommendations have been implemented by the units and agencies of government concerned. The chapter thus describes the development status of each of the airports recommended in the second-generation plan to comprise an integral part of the regional airport system.

THE CURRENTLY ADOPTED REGIONAL AIRPORT SYSTEM PLAN

The adopted second-generation regional airport system plan identifies the number and type of airports that together should comprise the regional airport system required to accommodate the existing and probable future aviation demand in Southeastern Wisconsin. The recommended regional airport system consists of 11 airports, all of which are currently open for use by the general public. Eight of these airports are currently publicly owned and three are privately owned. The second-generation plan recommends the continued operation of, but not necessarily the public acquisition of, the three privately owned airports. Public acquisition of these three airports is recommended only if continued private operation is for any reason proposed to be discontinued.

The second-generation plan recognizes that this basic system of 11 airports would be supplemented by the 12 privately owned and operated airports that existed in the Region in 1987 and that the continued operation of these airports may permit the deferral of some of the major capacity improvements recommended for the airports comprising the regional system. The second-generation plan does not recommend the development of any new airport sites and does not recommend the closure of any privately owned airports not included within the system plan. The adopted second-generation regional airport system plan is shown in graphic summary form on Map 1.

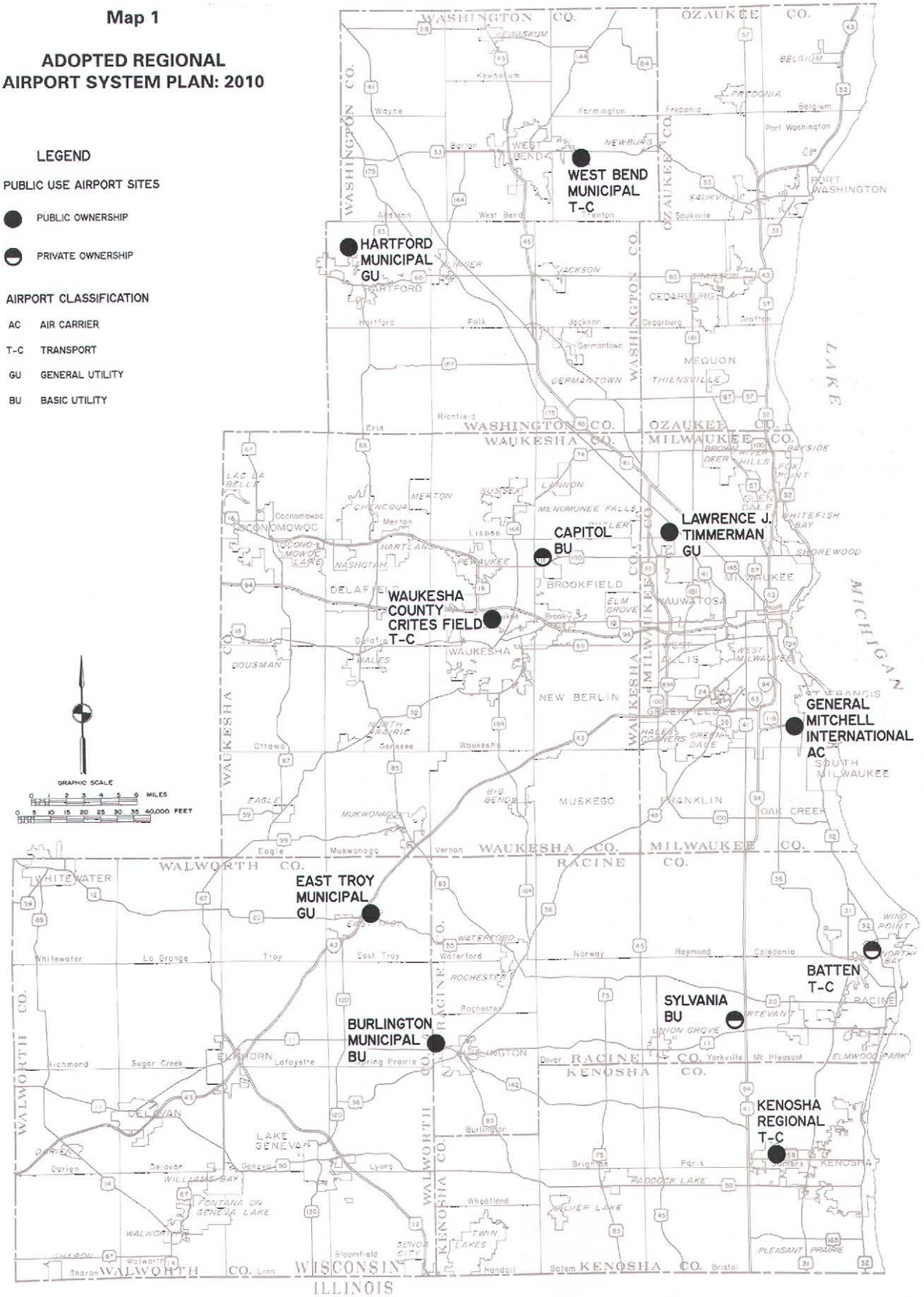
The plan provides recommendations for the improvement of each of the 11 airports that comprise the basic system. These recommendations address the necessary major physical improvements, including land acquisition; runway, taxiway and apron improvements; navigational aid improvements; and terminal facility improvements; as well as recommendations concerning the development of surrounding lands, the development of airport master plans, and the ownership of each airport. The precise design of the recommended facility improvements is left to subsequent airport master planning and project engineering efforts, which are required to further refine, detail, and carry out the recommendations in the regional airport system plan.

One of the most important recommendations of the regional airport system plan is the airport classification proposed for each airport in the plan. Airport classifications define the size and type of aircraft which may be accommodated at an airport and define the function individual airports are intended to perform in the overall regional airport system. Table 1 describes the various Federal Aviation Administration (FAA) airport classifications used under the second-generation regional system planning effort. Table 2 shows, for each airport in the regional airport system, the existing airport classification as of 1984, when work on the regional airport system plan was initiated; the existing classification as of 1993; and the future classification as recommended in the reevaluated second-generation regional airport system plan. The classifications, to be official, must be approved by the FAA.

Because General Mitchell International Airport was proposed to remain the only scheduled air carrier airport within the Region, the remaining airports in the plan were expected to serve as general aviation airports able to accommodate much of the general aviation activity that might otherwise be using Mitchell International. These general aviation airports are intended to serve the surrounding area

Map 1

ADOPTED REGIONAL AIRPORT SYSTEM PLAN: 2010



The adopted second-generation regional airport system plan recommended the minimum number and type of airports essential to accommodate the existing and probable future aviation demands in Southeastern Wisconsin. The system consisted of 11 airports, all of which were currently open for use by the general public, eight of which were publicly owned and three of which were privately owned. The plan did not recommend the closing of any privately owned airports not included within the system plan but recognized that the continued operation of such airports could permit the deferral of some of the major improvements recommended for the 11 essential airports in the regional airport system plan.

Source: SEWRPC.

Table 1

AIRPORT CLASSIFICATION USED BY THE FEDERAL AVIATION ADMINISTRATION FOR AIRPORT PLANNING DURING PREPARATION OF THE SECOND-GENERATION REGIONAL AIRPORT SYSTEM PLAN IN 1987

Airport Class	Description
BU-I	A Basic Utility-Stage I airport is intended to serve all small single-engine, propeller-driven aircraft and the smallest of the twin-engine, propeller-driven aircraft. These aircraft typically seat one to four people, and are generally used for personal and sport flying, and for training and agricultural purposes. Within Southeastern Wisconsin, such an airport would have a minimum primary runway length of 2,800 feet.
BU-II	A Basic Utility-Stage II airport is intended to serve all small single-engine, propeller-driven aircraft and most of the twin-engine, propeller-driven aircraft. Only the largest twin-engine, propeller-driven aircraft, those that typically seat 6 to 14 people, cannot be accommodated. This type of airport accommodates not only those aircraft typically used for personal and sport flying, but also many of the smaller aircraft used for business and charter purposes. Within Southeastern Wisconsin, such an airport would have a minimum primary runway length of 3,300 feet.
GU-I	A General Utility-Stage I airport is intended to serve all single-engine and twin-engine, propeller-driven aircraft. In addition to the smaller aircraft, these airports can accommodate many of the larger twin-engine piston and turboprop aircraft, including those that typically seat 6 to 14 passengers. Within Southeastern Wisconsin, such an airport would have a minimum primary runway length of 3,900 feet.
GU-II	A General Utility-Stage II airport is intended to serve all single-engine aircraft; virtually all twin-engine piston and turboprop aircraft, including propeller-driven aircraft used by commuter airlines and most business and corporate jets. Such an airport usually would have the capability to accommodate precision instrument approach operations. Within Southeastern Wisconsin, such an airport would have a minimum primary runway length of 4,800 feet.
T	A Transport airport is intended to serve all aircraft up to, and including, large jet airliners and military transports. Transport airports are designed to handle primarily scheduled air carrier operations and traffic, but frequently also serve significant levels of general aviation activity. Within Southeastern Wisconsin, such an airport would have a minimum primary runway length of 5,500 feet.

Source: Federal Aviation Administration and SEWRPC.

Table 2

CLASSIFICATIONS OF AIRPORTS IN THE ADOPTED REGIONAL AIRPORT SYSTEM PLAN

Airport	Classifications[a]		
	1984 Existing	1993 Existing	2010 Recommended
General Mitchell International Airport	T	T	T
Batten Airport	GU-II	GU-II	GU-II
Kenosha Regional Airport	GU-I	GU-II	GU-II
Waukesha County-Crites Field	GU-I	GU-II	GU-II
West Bend Municipal Airport	GU-I	GU-I	GU-II
East Troy Municipal Airport	Below BU-I	GU-I	GU-I
Hartford Municipal Airport	BU-I	BU-I	GU-I
Lawrence J. Timmerman Airport	GU-I	GU-I	GU-I
Burlington Municipal Airport	BU-II	BU-II	BU-II
Capitol Airport	Below BU-I	BU-II	BU-II
Sylvania Airport	Below BU-I	Below BU-I	BU-II

[a] *FAA airport classifications used in this table are described in Table 1 and one based on the terminology used from 1984 through 1987.*

Source: SEWRPC.

within an acceptable distance and driving time, as well as to act as reliever airports. As reliever airports, these airports are intended to divert aircraft operations away from Mitchell International and to balance the general aviation demand among all of the airports in the system better. Such a system of reliever airports was concluded in previous regional airport planning efforts to be critical to maintaining the efficient and safe operation of Mitchell International by diverting aviation demand generated within the greater Milwaukee area to outlying airports, such as Lawrence J. Timmerman Airport, Capitol Airport, Waukesha County-Crites Field, and Batten Airport. Should any of these outlying airports become unavailable, a significant portion of the activity once accommodated at these airports may be expected to use Mitchell International, causing congestion, excessive delays, and potential safety hazards. Thus, the efficient and safe operation of General Mitchell International Airport is dependent upon an adequately maintained system of reliever airports in Southeastern Wisconsin. On the basis of their relative importance as reliever facilities and upon the proximity to Mitchell International, all 10 general aviation airports in the plan were recommended in the second-generation system plan to be designated as reliever airports, but were categorized into three levels of relative importance as reliever facilities. The most important reliever general aviation airports were identified as Batten Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and Timmerman Airport; followed by East Troy Municipal Airport and Capitol Airport; and, last, by West Bend Municipal Airport, Hartford Municipal Airport, Sylvania and Burlington Municipal Airport. As of December 1993, the FAA has, as recommended in the system plan, designated seven airports as relievers to Mitchell International. These are Batten Airport, Kenosha Regional Airport, Timmerman Airport, Waukesha County-Crites Field, Capitol Airport, Hartford Municipal, and West Bend Municipal Airport.

The implementation of the regional airport system plan was envisioned as proceeding by means of a series of steps, including plan adoption and endorsement by the units and agencies of government concerned, preparation or updating of an airport master plan for each airport, and then such actual facility development as the construction of specific improvements.

Plan Adoption and Endorsement

The second-generation regional airport system plan recommended that the local legislative bodies and the existing local, areawide, State, and Federal agencies and private parties concerned adopt, endorse, or formally acknowledge, as appropriate, the regional airport system plan. This action was intended to assure a common understanding among the various parties involved. It may also be required by Federal and State regulations either before certain projects could proceed or to maintain State and Federal financial eligibility.

The original, or first-generation, regional airport system plan was adopted by the Regional Planning Commission on March 4, 1976, and documented in SEWRPC Planning Report No. 21, A Regional Airport System Plan for Southeastern Wisconsin. As already noted, the second-generation regional airport system plan was adopted by the Regional Planning Commission on June 15, 1987, and documented in SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010. Following adoption by the Commission, the plans were certified to all units and agencies of government concerned with airport development within the seven-county region. The original regional airport system plan was subsequently adopted by the Milwaukee County Board of Supervisors and the Village of Nashotah in 1976 and was endorsed by the Wisconsin Department of Natural Resources, the Wisconsin Department of Local Affairs and Development, and the Wisconsin Department of Transportation, also in 1976. The second-generation regional airport system plan was subsequently adopted by Waukesha County and the Cities of Franklin, Wauwatosa, and West Bend in 1987; the City of St. Francis in 1988; and the City of Milwaukee in 1989. The second-generation plan was endorsed by the Wisconsin Department of Development and the Wisconsin Department of Agriculture, Trade and Consumer Protection and acknowledged by the U. S. Department of the Army, Corps of Engineers, in 1987. While plan adoption by local units of government has been limited, the regional airport system plan has proven to be a useful tool for local units of government in planning for airport facility improvements and development surrounding airports in Southeastern Wisconsin. The preparation and updating of airport master plans for individual airports and the implementation of improvements at selected airports has continued in a manner consistent with, and has served to implement, the adopted regional airport system plan.

Airport Master Planning Efforts

The Regional Planning Commission has always recognized the cyclical nature of planning for land

Table 3

STATUS OF AIRPORT MASTER PLANNING WORK FOR AIRPORTS IN THE REGIONAL AIRPORT SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: DECEMBER 1993

Airport Name	Completion or Most Recent Update of Airport Layout Plan	Completion or Most Recent Update of Airport Master Plan
General Mitchell International Airport	1993[a]	1993[a]
Batten Airport	1983	--
Kenosha Regional Airport	1977[b]	1977[b]
Waukesha County-Crites Field	1993	1976
West Bend Municipal Airport	1977	1977[c]
East Troy Municipal Airport	1985	--
Hartford Municipal Airport	1992	1991
Lawrence J. Timmerman Airport	--[d]	--
Burlington Municipal Airport	1978	--
Capitol Airport	1992	1990
Sylvania Airport	--	--

[a] *Initial airport master plan and airport layout plan completed in 1977.*

[b] *As of December 1993, an update of the airport master plan and airport layout plan was underway.*

[c] *Feasibility study of airfield expansion alternatives completed in 1993.*

[d] *Portions of airport layout plan completed in 1968.*

Source: SEWRPC.

use and public infrastructure development. This process alternates between system planning and facilities planning. With respect to airports, the system planning is represented by the preparation of regional and State airport system plans; the facilities planning is represented by the preparation of individual airport master plans. Following completion of the original regional airport system plan in 1976, master plans were prepared for a number of the airports included in that first-generation plan. The master plans were intended to provide the basis for either implementation of the system plan or, if implementation were ultimately determined to be infeasible in some respect, for making that conclusion known so that it could be taken into account in the preparation of the next system plan.

Airport master plans are intended to refine and detail the recommendations of a regional airport system-level plan and to provide the next step towards implementation of improvements at a specific airport. An airport master plan, in effect, is a description of the long-term development envisioned for a specific airport. Such a plan illustrates the conceptual development of the airport and reports the data and logic upon which the airport master plan is based. Master plans are prepared to support the modernization and improvement of existing airports and the development of new airports. Following completion of a second-generation regional airport system plan in 1987, master planning efforts had again been undertaken, so that as of December 31, 1993, as listed in Table 3, airport master plans existed for six of the 11 airports comprising the recommended regional airport system. Five of these plans, those for General Mitchell International Airport, Kenosha Regional Airport, Waukesha County-Crites Field, West Bend Municipal Airport, and Hartford Municipal Airport, have been adopted by the local unit of government that owns the airport. The master plan for Capitol Airport was under consideration for adoption by its private-sector owners.

According to Federal Aviation Administration guidance, airport master plans consist of several major elements, including a forecast of aviation demand, an analysis of facility requirements, an environmental assessment, a financial plan, and an airport layout plan. The airport layout plan is the actual set of scaled plans graphically depicting the recommended ultimate development of airport facilities. The airport layout plan portion of the master planning effort has been completed for three additional airports: Batten Airport, East Troy Municipal Airport, and Burlington Municipal Airport. The airport

master planning process has not proceeded since the adoption of the second-generation regional airport system plan for either Timmerman Airport or Sylvania Airport. The FAA recommends, but does not require, that a master plan be completed for each airport that anticipates receiving Federal funding for airport improvements. The Federal Aviation Administration, however, does require that there be a current, approved airport layout plan on file prior to the disbursement of any Federal funds for improvements. Consequently, there tends to be more attention given to preparing and updating airport layout plans than to completing and updating entire master plans.

Facility Development

On a system-level basis, a significant amount of facility development has occurred among the 11 public-use airports included in the regional airport system plan for Southeastern Wisconsin. All the facility improvements implemented since the preparation of the second-generation regional airport system plan were recommended in, or were consistent with, that plan.

Since the preparation of the second-generation regional airport system plan, five of the airports in the plan have made major improvements of the type that affect either the size of the airport, its capacity, or its classification. Waukesha County-Crites Field has been improved from a GU-I airport to a GU-II airport as a result of the extension of its primary runway and parallel taxiway to a length of 5,850 feet.

Similarly, Kenosha Regional Airport has been improved from a GU-I airport to a GU-II airport as a result of the construction of a new 5,500-foot-long primary runway and taxiway and the installation of a full instrument landing system. The terminal apron areas and hangar facilities at Kenosha Regional Airport have also been greatly enlarged.

East Troy Municipal Airport has undergone dramatic development, changing its classification from below BU-I to that of a GU-I facility. This was accomplished by the replacement of the Airport's 2,100-foot-long turf runway with a new 3,900-foot-long paved runway and parallel taxiway, together with a new turf crosswind runway and a new terminal apron.

Batten Airport in the City of Racine remained a GU-II facility but added parallel taxiways to both of its runways, a new terminal, and a new terminal apron.

Major improvements were made to General Mitchell International Airport, including the expansion of the apron for the air carrier terminal, additional apron area for cargo facilities, construction of new passenger terminal gate areas, and major expansion of the automobile parking structure.

A variety of such minor improvements as improved airfield lighting, land acquisition, and clearing for runway protection zones; repair and reconstruction of pavement surfaces; extension of airport service roads; construction of additional aircraft hangars; installation of security fencing; and improvements to utility services have been undertaken to varying degrees at all 11 airports comprising the regional system. These improvements are reflected in the descriptions of facilities and services at each airport contained in Chapter III of this report.

Consistency with State and National Airport System Plans

As indicated above, the recommended classification for each airport in the regional airport system plan is intended to establish the ultimate function of each airport in the overall system. To enable the airport improvement process to proceed efficiently for each airport, it is important that recommended airport classifications and improvements be consistent throughout the various levels of airport planning and engineering.

When the current Wisconsin State airport system plan was completed in 1987, the recommended classification and recommended long-term major improvements for each of the 11 airports comprising the regional airport system for Southeastern Wisconsin were consistent with the State plan and the then-current regional airport system plan. In December 1989, the Wisconsin Department of Transportation prepared and approved a memorandum supplementing the State airport system plan, revising the recommended classifications for some airports in the State plan, including five within Southeastern Wisconsin, as shown in Table 4. This revision of the State plan was conducted independent of, and without input from, the regional planning process. Accordingly, an appropriate and necessary purpose of this update of the regional airport system plan is to bring the regional and State airport system plans into conformity once again.

When both the current regional and current State airport system plans were being prepared in 1987, the airport classification scheme using the BU-I, BU-II, GU-I, GU-II, and T designations developed

Table 4

CLASSIFICATION OF ESSENTIAL SOUTHEASTERN WISCONSIN AIRPORTS IN CURRENT REGIONAL, STATE, AND NATIONAL AIRPORT SYSTEM PLANS: 1993

Airport	Recommended in Current Regional Airport System Plan[a]	Recommended in Revision to State Airport System Plan[a]	Recommended in Current FAA NPIAS[b]
General Mitchell International Airport	T	T	L
Batten Airport	GU-II	T	TR
Kenosha Regional Airport	GU-II	T	TR
Waukesha County-Crites Field	GU-II	GU-II	TR
West Bend Municipal Airport	GU-I	T	TR
East Troy Municipal Airport	GU-I	GU-I	BU
Hartford Municipal Airport	GU-I	GU-I	GU
Lawrence J. Timmerman Airport	GU-I	GU-I	GU
Burlington Municipal Airport	BU-II	GU-I	BU
Capitol Airport	BU-II	GU-I	BU
Sylvania Airport	BU-II	BU-II	--[c]

[a] *Classifications used in this column are described in Table 1.*

[b] *Classifications used in this column are: L, Commercial Service-Primary-Long Haul; R, General Aviation-Transport; GU, General Aviation-General Utility; and BU, General Aviation-Basic Utility. These classifications are described in more detail in Appendix A.*

[c] *Not included in the National Plan of Integrated Airport Systems (NPIAS).*

Source: Federal Aviation Administration, Wisconsin Department of Transportation, and SEWRPC.

by the Federal Aviation Administration was used to signify both the appropriate function and the appropriate design standards for each specific airport in the two plans. Since that time, the FAA has introduced a more detailed classification scheme for determining appropriate airport design standards. However, the FAA continues to use nomenclature similar to the regional nomenclature to define the function of each airport included in the National Plan of Integrated Airport Systems (NPIAS). Table 4 also shows the airport classifications as recommended in the national airport system plans.

Definitions of the airport roles used by the Federal Aviation Administration in the NPIAS and a comparison of these roles with the airport classification system used in the second-generation regional and State airport system plans are presented in Appendix A. Accordingly, another appropriate and necessary output of this planning effort is to ensure that recommendations of the regional airport system plan utilize the same airport classification scheme now used by the FAA for describing the appropriate airport role and airport design standards.

When work on this reevaluation of the regional airport system plan was initiated, work was also begun on an update of the State airport system plan for Wisconsin. It is important that the recommendations of these two plans with respect to airport classifications and roles, recommended airport improvements, and the recommended ultimate development of each airport be entirely consistent to ensure the efficient and timely development of the airport system, as well as to indicate clearly the appropriate actions and priorities that should be embraced by the Federal Aviation Administration. As part of the State airport system plan update, a special Wisconsin air cargo study element was also undertaken to provide an air cargo facility and activity inventory, market analysis and forecasts, and appropriate recommendations. The findings and recommendations of this air cargo study element that pertain to the Southeastern Wisconsin Region were considered in the regional airport system plan reevaluation effort.

STATUS OF INDIVIDUAL AIRPORTS IN THE REGIONAL AIRPORT SYSTEM PLAN

The following section provides a review of the status of each airport in the current regional airport system plan. Information concerning each airport relative to the recommendations in the second-generation regional airport system plan for

that airport, concerning development or improvement activities currently underway or being considered by the airport owner, and concerning any other issues that may affect the particular airport is presented.

General Mitchell International Airport

The second-generation regional airport system plan recommended that General Mitchell International Airport remain the sole transport-category airport within the region providing facilities to accommodate air carrier-sized aircraft and air carrier operations. Recommended improvements in the second-generation regional airport system plan included the acquisition of some additional air navigation easements to provide for runway protection zones; the eventual extension of Runway 7R/25L from a length of 8,011 feet to a length of 9,000 feet; the eventual extension of Runway 1L/19R from a length of 9,690 feet to a length of 11,500 feet; the realignment and extension of Runway 7L/25R from a length of 3,163 feet to a length of 4,500 feet; improvements to airfield lighting and navigational aids; and the expansion of such support facilities as automobile parking, terminal gates, hangar facilities, and maintenance buildings. Many of these recommended improvements, such as the expansion of the air carrier and air cargo apron areas, the addition of more passenger gates at the air carrier terminal, and the expansion of automobile parking, have been implemented.

During 1987, Milwaukee County began an update of the master plan for General Mitchell International Airport. The update was undertaken for several reasons, including deregulation of the airline industry, growth in the air transport industry, development and expansion of the national hub-and-spoke operational system by air carriers, the expansion of Midwest Express Airlines, and the potential for increased connecting traffic as a result of insufficient air carrier airport capacity in the Chicago region. Following the preparation of new aviation forecasts, capacity analyses, and examination of facility requirements, recommendations were made in the new master plan that addressed both short-term and long-term improvements to General Mitchell International Airport. Recommended short-term improvements were intended to address overall operating efficiency and both existing and projected levels of aircraft operations during good flying weather (VFR conditions). Short-term improvements included the long-recommended extension of Runway 7R/25L by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of Runway 1R/19L by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway safety overrun for the south end of Runway 1L/19R; realignment and reconstruction of Runway 7L/25R; construction of new taxiways and taxiway exits; and decommissioning of Runway 13/31. Recommended long-term improvements address the projected need for additional capacity during poor flying weather (IFR conditions). Long-term improvements include the land acquisition for, and construction of, an east-west parallel primary runway; the construction of additional air carrier terminal gates and ticketing and baggage claim facilities; the construction of additional public and employee parking; and the expansion of air cargo facilities. In September 1993, the Milwaukee County Board of Supervisors adopted the master plan update.

The new master plan for Mitchell International makes several airfield improvement recommendations that are consistent with both the first- and second-generation regional airport system plans. These include the extension of the primary east-west runway, Runway 7R/25L, from the existing length of 8,011 feet to 9,000 feet; the realignment of the secondary northeast-southwest runway, Runway 7L/25R, so as to be parallel to the primary east-west runway; and the decommissioning of Runway 13/31, which is the northwest-southeast general aviation runway. These recommendations represent important improvements in terms of accommodating forecast future scheduled air carrier activity in relation to safety considerations and to accommodating general aviation activity at Mitchell International. In addition, the new master plan also recommends that the north-south parallel runway, Runway 1R/19L, be extended from its existing length of 4,182 feet to 7,000 feet to help accommodate future activity. This improvement was recommended in the first-generation regional airport system plan but not the second-generation plan. The construction of a runway safety overrun at the south end of Runway 1L/19R southward across E. College Avenue is recommended in the new master plan for the first time and replaces the recommendation for the extension of runway 1L/19R to a length of 11,500 feet from the existing length of 9,690 feet which was included in the old master plan as well as in the first- and second-generation regional airport system plans.

Experience since the preparation of the 1987 regional airport system plan in terms of air passenger traffic at Mitchell International indicates that enplaning passenger traffic trends have returned to

the levels of activity initially anticipated under the first-generation plan. It is this return to the higher forecast levels reported in the new master plan for Mitchell International which underlies the airfield improvement recommendations set forth in that plan.

The new master plan, looking to both a baseline forecast and a higher alternative forecast of enplaning passenger traffic activity, also recommends that Milwaukee County take steps to ensure that a new air carrier runway parallel to the primary northeast-southwest runway could ultimately be provided should the higher forecast levels of activity come about. The plan does not recommend the actual construction of this new major parallel runway; rather, the plan recommends that contingency planning and implementation activities for such a new runway be undertaken, including identifying the lands required to accommodate such a new runway and the means of acquisition over time of such lands. This would maintain the flexibility required to proceed with construction of that runway when the need becomes apparent. This particular airfield improvement recommendation, together with the extension of the parallel north-south runway proposed in the new master plan, is consistent with the first-generation regional airport system plan, which foresaw a similar need to provide a new major parallel runway to accommodate forecast scheduled air carrier activity at Mitchell International.

Batten Airport

The 1987 regional airport system plan recommended that Batten Airport remain classified as a General Utility-Stage II airport in order to fulfill its roles of serving virtually all types of general aviation aircraft in eastern Racine County, especially the high- performance corporate jet aircraft based in and around the City of Racine, and in order to continue functioning as a reliever to General Mitchell International Airport. The airport has a 6,556-foot primary runway, which is consistent with recommendations in the second-generation regional airport system plan. Since preparation of the second-generation plan was undertaken, the private owners of Batten Airport have maintained an aggressive program of improvements at the airport. Parallel taxiways and the associated connecting taxiways have been constructed for both runways, a new terminal apron has been constructed, and a new terminal building has been constructed. Other improvements to airfield lighting, perimeter fencing, and hangar facilities have also been made. In addition, the airport owners continue to work towards the eventual acquisition of property and easements for the runway protection zones at the ends of each runway. These improvements are fully consistent with both the 1976 and 1987 regional airport system plans.

As of December 1993, a number of long-term improvements recommended in the 1987 plan have yet to be implemented, but have been programmed by the airport owners and the Wisconsin Department of Transportation. These improvements include land acquisition and obstruction removal in the runway protection zones, airfield lighting improvements, taxiway improvements, additional parking and fencing, additional apron construction, and construction of an air traffic control tower.

Kenosha Regional Airport

The second-generation, 1987, regional airport system plan recommended that Kenosha Regional Airport, then classified as a General Utility-Stage I airport, be developed to General Utility-Stage II airport standards to fulfill its role of serving virtually all types of general aviation aircraft in Kenosha County and of continuing to function as a reliever to General Mitchell International Airport. The City of Kenosha has maintained an aggressive program of development for the airport and since preparation of the second-generation regional airport system plan virtually all the major improvements recommended in that plan for Kenosha Regional Airport have been implemented. These have included construction of a new 5,500-foot-long primary runway and parallel taxiway, construction of new connecting taxiways and apron areas, construction of a new terminal and automobile parking area, construction of new hangars, installation of a full instrument landing system, and other airfield lighting improvements. Construction of a new air traffic control tower was completed in 1994. In addition a significant amount of land was acquired to enable these improvements to be made. The only major improvement recommended in the regional plan and not implemented as of the end of 1993 was the extension of the crosswind runway to a total length of 4,800 feet. That runway was, however, extended to 4,440 feet. In addition, Kenosha Regional Airport has maintained a Federal Aviation Regulation Part 139 certificate since 1987. This allows some certificated air carriers operating large aircraft to use the airport. The certificate is limited to operations by large scheduled and unscheduled cargo aircraft and unscheduled passenger aircraft. The certificate has been maintained to

allow air cargo carriers, many of which operate turboprop aircraft with weights in excess of 12,500 pounds, to use the airport.

Because of the recently completed improvements and its location, Kenosha Regional Airport appears to be well positioned to experience significant growth in the short- and long-term future. The airport is located about midway along the Milwaukee-Chicago corridor, which is experiencing rapid development of residential, business, and industrial land uses. Much of this development has occurred recently and is expected to continue to occur in northern Lake County, Illinois; Kenosha County; and Racine County along IH 94, as well as in the area between IH 94 and the already developed cities along Lake Michigan. Kenosha Regional Airport is located adjacent to IH 94, due west of the City of Kenosha. During the past several years, the airport has experienced a significant increase in activity and in based aircraft, much of which has come from Northeastern Illinois airports which have become increasingly crowded. Suburban development pressures have also resulted in the closure of some general aviation airports throughout the Chicago metropolitan area. In fact, Kenosha Regional Airport has not only continued to function as a reliever to Mitchell International, but has also begun to function as a reliever to Chicago's O'Hare International Airport and the system of general aviation airports in Northeastern Illinois.

Anticipating the effect this growth in the area may have on the airport, the City of Kenosha undertook the preparation of an update of the airport master plan during 1992. One of the primary issues to be addressed in this planning effort was the need to further expand Kenosha Regional Airport and to determine necessary future facility improvements. There were two important factors influencing the possible need for expansion of the airport. First, it was thought that there may be a potential for a significant increase in air cargo activity and the need to accommodate larger cargo aircraft. The envisioned market for this activity is largely in Northeastern Illinois. This may represent an opportunity to help make the airport financially self-sufficient. Second, there may be a need to improve some airport facilities better to accommodate corporate, commercial, and other business activity that is already using the airport, under all conditions, as well as to meet the airport design standards required for those larger cargo aircraft using the airport. Along with this master plan update work, a special air cargo needs study for the Kenosha Regional Airport was to be undertaken by the City, in tandem with a Federal Aviation Regulation Part 150 Noise and Land Use Compatibility Study, to provide more detailed information to help ensure compatible surrounding land use development. As of December 1993, the master plan update and the FAR Part 150 study were underway. Work on the air cargo needs study had not yet been initiated. It should be noted that other land use-related studies of the area around Kenosha Regional Airport had recently been completed. These include an airport land use plan completed in 1985 by the City of Kenosha Planning Department, a corridor land use plan prepared by the City of Kenosha Department of City Development in 1991, and a land use-transportation plan for the IH 94 corridor, also completed in 1991, by the Regional Planning Commission at the request of Kenosha and Racine Counties. While these plans addressed land uses surrounding the Kenosha Regional Airport, all three plans assumed that the airport would not be enlarged beyond what was then recommended in the second-generation regional airport system plan.

The City of Kenosha and the Wisconsin Department of Transportation had programmed future improvements at Kenosha Regional Airport that included the extension of the primary runway to a length of 6,800 feet, the extension of the crosswind runway to a length of 5,500 feet, and attendant taxiway extensions and land acquisition. As of December 1993, however, the improvements reflected in this expansion proposal had not been included in the approved airport layout plan, were not consistent with the adopted regional airport system plan, and were not reflected in recently completed land use and transportation plans for the area.

Waukesha County-Crites Field

The 1987 regional airport system plan recommended that Waukesha County-Crites Field, which was then classified as a General Utility-Stage I airport, be developed to General Utility-Stage II airport standards to fulfill its role of serving virtually all types of general aviation aircraft, as well as continuing to function as a reliever for General Mitchell International Airport. To accommodate this, it was recommended that the primary runway and taxiway be extended from a length of 4,200 feet to a length of 5,850 feet; a full instrument landing system be installed; and that other taxiway airfield lighting, access roadway, parking, and hangar improvements be made. In addition, it was recommended that the terminal area ultimately be relocated to provide for more efficient expansion of

the terminal facilities and to enable the airfield to meet Federal standards for geometric design, clearances, and safety.

Since the second-generation regional airport system plan was undertaken in 1987, a number of these improvements have been made, including the extension of the primary runway and taxiway to 5,850 feet, together with the attendant land acquisition and the installation of an approach-light system. These improvements are fully consistent with the second-generation regional airport system plan. In addition, the intersection of CTH J and CTH JJ, at the northeast corner of the airport, has been relocated to provide for an appropriate runway protection zone at the east end of the primary runway in conformance with Federal design standards.

During 1993, an updated airport layout plan was completed for Waukesha County-Crites Field. The updated master plan includes a new, relocated terminal area as recommended in the regional airport system plan, but in a different location than shown in the previous master plan and in the regional plan. To accomplish the improvements necessary to allocate the terminal area, the new layout plan also includes new full-length parallel taxiways for both runways. New parallel taxiways, while not in conflict with the regional airport system plan, are not now included in that plan. During 1993, Waukesha County adopted a long-range land use plan for the airport that recommended how the airport and surrounding lands should be developed. Waukesha County and the Wisconsin Department of Transportation have programmed a number of improvements recommended in the regional airport system plan, including installation of a new air traffic control tower, construction of a new airport terminal building at a new location on the airfield, construction of new terminal parking areas and access roads, and construction of new apron areas.

West Bend Municipal Airport

The 1987 regional airport system plan recommended that West Bend Municipal Airport, which was then classified as a General Utility-Stage I airport, be developed to General Utility-Stage II standards to fulfill its role of serving virtually all types of general aviation aircraft in Washington and Ozaukee Counties and continuing to function as a reliever to General Mitchell International Airport. The major improvements recommended in the plan necessary to implement these recommendations included the extension of the primary runway and taxiway to a length of 5,500 feet; the installation of a full instrument landing system; the construction of additional taxiways and apron areas, with attendant land acquisition; and the development of improved and enlarged terminal and hangar facilities. The development of this airport as recommended would necessitate the relocation of STH 33 along the north side of the airport. Since completion of the second-generation regional airport system plan, a number of recommended improvements have been made, including extension of the parallel taxiway to the end of the existing primary runway, improvements to airfield lighting and navigation aids, and the construction of additional hangars. These improvements are consistent with the regional airport system plan. The City of West Bend has also acquired some land required for the eventual expansion of the airport.

In May 1993, a feasibility study was completed for the West Bend Municipal Airport. It identified and evaluated seven alternative alignments and orientations for a 6,000-foot-long primary runway, which is longer that the ultimate runway length of 5,500 feet recommended in the 1987 regional airport system plan. This study was requested by the Wisconsin Department of Transportation of the airport before an updated airport layout plan was prepared. Prior to this feasibility study, City of West Bend officials were considering proceeding with the implementation of the airport expansion. The City of West Bend and the Wisconsin Department of Transportation have programmed many of the improvements recommended in the regional plan, including land acquisition, extension of the primary runway and taxiway, relocation of STH 33, improvements to airfield lighting and airport apron, and construction of a new terminal.

East Troy Municipal Airport

The 1987 regional airport system plan recommended that East Troy Municipal Airport, which was then classified as below Basic Utility-Stage I standards, be developed to General Utility-Stage I standards to fulfill its role of serving most types of general aviation traffic throughout much of Walworth County and Southern Waukesha County. Since the plan was completed, a number of major improvements, consistent with the regional airport system plan, have been implemented, enabling the airport to be upgraded to General Utility-Stage I classification. These improvements included the construction of a 3,900-foot-long primary runway and taxiway; the construction of a 2,400-foot-long

turf crosswind runway; the construction of a terminal apron; and improvements to the airfield lighting, navigational aids, and hangar facilities. Major improvements recommended in the regional airport system plan, but not yet implemented, include paving of the crosswind runway, construction of a parallel taxiway for the crosswind runway, and extension of the primary runway and taxiway to an ultimate length of 4,200 feet. The Village of East Troy and the Wisconsin Department of Transportation have programmed the future paving of the crosswind runway.

Hartford Municipal Airport

The 1987 regional airport system plan recommended that Hartford Municipal Airport, which was then classified as a Basic Utility-Stage I airport, be developed to GU-I standards to fulfill its role of serving most types of general aviation aircraft in western Washington County and northern Waukesha County. The major improvements recommended to meet this classification included the construction of a new 4,400-foot-long primary runway and taxiway; extension of the existing 3,000-foot-long primary runway and taxiway to a length of 3,500 feet for use as the new crosswind runway; construction of new connecting taxiways and apron areas; and further development and possible relocation of the terminal facilities, parking, and additional hangar facilities. As of December 1993, the airport remains essentially unchanged from 1984, when work on the second-generation regional airport system plan was undertaken, with the exception of some additional hangars.

During 1989, the City of Hartford undertook review and revision of the airport master plan. This was done through the preparation of a revised forecast for aviation demand, a revised airport layout plan, and an environmental assessment. The master plan revision work resulted in a recommendation for the construction of a new paved 4,500-foot-long primary runway on a new north-south alignment so that the primary runway could ultimately be extended to a length of 4,900 feet, which would be longer than the 4,400-foot runway recommended in the regional system plan and would require the closing of a local road; larger runway protection zones to provide ultimately for a full instrument landing system; and construction of an appropriate taxiway system. These are airfield facilities larger in scope than those now recommended under the second-generation regional airport system plan. Following extensive debate within the community, the City of Hartford Common Council voted against expansion of the airport in February 1991 and again in March 1992. In July 1993, the Common Council approved the updated and revised airport layout plan as a means of maintaining eligibility for Federal funding assistance, but emphasized that expansion would not currently be considered for the airport. Neither the City of Hartford nor the Wisconsin Department of Transportation have programmed any major improvements for the airport.

Lawrence J. Timmerman Airport

The 1987 regional airport system plan recommended that Timmerman Airport remain classified as a General Utility-Stage I airport to fulfill its role of accommodating most types of general aviation aircraft in northern Milwaukee County and southern Ozaukee County and to continue serving as a reliever to General Mitchell International Airport. The major recommendations for Timmerman Airport included widening the existing 4,107-foot-long primary runway from 75 feet to 100 feet, completing installation of the full instrument landing system, implementing other airfield lighting improvements, and expanding the terminal parking and service roads and hangar facilities. As of December 1993, no action had been taken toward beginning the work necessary to complete these recommended improvements. The Wisconsin Department of Transportation has programmed some improvements including completion of the instrument landing system, an airport layout plan update, and a runway extension feasibility study.

Burlington Municipal Airport

The second-generation regional airport system plan of 1987 recommended that Burlington Municipal Airport remain classified as a Basic Utility-Stage II airport to continue fulfilling its role of serving many types of general aviation aircraft in western Racine and Kenosha Counties and eastern Walworth County. Major improvements recommended in the 1987 regional airport system plan included extension of the parallel taxiway for the primary runway, paving the crosswind runway and constructing a parallel taxiway for the crosswind runway, various airfield lighting improvements, and additional automobile parking and hangars. Since completion of the regional plan, the taxiway for the primary runway has been extended the full length of the runway and additional hangars have been constructed.

Beginning in 1990, the City of Burlington began giving consideration to possible improvements at the airport, including a 1,000-foot extension of

the existing 3,600-foot-long primary runway. The improvements were being considered as a means of promoting economic development in the area. In August 1993, the City specifically requested the Regional Planning Commission to consider the need for such a runway extension. As of May 1994, the City had obtained the necessary funding for the preparation of an updated airport layout plan, with work to proceed shortly thereafter. Extension of the primary runway would be in excess of the 3,600-foot-long runway recommended in the regional airport system plan. The City of Burlington and the Wisconsin Department of Transportation have programmed one improvement for the airport, the paving of the crosswind runway.

Capitol Airport

The second-generation regional airport system plan recommended, in 1987, that Capitol Airport, which was then classified as below Basic Utility-Stage I standards, be developed to Basic Utility-Stage II standards to fulfill its role of accommodating many types of general aviation aircraft in northeastern Waukesha County, northwestern Milwaukee County, and southeastern Washington County and to continue serving as a reliever to General Mitchell International Airport. Since the regional plan was prepared, the principal improvements made by the owners of Capitol Airport have been to lengthen the primary northeast-southwest runway to a length of 3,500 feet and to extend of the east-west crosswind turf runway to a length of 3,270 feet. It should be noted that while the primary runway already has an appropriate length for meeting Federal classification criteria, the existing airfield facilities now in place do not meet Federal standards for runway and taxiway widths, clearances, obstructions, runway protection zones, and other design considerations.

During 1989, work was undertaken on an initial master plan for the Capitol Airport. The plan was cosponsored by the private-sector airport owners and the City of Brookfield. Following completion of technical work on the master plan, there was significant debate within the community concerning the advantages and disadvantages of the proposed improvements, especially with respect to the use of adjoining wetlands required for some of the improvements. The proposed improvements would have resulted in a General Utility-Stage I airport, exceeding recommendations in the regional airport system plan, which called for ultimate development up to Basic Utility-Stage II standards. As of December 1993, and upon further consideration of these concerns, it appeared that the master plan will be revised to recommend the development of Capitol Airport as a Basic Utility-Stage II facility, as recommended in the second-generation regional airport system plan, with a primary runway length of 3,600 feet and partial parallel taxiways for both runways. This will eliminate the need to use wetland areas and will still allow the airport to perform its role as an important reliever airport in the Milwaukee metropolitan area.

The Wisconsin Department of Transportation has programmed many of the improvements necessary for upgrading Capitol Airport, including land acquisition, construction of primary and crosswind runways, construction of parallel taxiways and aprons, installation of airfield lighting and navigational aids, construction of access roads, and improvement of the terminal and hangar areas.

Sylvania Airport

The second-generation regional airport system plan of 1987 recommended that Sylvania Airport, which was then classified as below Basic Utility-Stage I standards, be developed to Basic Utility-Stage II standards to fulfill its role of accommodating many types of general aviation aircraft in Racine County and southern Milwaukee County, especially throughout the IH-94 corridor, and to function as a reliever for General Mitchell International Airport. The recommended improvements necessary to accommodate this development included extension of the existing primary runway from a length of 2,300 feet to 3,300 feet, construction of a paved crosswind runway and connecting taxiways, further development of the apron area terminal and parking, and improvements to the airfield lighting and air navigation aids. Since preparation of the regional plan, improvements implemented to date have included improved hangar facilities and removal of electric power lines obstructing runway approaches.

Elkhorn Area

The original 1976 regional airport system plan included two public airports in Walworth County, Gruenwald Field and East Troy Municipal Airport. The original plan recommended that Gruenwald Field, then a privately owned, public-use airstrip on the south side of the City of Elkhorn, be developed into a public-use general aviation airport serving Walworth County. Following preparation of the original regional airport system plan, the City of Elkhorn requested that the Regional Planning Commission remove Gruenwald Field from the regional airport system plan. That facility was accordingly

not included in the second-generation regional airport system plan. In 1984, Gruenwald Field was abandoned as an airport. In 1990, a study effort was undertaken by the Regional Planning Commission, at the request of the Wisconsin Department of Transportation, to assess the need for a general aviation airport in the Elkhorn area and the desirability of including such an airport in the regional airport system plan for Southeastern Wisconsin and in the Wisconsin State airport system plan. The findings of that work have been integrated into the present reevaluation of the second-generation regional airport system plan.

It should also be noted that, like the original system plan, the second-generation regional airport system plan recognized that some of the general aviation activity in Walworth County would continue to be served by a small number of privately owned public-use airports, such as nearby Lake Lawn and Americana Airports, which serve significant levels of resort traffic. In October 1991, one of these airports, Americana Airport, was closed by its owners.

SUMMARY

In 1987 the Regional Planning Commission formally adopted a second-generation regional airport system plan for Southeastern Wisconsin. The plan recommended a basic system of 11 essential public-use airports for the Region intended to serve the aviation needs of Southeastern Wisconsin to the year 2010. Of these 11 airports, eight are currently publicly owned and three are privately owned. The plan recommended the improvement of airport facilities and proposed generalized land use plans to help assure compatible land use development around airport sites. The plan did not recommend closing any privately owned airports not included within the system plan. Implementation of the regional airport system plan was envisioned as proceeding by means of a series of actions including plan adoption and endorsement, preparation or updating of an airport master plan for each airport, and actual facility development.

Since the preparation of the second-generation regional airport system plan, significant implementation of its recommendations has proceeded. While official adoption of the plan by local units of government has been limited, the plan has proven to be a useful tool for local units of government in planning for airport development. The result of this is that the preparation and updating of airport master plans for individual airports and subsequent implementation of improvements has continued in a manner consistent with the system plan.

Following completion of the original regional airport system plan in 1976, master plans refining and detailing the recommendations contained in the regional system plan were prepared for many of the airports included in that first-generation plan. Following completion of the second-generation regional airport system plan in 1987, additional master planning efforts had again been undertaken. As of December 1993, full master plans have been completed for six of the 11 airports in the regional system plan, including General Mitchell International Airport, Kenosha Regional Airport, Waukesha County-Crites Field, West Bend Municipal Airport, Hartford Municipal Airport, and Capitol Airport. The airport layout plan portion of the master planning effort has been completed for three additional airports, Batten Airport, East Troy Municipal Airport, and Burlington Municipal Airport. The airport master planning process has not proceeded for either Timmerman Airport or Sylvania Airport.

A significant level of facility development has occurred among the 11 public-use airports included in the plan. Five of these airports have made major improvements affecting either the size of the airport, airfield capacity, or airport classification. Both Waukesha County-Crites Field and Kenosha Regional Airport have been improved to be capable of handling virtually all general aviation aircraft, including corporate and business jets. East Troy Municipal Airport has been developed from a small airport with a single turf landing strip to an airport with a paved runway and taxiway system capable of accommodating most propeller-type general aviation aircraft. Batten Airport has added a full parallel taxiway system. General Mitchell International Airport has continued to make major improvements to the air carrier terminal, other passenger facilities, and the cargo facilities. A variety of other minor improvements, such as improved airfield lighting, land acquisition for runway protection zones, repair and reconstruction of pavement surfaces, construction of aircraft hangars, have been undertaken to varying degrees at all of the airports in the plan.

An important aspect of the airport system planning process is consistency between the recommended airport classifications and improvements in the regional plan and the recommended classifications and improvements in the Wisconsin State airport system plan as well as the National Plan of Inte-

grated Airport Systems. When the current Wisconsin State system plan was completed in 1986, the recommended classification and long-term major improvements for each of the 11 essential airports in Southeastern Wisconsin were consistent between the State plan and the regional plan. Since this time the recommended classifications for some airports in the State plan have been revised and now differ from those in the regional plan. Also, the Federal Aviation Administration has also identified a need to use a different classification scheme for airports and has shifted away from using the classification designations formerly used in the regional and State airport system plans. Accordingly, an objective of the reevaluation of the regional airport system plan is to make the airport classification recommendations consistent among the regional, State, and national airport system plans.

Review of the progress toward implementation of the most recently adopted regional airport system plan indicated that there are some regional airport system planning issues that require specific consideration under this regional airport system planning effort. These issues include the following:

- General Mitchell International Airport: There is a need to amend the regional airport system plan to reflect the recommendations contained in the recently completed airport master plan update for General Mitchell International Airport.

- West Bend Municipal Airport: There is a need to review the recommended ultimate length for the primary runway and of the most promising airfield configuration and the need to amend appropriately the regional airport system plan to reflect the findings and recommendations of the recently completed West Bend Municipal Airport runway feasibility study.

- Hartford Municipal Airport: There is a need to review the recommended function and airfield improvements for this airport in the regional airport system and to amend appropriately the regional airport system plan in light of the City of Hartford's recent decision not to proceed with the implementation of improvements recommended in the recently completed Hartford Municipal Airport master plan revision.

- Capitol Airport: There is a need to amend appropriately the regional airport system plan in light of the recommendations of the recently completed airport master plan work for Capitol Airport.

- Kenosha Regional Airport: There is a need to review the recommended function of Kenosha Regional Airport and to amend appropriately the regional airport system plan in light of the airport master plan update now underway and the air cargo needs study to be conducted for Kenosha Regional Airport.

- Burlington Municipal Airport: There is a need to review the function of the Burlington Municipal Airport in the regional airport system, together with its attendant runway lengths.

- Elkhorn Area: There is a need to amend appropriately the regional airport system plan in light of the findings of the Elkhorn area airport plan.

- State Airport System Plan: There is a need to bring the regional airport system plan and the Wisconsin State airport system plan into conformity with respect to the recommended improvements and the classification and role for each essential airport within Southeastern Wisconsin.

- Wisconsin Air Cargo Study: There is a need to review the findings and recommendations of the air cargo study element of the State airport system plan for Wisconsin and to amend the regional airport system plan as appropriate.

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Chapter III

EXISTING REGIONAL AIR TRANSPORTATION SYSTEM

INTRODUCTION

The existing air transportation system within the Southeastern Wisconsin Region consists of three principal elements: the airports and their facilities and services, the aircraft that use these airports, and the airspace between the airports and the airways and air traffic control systems and services. The purpose of this chapter is to describe these elements of the existing regional air transportation system as they pertain to the preparation of an updated and revised regional airport system plan for Southeastern Wisconsin.

AIRPORTS

An airport is defined as a specific area of land or water that is used, or intended to be used, for the takeoff and landing of aircraft and includes all its buildings and facilities, if any. There were a total of 103 airports of all types located within the Southeastern Wisconsin Region as of December 31, 1993. For the purposes of the regional airport system planning effort, these airports were classified into five functional categories: air carrier; general aviation, public-use; general aviation, private-use; military; and heliport. The location of each of these airports is shown on Map 2.

General Mitchell International Airport is the only air carrier airport within the Region. Air carrier airports are intended primarily to accommodate commercial airline service, including scheduled air carriers; regional or "commuter" carriers; major cargo carriers; and corporate, business, and air taxi operations. As the sole air carrier airport in Southeastern Wisconsin, Mitchell International constitutes a major interregional transportation terminal handling large volumes of passengers, mail, and cargo in regularly scheduled aircraft operated by major national and regional carriers. Mitchell International is a publicly owned airport and, in addition to serving large volumes of air carrier, corporate, and business aviation activity, serves some general aviation and military aviation activity. The airport also serves international passengers on a nonscheduled and charter basis and provides customs and immigration facilities for these passengers. In 1993, Mitchell International accommodated about 17,000 international passengers.

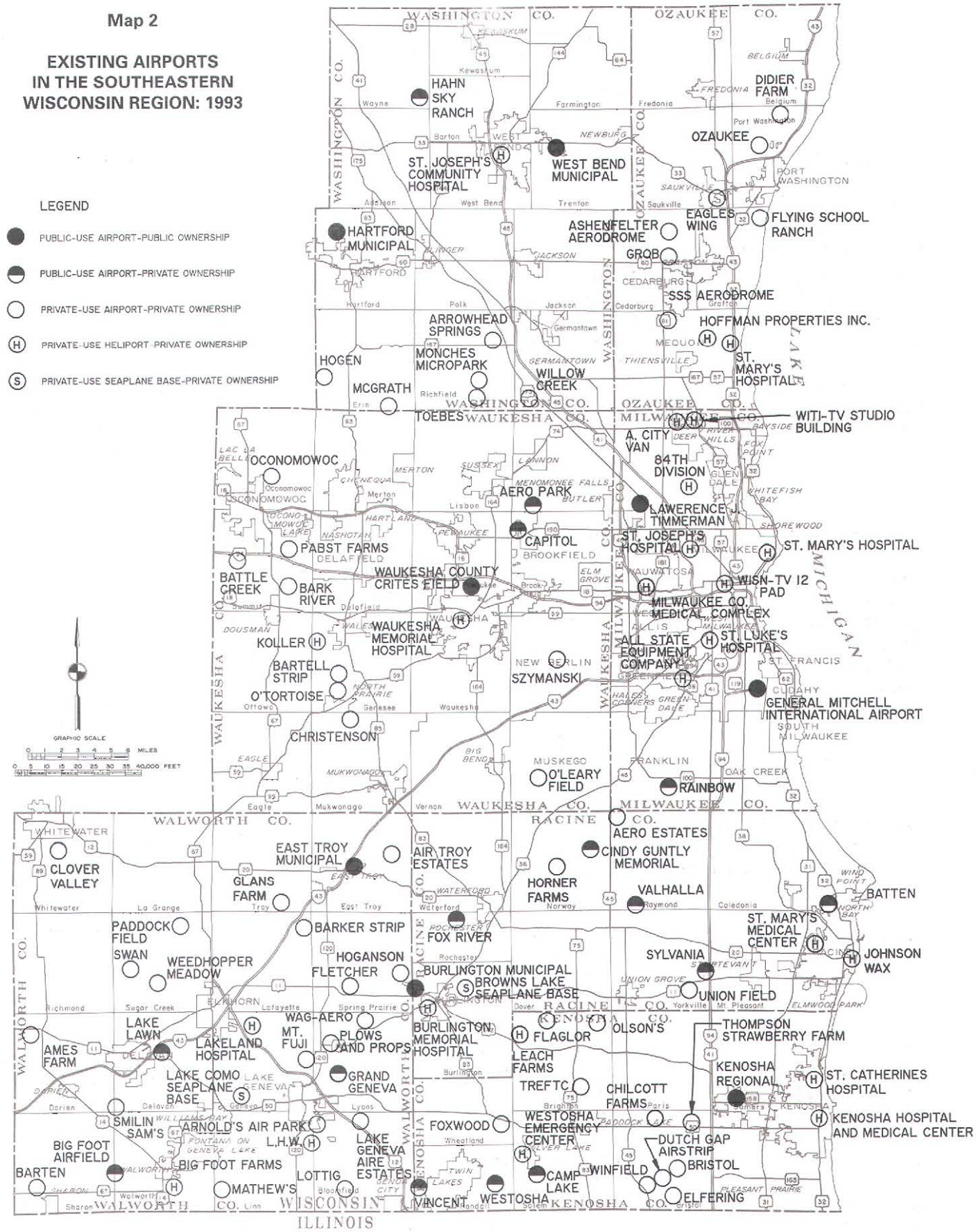
In 1993, there were 23 general aviation, public-use airports within the Region, including Mitchell International, eight of which were publicly owned and 15 of which were privately owned. These airports are intended to serve corporate and business aviation activity, charter and air taxi activity, agricultural flying, recreational and sport flying, flight training, and other personal flying. All 23 of these airports were open to the general public, regardless of ownership status.[1] These airports varied greatly in size and runway length, as indicated in Table 5. Two of these airports have been issued Federal Aviation Regulation (FAR) Part 139 certificates by the Federal Aviation Administration (FAA). Part 139 airports are authorized to serve certificated air carriers that operate large aircraft. Mitchell International maintains a FAR certificate allowing all air carriers with scheduled and nonscheduled operations to use the airport. Kenosha Regional Airport maintains a limited certificate that allows scheduled and nonscheduled operations by cargo aircraft and nonscheduled passenger aircraft operations. The larger general aviation, public-use airports, most of which were publicly owned, are capable of accommodating most types of general aviation aircraft and operations, including high-performance corporate jets. Importantly, these airports provide capacity which can be used to relieve Mitchell International. Designated as reliever airports by the FAA, these airports are eligible for special Federal airport improvement funding. The reliever airports in the Region include Batten Airport, Capitol Airport, Hartford Municipal Airport, Kenosha Regional Airport, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. Some of the smaller general aviation airports, while open to use by the general public, in many cases do not have paved runways and are primarily used for personal recreational and sport flying, flight training, and agricultural flying. The general aviation, public-use airports in the counties immediately surrounding the Region are shown on Map 3 and identified in Table 6.

The total number of private-use airports within the Region in 1993 was 56, not including heliports.

[1]*Grand Geneva Airport, formerly Americana Airport, was closed in October 1991 and reopened in August 1994.*

Map 2

EXISTING AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993



In 1993, there were a total of 103 airports of all types within Southeastern Wisconsin. In 1971, there were a total of 46 airports of all types in operation within the Region, 57 fewer than now. Of the 103 airports within the Region in 1993, Milwaukee County's General Mitchell International Airport was the largest, as well as the only, airport serving scheduled air carriers. General aviation public-use airports accounted for another 23 of the 103 airports. Of these 23 airports, 8 were publicly owned and 15 were privately owned. The remaining 80 airports were not open for use by the general public. Of these 80 airports, 2 were seaplane bases and 24 were heliports.

Source: SEWRPC.

Table 5

SELECTED CHARACTERISTICS OF EXISTING GENERAL AVIATION PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Airport Identification	Associated City	Owner	Type of Ownership	Elevation[a] (feet)	Primary Runway(s) Length (feet)	Primary Runway(s) Surface	Crosswind or Other Runway(s) Length (feet)	Crosswind or Other Runway(s) Surface
Kenosha	Camp Lake	49C	Camp Lake	Edward Simpson	Private	755	2,200	Turf	--	--
	Kenosha Regional	ENW	Kenosha	City of Kenosha	Public	743	5,499	Concrete	4,440	Concrete
					Private				3,300	Asphalt
	Vincent	64C	Genoa City	John Vincent	Private	880	1,775	Turf		
	Westosha	WI10	Wilmot	Thelen Sand and Gravel		850	2,850	Asphalt	1,480	Turf
Milwaukee	General Mitchell International	MKE	Milwaukee	Milwaukee County	Public	723	9,690	Concrete	5,868	Concrete
							8,011	Concrete	4,182	Concrete
									3,163	Concrete
	Rainbow	Y78	Milwaukee	Milwaukee County	Private	685	2,155	Asphalt	--	--
	Lawrence J. Timmerman	MWC	Milwaukee	Milwaukee County	Public	745	4,107	Asphalt	3,202	Asphalt
					--	--	3,251	Turf	2,859	Turf
Ozaukee	None	--	--	--	--	--	--	--	--	--
Racine	Batten	RAC	Racine	Racine Commercial Airport Corporation	Private	674	6,556	Concrete	4,824	Asphalt
	Burlington Municipal	C59	Burlington	City of Burlington	Public	779	3,601	Asphalt	2,600	Turf
	Fox River	96C	Rochester	Jerry Mehloff	Private	822	2,505	Asphalt	--	--
	Cindy Guntly Memorial	62C	Franksville	Thomas Guntly	Private	790	2,425	Turf	1,200	Turf
	Sylvania	C89	Sturtevant	Don Hurd and Bob Demski	Private	785	2,300	Asphalt	2,360	Turf
	Valhalla	84C	North Cape	Francis Moran	Private	805	2,600	Turf	--	--
Walworth	Big Foot Airfield	WI05	Walworth	John Ingalls	Private	951	3,000	Turf	2,115	Turf
	East Troy Municipal	57C	East Troy	Village of East Troy	Public	860	3,900	Asphalt	2,400	Turf
	Grand Geneva[b]	C02	Lake Geneva	Grand Geneva Resort and Spa	Private	835	4,100	Asphalt	--	--
	Lake Lawn	C59	Delavan	Anvan Corporation	Private	981	4,423	Asphalt	--	--
Washington	Hahn Sky Ranch	WI08	West Bend	Lester Hahn	Private	1,090	2,900	Turf	--	--
	Hartford Municipal	C31	Hartford	City of Hartford	Public	1,070	3,001	Asphalt	2,250	Turf
	West Bend Municipal	ETB	West Bend	City of West Bend	Public	888	4,500	Asphalt	3,900	Asphalt
Waukesha	Aero Park	76C	Menomonee Falls	Sophie Schaarschmidt	Private	850	1,880	Turf	1,865	Turf
									1,250	Turf
	Capitol	02C	Brookfield	Wally and Lois Mitchell	Private	850	3,500	Asphalt	3,270	Turf
									1,525	Turf
	Waukesha County-Crites Field	UES	Waukesha	Waukesha County	Public	911	5,850	Concrete	3,599	Asphalt

NOTE: Listed runway lengths may not be usable lengths owing to displaced thresholds.

[a] *Defined as the highest point of an airport's usable runways measured in feet from mean sea level.*

[b] *Closed from October 1991 to August 1994.*

Source: Federal Aviation Administration, Wisconsin Department of Transportation, and SEWRPC.

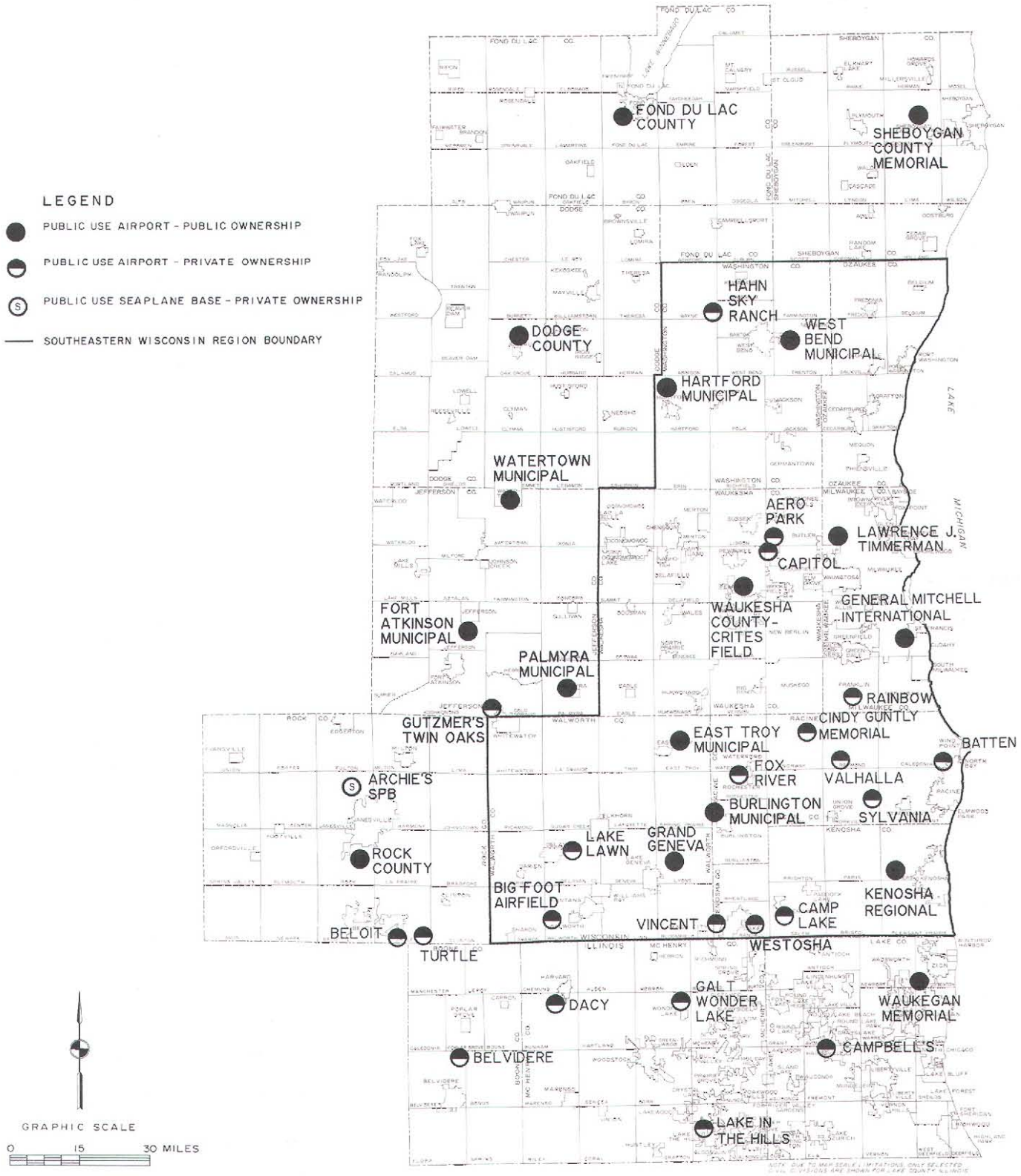
These airports were restricted-use facilities and were not open for use by the general public, but were for the exclusive use of the airport owner and invited guests. With few exceptions, these airports typically include a turf runway, possibly a hangar, and few, if any, other facilities or lighting and navigational aids. These 56 airports within the Southeastern Wisconsin Region include two seaplane bases. These airports are identified in Table 7 and are shown on Map 2.

In 1993 there were no exclusive military-use airports within the Region, although significant levels of military activity occurred at three airports: Mitchell International, Waukesha County-Crites Field, and West Bend Municipal Airport. There were minor levels of military activity, usually of a training nature, at some of the other general aviation airports in the Region also.

A heliport is defined as an area of land or water or a structure used, or intended to be used, for the takeoff and landing of helicopters. This differs from a helipad, which is the actual takeoff and landing area of the heliport or of an airport. The takeoff and landing area is not necessarily the area where passengers or cargo are loaded and unloaded. There are currently 24 heliports in the Region, as identified in Table 8 and shown on Map 2. These heliports generally consist of little more than a designated takeoff and landing area. They are not open for use by the general public.

Map 3

EXISTING GENERAL AVIATION, PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION AND IN THE COUNTIES ADJACENT TO IT: 1993



In addition to the 23 public-use airports within the Southeastern Wisconsin Region, there were, in 1993, 18 additional public-use airports in counties adjacent to the Region. Some of these airports serve residents and businesses based within the Region. For example, a number of general aviation aircraft registered in the Oconomowoc area were based at Watertown Municipal Airport, in Jefferson County; a number of aircraft registered in the Whitewater and Elkhorn area were based at Palmyra Municipal Airport, in Jefferson County.

Source: SEWRPC.

Table 6

SELECTED CHARACTERISTICS OF GENERAL AVIATION, PUBLIC-USE AIRPORTS IN COUNTIES ADJACENT TO THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Airport Identification	Associated City	Owner	Type of Ownership	Elevation (feet)	Primary Runway(s)		Crosswind or Other Runway(s)	
							Length (feet)	Surface	Length (feet)	Surface
Wisconsin										
Sheboygan	Sheboygan County Memorial	SBM	Sheboygan Falls	Sheboygan County	Public	749	5,399	Asphalt	3,993	Asphalt
Fond du Lac	Fond du Lac County	FLD	Fond du Lac	Fond du Lac County	Public	807	5,560	Asphalt	3,602	Asphalt
Dodge	Dodge County	UNV	Juneau	Dodge County	Public	935	4,027	Asphalt	3,300	Asphalt
Jefferson	Watertown Municipal	RYV	Watertown	City of Watertown	Public	833	4,000	Asphalt	2,800	--
	Palmyra Municipal	88C	Palmyra	Township of Palmyra	Public	854	2,150	Turf	--	--
	Fort Atkinson Municipal	61C	Fort Atkinson	City of Fort Atkinson	Public	800	3,801	Asphalt	--	--
Rock	Gutzmer's Twin Oaks	WI09	Whitewater	Eugene Gutzmer	Private	818	2,500	Turf	--	--
	Rock County	JVL	Janesville	Rock County	Public	808	6,701	Asphalt	5,396	Asphalt
						--	--		5,000	Asphalt
	Beloit	44C	Beloit	Beloit Airport, Inc.	Private	817	3,300	Asphalt	--	--
	Turtle	WI02	Beloit	Vernon Moore	Private	911	1,800	Turf	--	--
	Archie's Seaplane Base	70C	Janesville	Archie M. Henkelmann	Private	768	7,800	Water	--	--
Illinois										
Lake	Campbell's	C81	Grayslake	Richard H. Thomas	Private	788	3,270	Asphalt	2,573	Asphalt
	Waukegan Regional	UGN	Waukegan	City of Waukegan	Public	727	6,000	Concrete	3,751	Concrete
McHenry	Lake in the Hills	3CK	Village of Lake in the Hills	Port District	Public	886	3,802	Asphalt	--	--
	Dacy	0C0	Harvard	Village of Lake in the Hills	Private	913	3,500	Turf	2,500	Turf
				John F. Dacy					2,760	Turf
	Galt Wonder Lake	10C	Greenwood	A. T. Galt, Jr.	Private	875	3,219	Asphalt	2,100	Turf
Boone	Belvidere	C77	Belvidere	Richard H. Thomas	Private	856	3,769	Asphalt	2,500	Turf
							--	--	2,500	Turf

NOTE: Listed runway lengths may not be usable lengths owing to displaced thresholds.

Source: Federal Aviation Administration, Illinois Department of Transportation, Wisconsin Department of Transportation, and SEWRPC.

Landing Area and Terminal Facilities

The 23 public-use airports in Southeastern Wisconsin vary greatly as to the type and extent of facilities and services they offer. A summary of the facilities and services at each of the 23 public-use airports in the Region as of December 1993 is presented in Table 9.

General Mitchell International Airport had the widest range of facilities and services of any airport in the Region since it handles scheduled air carrier traffic, in addition to general aviation activities. The airport facilities at Mitchell International are located in a number of distinct areas, including the air carrier terminal; areas devoted to air cargo, military, general aviation, airport support facility, parking, and ground transportation activities; and the airfield and runway protection zones. These areas are shown in Figure 1. The air carrier terminal is the most complex area and has undergone dramatic changes over the past decade. Work that was begun in 1982 to expand and completely modernize and replace the passenger terminal facilities at Mitchell International was largely completed by the end of 1985. The terminal currently has a total of 42 gates distributed over three separate concourses. The recommended alternative for the passenger terminal facilities outlined in the recently adopted master plan for Mitchell International includes the eventual construction of two additional concourses, expansion of Concourse C, and the reconstruction of the administrative services area into Concourse B, to provide a total of 68 gates in five concourses. Ultimately, the overall terminal area configuration will have the capability to be expanded to approximately 80 gates if future demand warrants.

Among the general aviation airports other than Mitchell International, it is typically the larger fields, such as West Bend Municipal and Kenosha Regional Airports, that are publicly owned and provide a complete range of facilities and services. At these airports, the airfield facilities usually include one paved runway or more, taxiways and aprons, runway lighting, and various navigational

Table 7

SELECTED CHARACTERISTICS OF PRIVATE-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Associated City	Owner	Primary Runway(s)		Crosswind or Other Runway(s)	
				Length (feet)	Surface	Length (feet)	Surface
Kenosha	Dutch Gap Airstrip	Bristol	Gary L. Ziegler	1,800	Turf	--	--
	Elfering	Bristol	Noel Elfering	2,700	Turf	2,000	Turf
	Foxwood	New Munster	Celtic Empennage Meadows	2,900	Turf	--	--
	Olson's	Union Grove	Rudolph Olson	1,600	Turf	--	--
	Thompson Strawberry Farm	Bristol	Charles Thompson	2,500	Turf	--	--
	Treftc	Klondike	Charles F. Treftc	1,845	Turf	--	--
	Winfield	Bristol	Richard J. Winfield	2,000	Turf	1,500	Turf
	Chilcott Farm	Paddock Lake	Brett and Leslie Chilcott	2,400	Turf	--	--
	Bristol	Bristol	Larry Fitzgerald	1,500	Turf	--	--
	Flaglor	Kansasville	Kenneth Flaglor	1,600	Turf	--	--
Milwaukee	None	--	--	--	--	--	--
Ozaukee	Ashenfelter Aerodrome	Grafton	Bruce Ashenfelter	1,900	Turf	--	--
	Didier Farm	Port Washington	Peter J. Didier	3,500	Turf	--	--
	Eagles Wing	Saukville	Paul E. Meenk	2,400	Turf	--	--
	Flying School Ranch	Port Washington	Francis Shanen	1,898	Turf	--	--
	Grob	Cedarburg	Benjamin Grob, Inc.	2,676	Turf	2,500	Turf
				--	--	1,710	Turf
	Ozaukee	Port Washington	Ray Karrels	2,450	Turf	1,900	Turf
	SSS Aerodrome	Cedarburg	Alfred Kelch, Jr.	1,100	Turf	--	--
Racine	Aero Estates	Raymond	Clayton Carriveau	3,000	Turf	--	--
	Browns Lake Seaplane Base	Burlington	Goodman Aero Service	6,000	Water	--	--
	Horner Farms	Union Grove	Edsal Matlax	2,000	Turf	1,300	Turf
	Union Field	Union Grove	Wyatt and Steven Wagner	900	Turf	--	--
Walworth	Air Troy Estates	East Troy	Louis W. Stanley	1,600	Turf	--	--
	Ames Farm	Darien	John D. Ames	2,000	Turf	--	--
	Arnold's Air Park	Lake Geneva	Arnold Air Park	2,400	Turf	--	--
	Barker Strip	East Troy	Zennor Backer	2,350	Turf	--	--
	Barten	Sharon	Michael G. Barten	2,600	Turf	--	--
	Clover Valley	Whitewater	Leo Weidenfeld	1,600	Turf	--	--
	Fletcher	Spring Prairie	Wayne F. Fletcher	2,600	Turf	--	--
	Glans Farm	Elkhorn	Kenneth Glans	1,650	Turf	--	--
	Hoganson	Burlington	Lester Hoganson	900	Turf	--	--
	Lake Como Seaplane Base	Lake Geneva	Milton Tomaske	10,500	Water	N/A	Water
	Lake Geneva Aire Estates	Lake Geneva	Daniel Kavanaugh	2,400	Asphalt	--	--
	Lottig	Linton	Theodora Lottig	N/A	N/A	--	--
	Mathew's	Linton	Daryl Mathews	2,400	Turf	--	--
	Mt. Fuji	Lake Geneva	E. Meltzer	2,800	Turf	--	--
	Paddock Field	Elkhorn	Myron E. Paddock	3,200	Turf	--	--
	Plows and Props	Springfield	John Schnaubelt	2,200	Turf	--	--
	Smilin Sam's	Delavan	Salvatore Brusa	2,000	Turf	--	--
	Swan	Elkhorn	Vander Veen Farms	2,200	Turf	2,000	Turf
	Wag-Aero	Lyons	Richard Wagner	3,100	Turf	2,100	Turf
	Weedhopper Meadow	Elkhorn	Larry Steenstry	1,350	Turf	--	--
Washington	Arrowhead Springs	Richfield	Elmer W. Mintzlaff	2,100	Turf	1,800	Turf
	Hogen	Hartford	Todd Hogen	1,300	Turf	--	--
	McGrath	North Lake	William McGrath	2,050	Turf	--	--
	Monches Micropark	North Lake	Jerome Golner	1,500	Turf	--	--
	Toebes	Colgate	Michael Toebes	2,000	Turf	--	--
	Willow Creek	Germantown	Sheldon Pollow	1,200	Turf	--	--
Waukesha	Bark River	Dousman	Thomas Schober	2,000	Turf	--	--
	Bartell Strip	Genesee Depot	Lawrence Bartell	1,500	Turf	--	--
	Battle Creek	Oconomowoc	Robert J. Heuser	1,485	Turf	--	--
	Christenson	Mukwonago	Charles F. Christenson	N/A	N/A	--	--
	Oconomowoc	Oconomowoc	R. E. Wessel	1,400	Turf	--	--
	O'Leary Field	Muskego	Donald O'Leary	1,300	Turf	--	--
	O'Tortoise	Genesee Depot	Steven J. Webster	1,600	Turf	--	--
	Pabst Farms	Oconomowoc	David Pabst	1,850	Turf	--	--
	Szymanski	New Berlin	Ronald Szymanski	1,325	Turf	--	--

NOTES: This list does not include helipads or heliports. Also, listed runway lengths may not be usable lengths owing to displaced thresholds, crop rotation, or deferred maintenance.

N/A indicates data not available.

Source: Wisconsin Department of Transportation and SEWRPC.

Table 8

SELECTED CHARACTERISTICS OF HELIPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Associated City	Owner	Type of Ownership	Open to Public	Helipad Diameter (feet)	Surface
Kenosha	St. Catherine's Hospital	Kenosha	St. Catherine's Hospital	Private	No	40	Asphalt
	Westosha Emergency Center	Silver Lake	Kenosha Hospital and Medical Center	Private	No	100	Turf
	Kenosha Hospital/Medical Center	Kenosha	Kenosha Hospital and Medical Center	Private	No	47	Asphalt
	Leach Farms	Burlington	Aaron L. Leach	Private	No	60	Turf
Milwaukee	A City Van	Brown Deer	North Star Van and Storage	Private	No	100	Asphalt
	All-State Equipment Company	Greenfield	Edward Ennis	Private	No	50	Asphalt
	Milwaukee Regional Medical Center	*Wauwatosa*	*Milwaukee County*	Private	No	75	Concrete
	St. Joseph's Hospital	Milwaukee	St. Joseph's Hospital	Private	No	35	Concrete
	St. Luke's Hospital	Milwaukee	St. Luke's Hospital	Private	No	45	Concrete
	St. Mary's Hospital	Milwaukee	St. Mary's Hospital	Private	No	20	Concrete
	WISN-TV 12 Pad	Milwaukee	WISN-TV	Private	No	50	Asphalt
	WITI-TV Studio Building	Brown Deer	WITI-TV, Inc.	Private	No	40	Asphalt
	84th Division	Milwaukee	U. S. Department of the Army	Public	No	100	N/A
Ozaukee	Hoffman Properties, Inc.	Thiensville	Donald J. Zainer	Private	No	12	Concrete
	St. Mary's Hospital	Mequon	St. Mary's Hospital	Private	No	40	Concrete
Racine	Burlington Memorial Hospital	Burlington	Burlington Memorial Hospital	Private	No	60	Asphalt
	St. Mary's Medical Center	Racine	St. Mary's Medical Center	Private	No	30	Concrete
	Johnson Wax	Racine	S. C. Johnson & Son, Inc.	Private	No	70	Asphalt
Walworth	Big Foot Farms	Walworth	Big Foot Farms, Inc.	Private	No	75	Asphalt
	Lakeland Hospital	Elkhorn	Lakeland Hospital	Private	No	47	Asphalt
	L. H. W.	Lake Geneva	L. H. Whitting, Jr.	Private	No	30	Turf
Washington	St. Joseph's Community Hospital	West Bend	St. Joseph's Community Hospital	Private	No	65	Asphalt
Waukesha	Koller	Wales	Joseph A. Koller	Private	No	400	Turf
	Waukesha Memorial Hospital	Waukesha	Waukesha Memorial Hospital	Private	No	65	Asphalt

NOTE: N/A indicates data not available.

Source: Wisconsin Department of Transportation and SEWRPC.

aids, possibly including an instrument landing system. Terminal improvements at these airports typically include a variety of hangar facilities and a terminal building which provides pilot and passenger lounge facilities as well as the fixed-base operator facilities, enabling a variety of fuel, maintenance, and repair, rental and charter, and instructional services to be offered. These airports generally cater to commercial, business, corporate, and personal aviation activity in addition to offering training services, are open all year, and have staff on duty daily during daylight hours.

The smaller general aviation, public-use airports, such as Sylvania and Westosha, are privately owned and frequently offer a more limited range of facilities and services. In many cases, the smaller airports consist of a single runway with either a paved or turf surface, with minimal lighting and navigational aids. Terminal facilities are usually limited to a single office building, some hangars, and few services. Some airports of this size, even though open to the general public, consist solely of a turf runway and no other facilities or services. The smallest of these airports are not staffed at all and are closed during winter. These airports cater predominantly to training, recreational, and sport flying activity, as well as some agricultural flying. Ultralight and glider operations, as well as parachuting, are typically more common at these airports than at the larger general aviation airports.

The 56 private-use airports in the Region usually consist of only a turf runway and possibly a small hangar for the one or two aircraft typically based at the facility. Many of these airports serve agriculture-related uses, with the runway length and orientation sometimes changing seasonally. Some of these airports serve flying clubs or groups of sport flyers and, thus, in a limited number of cases, may have facilities approaching those of some of the smaller general aviation, public-use airports.

Table 9

GENERAL AVIATION FACILITIES AND SERVICES AT PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Characteristics						
		Terminal Facilities				Aircraft Storage		
		Passenger Terminal	Open All Year	Attended, Daylight	Attended, Evening	Conventional Hangars[a] (number of buildings)	Individual and T-Hangars (number of spaces)	Tie-Downs (number of spaces)
Kenosha	Camp Lake	--	X	X	--	--	--	--
	Kenosha Regional	X	X	X	X	15	200	80
	Vincent	--	--	--	--	--	--	--
	Westosha	X	X	X	--	--	28	34
Milwaukee	General Mitchell International	X	X	X	X	16	34	103
	Rainbow	X	X	X	--	5	--	50
	Lawrence J. Timmerman	X	X	X	X	13	105	60
Ozaukee	None	--	--	--	--	--	--	--
Racine	Burlington Municipal	X	X	X	X	13	25	28
	Fox River	X	X	X	--	2	--	12
	Batten	X	X	X	X	8	32	118
	Cindy Guntly Memorial	--	X	X	--	6	1	36
	Sylvania	X	X	X	--	3	25	30
	Valhalla	--	X	--	--	--	--	--
Walworth	Big Foot Airfield	--	--	--	--	--	--	30
	East Troy Municipal	X	X	X	--	25	12	20
	Grand Geneva[b]	X	X	--	--	1	--	18
	Lake Lawn	X	X	X	X	--	--	30
Washington	Hahn Sky Ranch	--	X	X	--	--	--	--
	Hartford Municipal	X	X	X	--	30	--	7
	West Bend Municipal	X	X	X	--	9	60	58
Waukesha	Aero Park	X	X	X	--	2	8	4
	Capitol	X	X	X	--	10	10	60
	Waukesha County-Crites Field	X	X	X	X	13	90	60

County	Airport Name	Characteristics						
		Visual Aids						
		Wind Indicator	Segmented Circle	Beacon	Runway Lighting	REIL	VASI	Approach Lighting
Kenosha	Camp Lake	X	X	--	--	--	--	--
	Kenosha Regional	X	X	X	H	X	X	X
	Vincent	X	--	--	L	--	--	--
	Westosha	X	--	X	L	--	--	--
Milwaukee	General Mitchell International	X	--	X	H	X	X	X
	Rainbow	X	--	--	L	--	--	--
	Lawrence J. Timmerman	X	--	X	M	X	--	--
Ozaukee	None	--	--	--	--	--	--	--
Racine	Burlington Municipal	X	X	X	M	X	X	--
	Fox River	X	--	--	--	--	--	--
	Batten	X	--	X	H	X	X	X
	Cindy Guntly Memorial	X	--	--	L	--	--	--
	Sylvania	X	--	--	L	--	--	--
	Valhalla	--	--	--	--	--	--	--
Walworth	Big Foot Airfield	X	--	--	L	--	--	--
	East Troy Municipal	X	X	X	M	--	--	--
	Grand Geneva[b]	X	X	--	M	--	--	--
	Lake Lawn	X	--	X	M	X	--	--
Washington	Hahn Sky Ranch	--	--	--	--	--	--	--
	Hartford Municipal	X	X	X	M	X	--	--
	West Bend Municipal	X	--	X	M	X	X	--
Waukesha	Aero Park	X	--	--	--	--	--	--
	Capitol	X	X	X	L	X	--	--
	Waukesha County-Crites Field	X	X	X	H	X	X	X

Table 9 (continued)

County	Airport Name	Characteristics							
		Navigational Aids				Services			
								Repairs	
		Control Tower	NDB	VOR	ILS	Fuel	Avionics	Airframe	Power Plant
Kenosha	Camp Lake	--	--	--	--	--	--	B	B
	Kenosha Regional	X	X	X	Category I	X	X	A	A
	Vincent	--	--	--	--	--	--	--	--
	Westosha	--	--	X	--	X	--	A	A
Milwaukee	General Mitchell International	X	X	--	Category III	X	X	A	A
	Rainbow	--	--	--	--	X	--	A	A
	Lawrence J. Timmerman	X	--	X	LOC	X	X	A	A
Ozaukee	None	--	--	--	--	--	--	--	--
Racine	Burlington Municipal	--	--	X	--	X	--	A	A
	Fox River	--	--	--	--	--	--	--	--
	Batten	--	X	X	Category I	X	--	B	B
	Cindy Guntly Memorial	--	--	--	--	X	--	A	A
	Sylvania	--	--	--	--	X	--	A	A
	Valhalla	--	--	--	--	--	--	--	--
Walworth	Big Foot Airfield	--	--	--	--	--	--	--	--
	East Troy Municipal	--	--	X	--	X	--	A	A
	Grand Geneva[b]	--	--	--	--	--	--	--	--
	Lake Lawn	--	X	--	--	X	--	--	--
Washington	Hahn Sky Ranch	--	--	--	--	--	--	B	B
	Hartford Municipal	--	X	X	--	--	--	A	A
	West Bend Municipal	--	X	X	LOC	X	--	A	A
Waukesha	Aero Park	--	--	--	--	--	--	--	--
	Capitol	--	--	--	--	X	--	A	A
	Waukesha County-Crites Field	X	X	X	LOC	X	X	A	A

NOTE: -- equals no or none; X equals yes; L (low), M (medium), or H (high) intensity; A equals Major, B equals Minor; ILS equals instrument landing system; Category I equals a precision ILS that consists of a localizer, glide slope, outer and middle markers, and approach lights, and permits instrument operations to a decision height of not less than 200 feet with a 1,800-foot-long runway visual range. Category III equals a precision ILS that permits instrument operations with no decision height and a runway visual range of either 0, 150, or 700 feet. Special air crew and aircraft certification is required. LOC equals a nonprecision ILS that consists only of a localizer for providing directional guidance; REIL equals runway end identifier lights; VASI equals visual approach slope indicator lights; NDB equals nondirectional radio beacon; VOR equals very high frequency omnidirectional radio beam.

[a] *Includes corporate hangars for private use only.*

[b] *Closed from October 1991 to August 1994.*

Source: SEWRPC.

Surface Access Facilities to Airports

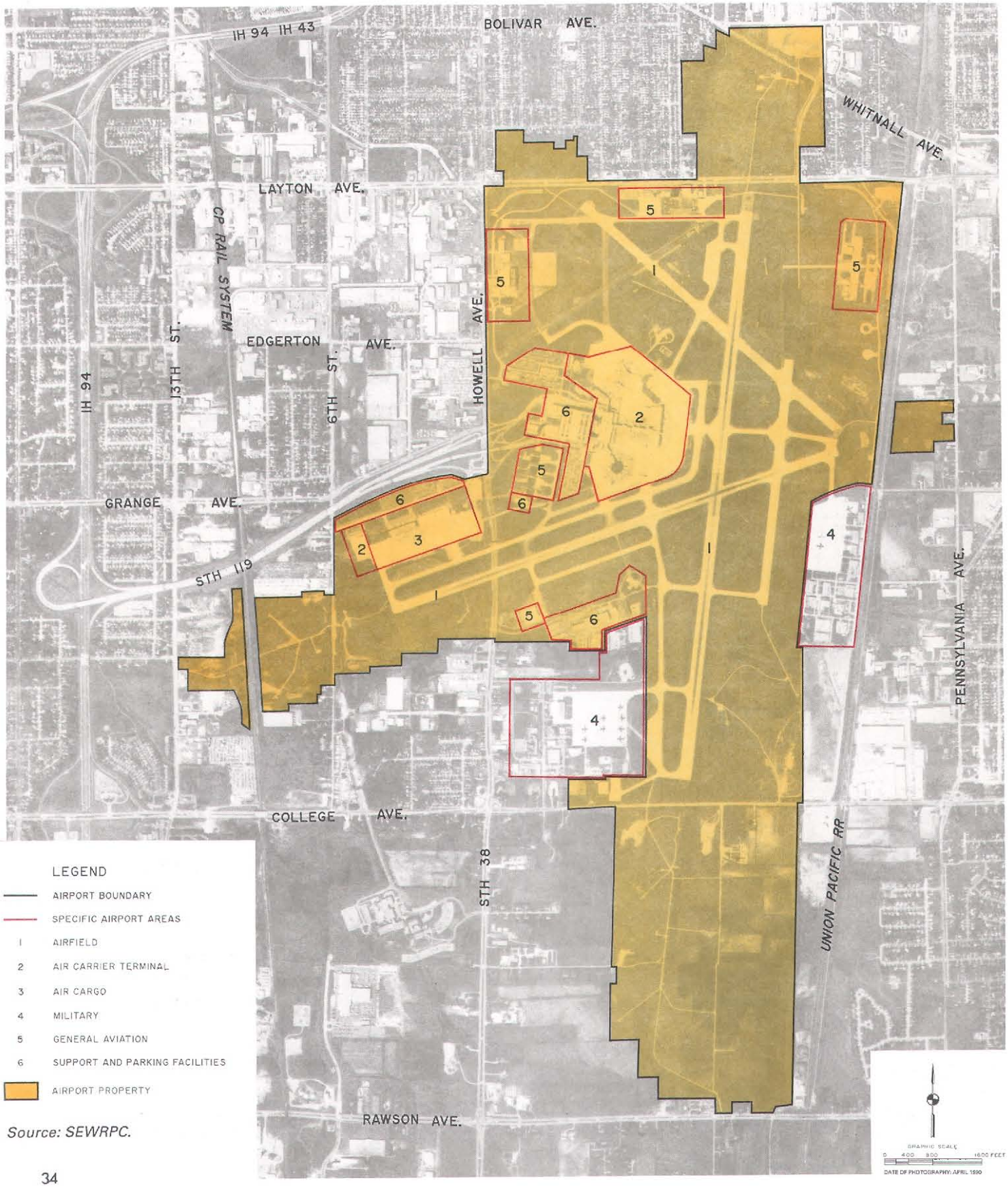
The surface transportation system is a vital link to the airports within Southeastern Wisconsin. Ground access to the public-use airports for passengers, cargo, staff, and a variety of supplies and services is provided by the arterial street and highway system and, to a much more limited extent, by public transit.

The arterial street and highway system within Southeastern Wisconsin provides the principal means of surface access to the public-use airports in the Region. General Mitchell International Airport is served by a freeway spur, STH 119, which provides direct motor vehicle access to and from the airport terminal to and from the regional freeway system. Most other public-use airports in the Region are served directly by arterial streets or highways. Table 10 indicates the type of freeway and arterial street and highway service provided to each of the 22 public-use airports in the Region.

Mitchell International, the Region's only scheduled air carrier airport, is also served by local and intercity bus lines. The Milwaukee County Transit System Route 80 provides direct local bus service

Figure 1

ONSITE LAND USE AT MILWAUKEE'S GENERAL MITCHELL INTERNATIONAL AIRPORT: 1993



Source: SEWRPC.

Table 10

TYPE OF FREEWAY AND ARTERIAL STREET ACCESS TO PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport	Freeways	Arterial Streets and Highways		
		Direct or Adjacent	Direct	Within One Mile	Within Two Miles
Kenosha	Camp Lake	--	X	--	--
	Kenosha Regional	X	X	--	--
	Vincent	--	X	--	--
	Westosha	--	X	--	--
Milwaukee	General Mitchell International	X	X	--	--
	Rainbow	--	X	--	--
	Lawrence J. Timmerman	--	X	--	--
Ozaukee	None	--	--	--	--
Racine	Burlington Municipal	--	--	X	--
	Fox River	--	X	--	--
	Batten	--	X	--	--
	Cindy Guntly Memorial	--	--	--	X
	Sylvania	X	--	X	--
	Valhalla	--	--	--	X
Walworth	Big Foot Airfield	--	--	--	X
	East Troy Municipal	X	X	--	--
	Grand Geneva	--	--	--	X
	Lake Lawn	X	X	--	--
Washington	Hahn Sky Ranch	--	X	--	--
	Hartford Municipal	--	X	--	--
	West Bend Municipal	--	X	--	--
Waukesha	Aero Park	--	X	--	--
	Capitol	--	--	X	--
	Waukesha County-Crites Field	X	X	--	--

Source: SEWRPC.

from the airport terminal to the central business district and the south and north sides of the Milwaukee area. Three intercity bus operators serve the Mitchell International passenger terminal with regularly scheduled direct service. United Limo, Inc., operates daily motor-coach service between downtown Milwaukee, Mitchell International, and Chicago O'Hare International, with stops near Racine and Kenosha. Badger Coaches, Inc., operates daily motor-coach service between Madison, Milwaukee, and Mitchell International. Wisconsin Coach Lines, Inc., operates daily motor-coach service between Kenosha, Racine, Mitchell International, and the Milwaukee central business district.

In addition, the ground transportation services at Mitchell International include taxis; courtesy cars operated by hotels, motels, and the fixed-base operators; rental cars; special handicapped transportation; and limousines. The limousines operate to a variety of destinations, including the Milwaukee central business district and selected metro and suburban areas, as well as Fond du Lac, Lake Geneva, Manitowoc, Oshkosh, and Waukesha.

Classification of Airports

The Federal Aviation Administration uses differing airport classification terminology for specifying the appropriate role, the appropriate service level, and the design standards applicable to specific airports. When both the currently adopted regional State airport system plans were being prepared, the airport classification scheme used the BU-I, BU-II, GU-I, GU-II, and T designations developed by the FAA, as described in Chapter II of this report, to signify the appropriate role and the appropriate design standards for each airport in these two plans. Since

Table 11

AIRPORT ROLE CLASSIFICATIONS

Role	Name
BU	Basic Utility
GU	General Utility
TR	Transport
L	Long Haul Air Carrier
M	Medium Haul Air Carrier
S	Short Haul Air Carrier
HE	Heliport
SP	Seaplane Base
ST	STOLport (short-takeoff-and-landing airport)

Source: Federal Aviation Administration.

the adoption of these plans, the FAA has decided to use a more detailed classification scheme comprised of reference codes for airport design standards. However, the FAA also uses a new general classification scheme to define the role and service level of each airport included in the National Plan of Integrated Airport Systems (NPIAS). Thus, the FAA now uses three distinct types of airport classifications for airport planning purposes. All three will be used in this regional airport system plan update as necessary to ensure compatibility.

For purposes of defining the role and service level of individual airports within the national plan, the FAA groups airports using narrative terminology. The airport role reflects the airport design which, in turn, influences the specific aircraft the airport can accommodate or, in the case of air carrier airports, the routes and markets that can be served on a nonstop basis. The various airport role classifications, as defined by the FAA, are listed in Table 11.

Under the FAA airport role classification, a Basic Utility airport is intended to serve all small single-engine piston aircraft and many of the smaller twin-engine piston aircraft with a maximum gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are used for a wide variety of activities, including recreational and sport flying, training, agricultural purposes, and some business and charter flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 2,800 to 3,900 feet.

A General Utility airport is intended to serve virtually all small general aviation single- and twin-engine aircraft, both piston and turboprop, with a maximum takeoff weight of 12,500 pounds or less. The larger aircraft that this type of airport is intended to serve typically seat from six to 14 people and are widely used for business, corporate, and commercial flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 3,900 to 4,800 feet.

A Transport airport, referred to as a Transport-Corporate airport in the context of this regional airport system plan reevaluation, is intended to serve business jets and transport-type aircraft as well as virtually all small general aviation aircraft. An airport of this type is not intended to serve scheduled air carriers, yet its facilities may be designed to accommodate aircraft of a size similar to that of aircraft typically used by commuter and regional airlines and by many air cargo operators. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 4,800 to 6,800 feet.

An Air Carrier airport is intended to serve all aircraft up to, and including, large jet airliners and military transports. Long-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of over 1,500 miles. Milwaukee County's General Mitchell International Airport is classified as a long-haul Air Carrier airport. Medium-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of between 500 and 1,500 miles. Short-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of less than 500 miles. Within Southeastern Wisconsin, long-haul Air Carrier airports would normally have a primary runway length of 8,800 to 9,800 feet, medium-haul Air Carrier airports would normally have a primary runway length of 7,800 to 8,800 feet, and short-haul Air Carrier airports would normally have a primary runway length of 6,800 to 7,800 feet. Throughout the entire State of Wisconsin, Air Carrier airports typically have primary runways that vary in length from 6,500 feet to 9,700 feet.

The three remaining airport role classifications are self-explanatory. Heliports are designated areas of land or of water or structures to be used for the landing and takeoff of helicopters. Seaplane bases are designated areas of water to be used for the landing and takeoff of appropriately equipped aircraft. STOLports are airports specifically designed for short-takeoff-and-landing aircraft and separate from conventional airport facilities.

There are some important differences between the former FAA classification system, with its BU-I, BU-II, GU-I, GU-II, and T designations, and the current FAA airport role classification system, which will be used in this regional airport system plan reevaluation even though some of the classification terminology may appear alike in the two systems. In general, the current Basic Utility role includes the airports formerly classified as either BU-I or BU-II. The current General Utility role includes the airports formerly classified as GU-I. The current Transport-Corporate role includes the airports formerly classified as GU-II. Finally, the current Air Carrier role includes the airports formerly classified as T. A summary of these classifications is presented in Table A-2 in Appendix A of this report.

The airport service level reflects the type of public service provided to the community by the airport. The five basic airport service levels also represent funding categories established by the United States Congress to assist in airport development. The airport service levels are listed in Table 12. These service level designations are used primarily for fiscal purposes.

For purposes of defining the airport design standards appropriate to a specific airport, the FAA has developed a system of airport reference codes. This system is used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport. The airport reference code has two components relating to the airport design aircraft. The first component, indicated by a letter, is the aircraft approach category and relates to the aircraft approach speed, an operational characteristic. The aircraft approach speed is defined as 1.3 times the aircraft stall speed when the aircraft is in its landing configuration at its maximum certificated landing weight. The various aircraft approach categories are shown in Table 13. The second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan, a physical characteristic. The various airplane design groups are shown in Table 14. The combination of these two characteristics determines the overall minimum areal needs for a particular airfield.

These two important aircraft characteristics plus the aircraft weight display a high degree of correlation. In general, as the weight of various aircraft increases, the approach speed becomes higher and the wingspan becomes larger. However, there are exceptions to this direct relationship that may affect the design of airport facilities, especially among specialized and high-performance aircraft. For example, some military jet fighters and some corporate jets weigh less and have a smaller wingspan than typical aircraft used by regional and commuter air carriers. The approach speed of the military and corporate jets may be significantly higher, however, necessitating a longer runway. Thus, it is important that airport improvements be planned to accommodate the most demanding

Table 12

AIRPORT SERVICE LEVEL CATEGORIES

Service Level	Name
PR	Commercial Service-Primary
CM	Commercial Service-Other
CR	Reliever Airport with Commercial Service
RL	Reliever Airport
GA	General Aviation Airport

Source: Federal Aviation Administration.

Table 13

AIRCRAFT APPROACH CATEGORY CLASSIFICATIONS

Category	Approach Speed (knots[a])
A	Less than 91
B	91 or more, but less than 121
C	121 or more, but less than 141
D	141 or more, but less than 166
E	166 or more

[a]A knot is defined as a unit of speed equal to 1.14 statute miles per hour.

Source: Federal Aviation Administration.

Table 14

AIRPLANE DESIGN GROUP CLASSIFICATIONS

Airplane Design Group	Wingspan (feet)
I	Less than 49
II	49 or more, but less than 79
III	79 or more, but less than 118
IV	118 or more, but less than 171
V	171 or more, but less than 197
VI	197 or more, but less than 262

Source: Federal Aviation Administration.

Figure 2

AIRPORT CLASSIFICATIONS INTENDED TO ACCOMMODATE VARIOUS AIRCRAFT TYPES BY AIRPORT REFERENCE CODE CLASSIFICATION

Aircraft Approach Category[b]	Airplane Design Group[a]					
	I	II	III	IV	V	VI
A	BU	GU[c] T[d]	T	--	--	--
B	BU[c] T[d]	GU[c] T[d]	T	--	--	--
C	T	GU[c] T[d]	AC	AC	--	--
D	T	T	--	AC	AC	--
E	--	--	--	--	--	--

NOTE: Airport classifications within each cell are described in the text and are summarized in Table A-2 in Appendix A. Cells in which no airport classification is shown reflect airport reference code combinations for which aircraft do not exist, are very rare, or are extremely specialized and require special airport planning consideration.

[a] *Described in Table 14.*

[b] *Described in Table 13.*

[c] *For aircraft under a maximum certified takeoff weight of 12,500 pounds.*

[d] *For aircraft with a maximum certified takeoff weight of 12,500 pounds or more.*

Source: SEWRPC.

aircraft, termed the "critical" aircraft, that are anticipated to use the airport within the planning design period. The critical aircraft may be based at the airport or may be itinerant aircraft that use the airport although based elsewhere. Accordingly, the airport reference code, which consists of the aircraft approach category designation and the airplane design group designation, defines the critical aircraft and, therefore, the appropriate design standards for a specific airport.

Typically, the process of airport design first requires selecting the appropriate airport reference code and then applying the airport design criteria associated with that airport reference code. Basic Utility airports are intended to accommodate small single-engine and twin-engine piston aircraft of under 12,500 pounds and have an airport reference code of A-I or B-I. General Utility airports are intended to accommodate small aircraft of under 12,500 pounds up to, and including, twin-engine piston and turboprop aircraft and have an airport reference code of A-II, B-II, or C-II. Transport-Corporate airports are intended to accommodate small and large aircraft up to, and including, many corporate and business jets and regional/commuter turboprop and jet aircraft and have an airport reference code of A-III, B-III, C-I, D-I, or D-II. Transport-Corporate airports are also intended to accommodate aircraft of 12,500 pounds or more and have an aircraft reference code of A-II, B-I, B-II, or C-II. Air carrier airports are intended to accommodate small and large aircraft up to and including the large jet aircraft used by scheduled airlines and have an airport reference code of C-III, C-IV, D-IV, or D-V. Transport-Corporate and Air Carrier airports are also intended to be equipped with full instrument landing systems. A summary of the relationship between each airport classification and each airport reference code is illustrated in Figure 2.

Table 15

SUMMARY OF CURRENT AIRPORT CLASSIFICATIONS OF PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	City	Airport Role	Service Level	Airport Reference Code	Former Airport Classification[a]
Kenosha	Camp Lake	Camp Lake	BU	GA	A-I	Below BU-I
	Kenosha Regional	Kenosha	TR	RL	C-III	GU-II
	Vincent	Genoa City	BU	GA	A-I	Below BU-I
	Westosha	Wilmot	BU	GA	A-I	Below BU-I
Milwaukee	General Mitchell International	Milwaukee	L	PR	D-VI	T
	Rainbow	Milwaukee	BU	GA	A-I	Below BU-I
	Lawrence J. Timmerman	Milwaukee	GU	RL	B-II	GU-I
Ozaukee	None	--	--	--	--	--
Racine	Batten	Racine	TR	RL	C-III	GU-II
	Burlington Municipal	Burlington	BU	GA	B-II	BU-II
	Fox River	Rochester	BU	GA	A-I	Below BU-I
	Cindy Guntly Memorial	Franksville	BU	GA	A-I	Below BU-I
	Sylvania	Sturtevant	BU	GA	A-I	Below BU-I
	Valhalla	North Cape	BU	GA	A-I	Below BU-I
Walworth	Big Foot Airfield	Walworth	BU	GA	B-I	BU-I
	East Troy Municipal	East Troy	BU	GA	B-II	GU-I
	Grand Geneva	Lake Geneva	BU	GA	A-I	GU-I
	Lake Lawn	Delavan	GU	GA	B-II	GU-I
Washington	Hahn Sky Ranch	West Bend	BU	GA	A-I	Below BU-I
	Hartford Municipal	Hartford	BU	GA	B-II	BU-I
	West Bend Municipal	West Bend	TR	RL	B-II	GU-I
Waukesha	Aero Park	Menomonee Falls	BU	GA	A-I	Below BU-I
	Capitol	Brookfield	BU	RL	B-I	BU-II
	Waukesha County-Crites Field	Waukesha	GU	RL	C-III	GU-II

[a] *Used in second-generation regional and State airport system plans.*

Source: Federal Aviation Administration and SEWRPC.

The airport reference codes, airport role classifications, and airport service levels associated with the current design of the 22 public-use airports in Southeastern Wisconsin are shown in Table 15. Although all 22 public-use airports are shown in this table, the FAA provides classifications only for those airports included in the National Plan of Integrated Airport Systems. Classifications for the remaining airports were assigned as part of the regional airport system planning effort.

Airport Employment

The public-use airports within Southeastern Wisconsin together represent a significant source of employment. Such employment consists not only of airport administrative and maintenance personnel, but also of employees of the fixed- base operators and other service providers located on airport grounds. Estimated employment at each of the 23 public-use airports is listed in Table 16.

AIRCRAFT

A wide variety of aircraft use the airport facilities in Southeastern Wisconsin. The various aircraft types are described in this section in terms of the categories appropriate for long-range airport system planning. Trends in aircraft types and technology which may affect the various aircraft types, and thus may have implications for the aviation activity forecasts to be prepared under this system planning effort, are also discussed.

Aircraft Types

For purposes of airport system planning and forecasting, the FAA classifies civil aircraft, defined as all aircraft other than military, into either general aviation aircraft or air carrier aircraft. These classifications are widely used for collecting and maintaining data on the registered fleet of civil aircraft in the United States and for forecasting aircraft activity at the national, State, and regional levels. General aviation aircraft are further separated into six categories: 1) single-engine piston, 2) multi-engine piston, 3) turboprop, 4) turbojet, 5) rotorcraft, or helicopters, and 6) miscellaneous types. The first four of these categories are considered to be fixed-wing aircraft. In a more general sense, the FAA also defines aircraft as either small or large. Small aircraft are defined as those with a maximum

Table 16

EMPLOYMENT AT PUBLIC-USE AIRPORTS IN THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Civilian			Military[a]			Total
		Full Time	Part Time	Subtotal	Full Time	Part Time	Subtotal	
Kenosha	Camp Lake	--	--	--	--	--	--	--
	Kenosha Regional	39	18	57	--	--	--	57
	Vincent	--	--	--	--	--	--	--
	Westosha	1	--	1	--	--	--	1
Milwaukee	General Mitchell International	2,180[b, c]	940[b, c]	3,120[b, c]	685	2,255	2,940	6,060
	Rainbow	1	5	6	--	--	--	6
	Lawrence J. Timmerman	100	10	110	--	--	--	110
Racine	Cindy Guntly Memorial	1	1	2	--	--	--	2
	Batten	6	12	18	--	--	--	18
	Burlington Municipal	14	1	15	--	--	--	15
	Fox River	1	--	1	--	--	--	1
	Sylvania	2	5	7	--	--	--	7
	Valhalla	--	--	--	--	--	--	--
Walworth	Big Foot	--	--	--	--	--	--	--
	East Troy Municipal	--	4	4	--	--	--	4
	Grand Geneva	--	--	--	--	--	--	--
	Lake Lawn	2	3	5	--	--	--	5
Washington	Hahn Sky Ranch	--	--	--	--	--	--	--
	Hartford Municipal	3	6	9	--	--	--	9
	West Bend Municipal	21	--	21	2	141	143	164
Waukesha	Aero Park	1	--	1	--	--	--	1
	Capitol	1	12	13	--	--	--	13
	Waukesha County-Crites Field	30	18	48	15	65	80	128
--	Total	2,403	1,035	3,438	702	2,461	3,163	6,601

[a] *Includes civilian employees employed in military operations and reservists.*

[b] *These employment figures exclude employees of airport-related services not located on airport property.*

[c] *Estimated.*

Source: Airports and SEWRPC.

certified takeoff weight of 12,500 pounds or less. Large aircraft are defined as those with a maximum certified takeoff weight of more than 12,500 pounds. The four categories of general aviation fixed-wing aircraft are described below. Characteristics of representative aircraft from these four general aviation categories are shown in Table 17. The category of rotorcraft, or helicopters, is self-explanatory. The category of other aircraft includes miscellaneous types such as gliders, balloons, and dirigibles.

With respect to fixed-wing aircraft, the majority of the aircraft in the United States civil fleet are small single-engine, piston-type aircraft. This category includes virtually all agricultural aircraft and a large variety of low-wing, high-wing, and biplane aircraft. Most aircraft in this category are in the 3,000- to 6,000-pound range, seat from one to four people, including the pilot, and are typically used for personal and sport flying and for instructional and agricultural purposes. Examples of this type of aircraft include the Beechcraft Bonanza, the Cessna 170 series, the Mooney M20, and the Piper Cherokee. This category also includes most experimental and antique aircraft.

Many of the piston aircraft are small two-engine aircraft. This category of multi-engine piston aircraft includes aircraft used for personal and sport flying and for some business purposes. Aircraft in this class typically range in weight from 3,000 to 7,500 pounds and can seat from two to eight people. Examples of this type of aircraft include the Beech Baron series, the Cessna 310 and 402, and the Piper Seneca. Some of the aircraft in this category are available with optional turbocharged engines.

The next category of general aviation aircraft includes turboprop airplanes. These consist primarily of twin-engine airplanes that are somewhat larger and faster than the twin-engine piston aircraft. This category also includes the largest general aviation aircraft. These higher-performance aircraft tend to be used for business, corporate, charter, commercial, and air taxi purposes. Many

Table 17

SELECTED GENERAL AVIATION AIRCRAFT CHARACTERISTICS

Manufacturer and Model	Weight (pounds)	Length (feet)	Wingspan (feet)	Approach Speed (knots[a])	Cruising Speed (mph)	Engine(s)		Typical Seating Capacity	Airport Reference Code
						Type	Number		
Single-Engine Aircraft									
Beechcraft Bonanza 35	3,400	26'5"	33'6"	70	190	Piston	1	4	A-I
Beechcraft Bonanza 36	3,600	27'6"	33'6"	72	188	Piston	1	6	A-I
Cessna 170 Skyhawk	2,200	25'	36'	N/A	110	Piston	1	4	A-I
Cessna 185 Skywagon	2,800	25'9"	36'2"	65	129	Piston	1	6	A-I
Cessna 210 Centurion	N/A	28'2"	36'9"	N/A	193	Piston	1	N/A	A-I
Mooney M20 Chapparal	N/A	23'2"	35'	N/A	172	Piston	1	4	A-I
Piper PA28 Cherokee 150	2,400	23'3"	30'	N/A	130	Piston	1	4	A-I
Piper PA32R-300 Lance	N/A	27'9"	32'9"	N/A	158	Piston	1	6	A-I
Multi-Engine Piston Aircraft									
Beech Baron 55	5,100	28'0"	37'0"	90	216	Piston	2	4	A-I
Beech 95 Travel Air	N/A	25'11"	37'10"	N/A	195	Piston	2	4	A-I
Cessna 310 Skynight	5,100	29'7"	37'6"	N/A	177	Piston	2	6	A-I
Piper Apache	3,800	27'3"	37'0"	N/A	150	Piston	2	5	A-I
Beech King Air E90	9,650	35'6"	45'10"	100	260	Turboprop	2	8	B-I
Beech Queen Air 65	7,700	35'6"	45'11"	N/A	230	Piston	2	6	B-I
Cessna 414 Chancellor	6,785	36'4"	44'1"	94	226	Piston	2	N/A	B-I
Cessna 402 Businessliner	6,850	36'3"	44'1"	95	174	Piston	2	8	B-I
Piper PA34 Seneca	N/A	28'6"	38'11"	N/A	187	Piston	2	5	B-I
Piper Navajo	6,200	32'8"	40'8"	100	244	Piston	2	7	B-I
Turboprop Aircraft									
Mitsubishi Solitaire	10,740	33'2"	39'1"	87	370	Turboprop	2	6	A-I
Piper Twin Comanche	3,600	25'2"	36'9"	N/A	186	Turboprop	2	4	A-I
Aero Commander	10,300	42'4"	46'6"	97	288	Turboprop	2	8	B-I
Beech King Air B100	10,750	39'11"	45'10"	111	260	Turboprop	2	8	B-I
Cessna 421 Golden Eagle	7,450	36'1"	41'8"	96	211	Piston	2	N/A	B-I
Piper PA31T Cheyenne	10,500	36'8"	42'8"	110	244	Turboprop	2	6	B-I
Swearingen Merlin II	12,500	40'1"	45'11"	105	295	Turboprop	2	6	B-I
Beech Super King Air B200	12,500	43'9"	54'6"	103	320	Turboprop	2	10	B-II
Cessna 441 Conquest	9,925	39'0"	49'4"	100	290	Turboprop	2	N/A	B-II
Gruman G159 Gulfstream	N/A	64'8"	78'4"	113	288	Turboprop	2	24	B-II
Jet Aircraft									
Cessna Citation I	11,850	43'6"	47'1"	108	420	Jet	2	6	B-I
Mitsubishi Diamond	13,890	48'4"	43'5"	100	343	Jet	2	7	B-I
Rockwell Sabreliner 60	20,000	48'4"	44'6"	120	600	Jet	2	10	B-I
Cessna Citation II	13,300	47'2"	51'8"	108	420	Jet	2	N/A	B-II
Dassault Falcon 50	37,480	60'10"	61'11"	113	520	Jet	3	8	B-II
Dassault Falcon 900	45,500	66'4"	63'5"	100	520	Jet	3	12	B-II
Gates Learjet 25	15,000	47'7"	35'7"	137	528	Jet	2	8	C-I
Gates Learjet 55	21,500	55'1"	32'8"	128	523	Jet	2	8	C-I
IAI Westwind	23,500	52'3"	44'9"	129	420	Jet	2	10	C-I
Canadian 600 Challenger	41,250	68'5"	61'10"	125	509	Jet	2	10	C-II
Gates Learjet 35	18,300	48'8"	39'6"	143	529	Jet	2	8	D-I
Grumman Gulfstream IV	71,780	87'10"	77'10"	145	512	Jet	2	11	D-II

[a] *A knot is defined as a unit of speed equal to 1.14 statute miles per hour.*

Source: SEWRPC.

of the aircraft in this category typically range in weight from 6,000 to 10,000 pounds and can seat from four to six people. Examples of this type of aircraft include the Mitsubishi Solitaire and the Piper Cheyenne. A significant portion of this category are larger aircraft that typically range in weight from 12,500 to 15,000 pounds and can usually seat 10 to 16 passengers. Examples of these aircraft are the Beech Super King Air and the Fairchild Merlin series.

The fourth category of general aviation fixed-wing aircraft is the turbojet category. Business and corporate jet aircraft in this category range in weight from 12,500 to 35,000 pounds and typically accommodate from eight to 12 passengers. Examples of this type of aircraft include the Cessna Citation series, the family of Learjets, and the Mitsubishi Diamond.

Air carrier aircraft are separated into two general categories for purposes of airport system planning and forecasting. The categories are regional/commuter aircraft and commercial airliners. Characteristics of representative aircraft from these two air carrier categories are shown in Table 18. The

Table 18

SELECTED COMMERCIAL AIRCRAFT CHARACTERISTICS

Manufacturer and Model	Weight (pounds)	Length	Wingspan	Approach Speed (knots[a])	Cruising Speed (mph)	Engine(s)		Typical Seating Capacity	Airport Reference Code
						Type	Number		
Commuter and Regional Aircraft									
De Havilland DHC6 Twin Otter	12,500	51'9"	65'	75	200	Turboprop	2	18	A-II
Fairchild Metro III	12,500	59'4"	46'3"	112	279	Turboprop	2	20	B-I
Beechcraft 1900	16,600	57'9"	54'6"	120	280	Turboprop	2	19	B-II
Shorts 330	22,900	58'	74'8"	96	173	Turboprop	2	30	B-II
Shorts 360	25,700	70'6"	74'8"	104	217	Turboprop	2	36	B-II
Convair 580	54,600	81'6"	105'4"	107	300	Turboprop	2	44	B-III
Fokker F27	45,000	82'2"	95'2"	102	298	Turboprop	2	50	B-III
Nihon YS-11	54,010	86'3"	105'	98	250	Turboprop	2	58	B-III
Airliners									
British Aerospace 146-200	88,250	93'8"	86'5"	117	440	Jet	4	96	B-III
Airbus A320-100	145,505	123'4"	111'4"	138	517	Jet	2	130	C-III
Boeing 727-200	210,000	153'2"	108'	138	570	Jet	3	189	C-III
Boeing 737-200	119,500	100'	93'	137	564	Jet	2	130	C-III
McDonnell Douglas DC-9-30	121,000	119'4"	93'5"	127	565	Jet	2	119	C-III
McDonnell Douglas MD-88	149,500	147'10"	107'10"	135	565	Jet	2	130	C-III
Boeing 707-B20B	316,000	152'11"	145'9"	136	550	Jet	4	189	C-IV
Boeing 757-200	255,000	155'4"	124'10"	135	494	Jet	2	N/A	C-IV
Lockheed L-1011 TriStar	466,000	177'8"	155'4"	140	558	Jet	3	345	C-IV
McDonnell Douglas DC-10	580,000	181'7"	165'4"	151	540	Jet	3	250	D-IV
Boeing 747-200	830,000	231'4"	195'8"	152	550	Jet	4	350	D-V

[a] *A knot is defined as a unit of speed equal to 1.14 statute miles per hour.*

Source: SEWRPC.

regional/commuter aircraft category includes a wide variety of airplanes, ranging in weight from 12,500 pounds to almost 60,000 pounds and seating anywhere from 18 to 60 passengers. Examples of this type of aircraft include the de Havilland Twin Otter, the Shorts 330 and 360, the Fairchild Metro, the Fokker F27, and the Nihon YS-11. This category also includes the venerable Douglas DC-3 and the Convair 580, both of which were once mainstays of important airline companies.

Commercial airliners are the large aircraft with two, three, or four engines and a maximum certified takeoff weight of 60,000 pounds or more. This category includes the jet aircraft flown by certificated air carriers in regularly scheduled and charter service. With respect to the commercial airliners used to serve Southeastern Wisconsin, these aircraft typically range in weight from 120,000 to 220,000 pounds. Seating capacities of such aircraft vary greatly, but range from 80 to 160 passengers. Examples of this type include the McDonnell Douglas DC-9, the Boeing 727 and 737, and the British Aerospace 146-200. The heaviest of these commercial aircraft include the wide-bodied jets used by major domestic and international air carriers. These aircraft range in weight from 300,000 to 775,000 pounds and carry from 250 to 400 passengers. Examples of this type of aircraft include the Boeing 707 and 747, the Lockheed L-1011, and the McDonnell Douglas DC-8 and DC-10.

Military aircraft are considered separately from civil aircraft since the FAA does not report registration or activity data for military aviation. Like civil aviation aircraft, the different types of military aircraft encompass a wide range of sizes. Military aircraft range from the single-engine Beech T-34C and Cessna 172 used for training through a variety of twin-engine aircraft used for weather observation, surveillance, supply, search and rescue, and tactical missions to jet fighters, large transports, and bombers. Examples of the largest military aircraft include the Boeing B-52 and the Lockheed C-5A. Characteristics of representative fixed-wing military aircraft are shown in Table 19.

Helicopters, which are categorized as rotorcraft by the FAA, are considered separately from fixed-wing aircraft airport planning and forecasting, since

Table 19

SELECTED MILITARY AIRCRAFT CHARACTERISTICS

Manufacturer and Model	Weight (pounds)	Length	Wingspan	Approach Speed (knots[a])	Cruising Speed (mph)	Engine		Typical Seating Capacity	Airport Reference Code
						Type	Number		
Lockheed C-130 Hercules	155,000	97'10"	132'7"	141	340	Turboprop	4	N/A	D-IV
Boeing B-52 Stratofortress	488,000	157'7"	185'	141	650	Jet	8	N/A	D-V
Lockheed C-5A Galaxy	769,000	247'10"	222'8"	135	518	Jet	4	N/A	C-VI
Lockheed C141A Starlifter	325,000	145'	159'10"	129	495	Jet	4	N/A	C-IV
Beech T-34A	N/A	25'10"	32'10"	N/A	160	Piston	1	1	A-I
Beech T-34C	N/A	28'8"	33'4"	N/A	241	Turboprop	1	1	A-I
Boeing KC-135A	301,600	136'3"	130'10"	135	550	Jet	4	N/A	C-IV

[a] *A knot is defined as a unit of speed equal to 1.14 statute miles per hour.*

Source: SEWRPC.

Table 20

SELECTED HELICOPTER CHARACTERISTICS

Manufacturer and Model	Weight (pounds)	Length	Rotor Diameter	Cruising Speed (mph)	Engine(s)		Typical Seating Capacity
					Type	Number	
Commercial Use							
MBB/Kawasaki BK-117	7,056	42'8"	36'1"	158	Turbine	2	10
Bell 206 Long Ranger	4,150	42'6"	37'	133	Turbine	1	6
Bell 222	7,850	47'5"	39'9"	161	Turbine	2	10
McDonnell Douglas MD 500	N/A	30'10"	26'4"	137	Turbine	1	4
Sikorsky S-76 Spirit	10,500	52'6"	44'	144	Turbine	2	12
Military Use							
Bell UH-1 Iroquois	9,500	57'1"	48'	127	Turbine	1	14
Bell OH-58D Sea Ranger	N/A	40'6"	35'4"	117	Turbine	1	2
McDonnell Douglas AH-64 Apache	N/A	58'3"	48'	184	Turbine	2	2
Kaman H-2 Seasprite	N/A	52'7"	44'	150	Turbine	2	3
Sikorsky UH-60 Blackhawk	N/A	64'10"	53'8"	167	turbine	2	17

Source: SEWRPC.

these aircraft require a very small area to take off and land and therefore do not require much land for an airfield. Characteristics of representative civil and military helicopters are shown in Table 20. The use of helicopters within Southeastern Wisconsin continues to be relatively low and is concentrated in the military, emergency medical, and commercial charter uses.

Aircraft Technology

The state of the art of aircraft technology is an important consideration in any airport planning effort. Major advances or changes in the size, configuration, design, or performance of the different fixed-wing, general aviation, large air carrier, and commuter/regional aircraft types may affect the airport design parameters of the critical aircraft and therefore the size and scope of necessary airport facilities. For this reason, a review of the current status of aircraft technology as it applies to airport planning for Southeastern Wisconsin was undertaken in order to identify any technology-related considerations that might be pertinent to the forecasting efforts.

General Aviation Aircraft: There is a wide variety of general aviation aircraft in service. These include the many single-engine, multi-engine, piston, turboprop, and jet aircraft typically used for recreational and sport flying, training, personal use, air taxi,

Table 21

AVERAGE AGE OF ACTIVE GENERAL AVIATION AIRCRAFT IN THE SOUTHEASTERN WISCONSIN REGION: 1992

Aircraft Type	Average Age (years)
Single-Engine Piston	27
Multi-Engine Piston	21
Turboprop	15
Jet	14
Helicopter	25
Other	17
All Aircraft	25

Source: Wisconsin Department of Transportation and SEWRPC.

business, and corporate purposes. In general, such aircraft are designed to maximize in-flight performance and efficiency, not to fit within any specific set of existing airport design constraints.

In airport planning, any radical changes in the size and configuration of the different kinds of fixed-wing general aviation aircraft could have a profound effect on the design, layout, and capacity of, and the necessary improvements required at, specific airport sites. The size and performance of general aviation aircraft, however, are not expected to change enough in the foreseeable future to affect the design and operation of most airport facilities. Periodic advances in the state of the art of aircraft technology may be expected to remain evolutionary, not revolutionary. Furthermore, the smaller general aviation aircraft do not generally require large-scale physical improvements at airports since such facilities as runways and taxiways are already of sufficient size. Accordingly, the most important aircraft-related issue with respect to airport system planning is likely to remain the composition of the general aviation fleet in terms of the different types of aircraft and how common each type may be.

In this regard, some measures of the overall health of the general aviation industry are related to fleet composition, such as the average age of the civil aviation fleet. While the FAA does not normally distribute data concerning the average age of general aviation aircraft, it has noted that in the United States in 1992, the average age of all active single-engine piston aircraft was 27 years. This is considered to be relatively old for small aircraft. Furthermore, 24 percent of the active national single-engine piston fleet was over 32 years old. Single-engine piston aircraft have always made up the largest portion of the national general aviation fleet, comprising from 75 to 80 percent of all registered fixed-wing aircraft.

There is no strict definition available for the anticipated useful life of small general aviation aircraft. The actual useful life is dependent upon a wide range of variables, including original design, quality of maintenance, damage, and annual use. Generally, the industry once considered aircraft to be old after about 15 years, except for museum and antique airplanes, but this no longer appears to be the perception. In recent years, the increased cost of purchasing and operating small aircraft has contributed to owners operating aircraft less on an annual basis and keeping aircraft longer. In practice, most airplane systems and components should be replaced or overhauled on the basis of specified number of flight hours, which varies with the system or component. When this work is due and the cost of this work far exceeds the value of the airplane, the owner may decide not to keep the airplane in operation any longer. Given the present overall age of the single-engine piston aircraft fleet in the United States, both the FAA and small aircraft manufacturers apparently consider it likely that over the next five years many owners will indeed decide to cease maintaining and operating many of the oldest aircraft. This may be expected to cause the national small airplane fleet to contract, at least in the near future.

Analysis of the active general aviation aircraft fleet based within Southeastern Wisconsin reveals similar results, as shown in Table 21. Within Southeastern Wisconsin, the average age of all registered general aviation aircraft in 1992 was 25 years. The average age for single-engine piston aircraft within the Region in 1992 was 27 years.

Another measure of the health of the general aviation industry is the level of manufacturing of new aircraft in the United States. In 1993, the general aviation aircraft shipments by United States manufacturers totaled 811. This represents a decrease from 1992, when there was a total of 872 shipments, and from 1991, when there was a total of 1,021 general aviation aircraft shipments. The manufacture of new general aviation aircraft peaked in 1978

at over 14,000 aircraft. The 811 new aircraft that were manufactured in 1993 represent a decline of almost 95 percent from 1978 levels. Since 1983, the number of new general aviation aircraft sold has remained under 2,000 per year. Of the 811 general aviation aircraft manufactured in 1993, 436, or 54 percent, were single-engine and multi-engine piston aircraft; 207, or 25 percent, were turboprop aircraft; the remaining 168, or 21 percent, were jet aircraft. A total of 355, or 44 percent of all aircraft shipments in 1993, were for export.

Several factors have contributed to the advanced age of the registered general aviation fleet and the declining sales of new general aviation aircraft. Private individuals are purchasing fewer piston-engine aircraft for personal use and businesses are purchasing fewer turbine aircraft for business-related purposes, replacing older aircraft more slowly. Despite its historic dominance, general aviation has been in a state of decline throughout most of the 1980s and into the 1990s. This decline is exemplified by virtually all annual measures of national general aviation activity, including the number of new general aviation aircraft shipments, the size of the active general aviation fleet, hours flown by general aviation aircraft, the number of general aviation operations at airports with FAA towers, the number of private pilots, the number of student pilots, and the number of manufacturers of piston-type aircraft in the United States.

A variety of factors has contributed to these trends, including severe recessions in the United States economy; the increasing cost of owning, maintaining, and operating general aviation aircraft; increases in airspace restrictions for operations under visual flight rules (VFR); downsizing and economizing measures by businesses; substitution of electronic communication for corporate travel; reductions and shifts in the preferred use of leisure time; and a decline in disposable, discretionary income. While these factors are most pertinent to the following chapters concerning general aviation trends and forecasting, there are also technology-related ramifications.

The most significant factor contributing to the decline in general aviation aircraft sales has been the high cost of purchasing new aircraft. The cost of liability insurance premiums that aircraft manufacturers must pay has been passed on to the consumers, in this case, individuals and companies purchasing new aircraft. Some examples illustrate this point. According to the FAA, the cost of purchasing a general aviation aircraft has increased dramatically, far exceeding the rate of general price inflation. The FAA has noted that the cost of a single-engine piston aircraft in 1978 was approximately $40,000 in actual 1978 dollars, which is equivalent to about $90,000 in 1993 dollars. However, that same aircraft in 1993 may actually be expected to cost between $125,000 and $130,000. In another example, the cost of a well-equipped single-engine aircraft in 1968 was approximately $50,000 in actual 1968 dollars, which is equivalent to about $220,000 in 1993 dollars. However, that same aircraft in 1993 may actually be expected to cost about $300,000. In 1993, current aviation periodicals indicated that a new small single-engine aircraft may cost anywhere from $160,000 to $300,000, depending upon the options and avionics equipment chosen by the buyer. Factors affecting aircraft sales include not only the cost to operate and maintain an airplane, but also the current competitive and somewhat uncertain economic environment for businesses, economic recessions that limit discretionary spending for sport and personal flying, and the increasing popularity of less expensive ultralight and kit-assembled airplanes for personal use.

The number of private individuals that may be expected to purchase new traditional aircraft may be expected to remain modest. The still-rising costs of aircraft ownership and operation place a premium on operating and maintaining even the smallest, most economical general aviation aircraft. Many private individuals who still desire to own an airplane are purchasing less expensive ultralights and kit-assembled sport planes in lieu of traditional single-engine aircraft for personal use. These airplanes are much more limited in terms of performance, range, and overall capabilities than conventional aircraft, but purchase price is typically in the range of $30,000 to $90,000. Accordingly, it may be expected that the majority of new general aviation aircraft purchased, both nationally and within the Region, will be for business-related purposes.

The combination of the advanced age of the general aviation fleet and the current relatively low sales of new general aviation aircraft may be expected to have some long-term implications for the vitality of the general aviation industry. It is possible that when many of the older aircraft in the fleet are no longer economic to operate, owners may decide that it is too expensive to replace them. Given the significantly large number of general aviation aircraft

due for replacement at about the same time, the relatively low number of new aircraft sales in recent years suggests that many of these older aircraft will not be replaced and the fleet size will decrease significantly. The decline in shipments of single-engine piston aircraft is particularly significant in this respect, since the single-engine piston aircraft market is the base on which general aviation activity builds. Traditionally, new pilots are trained in single-engine piston aircraft and work their way up through retractable landing gear and multi-engine piston craft to turbine aircraft. The decline in the single-engine piston market since 1978 may signal a significant slowing in the historic rates of expansion in the general aviation fleet and, consequently, a slowing in the rate of growth in other areas of general aviation. For example, general aviation equipment suppliers and service providers may have a smaller market to serve and thus may find it more difficult to remain in business. This is critical even for business and corporate aviation, since these generally use the same support services. For example, business and corporate aviation users require the services of fixed-base operators, most of whom require business from the personal and sport aviation markets as well as from business and corporate markets in order to survive economically.

Another issue affecting the operation of general aviation aircraft is related to environmental concerns and the continued availability of leaded fuel. The Clean Air Act of 1991 threatens the availability of low-cost aviation gasoline because it requires phasing out leaded gasoline after December 1995. Initially it was feared that this ban would include piston-type aircraft as well as automobiles. However, the United States Environmental Protection Agency has now indicated that the ban on lead fuel-burning engines would not apply to general aviation. It is nevertheless possible that market forces could force petroleum refineries to halt the production of 100 octane low-lead aviation gasoline or, in the alternative, result in very high prices for leaded fuel. The long-term survival of the existing general aviation industry depends in part upon the continued availability of low-cost 100 octane aviation gasoline.

Certain segments of the general aviation community have recently begun to take a proactive approach in an effort to reverse these trends and to foster growth in general aviation. These efforts are being supported and coordinated by the FAA, the National Aeronautics and Space Administration (NASA), trade organizations, manufacturers, and other related interest groups. Two of these efforts have significant technology-related elements.

The FAA, in collaboration with the general aviation user community and industry, has developed the General Aviation Action Plan,[2] a strategic plan intended to address the needs of the general aviation community for the next three to five years. The NASA General Aviation and Commuter Element office is undertaking an effort known as the Advanced Subsonic Technology Program, which will be active through the year 2001. Each of these efforts is specifically intended to address a number of technology-related issues, including reducing the cost of the design and manufacture of single-engine piston aircraft; reducing the cost and time necessary for pilot training and certification; improving the availability of, or seeking clean alternatives to, existing aviation fuels for small aircraft; improving the access to the national air traffic control system for more pilots; reducing the cost and complexity of avionics; and attracting new markets that can make use of the flexibility and convenience provided by general aviation. These programs are both intended to assist in revitalizing general aviation in the United States. Since both of these initiatives are in the earliest stages, it remains to be seen what measures for improving the vitality of general aviation are presented and to what degree those measures can be successfully implemented.

Another effort intended to abate the rapid increase in the cost of manufacturing general aviation aircraft is the General Aviation Revitalization Act of 1993. This Federal legislation enacted an 18-year state of repose for product liability claims against manufacturers of general aviation aircraft and equipment. Passage of this legislation is expected to contribute to a revival of general aviation aircraft manufacturing and help increase general aviation-related employment and use.

Air Carrier and Commuter or Regional Aircraft: For large air carrier aircraft, gradual improvements may be expected in propulsion systems, aerodynamics, structural design, flight control systems, and air navigation equipment and systems. With-

[2]*See U. S. Department of Transportation, Federal Aviation Administration, General Aviation Action Plan, March 1994 revision.*

out any foreseeable major advances in related technology, however, the aspect of air carrier technology that will most influence forecasting procedures will remain the average aircraft size. This is not to say that hardware technology is not significant. For example, advancements in materials engineering design may be expected to lead to the use of stronger, lighter-weight, composite materials in airframe, wing, and fuselage construction. The use of improved composite materials and improved aerodynamics will produce gains in cruise performance and efficiency. Currently, flight control systems, which operate with hydraulic and mechanical-cable systems, may be expected to be replaced with "fly-by-wire" electronic technology, which may reduce direct operating costs for air carrier aircraft up to 25 percent. Advances in air traffic control technology may enable commercial air carrier aircraft to be flown more efficiently and safely. Currently, the Traffic Alerting Collision Avoidance System (T/CAS), is under evaluation and is intended to provide air crews with the capability of detecting, and responding to, emergency conditions more quickly. New air traffic control technologies expected to be developed within the next 10 to 15 years include four-dimensional navigation and guidance systems; improved communication methods for the dissemination of weather, traffic, and ground information between flight crews and air traffic controller personnel; and advances in computerized controller aids for optimum aircraft spacing and sequencing during landing and takeoff operations. In essence, technological improvements may be expected to continue to be made over the next 10 to 15 years with respect to large air carrier aircraft, but these are not expected to affect significantly the design and operation of most major airport facilities, including Milwaukee's General Mitchell International Airport.

The development of significantly larger aircraft than those now available is not expected. Large, wide-body aircraft, such as the Boeing 777, continue to be designed, but the different variations continue to have seating capacities of 300 to 400 passengers. It may be expected that, because of industry conditions, including increased competition and the high capital costs entailed in replacing aging jet aircraft, orders for new planes will be at lower levels than previously observed. Also, with more airline companies centering their service networks on hub cities, more emphasis may be placed on serving direct city-to-city markets, which suggests greater use of medium-sized aircraft.

Design studies conducted by major aircraft manufacturers indicate that technologically advanced supersonic air carrier aircraft could eventually carry up to 300 passengers on transcontinental flights at 2.0 to 3.2 times the speed of sound in a cost-effective manner. These projected improvements are based on several major advances in wing design, cruise drag reduction, propulsion technology, and new composite materials for aircraft structures. However, the significant development costs of manufacturing supersonic aircraft and the technology needed to control noise impacts from supersonic aircraft jet engines may be expected to limit the potential for these aircraft to enter the market in the near future.

Many of the same gradual advances in propulsion systems, aerodynamics, structural design, flight control systems, and air navigation equipment and systems that may impact large air carrier aircraft may also impact commuter/regional aircraft. In addition, research and development continues on turboprop technology, since much of the commuter or regional airline fleet requires propeller-driver aircraft to remain cost-effective. In this regard, some major aircraft component manufacturers are developing and testing counter-rotating turboprop engines. Boeing and McDonnell Douglas are currently investigating aircraft designs that would use these newly developed turboprop engines. Otherwise, the aspect of regional or commuter aircraft technology that will most influence the forecast of procedures for airport system planning will remain changes in average aircraft size.

With respect to aircraft types, several other nontraditional types of aircraft have been thought to offer the potential for eventual widespread use as commuter or regional aircraft. During the mid-1970s, there was significant interest in STOL (short-takeoff-and-landing) aircraft and in the possibility of constructing special "STOLports" specifically designed for the exclusive use of such aircraft. The STOL concept envisioned the use of specialized aircraft designed to take off and land from very short runways 2,000 to 3,000 feet in length. Proponents of the STOL concept argue that STOL aircraft are less noisy and less costly to operate than are helicopters and that such aircraft require less land for runways than do conventional aircraft. Thus, the use of STOL technology has been viewed as a short-haul, intercity transportation alternative, providing service from close-in STOLports or existing general aviation airports in congested metropolitan areas.

The National Aviation and Space Administration's vertical/short-takeoff-and-landing (V/STOL) technology efforts have led directly to the development of the V-22 Osprey tiltrotor aircraft by the United States Department of Defense. There are about 900 V-22 aircraft in the Nation's military fleet. The success of the V-22 Osprey tiltrotor aircraft in military operations has again given credence to the idea that a civilian aircraft using tiltrotor technology could be developed. However, the current National Plan for Integrated Airport System Plan envisions no STOLports being built within the United States through 1999. Even though STOL aircraft can reduce the extent of noise exposure areas, such aircraft have yet to fulfill expectations. It is therefore not envisioned that STOL aircraft and STOLports will become a significant factor in airport planning for Southeastern Wisconsin for the foreseeable future.

In many areas of the United States, particularly in the congested metropolitan areas of the Northeast, Texas, Southern California, and Florida, helicopters are used for business-related transportation. Only in New York City was scheduled helicopter service provided in 1993. The majority of helicopter transportation in other areas is provided by charter service or by company-owned aircraft. Because of the relatively uncongested character of the Milwaukee metropolitan area and the high cost of helicopter operation, civil helicopter activity within Southeastern Wisconsin has been minor to date. It can be expected, however, that the technology of helicopter design, construction, and operation will continue to evolve. At this time, however, it is not expected that the design and operation of helicopters, helipads, and heliports will be affected within the foreseeable future.

AIRSPACE

Airspace matters that affect the regional airport system planning process include 1) airport airspace surfaces, 2) air navigation aids, 3) national airspace system, and 4) air traffic control.

Airport Airspace Surfaces

The airspace immediately surrounding public-use airports is defined in terms of a system of imaginary surfaces to help ensure safe aircraft operations in the proximity of airports, as well as to control height obstructions. These imaginary surfaces are not intended to assist air traffic control procedures, but to prevent tall objects from being constructed too close to airports and thus guide the planning of appropriate land uses adjacent to airports and to the development and updating of local height control ordinances.

Chapter 114.136 of the Wisconsin Statutes provides the State legislation necessary to enable public airport owners to protect the airspace around airports from the intrusion of hazards to aircraft operations. This Statute permits any county, city, village, or town that owns an airport site to establish zoning height criteria within three miles of that site's boundaries to prevent the construction of tall objects that would endanger safe aircraft operation. The Statute further allows the airport owner to negotiate the purchase of, or acquire by eminent domain or other means, the air rights to any property that might contain structures or objects that endanger safe airport operation.

The criteria used to determine the shape, location, and slope of the various imaginary surfaces through which no obstructions should penetrate are recommended by the FAA. A typical set of imaginary surfaces extending from one end of a runway is shown in Figure 3. The various surfaces are defined below:

- The primary surface is a surface longitudinally centered on the runway. It extends to each end of the unpaved runways and 200 feet beyond each end of paved runways. For airports within the regional system, it has a width of 250 feet for runways with only visual approaches, 500 feet for runways with nonprecision instrument approaches, and 1,000 feet for runways with precision instrument approaches. The width of the primary surface of a runway will be that prescribed for the most precise approach existing or planned for either end of the runway; the elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.

- The approach surface is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. The slope and configuration of the runway approach surface are based upon the type of approach available or planned for the runway end. The length, measured horizontally, and slope of the approach surfaces are 5,000 feet at a slope of 1 vertical on 20 horizontal for all runways with visual approaches, 10,000

feet at a slope of 1 vertical on 34 horizontal for runways with nonprecision instrument approaches, and 10,000 feet at a slope of 1 vertical on 50 horizontal plus an additional 40,000 feet at a slope of 1 vertical on 40 horizontal for all runways with precision instrument approaches. The inner edge, or runway level width, of the approach surface is the same as the width of the primary surface; it expands uniformly to a width of 1,250 feet for all visual approach surfaces if located at the opposite end of runways with visual approaches or to a width of 1,500 feet if located at the opposite end of runways with nonprecision instrument or precision instrument approaches, to a width of 3,500 feet for all runways with nonprecision instrument approaches, and to a width of 16,000 feet for all runways with precision instrument approaches.

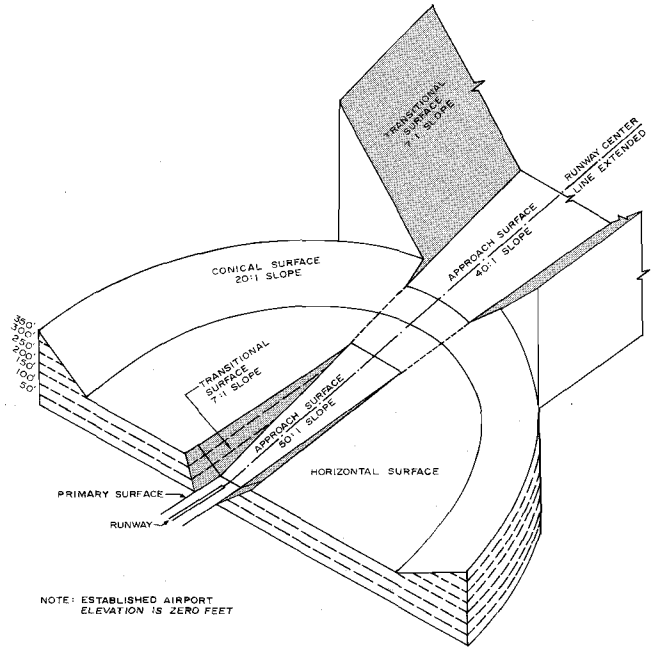
- The horizontal surface is a horizontal plane 150 feet above the established airport elevation. The perimeter of the horizontal surface is established by arcs of specified radii from the center of each end of the primary surface of each runway and by tangents connecting those arcs. The radius of each arc is 5,000 feet for all runways designated as utility or visual and 10,000 feet for all runways designated as precision or nonprecision. The radius of the arc specified for each end of the runway will be the same as the largest determined by the abovementioned runway designations. When an arc is encompassed by another arc or arcs or by tangents connecting adjacent arcs, the encompassed arc shall be disregarded in the determination of the perimeter of the horizontal surface.

- The conical surface extends outward and upward from the periphery of the horizontal surface at a slope of 1 vertical on 20 horizontal for a horizontal distance of 4,000 feet.

- The transitional surfaces are surfaces extending outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 1 vertical on 7 horizontal from the edges of the primary and approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

Figure 3

PERSPECTIVE VIEW OF IMAGINARY SURFACES USED TO DEFINE AIRSPACE IN THE VICINITY OF AIRPORTS



Source: SEWRPC.

Air Navigation Aids

Various types of air navigation aids (NAVAIDS) are in use, each serving a special purpose in the air navigation system. Although navigational aids have varied owners and operators, including the FAA, the military services, private organizations, individual states, and foreign governments, most NAVAIDS in Wisconsin have been installed by the FAA. The FAA has the statutory authority to establish, operate, and maintain air navigation facilities in the United States and to prescribe standards for the operation of any air navigation aids that are used by both civil and military aircraft for instrument flight in Federally controlled airspace. The most common air navigation aids in use are identified below, categorized as either terminal NAVAIDS, Visual Landing Aids, or enroute NAVAIDS. They influence airport system planning by directly affecting the level of service available at individual airports and by having specific site and clearing requirements for facilities.

Terminal NAVAIDS: Some navigational aids are primarily used for terminal navigation, including the landing of aircraft during periods of low clouds and reduced visibility, especially during instrument flight rules (IFR) conditions. The various types of commonly used terminal NAVAIDS are described below:

- A localizer (LOC) provides precise course guidance and is one component of an ILS (Instrument Landing System). The localizer signal is used by the aircraft pilot to establish and maintain the horizontal flight direction of the aircraft until visual contact with the runway is achieved.

- A glide slope (GS) provides precise vertical guidance and is the ILS component which differentiates the precision from the nonprecision approach. The glide slope signal is used by the pilot of the aircraft to establish and maintain the descent rate of the aircraft until visual contact is made with the runway.

- A simplified directional facility (SDF) provides a final course which is similar to that of the ILS localizer. It does not provide glide slope information. For the pilot of the aircraft, the approach techniques and procedures used in the performance of an SDF instrument approach are essentially identical to those used in executing a standard localizer approach except that the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

- An ILS is an instrument landing system that is designed to provide an approach path for precise horizontal and vertical alignment of an aircraft on the final approach to a runway. A complete precision ILS consists of a localizer and glide slope for guidance information, outer and middle marker beacons for range information, and appropriate approach lights and runway lights for visual information. At many general aviation airports, an ILS is installed in increments. Without a glide slope transmitter, an ILS is considered to be a nonprecision landing aid. There are three levels of ILS precision, Category I, II, III, based upon the minimum decision height and runway visual range as authorized by the FAA. A Category III ILS is the most precise instrument landing system.

- The Global Positioning System (GPS) is a satellite-based navigation system which provides highly accurate three-dimensional data to equipped users anywhere on or near the surface of the earth. It is currently being rapidly developed for aviation, as well as for other uses. The typical GPS integrated system provides position, velocity, time, altitude, ground speed and ground track error, heading, and variation. GPS also provides a constant monitoring of system status and accuracy; the built-in test circuitry provides self-tests which diagnose most system failures. The United States Air Force has been equipping new aircraft with GPS receivers and retrofitting those aircraft already in service. It appears that GPS has become standard equipment in almost all Air Force aircraft and is becoming the primary enroute navigation and nonprecision approach air navigation system for military aircraft.

  With respect to civil aviation, the relative simplicity of GPS navigation is viewed as offering the eventual opportunity, especially for general aviation, for significantly less costly navigation equipment both aboard aircraft and at airports. Thus, GPS technology offers the potential for greater numbers of general aviation pilots to conduct instrument flight operations and the potential for more general aviation airports to accept instrument approaches, since GPS navigation could eventually be a substitute for such more complicated and costly air navigation installations as VOR stations.

  Implementation, and acceptance by pilots, of GPS is proceeding rapidly as the FAA certifies hardware, software, and procedures. Initial civil aircraft use of GPS was as a supplementary system for enroute domestic and foreign operations and some approach applications. It is now seeing widespread use as a terminal navigation aid. In fact, the first-ever use of GPS as the sole source of enroute and approach navigation by a scheduled air carrier using an approved GPS approach occurred in December 1993.

- Microwave Landing Systems (MLS) are another type of precision instrument landing system. The use of the MLS for terminal navigation was believed only a few years ago to

provide the eventual replacement for standard instrument landing system technology. However, the development of the MLS for such use has largely been halted by the advent of, and current widespread interest in, and use of, GPS technology.

- Airport Surveillance Radar (ASR) is designed to provide coverage in the general vicinity of an airport. ASR facilities serve as an expeditious means of handling terminal-area traffic through observation of aircraft locations on a radarscope. The ASR can also be used as an instrument approach aid.

- Nondirectional Radio Beacons (NDB) are low-, medium-, or ultrahigh- frequency radio beacons that transmit nondirectional radio signals. These signals can be used by a pilot of properly equipped aircraft to determine and display a bearing to any radio station within its frequency and sensitivity range. Nondirectional radio beacons have historically served general aviation as a low-cost navigation aid and are still common at smaller general aviation airports. However, NDBs are expected to become obsolete as GPS use increases; it is not expected that any new NDB approaches will be commissioned.

Visual Landing Aids: The use of airport lighting aids expedites landing at night or during periods of reduced visibility. These lighting aids can also be considered navigational aids. The different operational requirements at each individual airport will dictate the need for, and sophistication and configuration of, each type of lighting installation. The various types of commonly used visual landing aids are described below:

- Runway Lights are lights positioned either adjacent to, or on the centerline of, the physical landing surfaces to aid pilots in identifying the landing surface during periods of darkness. Runway light installations include High-Intensity Runway Edge Lights (HIRL), Medium-Intensity Runway Edge Lights (MIRL), Low-Intensity Runway Edge Lights (LIRL), and centerline lights. HIRL or MIRL are required for ILS precision approaches.

- A Lead-In Facility (LDIN) consists of a series of at least three flashing light units installed at, or near, ground level to define the desired course to an approach lighting system or to a runway threshold. Each LDIN is unique and designed to overcome specific problems due to hazardous terrain, obstructions, noise-sensitive areas, or other conditions. The system may be curved, straight, or in a combination of the two.

- Runway End Identifier Lights (REILS) are unidirectional flashing lights providing rapid and positive identification of the approach end of a runway. The REIL installation consists of two synchronized flashing lights, one on each side of the runway threshold, facing the approach area.

- An Approach Light System (ALS) is a configuration of signal lights symmetrically dispersed along an extended runway centerline. It begins at the runway threshold and projects outward in the direction of the approaching aircraft. An ALS augments other electronic navigation aids. The FAA recommends a variety ALS lighting configurations to meet different operational requirements. ALSF-2 is a high-intensity ALS with sequenced flashing lights. It is required for ILS Category II and Category III precision approaches. MALS is a medium-intensity approach lighting system installed at airports to permit nonprecision and visual approaches during periods of darkness. The MALSR is a medium-intensity approach lighting system with runway alignment indicator lights (RAILS). It is an economy ALS system approved for ILS Category I precision approaches with descent height as low as 200 feet.

- An Omnidirectional Approach Lighting System (ODALS) consists of seven capacitor discharge lights. Five of the seven ODALS lights are sequentially flashing omnidirectional lights located on the runway centerline. The other two lights are located on each side in line with the runway threshold at a distance of 45 or 75 feet from the runway edge. ODALS may be installed on runways with nonprecision approach procedures and on other runways that are difficult to identify because of an excessive number of lights in the area.

- Visual Approach Descent Indicator (VADI) systems consist of devices located along the

runway to provide pilots with visual guidance in establishing a safe descent path to the runway. They are primarily intended for use during day or night under visual flying rules weather conditions. There are currently three types of approved systems: the Precision Approach Path Indicator (PAPI), the Pulsating Visual Approach Slope Indicator (PLASI), and the Visual Approach Slope Indicator (VASI). A PAPI consists of a row of lights along the runway which provides pilots with a precision guided approach to the runway. A PLASI consists of a pulsating light-emitting box alongside the runway. A VASI consists of a series of boxes located along the side of the runway to provide a visual light path guidance to the runway.

- Airport rotating beacons project two beams of light spaced 180 degrees apart to indicate the location of an airport. Alternating white and green flashes identify a lighted civil airport. White only identifies an unlighted civil airport.

Enroute NAVAIDS: Some navigational aids are used primarily for enroute navigation and require a ground station to transmit or receive signals. The ground stations are located both at and away from airports. The various types of enroute NAVAIDS commonly used are described below:

- Very-high-frequency Omnidirectional Range beacons (VOR) are a system of stations that transmit signals in all directions. A VOR station transmits signals called radials outward in all directions; each of these signals can be considered a course or route. An airborne VOR received in an aircraft can be used to detect these signals, which indicate on which radial course an aircraft is located, thus enabling an aircraft pilot to follow a radial course to or from a VOR. The VOR transmitter stations are used to establish the network of Federal airways across the United States.

- Distance Measuring Equipment (DME) is an aid that allows equipped aircraft to send a signal to most DME equipped VOR stations to measure the slant-range distance from the aircraft to the station in nautical miles, or knots. The airborne DME unit translates this signal into distance in nautical miles, ground speed, and time from the aircraft to the ground station.

- Tactical Air Navigation (TACAN) is an ultrahigh-frequency electronic navigational aid which provides suitably equipped aircraft with continuous information on direction and distance from or to a TACAN station. This system serves the same purpose as VOR and DME facilities, but was developed for the peculiarities of military operations.

- A VORTAC facility is a navigational aid consisting of two components, VOR and TACAN. A VORTAC facility provides three individual services: VOR azimuth, TACAN azimuth, and DME. Although it consists of more than one component, incorporating more than one operational facility and using more than one antenna system, a VORTAC is considered to be a unified navigational aid. Both components of a VORTAC are operating simultaneously and providing all three services at all times.

- Area Navigation (RNAV) is an airborne navigational system that electronically relocates a VOR or DME to facilitate straight-line navigation. The RNAV units are located in the aircraft.

- Air Route Surveillance Radar (ARSR) is a long-range radar system designed primarily to provide a display for tracking enroute aircraft. This aid is used by air traffic controllers to monitor and help guide aircraft as necessary.

- Long-Range Navigation, or LORAN, is an electronic means of establishing an aircraft's position relative to three or more antennas transmitting a low-frequency radio signal from points as far away as 1,000 miles. The use of LORAN for aviation is relatively new. LORAN was developed for marine use during World War II and is now a standard navigation system for ships, yachts, and fishing boats. LORAN-C is the current generation of LORAN. The FAA may establish LORAN-C nonprecision instrument approaches. It may eventually be incorporated as a supplemental navigational aid to global positioning systems. LORAN-C has the potential to serve as the primary cost-effective method to provide nonprecision instrument approaches to airports that currently lack instrument approach capability. It is anticipated that nonprecision instrument approaches based on NDB and

VOR facilities will eventually be replaced by the use of LORAN-C approaches. However, this will be practical only as IFR-certified LORAN-C receivers come into common use on general aviation aircraft, which is expected to be after the year 2000.

The National Airspace System

The airspace system of the United States is a complex network of airways, air navigation aids, and air traffic control facilities designed to move aircraft safely and efficiently throughout the nation. The Federal Aviation Act of 1958, as amended, and Executive Order 10854 designate the navigable airspace as a limited national resource. Therefore, specific rules and regulations have been established by the FAA to govern the use of this resource. Because the FAA is responsible for the control and regulation of air traffic and airspace within the United States, as well as for the development, improvement, and operation of the air traffic control system, the FAA is also logically responsible for airspace planning and analysis. This includes airspace analysis as it relates to airport facility improvements and the development of new airport sites, not only under the National Plan for Integrated Airport Systems, but also under State and regional airport system plans. Accordingly, while potential airspace conflicts will require consideration in this plan update with respect to any alternative airport improvements or consideration of new sites, the detailed analysis of airspace, airspace use, and airspace conflicts is beyond the scope of the regional system planning effort, requiring, as it does, the attention of the FAA. Nevertheless, the operation and efficiency of any airport is affected by the surrounding airspace. This warrants a brief description of the basic airspace components.

In September 1993, the FAA reclassified the different types of airspace utilized in the United States. This resulted in the revision of the airspace nomenclature and in some procedural changes. With respect to nomenclature, descriptive terms formerly used to identify the various classifications of airspace, such as Positive Control Areas and Control Zones, were replaced by the alphabetic characters A through G, with the exception of F[3]. The purpose of this reclassification was to simplify the United States airspace designations, to enable the airspace designations in the United States to conform to the international system of airspace designations, to help standardize equipment requirements for the operation of aircraft within the various types of airspace, and to clarify pilot certificate requirements and operational procedures and air traffic assistance offered in each of type of airspace. Each type of airspace has specific operating rules, as well as exact boundaries, defined in the Federal Aviation Regulations, that must be observed by aircraft pilots. The revised airspace classifications are illustrated in Figure 4 and are described below:

- Class A: Controlled enroute airspace, including the area from 18,000 feet above mean sea level to 60,000 feet above mean sea level, in which aircraft are required to be operated under IFR at all times. All operations are subject to air traffic control clearances and instructions. Aircraft separation and safety advisories are also provided by air traffic control. This airspace, formerly known as the Positive Control Area, includes the jet routes.

- Class B: Controlled terminal airspace, typically extending outward from the nation's busiest airports and upward from the surface to a ceiling of 10,000 feet above sea level. Operations in this airspace may be under VFR or IFR, but all aircraft are subject to air traffic control clearances and instructions. Air traffic control provides aircraft separation and safety advisories. This airspace includes what were formerly known as Terminal Control Areas. There currently is no Class B airspace in Southeastern Wisconsin, but one is centered on Chicago O'Hare International Airport.

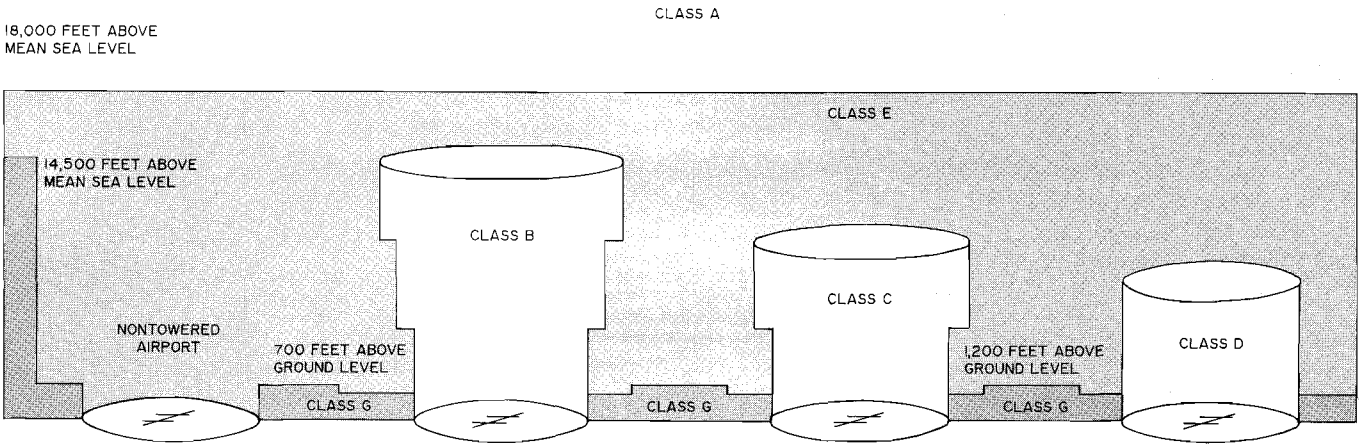
- Class C: Controlled terminal airspace, typically extending outward from moderately busy airports and upward from the surface to a ceiling of 4,700 feet above sea level. Operations in this airspace may be under VFR or IFR, but all aircraft are subject to air traffic control clearances and instructions. Air traffic control provides aircraft separation between IFR aircraft. VFR operations are given traffic advisories and, on request, conflict-resolution instructions. This airspace includes what were formerly known as Airport Radar Service Areas. In Southeastern Wisconsin, a Class C airspace is centered on General Mitchell International Airport.

- Class D: Controlled terminal airspace, typically extending outward from the nation's less

[3]*The Class F airspace designation is in use in other countries, but not in the United States.*

Figure 4

NEW 1993 AIRSPACE CLASSIFICATION



Source: Federal Aviation Administration.

busy airports and upward from the surface to a ceiling of 3,200 to 3,400 feet above mean sea level. Operations in this airspace may be under VFR of IFR, but all aircraft are subject to air traffic control clearances and instructions. Air traffic control provides aircraft separation between IFR aircraft and VFR aircraft. VFR operations are given traffic advisories and, on request, conflict-resolution instructions. This airspace includes what were formerly known as Airport Traffic Areas. In Southeastern Wisconsin, one Class D airspace is centered on Waukesha County-Crites Field and one on Timmerman Airport.

- Class E: Controlled enroute low-altitude and terminal airspace, including the area below 18,000 feet above mean sea level and above the Class G ceiling, but not including Class B, C, and D terminal airspace. Operations in this airspace may be either IFR or VFR. Separation service is provided to IFR aircraft only and, to the extent practical, traffic advisories to aircraft operating under VFR. This airspace includes the Federal Airways and was formerly known as the Continental Control Area and General Controlled Airspace.

- Class G: Uncontrolled airspace, extending from the surface up to either 700 feet or 1,200 feet above ground level in areas not already in Class B, C, or D terminal airspace. Operations may be either IFR of VFR, but no air traffic control service is available. This airspace was formerly known as Uncontrolled Airspace.

- Special-Use Airspace: Areas set aside for purposes of national security, welfare, and environmental protection and for military training, research, testing, development, and evaluation. Entry into these areas by nonparticipating aircraft is not permitted and could be dangerous. Special-use airspace includes Prohibited Areas, Restricted Areas, Warning Areas, Military Operations Areas, Alert Areas, and Controlled Firing Areas. The dimensions and hours of these areas vary and are typically set by the FAA. There is currently no special-use airspace in Southeastern Wisconsin, although both a restricted area and a military operations area exist over a portion of Lake Michigan east of Ozaukee County.

Air Traffic Control

The FAA prescribes two basic types of flight rules for air traffic: visual flight rules (VFR) and instrument flight rules (IFR). Visual flight rules are used when weather conditions permit aircraft to maintain safe separation by visual means. Instrument flight rules are used when the visibility or ceiling falls below those conditions prescribed under VFR, normally defined as a visibility and ceiling equal

to, or greater than, three miles and 1,000 feet, respectively. In IFR conditions, safe separation between aircraft is the responsibility of air traffic control personnel, while under VFR conditions, it is the responsibility of the pilot. In certain airspace areas, especially where high-speed jet aircraft operate, IFR are prescribed at all times, regardless of weather conditions.

Different air traffic control procedures apply to aircraft operating within these control areas on the basis of the type of airport involved. Some VFR airports can operate when weather conditions require instrument flight rule operations if operations are limited to arrivals and departures under special, prescribed conditions. The sophistication of the air navigation aids used and obstruction clearance criteria associated with each instrument approach establishes the extent of IFR capability.

Within Southeastern Wisconsin there are ten airports that had published IFR procedures in effect as of December 1993. These are General Mitchell International Airport, Timmerman Airport, Burlington Municipal Airport, Kenosha Regional Airport, Waukesha County-Crites Field, West Bend Municipal Airport, Batten Airport, East Troy Municipal Airport, Lake Lawn Airport, and Hartford Municipal Airport. Within counties adjacent to the Region, there are nine airports that had published IFR procedures in effect as of September 1993. These are Sheboygan County Memorial Airport, Fond du Lac County Airport, Dodge County Airport, Watertown Municipal Airport, and Rock County Airport, all in Wisconsin; and Waukegan Memorial Airport, Galt Airport, Belvidere Airport, and Lake in the Hills Airport in Illinois.

The control and regulation of air traffic is the responsibility of the FAA and is accomplished through a network of air traffic control facilities which achieve the safe separation and orderly flow of aircraft enroute and in terminal areas. Air route traffic control centers (ARTCC) are established primarily to provide air traffic control services to aircraft operating under IFR conditions within controlled airspace, principally during the enroute phase of flight. Primary responsibility for the control of IFR air traffic in Southeastern Wisconsin is retained by the FAA Chicago air route traffic control center. Airport traffic control towers (ATCT) are responsible for monitoring, supervising, and directing the flow of traffic at airports in the immediate airspace, within a five-mile radius of the airport. FAA traffic control towers are located at Milwaukee's General Mitchell International Airport, Lawrence J. Timmerman Airport, and Kenosha Regional Airport. A privately owned and operated traffic control tower is operated at Waukesha County-Crites Field. When a control tower is equipped for approach or departure control, it also controls arrival, departure, and other traffic in the area outward from the airport traffic area to about a 35-mile radius. Thus, an approach or departure facility performs the important function of monitoring and sequencing aircraft in busy terminal areas for one or more airports. Ground control also normally operates from the tower and is responsible for directing all aircraft and ground equipment movements on taxiways and runways.

To aid both air carrier and general aviation pilots, other air traffic services are typically available. Flight service stations (FSS) provide pilot briefings and search and rescue services, relay air traffic control clearances, provide notices to airmen, broadcast weather information, and receive and process flight plans and report on hazardous areas. Automated terminal information service (ATIS) is a continuous broadcast, updated hourly, of selected weather, traffic, and airport information in high-activity terminal areas. The automated weather observing system (AWOS) is operationally relatively new. This is a fully automated weather observing system that generates a complete weather report continuously 24 hours a day. Reports are voice-synthesized and can be transmitted by a variety of means, also to pilots in the air, over existing navigational frequencies. The Automated Surface Observation System (ASOS) is a new system similar to AWOS. The ASOS, however, also includes sensors that provide information about precipitation conditions at the station to pilots.

SUMMARY

The existing air transportation system in Southeastern Wisconsin consists of three principal elements: airports, aircraft, and airspace. In 1993, there were a total of 103 airports of all types located within the seven-county Southeastern Wisconsin Region. Of these, Milwaukee County's General Mitchell International Airport was the largest and the only airport serving scheduled air carriers. General aviation, public-use airports accounted for another 22 of the 103 airports. Of these 22 airports, seven were publicly owned, including Kenosha Regional Airport, Lawrence J. Timmerman Airport, Burlington Municipal, East Troy Municipal,

Hartford Municipal, West Bend Municipal, and Waukesha County-Crites Field. A total of 15 general aviation, public-use airports were privately owned, including Camp Lake, Vincent, Westosha, Rainbow, Fox River, Batten Airport, Cindy Guntly Memorial, Sylvania, Valhalla, Big Foot Airfield, Grand Geneva Airport, Lake Lawn Airport, Hahn Sky Ranch, Aero Park, and Capitol. The remaining 80 airports in Southeastern Wisconsin were privately owned and not open for public use. Of these 80 airports, two were seaplane bases and 24 were heliports.

The Federal Aviation Administration uses three different airport classification schemes for the purpose of specifying the appropriate role, appropriate service level, and the appropriate design standards for individual airports. The airport role reflects a particular airport's design, which, in turn, influences the specific aircraft the airport can accommodate. The airport roles include Basic Utility, General Utility, Transport, Air Carrier, Heliport, Seaplane Base, and STOLport.

A Basic Utility airport is intended to serve all small single- and twin-engine piston aircraft with a maximum gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are used for recreational and sport flying, training, agricultural purposes, and some business and charter flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 2,800 to 3,900 feet. Public-use airports within the Region having this classification included Aero Park, Big Foot, Burlington Municipal, Camp Lake, Capitol, Cindy Guntly Memorial, East Troy Municipal, Fox River, Grand Geneva, Hahn Sky Ranch, Hartford Municipal, Rainbow, Sylvania, Valhalla, Vincent, and Westosha Airports.

A General Utility airport is intended to serve virtually all small general aviation single- and twin-engine aircraft, both piston and turboprop, with a maximum gross takeoff weight of 12,500 pounds or less. The larger aircraft that this airport is intended to serve typically seat from six to 14 people and are widely used for business, corporate, and commercial flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 3,900 to 4,800 feet. Public-use airports within the Region thus classified include Lake Lawn Airport, Timmerman Airport, and Waukesha County-Crites Field.

A Transport airport, referred to as a transport-corporate airport within the context of this regional airport system plan reevaluation, is intended to serve business jets and transport type aircraft as well as smaller general aviation aircraft. Although this type of airport is not intended to serve scheduled air carriers, its facilities may be designed to accommodate aircraft of a size similar to that of aircraft typically used by commuter and regional airlines and by many air cargo operators. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 4,800 to 6,800 feet. Public-use airports within the Region having this classification included Kenosha Regional Airport, Batten Airport, and West Bend Municipal Airport.

An Air Carrier airport is intended to serve all aircraft up to, and including, large jet airliners and military transports. Long-haul air carrier airports are intended to serve scheduled nonstop airline markets with routes of over 1,500 miles. Mitchell International Airport is classified as a long-haul air carrier airport. Medium-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of between 500 and 1,500 miles. Short-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of less than 500 miles. No airports in the region were classified as medium-haul or short-haul air carrier airports. Within Southeastern Wisconsin, long-haul air carrier airports would normally have a primary runway length of 8,800 to 9,800 feet, medium-haul air carrier airports would normally have a primary runway length of 7,800 to 8,800 feet, and short-haul air carrier airports would normally have a primary runway length of 6,800 to 7,800 feet.

The three remaining airport role classifications are self-explanatory. Heliports are designated areas of land or water or structures used for the landing and takeoff of helicopters. There were 24 private heliport facilities in the Region. Seaplane bases are designated areas of water to be used for the landing and takeoff of appropriately equipped aircraft. There were two such private facilities in the Region. STOLports are airports specifically designed for short-takeoff-and-landing aircraft and separate from conventional airport facilities. There were no STOLports in the Region as of 1993.

The airport service level reflects the type of public service provided to the community by the airport and, importantly, represent funding categories

set up by Congress to assist in airport development. The five basic airport service levels are used primarily for funding purposes and include Commercial Service-Primary (PR), Commercial Service-Other (CM), Reliever Airport with Commercial Service (CR), Reliever Airport (RL), and General Aviation Airport (GA). Mitchell International was the only Commercial Service-Primary Airport within the Region. Seven of the airports within the Region were designated by the Federal Aviation Administration as reliever airports, providing capacity relief from congestion at Mitchell International. These include Capitol, Batten Airport, Hartford Municipal, Kenosha Regional Airport, Timmerman Airport, Waukesha County-Crites Field and West Bend Municipal Airport. The remaining public-use airports were classified as General Aviation Airports. There were no airports within the Region classified as either Commercial Service-Other or Reliever Airport with Commercial Service.

A system of airport reference codes is used to specify the appropriate airport facility design standards and criteria for individual airports. An airport reference code has two components relating to the operational and physical characteristics of the airplanes intended to operate at the airport. The first component, depicted by a letter, is the aircraft approach category and relates to the aircraft approach speed, an operational characteristic. The second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan, a physical characteristic. The combination of these two characteristics determines the most demanding aircraft, referred to as the "critical" aircraft, and therefore the appropriate design standards for a specific airport. For example, airports expected to accommodate single-engine aircraft normally may fall into airport reference code A-I; airports serving larger general aviation aircraft and commuter-type airplanes may normally be included in airport reference codes B-II or C-III, respectively; and larger air carrier airports may normally be included in airport reference code D-VI.

The different airports in Southeastern Wisconsin provide various levels of services and facilities appropriate to the type of aircraft and operations they accommodate. Mitchell International, the only airport in Southeastern Wisconsin classified as an air carrier airport, has the widest range of facilities and services, since it handles scheduled air carrier traffic in addition to general aviation activities. Work that was begun in 1982 to expand and completely modernize and replace the passenger terminal facilities was largely completed by 1987. The current airport master plan for Mitchell International recommends that the terminal area eventually be expanded to a total of 80 gates if increases in passenger demand warrant.

Among the general aviation, public-use airports other than Mitchell International, it is typically the larger fields, classified as either General Utility or Transport, that are publicly owned and provide a complete range of facilities and services. These airports, such as Timmerman Airport and Waukesha County-Crites Field, usually have one paved runway or more, lighting and navigational aids, a variety of indoor and outdoor aircraft storage facilities, and maintenance, repair, charter, and instructional services. These kinds of airports cater to commercial, business, corporate, and personal aviation activity in addition to offering training services. The smaller general aviation, public-use airports are typically classified as Basic Utility airports and offer more limited facilities and services, catering more to recreational and sport flying activities. The private-use airports in Southeastern Wisconsin usually have very few facilities and, in many cases, consist only of a turf runway and possibly a small hangar. These airports typically serve a limited number of aircraft, used for either agricultural or personal flying.

The second element of the regional air transportation system consists of the aircraft, of which there are a wide variety in use at airports in Southeastern Wisconsin. For purposes of airport system planning, civil aircraft, that is, nonmilitary aircraft, are divided into either general aviation and air carrier aircraft. General aviation aircraft are further separated into four fixed-wing aircraft categories: single-engine piston, multi-engine piston, turboprop, and turbojet, and the categories of helicopters and miscellaneous aircraft types: gliders, balloons, and dirigibles. Air carrier aircraft are separated into two categories: regional or commuter aircraft and commercial airliners. Military aircraft are normally addressed separately from civil aircraft since the FAA does not report registration or activity data for military aviation.

Helicopters, which are categorized as rotorcraft by the Federal Aviation Administration, are addressed separately from fixed-wing aircraft for airport planning and forecasting purposes since they require a very small plot of land to take off and land and therefore do not require large areas for airfields.

The use of helicopters within Southeastern Wisconsin continues to be relatively low concentrated in the emergency medical, commercial charter, and military uses.

Major advances or changes in the size, configuration, design, and performance of the different aircraft types may affect the size and scope of necessary airport facilities and therefore could have implications for airport system forecasting and planning. The size and performance of both general aviation and air carrier aircraft are not expected to change enough in the foreseeable future to affect the overall design and operation of airport facilities. Periodic advances in the State of the art of aircraft technology may be expected to remain evolutionary, not revolutionary. Accordingly, the basic issues with respect to airport system planning is likely to remain the composition of the overall aircraft fleet in terms of the mix of different sized aircraft, not the technology of the hardware.

With respect to fixed-wing aircraft, the majority of airplanes are small single-engine aircraft, which will continue to dominate the general aviation fleet both in the United States and in Southeastern Wisconsin. During the past 15 years, the manufacture and sale of new general aviation aircraft has declined to only a small fraction of what it once was, largely because of the high cost of purchasing, owning, and maintaining general aviation aircraft, the current uncertain economic environment, and the increasing popularity of less expensive ultralight and kit-assembled airplanes. Fixed-wing turbine aircraft and helicopters are expected to be the fastest growing segments of the general aviation feet. The newest type of general aviation airplane configuration is a pusherprop, which is, however, not expected to represent a significant proportion of the general aviation fleet in Southeastern Wisconsin in the foreseeable futures.

For large air carrier aircraft, gradual advances in propulsion systems, aerodynamics, structures, flight control systems, and air navigation equipment and systems are expected to continue. Without any foreseeable major leaps in related technology, however, the aspect of air carrier technology that will most influence forecasting procedures will remain the average aircraft size. Supersonic air carrier aircraft have been under development, but the significant development costs needed to manufacture such aircraft and the technology needed to control noise impacts from supersonic aircraft jet engines will limit the potential for these aircraft to enter the market in the near future. From a fleet once composed predominantly of general aviation type aircraft, today's fleet of commuter or regional aircraft is increasingly composed of new state-of-the-art aircraft offering amenities similar to those found on large jet aircraft. Several other nontraditional types of aircraft have been thought to offer the potential for eventual widespread use as commuter or regional aircraft, including short-takeoff-and-landing aircraft, tiltrotor aircraft, and helicopters. It is not envisioned that these types of aircraft will become a significant factor in airport planning for Southeastern Wisconsin within the foreseeable future.

The third element of the regional air transportation system is airspace. The airspace system of the United States and Southeastern Wisconsin is a complex network of airways, air navigation aids, and air traffic control facilities designed to move aircraft safely and efficiently both enroute and into airport terminal areas. The Federal Aviation Administration is responsible for the analysis of available airspace, airspace use, and possible airspace conflicts. However, a description of the basic airspace components has been included in this chapter since they affect the operations and efficiency of airports in Southeastern Wisconsin and may have a bearing on the design and evaluation of improvements and land use controls recommended in the regional airport system plan.

Chapter IV

EXISTING AERONAUTICAL ACTIVITY

INTRODUCTION

An inventory of the existing aeronautical activity within the Southeastern Wisconsin Region is important to any airport system planning effort, not only to facilitate a better understanding of the extent, nature, and trends of such activity, but also to provide a sound basis on which to review existing forecasts and prepare new forecasts. The existing aeronautical activity within Southeastern Wisconsin can be divided into six basic categories for the purposes of this plan reevaluation. These categories are: 1) air carrier activity, 2) general aviation activity, 3) air cargo activity, 4) military aviation activity, 5) helicopter activity, and 6) other activity. Together, these six functional categories represent the demand which is placed upon, and may be expected to continue to be placed upon, the regional airport system. The purpose of this chapter is to describe those aspects of each of these categories of aeronautical activity pertinent to the preparation of a regional airport system plan for Southeastern Wisconsin.

AIR CARRIER PASSENGER ACTIVITY

Passenger air carriers constitute the backbone of public intercity passenger transportation services used by individuals coming into, or going out of, the Southeastern Wisconsin Region. Most of the air carrier service is scheduled; only a very small portion is unscheduled. All of the passenger air carrier services utilize Milwaukee County's General Mitchell International Airport as the terminal for the Milwaukee metropolitan area and Southeastern Wisconsin. This section of the chapter describes the air carriers serving Mitchell International, the level of service provided by passenger air carriers for Southeastern Wisconsin, the current and historic passenger volumes and aircraft operations, and the socio-economic characteristics and travel patterns of passengers using Mitchell International.

Air Carrier Passenger Service at General Mitchell International Airport

As of December 1993, there were a total of 19 domestic air carriers providing scheduled airline passenger service to and from Milwaukee County's Mitchell International Airport.[1] There were no foreign-flag air carriers providing service to Milwaukee, nor were any of the domestic carriers serving Milwaukee with scheduled international flights. The 19 air carriers include both large certificated air carriers operating under authority of Part 121 of the Federal Aviation Regulations (FAR) and commuter air carriers operating under authority of Parts 135 or 121 of the FAR. Air carriers and aircraft are defined by the Federal Aviation Administration (FAA) in a number of different ways, depending upon the purposes involved. Certificated air carriers are grouped into large and small categories according to the size of the aircraft the carrier operates. A large certificated air carrier is one that operates aircraft designed to have a maximum passenger seating capacity of 60 seats or more or a maximum payload capacity of 18,000 pounds or more or used in international operations. A small certificated air carrier operates aircraft of less than 60 seats or a payload capacity of less than 18,000 pounds. Commuter air carriers are defined as a type of air-taxi operator performing at least five round trips per week between two or more points and publishing flight schedules which specify the times, days of the week, and points between which such flights are performed. An air taxi is defined as a classification of air carrier which transports persons, property, and mail using small aircraft with 30 seats or less or a maximum payload capacity of less than 7,500 pounds. The aircraft used by air carriers are also grouped into large and small categories. Large aircraft include all aircraft carrying passengers of cargo for compensation or hire with more than 30 seats. Small aircraft include all aircraft carrying passengers or cargo for compensation or hire with 30 seats or less. Table 22 lists the category and describes the basic route structure for each of the airlines serving Milwaukee as of December 1993. The large certificated airlines may be

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[1] *The number of air carriers providing scheduled service to Mitchell International changes frequently, depending upon market conditions. For example, as of July 1994, there were 21 domestic air carriers providing such services, including those listed above plus America West Express, Capitol Air, and Trans World Express; Chicago Express no longer provided service to Mitchell International.*

Table 22

SCHEDULED AIR CARRIERS SERVING GENERAL MITCHELL INTERNATIONAL AIRPORT: DECEMBER 1993

Airline Name and Carrier Group	Airline Hubs	Nonstop Service from Milwaukee	Aircraft Type Typically Used at Milwaukee
Major Carriers			
America West Airlines	Columbus and Phoenix	Las Vegas, Phoenix	Airbus A320 Boeing 737
American Airlines	Chicago, Dallas/Fort Worth, and Nashville	Chicago, Dallas/Fort Worth, and Nashville	Boeing 727
Continental Airlines	Cleveland, Denver, Newark, and Houston	Denver and Cleveland	Boeing 727, 737
Delta Air Lines	Atlanta, Cincinnati, Dallas/Fort Worth, and Salt Lake City	Atlanta	Boeing 737, McDonnell Douglas MD-88
Northwest Airlines	Detroit, Memphis, and Minneapolis/ St. Paul	Detroit, Memphis, Minneapolis/ St. Paul, and Toronto	Airbus A320 Boeing 727, 757 McDonnell Douglas DC-9, DC-10
Trans World Airlines	New York and St. Louis	St. Louis	Boeing 727 McDonnell-Douglas DC-9
United Airlines	Chicago, Denver, Los Angeles, San Francisco, and Washington	Chicago and Denver	Boeing 727, 737
USAir	Baltimore, Charlotte, Philadelphia, and Pittsburgh	Charlotte, Philadelphia, and Pittsburgh	Boeing 737 McDonnell Douglas DC-9
National Carriers			
Air Wisconsin (Doing business as United Express)	Chicago and Washington	Appleton, Chicago and Oshkosh	British Aerospace BA-146
American Trans Air	--	Ft. Lauderdale, Ft. Meyers, Orlando, and Tampa-St. Petersburg	Boeing 727, 757
Midwest Express Airlines	Milwaukee	Appleton, Atlanta, Boston, Cleveland, Dallas/Fort Worth, Denver, Grand Rapids, Kansas City, Los Angeles, Madison, New York City, Philadelphia, San Diego, San Francisco, and Washington, D.C.	McDonnell Douglas DC-9, MD-88
Large Regional Carriers			
Simmons Airlines (Doing business as American Eagle)	Chicago	Chicago	--
Medium Regional Carriers			
None	--	--	--
Commuter Carriers			
Air Vantage	--	Minneapolis-St. Paul	--
Chicago Express	Chicago	Chicago	--
ComAir (Doing business as the Delta Connection)	Cincinnati	Appleton, Cincinnati, Cleveland, and Dayton	Fairchild Metro III
Continental Express	Chicago	Cleveland	--
Great Lakes Aviation (Doing business as United Express)	Chicago	Escanaba and Minneapolis-St. Paul	--
Jetstream International (Doing business as USAir Express)	Pittsburgh	Dayton, Indianapolis	British Aerospace Jetstream 31
Skyway Airlines (Doing business as the Midwest Express Connection)	Milwaukee	Appleton, Cedar Rapids, Cleveland, Columbus, Dayton, Des Moines, Flint, Grand Rapids, Green Bay, Indianapolis, La Crosse, Lansing, Madison, Muskegon, Rhinelander, Rockford, South Bend, Traverse City, and Wausau	Beechcraft 1900

Source: Airline Schedules effective December 1993 and SEWRPC.

classified into one of four categories based upon annual operating revenue: major carriers, national carriers, large regional carriers, and medium regional carriers.

Major Carriers: Major carriers are defined as air carriers with annual operating revenues of $1 billion or more. These carriers serve primarily the long-haul national markets, emphasizing nonstop service in many major domestic markets, service to most major United States cities, and service to selected foreign counties. The major carriers make extensive use of large-capacity aircraft such as the Boeing 727 and the McDonnell Douglas DC-10, as well as wide-body and "jumbo" jets, such as the Lockheed L-1011 and the Boeing 767. Major carriers serving Milwaukee as of December 1993 included Northwest Airlines, Inc.; United Air Lines, Inc.; Trans World Airlines, Inc.; American Airlines; USAir, Inc.; American West Airlines; Continental Airlines, Inc.; and Delta Airlines, Inc.

National Carriers: National carriers are defined as air carriers with annual operating revenues of from $100 million to $1 billion. National carriers serve selected long-haul and short-haul markets throughout entire sections of the United States. Unlike major carriers, however, the national carriers do not offer nationwide service. Average lengths of flights and passenger trips for national carriers are significantly shorter than those of the major carriers. The national carriers make extensive use of narrow-body jet aircraft such as the McDonnell Douglas DC-9 and MD-88. The national carriers serving Milwaukee as of October 1993 included Air Wisconsin, American Trans Air, and Midwest Express Airlines.

Large Regional Carriers and Medium Regional Carriers: Large regional carriers are defined as air carriers with annual operating revenues from $10 million to $100 million. Medium regional carriers are defined as air carriers with annual operating revenues of less than $10 million. Large and medium regional carriers primarily serve as feeders to major and national airline hubs, serve smaller nonstop markets given up by major and national carriers, or serve special niche markets. In addition, many of the nonscheduled passenger and air cargo certificated air carriers are in these categories. Regional carriers operate with aircraft that range from small- to medium-size, two-engine turboprop aircraft, such as the Shorts 330 and 360, up to narrow-body, full-size jets such as DC-9s. As of October 1993, Simmons airlines was the only large regional carrier serving Milwaukee. There were no medium regional carriers serving Milwaukee at that time. Operations of these carriers typically extend over a three- to four-state area, with the routes being designed to act as feeders to the major and national carriers.

Commuter air carriers are airlines using small aircraft with 30 seats or less and performing at least five round trips per week between two or more points and publishing flight schedules. Commuter airlines are subject to less stringent Federal regulations and data reporting requirements than are large certificated air carriers. Commuter airlines typically provide local point-to-point service, providing feeder service to system hubs operated by major or national air carriers and linking smaller communities with larger cities. These carriers typically use smaller, two-engine, turboprop aircraft, such as the Beechcraft 1900. As of October 1993, commuter airlines serving Milwaukee included Air Vantage, Chicago Express, ComAir, Continental Express, Skyway Airlines, Great Lakes Aviation, and Jetstream International.

In addition to being served by three of the four categories of air carriers, Milwaukee is served by various supplemental carriers. Supplemental carriers are defined as certificated air carriers that operate under authority of Part 121 of the Federal Aviation Regulations and provide nonscheduled or charter passenger and cargo transportation services. Supplemental carriers serving Mitchell International typically use aircraft ranging in size from small, single-engine turboprops to such jet aircraft as Boeing 727s. As of December 1993, supplemental carriers serving Milwaukee and handling passenger traffic included American Trans Air, Casino, Express One, Scott Aviation, and Sun Country. Typical markets for supplemental carriers using large jet aircraft serving Milwaukee include Las Vegas, Orlando, and other vacation and leisure destinations.

At the end of December 1993, the 19 air carriers with scheduled airline service to and from Mitchell International provided weekday nonstop service to 46 different metropolitan areas or cities within the United States, as shown in Table 23. Because this table reflects wintertime seasonal service, nonstop service is reflected between Milwaukee and a number of Florida cities. Direct weekday service, which may include one or more intermediate stops, was provided between Milwaukee and 49 different cities, including some that also have nonstop service, and other smaller cities. Service between Milwaukee and other cities which either represent major markets or are airline system hubs has been

Table 23

NUMBER OF WEEKDAY NONSTOP FLIGHTS DEPARTING GENERAL MITCHELL INTERNATIONAL AIRPORT FOR OTHER CITIES: 1971, 1983, 1989, AND 1993

City	1971[a]	1985[b]	1989[c]	1993[d]
Appleton, Wisconsin	2	2	8	6
Atlanta, Georgia	2	5	10	5
Benton Harbor, Michigan	2	0	0	0
Boston, Massachusetts	1	2	5	3
Cedar Rapids, Iowa	1	0	2	3
Charlotte, North Carolina	0	0	0	2
Chicago, Illinois	24	24	22	22
Cincinnati, Ohio	3	9	9	7
Cleveland, Ohio	3	4	7	9
Columbus, Ohio	1	3	5	7
Dallas-Fort Worth, Texas	0	4	3	4
Dayton, Ohio	3	3	0	0
Denver, Colorado	2	8	4	4
Des Moines, Iowa	0	0	2	0
Detroit, Michigan	9	12	12	7
Escanaba, Michigan	0	3	0	1
Flint, Michigan	0	0	2	2
Fort Lauderdale, Florida	0	0	0	1
Fort Meyers, Florida	0	0	0	1
Grand Rapids, Michigan	1	3	12	6
Green Bay, Wisconsin	1	5	6	4
Indianapolis, Indiana	3	5	7	12
Iron Mountain, Michigan	0	2	0	1
Kansas City, Missouri	0	1	0	2
La Crosse, Wisconsin	0	3	3	3
Lansing, Michigan	0	0	2	3
Las Vegas, Nevada	0	0	0	1
Los Angeles, California	2	0	1	2
Madison, Wisconsin	13	6	6	7
Manitowoc, Wisconsin	2	0	0	0
Memphis, Tennessee	0	3	4	3
Menomonee, Michigan	0	0	0	1
Minneapolis-St. Paul, Minnesota	11	10	8	16
Moline, Illinois	1	0	0	0
Muskegon, Michigan	4	3	4	4
Nashville, Tennessee	0	0	3	2
New York, New York-Newark. New Jersey	14	5	9	7
Orlando, Florida	0	0	0	1
Oshkosh, Wisconsin	5	4	0	1
Philadelphia, Pennsylvania	2	0	4	4
Phoenix, Arizona	0	0	0	2
Pittsburgh, Pennsylvania	1	2	3	4
Rochester, Minnesota	2	0	0	0
Rockford, Illinois	1	0	2	2
St. Louis, Missouri	3	6	6	6
San Diego, California	0	0	0	1
San Francisco, California	1	0	1	2
Seattle-Tacoma, Washington	1	0	0	0
South Bend, Indiana	0	0	0	3
Tampa-St. Petersburg, Florida	1	1	0	2
Toronto, Ontario	0	0	1	1
Traverse City, Michigan	0	3	0	1
Washington, D.C.	3	1	4	3
Wausau-Stevens Point, Wisconsin	0	0	5	3

[a] *Based on airline schedules effective January 1971.*

[b] *Based on airline schedules effective August 1, 1985.*

[c] *Based on airline schedules effective October 26, 1989.*

[d] *Based on airline schedules effective December 31, 1993.*

Source: Airline schedules and SEWRPC.

Table 24

ANNUAL ENPLANING AND DEPLANING AIR CARRIER PASSENGERS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1993

Year	Enplaning Passengers	Deplaning Passengers	Total Number of Passengers	Enplaning Passengers as Percent of Total
1970	887,047	879,755	1,766,802	50
1971	976,609	970,833	1,947,442	50
1972	961,376	955,876	1,917,252	50
1973	1,020,979	1,020,475	2,041,454	50
1974	1,072,466	1,070,605	2,143,071	51
1975	1,176,940	1,064,805	2,241,745	52
1976	1,282,816	1,273,904	2,556,720	50
1977	1,391,169	1,411,969	2,803,138	50
1978	1,494,808	1,496,942	2,991,750	50
1979	1,740,282	1,720,159	3,460,441	50
1980	1,642,532	1,652,977	3,295,509	52
1981	1,558,549	1,559,334	3,117,883	50
1982	1,627,335	1,658,549	3,296,763	50
1983	1,463,227	1,460,414	2,923,641	50
1984	1,287,663	1,285,576	2,573,239	50
1985	1,530,169	1,532,785	3,062,954	50
1986	1,682,739	1,701,925	3,384,664	50
1987	1,798,679	1,771,661	3,570,340	50
1988	2,012,727	2,017,019	4,029,746	50
1989	2,132,541	2,175,754	4,308,295	49
1990	2,213,672	2,274,632	4,488,304	49
1991	2,027,689	2,086,362	4,114,051	49
1992	2,189,052	2,233,037	4,422,089	50
1993	2,264,402	2,257,470	4,521,872	50

Source: Milwaukee County and SEWRPC.

relatively consistent during the past decade. Service to other cities, however, can change, and has changed, rapidly since deregulation of the airline industry, since airline companies are now able to enter or leave any markets they desire whenever airline management considers it prudent. Accordingly, the most consistent level of service to and from Milwaukee is to the traditional major markets, such as New York, Boston, Washington, D.C., and Florida cities; to cities that serve as airline system hubs for other airlines, such as Detroit, Memphis, Cincinnati, Denver, Dallas-Fort Worth, and Pittsburgh; and to Upper Midwest cities that are connected to Milwaukee by regional or commuter carriers acting as feeders to the larger airlines, such as Grand Rapids, Appleton, Madison, Rockford, and Cedar Rapids.

Air Carrier Passenger Traffic at General Mitchell International Airport

Existing and historic enplaning and deplaning passenger volumes for the air carriers serving Mitchell International are presented in Table 24. Most of the airline passenger travel data presented in this report are for enplaning passengers only and, to the extent possible, are shown for the most recent ten-year period, 1983 to 1993. Data on enplaning passengers only are presented in order to remain consistent with Federal data collection and forecasting procedures. The FAA typically reports passenger volumes and passenger forecasts in terms of enplaning passengers. As shown in Table 24, the numbers of historic enplaning and deplaning passenger data are highly reciprocal in nature.

Passenger enplanements at Mitchell International have fluctuated from year to year, but have shown an overall constant increase over the long term. Passenger enplanements have increased at an average annual rate of about 6 percent from 1970 to 1980 and an average annual rate of about 3 percent from 1980 to 1990. However, between 1980 and 1984, passenger enplanements first decreased at an average annual rate of about 6 percent; between 1984 and 1990 they increased at an average annual rate of about 9 percent. The 1980 through 1984 decrease in enplanements may be attributed to a

Table 25

TOTAL NUMBER OF ENPLANING PASSENGER BY MONTH AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1989-1993

Month	1989	1990	1991	1992	1993
January	159,740	162,901	160,630	155,046	158,763
February	157,163	160,939	152,981	153,619	166,181
March	202,214	212,010	180,690	183,755	203,594
April	166,899	197,642	162,779	166,153	203,773
May	168,289	185,119	166,770	165,628	180,753
June	187,966	192,368	169,472	210,600	195,721
July	184,785	191,852	180,907	226,038	198,353
August	205,113	202,935	185,911	235,504	201,504
September	166,413	166,953	160,497	177,598	179,288
October	190,375	199,662	185,424	182,962	198,806
November	173,657	175,308	150,056	161,959	180,126
December	169,927	165,983	171,572	170,190	197,540
Total	2,132,541	2,213,672	2,027,689	2,189,052	2,264,402

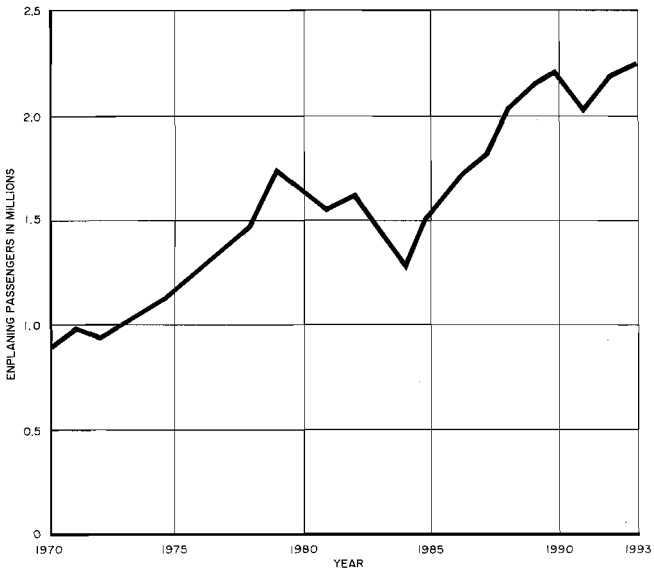
Source: Milwaukee County and SEWRPC.

period of severe economic recession in Southeastern Wisconsin and drastic changes in the airline industry as a result of deregulation. During this period, many of the largest airlines were adopting new marketing and pricing strategies and concentrating efforts on their largest markets, such as New York City, Chicago, and Los Angeles. During the second half of the 1980 decade, the large airlines began competing more intensively in smaller markets such as Milwaukee and the regional economy had begun recovering from the previous recession. These factors were reflected in significant increases in enplaning passengers. From 1990 to 1993, total enplaning passengers at Mitchell International first decreased during 1991, then began increasing once again to a total of 2.26 million enplanements in 1993, an all-time high to date. From 1990 to 1993, enplanements increased at an annual average of only about 1 percent. Over the long term, from 1970 to 1993, enplanements at Mitchell International have increased at an annual average rate of about 4 percent, as shown in Figure 5.

Enplaning passenger volumes at Mitchell International fluctuate not only by year, but also by season and by month. Monthly enplaning passenger volumes for 1989 through 1993 are set forth in Table 25. Seasonal and monthly fluctuations in air travel are largely related to social-recreational trip making. While business and work-related air travel remain relatively constant throughout the year, social-recreational air travel is concentrated in the spring and summer months and during holidays.

Figure 5

ENPLANING PASSENGER TRAFFIC AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1993



Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

Table 26 summarizes passenger enplanements at Mitchell International by type of airline. Between 1986 and 1993, the percentage of total enplaning passengers using large air carriers at Mitchell International has fluctuated between about 81 and 89 percent. The percent of total enplaning passengers using regional air carriers at Mitch-

Table 26

ENPLANING PASSENGER TRAFFIC BY TYPE OF AIRLINE AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1986-1993

Year	Large Air Carriers		Commuter Air Carriers		Supplemental Air Carriers		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1986	1,422,323	84.5	195,243	11.6	65,173	3.9	1,682,739	100.0
1987	1,548,713	86.1	172,941	9.6	77,025	4.3	1,798,679	100.0
1988	1,716,856	85.3	148,942	7.4	146,929	7.3	2,012,727	100.0
1989	1,904,359	89.3	145,013	6.8	83,169	3.9	2,132,541	100.0
1990	1,927,552	87.1	196,134	8.9	90,256	4.1	2,213,672	100.0
1991	1,736,651	85.6	215,501	10.6	75,537	3.8	2,027,689	100.0
1992	1,856,513	84.8	245,787	11.2	86,752	4.0	2,189,052	100.0
1993	1,831,591	80.8	332,913	14.8	99,898	4.4	2,264,402	100.0

Source: Milwaukee County and SEWRPC.

ell International has fluctuated between 7 and 15 percent. The percentage of enplaning passengers using supplemental air carriers has varied between 3 and 4 percent.

Enplaning passenger trends at General Mitchell International Airport have generally been very similar to national enplaning passenger trends, as shown in Table 27 and Figure 6. Throughout the 1960s and 1970s and the first few years of the 1980s, Mitchell International enplanements have typically represented about 0.57 percent of total domestic enplanements in the United States. From 1983 through 1987, the Mitchell International share of the national domestic enplanements decreased to about 0.38 percent. This was most likely a result of the combined impacts of the economic recession and post-deregulation efforts by the large airlines to emphasize marketing and pricing strategies for their largest markets. Since 1988, Mitchell International's share of the national domestic enplanements has been gradually increasing as its share of the national enplanements is being recovered. The ratio of enplanements at a specific airport, such as Mitchell International, to the total national enplanements is used by the Federal Aviation Administration to classify air traffic hubs as large, medium, or small, with Milwaukee falling into the medium hub category.[2]

The most popular destinations of passengers departing from Mitchell International on an annual basis in 1993 are shown in Table 28. The destinations shown in this table are by metropolitan area, since a number of the metropolitan areas are served by more than one airport with scheduled airline service. These metropolitan areas include primarily business destinations such as New York, Washington D.C., Minneapolis-St. Paul, Boston, and Detroit, as well as primarily vacation and recreational destinations such as Orlando, Tampa, Phoenix, and Las Vegas. These data are based on a sample survey of 10 percent of all tickets conducted by the U. S. Department of Transportation on a continuing basis

[2]*Air traffic hubs are not defined as airports but as cities or twin cities requiring aviation services. The hubs fall into four classes, determined by each community's percentage of the total enplaned passengers in all services and all operations of U. S. certificated air carriers in the 50 States, the District of Columbia, and other U. S. areas.*

- *Large air traffic hub: A community enplaning 1 percent or more of the total passengers enplaned nationally.*
- *Medium air traffic hub: A community enplaning from 0.25 to 0.99 percent of the total passenger enplaned nationally.*
- *Small air traffic hub: A community enplaning from 0.05 to 0.24 percent of the total passengers enplaned nationally.*
- *Nonhub: A community enplaning less than 0.05 percent of the total passengers enplaned nationally.*

Table 27

PASSENGER TRAFFIC ENPLANED AT ALL UNITED STATES STATIONS AND AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1992

Year	Total Number of Enplaned Passengers				
	United States			General Mitchell International Airport	
	Large Air Carriers	Commuter Air Carriers	Total	Number of Enplaned Passengers	Total as Percent of U. S. Total
1970	155,938,787	--[a]	155,938,787	887,047	0.57
1971	152,291,732	4,698,000	156,989,732	976,609	0.62
1972	172,263,469	5,262,000	177,525,469	961,376	0.53
1973	182,987,738	5,688,000	188,675,738	1,020,979	0.54
1974	189,316,615	6,842,000	196,158,615	1,072,466	0.55
1975	195,161,858	6,666,000	201,827,858	1,176,940	0.58
1976	206,664,841	7,305,000	213,969,841	1,282,816	0.59
1977	222,589,589	8,505,000	231,094,589	1,391,169	0.60
1978	253,397,340	10,074,000	263,471,340	1,494,808	0.57
1979	286,880,624	11,054,000	297,934,624	1,740,282	0.58
1980	280,450,572	10,865,000	291,315,572	1,642,532	0.56
1981	256,007,148	15,642,000	271,649,148	1,558,549	0.57
1982	268,118,227	17,444,000	285,562,227	1,627,335	0.57
1983	292,962,603	15,941,000	308,903,603	1,463,227	0.47
1984	316,280,548	18,464,000	334,744,548	1,287,663	0.38
1985	381,108,118	18,853,000	399,961,118	1,530,169	0.38
1986	418,563,577	20,849,000	439,412,577	1,682,739	0.38
1987	448,913,726	24,839,000	473,752,726	1,798,679	0.38
1988	456,026,372	27,801,000	483,827,372	2,012,727	0.42
1989	455,263,066	29,612,000	484,875,066	2,132,541	0.44
1990	438,544,001	33,491,000	472,035,001	2,213,672	0.47
1991	428,319,248	32,713,000	461,032,248	2,027,689	0.44
1992	447,625,988	36,515,000	484,140,988	2,189,052	0.45
1993	468,313,029	39,044,000	507,357,029	2,264,402	0.45

[a]*Commuter air carrier statistics not compiled before 1971.*

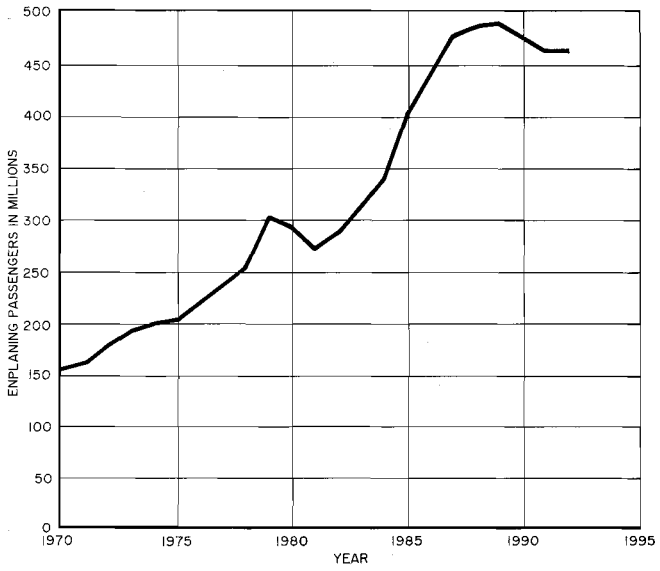
Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

to maintain a base of air carrier statistics. Accordingly, the metropolitan areas shown in this table are the destinations for the air travel portion of the sample trips, with the ultimate destinations of those trips not necessarily located in the specified metropolitan area. The 50 most popular metropolitan area destinations for Milwaukee originating passengers account for 75 percent of all originating passengers at Milwaukee, while the 10 most popular destinations account for 37 percent of all Milwaukee originating passengers. Of the 20 most popular destinations for passengers originating at Milwaukee, nonstop scheduled services is provided to each of these from Milwaukee with the exception of Miami and Seattle. In addition to nonstop scheduled airline services provided by the various carriers out of Milwaukee, direct or connecting service through the airline hubs is available to virtually all cities with scheduled service in the United States and Canada, as well as to many foreign destinations.

The number of connecting passengers using Mitchell International to change from one scheduled flight to another has been estimated and is presented in Table 29, based on data from General Mitchell International Airport and U. S. Department of Transportation Origin/Destination Survey data of airline passenger traffic for the United States. As shown in this table, the number of connecting passengers using Mitchell International has typically varied from about 20 to 25 percent of total enplaning passengers from 1972 to 1983. From 1984 to 1993, it was estimated that 10 to 12 percent of all enplaning passengers at Mitchell International were connecting from one flight to another.

Figure 6

ENPLANING PASSENGER TRAFFIC IN THE UNITED STATES: 1970-1992



Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

The percentage of connecting passengers using Mitchell International has also been estimated as part of enplaning passenger surveys conducted periodically by the Regional Planning Commission. These survey efforts found the percentage of connecting passengers to be 17 percent in 1971, 15 percent in 1983, and 12 percent in 1989.

Use of Chicago's O'Hare International Airport by Southeastern Wisconsin Residents

A significant portion of the total air carrier passenger traffic generated by Southeastern Wisconsin has historically elected to use Chicago's O'Hare International Airport instead of General Mitchell International Airport. Mitchell International's situation is unique in that O'Hare Airport is the largest airport in the world in terms of annual enplaned passengers and air carrier departures and it is located less than two hours' driving time from much of Southeastern Wisconsin, including all of Milwaukee County. Because O'Hare Airport serves the vast Chicago metropolitan area and has been developed into a national system hub by several major airlines, it is able to offer a very large number of nonstop flights to a very large number of destinations, with a wide variety of departure times. In fact, in terms of service frequency and destinations, O'Hare Airport may offer the highest level of service of any airport in the world.

Table 28

DESTINATIONS BY MAJOR METROPOLITAN AREA OF ORIGINATING PASSENGERS USING SCHEDULED AIR CARRIERS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1993

Rank	Metropolitan Area	Number of Originating Passengers	Percent of Total
1	New York, NY/Newark, NJ	118,500	6.3
2	Washington, DC/Baltimore, MD	81,570	4.4
3	Los Angeles, CA	77,200	4.1
4	Orlando, FL	76,560	4.1
5	Minneapolis/St. Paul, MN	63,180	3.4
6	Boston, MA	60,350	3.2
7	Tampa, FL	60,350	3.2
8	Phoenix, AZ	59,220	3.2
9	San Francisco, CA	42,290	2.3
10	Denver, CO	54,570	2.9
11	Detroit, MI	52,680	2.8
12	Atlanta, GA	50,890	2.7
13	Dallas/Ft. Worth, TX	47,630	2.5
14	Miami, FL	46,410	2.5
15	Las Vegas, NV	44,990	2.4
16	Philadelphia, PA	41,650	2.2
17	San Diego, CA	27,450	1.5
18	Fort Meyers, FL	24,060	1.3
19	Seattle, WA	23,300	1.2
20	St. Louis, MO	21,380	1.1
21	Kansas City, MO	20,250	1.1
22	Cleveland, OH	19,760	1.0
23	Pittsburgh, PA	18,090	1.0
24	Houston, TX	17,180	0.9
25	Nashville, TN	14,650	0.8
26	Columbus, OH	14,170	0.8
27	Charlotte, NC	13,650	0.7
28	Portland, OR	13,090	0.7
29	New Orleans, LA	12,410	0.7
30	West Palm Beach, FL	12,080	0.6
31	Tucson, AZ	11,070	0.6
32	Memphis, TN	10,630	0.6
33	Salt Lake City, UT	10,510	0.6
34	Hartford, CT	10,460	0.6
35	San Antonio, TX	10,010	0.5
36	Cincinnati, OH	9,730	0.5
37	Raleigh, NC	9,630	0.5
38	San Juan, PR	9,500	0.5
39	Honolulu, HI	8,600	0.5
40	Sacramento, CA	7,680	0.4
41	Albuquerque, NM	7,510	0.4
42	Albany, NY	6,750	0.4
43	Jacksonville, FL	6,740	0.4
44	Harrisburg, PA	6,560	0.4
45	Reno, NV	6,510	0.3
46	Norfolk, VA	6,460	0.3
47	Omaha, NE	6,250	0.3
48	Buffalo, NY	6,200	0.3
49	Chicago, IL	6,080	0.3
50	Grand Rapids, MI	6,020	0.3
--	Other Destinations	476,410	25.0
--		1,868,870	100.0

Source: SEWRPC.

To determine the number of enplanements at O'Hare Airport that were made by residents of Southeastern Wisconsin, a two-part survey was conducted by the Regional Planning Commission

Table 29

ORIGINATING AND CONNECTING AIR CARRIER PASSENGERS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1972-1993

Year	Originating Passengers	Connecting Passengers	Enplaning Passengers	Connecting Passengers as a Percent of Total
1972	788,859	249,958	961,376	26.0
1973	1,020,979	250,140	1,020,979	24.5
1974	1,072,466	243,450	1,072,466	22.7
1975	896,828	280,112	1,176,940	23.8
1976	1,282,816	319,421	1,282,816	24.9
1977	1,391,169	346,401	1,391,169	24.9
1978	1,494,808	363,238	1,494,808	24.3
1979	1,740,282	452,473	1,740,282	26.0
1980	1,199,048	443,484	1,642,532	27.0
1981	1,558,549	522,114	1,558,549	33.5
1982	1,627,335	543,530	1,627,335	33.4
1983	1,085,714	377,513	1,463,227	25.8
1984	1,147,308	140,355	1,287,663	10.9
1985	1,367,971	162,198	1,530,169	10.6
1986	1,408,453	274,286	1,682,739	16.3
1987	1,579,240	219,439	1,798,679	12.2
1988	1,773,212	239,515	2,012,727	11.9
1989	1,906,492	226,049	2,132,541	10.6
1990	2,003,373	210,299	2,213,672	9.5
1991	1,861,418	166,271	2,027,689	8.2
1992	1,972,336	216,716	2,189,052	9.9
1993	2,033,433	230,969	2,264,402	10.2

Source: Milwaukee County, and SEWRPC.

in October 1983 as part of the second-generation regional airport system planning effort. The first part of the survey consisted of a survey of automobiles with Wisconsin license plates that were already parked in the O'Hare Airport terminal parking areas and that were arriving and departing the terminal and parking areas. The second part of the survey consisted of an on-board bus survey to estimate the number of Wisconsin residents that used one of the regularly scheduled bus services to travel to O'Hare Airport for the purpose of boarding a flight. Additional information concerning the conduct of these surveys may be found in Chapter VI, "Existing Aeronautical Activity," of SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010.

Results from both the license plate survey and intercity bus survey indicated that on an average weekday 332 residents of Southeastern Wisconsin traveled to Chicago's O'Hare Airport, 308 by automobile and 24 by bus, to board a flight. The enplaning passenger survey at Mitchell International indicated that, during 1983, about 1,280 enplaning passengers, or about 32 percent of the total of 4,010 average daily enplaning passengers at Mitchell International, were residents of the seven-county Region. This total of 1,280 passengers, together with the 332 residents of the Region who departed from O'Hare Airport, represented the average daily enplaning passenger demand for air travel by Southeastern Wisconsin residents in 1983. Thus, about 21 percent of all airline enplaning passengers surveyed in 1983 who were residents of Southeastern Wisconsin used O'Hare Airport rather than Mitchell International. In 1970, automobile license plate surveys similar to those made in 1983 and conducted by the Wisconsin Department of Transportation in cooperation with the Southeastern Wisconsin Regional Planning Commission indicated that 20 to 25 percent of all Southeastern Wisconsin residents who were airline passengers boarded flights at O'Hare Airport rather than Mitchell International.

Table 30

AIRPORT USED FOR SCHEDULED AIRLINE SERVICE BY MILWAUKEE METROPOLITAN-AREA RESIDENTS BY PERCENT OF TOTAL: 1983-1993

Year[a]	General Mitchell International Airport	Chicago O'Hare International Airport	Other Airports	No Answer	Total[b]
1983	72	24	4	--[c]	100
1984	72	22	3	3	100
1985	76	17	3	4	100
1986	75	14	3	8	100
1987	77	12	4	7	100
1988	77	14	2	3	100
1989	78	13	1	2	100
1990	83	12	3	3	100
1991	77	16	2	5	100
1992	71	22	2	--[b]	100
1993	75	8	4	--[b]	100

NOTE: Based on residents in Milwaukee, Ozaukee, Washington, and Waukesha Counties.

[a]*Year in which survey was conducted.*

[b]*Percentages may not add up because of rounding errors.*

[c]*Not given.*

Source: Milwaukee Journal Consumer Analysis," and SEWRPC.

These survey results compare very closely with the findings of the annual Milwaukee Journal Consumer Analysis. This is a small-sample survey of households in the four-county Milwaukee metropolitan area made annually for purposes of market research. The questionnaire used on this survey has, since 1983, included travel-related questions about whether the survey respondent had used any scheduled airline service during the preceding 12-month period and, if so, which airport the respondent used. Findings of the 1984 survey, conducted during October 1983, indicated that during the 12-month period preceding the survey, 72 percent reported using Mitchell International, 24 percent reported using O'Hare Airport, and 4 percent reported using other airports. As shown in Table 30, later consumer analysis surveys show similar and consistent findings.

Characteristics of Air Carrier Passengers Using General Mitchell International Airport

To provide accurate data on the use of scheduled air carriers service at Milwaukee by persons in Southeastern Wisconsin, enplaning passenger surveys have been periodically conducted by the Regional Planning Commission at Mitchell International. Such surveys were conducted as part of the original regional airport system planning effort in 1971 and as part of the second-generation regional airport system planning effort in 1983. In 1989, the Regional Planning Commission was asked by the Wisconsin Department of Transportation to conduct another survey of enplaning passengers using scheduled airline flights at Mitchell International in the light of a number of significant developments then affecting use of the airport. Data collected under this most recent survey provide an important basis for this reevaluation of the second-generation regional airport system plan.

The enplaning passenger survey was conducted in the gate areas of the airport over a seven-day period from Thursday, October 26, 1989, through Wednesday, November 1, 1989. Enplaning passengers for all regularly scheduled departing flights during this period were given questionnaires in the boarding areas and asked to complete them and return the forms to survey personnel before boarding their flight. Although the survey was of a handout-hand-back design, the questionnaires included an optional pre-addressed and postage-paid mail-back feature for those passengers with insufficient time to complete the form.

A total of 17,100 usable survey forms were received from 40,300 enplaning passengers during the survey period. The overall return rate for this survey was thus 42 percent, a good response for this type of survey. The reported survey findings represent the 17,100 usable returns expanded to the sampled

Table 31

TRIP ORIGINS OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT BY PERCENTAGE: 1971, 1983, AND 1989 SURVEYS

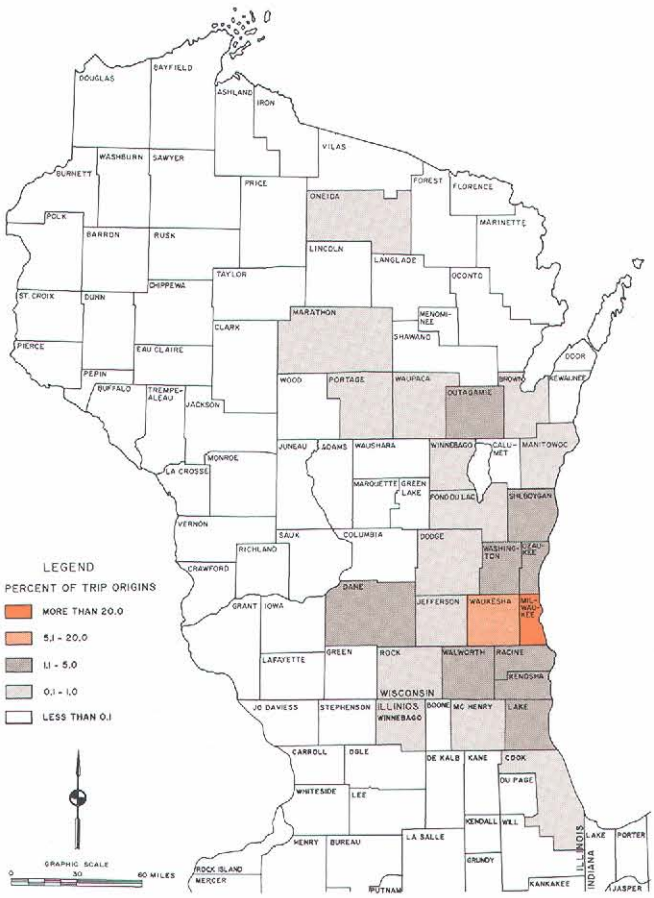
Trip Origin	1971	1983	1989
Southeastern Wisconsin			
Milwaukee County	54.7	44.7	43.2
Ozaukee County	1.5	2.7	3.9
Kenosha County	1.4	1.4	1.6
Racine County	4.3	4.4	4.6
Walworth County	0.4	1.1	1.9
Washington County ...	1.1	1.7	2.5
Waukesha County	9.0	12.9	16.7
Subtotal	72.4	68.9	74.4
Wisconsin Counties Outside Southeastern Wisconsin	13.6	15.9	14.9
Northern Illinois[a]	1.5	1.8	2.9
Rest of United States ...	12.1	13.2	7.6
Foreign Country	0.4	0.2	0.2
Total	100.0	100.0	100.0

[a] *Includes Northeastern and Northwestern Illinois.*

Source: SEWRPC.

Map 4

TRIP ORIGINS OF ENPLANING PASSENGERS AT GENERAL MITCHELL INTERNATIONAL AIRPORT BY COUNTY: 1989



General Mitchell International Airport continues to be primarily an air carrier airport serving the Milwaukee metropolitan area, all of the Southeastern Wisconsin Region, and much of the State of Wisconsin. Almost three-quarters of the passengers using Mitchell International had trip origins within Southeastern Wisconsin. From 1971 to 1989, the percentage of trips originating in Milwaukee County decreased from 55 percent to 43 percent, while the percentage of trips originating in the remaining six Southeastern Wisconsin counties increased. The change was minimal for some counties but very significant for Waukesha County. About 3 percent of all enplaning passengers had trip origins within northeastern and north-central Illinois.

Source: SEWRPC.

answers of 40,300 enplaning passengers during the one-week survey.

A detailed description of the data and information collected during this survey and its findings is provided in SEWRPC Technical Report No. 32, General Mitchell International Airport Enplaning Passenger Survey Findings: 1989. Since the 1971, 1983, and 1989 surveys were designed and conducted to be consistent, comparisons can be made among the findings of all three surveys. The major findings of the enplaning passenger survey that are pertinent to the forecasting of enplaning passengers at Mitchell International may be summarized as follows:

- Almost three-quarters of the enplaning passengers using Mitchell International had trip origins within Southeastern Wisconsin, as shown in Table 31 and on Map 4.

- From 1971 to 1989 the percentage of trips originating in Milwaukee County decreased from 55 percent to about 43 percent, while the percentage of trips originating in the remaining six Southeastern Wisconsin counties increased, minimally for some counties, but very significantly for Waukesha County.

- About 3 percent of all enplaning passengers during the week-long survey had trip origins within northeastern and north-central Illinois, representing a significant increase over the percentage of trips originating in northern Illinois during the earlier surveys. Almost all these Illinois-based trips originated in Cook, Lake, McHenry, and Winnebago Counties. Nevertheless, Illinois-based trips continue to represent only a small portion of all enplanements at Mitchell International.

- Within the City of Milwaukee, about 30 percent of the trip origins were generated by the central business district. On an average weekday, an estimated 800 originating and

Table 32

OVERALL TRAVEL PURPOSE OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT: 1971, 1983, AND 1989 SURVEYS

Trip Purpose	Percent of Total		
	1971	1983	1989
Work or Work-Related Business ...	50.7	47.9	54.1
Personal Business	6.7	10.0	8.7
School	2.3	1.4	1.6
Social-Recreation-Vacation	38.5	39.8	32.4
Other	1.8	0.9	3.2
Total	100.0	100.0	100.0

Source: SEWRPC.

terminating passengers traveled between the airport and the central business district, compared with an estimated 500 such passengers in 1983.

- About 12 percent of the enplaning passengers during the one-week survey indicated that they were changing scheduled flights at Mitchell International. Of these connecting passengers, about 88 percent were transferring between flights of the same airline. Of all the connecting passengers, about 94 percent were changing flights operated by one of the two air carriers conducting hubbing operations at Mitchell International, Midwest Express and Northwest, or between one of these carriers and an affiliated commuter carrier.

- The earlier surveys found the percentage of connecting passengers to be 17 percent in 1971 and 15 percent in 1983. In the years immediately following the 1983 survey, the percentage of connecting passengers continued to decline to below 10 percent, then began to increase in 1987, reaching 12 percent in 1989.

- Work- or business-related travel and social-recreational travel were found to be the most important kinds of trips served by Mitchell International. Work- or business-related travel accounted for over half, 54 percent, of the trips, and social-recreational trips account for 32 percent of all trips. The remaining 14 percent of the trips were for school, personal, or other reasons. The overall distribution of travel purposes was found to be similar to the 1971 and 1983 survey findings, as shown in Table 32.

- The use of Mitchell International is largely by occasional users, with nearly 85 percent of the enplaning passengers using the airport no more than once a month. Fewer than 2 percent of all enplaning passengers fly out of the airport more than once a week, but about 35 percent of the enplaning passengers use the airport once a year or less.

- Of all originating passengers, over three-quarters arrived at the airport by private automobile or truck, including privately operated company or agency vehicles. Compared with the previous surveys, a gradually increasing share of passengers arrived by rental car or by hotel and motel courtesy cars, and a gradually decreasing share arrived by taxicab. The use of limousines has fluctuated and the use of both local and intercity buses has remained relatively constant.

- Selected socio-economic characteristics of the enplaning passengers are summarized in Table 33. The median annual household income of the passengers surveyed in 1989 was $63,600, expressed in constant 1993 dollars. As might be expected, this is higher than the median annual income of all households in Southeastern Wisconsin of $36,200, also expressed in constant 1993 dollars. As in past surveys, these findings continue to reflect a strong correlation between annual household income and the frequency of commercial air travel.

- The median age of the enplaning passengers was 41 years, which reflects little change from the previous surveys. As in the 1983 survey, the 1989 survey indicated that almost 40 percent of the passengers were female, compared with only about 19 percent in the 1971 survey.

- About 45 percent of the enplaning passengers were residents of Southeastern Wisconsin, another 14 percent were residents of other Wisconsin counties, and another 2 percent were residents of northeastern Illinois. About 37 percent of enplaning passengers were residents of the remainder of the United States and 2 percent were residents of other countries. The share of Southeastern Wisconsin residents represents a substantial increase over 1971 and 1983, when about 30 percent of the enplaning passengers were residents of Southeastern Wisconsin. This is summarized in Table 34 and on Map 5.

Table 33

SOCIO-ECONOMIC CHARACTERISTICS OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT: 1971, 1983, AND 1989 SURVEYS

Characteristic	Enplaning Passengers (percent)			Southeastern Wisconsin Region Population (percent)		
	1971	1983	1989	1970	1980	1990
Sex						
Male	70.8	60.7	61.2	48.3	48.4	51.7
Female	29.2	39.3	38.8	51.7	51.6	48.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Age						
Under 25	13.9	15.5	8.6	46.6	41.8	36.5
25-44	45.0	47.6	49.5	23.5	27.4	32.5
45-64	35.3	30.4	33.8	20.2	19.7	18.5
65 or Older	5.8	6.5	8.1	9.7	11.1	12.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Median Age	41	39	41	28	30	33
Annual Household Income						
Actual Median Income	$16,650	$33,000	$54,000	$9,950	$20,100	$32,150
Adjusted Median Income in 1993 Dollars	60,800	46,800	63,600	37,700	35,100	36,200

Source: SEWRPC.

Table 34

PLACE OF RESIDENCE OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT: 1971, 1983, AND 1989 SURVEYS

Trip Origin	1971	1983	1989
Southeastern Wisconsin			
Milwaukee County	20.6	16.5	22.0
Ozaukee County	1.0	1.1	3.4
Kenosha County	0.6	0.6	1.2
Racine County	2.1	1.9	3.2
Walworth County	0.1	0.2	1.1
Washington County	0.6	0.5	2.0
Waukesha County	5.3	6.6	12.4
Subtotal	30.3	27.4	45.3
Wisconsin Counties Outside Southeastern Wisconsin	14.4	19.2	13.6
Northern Illinois[a]	1.5	1.4	2.2
Rest of United States	50.9	48.9	37.0
Foreign Country	2.9	3.1	1.9
Total	100.0	100.0	100.0

[a]*Includes Northeastern and Northwestern Illinois as shown on Map 5.*

Source: SEWRPC.

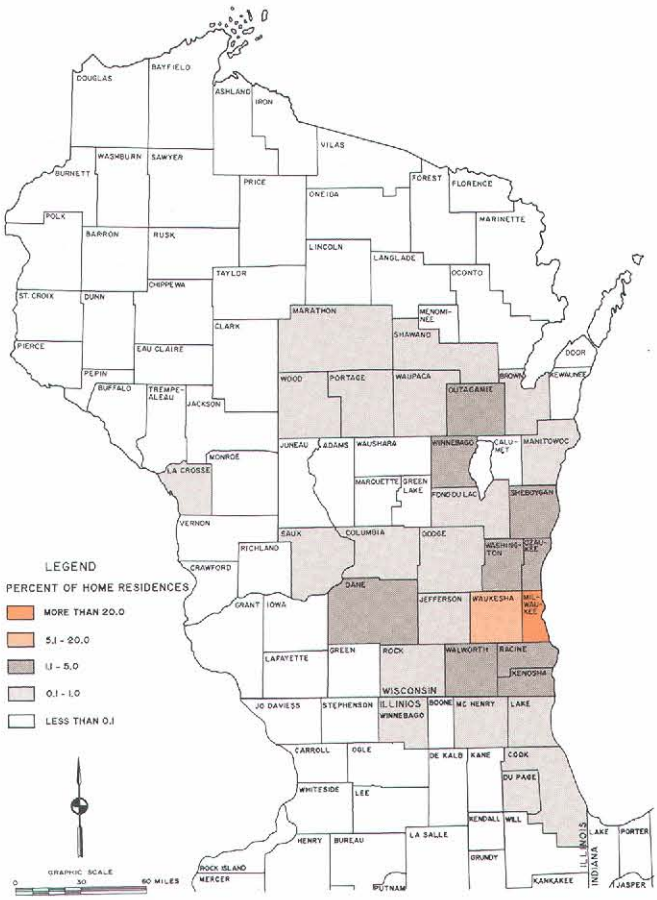
- The 1989 survey continued to indicate that, while distance from the airport may influence the number of enplaning passengers generated by a particular locality, other factors, such as the average household income of an area and the relative distance to other airports, such as Chicago's O'Hare International, may also have a strong influence. For example, Ozaukee and Waukesha Counties generated significantly more enplaning passengers per thousand resident population than did the other Southeastern Wisconsin counties.

- The most important reasons why passengers chose to fly out of Mitchell International was that the airport was near their home or place of work. Other frequently cited reasons included the ease with which they could use the airport terminal and their choice of airline.

- The most important reasons cited by passengers for sometimes choosing to use Chicago's O'Hare International Airport instead of

Map 5

PLACE OF RESIDENCE OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT BY COUNTY: 1989



About 45 percent of the enplaning passengers at General Mitchell International Airport were residents of Southeastern Wisconsin. Another 14 percent were residents of other Wisconsin counties. About 2 percent were residents of northeastern Illinois. The share of Southeastern Wisconsin residents represents a substantial increase over 1971 and 1983, when about 30 percent of the enplaning passengers at Mitchell International were residents of the Region.

Source: SEWRPC.

Mitchell International included better schedules and more nonstop flights to desired locations, as well as lower fares and the availability of international flights. Passengers who were residents of Southeastern Wisconsin indicated the availability of international flights to be an important reason.

Air Carrier Aircraft Operations

Air carrier aircraft operations have represented the largest share of total aircraft operations at General Mitchell International Airport since 1989. The existing and historic annual air carrier, general aviation, and military aircraft operations at General Mitchell International Airport are presented in Table 35 and Figure 7. Since 1970, total air carrier operations, which includes regional and commuter aircraft operations, have increased from about 33 percent, to almost 60 percent of all aircraft operations at Mitchell International, while general aviation operations have decreased from about 60 percent to under 40 percent of all aircraft operations. During the same period, military aircraft operations have decreased from about 6 percent to about 3 percent of the total. Total air carrier operations include not only scheduled flights but also other movements such as those made by supplemental carriers, charter operations, weather diversions, and deadhead and training flights.

Table 36 presents the number of aircraft operations by type of air carrier at General Mitchell International Airport. Since 1986 the large air carriers have accounted for about 60 to 65 percent of all air carrier operations. The commuter air carriers have accounted for 30 to 37 percent of all air carrier operations. The supplemental air carriers have accounted for 3 to 5 percent of all air carrier operations at Mitchell International.

For purposes of forecasting air carrier passenger traffic, two other important characteristics include the average number of passengers for departure and the enplaning load factor. The enplaning load factor is defined as the percentage of available seats on board the aircraft that are occupied by revenue passengers. In recent years, the airline industry has pursued a number of marketing and management actions to increase such load factors in order to remain profitable. Nevertheless, the many full airplanes during peak and holiday travel periods are generally balanced by only partially filled aircraft during periods when passenger demand is relatively low.

The average number of passengers per departure and enplaning load factors at General Mitchell International Airport are presented in Table 37 for large and supplemental air carriers and in Table 38 for commuter air carriers. Because of the dramatic difference in aircraft size between the two groups of carriers, this information is presented separately. It should also be noted that the enplaning load factor is the percentage of seats on departing flights that are filled by passenger enplaning at a par-

Table 35

TOTAL AIRCRAFT OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT BY TYPE OF OPERATION: 1970-1993

Year	Air Carrier		General Aviation		Military		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1970	73,817	32.6	138,264	61.1	14,069	6.2	226,150	100.0
1975	75,121	35.8	124,413	59.2	10,547	5.0	210,081	100.0
1980	85,275	36.1	139,216	58.9	11,734	5.0	236,225	100.0
1985	84,411	44.9	95,751	50.9	7,995	4.2	188,157	100.0
1986	90,826	47.4	93,961	49.0	6,913	3.6	191,700	100.0
1987	76,146	41.0	103,444	55.8	5,974	3.2	185,564	100.0
1988	92,087	47.8	94,160	48.9	6,374	3.3	192,621	100.0
1989	106,783	53.8	85,048	42.9	6,608	3.3	198,439	100.0
1990	122,866	59.4	77,674	37.6	6,129	3.0	206,669	100.0
1991	116,170	57.2	81,124	39.9	5,948	2.9	203,242	100.0
1992	118,945	58.6	77,093	38.0	6,992	3.4	203,030	100.0
1993	117,988	58.6	77,504	38.5	5,796	2.9	201,288	100.0

Source: Milwaukee County and SEWRPC.

ticular airport and does not include those passengers who have already boarded a particular flight at another city. At Mitchell International the average number of passengers per departure has averaged about 50 from 1986 to 1993 and the respective enplaning load factor has also averaged about 50 percent. More specifically, in 1993 the average number of passengers per departure was 51 and the enplaning load factor was 53 percent. By comparison, the average number of passengers per departure on all United States large airlines was 105 in 1993 and the respective enplaning load factor was 63 percent. It should be expected that the average number of passengers per departure and the enplaning load factor at Milwaukee will generally be lower than the similar national figures since all of the large national airlines as a group would include a higher proportion of well-traveled markets, such as those between the East and West Coasts of the United States.

For commuter air carriers serving Mitchell International, the number of passengers per departure has averaged about 12 from 1986 to 1993 and the resultant enplaning load factor has averaged about 40 percent during the same period. More specifically, during 1993, the average number of passengers per departure at Mitchell International was 16 and the enplaning load factor was 43 percent. By comparison, the average number of passengers per departure for all commuter air carriers in the United States was 11 in 1993 and the resultant enplaning load factor was 49 percent.

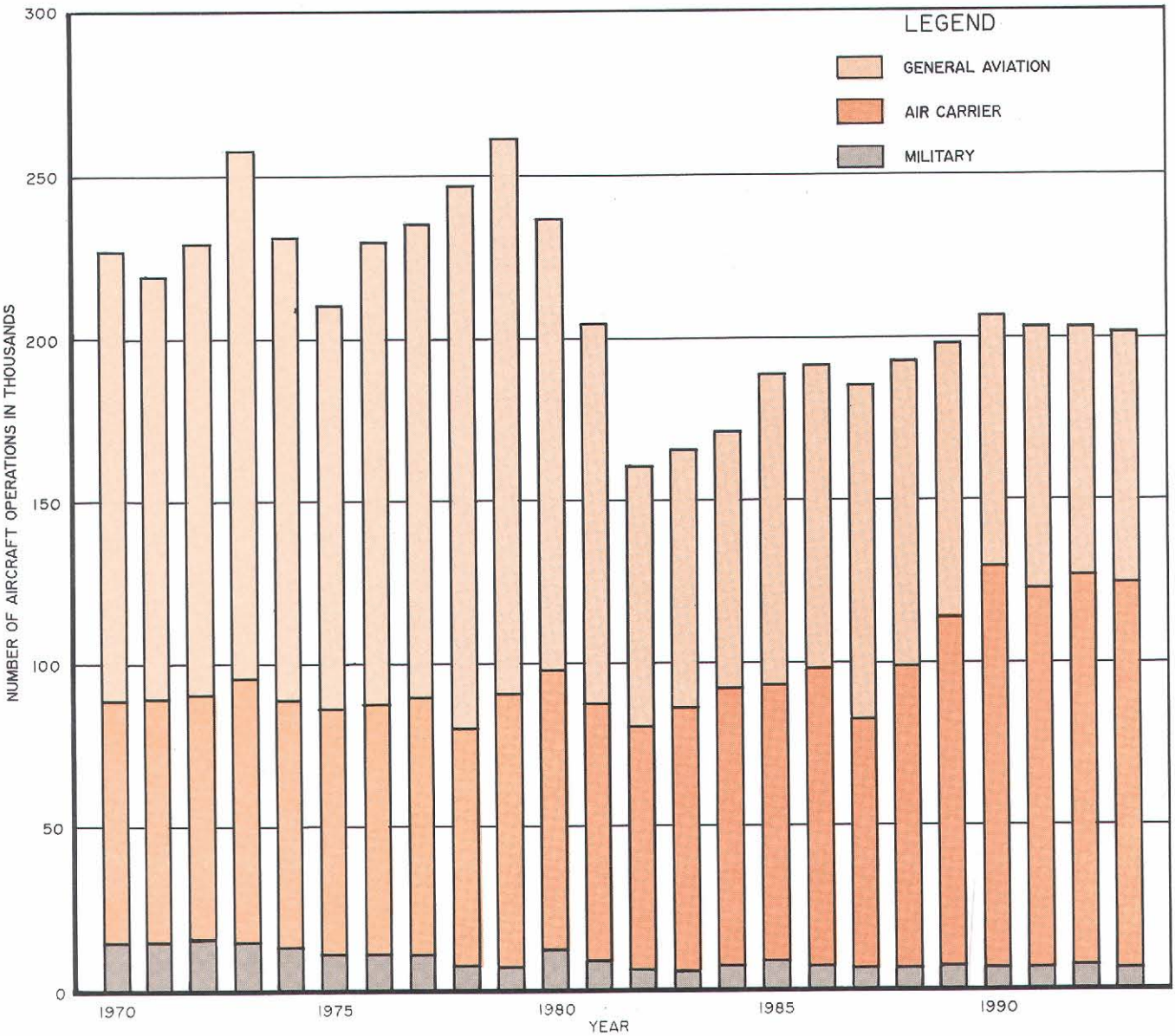
GENERAL AVIATION ACTIVITY

General aviation includes a wide range of aviation activities and includes all segments of the aviation industry except air carrier and military activity. General aviation activities range from the training of new pilots through sport, recreational, and personal flying to a wide variety of business related flying, such as corporate transportation, charter, and air taxi activities; emergency shipments; aerial photography; medical services including "flight for life" operations; and crop dusting. Aircraft used in general aviation range from the one-seat, single-engine piston aircraft to the long-range corporate jet. General aviation is an important component of the aviation industry, the national transportation system, and the national and regional economies. It provides immediate, efficient, and direct aviation services that commercial air carriers cannot, or will not, provide. In addition, the production and sale of general aviation aircraft, avionics, and other equipment, along with the provision of such support services as flight schools, fixed-base operators, financing, and insurance make the general aviation industry an important contributor to the economy.

This section of the chapter describes the different types of general aviation activity, the general aviation fleet size, aircraft operations and traffic levels, characteristics of general aviation users, and the areas of public-use general aviation airports in Southeastern Wisconsin.

Figure 7

CATEGORIES OF AIRCRAFT OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1993



Source: Milwaukee County and SEWRPC.

Types of General Aviation Activity

All 103 airports within Southeastern Wisconsin are intended to serve general aviation activities, either solely or in combination with commercial and military aviation activities. Most of the general aviation activity in Southeastern Wisconsin is concentrated at about 20 of these 103 airports.

For the purposes of this updated and revised regional airport system plan, general aviation wasdefined as all civil aviation, that is, all nonmilitary aviation, except the transport of passengers by commercial air carrier. General aviation activity thus encompasses a variety of functional uses, as described by the following categories, based on the Federal Aviation Administration definitions of primary use categories for general aviation aircraft:

- Aerial Application: The use of aircraft for purposes which concern the production of food, fibers, or the protection of health in which aircraft are used in lieu of farm implements or ground vehicles for the particular task entailed. Aerial application includes fire-fight-

Table 36

AIR CARRIER AIRCRAFT OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1986-1993

Year	Large Air Carriers		Commuter Air Carriers		Supplemental Air Carriers		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1986	55,196	60.7	31,852	35.1	3,778	4.2	90,826	100.0
1987	47,654	62.5	24,410	32.1	4,082	5.4	76,146	100.0
1988	59,109	64.2	28,314	30.7	4,664	5.1	92,087	100.0
1989	69,861	65.5	32,706	30.6	4,216	3.9	106,783	100.0
1990	76,840	62.6	42,036	34.2	3,990	3.2	122,866	100.0
1991	70,504	60.7	41,846	36.0	3,820	3.3	116,170	100.0
1992	71,193	59.8	44,004	37.0	3,748	3.2	118,945	100.0
1993	71,582	60.7	42,596	36.1	3,810	3.2	117,988	100.0

Source: Milwaukee County and SEWRPC.

Table 37

AVERAGE NUMBER OF PASSENGERS FOR LARGE AND SUPPLEMENTAL AIR CARRIER DEPARTURES AND ENPLANING LOAD FACTORS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1986-1993

Year	Total Large and Supplemental Air Carrier Enplanements	Total Large and Supplemental Air Carrier Departures	Average Number of Passengers per Departure	Total Annual Large and Supplemental Air Carrier Seats	Average Number of Seats per Departure	Enplaning Load Factor
1986	1,487,496	31,376	47	3,261,200	104	46
1987	1,625,738	27,909	58	2,791,100	100	58
1988	1,863,785	34,219	54	3,035,400	89	61
1989	1,987,528	39,147	51	3,973,900	102	50
1990	2,017,808	42,410	48	4,402,200	104	46
1991	1,812,188	39,072	46	4,008,300	103	45
1992	1,943,265	39,345	49	4,113,800	105	47
1993	1,931,489	37,696	51	3,612,800	96	53

Source: Milwaukee County and SEWRPC.

ing operations, the distribution of chemicals or seeds in agriculture, reforestation, and insect control.

- Aerial Observation: The use of aircraft for aerial mapping, photography, fish spotting, patrol, traffic advisory, survey, search and rescue, hunting, or sight-seeing purposes.

- Air Taxi: The use of aircraft for the transport of passengers or cargo, including charter and excluding commuter air carrier operations.

- Commuter Air Carrier: The use of aircraft that performs at least five scheduled round trips per week between two or more points for the transport of passengers, cargo, or mail.

- Business Transportation: The use of aircraft on a not-for-hire basis by individuals for the transport of employees and possibly other passengers and cargo in connection with the operation of a business, industrial enterprise, or a profession, including medical activities such as "flight for life" operations. Business transportation may, or may not, employ professional pilots for the operation of the aircraft.

- Corporate Transportation: The use of aircraft on a not-for-hire basis by corporations or other organizations for the transport of employees and possibly other passengers and cargo in connection with the operation of a business, industrial enterprise, or a profession, and employing professional pilots for the operation of the aircraft.

- Instructional Flying: The use of aircraft for the purpose of formal instruction with a flight instructor aboard or with the maneuvers during a particular flight specified by a

Table 38

AVERAGE NUMBER OF PASSENGERS FOR COMMUTER AIR CARRIER DEPARTURES AND ENPLANING LOAD FACTORS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1986-1993

Year	Total Commuter Air Carrier Enplanements	Total Commuter Air Carrier Departures	Average Number of Passengers per Departure	Total Annual Commuter Air Carrier Seats	Average Number of Seats Per Departure	Enplaning Load Factor
1986	195,243	15,926	12	493,900	31	40
1987	172,941	12,205	14	433,100	35	40
1988	148,942	14,157	11	426,200	30	35
1989	145,013	16,353	9	394,600	24	37
1990	196,134	21,018	9	556,500	26	35
1991	215,501	20,923	10	650,100	31	33
1992	245,787	22,002	11	671,800	31	37
1993	332,913	21,298	16	780,500	37	43

Source: Milwaukee County and SEWRPC.

flight instructor, excluding, however, proficiency flying.

- Personal Flying: The use of an aircraft on a not-for-hire basis for personal, recreation, and sport purposes not associated with the operation of a business, industrial enterprise, or a profession, including operation for the maintenance of pilot proficiency.

- Miscellaneous Work Use: The use of aircraft for construction work, including the lifting or hoisting of materials or equipment, towing of gliders, aerial advertising, and transporting of parachutists.

- Other Use: The use of aircraft for purposes not included in the above categories, including aircraft experimentation, research and development, testing, demonstration, air shows, and air racing.

General Aviation Fleet Size

Because the general aviation fleet size is one of the most basic indicators of general aviation activity, a good understanding of how many and what types of general aviation aircraft exist and are used within the Region is important to good airport system planning. However, many types of general aviation data, including data related to aircraft types and fleet size, are not normally collected in certain forms, are collected only sporadically, or not collected at all. In addition, certain data collected by one agency, such as the Federal Aviation Administration, may not be collected by state or local agencies in the same manner, for a similar period, or at all, thus making comparisons difficult. Accordingly, it is useful to review general aviation data from various sources to provide as complete a picture as possible and appropriate.

There are two primary sources of data on general aviation fleet size for Southeastern Wisconsin. The first source is the aircraft registration data maintained by the FAA. The second source is the aircraft registration data maintained by the State of Wisconsin. Review of the FAA data is useful since it assists in identifying long-term national trends, may enable local and regional trends to be compared to national trends, and has been consistently collected and disseminated in the same manner for many years. These aircraft registration data are maintained by the FAA at a national level and represent aircraft registrations by the owner's county of residence. These data also include all aircraft, both active and inactive. For the plan reevaluation, the most recent year for which the FAA registration data were available was 1993. A historical record of aircraft registrations for the United States, the State of Wisconsin, and the Southeastern Wisconsin Region, based on the FAA registration data, is provided in Table 39 and Figure 8. These data indicate that there were 1,565 general aviation aircraft registered in the seven-county Southeastern Wisconsin region in 1993. The current composition of the general aviation fleet is also provided in Table 40, which presents the same registration data for 1993 by type of aircraft. Table 41 indicates that the State of Wisconsin's share of all general aviation aircraft registered in the United States has, over the long term, remained at just below 2 percent since 1970. The Southeastern Wisconsin Region's share of all general aviation aircraft registered in Wisconsin, over the long term, has been just under one-third since 1970, with a very slight overall decrease during this period.

Table 39

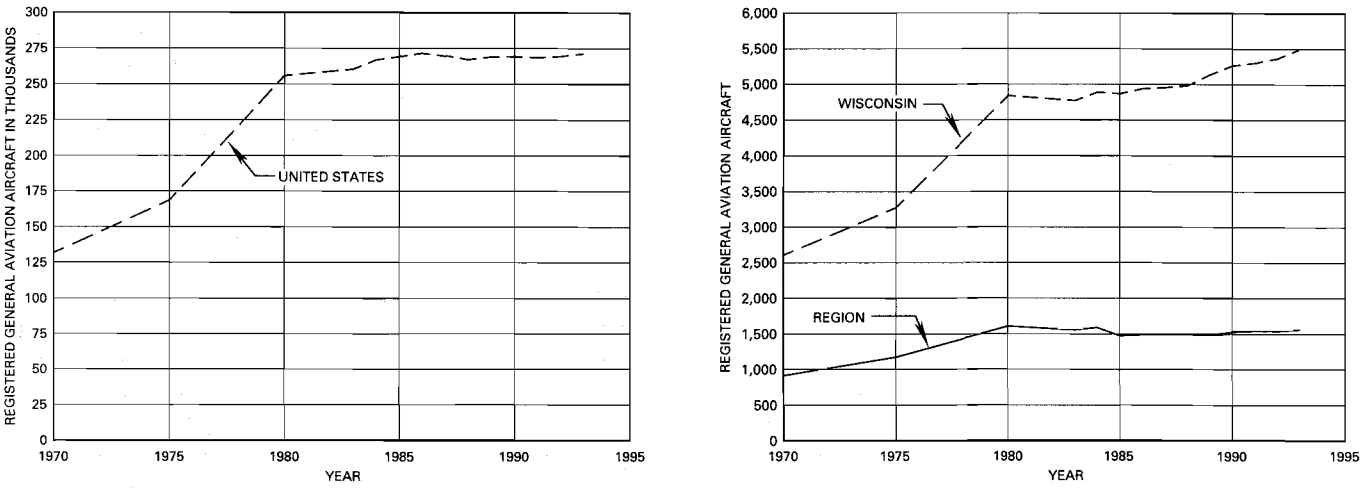
NUMBER OF GENERAL AVIATION AIRCRAFT REGISTERED IN THE UNITED STATES, WISCONSIN, AND THE REGION, BASED ON FEDERAL AVIATION ADMINISTRATION RECORDS: 1970-1993

Year	United States	Wisconsin	Southeastern Wisconsin Region by County of Owner's Residence							Region Total
			Kenosha	Milwaukee	Ozaukee	Racine	Walworth	Washington	Waukesha	
1970	131,743	2,608	75	361	16	101	50	104	207	914
1975	168,475	3,275	144	378	21	157	84	144	243	1,171
1980	255,735	4,839	117	662	80	199	148	111	288	1,605
1983	260,386	4,772	95	644	74	181	139	107	317	1,557
1984	266,886	4,887	103	618	83	193	149	110	333	1,589
1985	269,096	4,868	92	508	78	192	152	118	335	1,475
1986	271,611	4,938	106	505	80	197	160	114	325	1,487
1987	269,712	4,954	103	496	85	199	160	118	332	1,493
1988	266,910	4,981	105	482	83	185	168	123	339	1,485
1989	268,931	5,131	104	475	82	182	166	120	360	1,489
1990	269,201	5,263	107	488	80	179	171	130	373	1,528
1991	268,514	5,302	105	489	82	185	163	137	384	1,545
1992	269,518	5,367	103	474	80	181	177	138	388	1,541
1993	271,424	5,498	107	470	75	195	190	141	387	1,565

Source: Federal Aviation Administration.

Figure 8

NUMBER OF GENERAL AVIATION AIRCRAFT REGISTERED IN THE UNITED STATES, WISCONSIN, AND THE REGION, BASED ON FEDERAL AVIATION ADMINISTRATION RECORDS: 1970-1993



Source: Federal Aviation Administration.

The FAA registration data discussed above include both active and inactive aircraft. Because a sizeable portion of the national general aviation aircraft fleet is not active and many aircraft owners continue to register aircraft after they are no longer in service, a more accurate picture of general aviation activity can be provided by reviewing only the number of aircraft that are indeed active. Estimates of the number of active general aviation aircraft in the United States are developed annually by the FAA, using data from an annual general aviation activity survey. The information obtained from this survey enables the FAA and other agencies to monitor the general aviation fleet so that the demand for national air space facilities and services can be anticipated, the impact of regulatory changes on the general aviation fleet can be assessed, and measures to ensure the safe operation of aircraft can be implemented. The information from this survey is also useful for national, statewide, and regional forecasting activities. Under this survey, the FAA defines active aircraft as all legally registered civil aircraft which flew one of more hours during the calendar year of the survey.

A record of the active general aviation aircraft in the United States and the State of Wisconsin, based on the FAA general aviation activity survey data,

Table 40

TYPES OF GENERAL AVIATION AIRCRAFT REGISTERED IN THE UNITED STATES, WISCONSIN, AND THE REGION, BASED ON FEDERAL AVIATION ADMINISTRATION RECORDS: 1970-1993

Aircraft Type	United States	Wisconsin	Southeastern Wisconsin Region by County of Owner's Residence							Region Total
			Kenosha	Milwaukee	Ozaukee	Racine	Walworth	Washington	Waukesha	
Piston										
Single-Engine	210,757	4,658	94	358	61	157	171	116	330	1,287
Other	26,396	420	7	32	5	10	9	6	18	87
Subtotal	237,153	5,078	101	390	66	167	180	122	348	1,374
Turboprop										
Twin-Engine	5,203	83	--	16	--	3	1	--	8	28
Other	990	4	--	2	--	1	--	--	--	3
Subtotal	6,193	87	--	18	--	4	1	--	8	31
Jet	5,520	74	--	15	2	8	1	--	3	29
Helicopter	11,058	123	1	10	1	6	3	3	7	31
Other	11,500	135	1	20	5	4	3	13	11	57
Unknown	--	1	4	17	1	6	2	3	10	43
Total	271,424	5,498	107	470	75	195	190	141	387	1,565

Source: Federal Aviation Administration.

Table 41

SHARE OF UNITED STATES GENERAL AVIATION AIRCRAFT REGISTERED IN WISCONSIN, AND THE REGION, BASED ON FEDERAL AVIATION ADMINISTRATION RECORDS: 1970-1993

Year	United States	Registered Aircraft			
		Wisconsin		Region	
		Number	Percent of U. S. Total	Number	Percent of Wisconsin Total
1960	76,549	1,544	2.02	566	36.6
1965	95,442	1,834	1.92	683	37.2
1970	131,743	2,608	1.98	914	37.6
1975	168,475	3,275	1.94	1,171	35.8
1980	255,735	4,839	1.89	1,605	33.2
1983	260,386	4,772	1.83	1,557	32.6
1984	266,886	4,887	1.83	1,589	32.5
1985	269,096	4,868	1.81	1,475	30.3
1986	271,611	4,938	1.82	1,487	30.1
1987	269,712	4,954	1.84	1,493	30.1
1988	266,910	4,981	1.87	1,485	23.5
1989	268,931	5,131	1.91	1,489	29.0
1990	269,201	5,263	1.96	1,528	29.0
1991	268,514	5,302	1.97	1,545	29.1
1992	269,518	5,367	1.99	1,541	28.7
1993	271,424	5,498	2.02	1,565	28.5

Source: Federal Aviation Administration.

is provided in Table 42 for the most recent 10-year period. According to these data, there were about 176,000 active aircraft in the United States in 1993, about 65 percent of all registered general aviation aircraft in the United States. Also in 1993, there were an estimated 3,800 active general aviation aircraft in the State of Wisconsin, or about 70 percent of all registered general aviation aircraft reported in the State, as shown in Table 42. This table indicates clearly that the number of active general aviation aircraft in the United States has been decreasing since the early 1980s, although

Table 42

NUMBER AND SHARE OF ACTIVE UNITED STATES GENERAL AVIATION AIRCRAFT REGISTERED IN WISCONSIN: 1970-1993

Year	United States	Wisconsin	
		Number	Percent of United States Total
1983	213,293	3,782	1.77
1984	220,943	4,180	1.89
1985	196,500	N/A	N/A
1986	205,300	3,900	1.90
1987	202,700	4,070	2.01
1988	196,200	3,783	1.93
1989	205,000	4,266	2.08
1990	198,000	3,817	1.93
1991	198,475	4,389	2.21
1992	184,434	3,965	2.15
1993	176,006	3,836	2.18

N/A: Not Available.

Source: Federal Aviation Administration and SEWRPC.

Table 43

TYPES OF ACTIVE GENERAL AVIATION AIRCRAFT REGISTERED IN THE UNITED STATES: 1993

Aircraft Type	United States	
	Number	Percent
Piston		
Single-Engine	141,625	80.5
Other	16,406	9.3
Subtotal	158,031	89.8
Turboprop		
Twin-Engine	3,632	2.1
Other	727	0.4
Subtotal	4,359	2.5
Jet	3,859	2.2
Helicopter	4,510	2.5
Other[a]	5,247	3.0
Total	176,006	100.0

[a] *Includes gliders, dirigibles, and balloons.*

Source: Federal Aviation Administration.

the share of active general aviation aircraft in the State of Wisconsin has slowly increased from about 1.8 percent to about 2.1 percent of the national total. Data for active general aviation aircraft are not available from this FAA survey for areas below the State level. Table 43 shows the composition of the national general aviation fleet, reaffirming that single-engine piston aircraft continue to constitute the overwhelming share of all general aviation aircraft in the United States.

The second primary source of general aviation fleet size data for Southeastern Wisconsin is the aircraft registration data maintained by the Wisconsin Department of Transportation, Bureau of Aeronautics. Review of the State data is useful since it assists in identifying the specific types of aircraft that are based at specific airports and identifies the owner's address. These aircraft registration data are maintained by the State at a county and airport level and presents aircraft registrations by the airport at which the aircraft is based. Like the FAA national data, the State data also include both active and inactive aircraft. For this reevaluation, the most recent year for which the State registration data were available was 1993.

The number of general aviation aircraft registered in Southeastern Wisconsin according to the State registration records is summarized in Table 44 for 1992 and Table 45 for 1993. As shown in these tables, there is little difference in the number or distribution of aircraft between these two years. These data indicate that a total of 1,421 general aviation aircraft were registered in the seven-county Southeastern Wisconsin Region in 1992 and a total of 1,420 general aviation aircraft registered in the Region in 1993. On the basis of these data, about 90 percent of all registered aircraft in Southeastern Wisconsin may be considered active. For purposes of the regional airport system plan reevaluation, active aircraft in the State aircraft registration records are defined as all general aviation aircraft except those specifically noted in the registration records as non-airworthy, incomplete amateur-built, title only, or museum aircraft. About 10 percent of all registered aircraft are not based at a specific airport. Many of these aircraft are not active, since only about 5 percent of the active aircraft are not based at airports. Such aircraft are typically flown for sport, hobby, recreational, or experimental purposes, and are normally kept in private storage facilities.

Table 46 identifies the number and types of general aviation aircraft based at each airport within the Southeastern Wisconsin Region at the end of 1993. While the State aircraft registration data discussed above include all active aircraft registered, they does not necessarily recognize all aircraft that are based within the Region. In fact, most of the larger general aviation airports within Southeastern Wisconsin include aircraft that are normally based at that airport but are registered in other counties, or

Table 44

NUMBER OF GENERAL AVIATION AIRCRAFT REGISTERED IN SOUTHEASTERN WISCONSIN BY COUNTY, BASED ON WISCONSIN DEPARTMENT OF TRANSPORTATION RECORDS: 1992

County	Registered Aircraft			Active Aircraft		
	Based at Airport	Not Based at Airport	Total	Based at Airport	Not Based at Airport	Total
Kenosha	186	11	197	172	6	178
Milwaukee	316	39	355	305	20	325
Ozaukee	18	7	25	18	3	21
Racine	183	11	194	171	4	175
Walworth	107	29	136	102	11	113
Washington	171	15	186	160	7	167
Waukesha	296	32	328	282	12	294
Total	1,277	144	1,421	1,210	63	1,273

Source: Wisconsin Department of Transportation and SEWRPC.

Table 45

NUMBER OF GENERAL AVIATION AIRCRAFT REGISTERED IN SOUTHEASTERN WISCONSIN BY COUNTY, BASED ON WISCONSIN DEPARTMENT OF TRANSPORTATION RECORDS: 1993

County	Registered Aircraft			Active Aircraft		
	Based at Airport	Not Based at Airport	Total	Based at Airport	Not Based at Airport	Total
Kenosha	185	9	194	171	5	176
Milwaukee	311	36	347	304	16	320
Ozaukee	22	4	26	21	1	22
Racine	189	12	201	175	5	180
Walworth	127	25	152	119	10	129
Washington	166	14	180	153	7	160
Waukesha	288	32	320	274	13	287
Total	1,288	132	1,420	1,217	57	1,274

Source: Wisconsin Department of Transportation and SEWRPC.

even in other states. A number of reasons exist for this situation, one of the most common being that out-of-Region or out-of-State residents find it more desirable to base the aircraft at a particular airport within Southeastern Wisconsin for reasons of convenience, lack of congestion, or cost. This was borne out by a comparison of the number of aircraft based at individual airports as reported by the State registration records with the number of aircraft based at individual airports as reported on each Airport Master Record Form 5010-1. For airports where a significant difference between the two sources existed and was identified, specific contacts were made with each airport's management to attempt to resolve that difference. As a result, Table 46 reflects the most accurate count of based aircraft within Southeastern Wisconsin by airport and by aircraft type for 1993. These data indicate that there was a total of 1,489 general aviation aircraft based in the seven-county Southeastern Wisconsin Region in 1993. The current composition of the general aviation fleet based within the Region is included in Table 47 and is very similar to the composition of the national active general aviation aircraft fleet shown in Table 43, with the exception that there is a greater percentage of turboprop aircraft within the Region but a smaller percentage of helicopters within the Region than there is nationally.

The relationship between the place of residence of aircraft owners and the location of based air-

Table 46

NUMBER OF ACTIVE GENERAL AVIATION AIRCRAFT BASED IN SOUTHEASTERN WISCONSIN BY AIRPORT AND TYPE: 1993

County	Airport	Open to Public	Based Aircraft by Type				Helicopters	Other[a]	Total
			Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet			
Kenosha	Kenosha Regional	Yes	185	25	4	2	2	--	218
	Camp Lake	Yes	1	--	--	--	--	--	1
	Vincent	Yes	1	--	--	--	--	--	1
	Olson's	No	1	--	--	--	--	--	1
	Westosha	Yes	52	2	--	--	--	--	54
	Winfield	No	--	--	--	--	1	--	1
	Thompson Strawberry Farm	No	3	--	--	--	--	--	3
	Elfering	No	1	--	--	--	--	--	1
	Not at Airport	No	5	--	--	--	--	1	6
	Total		249	27	4	2	3	1	286
Milwaukee	Lawrence J. Timmerman	Yes	93	16	4	--	--	--	113
	Mitchell International	Yes	31	27	31	28	--	--	117
	Rainbow	Yes	27	--	--	--	--	--	27
	Milwaukee County Medical Center	No	--	--	--	--	1	--	1
	Not at Airport	No	3	--	--	--	4	10	17
	Total		154	43	35	28	5	10	275
Ozaukee	Grob	No	7	--	--	--	--	--	7
	Ashenfelter Aerodrome	No	3	--	--	--	--	--	3
	SSS Aerodrome	No	6	--	--	--	--	--	6
	Hoffman Properties	No	--	--	--	--	1	--	1
	Didier Farms	No	2	--	--	--	--	--	2
	Not at Airport	No	2	--	--	--	--	1	3
	Total		20	--	--	--	1	1	22
Racine	Batten	Yes	52	9	6	8	1	--	76
	Sylvania	Yes	38	2	--	--	--	7	47
	Burlington Municipal	Yes	60	8	1	--	2	--	71
	Cindy Guntly Memorial	Yes	35	2	--	--	--	2	39
	Valhalla	Yes	1	--	--	--	--	--	1
	Aero Estates	No	1	--	--	--	1	--	2
	Fox River	Yes	6	--	--	--	--	--	6
	Not at Airport	No	4	--	--	--	--	1	5
	Total		197	21	7	8	4	10	247
Walworth	East Troy Municipal	Yes	69	5	--	--	2	4	80
	Air Troy Estates	No	17	--	--	--	1	--	18
	Lake Lawn	Yes	8	--	--	--	--	--	8
	Swan	No	2	--	--	--	--	--	2
	Barker Strip	No	1	--	--	--	--	--	1
	Wag-Aero	No	5	--	--	--	--	--	5
	Big Foot Airfield	Yes	6	--	--	--	--	1	7
	Ames Farm	No	1	--	--	--	--	--	1
	Barten	No	1	--	--	--	--	--	1
	Fletcher	No	1	--	--	--	--	--	1
	Lottig	No	1	--	--	--	--	--	1
	Paddock Field	No	1	1	--	--	--	--	2
	Plows and Props	No	1	--	--	--	--	--	1
	Lake Geneva Aire Estates	No	7	--	--	--	--	--	7
	Weedhopper Meadow	No	2	--	--	--	--	--	2
	Not at Airport	No	7	--	--	--	1	--	8
	Total		130	6	--	--	4	5	145
Washington	West Bend Municipal	Yes	96	11	--	--	--	16	123
	Hartford Municipal	Yes	55	4	--	--	--	8	67
	Willow Creek	No	1	--	--	--	--	--	1
	Miles Field	No	9	--	--	--	--	--	9
	Not at Airport	No	2	--	--	--	1	4	7
	Total		163	15	--	--	1	28	207
Waukesha	Waukesha County-Crites Field	Yes	136	24	15	3	--	--	178
	Capitol	Yes	94	1	--	--	--	--	95
	Aero Park	Yes	10	--	--	--	--	1	11
	Oconomowoc	No	8	--	--	--	--	--	8
	Bartell Field	No	1	--	--	--	--	--	1
	Christenson	No	1	--	--	--	--	--	1
	Not at Airport	No	8	--	--	--	--	5	13
	Total		258	25	15	3	--	6	307
Region	Total	--	1,171	137	61	41	18	61	1,489

[a] *Includes balloons, gliders and registered ultralights.*

Source: Wisconsin Department of Transportation, individual airports, and SEWRPC.

Table 47

TYPES OF ACTIVE GENERAL AVIATION AIRCRAFT BASED IN SOUTHEASTERN WISCONSIN: 1993

Aircraft Type	Southeastern Wisconsin	
	Number	Percent
Piston		
Single-Engine	1,171	78.6
Other	137	9.2
Subtotal	1,308	87.8
Turboprop		
Twin-Engine	61	4.1
Other	0	0.0
Subtotal	61	4.1
Jet	41	2.8
Helicopter	18	1.2
Other[a]	61	4.1
Total	1,489	100.0

[a]*Includes gliders, balloons, and registered ultralights.*

Source: SEWRPC.

craft is shown in Table 48. This type of tabulation provides an approximation of how many aircraft owners reside in, or are located outside, the county in which the aircraft is reported to be based. This distinction between the location of based aircraft and owner's residence is important, since the forecasts of the general aviation fleet size are related to the residences of aircraft owners as well as the location of the based aircraft. This permits consid eration in the planning process of user convenience in airport location and permits the demand for aviation activity to be related to future population and employment levels and distribution.

General Aviation Aircraft

Operations and Traffic Levels

Operations at each of the 23 general aviation, public-use airports, including Milwaukee's Mitchell International Airport, within the Region are summarized in Table 49. An operation is defined as either an aircraft landing, aircraft take-off, or "touch-and-go" operation.[3] These annual operations statistics were obtained from estimates included in the FAA Airport Master Record Form 5010-1 for each public-use airport or from exact tower counts obtained from the airport. The annual traffic counts include not only fixed-wing aircraft activity, but also helicopter and ultralight aircraft activity. Helicopter activity, however, was found to be very limited at most general aviation public-use airports, representing a very small percentage of total general aviation activity. Similarly, ultralight aircraft activity was found to occur only at a few airports within the Region. The counts in Table 49 also include passenger air carrier operations, which occur only at General Mitchell International Airport, and military operations, which occur principally at Mitchell International, Waukesha County-Crites Field, and West Bend Municipal Airport.

In 1993, total aircraft operations at public-use general aviation airports in Southeastern Wisconsin were estimated to be about 907,500. Much of this activity, however, was concentrated at a limited number of airports, as shown in Figure 9. By itself, Mitchell International accounted for over 20 percent of all aircraft operations at public-use airports in the Region. About one-half of the total operations at public-use airports in the Region occurred at only four airports: Mitchell International, Kenosha Regional Airport, Timmerman Airport, and West Bend Municipal Airport. Also, the eleven airports that comprised the then-current regional airport system plan accounted for about 90 percent of all public-use airport operations in the Region.

The 907,500 aircraft operations estimated to have occurred in Southeastern Wisconsin during 1993 reflect an increase over the total operations estimated for 1971 of 867,100 and for 1984 of 787,200, as shown in Table 49. This suggests an overall trend, at least for general aviation aircraft operations within the Region, that may differ from national trends, which, as noted previously, have indicated an overall decline in general aviation activity during the past decade. For example, the total hours estimated to have been flown by general aviation aircraft in the United States and Wisconsin has declined, as shown in Table 50 and Figure 10. Also, the number of active pilots in the United States, especially those with student or private ratings, have declined, as shown in Table 51 and Figure 11. Only the number of pilots with instrument ratings has increased. The activity at airports with air traffic control towers has decreased and then held relatively stable in recent years, as shown in Table 52. This and the increase in instrument rated pilots suggests an increasing sophistication of the general aviation pilots that maintain their licenses.

[3]*A "touch-and-go" operation is defined as an operation in which an aircraft touches down on an airport runway and immediately takes off again without stopping. Touch-and-go operations are normally performed by both student and licensed pilots to improve proficiency.*

Table 48

NUMBER OF GENERAL AVIATION AIRCRAFT REGISTERED IN SOUTHEASTERN WISCONSIN BY COUNTY WHERE BASED AND BY PLACE OF RESIDENCE OF OWNER, BASED ON WISCONSIN DEPARTMENT OF TRANSPORTATION RECORDS: 1992

County Where Aircraft is Based	County or Other Place of Residence of Aircraft Owner										
	Kenosha	Milwaukee	Ozaukee	Racine	Walworth	Washington	Waukesha	Counties	Illinois	States	Total
Kenosha	93	6	--	11	1	--	--	4	80	2	197
Milwaukee	1	265	20	7	2	11	38	5	1	5	355
Ozaukee	--	3	17	--	--	4	--	1	--	--	25
Racine	10	20	--	136	13	--	2	4	1	8	194
Walworth	--	9	--	8	96	--	20	1	1	1	136
Washington	--	11	29	--	--	108	23	12	1	2	186
Waukesha	--	71	3	4	--	8	235	4	--	3	328
Total	104	385	69	166	112	131	318	31	84	21	1,421

Source: Wisconsin Department of Transportation.

The airports within Southeastern Wisconsin remain the busiest in the State of Wisconsin. This should not be surprising, since, although the Region includes only seven of the 72 counties within the State, it has almost 40 percent of the State of Wisconsin population and, in addition, about 39 percent of the jobs. Table 53 ranks the 26 busiest public-use airports in the State of Wisconsin by total operations for 1993. These 26 airports included all 11 of the airports that were studied in the then-current regional airport system plan.

Existing and historic annual general aviation operations statistics for Mitchell International, Timmerman Airport, and Waukesha County-Crites Field for the period 1970 through 1993 are presented in Table 54 and Figure 12. Historic annual operations counts are available only for these three airports within Southeastern Wisconsin, since each has an air traffic control towers that must maintain such records. Operations data for Mitchell International are from actual air traffic control tower counts. Since the tower at Mitchell International is open continuously, these counts include all activity. The towers at Timmerman Airport and Waukesha County-Crites Field, however, are typically only open from 14 to 16 hours each day, resulting in some aircraft operations not being reflected in the activity counts for these airports. Accordingly the annual number of operations reported for Timmerman Airport and Crites Field have been adjusted. On the basis of the input of airport officials, the annual number of operations was increased by 10 percent for Waukesha County-Crites Field and by 3 percent for Timmerman Airport. An overall long-term decrease in general aviation activity is evident at all three airports. General aviation operations fluctuate not only by year, but also by season, by month, by day of the week, and by hour of the day. The number of monthly operations for 1989 through 1993 at Mitchell International and Timmerman Airport is set forth in Tables 55 and 56. Seasonal and monthly changes in general aviation operations are largely due to changes in personal, sport, and recreational operations. General aviation activity for business and work-related travel purposes remains relatively stable throughout the year; personal, leisure, recreation, and sport activity occurs mainly during the spring, summer, and fall months. This pattern is typical at most general aviation, public-use airports. At airports where a high percentage of general aviation activity is composed of business and corporate flights, such as Mitchell International, the seasonal and monthly pattern of operations fluctuates more moderately throughout the year.

General aviation operations are typically subdivided into local, itinerant, air taxi, and military categories of operations, as shown in Table 57. Local operations are defined as those which occur in the local traffic pattern or within sight of the airport control tower. Local operations include those flights known to be departing for, or arriving from, local practice areas which generally lie within a 20-mile radius of the airport. Itinerant operations are defined as all aircraft operations other than local operations. Typically, local operations are conducted for training and instructional purposes, but may also include such miscellaneous uses as sight-seeing. Air taxi operations, which are usually associated with business or work-related trips, are typically itinerant in nature. Military operations include both local and itinerant activity.

Table 49

TOTAL ANNUAL AIRCRAFT OPERATIONS AT PUBLIC-USE GENERAL AVIATION AIRPORTS IN SOUTHEASTERN WISCONSIN: 1971, 1984, AND 1993

County	Airport Name	Number of Annual Operations		
		1971	1984	1993
Kenosha	Camp Lake	1,200[a]	700	1,400
	Kenosha Regional	64,500	83,500	79,000
	Vincent	4,000	3,000	3,100
	Westosha	500[a]	20,000	20,350
Milwaukee	Hales Corners	25,200	--[b]	--[b]
	Mitchell International	224,071	171,029	201,288
	Rainbow	20,000	17,250	16,750
	Lawrence J. Timmerman	143,900	85,554	88,261
Ozaukee	Ozaukee	3,500	--[a]	--[a]
Racine	Burlington Municipal	8,000	45,350	46,300
	Fox River	3,200	12,000	4,000
	Batten	35,000	28,000	51,250
	Cindy Guntly Memorial[c]	800	13,500	5,700
	Sylvania	12,000	16,300	38,400
	Valhalla	200	30	30
Walworth	Americana	5,700	16,100	--[b]
	Big Foot Airfield	1,000	3,675	4,075
	East Troy Municipal	5,700	3,000	55,100
	Edgewood Seaplane Base	360	--[b]	--[b]
	Gruenwald	1,600	--[a]	--[b]
	Lake Lawn	1,400	20,100	35,000
	Mt. Fuji	100	--[a]	--[a]
Washington	Hahn Sky Ranch	1,000	1,200	410
	Hartford Municipal	57,600	19,665	28,320
	West Bend Municipal	90,540	84,072	82,100
Waukesha	Aero Park	3,200	11,000	6,000
	Capitol	35,000	50,810	68,810
	O'Leary Field	800	--[a]	--[a]
	Waukesha County-Crites Field	117,000	81,322	71,876
Total	--	867,071	787,113	907,520

NOTE: Annual operations shown in this table include all general aviation, air carrier,air taxi, military, and helicopter activity. Military and helicopter activity are significant at General Mitchell International Airport, Kenosha Regional Airport, West Bend Municipal Airport, and Waukesha County-Crites Field. Activity data for General Mitchell International Airport are from actual air traffic control tower counts. Activity data for Timmerman Airport and Waukesha County-Crites Field are from air traffic control tower counts adjusted to account for operations during times when the tower is not open.

Activity data for General Mitchell International Airport are from Actual air traffic control tower counts. Activity data for Timmerman Airport and Waukesha County-Crites Field are from air traffic control tower counts adjusted to include hours when the tower is not open. Activity data for other airports are based on estiminates provided by airport officials.

[a] *Private use airport, not open for public use.*

[b] *Airfield closed*

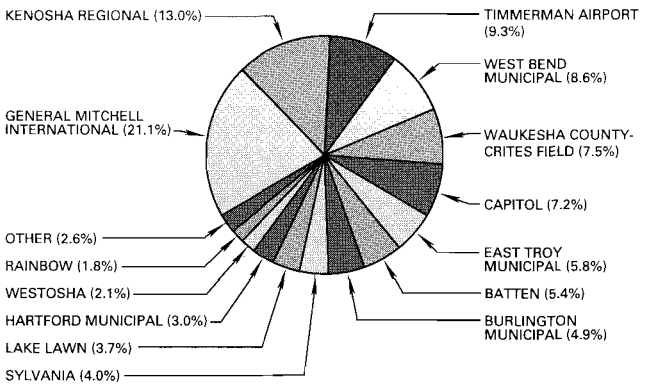
[c] *Airport formerly named Hunt Field.*

Source: Wisconsin Department of Transportation and SEWRPC.

The distribution of total operations among local operations, itinerant operations, and air taxi operations provides an indication of the function each airport performs in the regional airport system. This activity is summarized in Table 57. The high volumes of local operations compared to other operations generally denote airports with substantial flying for instructional and pilot proficiency pur poses and for personal and possibly aerial application purposes. Local general aviation operations

Figure 9

ANNUAL AIRCRAFT OPERATIONS AT PUBLIC USE AIRPORTS IN SOUTHEASTERN WISCONSIN: 1993



Source: SEWRPC.

Table 50

ACTIVE GENERAL AVIATION AIRCRAFT TOTAL HOURS FLOWN IN THE UNITED STATES AND WISCONSIN: 1983-1992

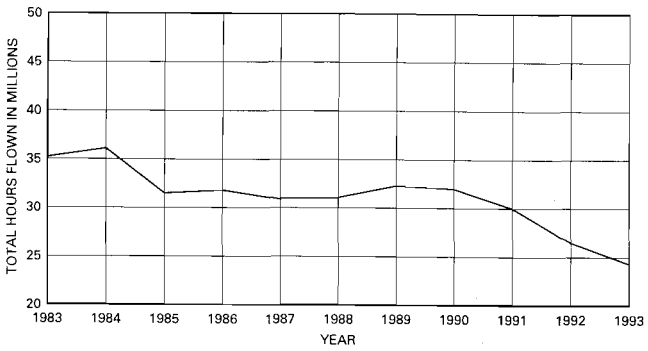
Year	United States (in millions)	Wisconsin (in thousands)	Percent of U. S. Total
1983	35.2	535	1.5
1984	36.1	563	1.6
1985	31.5	N/A	N/A
1986	31.8	528	1.7
1987	30.9	531	1.7
1988	31.1	583	1.9
1989	32.3	543	1.7
1990	32.0	452	1.4
1991	30.0	483	1.6
1992	26.5	449	1.7
1993	24.3	336	1.4

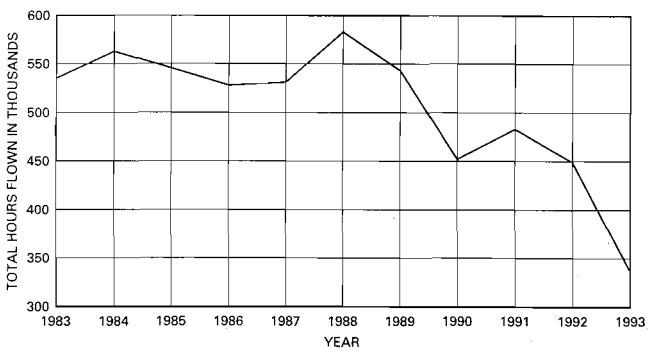
N/A: Not Available.

Source: Federal Aviation Administration.

Figure 10

ACTIVE GENERAL AVIATION AIRCRAFT TOTAL HOURS FLOWN IN THE UNITED STATES AND WISCONSIN: 1983-1993





Source: Federal Aviation Administration.

accounted for an estimated 41 percent of all operations at the 22 public-use airports in the Region during 1993. At Mitchell International and Batten airports, local operations incorporating touch-and-go maneuvers are either not encouraged or prohibited. The high volumes of itinerant operations compared to other operations denote airports with substantial flying for business or corporate purposes. Itinerant general aviation operations also accounted for an estimated 41 percent of all operations during 1993. Air taxi and military operations, both of which are often itinerant, accounted for about 3 and 2 percent, respectively. The remaining 13 percent of all operations in the Region during 1993 were performed by air carriers, whose operations are also classed as itinerant.

Significant volumes of air traffic activity also occurred at general aviation, public-use airports located in counties adjacent to the Southeastern Wisconsin Region. This activity is summarized in Table 58. The locations of these airports in the surrounding counties are shown on Map 3 in Chapter III of this report.

An important measure useful in airport system planning is the average number of annual operations per aircraft. With respect to general aviation aircraft, the average number of annual operations for specific aircraft types is based on the average annual hours flown for each aircraft type and is derived from data provided in the annual General Aviation Activity Survey conducted by the FAA.

Table 51

ACTIVE PILOTS IN THE UNITED STATES: 1980-1992

Year	Total (thousands)	Selected Categories (thousands)		
		Students	Private	Instrument Ratings
1980	827.1	199.8	357.5	260.5
1983	718.0	147.2	318.6	254.3
1984	722.4	150.1	320.1	256.6
1985	709.5	146.6	311.1	258.6
1986	709.1	150.3	305.7	262.4
1987	699.6	146.0	300.9	266.1
1988	694.0	136.9	299.8	273.8
1989	700.0	142.5	293.2	282.8
1990	702.7	128.7	299.1	297.1
1991	692.1	120.2	293.3	303.2
1992[a]	683.0	114.6	288.1	306.2

[a] *Estimated.*

Source: Federal Aviation Administration.

Table 52

GENERAL AVIATION ACTIVITY AT FEDERAL AVIATION ADMINISTRATION-TOWERED AIRPORTS IN THE UNITED STATES: 1979-1993

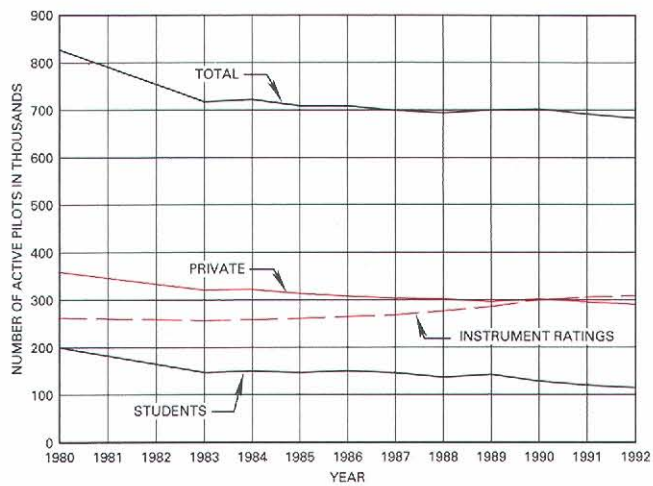
Year	Number of Departures (millions)
1979	51.7
1980	48.9
1981	44.6
1982	34.2
1983	35.3
1984	36.8
1985	37.2
1986	37.1
1987	37.8
1988	37.5
1989	37.8
1990	39.0
1991	37.6
1992	37.0
1993	35.2[a]

[a] *Estimated.*

Source: Federal Aviation Administration.

Figure 11

ACTIVE PILOTS IN THE UNITED STATES: 1980-1992



Source: Federal Aviation Administration.

Table 59 presents the average hours flown per active general aviation aircraft in the United States by aircraft type. In 1992 the average number of hours flown for all types of aircraft was 140.4 hours per year. For comparison purposes, the survey noted that the average hours flown per active aircraft in the FAA's Great Lakes Region during 1992 was 124.9 hours. The Great Lakes Region includes the states of Wisconsin, Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, and South Dakota. The same survey indicated that the average hours flown for active aircraft in the State of Wisconsin for all types of aircraft was 107.6 hours in 1992. This

Table 53

HIGHEST-RANKED AIRPORTS IN THE STATE OF WISCONSIN, BASED ON TOTAL OPERATIONS: 1993

Rank	City and Airport	Annual Operations	Enplaning Passengers
1	Milwaukee, General Mitchell International	201,288	2,253,714
2	Madison, Dane County Regional	147,728	564,571
3	Milwaukee, Lawrence J. Timmerman	88,261	--
4	Green Bay, Austin Straubel Field	87,318	272,910
5	Janesville, Rock County	83,000	--
6	West Bend, West Bend Municipal	82,100	--
7	Oshkosh, Wittman Field	80,238	9,607
8	Appleton, Outagamie County	79,194	186,724
9	Kenosha, Kenosha Regional	79,000	--
10	La Crosse, La Crosse Municipal	77,923	107,574
11	Waukesha, Waukesha County-Crites Field	71,876	--
12	Brookfield, Capitol	68,810	--
13	Fond du Lac, Fond du Lac County	67,850	--
14	Sheboygan, Sheboygan County Memorial	61,400	--
15	Eau Claire, Eau Claire County	57,000	25,977
16	Watertown, Watertown Municipal	55,220	--
17	East Troy, East Troy Municipal	55,100	--
18	Racine, Batten	51,250	--
19	Burlington, Burlington Municipal	46,300	--
20	Madison, Morey	41,610	--
21	Mosinee, Central Wisconsin	38,999	128,711
22	Sturtevant, Sylvania	38,400	--
23	Sturgeon Bay, Door County Cherryland	37,450	1,500
24	Rhinelander, Rhinelander-Oneida County	32,700	30,943
25	Stevens Point, Stevens Point Municipal	30,650	--
26	Hartford, Hartford Municipal	28,320	--

Source: Wisconsin Department of Transportation.

suggests that the annual aircraft utilization with respect to the entire active aircraft fleet is somewhat less in the Great Lakes Region and the State of Wisconsin than in the rest of the United States. Specific data pertaining to the average hours flown per aircraft are not available by type below the national level, however.

Table 60 presents the number of aircraft landings reported, the estimated hours per flight, and the estimated average number of operations per aircraft for the different types of active general aviation aircraft in the United States in 1992. This table provides a useful indication of aircraft utilization by different aircraft types. Annual utilization, based on national analyses, varies from about 150 operations per year for miscellaneous aircraft, such as balloons and gliders, to about 1,400 operations per year for helicopters. The entire fleet of general aviation aircraft in the United States has an average of about 420 operations per aircraft. It should also be noted that the differences among the different types of aircraft utilization are as one would expect. For example, aircraft with a lower number of annual operations would be expected to be those used primarily for personal, sport, and recreational purposes and appropriately include the single-engine piston and other aircraft categories. Aircraft that have a higher average number of annual operations would be expected to be used for business, corporate, and commercial uses, and appropriately include the twin-engine turboprop aircraft, jet aircraft, and helicopter categories.

It is also useful to review the average number of aircraft operations per active based aircraft at the public-use general aviation airports within Southeastern Wisconsin. A summary of this information for 1993 is provided in Table 61. This table illustrates that, with the exception of a small number of airports that have an unusually small number of based aircraft, the estimated operations per active based aircraft are generally comparable to the estimates derived from the 1992 FAA General Aviation Activity Survey shown in Tables 59 and 60. An important distinction is that the estimates of

Table 54

ANNUAL TOTAL GENERAL AVIATION OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT, LAWRENCE J. TIMMERMAN AIRPORT, AND WAUKESHA COUNTY-CRITES FIELD: 1979-1993

Year	Mitchell International	Timmerman[a]	Waukesha County-Crites Field[a]
1970	138,264	148,203	N/A
1975	116,324	135,690	110,437
1980	129,324	135,308	105,522
1985	81,041	89,278	85,312
1986	93,961	106,286	75,972
1987	103,444	103,536	79,616
1988	94,160	114,084	N/A
1989	73,189	127,101	79,499
1990	65,768	120,917	76,650
1991	67,519	115,809	86,270
1992	65,237	106,192	80,797
1993	63,370	88,261	71,876

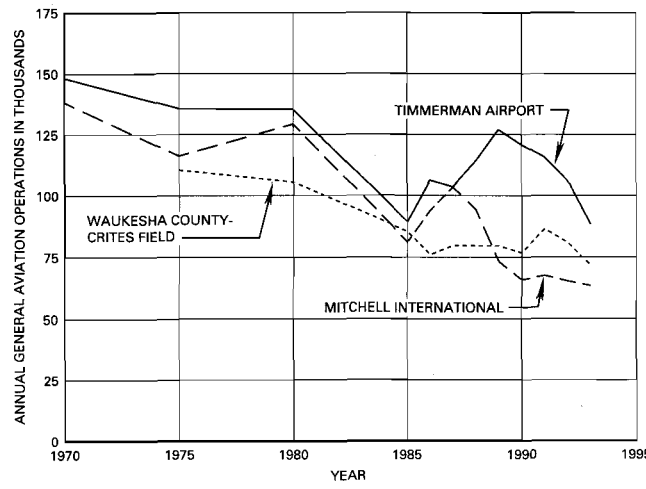
NOTE: N/A indicates data not available.

[a]*These totals include air taxi and military operations.*

Source: Milwaukee County and Midwest Air Traffic Control, Inc.

Figure 12

ANNUAL TOTAL GENERAL AVIATION OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT, LAWRENCE J. TIMMERMAN AIRPORT, AND WAUKESHA COUNTY-CRITES FIELD: 1979-1993



Source: Milwaukee County and Midwest Air Traffic Control, Inc.

operations per based aircraft that use total annual airport operation counts also reflect operations of itinerant aircraft that are not based at the particular airport.

Table 61 does not include an estimate of operations per active based aircraft for private airports, since those airports are not required to report total annual operations. Within Southeastern Wisconsin, such private airports are typically a base for a very small number of small single-engine aircraft, many of which are used infrequently. A review of the specific aircraft based at these airports within Southeastern Wisconsin, together with annual aircraft utilization data from the FAA General Aviation Activity Survey by aircraft type and make, suggests that such aircraft are used chiefly for agriculture, sport, and experimental purposes and are used significantly less than the rest of the aircraft fleet. It was concluded that each of these aircraft are likely to generate from 100 to 200 operations per year. Similarly, general aviation aircraft that are reported in the State registration records as not being based at any specific airport may also be expected to generate from 100 to 200 operations per year.

It may be reasonably assumed that the level of operations at private airports is far below that at the public-use airports and that such operations are made entirely by small aircraft based at that airport. As shown on Table 46, a total of 1,340 active aircraft were based at the public-use airports in the Region in 1993, while a total of 90 aircraft were based at the private airports or heliports in the Region and a total of 59 aircraft were based at locations other than airports in the Region, such as private garages, barns, and at private residences. Based upon a review of these private airports and of the aircraft that are based both at these private airports, as well as at locations other than airports, it was estimated that these 149 active aircraft generated a total of about 22,800 annual operations within Southeastern Wisconsin in addition to the activity at the 22 public-use airports in the Region. A small number of these private airports, such as Air Troy Estates Airport and Oconomowoc Airport, did have a significant number of active based aircraft and, therefore, could be expected to generate a significant number of annual operations.

It is also worth noting that the FAA provides guidelines for use in estimating activity per based aircraft. When more detailed local or regional data or forecasts are not available, the FAA suggests that activity estimates may be developed for general aviation airports by using a figure of 1,000 annual operations per based aircraft for airports in metropolitan areas and a figure of 500 operations per

Table 55

GENERAL AVIATION OPERATIONS BY MONTH AT GENERAL MITCHELL INTERNATIONAL AIRPORT[a]: 1989-1993

Month	1989	1990	1991	1992	1993
January	5,653	4,909	4,385	3,807	4,206
February	5,848	4,159	5,217	4,363	4,571
March	5,793	5,072	5,565	5,255	4,911
April	6,582	5,491	5,208	4,997	5,258
May	6,794	5,863	5,226	5,809	5,885
June	6,907	6,194	7,301	6,410	6,390
July	6,615	6,802	7,758	6,764	6,340
August	6,931	6,596	7,178	6,966	5,729
September	6,478	6,168	6,242	6,090	5,364
October	6,208	5,462	4,922	6,099	5,597
November	5,230	4,890	4,587	4,505	4,438
December	4,150	4,162	3,930	4,172	4,681
Total	73,189	65,768	67,519	65,237	63,370

[a]*These totals include general aviation operations, but do not include air carrier, air taxi or military operations.*

Source: Milwaukee County.

Table 56

GENERAL AVIATION OPERATIONS BY MONTH AT LAWRENCE J. TIMMERMAN AIRPORT[a]: 1989-1993

Month	1989	1990	1991	1992	1993
January	7,888	8,211	6,649	6,568	5,155
February	7,503	7,586	8,431	8,405	6,112
March	10,081	10,517	7,649	8,826	5,066
April	11,230	11,511	9,860	8,185	7,590
May	11,360	10,410	10,646	10,221	8,321
June	12,591	11,027	11,783	9,821	8,797
July	13,193	13,736	12,642	10,376	10,171
August	13,087	13,446	12,811	10,199	9,123
September	12,042	10,487	9,949	10,394	7,723
October	11,643	9,505	9,701	11,722	8,098
November	9,885	8,057	8,437	6,470	6,423
December	6,599	6,422	7,252	5,004	5,681
Total	127,101	120,917	115,809	106,192	88,261

[a]*These totals include air taxi and military operations.*

Source: Milwaukee County.

based aircraft for general aviation airports in non metropolitan areas. For both of these estimates, it is assumed that 40 percent of the operations would be itinerant and 60 percent of the operations would be local.

Characteristics of General Aviation Users

Information on the socio-economic characteristics and travel patterns of general aviation pilots and passengers at the public-use airports in Southeastern Wisconsin is useful to regional airport system planning. Two personal interview surveys, one in 1971 and one in 1983, were conducted by the Regional Planning Commission at public-use airports where there was significant activity. Data collected under these efforts were reviewed and used as appropriate in this reevaluation of the second-generation regional airport system plan.

Table 57

ANNUAL AIRCRAFT OPERATIONS AT PUBLIC-USE AIRPORTS IN SOUTHEASTERN WISCONSIN: 1993

County	Airport Name	Operations[a]				
		General Aviation				
		Local	Itinerant	Air Taxi[b]	Military	Total
Kenosha	Camp Lake	1,200	200	--	--	1,400
	Kenosha Regional	26,900	51,500	100	500	79,000
	Vincent	2,100	1,000	--	--	3,100
	Westosha	10,300	10,000	50	--	20,350
Milwaukee	Mitchell International	17,744	45,626	14,134	5,796	201,288[c]
	Rainbow	9,000	7,500	200	50	16,750
	Lawrence J. Timmerman	45,455	41,571	1,059	176	88,261
Ozaukee	None	--	--	--	--	--
Racine	Burlington Municipal	21,000	24,000	800	500	46,300
	Cindy Guntly Memorial	4,200	1,500	--	--	5,700
	Fox River	2,000	2,000	--	--	4,000
	Batten	31,000	19,000	1,250	--	51,250
	Sylvania	27,000	11,000	300	100	38,400
	Valhalla	10	20	--	--	30
Walworth	Big Foot Airfield	2,600	1,400	75	--	4,075
	East Troy Municipal	24,000	30,000	1,000	100	55,100
	Lake Lawn	6,500	27,600	600	300	35,000
Washington	Hahn Sky Ranch	200	200	--	10	410
	Hartford Municipal	17,000	10,500	800	20	28,320
	West Bend Municipal	40,000	32,000	4,100	6,000	82,100
Waukesha	Aero Park	5,000	1,000	--	--	6,000
	Capitol	48,000	20,000	800	10	68,810
	Waukesha County-Crites Field	28,619	40,519	759	1,979	71,876

[a] *Activity data for General Mitchell International Airport are from actual air traffic control tower counts. Activity data from Timmerman Airport and Waukesha County-Crites Field are from air traffic control tower counts adjusted to include hours when the tower is not open. Activity data for other airports are based on estimates provided by airport officials.*

[b] *At airports where air taxi operations are counted by air traffic control tower staff, Federal Aviation regulations require that only certain types of aircraft be counted in this category. Accordingly, total air taxi operations at these airports may be understated. Airports with operating air traffic control towers in 1993 included: General Mitchell International Airport, Timmerman Airport, and Waukesha County-Crites Field. At public use airports that do not have air traffic control towers in operation, the estiminates of air taxi activity were made by airport officials.*

[c] *Also includes 117,988 large, commuter, and supplemental air carrier operations.*

Source: Wisconsin Department of Transportation.

The 1983 general aviation survey was conducted at 19 airports located within the Region and at two airports located adjacent to the Region, Palmyra and Watertown Municipal, both in Jefferson County but near enough to the Region to serve aircraft owners residing primarily in Waukesha County. Pilots and passengers were interviewed at each airport during a period of three consecutive days, with one of the survey days either a Saturday or Sunday, during August and September 1983. Visitors to each airport who were not pilots or passengers making a trip by air on the day of the survey were not surveyed. In total, the survey included 1,699 interviews with pilots and 934 interviews with passengers. Although the survey did not purport to account for all general aviation activities in the Region, it did provide valid data concerning general aviation activity levels and general trends.

A detailed description of the data and information collected during and findings of this survey is provided in Chapter VI, "Existing Aeronautical Activity," of SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010. The major findings of the general aviation survey that are pertinent to the forecasting

Table 58

ANNUAL AIRCRAFT OPERATIONS AT GENERAL AVIATION, PUBLIC-USE AIRPORTS IN COUNTIES ADJACENT TO THE SOUTHEASTERN WISCONSIN REGION: 1993

County	Airport Name	Operations				
		General Aviation				
		Local	Itinerant	Air Taxi	Military	Total
Wisconsin						
Sheboygan	Sheboygan County Memorial	28,900	30,200	2,100	200	61,400
Fond du Lac	Fond du Lac County	39,800	24,700	3,200	150	67,850
Dodge	Dodge County	27,000	10,000	1,250	1,000	39,250
	Watertown Municipal	33,000	16,500	5,500	220	55,220
Jefferson	Palmyra Municipal	9,100	6,000	150	200	15,450
	Fort Atkinson Municipal	7,350	3,300	200	--	10,850
	Gutzmer's Twin Oaks	200	800	--	--	1,000
Rock	Rock County	48,344	30,090	1,480	1,893	81,807
	Beloit	18,000	8,400	400	30	26,830
	Turtle	--	300	--	--	300
Illinois						
Lake	Campbell's	8,456	9,212	34	70	17,772
	Waukegan Memorial	60,000	42,000	--	--	102,000
McHenry	Lake in the Hills	36,000	23,100	4,000	--	63,100
	Dacy	20,000	15,000	100	--	35,000
	Galt Wonder Lake	22,000	12,900	431	12	35,000
Boone	Belvidere	11,769	8,593	--	--	20,805

Source: Wisconsin Department of Transportation and Illinois Department of Transportation.

Table 59

ACTIVE GENERAL AVIATION AIRCRAFT ANNUAL TOTAL AND AVERAGE HOURS FLOWN IN THE UNITED STATES BY AIRCRAFT TYPE: 1992

Aircraft Type	Total Hours Flown		Average Hours Flown per Aircraft
	Number	Percent	
Piston			
Single-Engine	18,074,428	68.2	126.1
Other	3,176,478	12.0	164.3
Subtotal	21,250,908	80.2	130.4
Turboprop			
Twin-Engine	1,237,576	4.7	301.2
Other	240,133	0.9	381.6
Subtotal	1,477,709	5.6	314.1
Jet	1,072,293	4.0	270.7
All Fixed-Wing	23,800,912	89.8	136.7
Helicopter	2,282,703	8.6	381.7
Other[a]	409,872	1.5	50.9
All Aircraft	26,493,480	100.0	140.4

[a] *Includes gliders, dirigibles, and balloons.*

Source: Federal Aviation Administration.

Table 60

ACTIVE GENERAL AVIATION AIRCRAFT ANNUAL NUMBER OF LANDINGS AND AVERAGE NUMBER OF OPERATIONS IN THE UNITED STATES BY AIRCRAFT TYPE: 1992

Aircraft Type	Total Number of Annual Landings	Average Hours per Flight	Average Number of Operations per Aircraft
Piston			
Single-Engine	29,052,448	0.62	407
Other	3,090,811	1.03	319
Subtotal	32,143,259	0.66	395
Turboprop			
Twin -Engine	1,326,763	0.93	648
Other	416,602	0.58	1,316
Subtotal	1,743,365	0.85	739
Jet	929,511	1.15	471
All Fixed-Wing	34,816,135	0.68	402
Helicopter	4,193,382	0.54	1,414
Other[a]	597,753	0.69	148
All Aircraft	39,607,270	0.67	419

[a] *Includes gliders, dirigibles, and balloons.*

Source: Federal Aviation Administration and SEWRPC.

Table 61

AVERAGE NUMBER OF OPERATIONS PER ACTIVE BASED AIRCRAFT AT PUBLIC-USE GENERAL AVIATION AIRPORTS IN SOUTHEASTERN WISCONSIN: 1993

County	Airport Name	1993		
		Total Operations	Total Active Based Aircraft	Operations Per Active Based Aircraft
Kenosha	Camp Lake	1,400	1	1,400
	Kenosha Regional	79,000	218	362
	Vincent	3,100	1	3,100
	Westosha	20,350	54	377
Milwaukee	Mitchell International	77,504[a]	117	662
	Rainbow	16,750	27	620
	Lawrence J. Timmerman	88,261	113	781
Ozaukee	--	--	--	--
Racine	Burlington Municipal	46,300	71	652
	Fox River	4,000	6	667
	Batten	51,250	76	674
	Cindy Guntly Memorial	5,700	39	146
	Sylvania	38,400	47	817
	Valhalla	30	1	30
Walworth	Big Foot Airfield	4,075	7	582
	East Troy Municipal	55,100	80	689
	Lake Lawn	35,000	8	4,375
Washington	Hahn Sky Ranch	410	--	--
	Hartford Municipal	28,320	67	423
	West Bend Municipal	82,100	123	667
Waukesha	Aero Park	6,000	11	545
	Capitol	68,810	95	724
	Waukesha County-Crites Field	71,876	178	404

NOTE: The average number of operations per based active aircraft represents not only those operations generated by each based aircraft, but also represents operations generated by itinerant aircraft not based at the airport. Therefore, airports with a low number of based aircraft may have estimates of operations per based aircraft which are outside the normal range observed at other airports. Such airports within the Region include Camp Lake, Vincent, and Lake Lawn.

[a] *Includes general aviation and air taxi operations.*

Source: Wisconsin Department of Transportation and SEWRPC.

of general aviation activity in Southeastern Wisconsin may be summarized as follows:

- General aviation activity was more evenly distributed during daylight hours than were either enplaning passengers at General Mitchell International Airport or automobile and truck traffic on the regional highway system.

- Many pilots do not fly frequently. The most active general aviation pilots are those who fly for pay, including instructors, inspectors, air taxi pilots, and corporate pilots. The least active pilots are those who fly for sport or for recreation; these pilots are more constrained by bad weather and lack of available leisure time.

- About 38 percent of the pilots interviewed indicated that "ease" was the most important reason for using a particular airport. Other frequent responses included the airport being the pilot's normal base of operations and that the airport was a good place to practice and improve proficiency.

Table 62

SOCIO-ECONOMIC CHARACTERISTICS OF PILOTS USING GENERAL AVIATION AIRPORTS IN SOUTHEASTERN WISCONSIN: 1971 AND 1993

Characteristic	Pilots Interviewed (percent)		Southeastern Wisconsin Region Population (percent)		
	1971	1983	1970	1980	1990
Sex					
Male	97.7	95.8	48.3	48.4	51.7
Female	2.3	4.2	51.7	51.6	48.3
Total	100.0	100.0	100.0	100.0	100.0
Age					
Under 25	6.4	9.3	46.6	41.8	36.5
25-44	59.1	54.3	23.5	27.4	32.5
45-64	33.7	34.5	20.2	19.7	18.5
65 or Older	0.8	1.9	9.7	11.1	12.5
Total	100.0	100.0	100.0	100.0	100.0
Median Age	41	39	28	30	33
Annual Household Income					
Actual Median Income	$15,700	$37,500	$ 9,950	$20,100	$32,150
Adjusted Median Income in 1993 Dollars	57,400	53,200	37,700	35,100	36,200

Source: SEWRPC.

- Of all the activities surveyed, it was found that inbound and outbound flights averaged 1.8 crew members and 1.4 passengers per flight.

- About 6 percent of all surveyed flights reported carrying air cargo only.

- With respect to trip purpose, the most common trip purposes for pilots and passengers were social-recreational activities, followed by the need to conduct work-related business, followed by pilot flight proficiency. The most common trip purposes in the 1983 survey were found to be very similar to the trip purposes found in the 1971 survey.

- Selected socio-economic characteristics of the general aviation pilots are summarized in Table 62. The median annual household income of the pilots surveyed in 1983 was about $53,200, expressed in constant 1993 dollars. As might be expected, this is higher than the median annual income of all households in Southeastern Wisconsin, $36,200, also expressed in constant 1993 dollars. The median age of the pilots was 39 years, compared to 41 years in 1971; the pilots continued to be predominantly male, 96 percent in 1983 compared with 98 percent in 1971.

- Selected socio-economic characteristics of general aviation passengers are summarized in Table 63. The median annual household income of the passengers surveyed in 1983 was about $51,800, expressed in constant 1993 dollars. Like the general aviation pilots, this also was higher than the median annual income of all households in Southeastern Wisconsin. The median age of the passengers was 39 years, a decrease from the 41 years in 1971. Also, there was a decrease in the proportion of general aviation passengers who were male, 63 percent in 1983 compared to 75 percent in 1971. Thus, as a group, general aviation users, like air carrier passengers, had exhibited a trend between the two surveys of becoming someone less atypical of the regional population as a whole.

Business Aviation Survey

A survey of business and corporate aviation users was also conducted as part of the second-generation regional airport system planning effort. It was conducted as a mail-out/mail-back survey to determine the importance of owning or leasing aircraft to

businesses and corporations. This survey was conducted for the entire State of Wisconsin by the Regional Planning Commission at the request of the Wisconsin Department of Transportation. This was the first time such a business aviation survey had been conducted within Wisconsin for more than a single airport.

The survey was distributed to all firms in the State that in 1983 based or operated aircraft in Wisconsin, as well as to a sample of large and small firms that did not own and operate aircraft. A total of 186 firms, or 43 percent of the firms surveyed, responded to the survey, a good return for a mail-out, mail-back survey. A detailed description of the data and information collected during this survey is provided in Chapter VI, "Existing Aeronautical Activity" of SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010. The major findings of the business aviation survey may be summarized as follows:

- The responding firms owned only a moderate number of aircraft but used the aircraft intensively. Most firms, 73 percent, operated only one aircraft, 18 percent operated two aircraft, and 6 percent operated three aircraft.

- Although business aircraft use could be expected to fluctuate with the transportation needs of the firms and with the State and national economy, such use appears comparatively stable over the various seasons of the year.

- Most business aircraft are fully equipped for instrument flight operations, unlike many private general aviation aircraft.

- Business flights carried an average of 2.5 passengers, exclusive of crew. Passenger loads, however, varied from no passengers, which accounted for 4 percent of the flights, to four or more passengers, which accounted for about 20 percent of the flights.

- Relatively little cargo was carried by business aviation aircraft in Wisconsin. Some firms, however, noted that this is an important use of the aircraft.

- Many firms that own business aircraft reported definite advantages to using their own aircraft instead of charter aircraft, air taxi, or scheduled air carriers. The most common advantage identified was immediate availability, followed by flexibility and convenience. Other advantages reported included lower travel costs, access to remote areas, customer service, and prestige.

- For businesses that owned or leased aircraft, almost 60 percent ranked the convenience of a nearby airport capable of accommodating their aircraft as very important. In fact, this consideration was ranked well ahead of most other factors, with only taxes and highway availability more often ranked as more important.

- In general, nonaircraft-owning businesses believe that good access to a nearby scheduled air carrier airport was more important than proximity to a general aviation airport.

Airport Service Areas

There are two types of airports within Southeastern Wisconsin for which it is helpful to determine the service areas, or areas from which each airport draws most of its users. These two types of airports include air carrier airports and public-use general aviation airports.

As noted in Chapter III, General Mitchell International Airport and Kenosha Regional Airport are the only two airports within Southeastern Wisconsin authorized to serve certificated air carriers. Only Mitchell International is authorized to serve scheduled passenger air carriers. The service area for Mitchell International may be easily determined by examining the geographic locations of trip origins of enplaning passengers using the airport. This has been done by using data collected during the most recent enplaning passenger survey at Mitchell International, conducted by the Regional Planning Commission in 1989. The trip origins by county for passengers enplaning at Mitchell International are shown on Map 5 in this chapter. The survey findings clearly indicate that Mitchell International's service area includes the Milwaukee metropolitan area, all of eastern Wisconsin, and part of northeastern Illinois. Within eastern Wisconsin, Mitchell International's service area extends to include the urbanized areas around Madison, Fond du Lac, Oshkosh, Appleton, Sheboygan, Manitowoc, Green Bay, Wausau, and Rhinelander. While most of these cities have scheduled air carrier service directly to them, many of the passengers using these services connect with longer flights at Milwaukee. In fact, it was found that the passengers whose trips originated at these other eastern Wisconsin cities were divided among a variety of different travel modes by which

Table 63

SOCIO-ECONOMIC CHARACTERISTICS OF PASSENGERS USING GENERAL AVIATION AIRPORTS IN SOUTHEASTERN WISCONSIN: 1971 AND 1993

Characteristic	Passengers Interviewed (percent)		Southeastern Wisconsin Region Population (percent)		
	1971	1983	1970	1980	1990
Sex					
Male	74.8	63.1	48.3	48.4	51.7
Female	25.2	36.9	51.7	51.6	48.3
Total	100.0	100.0	100.0	100.0	100.0
Age					
Under 25	12.8	24.0	46.6	41.8	36.5
25-44	52.0	44.6	23.5	27.4	32.5
45-64	33.3	29.3	20.2	19.7	18.5
65 or Older	1.9	2.1	9.7	11.1	12.5
Total	100.0	100.0	100.0	100.0	100.0
Median Age	41	39	28	30	33
Annual Household Income					
Actual Median Income	$18,600	$36,500	$ 9,950	$20,100	$32,150
Adjusted Median Income in 1993 Dollars	68,000	51,800	37,700	35,100	36,200

Source: SEWRPC.

they arrived at Mitchell International. These modes of arrival at Milwaukee included not only other commuter and regional airlines, but also private and rental automobiles, hotel and motel courtesy cars, limousines, and buses. It is also worth noting that most of the enplaning passengers using Mitchell International who had trip origins in northeastern Illinois originated in Lake, Cook, McHenry, and Winnebago Counties. More detailed information concerning the trip origins of enplaning passengers using Mitchell International can be found in SEWRPC Technical Report No. 32, General Mitchell International Airport Enplaning Passengers Survey Findings: 1989.

The service areas for public-use general aviation airports serving Southeastern Wisconsin may be delineated by examining the geographical distribution of the aircraft owners' addresses for those aircraft based at a particular airport. These addresses will reflect either the locations of residences of owners or the locations of businesses which base aircraft at the airport.

A service area was defined for 14 of the 22 public-use general aviation airports in Southeastern Wisconsin. The service areas were not determined for the remaining eight public-use general aviation airports in the Region because these airports had too few based aircraft to permit delineation of a meaningful service area. Similarly, airport service areas were not defined for any private airports within the Region because such airports also have very small numbers of based aircraft owned by individuals or businesses either at the airport or in the immediate vicinity.

To determine the service area for each airport, the Wisconsin Department of Transportation aircraft registration data were used to determine the address of the aircraft owners who base aircraft at each airport. While these data do not include all the general aviation aircraft based at many of the airports, as discussed above, these data present an accurate sample that includes most aircraft owners. Approximate service area boundaries were determined by selecting an area surrounding each airport that includes 90 percent or more of the based aircraft shown in the State registration records.

The following are descriptions of the service areas determined for each of the 14 largest and busiest public-use airports in Southeastern Wisconsin:

- The service area for Kenosha Regional Airport includes all of Kenosha County and southern

Racine County in Wisconsin and all of Lake County and northern Cook County in Illinois, as shown on Map 6.

- The service area for Westosha Airport includes western Kenosha County in Wisconsin and northwestern Lake County and northeastern McHenry County in Illinois, as shown on Map 7.

- The service area for general aviation aircraft based at General Mitchell International Airport includes all of Milwaukee County and eastern Waukesha County, as shown on Map 8. It is important to note that, because of Mitchell International's high level of general aviation services and facilities for corporate and business users, Mitchell International also receives frequent use from general aviation users in surrounding counties, including Ozaukee, Washington, Waukesha, and Racine. Furthermore, Mitchell International is also used as a transfer point for general aviation operations bringing passengers from other airports both inside and outside of the Region to connect with scheduled air carrier flights at Milwaukee.

- The service area for Rainbow Airport includes southern Milwaukee County, as shown on Map 9.

- The service area for Timmerman Airport includes central and northern Milwaukee County, northeastern Waukesha County, southern Ozaukee County, and southeastern Washington County, as shown on Map 10.

- The service area for John H. Batten Airport includes eastern Racine County and the City of Kenosha, as shown on Map 11.

- The service area for Burlington Municipal Airport includes western Racine County and eastern Walworth County, as shown on Map 12.

- The service area for Cindy Guntly Memorial Airport includes central and western Racine County, with a number of aircraft owners located throughout southern Milwaukee County, as shown on Map 13.

- The service area for Sylvania Airport includes eastern and central Racine County and southeastern Milwaukee County, as shown on Map 14.

- The service area for East Troy Municipal Airport includes northeastern Walworth County, southern Waukesha County, and western Racine County, with a number of aircraft owners located throughout southern Waukesha County, as shown on Map 15.

- The service area for the Hartford Municipal Airport includes southern Washington County and northern Waukesha County, as shown on Map 16.

- The service area for West Bend Municipal Airport includes all of Washington County and all of Ozaukee County, with a number of aircraft owners located throughout northern Milwaukee and Waukesha Counties, as shown on Map 17.

- The service area for Waukesha County-Crites Field includes all of Waukesha County and western Milwaukee County, as shown on Map 18.

- The service area for Capitol Airport includes northern and eastern Waukesha County and central and northern Milwaukee County, as shown on Map 19.

There are three additional public-use general aviation airports outside the Southeastern Wisconsin Region which have a significant number of aircraft owners residing within the Region. The portions of each of these airport service areas which extend into Southeastern Wisconsin are described below:

- The service area for Watertown Municipal Airport extends into northwestern Waukesha County, as shown on Map 20.

- The service area for Palmyra Airport extends into southwestern Waukesha County and northern Walworth County, as shown on Map 21.

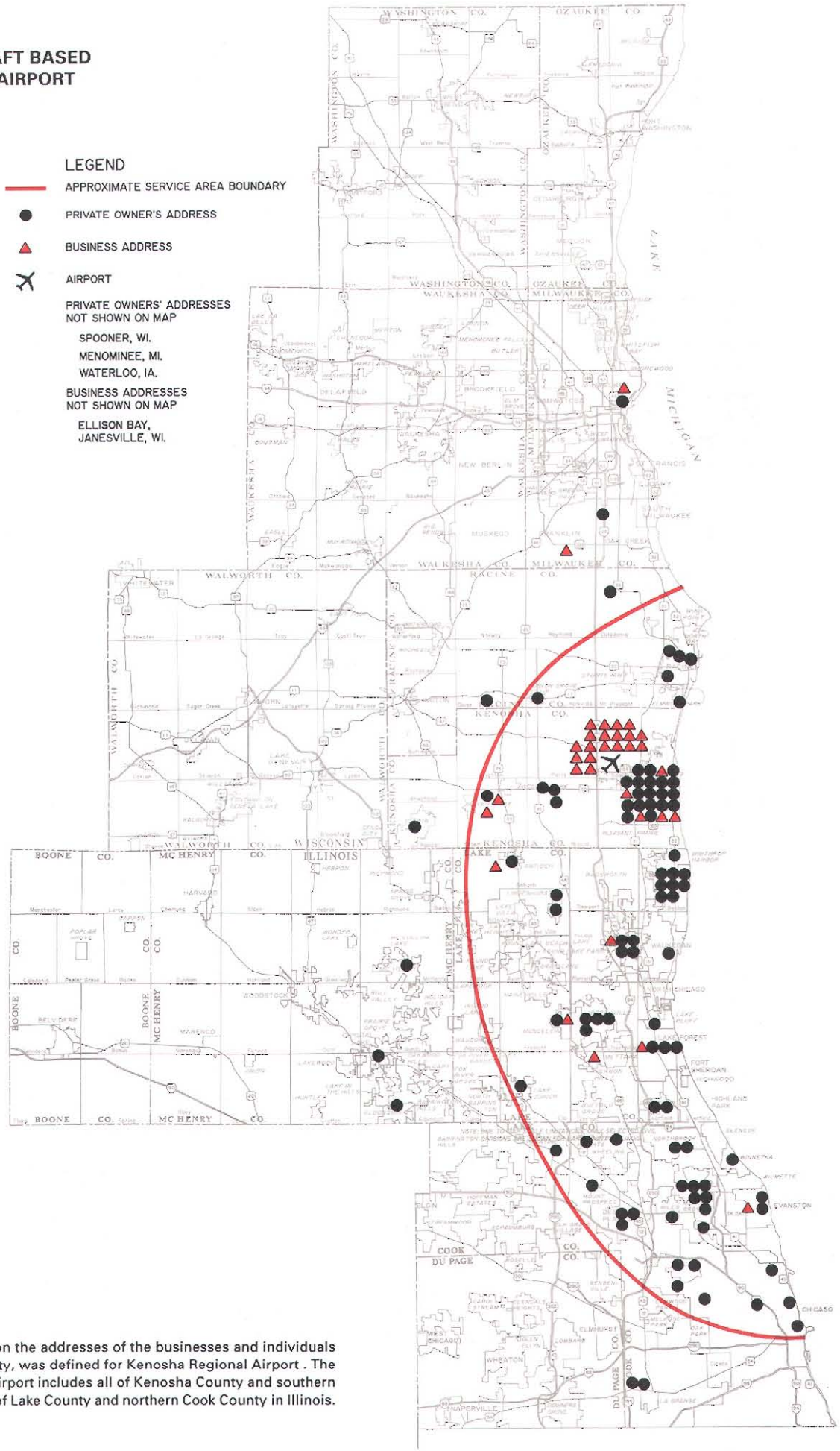
- The service area for Rock County Airport extends into southern Walworth County, as shown on Map 22.

Of the airport service areas for general aviation aircraft based at airports in and near the Region described above, many overlap with each other. The service areas for these 17 airports are shown superimposed on Map 23.

(Text continued on page 116)

Map 6

SERVICE AREA FOR AIRCRAFT BASED AT KENOSHA REGIONAL AIRPORT

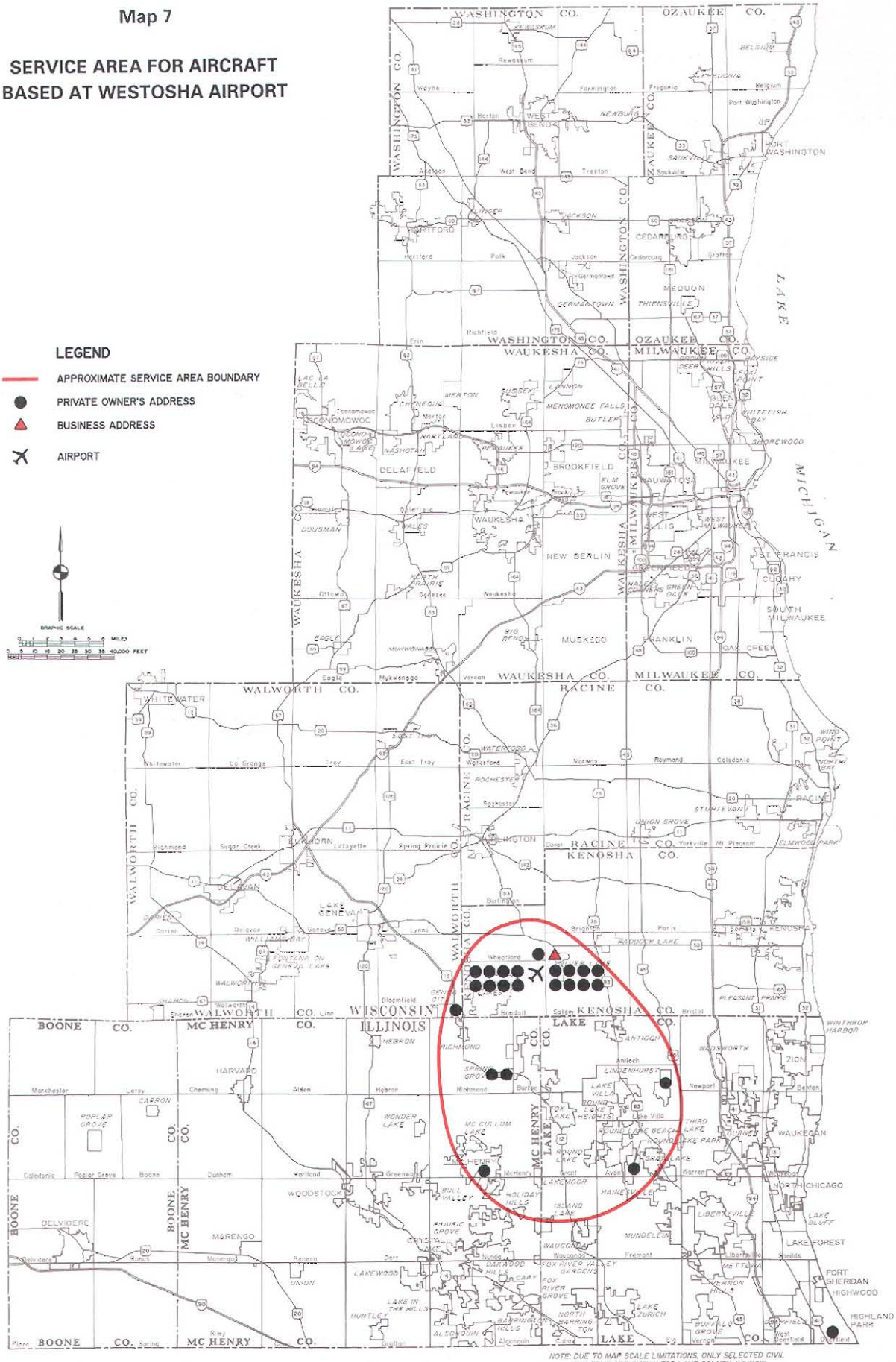


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Kenosha Regional Airport . The service area for Kenosha Regional Airport includes all of Kenosha County and southern Racine County in Wisconsin and all of Lake County and northern Cook County in Illinois.

Source: SEWRPC.

Map 7

SERVICE AREA FOR AIRCRAFT BASED AT WESTOSHA AIRPORT

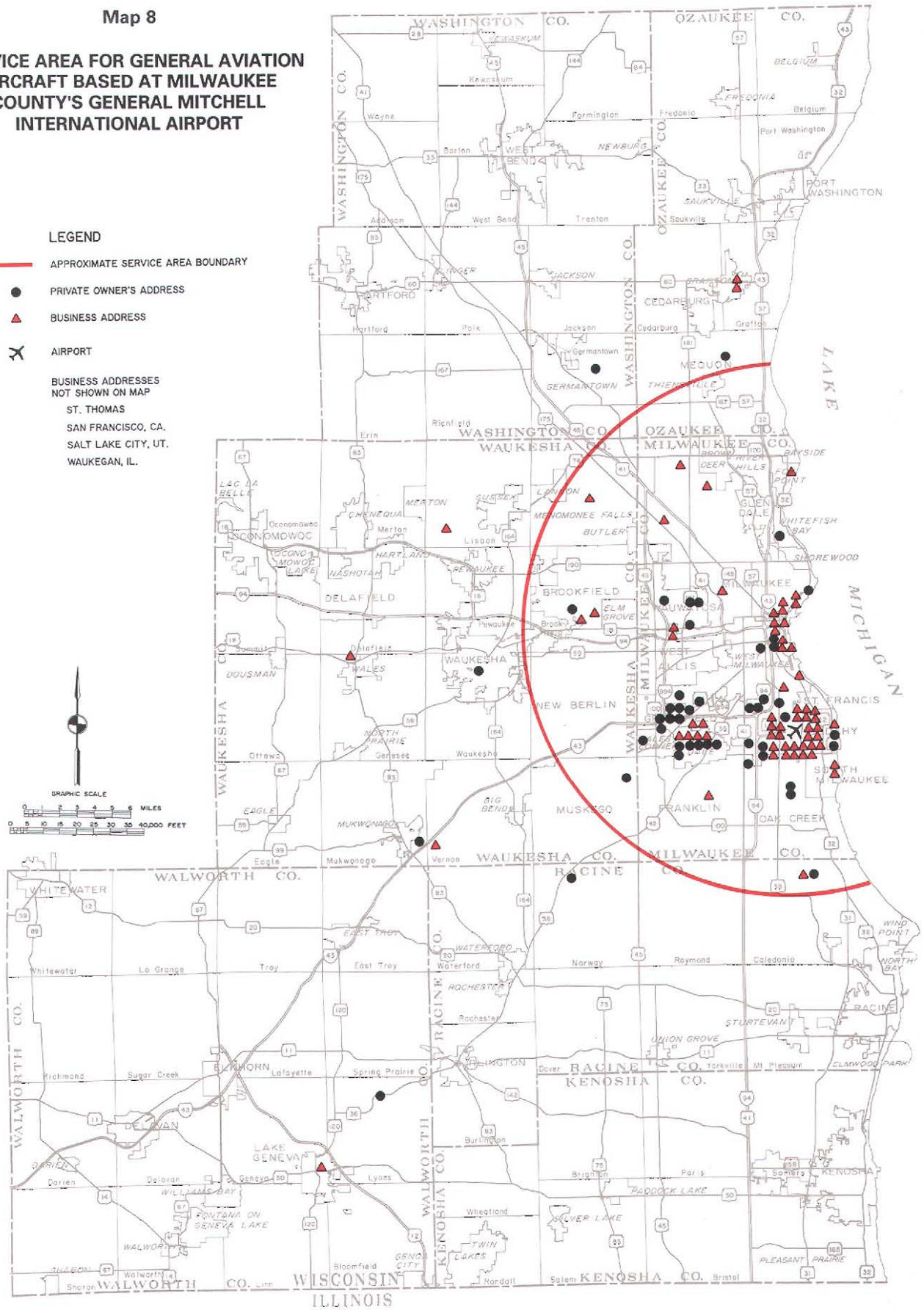


A generalized service area based on the businesses and individuals who based their aircraft at this facility was defined for Westosha Airport. This service area was found to include western Kenosha County, in Wisconsin, and both northwestern Lake County and northeastern McHenry County, Illinois.

Source: SEWRPC.

Map 8

SERVICE AREA FOR GENERAL AVIATION AIRCRAFT BASED AT MILWAUKEE COUNTY'S GENERAL MITCHELL INTERNATIONAL AIRPORT

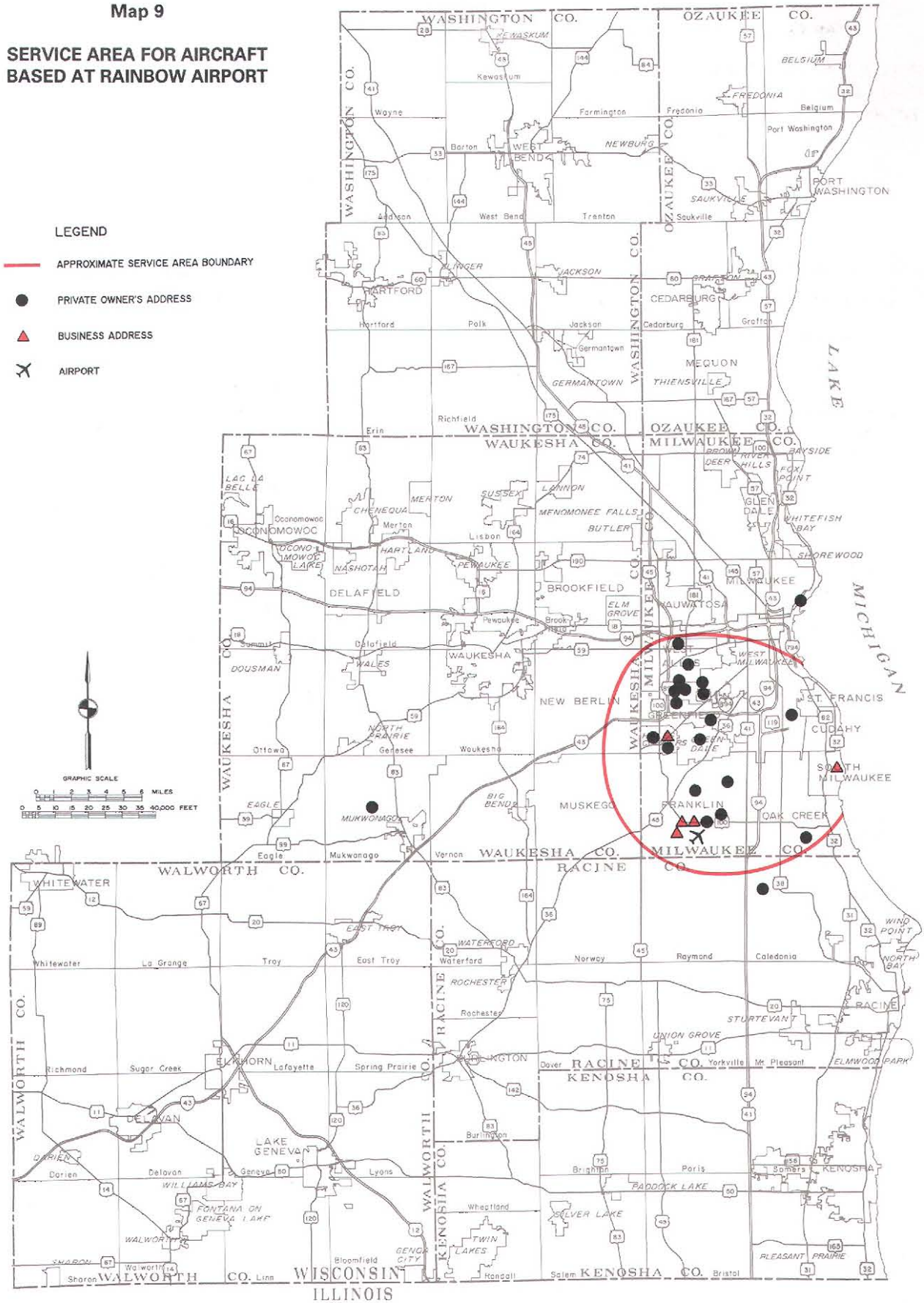


A generalized service area with regard to general aviation aircraft was defined for General Mitchell International Airport on the basis of the addresses of the businesses and individuals who based their aircraft there. The general aviation service area for Mitchell International includes all of Milwaukee County and eastern Waukesha County.

Source: SEWRPC.

Map 9

SERVICE AREA FOR AIRCRAFT BASED AT RAINBOW AIRPORT

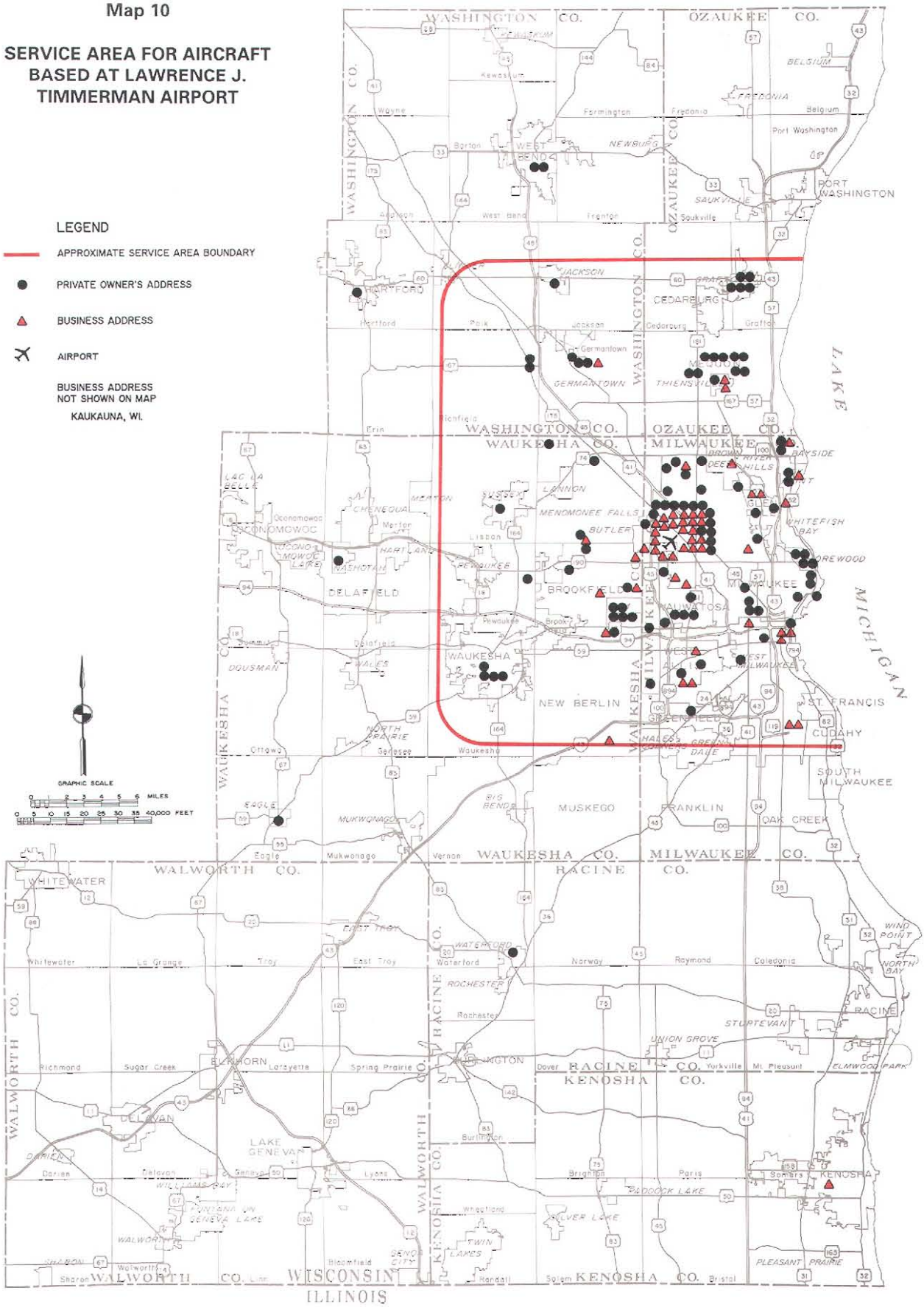


A generalized service area, based on the businesses and individuals who based their aircraft at this facility, was defined for Rainbow airport. The service area for Rainbow Airport includes southern Milwaukee County.

Source: SEWRPC.

Map 10

SERVICE AREA FOR AIRCRAFT BASED AT LAWRENCE J. TIMMERMAN AIRPORT

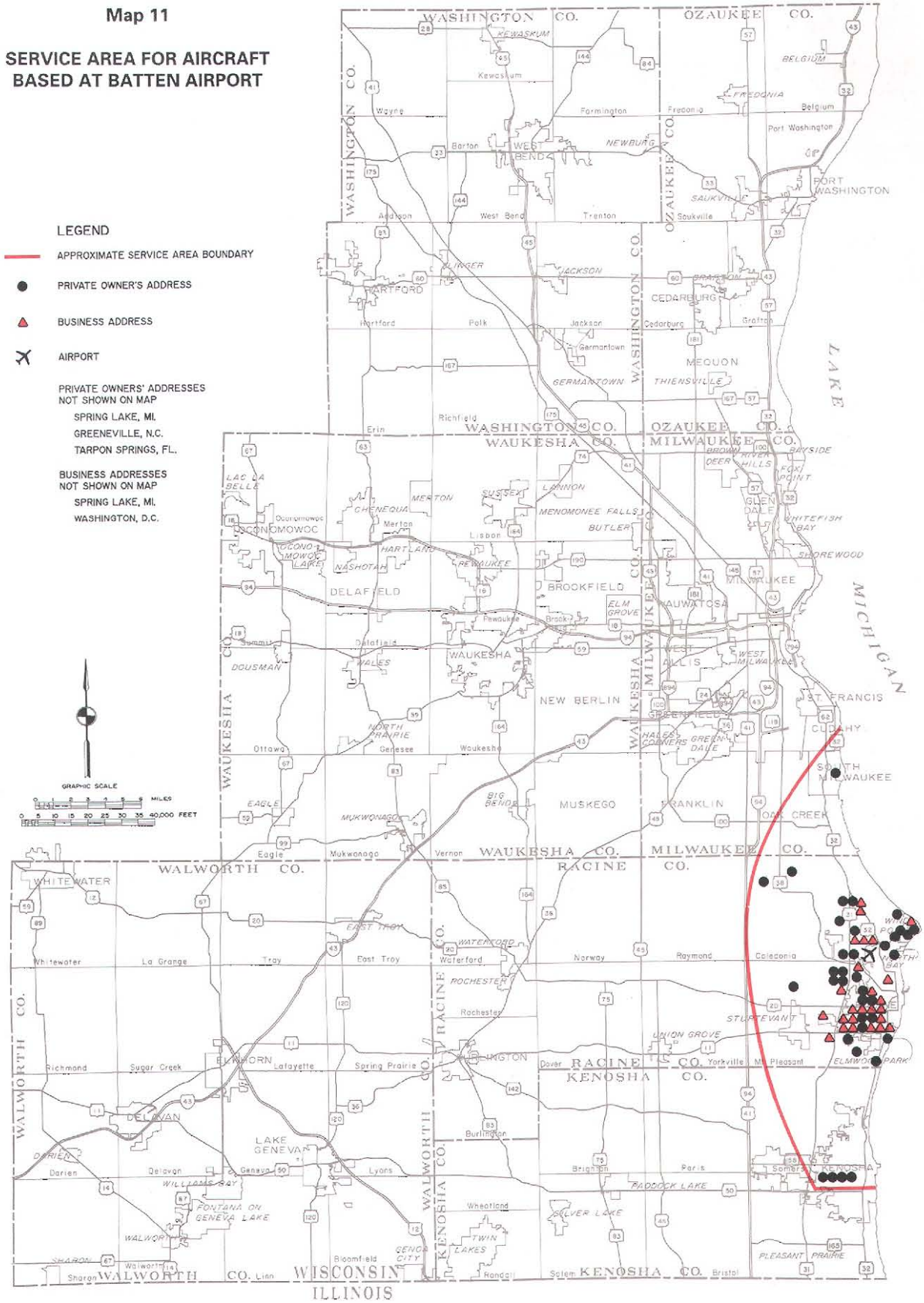


A generalized service area, based on the addresses of businesses and individuals who based their aircraft at this facility, was defined for Lawrence J. Timmerman Airport. The service area for Lawrence J. Timmerman Airport includes the central and northern portions of Milwaukee County, northeastern Waukesha County, southern Ozaukee County, and southeastern Washington County.

Source: SEWRPC.

Map 11

SERVICE AREA FOR AIRCRAFT BASED AT BATTEN AIRPORT

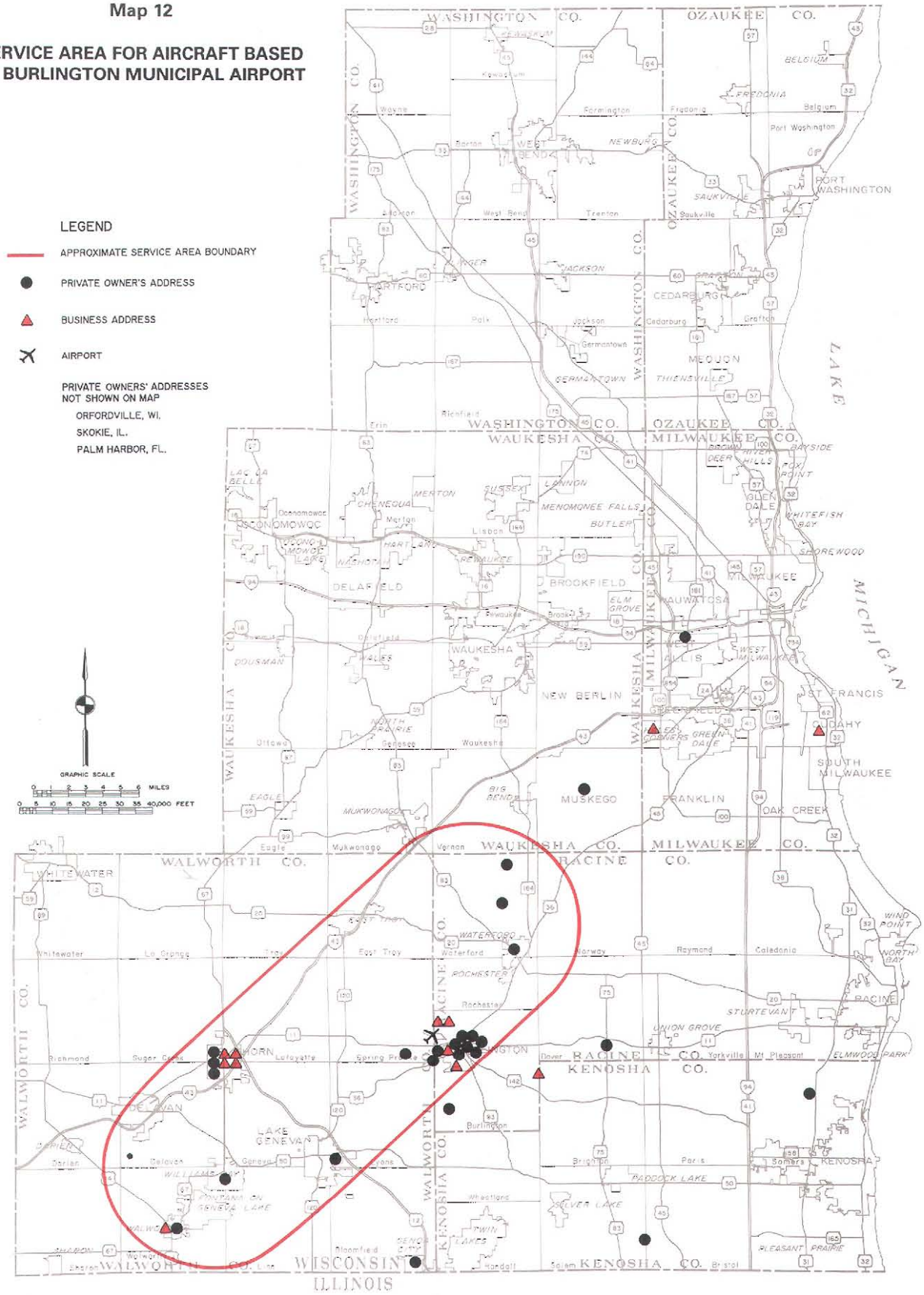


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Batten Airport. The service area for Batten Airport includes eastern Racine County and the City of Kenosha.

Source: SEWRPC.

Map 12

SERVICE AREA FOR AIRCRAFT BASED AT BURLINGTON MUNICIPAL AIRPORT

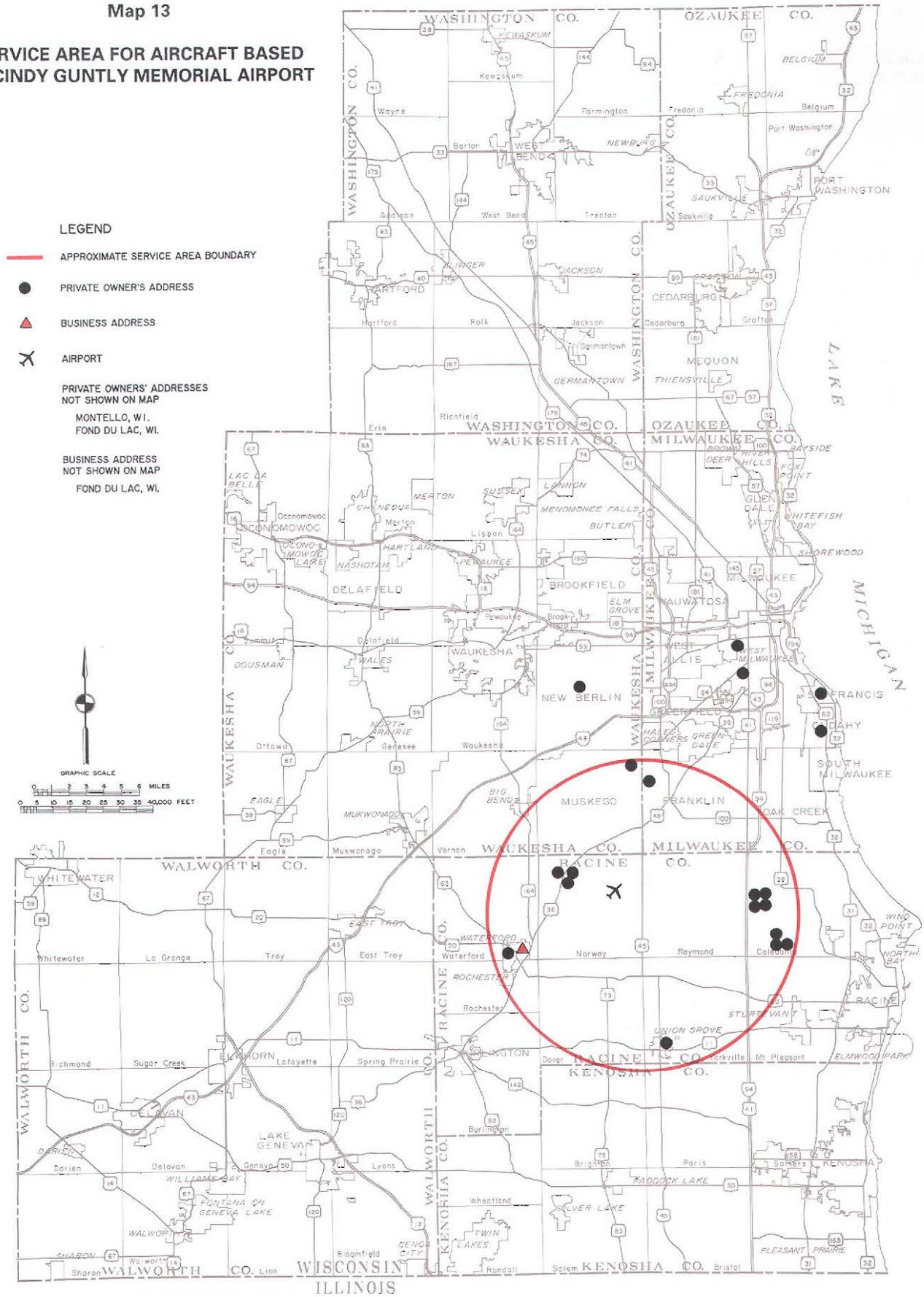


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Burlington Municipal Airport. The service area for Burlington Municipal Airport includes western Racine County and eastern Walworth County.

Source: SEWRPC.

Map 13

SERVICE AREA FOR AIRCRAFT BASED AT CINDY GUNTLY MEMORIAL AIRPORT

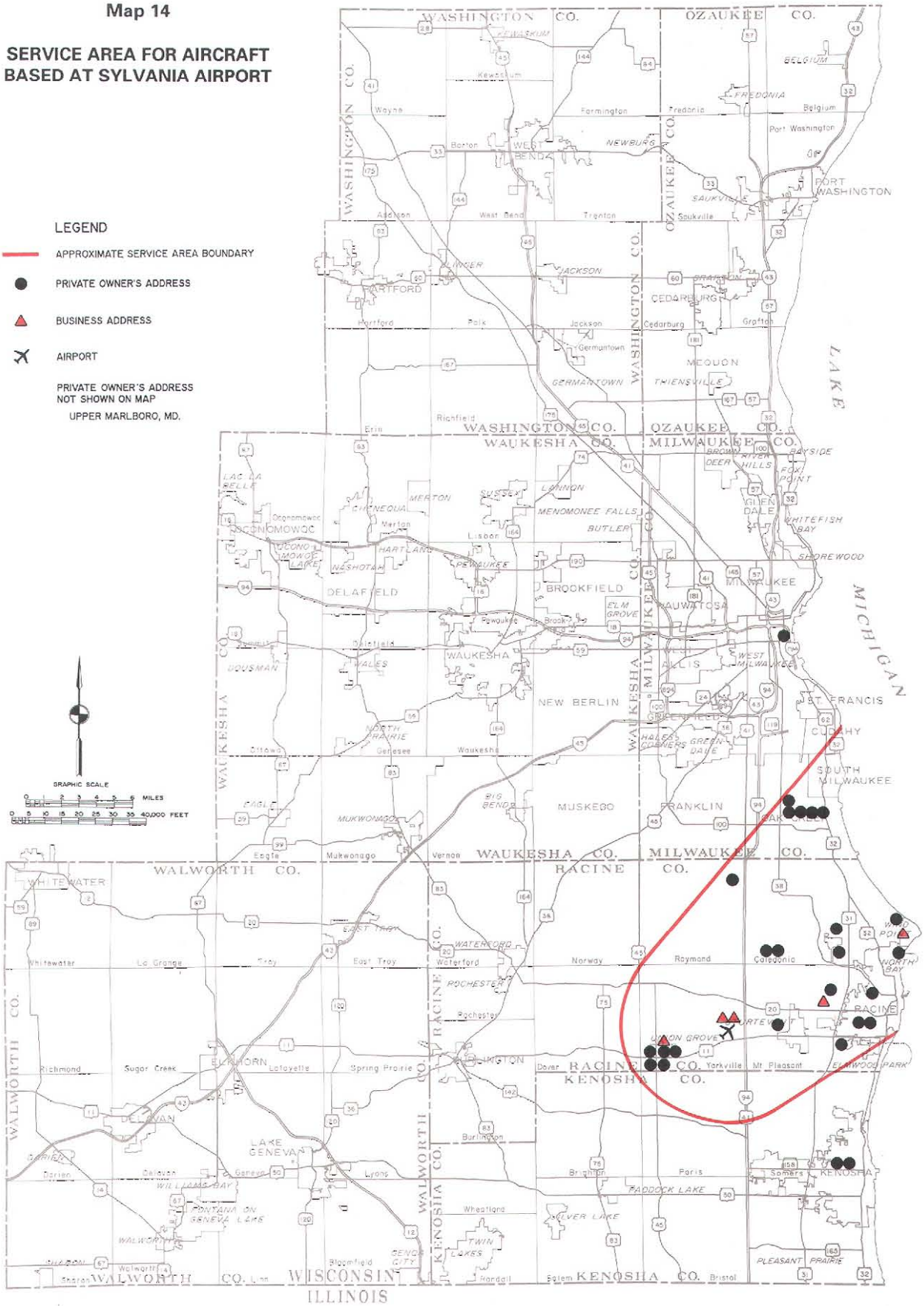


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Cindy Guntly Memorial Airport. The service area for Cindy Guntly Memorial Airport was found to include central and western Racine County, with a number of aircraft owners also located throughout southern Milwaukee County.

Source: SEWRPC.

Map 14

SERVICE AREA FOR AIRCRAFT BASED AT SYLVANIA AIRPORT

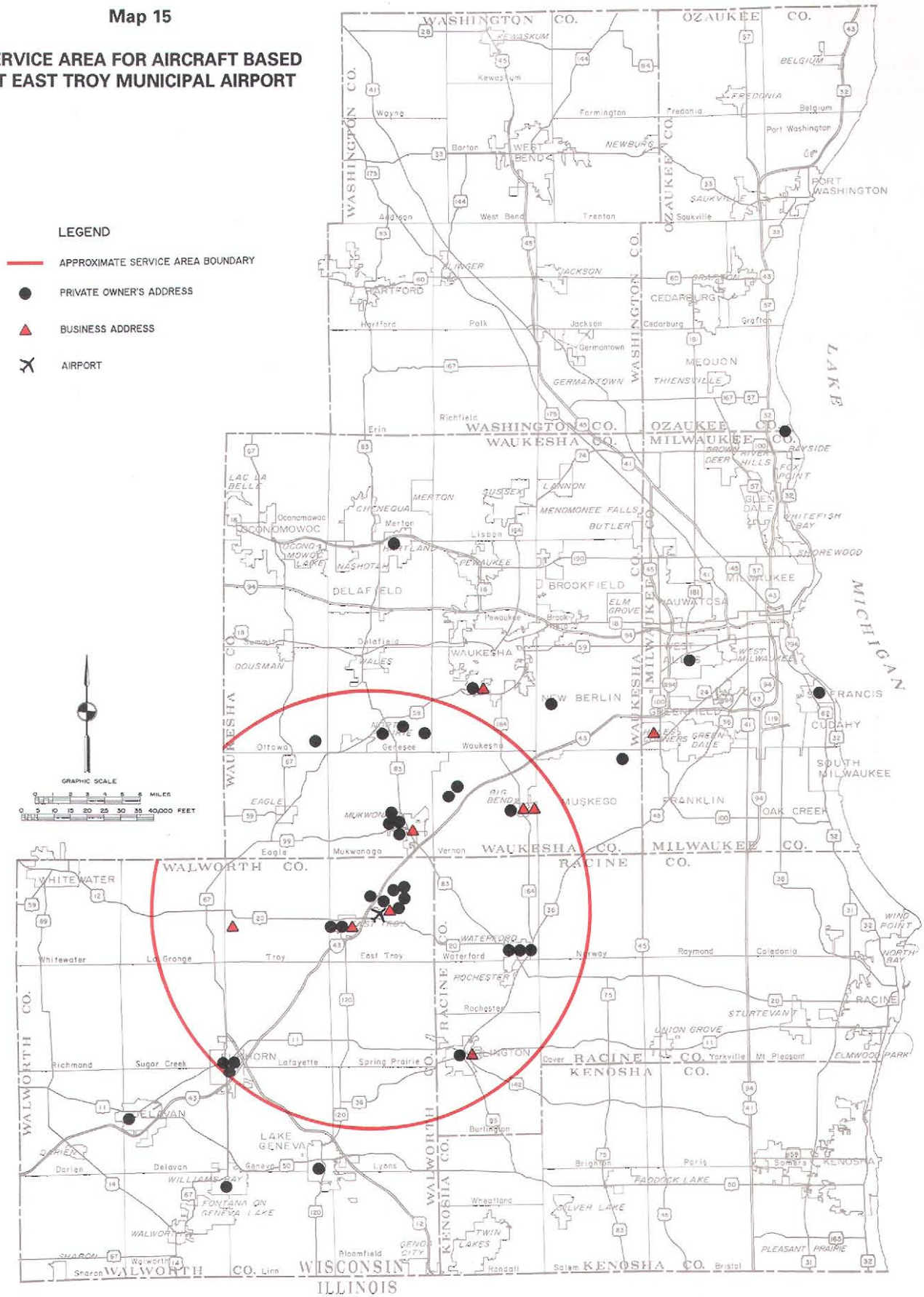


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Sylvania Airport. The service area for Sylvania Airport includes eastern and central Racine County and southeastern Milwaukee County.

Source: SEWRPC.

Map 15

SERVICE AREA FOR AIRCRAFT BASED AT EAST TROY MUNICIPAL AIRPORT

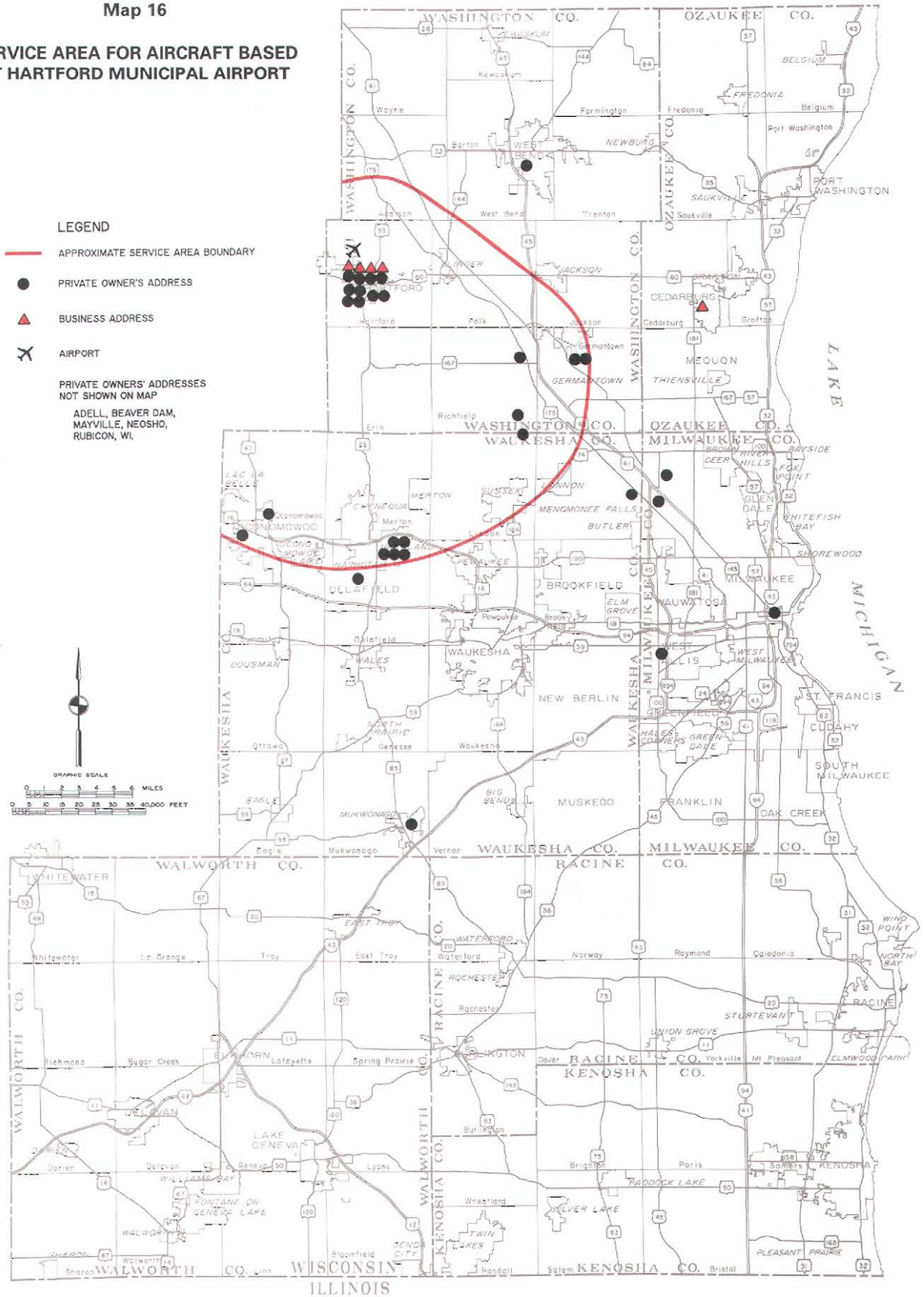


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for East Troy Municipal Airport. The service area for East Troy Municipal Airport includes, primarily, northeastern Walworth County, southern Waukesha County, and western Racine County.

Source: SEWRPC.

Map 16

SERVICE AREA FOR AIRCRAFT BASED AT HARTFORD MUNICIPAL AIRPORT

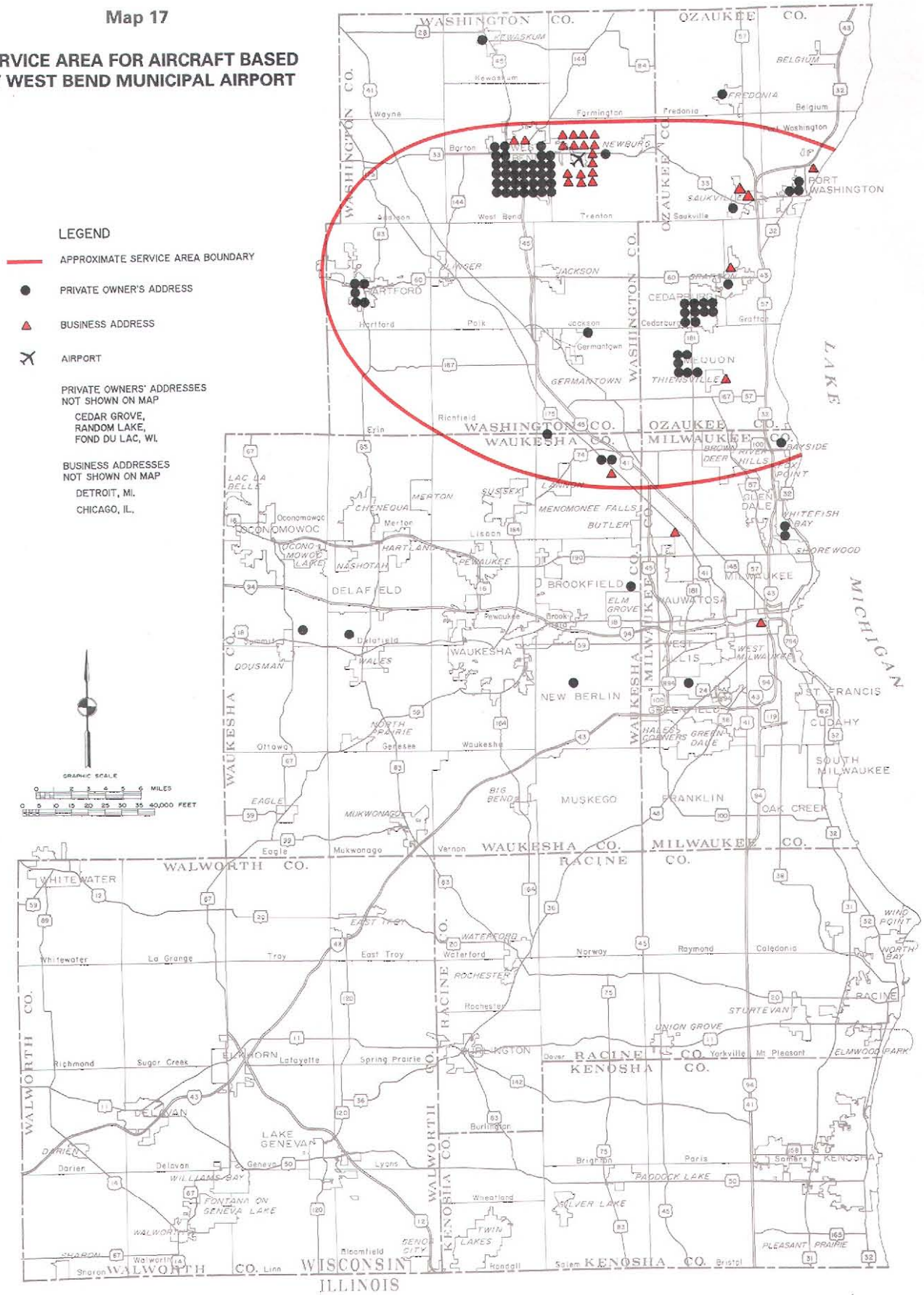


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Hartford Municipal Airport. The service area for Hartford Municipal Airport was found to include, primarily, southern Washington County and northern Waukesha County.

Source: SEWRPC.

Map 17

SERVICE AREA FOR AIRCRAFT BASED AT WEST BEND MUNICIPAL AIRPORT

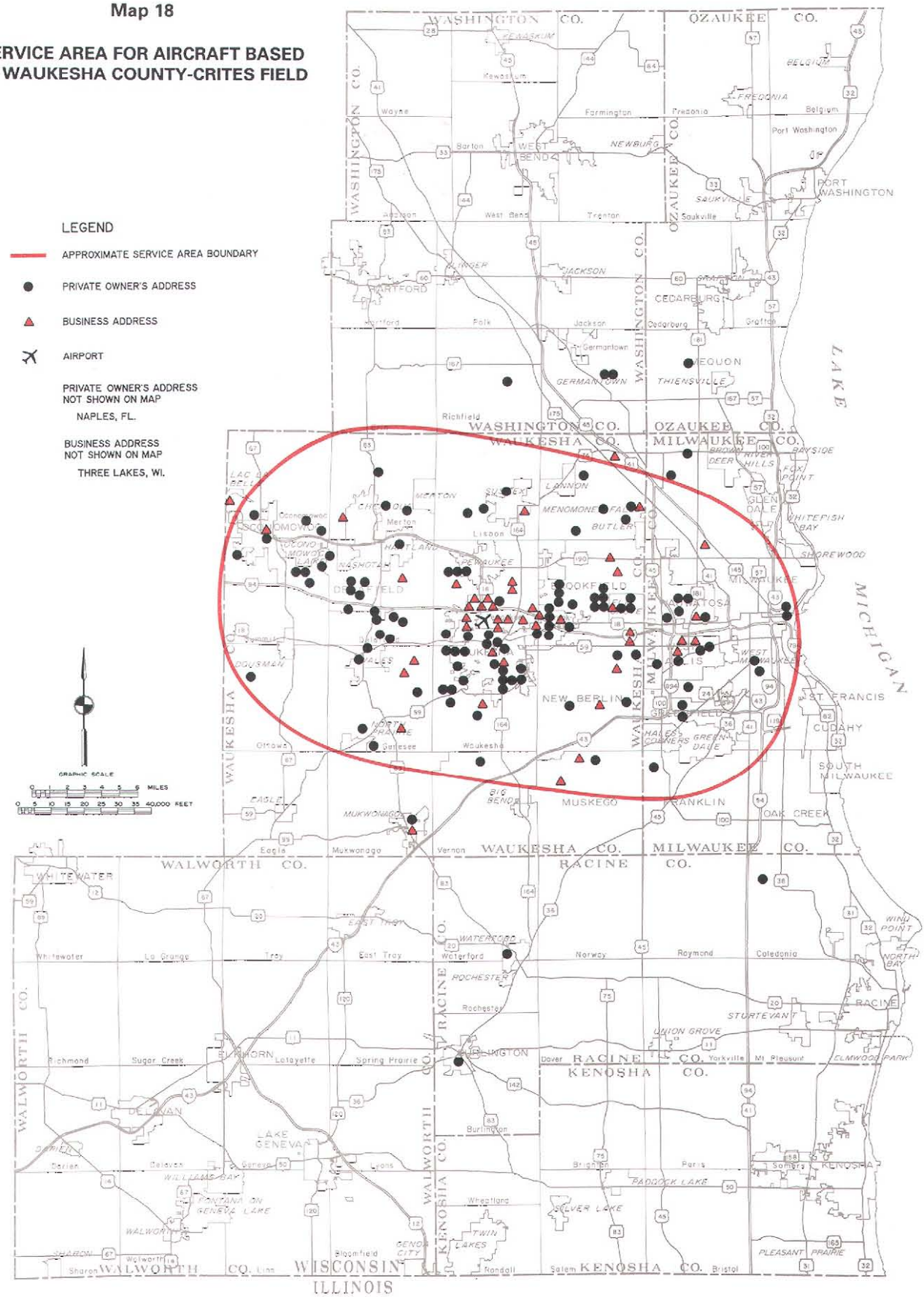


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for West Bend Municipal Airport . The service area for West Bend Municipal Airport was found to include all of Washington County and all of Ozaukee County. In addition, a significant number of aircraft owners were located throughout northern Milwaukee County and northern Waukesha County.

Source: SEWRPC.

Map 18

SERVICE AREA FOR AIRCRAFT BASED AT WAUKESHA COUNTY-CRITES FIELD

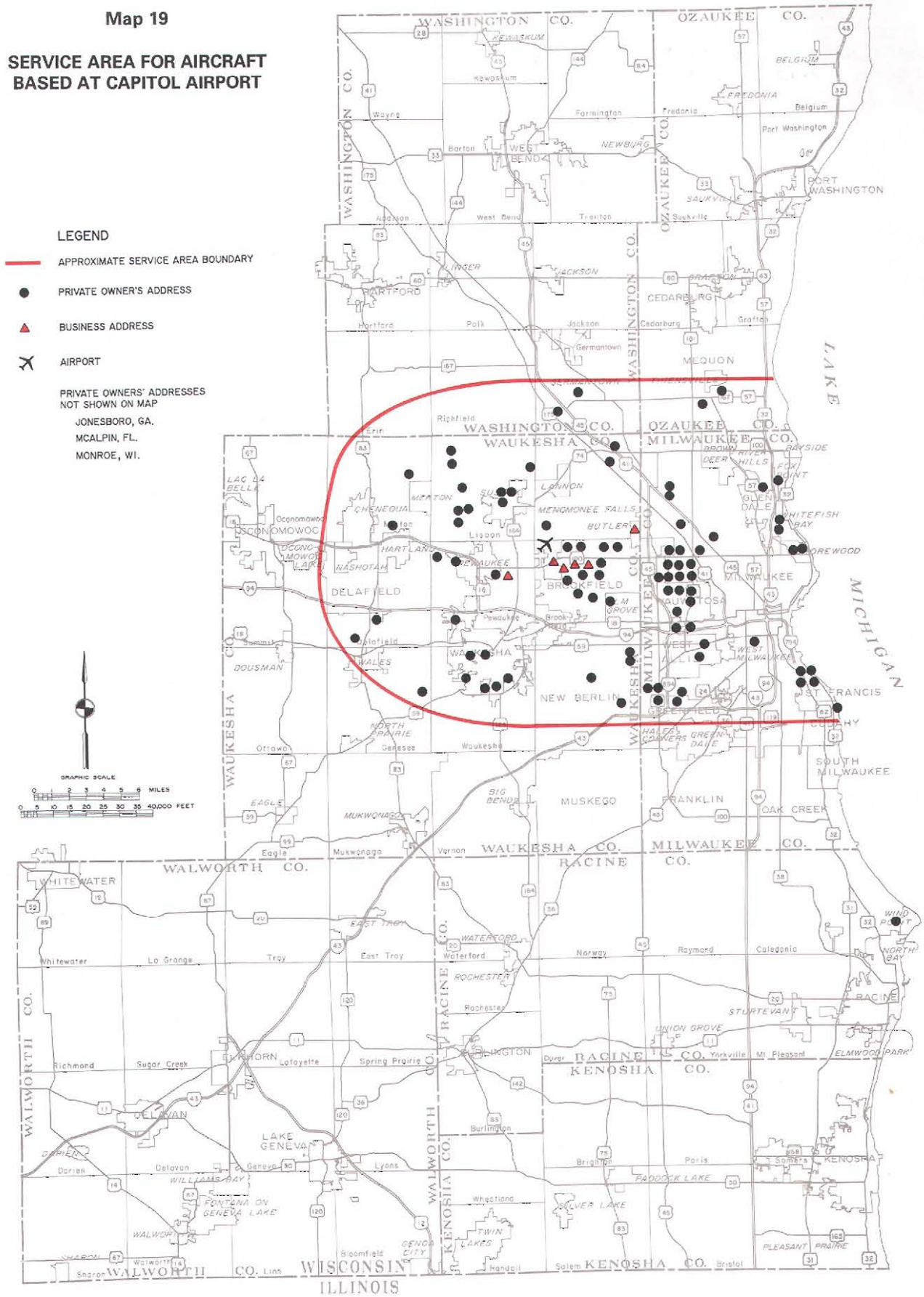


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility, was defined for Waukesha County-Crites Field . The service area for Waukesha County-Crites Field includes all of Waukesha County and western Milwaukee County.

Source: SEWRPC.

Map 19

SERVICE AREA FOR AIRCRAFT BASED AT CAPITOL AIRPORT

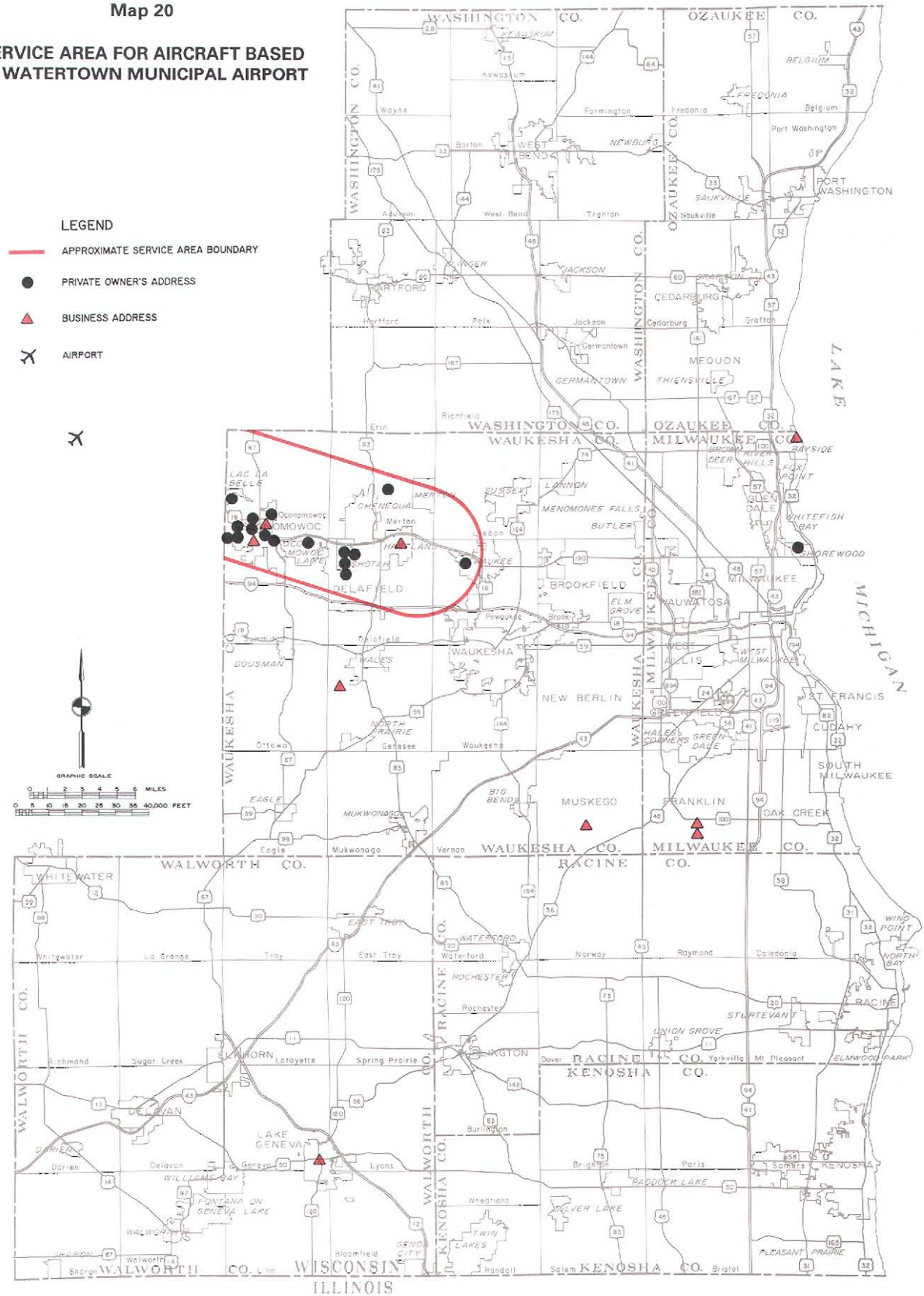


A generalized service area, based on the addresses of the businesses and individuals who based their aircraft at this facility,was defined for Capitol Airport. The service area for Capitol Airport includes northern and eastern Waukesha County and central and northern Milwaukee County.

Source: SEWRPC.

Map 20

SERVICE AREA FOR AIRCRAFT BASED AT WATERTOWN MUNICIPAL AIRPORT

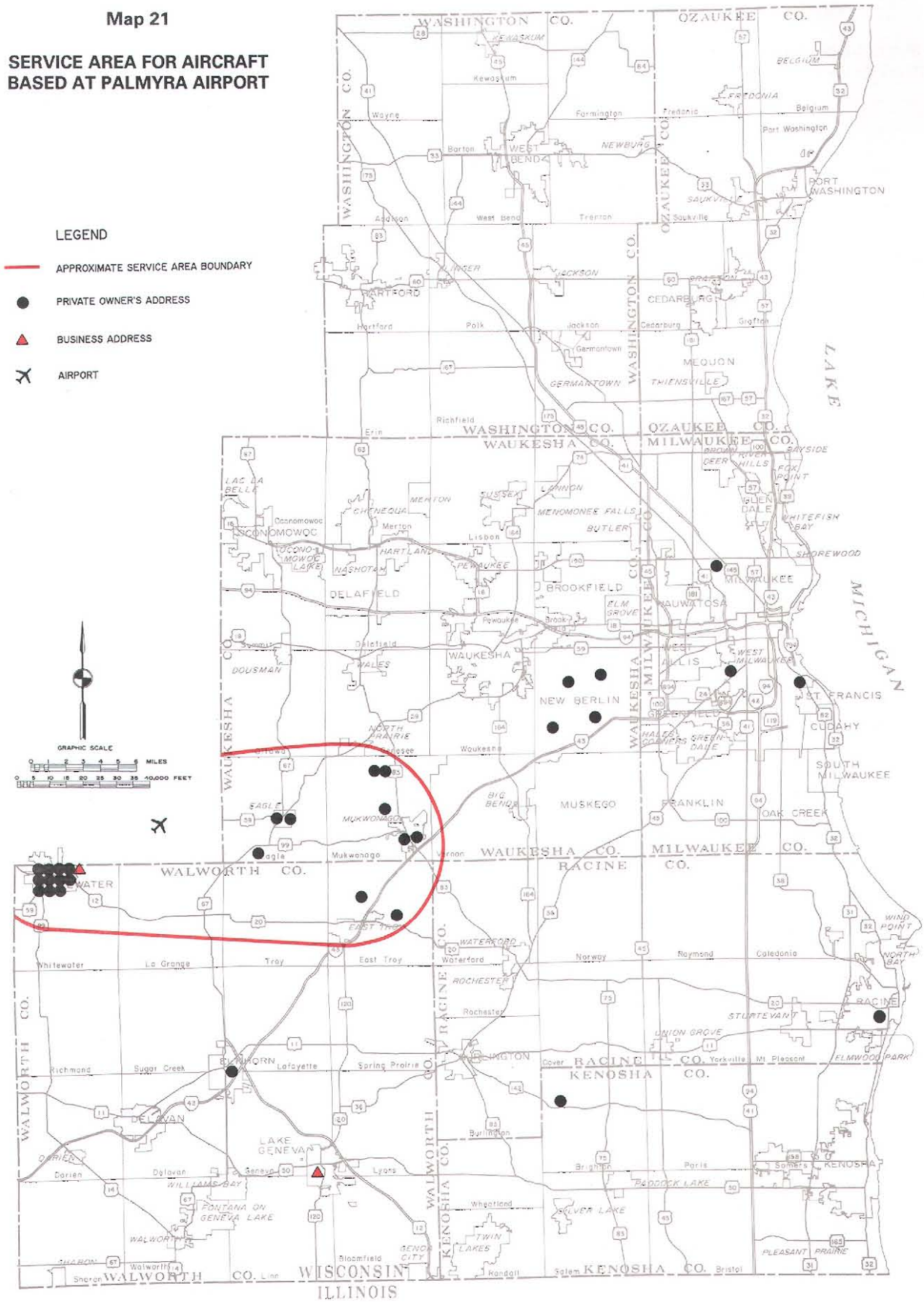


A generalized service area for Watertown Municipal Airport within the Southeastern Wisconsin Region was defined on the basis of the addresses of the businesses and individuals who based their aircraft at this facility. The service area for Watertown Municipal Airport extends into northwestern Waukesha County.

Source: SEWRPC.

Map 21

SERVICE AREA FOR AIRCRAFT BASED AT PALMYRA AIRPORT

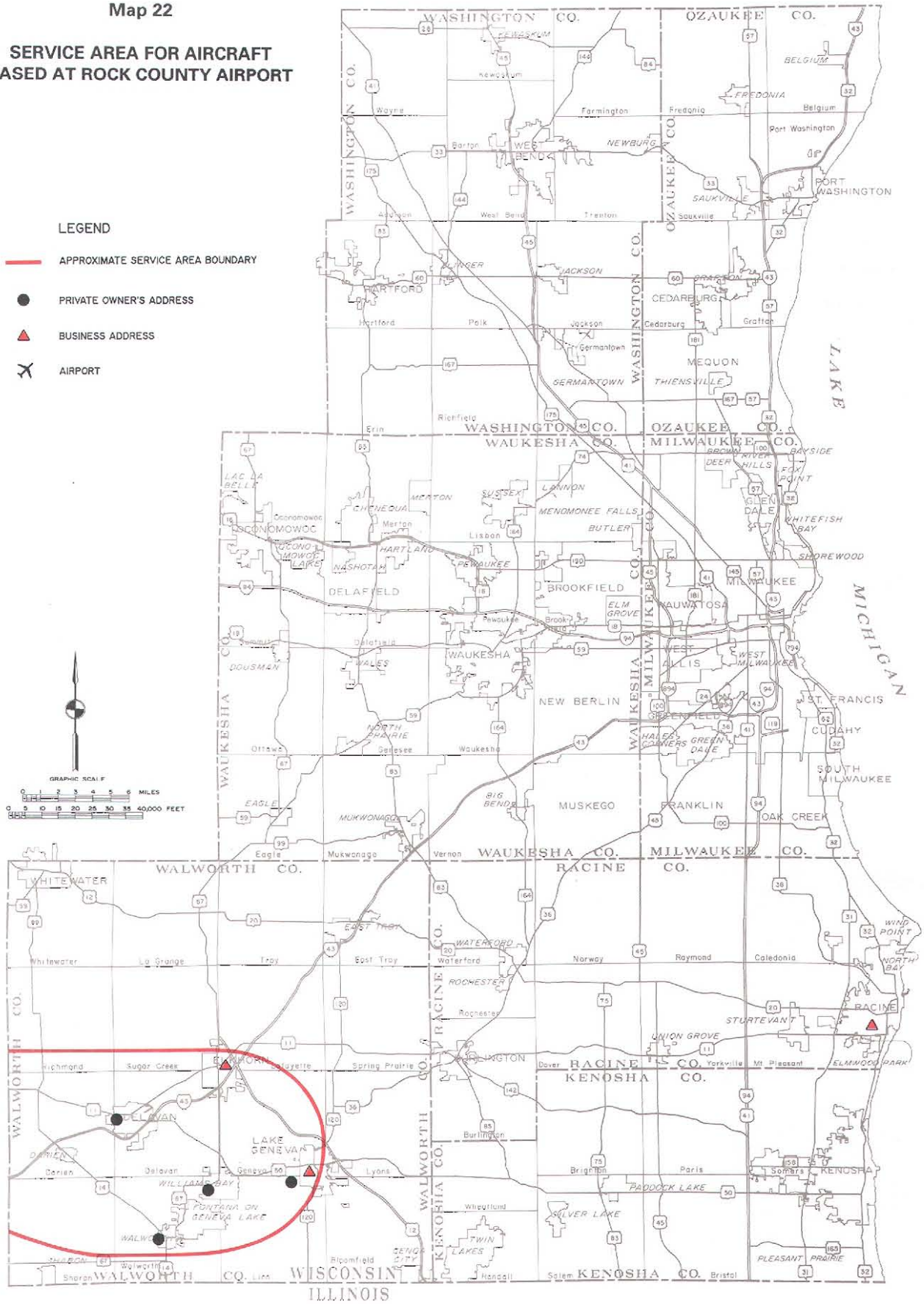


A generalized service area for Palmyra Airport within the Southeastern Wisconsin Region was defined on the basis of the addresses of the businesses and individuals who based their aircraft at this facility. The service area for Palmyra Airport extends into southwestern Waukesha County and northern Walworth County.

Source: SEWRPC.

Map 22

SERVICE AREA FOR AIRCRAFT BASED AT ROCK COUNTY AIRPORT

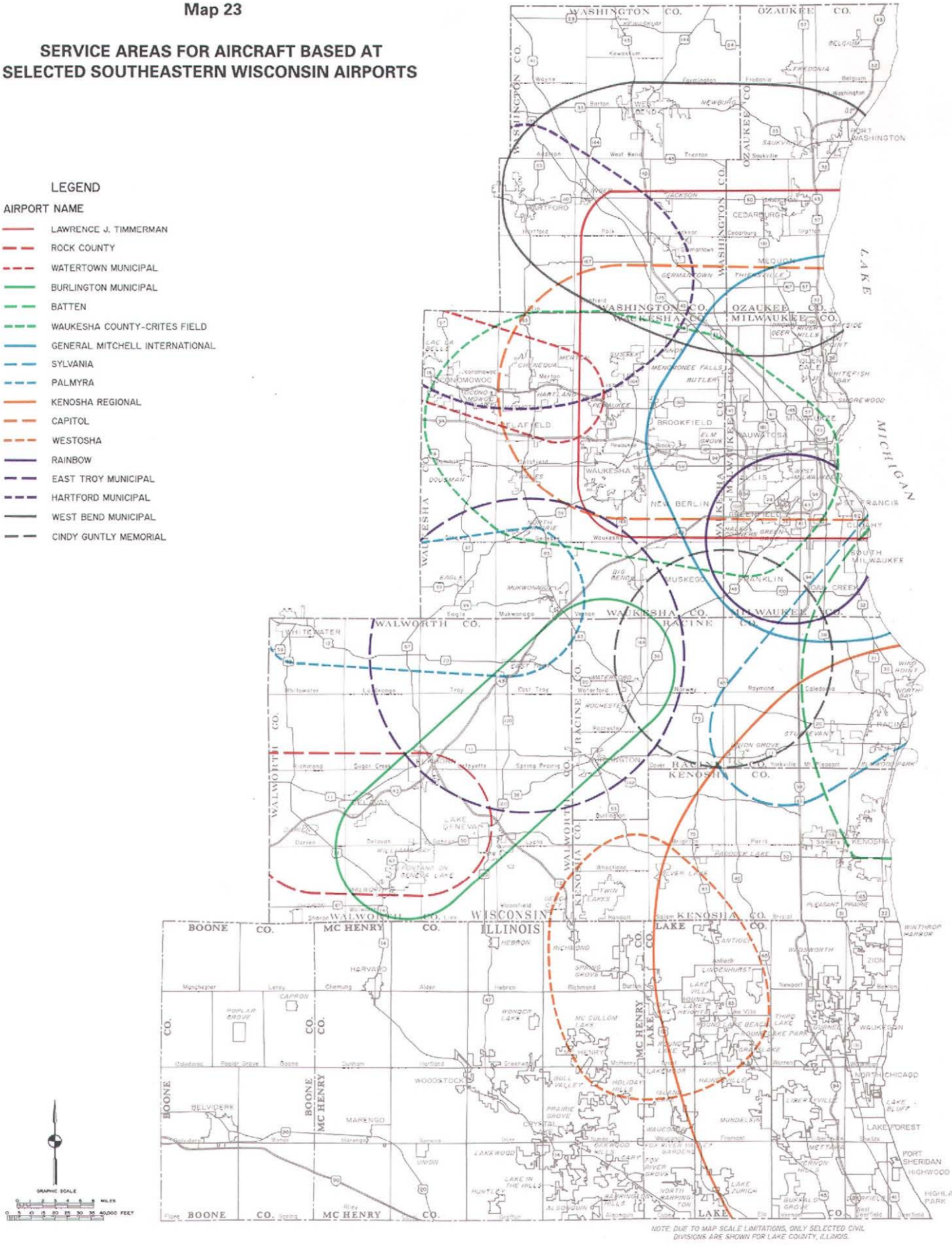


A generalized service area for Rock County Airport within the Southeastern Wisconsin Region was defined on the basis of the addresses of the businesses and individuals who based their aircraft at this facility. This service area was found to extend into southern Walworth County.

Source: SEWRPC.

Map 23

SERVICE AREAS FOR AIRCRAFT BASED AT SELECTED SOUTHEASTERN WISCONSIN AIRPORTS



A generalized service area was defined for 14 of the 23 general aviation airports within Southeastern Wisconsin in 1993 plus three additional public-use general aviation airports which have a significant number of aircraft owners residing within the Southeastern Wisconsin Region. Many of these service areas overlap with each other, and, together, include almost all of Southeastern Wisconsin.

Source: SEWRPC.

It is important that the service areas described above be regarded as approximate, since the data used to determine these areas were for a single year, 1993. Such service areas may change over time since many aircraft owners, both businesses and individuals, are sensitive to the level of services and facilities available at each airport. It is important to remember that business and corporate aircraft owners will select an airport at which to base their aircraft largely on the basis of convenience and the shortest driving time from the location of their office or plant. Personal, recreational, and sport aircraft owners, however, will tend to base their aircraft at an airport for a large variety of other reasons, including the cost of storage, fuel, and repairs; proximity to a weekend home or resort area; to be near friends, other pilots, or a flying club; or to be based away from busy flying areas or complex air traffic control areas. Also, management practices and pricing policies instituted by airport owners, managers, and fixed-base operators can have a significant impact on the level of based aircraft for personal, recreational, sport and business flying. The available services, hanger and fueling facilities, management practices, and attitudes toward promotional activities by airport management and the operator can either encourage or discourage activity and the attracting of based aircraft to the airport.

AIR CARGO ACTIVITY

Air cargo, which normally includes air freight, express, and mail, is accommodated at many of the airports within the Region. The center of air cargo activity, however, remains at General Mitchell International Airport, which provides direct access to national and world markets. Several of the other general aviation airports within Southeastern Wisconsin contribute to the air cargo distribution system by accommodating various point-to-point shipments, such as corporate freight carried in corporate aircraft or shipments destined for Mitchell International for transfer to major air cargo carriers. Of the airports in the Region other than Mitchell International, Kenosha Regional Airport probably has the largest amount of air cargo activity, having had freight forwarders regularly conducting business at the airport for many years.

Air cargo activity has been recognized as a very rapidly growing area of aviation. While the air cargo industry is subject to changes in the national and world economy, it has been regarded by many as a rapidly expanding and potentially lucrative area, and thus, has become very competitive. This has resulted in airlines and freight forwarders entering into alliances and partnerships in order to remain competitive and to provide customized transportation services for customers. The use of electronic communication in the management and tracking of shipments has become very common, as has the concept of "seamless" service so that customers need only deal with a single carrier. Trucking services have become an integral part of the air cargo network, not only for local pickup and delivery, but also to replace some of the aircraft segments of distribution and feeder services where more cost-effective or efficient.

Although air cargo has seen significant growth in recent years, it has not been accompanied by a similar growth in financial yield for the operators. Nevertheless, the air cargo market is expected to continue growing and may triple by the year 2010, according to recent world air cargo forecasts.[4] The volume of mail handled by air is also expected to increase, but less than air freight. It is also expected that international markets will outpace domestic market growth in the United States. Within the United States markets, trucks are providing service at levels comparable to those of airlines in markets under 1,000 miles. Accordingly, substitute air-truck and road-feeder services are expected to continue their growth; the increased use of expedited truck transport by both airline and trucking industries may limit the need for new, smaller air cargo aircraft.

At Mitchell International, air cargo and mail service is typically provided by all major and national airlines. Normally, such cargo and mail is handled in the lower holds of regularly scheduled air carrier aircraft, much of it in containers. Some large airlines, such as Northwest Airlines, have handled their cargo on cargo-only flights. The amount of air cargo handled in lower holds of scheduled air carrier aircraft may be gaining on the amount of cargo handled on freighter aircraft as passenger air carriers look for additional sources of revenue, as lower-hold capacity in new aircraft becomes larger, and as some of the older medium-sized freighter aircraft are taken out of service because of noise-abatement rules.

There were a total of 14 air cargo airlines serving Mitchell International during 1993, in addition to

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[4]*See Boeing Commercial Airplane Group, World Air Cargo Forecasts: 1993, Seattle, Washington, July 1993.*

Table 64

TOTAL AMOUNT OF AIRMAIL AND AIR CARGO AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1993

Year	Cargo (tons)			Airmail (tons)		
	Enplaned	Deplaned	Total	Enplaned	Deplaned	Total
1970	17,370	14,592	31,962	4,230	5,205	9,435
1975	14,682	12,316	26,998	5,932	5,788	11,720
1980	10,246	8,531	18,777	7,440	8,911	16,351
1985	12,966	10,746	23,712	5,787	10,731	16,518
1986	16,319	11,533	27,852	6,027	9,542	15,569
1987	24,471	17,680	42,151	7,091	10,887	17,978
1988	28,404	24,934	53,336	7,957	12,505	20,462
1989	30,062	26,058	56,120	8,409	12,348	20,757
1990	36,345	31,417	67,762	8,390	12,890	21,280
1991	38,918	34,119	73,037	13,644	17,351	30,995
1992	38,518	36,261	74,779	11,019	15,687	26,706
1993	42,794	37,718	80,512	8,995	12,848	21,843

Source: Milwaukee County.

the carriers providing regularly scheduled passenger service. Several of these air cargo carriers, such as Federal Express and UPS, operate large jet aircraft, such as Boeing 727s. The other air cargo carriers typically operate smaller, twin-engine turboprop aircraft. These air cargo carriers accounted for about almost 11,000 operations in 1993, or about 5 percent of all aircraft operations at Mitchell International. Air cargo operations typically occur at nonpeak times at Mitchell International, since much of the air cargo traffic moves overnight. As shown in Table 64, the volume of air cargo handled at Mitchell International has steadily increased, peaking at over 80,000 tons in 1993. The volume of airmail handled at Mitchell International has fluctuated, depending upon how much mail is trucked to the U. S. Postal Service's Chicago Regional Center, but in 1993 totaled almost 22,000 tons. As shown in Table 65, cargo enplaned at Mitchell International represented 0.78 percent of the United States total and mail handled at Mitchell International represented 0.66 percent of the United States total in 1992, the last year for which national data are available.

MILITARY AVIATION ACTIVITY

Although there were no exclusive military-use airports within, or immediately adjacent to, Southeastern Wisconsin, significant military aviation activity occurred at three public-use airports in the Region during 1993, including General Mitchell International Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. Military operating units were based at each of these three airports.

The headquarters of the 128th Air Refueling Group of the Wisconsin Air National Guard (ANG) and the 440th Tactical Airlift Wing of the United States Air Force Reserve (USAFR) are located at Mitchell International. In 1993, there were a total of 18 military aircraft based at Mitchell International, including eight Lockheed C-130H cargo aircraft and 10 Boeing KC-135R aircraft. These aircraft, together with occasional military aircraft not based at Mitchell International, accounted for about 5,800 operations, or almost 3 percent of all operations at Mitchell International during 1993. Both military units maintain their own apron areas, maintenance hangars, office space, and other support facilities. The level of military activity at Mitchell International since 1989 is shown in Table 66. The level of military operations has remained relatively stable since 1989 and significant increases in the number of military operations are not expected in the near future.

A United States Army National Guard facility is located at West Bend Municipal Airport, with a total of 12 Bell UH-1 helicopters based there. These aircraft were used primarily for training purposes and accounted for about 6,000 operations during 1993, or about 7 percent of all aircraft operations for the year. This military unit maintains its own apron, hangar, and other facilities at the airport.

The 84th Division of the U. S. Army Reserve Aviation Section maintains its headquarters at Waukesha County-Crites Field. This facility is a base for 15 Bell UH-1 helicopters. These aircraft, also used primarily for training and for proficiency flying,

Table 65

AIRMAIL AND CARGO TRAFFIC ENPLANED AT UNITED STATES STATIONS AND AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1992

Year	United States		General Mitchell International Airport		General Mitchell International Airport Total as Percent of U. S. Total	
	Enplaned Cargo (tons)	Enplaned Mail (tons)	Enplaned Cargo (tons)	Enplaned Mail (tons)	Cargo (tons)	Mail (tons)
1970	1,926,258	782,229	17,370	4,230	0.90	0.54
1975	2,717,369	890,490	14,682	5,932	0.54	0.67
1980	3,504,028	1,520,132	10,246	7,440	0.29	0.21
1985	2,548,025	1,416,643	12,966	5,787	0.51	0.41
1986	3,728,296	1,980,248	16,319	6,027	0.44	0.30
1987	3,948,061	1,534,720	24,471	7,091	0.62	0.46
1988	4,550,773	1,626,031	28,404	7,957	0.62	0.49
1989	5,116,092	1,537,235	30,062	8,409	0.59	0.55
1990	4,629,653	1,558,021	36,345	8,390	0.79	0.54
1991	4,750,582	1,550,220	38,918	13,644	0.82	0.29
1992	4,952,683	1,676,037	38,518	11,019	0.78	0.66

N/A: Not available.

Source: Federal Aviation Administration and Milwaukee County.

Table 66

NUMBER OF MILITARY OPERATIONS BY MONTH AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1989-1993

Month	1989	1990	1991	1992	1993
January	534	447	466	481	336
February	554	448	436	459	399
March	598	601	279	560	442
April	563	503	415	561	501
May	731	549	486	715	721
June	660	626	675	649	513
July	635	578	552	871	591
August	534	527	638	619	573
September	466	497	478	676	499
October	463	491	612	573	443
November	437	451	490	420	363
December	433	411	421	408	415
Total	6,608	6,129	5,948	6,992	5,796

Source: Milwaukee County.

during 1993 accounted for about 1,800 operations, or about 3 percent of all operations at the airport. The hangar and apron facilities at the airport used by this military unit are leased from, and maintained by, Waukesha County.

In addition, other general aviation airports within the Region occasionally handle military operations, usually in connection with training and practice flights. During 1993, other airports reporting some military operations included Kenosha Regional,

Rainbow, Timmerman Airport, Burlington Municipal, Sylvania, East Troy Municipal, Lake Lawn, Hahn Sky Ranch, Hartford Municipal, and Capitol Airports. No military aircraft were based at these airports.

HELICOPTER ACTIVITY

Helicopters represent a special segment of aviation because of their unique maneuvering characteristics and minimal landing facility requirements. Accordingly, helicopters have normally been employed as specialized vehicles used extensively for such special assignments as emergency medical services and law enforcement; the military; the news media; and for construction and exploration purposes, including utility construction and offshore oil drilling. In addition, helicopters are extensively used by corporations and businesses, chiefly for employee transportation, especially in congested metropolitan areas. Some aviation officials believe that the use of helicopters represents a significant growth area in aviation because of their unique operational abilities.

According to FAA data, the number of active civil helicopters in the United States as well as the total hours flown by these craft have fluctuated from year to year, but overall have been stable throughout the 1980s and the early 1990s. Of the 10,800 registered civil helicopters in 1992, the FAA has estimated that about 5,700, or about 53 percent, were active. Of these, about 60 percent were turbine-powered and 40 percent were piston powered. The 5,700 active helicopters represent about 3 percent of all active aircraft in the United States.

In contrast to widespread helicopter activity, especially for corporate and business purposes, in many areas of the United States, especially for corporate and business purposes, such activity in Southeastern Wisconsin remains a small portion of all aviation activity. In 1993, there were 18 civil helicopters based within the Region, up from 16 in 1983. As noted above, an additional 27 military helicopters are based at Region airports. Of the 18 civil helicopters, it was estimated that half were used for business purposes and half were used for sport and personal purposes and included amateur-built craft. The sport, personal, and amateur-built helicopters were assumed to account for only a small number of annual operations. The 18 civil helicopters were estimated to account for about 7,000 operations within Southeastern Wisconsin during 1993. Together with the 7,800 military helicopter operations, it was estimated that there were a total of 14,800 helicopter operations of all types in the Region in 1993.

As is the case with other aircraft, helicopter technology continues to advance. New helicopters use new alloys, new construction techniques, composite materials, and highly efficient turbine engines that together provide significantly improved levels of safety, performance, comfort, and operating economies. The turbine-powered portion of the national fleet is expected to continue to increase. One of the technological problems not yet completely solved is noise generated by "blade slap." Operation at higher altitudes has been suggested as a means of reducing the perceived noise nuisance at ground level, but airspace restrictions in areas where helicopters are most typically flown usually call for flights at about 1,500 feet, where a noise problem remains. Along with multiple engines and improved instrument flight capabilities, such technological improvements may provide operating efficiencies that will make helicopters attractive for serving certain commuter air travel demands. As mentioned in the previous chapter, the V-22 Osprey tiltrotor is thought to offer this opportunity. As yet, however, opinions on this possibility differ; proponents of greater helicopter use have made similar claims for a number of years.

OTHER AVIATION ACTIVITY

This section of the chapter identifies miscellaneous types of aviation activity which, in Southeastern Wisconsin, consists chiefly of balloon, glider, and ultralight activity. The inventory of based aircraft for 1993 identified a total of 61 miscellaneous craft in the Region in this category, including 19 balloons, 28 gliders, and 14 ultralights, all of which are either registered or based at public-use airports. However, since many of these aircraft are stored at locations away from airports, are used only occasionally in many cases, and may not need to be registered, there are thought to be somewhat more balloons, gliders, and ultralights within the Region than those included in this inventory. Operations generated by these craft are minimal and may be expected to have negligible impact on the need for airport facilities within the context of the regional airport system plan. For example, balloons do not require any airfield facilities or a large area to take off and land. In fact, most balloons in the Region

are not based at airports. Gliders, most of which are based at outlying general aviation airports, are towed by other aircraft during takeoff and stay within the local area. In the Region, the use of gliders is small and normally occurs during weekends and evenings in areas with little other traffic. Most of the glider activity within the Region is based at the West Bend Municipal, Sylvania, and Hartford Municipal Airports.

During the 1980s, interest in ultralights in the United States has grown significantly. An ultralight is essentially a small glider equipped with an engine. Ultralights have enjoyed quick popularity, in large part as an alternative to the more expensive conventional single-engine piston aircraft. The vehicle normally consists of a fabric-covered overhead wing, with fabric-covered tail surfaces held in place by aluminum tubing and plastic-coated cables. A two-cylinder engine hangs under the wing and drives a rear-facing propeller. The pilot sits on a small seat that may or may not be enclosed and operates the ultralight with two aluminum pedals and a control stick. Ultralights do not necessarily require the use of an airport or even an ultralight flight park, since takeoffs and landings can be made in a few hundred feet. They are relatively inexpensive to buy, are available either fully assembled or ready to build from a kit, are easy to maintain and to transport to suitable flying areas, and require neither advanced flying skills nor any licenses.

Because of the rapidly increasing popularity of ultralights, the Federal Aviation Administration recognized the vehicles in October 1982 by issuing Federal Aviation Regulation Part 103, which defined ultralights and provides appropriate operating rules. The FAA defines ultralights as vehicles that: are used, or intended to be used, for manned operation in the air by a single occupant; are used, or intended to be used, for recreation or sport purposes only; do not have any U. S. or foreign airworthiness certificate; if nonpowered, weigh less than 155 pounds and if powered weigh less than 254 pounds, empty weight, excluding floats and safety devices which are intended for deployment in a potentially catastrophic situation; have a fuel capacity not exceeding five U. S. gallons; are not capable of more than 55 knots calibrated airspeed at full power; and have a power-off stall speed which does not exceed 24 knots calibrated airspeed.

Importantly, the FAA currently does not consider ultralights to be aircraft in a regulatory sense and, thus, does not stringently regulate them, require them to be registered, nor require their operators to be certificated. However, Federal Aviation Regulation Part 103 does set forth operating rules governing such craft. For example, ultralight vehicles may be operated only in daylight hours, in uncontrolled airspace, and not over urbanized or congested areas or over groups of people. Furthermore, ultralights must be operated by visual reference with the ground surface and shall yield the right-of-way to all other aircraft.

Accurate measures of the number of ultralights or of ultralight activity are not available, since ultralights are not required to be registered and there are no agencies or organizations that maintain exact counts of the machines or activity. The 14 ultralights included in the Region's based aircraft inventory represent only a portion of all the ultralights thought to exist in Southeastern Wisconsin. Some ultralight vehicles are issued airworthiness certificates and thus are considered to be aircraft and subject to all Federal Aviation Regulations. In such cases, an ultralight cannot be operated interchangeably as a certificated aircraft and as an ultralight. In Southeastern Wisconsin, some ultralights are based at the smaller general aviation, public-use airports. In addition, ultralights can be, and are, flown out of many open areas not designated as airports. Ultralight activity typically occurs in the early morning or late afternoon hours to avoid strong winds.

Other types of aviation-related activity that occur in Southeastern Wisconsin include parachute jumping and banner towing. Most parachute jumping in the Region occurs at and around Aero Park, East Troy Municipal, Rainbow, and Winfield Airports and is organized by sky-diving clubs. Banner towing normally occurs only for special events and has been based at number of airports within the Region, including Kenosha Regional and West Bend Municipal Airports.

SUMMARY

The major findings of the inventory of existing aeronautical activity conducted under the reevaluation of the second-generation regional airport system plan for Southeastern Wisconsin are set forth in this chapter. The inventory findings are related to air carrier passenger activity, general aviation activity, air cargo activity, military aviation activity, helicopter activity, and other aviation activity.

With respect to air carrier passenger activity, one of the most important measures is the number of annual enplaning passengers at Milwaukee

County's General Mitchell International Airport, the only airport within the Region that accommodates scheduled air carrier passenger traffic. Passenger enplanements at Mitchell International have fluctuated from year to year but have shown an overall constant increase over the long term. Passenger enplanements have increased at an average annual rate of about 6 percent from 1970 to 1980 and an average annual rate of above 3 percent from 1980 to 1990. From 1990 to 1993, total enplaning passengers first decreased during 1991, then began increasing once again, to a total of 2.26 million enplanements during 1993, an all-time record. Over the long term, from 1970 to 1993, enplanements at Mitchell International have increased at an average annual rate of about 4 percent. At the end of 1993, scheduled airline passengers service to Milwaukee was provided by 19 domestic air carriers, including eight major carriers, three national carriers, one large regional carrier, and seven commuter carriers.

Enplaning passenger trends at Mitchell International have generally been very similar to national enplaning passenger trends. Mitchell International's share of the national domestic enplanements has varied from 0.38 percent to 0.62 percent during the last two decades. In 1993, Mitchell International's share was 0.45 percent. The number of connecting passengers using Mitchell International has typically varied from about 10 to 25 percent of total enplaning passengers. Also, it has been estimated that from 20 to 25 percent of all Southeastern Wisconsin residents who were airline passengers boarded flights at Chicago's O'Hare International Airport rather than Mitchell International. This air carrier activity inventory also includes the findings of enplaning passenger surveys conducted by the Regional Planning Commission. These surveys, conducted in 1971, 1983, and 1989, provide detailed data concerning the socio-economic and travel pattern characteristics of passengers using Mitchell International. Such surveys, conducted in 1971, 1983, and 1989, provide detailed data concerning the socio-economic characteristics of passengers using Mitchell International.

Another important measure of air carrier activity is the number of air carrier operations. Air carrier operations at Mitchell International have historically increased at a much lower rate than passenger enplanements have. Air carrier operations have increased by about 60 percent, from 74,000 in 1970 to 118,000 in 1993, compared with a 147 percent increase in passenger enplanements over this same period. This difference in the rates of increase is due in part to increasing aircraft size and in part to steadily increasing load factors for scheduled passenger aircraft operating into, and out of, Milwaukee. In 1993, the average number of seats per departure was 96 and the enplaning load factor was 53 percent for large air carriers. For commuter air carriers, the average number of seats per departure was 37 and the enplaning load factor was 43 percent in 1993.

General aviation includes all segments of the aviation industry except air carriers and the military. Its activities range from the training of new pilots, sport, and personal flying to a wide range of business-related flying, such as corporate transportation, emergency shipments, aerial photography, and crop dusting. The aircraft used in general aviation range from the one-seat single- engine piston aircraft up to the long-range corporate jet. General aviation provides immediate, efficient, and direct aviation services that commercial air carriers cannot or will not provide.

An important measure of general aviation activity is the fleet size and composition. The general aviation aircraft within Southeastern Wisconsin represent about 30 percent of all aircraft registered in the State of Wisconsin, which, in turn, represents about 2 percent of all aircraft registered in the United States. Since 1970, the total number of all general aviation aircraft registered in the United States, the State of Wisconsin, and Southeastern Wisconsin has more than doubled. Wisconsin's share of the national fleet has remained at just below 2 percent. Southeastern Wisconsin's share of all general aviation aircraft registered in Wisconsin has been just under one-third, with a very slight overall decrease since 1970.

About 70 percent of all aircraft registered in the United States are active. In 1993, it was estimated that there were 1,489 active general aviation aircraft based within Southeastern Wisconsin. Of the 1,489 general aviation aircraft based within the Region, 79 percent were single-engine piston aircraft, 9 percent were multi-engine piston aircraft, 4 percent were twin-engine turboprop aircraft, 3 percent were jet aircraft, 1 percent were helicopters, and 4 percent were such miscellaneous types of aircraft as gliders, balloons, and registered ultralights.

Another important measure of general aviation activity in the Region is the number of annual aircraft operations, that is, landings and takeoffs, that occur within the Region. This activity is summar-

Table 67

SUMMARY OF AIRCRAFT OPERATIONS IN SOUTHEASTERN WISCONSIN: 1993

Airport Name	Type of Aircraft Operations					
	Passenger Air Carrier	General Aviation	Military	Helicopter	Other	Total
General Mitchell International	117,988	77,404	5,796	100	--	201,288
Kenosha Regional	--	77,100	500	1,400	--	79,000
Lawrence J. Timmerman	--	88,085	176	--	--	88,261
West Bend Municipal	--	74,500	6,000	--	1,600	82,100
Waukesha County--Crites Field	--	69,897	1,979	--	--	71,876
Capitol	--	68,800	10	--	--	68,810
East Troy Municipal	--	53,660	100	900	440	55,100
Batten	--	50,750	--	500	--	51,250
Burlington Municipal	--	44,900	500	900	--	46,300
Sylvania	--	37,500	100	--	800	38,400
Hartford Municipal	--	27,350	20	--	950	28,320
Other Public Use Airports	--	95,855	360	--	600	96,815
All Private Use Airports	--	14,700	--	2,600	--	17,300
Not at Airport	--	3,100	--	600	1,800	5,500
Total	117,988	783,601	15,541	7,000	6,190	930,320

NOTE: Activity data for General Mitchell International Airport are from actual air traffic control tower counts. Activity data for Timmerman Airport and Waukesha County-Crites Field are from air traffic control tower counts adjusted to include hours when the tower is not open. Activity data for other airports are based on estimates provided by airport officials.

Source: SEWRPC.

ized in Table 67. In 1993, there was an estimated total of 930,300 aircraft operations of all types in Southeastern Wisconsin. Of these, 118,000, or about 13 percent, were air carrier; 796,800, or 86 percent, were general aviation; and 15,500, or about 1 percent, were military. The general aviation category includes civil helicopter activity and the "other" activity category. Civil and military helicopter activity together were estimated to account for 14,800 operations in 1993, or about 1.6 percent of all aircraft operations.

Aircraft operations in the Region can also be summarized by airport. In 1993, it was estimated that about 907,500 aircraft operations, or almost 98 percent of the total, occurred at the 23 public-use airports in the Region. About 810,700 aircraft operations, or about 87 percent of the total, occurred at the 11 public-use airports that make up the currently adopted regional airport system plan. About 96,800 aircraft operations, 10 percent of the total, occurred at the 11 public-use airports that are not part of the current system plan; about 17,300 operations, almost 2 percent, occurred at the private-use airports; and about 5,600 operations, or less than 1 percent, were estimated to have occurred at locations other than airports. Of all the airports in Southeastern Wisconsin, General Mitchell International Airport was the busiest, recording 201,300 operations of all types in 1993 and accounting for about 21 percent of all operations in the Region. At General Mitchell International Airport, some 77,500, or nearly 40 percent, of the 201,300 operations were general aviation. The next busiest airport in the Region was Timmerman Airport, estimated to have had 88,300 aircraft operations during 1993, or over 9 percent of all operations in the Region. All other airports in Southeastern Wisconsin had less than 9 percent of all activity.

A significant volume of air cargo, which normally includes air freight, express, and mail, is handled within Southeastern Wisconsin. While the center of air cargo activity remains at General Mitchell International Airport, several other general aviation airports, especially including Kenosha Regional Airport, contribute to the air cargo distribution system by accommodating corporate freight shipments, shipments destined for Mitchell International for transfer to air cargo carriers, or are even served by air cargo carriers.

Although there are no exclusive military-use airports within Southeastern Wisconsin, military aviation activity does occur, predominantly at three airports within the Region. General Mitchell International Airport is a base for two military units, the 128th Air Refueling Group of the Wisconsin Air National Guard and the 440th Tactical Airlift Wing of the United States Air Force Reserve. The operations of these two units accounted for 18 based

aircraft and about 5,800 operations during 1993. West Bend Municipal Airport includes a facility of the United States Army National Guard, which accounts for 12 based helicopters and about 6,000 operations during 1993. Waukesha County-Crites Field includes a base for the 84th Division of the U. S. Army Reserve Aviation Section, which maintained 15 helicopters and accounted for about 1,800 operations during 1993.

Helicopters represent a special segment of aviation because of their unique maneuvering characteristics and minimal requirements for landing facilities. In contrast to widespread helicopter activity in many areas of the United States, especially by business and corporate purposes, such activity in Southeastern Wisconsin remains a small portion of all aviation activity. In 1993, there were 18 civil helicopters based within the Region, which were estimated to account for about 7,000 operations during the year. Within Southeastern Wisconsin, these helicopters were largely used for emergency medical services, for corporate employee transportation, for construction and inspection purposes, and for personal and sport flying. An additional 27 military helicopters are also based at airports in the Region and accounted for 7,800 operations.

There are several miscellaneous types of aviation activity, which in Southeastern Wisconsin consist mostly of balloon, glider, and ultralight activity. Operations generated by these craft are minimal and may be expected to have negligible impact on the need for airport facilities within the context of the regional airport system plan. The 1993 inventory of based aircraft identified a total of 61 such miscellaneous craft. Ultralights have especially increased in popularity since the early 1980s. They are essentially small gliders equipped with an engine. Ultralights are not required to be registered nor do the operators need to be certificated. The small number of ultralights included in this inventory represents only a portion of all ultralights thought to exist in Southeastern Wisconsin.

This inventory of the existing demand for air transportation services and facilities within Southeastern Wisconsin has provided a basis for the development, not only of aviation forecasts, but also for airport improvement alternatives intended to satisfy aviation needs into the future.

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Chapter V

LEGAL AND INSTITUTIONAL CONSIDERATIONS IN REGIONAL AIRPORT SYSTEM PLANNING

INTRODUCTION

The legal and institutional structure for airport facility development and management within the Region will, in large measure, dictate the extent and timing of regional airport system plan implementation. An inventory of the pertinent legal and institutional factors is therefore a necessary element of any airport system planning effort. This chapter provides the findings of such an inventory. The chapter describes the Federal, State, and local statutory authority and administrative rules governing the development and operation of public airports; the regulations of land use in the vicinity of airports; and the airport development programs of, and related to, funding provided by various levels and agencies of government.

LEGAL AND ADMINISTRATIVE BASIS FOR AIRPORT FACILITY DEVELOPMENT

Public airport development within the Region involves Federal, State, and local units and agencies of government. Consequently, intergovernmental cooperation is essential to effective airport facility development. In Wisconsin, the local government or private corporation owning an airport must look to the Wisconsin Department of Transportation, Division of Aeronautics, as well as to the Federal Aviation Administration, for technical and financial assistance in developing the airport.

Because public airport development in the Region involves Federal, State, and local units and agencies of government, intergovernmental cooperation and coordination are essential to effective airport system development. To achieve the implementation of airport improvements in an effective manner, it is crucial that the scope and timing of needed airport improvements at each of the essential airports within Southeastern Wisconsin be agreed upon by each level, unit, and agency of government involved. Importantly, the recommended classifications and improvements at such essential airports should be identified and described in an identical manner in all pertinent plans, including, but not limited to, the Federal National Plan of Integrated Airport Systems (NPIAS), the State Airport System Plan for Wisconsin, the Regional Airport System Plan for Southeastern Wisconsin, and all airport master plans.

Federal Authority

The basic Federal statutory authority for airport facility development is contained in the Airport and Airway Improvement Act of 1982. This Act, as the successor to the Airport and Airway Development Act of 1970, charges the Federal Aviation Administration (FAA) with the responsibility of administering the Federal program for airport development, referred to as the Airport Improvement Program (AIP). The Airport Improvement Program is periodically reauthorized by the passage of amendments to the 1982 Act. The 1982 Act has been amended by the Airport and Airway Safety and Capacity Expansion Act of 1987; the Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Transportation Act of 1992; the Airport Improvement Program Temporary Extension Act of 1994; and the Federal Aviation Administration Authorization Act of 1994. The Federal program provides financial support and technical guidance for airport system and facilities planning, land acquisition, and eligible airport improvement projects. In addition, the program provides for the development and promulgation of airport design, construction, and maintenance standards and the preparation and biennial review and revision of a national airport system plan.

The original 1982 Act both broadened regional airport system planning and made specific its integration with other aspects of regional planning as follows:

> It is declared to be in the national interest to encourage and promote the development of transportation systems embracing various modes of transportation in a manner that will serve the States and local communities efficiently and effectively. To accomplish this objective, the Secretary [of Transportation] shall cooperate with State and local officials in the development of airport plans and programs which are formulated on the basis of overall transportation needs and coordinated with other transport planning with due considera-

tion to comprehensive long-range land-use and access plans and overall social, economic, environmental, system performance, and energy conservation goals and objectives. The process will be continuing, cooperative, and comprehensive to the degree appropriate based on the complexity of the transportation problems.[1]

The 1982 Act also defined and emphasized the need for continuing regional airport systems planning programs in the following manner:

> Integrated airport system planning means the initial as well as continuing development for planning purposes of information and guidance to determine the extent, type, nature, location, and timing of airport development needed in a specific area to establish a viable, balanced, and integrated system of public-use airports. It included identification of system needs, development of estimates of system-wide development costs, and the conduct of such studies, surveys, and other planning actions, including those related to airport access, as may be necessary to determine the short-, intermediate-, and long-range aeronautical demands required to be met by a particular system of airports. It also includes the establishment by a State of standards, other than standards for safety of approaches, for airport development at public-use airports which are not primary airports. . . . it is in the national interest to develop in metropolitan areas an integrated system of airports designed to provide expeditions access and maximum safety.[2]

The Federal Airport Improvement Program is administered in accordance with various parts of the Federal Code of Aviation Regulations, particularly Part 151, Federal Aids to Airports, and Part 152, Airport Aid Program. The provisions of Part 152 which are the most pertinent to regional airport system planning are those which define the categories of airport improvements eligible for Federal aid. Airport improvements eligible for Federal aid include land acquisition; site preparation; construction, alteration, and repair of runways, taxiways, aprons, and roads within airport boundaries; construction and installation of lighting, utilities, navigational aids, and aviation-related weather reporting equipment; installation of safety equipment required for certification of an airport facility; installation of required security equipment; acquisition of snow-removal equipment; limited terminal development at commercial service airports; off-airport roadway improvements related to airport development; obstruction removal; installation of fences; and implementation of noise abatement measures. Federal grants may not be made for the construction of hangars, parking areas for automobiles, or buildings not related to the safety of persons at the airport; for the acquisition of land required for industrial and other nonairport purposes; for maintenance work on runways; for site preparation that is not part of an overall site preparation project; for lighting of public parking areas; or for improvement of offsite roadways. Federal grants are made to the Wisconsin Department of Transportation, the Secretary of which acts as agent to receive the Federal funds and disburse them to local units of government seeking funding for airport improvements.

State Authority

The basic State authority for airport development is found in Chapter 114 of the Wisconsin Statutes, "Aeronautics." Under this Statute, the Wisconsin Department of Transportation is charged with developing a system of airports to accommodate the aeronautical needs of the State. This system is to include every airport included in the national airport system plan and such additional airports as may be deemed necessary (Section 114.01). Receipts from the tax on general aviation motor fuel, the airline property tax, and aircraft registration fees, together with revenues from nonaviation transportation areas, are deposited in a unified State transportation fund. Funding of the State of Wisconsin portion of the airport improvement program is drawn from the unified State transportation fund and is allocated to assist local airport sponsors in developing approved projects on the State airport system. Because revenues from aviation and nonaviation transportation areas are pooled into one Statewide fund and then reallocated on the basis of all Statewide transportation program needs during any given fiscal year, the amount of funding available for airport improvement projects may or may not be equal to the revenues generated by aviation related fees and taxes. Such receipts may also be used for providing air marking and air navigation facilities and for the administration of the Wisconsin Department of Transportation (Sections 114.20, 114.35, 78.555, and 20.395).

In general, the impetus for airport development comes from a local sponsor, with the Wisconsin

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[1] *Airport and Airway Improvement Act of 1982, 96 Stat. 671 (1982).*

[2] *Ibid.*

Department of Transportation providing advice and assistance. Any county, city, village, town, or other owner of an eligible public-use airport, as well as the Wisconsin Department of Transportation itself, may initiate and sponsor an airport project to be constructed with State and-or Federal aid. A petition for State and Federal funding must be filed with the Wisconsin Secretary of Transportation by the airport sponsor. On receipt of the petition, the Secretary may hold a public hearing on the proposed project, after which the Secretary must issue a finding. A favorable finding must be submitted to the Governor for review; only after approval by the Governor can State or Federal airport funds be granted for airport improvement projects (Section 114.33). No airport sponsor may submit a request for airport funds directly to the Federal government. The airport sponsor must designate the Secretary as its agent who, on its behalf, will accept, receive, and disburse the Federal funds (Section 114.32). Through interagency agreements with the local airport sponsor, the Wisconsin Department of Transportation, Bureau of Aeronautics, administers the airport improvement projects, assuming responsibility for project planning and design, land acquisition, and supervision of all work involving State and Federal aid. Improvements to public-use airports are eligible for Federal and State funding assistance. For funding assistance purposes, the State of Wisconsin Statues Section 114.002 defines a public-use airport as 1) any publicly owned airport, 2) any privately owned reliever airport, and 3) any privately owned airport used for public purposes and determined by the Secretary of the U. S. Department of Transportation to enplane 2,500 or more passengers and receive scheduled passenger service of aircraft.

Reliever airports are general aviation facilities in, and around, major metropolitan areas that can accommodate most types of general aviation activity and services and can attract general aviation activity away from busy air carrier airports. Thus, these airports can act to "relieve" the air carrier airports of costly, disruptive, and hazardous air traffic congestion, capacity problems, and delays. The air carrier airports, then, have the opportunity to operate in a safer, more efficient manner while reducing the need for expensive and disruptive facility expansion. Within Southeastern Wisconsin, seven airports have, in accordance with the adopted second-generation regional airport system plan, been designated by the Federal Aviation Administration as reliever airports for Milwaukee County's General Mitchell International Airport. These are Batten, Capitol, Hartford Municipal, Kenosha Regional, Lawrence J. Timmerman, and West Bend Municipal Airports and Waukesha County-Crites Field. Of these seven airports, two, Batten Airport and Capitol Airport, are privately owned.

It should be noted that the definition of "public-use airport" in the Wisconsin Statutes differs somewhat from the normal use of this terminology. Accordingly, a privately owned airport that has not been designated as a reliever airport and does not annually enplane at least 2,500 passengers and receive scheduled passenger service is not considered a public-use airport under the statutory definition, even if that airport is open for use by the general public. Of the 11 airports currently in the regional airport system plan, only Sylvania Airport was a private airport as of December 1994 under this statutory definition.

The costs of projects to be funded under the Federal Airport Improvement Program in excess of the Federal share must be borne by the local sponsor and the State, except that the State may not pay more than 50 percent of the nonFederal share nor more than $500,000 for the cost of constructing or improving an airport building. The Federal share may not exceed 90 percent of the eligible cost of any approved project, except for major commercial airports, where the Federal share may not exceed 75 percent. Also, the State cannot participate in the cost of constructing or improving hangars. For projects not funded under the Federal Airport Improvement Program, the State may not pay more than 80 percent of the total project costs nor more than $500,000 of the cost of constructing or improving airport buildings nor participate in the cost of hangar construction or improvement. For projects involving Federal aid, State aid may also be used for improvements at publicly owned and eligible privately owned public-use airports. For projects that do not involve Federal aid, State aid may also be used for improvements at publicly owned and eligible privately owned public-use airports (Section 114.34).

The local public sponsor has the power to protect aerial approaches to airports by a special-purpose "airport zoning ordinance" regulating, restricting, and determining the use, location, height, number of stories, and size of buildings, structures, and objects of natural growth in the vicinity of the airport and may divide the territory to be protected into several areas and impose different regulations and restrictions on each area. This ordinance is effective even though the land affected may not be

within the jurisdictional boundaries of the unit of government imposing the ordinance (Section 114.136). On lands not regulated by such an ordinance, a permit must be obtained from the Wisconsin Secretary of Transportation to erect any building, structure, tower, or other object that would either extend to a height of more than 500 feet above ground or surface of the water within one mile of the location of the airport or above a height determined by the ratio of 1 foot vertical on 40 feet horizontal measured from the nearest boundary of the nearest public airport within the State. (Section 114.135). This does not apply to objects of less than 150 feet in height above the ground or water level at the location of the object, or to objects located within areas zoned under Section 114.136, "Airport Approach Protection", or under Section 62.23 "City Planning" of the Wisconsin State Statutes.

The Wisconsin Statutes give full authority to counties, cities, towns, and villages to acquire, own, and operate airports. The power of condemnation for this purpose is expressly authorized; cities and villages are allowed to bond themselves to provide airport facilities. In the operation of such facilities, municipalities are authorized to make reasonable rules and regulations and to charge fees to pay for operating costs (Chapters 59, 60, 61, 62, and Section 67.04).

Chapter 114 of the Wisconsin Statutes specifies the powers and duties of the Wisconsin Secretary of Transportation with respect to airport development, making the Secretary responsible for the administration of all aviation matters within the State. Section 114.31 establishes a priority system for determining annual airport development projects. By July 1 of each even-numbered year, the governing body of each county, city, village, or town that contemplates an airport development project for which it proposes to request State or Federal aid in the next six years may notify the Secretary of its intent and submit such information as the Secretary requires. The Secretary shall then establish priorities for proposed projects in relation to the overall State airport system plan, taking into account such factors as industrial, commercial, recreational, and resource-development and transportation needs. As part of the Department of Transportation budget report, the Secretary submits to the State Legislature a tentative priority list of projects recommended for State aid in the following biennium. This list then becomes the guide for funding airport improvement projects and determining in what years the projects will be implemented.

AIRPORT ADMINISTRATIVE STRUCTURE

Chapter 114 of the Wisconsin Statutes delegates responsibility for the operation and maintenance of public airports to local units of government. Section 114.14 of the chapter empowers the governing body of a city, village, town, or county to adopt regulations and to establish fees or charges for the use of the airport, and to establish an airport commission responsible for the control and management of the airport. The airport commission may employ a manager, who may be a member of the commission.

Section 114.15 empowers the governing body of a city, village, town, or county annually to appropriate and cause to be raised by taxation a sum sufficient to carry out the provisions of Chapter 114. Section 114.151 permits any two or more governing bodies of a city, village, town, or county to join together to acquire, equip, and operate airports. Any governing body participating in the ownership or operation of a joint airport may at any time, by simple resolution, withdraw from such joint operation or control and thereby relinquish its interest in the airport.

The existing administrative structures for the eight publicly owned airports in the Region are varied. A description of the administrative structure of each of the publicly-owned airports follows.

Kenosha Regional Airport

Kenosha Regional Airport is owned, operated, and maintained by the City of Kenosha. A five-member Airport Commission, appointed by the Mayor and approved by the Common Council, provides policy direction. An Airport Director, who is hired by the City of Kenosha, is responsible for day-to-day management of the airport. In 1994, fixed-base operator[3] service was provided by Kenosha Aero, Inc., Kenosha Jet Center, Inc., Midwest Propeller, MobilAir, Inc., Northern Airmotive, Inc., Skycom Avionics, Inc., Sky's the Limit Aviation, and Universal Airmotive, Inc.

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[3]*Fixed-base operator (FBO) service is defined as a commercial operation at an airport which provides services to general aviation, including aircraft fueling and maintenance, flight training, aircraft storage, aircraft and parts sales, pilot briefing, and restaurant facilities. Additional services of operating and maintaining the airport facility are sometimes included under contractual arrangements with the airport owner.*

General Mitchell International Airport

General Mitchell International Airport, the only scheduled air carrier airport within the Region, is owned, operated, and maintained by Milwaukee County. The Milwaukee County Board of Supervisors and County Executive provides policy direction through the seven-member Transportation and Public Works Committee. An airport director, hired by Milwaukee County, is responsible for day-to-day management of both Mitchell International and Timmerman Airports. The Airport Division of the Milwaukee County Department of Public Works is responsible for the planning, design, construction, operation, and maintenance of all airport and terminal facilities, and for all crash, fire, and rescue services conducted on the airport grounds. The Milwaukee County Sheriff's Department provides airport security services. The Federal Aviation Administration is responsible for the control of all aircraft movements at Mitchell International and for the installation, operation, and maintenance of all on- and off-airport navigational and runway approach aids. Milwaukee County is responsible for maintaining runway and taxiway lighting. In 1994, fixed-base operator service was provided by Signature Flight Support, Inc.

Lawrence J. Timmerman Airport

Lawrence J. Timmerman Airport is owned, operated, and maintained by Milwaukee County. The Milwaukee County Board of Supervisors and County Executive provide policy direction through the seven-member Transportation and Public Works Committee. An airport director, hired by Milwaukee County, is responsible for day-to-day management of both Timmerman and Mitchell International Airports. The Airport Division of the Milwaukee County Department of Public Works is responsible for the planning, design, construction, operation, and maintenance of airport facilities. The Federal Aviation Administration provides air traffic control tower services in space provided by Milwaukee County and controls all aircraft movements at Timmerman Airport. In 1994, fixed-base operator service was provided by Gran-Aire, Inc.

Burlington Municipal Airport

Burlington Municipal Airport is owned, operated, and maintained by the City of Burlington. Policy direction is provided by a six-member City Airport Committee. An airport manager, hired by the City, is responsible for day-to-day management of the airport. In 1994, fixed-base operator service was provided by Burlington Air Center, Incorporated.

East Troy Municipal Airport

East Troy Municipal Airport is owned, operated, and maintained by the Village of East Troy. The seven-member Airport Committee of the Village Board provides policy direction and is appointed by the Village president. In 1994, fixed-base operator service and most day-to-day management activities were provided by Base Aviation, Incorporated.

Hartford Municipal Airport

Hartford Municipal Airport is owned by the City of Hartford. Airport policy direction is provided by a seven-member Airport Committee, which advises the Common Council. In 1994, fixed-base operator service and most day-to-day management activities were provided by Hartford Aero Enterprises, Inc.

West Bend Municipal Airport

West Bend Municipal Airport is owned, operated, and maintained by the City of West Bend. Airport policy direction is provided by a five-member Airport Commission consisting of one alderman and four citizens appointed by the Mayor. In 1994, fixed-base operator service and most day-to-day management activities were provided by West Bend Air, Inc.

Waukesha County-Crites Field

Waukesha County-Crites Field is owned, operated, and maintained by Waukesha County. Airport policy direction is provided by a five-member Airport Commission consisting of one County Supervisor and four citizens appointed by the County Executive and approved by the County Board. An airport manager, hired by Waukesha County, is responsible for day-to-day management of the airport. A nonFAA air traffic control tower was constructed and commissioned under county jurisdiction in 1974. In 1994, fixed-base operator service was provided by Waukesha Flying Services, Inc., and Skycom Avionics, Inc.

In addition, three of the privately-owned airports in the Region that are open to the public were included in the Regional Airport System Plan as of 1994. These include Batten Airport in the City of Racine, Capitol Airport in the City of Brookfield, and Sylvania Airport in the Town of Yorkville. Because these airports are in the Regional plan, a description of the administrative structure of each airport follows.

Batten Airport

Batten Airport is owned, operated, and maintained by the Racine Commercial Airport Corporation, a

private corporation. Major shareholders in the corporation include several of the largest manufacturing firms in the City of Racine. Airport policy direction is provided by a five-member board of directors. An airport manager, hired by the corporation, is responsible for day-to-day management of the airport. In 1994, fixed-base operator service was provided by the Racine Commercial Airport Corporation.

Capitol Airport

Capitol Airport is owned by Lois and Wallace Mitchell, who have an agreement with Eagle Aviation of Milwaukee to operate and maintain the airport. The owners provide airport policy direction. In 1994, fixed-base operator service and most day-to-day management activities were provided by Eagle Aviation.

Sylvania Airport

Sylvania Airport is owned, operated, and maintained by Robert S. Demski and Donald Hurd. The owners provide airport policy direction and day-to-day management of the airport. In 1994, fixed-base operator service was provided by Sylvania Aero Enterprises, Inc., and Racine Soaring, Inc.

ORDINANCES GOVERNING AIRPORT DEVELOPMENT

Federal, State, and local ordinances affecting the development of airports and land uses around them, specifically with respect to approach and runway protection zone protection and noise and air pollution abatement, have received considerable attention since the original regional airport system plan was first adopted in 1976. During the past two decades, the increased use of business jet aircraft on a widespread basis has made the attainment of compatible land uses adjacent to airports, particularly for those parcels located under normal flight paths and, therefore, most exposed to noise and air pollution, even more important than was true historically. As a result, airport-land use compatibility planning has become a recognized part of airport system and master planning programs and is fully eligible for Federal planning grant assistance. Although it is better to avoid incompatibility problems by good land use planning from the inception of airport development, the Federal Airport Improvement Program recognizes the problems presented by existing incompatible development and continues to make funds available for the purchase of incompatible lands which may, over the years, have encroached on lands near an existing airport. In addition, Federal Aviation Regulations (FAR) Part 77 set forth technical requirements for height zoning, upon which local ordinances should be based. Runway protection zone requirements are also specified by FAR Parts 27 and 152. Section 114.136 of the Wisconsin Statutes provides the authority for any county, city, village, or town that is the owner of an airport to protect its aerial approaches by ordinance regulating, restricting, and determining the use, location, height, number of stories and size of buildings and structures, and the objects of natural growth in the vicinity of the airport. The Federal Aviation Administration has developed a model zoning ordinance for such use. The model zoning ordinance is designed to be used as a guide to control the height of objects around airports and is described in the Federal Aviation Administration's Advisory Circular No. 150/5190-4A, "A Model Zoning Ordinance to Limit Height of Objects Around Airports."

There are basically two types of zoning that can be used directly to control the use of land on and around airports in Southeastern Wisconsin: comprehensive land use zoning ordinances and special-purpose height zoning ordinances in the vicinity of airports. These zoning provisions are intended to be used to protect and enhance the development of publicly owned airports.

The most common and, perhaps, most useful public land use control available to further sound and compatible airport development is zoning. Zoning is an exercise of the police powers of the State and local governments to regulate the use of private property in the public interest. A zoning ordinance divides a community into a number of districts for the purpose of regulating the use of land, water, and structures; the height, size, shape, and placement of structures; and the density of population. Zoning seeks to confine certain land uses to those areas of the community which are particularly suited to, and should be set aside for, these uses, thereby encouraging the most appropriate use of land throughout the community. Zoning seeks to assure adequate light, air, and open space for each building and to reduce fire and other hazards to health and safety and seeks to prevent overcrowding of land and congestion of the street, utility, and other public facility systems. Zoning can promote compatibility between airports and surrounding land uses while leaving the airport environs in private ownership, economically productive, and on the property tax rolls. At the same time, zoning is subject to change and must be continually monitored if it is to remain a viable tool

for the furtherance of sound airport and airport-related development.

State enabling legislation which permits cities, villages, towns, and counties in Wisconsin to make use of zoning in a comprehensive manner is found in the following sections of the Wisconsin Statutes (1982): city zoning, Section 62.23(7); village zoning, Section 61.35; town zoning, Sections 60.74 and 60.75; county zoning, Sections 59.97 and 59.99; and extra-territorial zoning, Sections 59.97 (6), and 62.23(7a). Special airport height zoning is provided for in Section 114.136.

The Regional Planning Commission suggests that those communities owning airport facilities prepare a special airport height zoning ordinance, pursuant to Section 114.136 of the Wisconsin Statutes, rather than attempt to regulate airport height zoning under a general zoning ordinance. The more comprehensive land use regulation required can then best be provided in the general zoning ordinance. Whenever the same public agency is preparing the legislation, the airport zoning and comprehensive zoning may be expected to be compatible. However, when sponsors are preparing airport zoning in areas under the comprehensive zoning control of other units of government, inter-jurisdictional agency review and coordination is required to achieve an acceptable zoning ordinance that promotes sound, comprehensive land use, as well as sound airport development. Such zoning can also be used to regulate the use of land on the airport site itself.

A second type of airport zoning may be used to limit the heights of structures around airports, thereby protecting airspace in the vicinity of the airport and its runway approaches from intrusion by high objects or other forms of interference, regardless of the local governmental jurisdictions involved. The objective is to protect the public investment in the airport by assuring that full runway lengths are available for safe use and that instrument landing systems are not restricted. Section 114.136 of the Wisconsin Statutes provides that any county, city, village, or town that owns Federal- or State-approved airport facilities may protect the aerial approaches to the site by an ordinance regulating, restricting, and determining the use, location, height, number of stories, and size of buildings, structures, and objects of natural growth in the vicinity. The ordinance is to be effective whether the site and lands affected are located within or outside the corporate limits of the public airport owner and may be administered without the consent of any other governing body. It should be noted that, while special-purpose airport zoning can protect the airspace around airports and thereby help to ensure safe and proper operations, such zoning needs to be supplemented by general zoning to assure compatibility between the airport itself and the surrounding land uses, thereby avoiding noise, air pollution, traffic congestion, and safety problems.

The airport zoning inventory conducted as part of the second-generation airport system planning effort was reviewed to determine the status of local ordinances relating to the public-use airports in the regional airport system plan. Comprehensive land use zoning is in effect at and around all publicly owned airports. Table 68 lists the pertinent special-purpose height control ordinances, as well as those airports and off-airport areas identified as a specific district or use in a comprehensive zoning ordinance and the status of additional land use actions as of December 1993. The original plan recommended that appropriate units of government prepare detailed land use plans as a basis for the zoning of areas surrounding each of the airports in the system plan. Other than these efforts, the only other off-airport land use controls provided were those contained in special airport-related ordinances to control offsite obstructions within the approach paths of aircraft. As of December 1993, there were height controls in place for Batten Airport in the City of Racine and for all publicly owned airports in the Region except East Troy Municipal. In most cases, however, the height controls were based on the existing airport layout and did not recognize such possible improvements as runway expansion envisioned under the appropriate airport master plans and airport layout plan updates.

The control of land use development in the vicinity of privately owned airports is made possible by Section 114.135 of the Wisconsin Statutes. This section provides that the aerial approaches to any airport owned and operated by corporations organized to provide aeronautical facilities to the general public may be protected in the following manner: The owner of such airport shall prepare and file with the register of deeds plans and specifications showing the land affected, the owner of each parcel or interest therein, whether public or private, the regulations to be imposed on each parcel, and the structures, buildings, or other objects to be removed. The owner or managing body of the airport may negotiate and acquire from the owner of the various parcels or interest therein, by deeds, the protection

Table 68

AIRPORT ZONING AND HEIGHT CONTROLS ADOPTED BY GOVERNMENTAL UNITS FOR PUBLIC-USE AIRPORTS IN THE REGION: 1993

Airport	Special Airport Zoning Regulations	
	Special Airport and Off-Airport District and Comprehensive Land Use Zoning Ordinances	Special-Purpose Height Control Zoning Ordinances
Kenosha Regional	Section 13, "Airport Overlay District," City of Kenosha Zoning Ordinance	Section 2.05,"Height-Limitations-Airport Approach Protection," Institutional-Park District, Zoning Ordinance, City of Kenosha
	Chapter 18, "Kenosha Municipal Airport Operations and Regulations," City of Kenosha Code of General Regulations and Zoning Ordinances	Chapter 18, "Kenosha Municipal Airport Operations and Regulations," City of Kenosha Code of General Regulations and Zoning Ordinances
	Section 3.19, "Institutional-Park District," City of Kenosha Zoning Ordinances	Section 3.19, "Institutional-Park District," City of Kenosha Zoning Ordinances
	Section 12.26-5, "Airport Overlay District," Kenosha County Zoning Ordinance	Section 12.26-5, "Airport Overlay District," Kenosha County Zoning Ordinance
General Mitchell International	--	Chapter 84, "Height Limitation at Airports," Milwaukee County Code of Ordinances
Lawrence J. Timmerman	--	Chapter 84, "Height Limitation at Airports," Milwaukee County Code of Ordinances
Batten	--	Division 35, "Airport Protection Overlay District." Chapter 20, "Zoning," Racine County Code of Ordinances
Burlington Municipal	Section 17.0303, "Agricultural/Holding District," City of Burlington Zoning Ordinance, and Chapter 17, "Zoning Code," City of Burlington Municipal Code	Chapter 19, "Airport Zoning and Regulation," City of Burlington Municipal Code, as amended
East Troy Municipal	Section 3.14, "Institutional and Public Service District," Village of East Troy Zoning District	--
Hartford Municipal	Chapter 9, "Airport," City of Hartford Municipal Code, and Section 13.0324, "Institutional District," City of Hartford Zoning Ordinance	Chapter 10, "Height of Structures and Trees in the Vicinity of the Hartford Municipal Airport," City of Hartford Municipal Code
West Bend Municipal	Chapter 19, "Municipal Airport," Municipal Code of West Bend	Section 17.11 (e), "Height Limitation Zones," City of West Bend Zoning Ordinance
Waukesha County-Crites Field	Chapter 17, "Zoning Ordinance," Codes and Ordinances of the Town of Pewaukee	Waukesha County ordinance regulating height of structures and trees and regulating use of property in the vicinity of the airport. Adopted under Resolution No. 147, as amended

Source: SEWRPC.

privileges shown by the plans and specifications. Referring in the deed to the plans and specifications and briefly describing them is deemed sufficient legal description to convey the protection privileges set forth in the plans and specifications in the property of the grantor or grantors. If the airport owner is unable to obtain the desired protection privileges by negotiation, he may acquire them by eminent domain in the manner set forth in Chapter 32, except for lands and buildings of railway companies which are necessary to, or are used in connection with, the operation of the railway. If the protection privileges sought extend into more than one county, the plans and specifications shall be filed with the register of deeds of each county. If any parcel of land lies in more than one county, eminent domain proceedings may be instituted in the circuit court of any county in which the parcel is situated, provided a certified copy of the final judgment with a description of the property involved is recorded with the register of deeds of all counties in which the parcel lies. The purchase of aviation

easements for the purpose of protecting such aerial approaches at public-use airports is an eligible item under the airport improvement program.

Of the three privately owned public-use airports in the second-generation regional airport system plan, Batten Airport has acted in cooperation with Racine County and surrounding communities to protect the airspace necessary for aerial approaches to the airport. This has been done through the development of an airport protection overlay district, as noted in Table 68. As of December 1993, no similar land use- or height-related protection had been initiated for either Capitol or Sylvania Airports. Because the purchase of aviation easements is an eligible improvement under the airport improvement program for eligible airports, it is important to note that such easements represent an important option for privately owned publicuse airports to protect the airport approaches against conflicting surrounding land uses.

AIRPORT DEVELOPMENT PROGRAMS

As previously noted, airport development within the Region can be achieved only through the cooperative and coordinated effort of the concerned Federal, State, and local units and agencies of government. This section reviews government programs currently available for airport development and improvement to support the implementation of this regional airport system plan.

The Federal Program

To promote the development of a system of airports to meet the nation's needs, the Federal government embarked on a grant-in-aid program to units of State and local government shortly after the end of World War II. This early program, the Federal Aid Airport Program (FAAP), was authorized by the Federal Airport Act of 1946 and drew its funding from the general fund of the United States Treasury.

In 1970, a more comprehensive program was established with the passage of the Airport and Airway Development Act of 1970. This Act provided matching grants for airport planning under the Planning Grant Program (PGP) and for airport development under the Airport Development Aid Program (ADAP). These programs were funded from a newly established Airport and Airway Trust Fund, into which revenues from several user taxes on such items as airline fares, air freight, and aviation fuel were deposited. The authority to issue grants under these two programs expired on September 30, 1981. During the 11-year period that Act was in effect, 8,809 grants totaling $4.5 billion were approved nationally for airport planning and development.

The current grant program, known as the Airport Improvement Program, was established by the Airport and Airway Improvement Act of 1982 (Title V of the Tax Equity and Fiscal Responsibility Act of 1982, Public Law 97-248, September 3, 1982) and amended by the Airport and Airway Improvements Act of 1987 (Public Law 100-223), the Airport and Airway Safety, Capacity, Noise Improvement and Intermodal Transportation Act of 1992, the 1994 Airport Improvement Program Temporary Extension Act, and the Federal Aviation Administration Authorization Act of 1994. Current legislation authorizes funding from the Airport and Airway Trust Fund for airport development, for airport planning, for noise compatibility planning, and to carry out noise compatibility programs as set forth in the Aviation Safety and Noise Abatement Act of 1979 (Public Law 96-193).

The Trust Fund is currently supported through user charges collected from various segments of the aviation community. These charges include an 10 percent tax on airline tickets, a 6.25 percent tax on air freight waybills, a $6.00 international departure fee per passenger, a $0.15 per-gallon tax on general aviation gasoline, and a $0.175 per gallon tax on jet fuel. Other sources of airport development funding at the Federal level include aircraft registration fees and interest on Trust Fund investments.

The Federal Aviation Administration Authorization Act of 1994 reauthorized the Airport Improvement Program for three years, including the remainder of the 1994 fiscal year and the fiscal years 1995 and 1996. The program was authorized at levels of $2.105 billion for fiscal year 1994, $2.161 billion for fiscal year 1995, and $2.214 billion for fiscal year 1996. In this respect it should be noted, however, that during the annual appropriations process, Congress may also limit the funding for grants to an amount that differs from the initial authorization amounts.

Grants for planning, development, or noise compatibility projects under the Airport Improvement Program are available only in connection with public-use airports, including heliports and seaplane bases. A public-use airport is defined as a publicly owned airport open to the public or pri-

vately owned but designated by the Federal Aviation Administration as a reliever airport or privately owned but having scheduled service and at least 2,500 annual enplanements. Within Southeastern Wisconsin, two privately owned public-use airports may qualify for assistance under this program by virtue of their designation as relievers airport by the Federal Aviation Administration. The privately owned airports are Batten and Capitol Airports. Furthermore, as already noted, the Federal share of allowable costs payable for any eligible and approved project is limited to a maximum of 90 percent, except for major commercial airports such as Mitchell International, for which it is limited to a maximum of 75 percent. The remaining portion of the project cost is the responsibility of the State and the local sponsor.

To be eligible for a grant, an airport must be included in the National Plan of Integrated Airport Systems. The Plan, prepared and published by the Federal Aviation Administration every two years, identifies the public-use airports considered necessary to provide a safe, efficient, and integrated system of airports to meet the needs of civil aviation, national defense, and the U. S. Postal Service. The National Plan currently lists about 3,300 airports, including 10 of 11 airports in the second-generation regional airport system plan for the Southeastern Wisconsin Region. These are Burlington Municipal, Capitol, East Troy Municipal, Hartford Municipal, General Mitchell International, Batten, Kenosha Regional, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, and West Bend Municipal Airports. Only Sylvania, which is included in the regional plan, is not included in the National Plan.

Under the Federal Airport Improvement Program, eligible airports are divided into five categories: 1) commercial service airports, which are publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled service, 2) primary airports, which are commercial service airports that enplane 10,000 or more passengers annually, 3) cargo airports, which are airports providing service to those aircraft transporting only property (including mail) with an aggregate annual landed weight in excess of 100 million pounds, 4) reliever airports, which are airports designated by the Federal Aviation Administration as having the function of relieving congestion at a commercial service airport and providing better general aviation access to the overall community, and 5) other airports, which are the remaining airports which, while not specifically defined in the Federal Act, are referred to as general aviation airports.

The funds for the Airport Improvement Program are distributed in accordance with certain provisions described in the most recent reauthorization of the Airport Improvement Program. Funds distributed by formula for use at a specific airport or in a specific State or insular area are termed "apportionments." The remaining funds are for use at the pleasure of the U. S. Secretary of Transportation and are termed "discretionary."

Under this funding process, no more that 49.5 percent of the Federal Airport Improvement Program Funds may be apportioned to primary airports and cargo airports. Each primary airport apportionment is based upon the number of passengers enplaning at the airport. Cargo airport apportionments are based on the loaded weight of all-cargo aircraft. Except for cases where appropriation actions may require adjustments, no primary airport is apportioned less than $500,000 per year. Cargo apportionments may be in addition to this. This money remains available for use on eligible projects for the fiscal year in which it is first authorized and the two fiscal years immediately following.

A total of 12 percent of the annual appropriation is for use within the states and insular areas. An area-population formula is used to distribute 99 percent of these funds to the 50 states, the District of Columbia, and Puerto Rico for projects at all airports except commercial service airports. The remaining 1 percent of these funds is for projects at airports in the insular areas (Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Virgin Islands). Although these funds are designated for use in these political entities, the Federal Aviation Administration is responsible for determining which airports should receive grants. Additionally, Alaskan airports are apportioned at least as much money as they were apportioned in fiscal year 1980 under previous Federal legislation.

The remaining funds are defined as discretionary, which means they can generally be used at any airport. However, a sizable portion must be used to achieve specific funding minimums. For example, a minimum of 5 percent of all funds is for reliever airports, 1.5 percent is for nonprimary commercial service airports, 12.5 percent is for planning and

implementing noise compatibility programs under the Aviation Safety and Noise Abatement Act of 1979, 0.75 percent is for the preparation of integrated airport system plans, and 2.5 percent is for the development of current and former military airports to improve the capacity of the national air transportation system. Three quarters of the remaining discretionary funds are to be used for primary airports and relievers for capacity, safety, security or noise compatibility projects and one-quarter for any eligible project at any airport.

To assist in the distribution of Federal airport improvement funds, the Federal Aviation Administration has undertaken a state block grant program on a trial basis. Under this program, each of the seven states, including Wisconsin, currently participating in the program receives Federal funding for all airport improvement projects in a single block. This program includes funding for airports in the general aviation airport, reliever airport, and non-primary commercial service airport categories. This program does not include funding for airports in the primary commercial service airport category; such funding is allocated in the usual manner based on annual enplanements. States in the block grant program may then distribute project funds to airport sponsors through subgrants. This program enables each state to use its own priorities and discretion on a broader scale although it does not change the amount of Federal funding available to a specific state.

The State Program

While Federal aids are of great importance, substantial expenditures for public airport development are made by the State and the airport sponsor, which is usually a local unit of government. From 1948 to 1961, State funds were allocated for airport development from both the general fund and from the following aviation user fees: airline property taxes, aircraft registration fees, and aviation fuel taxes. Since 1961, funds generated by transportation user taxes have been the only source of State monies provided. These funds are used by the State to aid sponsors in matching Federal aid and in making airport improvements independent of Federal aid.

The Wisconsin Statutes provide that the cost of projects involving Federal aid in excess of the Federal share shall be borne by the sponsor and the State, except that the State shall pay not more than one-half of eligible costs nor more than $500,000 for the cost of building construction or improvement projects and no part of the cost of hangars. Such State aid may be used for projects at publicly owned airports and at eligible privately owned, public-use airports.

With respect to projects not involving Federal aid, the Statutes provide that the cost may be borne by the State and the sponsor, but that the State's share shall not exceed 80 percent of such eligible costs; however, the State may pay up to 100 percent of the cost of lighting and navigational aids. Only those airports included in the Wisconsin Airport System Plan are eligible for State airport aid. Such State aid is restricted to publicly owned airports.

State funds are appropriated to the Wisconsin Department of Transportation through the biennial budget process to provide funding assistance for eligible local airport projects for other State aeronautics functions. The money appropriated has consistently closely approximated that generated by State taxes on Wisconsin aviation users. State aviation revenue is derived from a $0.06 per gallon tax on aviation gasoline and jet fuel used in general aviation aircraft (nonairline and nonmilitary), an airline ad valorem (property) tax, and general aviation aircraft registration fees. An amount of $20.6 million was anticipated to be available in the 1994-1995 biennium for the State of Wisconsin Department of Transportation's six-year Airport Improvement Program for 1994 through 1999.

Public airport projects in Wisconsin are programmed by the Wisconsin Department of Transportation by means of a six-year Airport Improvement Program. This program consists of a schedule of airport development projects which, in the Department's judgment, provides the best balance among the competing requests for airport improvement funding in light of needs, revenue resources and constraints, and resultant social, economic, and environmental impacts. Every two years, the Department solicits a six-year statement of project intentions from each airport owner in the system. The statements of those airport owners who respond provide the basic input to the development of the six-year program. A priority ranking is given to each eligible work item submitted by an airport owner. These rankings are used to select the highest-priority items from among the work items competing for State and Federal funds. After the projects have been rated and tabulated for each

year, the program is reviewed by the Department. Ultimately, the recommended program reflects the Department policy of funding projects according to three criteria: 1) preserving existing facilities and enhancing safety, 2) responding to present needs, and 3) providing for anticipated needs.

While each airport owner can submit a program of projects, the programs can, and do, vary considerably in character. There are many airports that do not respond to the Department's call for a statement of project intentions. To date, the inclusion of a project in the six-year program has not been a prerequisite for obtaining funding approval. The net effect has been that when programmed high-priority projects are petitioned for, they occasionally replace projects which have been programmed for several years. Since the total dollar value of projects requested in any one year usually exceeds the funds available, some projects must be delayed from the year requested, depending upon priorities, to fit the anticipated available funding.

The programming process is a continuous one, conducted on a two-year cycle. The cycle involves obtaining public comments on the program and process, identifying needed projects, developing alternative project solutions, evaluating and selecting projects, evaluating and selecting a program of projects providing the basis for the biennial budget request, finalizing the program, and reviewing the selected program with the public.

The first two years of the program are consistent with funding provided in the most recent biennial budget and the most likely Federal funding that can be envisioned at this time. Funding of the entire program is dependent upon funding to be provided by the State and Federal legislative bodies in subsequent biennia. Most airports included in the program are municipally owned. Therefore, initiation and funding of each project is also dependent upon action by the airport owner, which is usually a local unit of government.

Local Programs

Locally generated revenues for airport development are most often appropriated from general funds on a pay-as-you-go basis. Occasionally, direct user-benefit taxation is used at airports that have the capability of producing significant revenue from landing fees, building and general rentals, and concessions. It is difficult to predict the levels of local funds that will be available for airport development. Local funds for airport development are not normally earmarked and, therefore, vary from year to year and compete with the funding requirements of other governmental activities. Sources of airport development funding for the local airport sponsor include revenue bonds, general obligation bonds, general fund appropriations, private donations, economic development corporations, and the U. S. Department of Commerce, Economic Development Administration. Another source of locally generated revenues for airports that handle scheduled air carrier passengers is the use of a passenger facility charge. Such a charge is added to each enplaning passenger ticket at a specific airport and may vary from $1.00 to $3.00 per ticket.

While funds for the local share of airport development are normally appropriated on a project-by-project basis, funding for the regular day-to-day operation of airport activities is typically an annual budget item for which airport owners that are counties, cities, or villages are responsible. The funding of airport operations for the eleven airports in Southeastern Wisconsin which make up the current regional airport system plan is typical of airports throughout the United States and varies with the size and nature of activity at each airport.

Of the eight publicly-owned airports in the Region, General Mitchell International Airport has, by far, the greatest revenue producing potential since it is the only airport that serves scheduled passenger air carriers. Milwaukee County, which owns both General Mitchell International and Lawrence J. Timmerman Airports, charges the airlines, concessionaires, and other tenants for use of the airport grounds and facilities. Through lease agreements between the County and the airlines, the airlines have committed to provide funds to meet the airport operating and capital costs at both Mitchell International and Timmerman Airports through aircraft landing fees and terminal building rental fees. All costs of operating, maintaining, and administering Mitchell International and Timmerman, including debt service, are included in the fee structure. Additionally, all capital costs are recovered through depreciation, which is also included in the fee structure. Accordingly, the funding structure for General Mitchell International and Lawrence J. Timmerman Airports is designed by Milwaukee County to generate sufficient revenues to cover all expenses on a continuing basis.

The other six publicly-owned general aviation airports normally must utilize locally generated revenues in combination with lease and rental fees

Table 69

ESTIMATED AVERAGE ANNUAL OPERATING AND CAPITAL EXPENDITURES FOR PUBLICLY OWNED AIRPORTS IN THE REGION: 1990-1994

Airport Name	Average Annual Operating Cost[a]						Local Share of Annual Capital Cost	
	Revenues Provided by User Fees		Revenues Provided by Public Funds		Total Expenses			
	Amount	Percent	Amount	Percent	Amount	Percent	Range	Average
Burlington Municipal	$19,000	100	--	--	$ 19,000	100	$ 9-$32,000	$ 16,000
East Troy Municipal[b]	38,000	40	$ 56,000	60	94,000	100	$ 0-$132,000	26,000
Hartford Municipal	13,000	28	34,000	72	47,000	100	$ 0-$60,000	16,000
Kenosha Regional	98,000	25	291,000	75	389,000	100	$85-$878,000	402,000
Waukesha County-Crites Field	165,000	38	270,000	62	435,000	100	$120-$884,000[c]	476,000
West Bend Municipal	47,000	100	--	--	47,000	100	$0-$43,000	20,000

[a]Estimates provided herein are intended to represent actual day-to-day operating revenues and expenses on a comparable basis and should be used for general comparisons only. Figures shown for airport revenues and expenses in county and municipal account ledgers may differ because of specific local accounting and bookkeeping procedures.

[b]Average is for the years 1989-1993.

[c]Estimates represent budgeted amounts, not actual expenditures.

Source: Airport owners and SEWRPC.

from tenants and users to fund airport operations. Tenants and users pay for the use of facilities through fees and the cost of services rendered. Local residents and businesses pay for the benefits of having public air transportation facilities through tax revenues, in the same manner as other public services are supported. Such revenues typically come from property tax revenues, the amounts varying with the size and nature of activity at a particular airport. For these six publicly owned airports, the estimated operating and capital costs for each airport during the past five years, from 1989 through 1994, together with the amount and proportion of these costs provided by user fees and by tax revenues, are shown in Table 69. While property tax revenues are typically the source of these funds for public airport operation, it is not unusual for minor airport maintenance and repair activities to be provided by existing municipal or county departments, with the attendant cost of such activities absorbed by those departments. Public airport owners, however, usually bill the cost of such activities performed by other departments back to airport-related budgets in order to obtain a better estimate of the true airport operating costs.

The remaining three public-use airports in the current regional airport system plan are privately owned. Over the long term, these airports must recover all of their regular day-to-day operating costs from airport operating revenues. While the annual budgets of these airports are proprietary, it may be noted that all three airports have been in continuous operation for at least several decades.

SUMMARY

The legal and institutional structure for airport facility development and management within the Region has an important influence on the extent and timing of regional airport system plan implementation. Accordingly, the existing pertinent legislative, administrative, and financial resource factors have been described in this chapter. The following are the most significant findings of this examination.

Public airport development in the Region involves Federal, State, and local units and agencies of government; therefore intergovernmental cooperation and coordination are essential to effective airport system development. The local airport sponsor desiring to proceed with airport facility development must look to the Wisconsin Department of Transportation, Division of Aeronautics, and the Federal Aviation Administration for technical and financial assistance. Airport development within the Region will depend upon local sponsors to initiate expansion of existing airports, or development of a new airport, in accordance with recommendations of the regional airport system plan. Normally, such a sponsor must be a public agency or governmental unit. With respect to privately owned public-use airports, only if the proposed improvement project involves an airport designated by the Federal Aviation Administration to be a "reliever" airport or an airport determined by the U. S. Department of Transportation to enplane 2,500 or more passengers annually, is a private sponsor eligible for Federal

and State financial assistance. Availability of local funds to match State and Federal funds for airport development will depend upon the local sponsor's taxing and debt-carrying capabilities and a willingness to fund airport projects in competition with other demands for public financing.

Federal authority for airport facility development is contained in the Airport and Airway Improvement Act of 1982. This Act charges the Federal Aviation Administration with the responsibility of administering the Federal Airport Improvement Program. The program is periodically reauthorized by amendments to the 1982 Act, such as the Federal Aviation Administration Authorization Act of 1994. The program provides financial support and technical guidance for airport system and facilities planning and for land acquisition for eligible airport improvement projects. In addition, the program provides for the development and promulgation of airport design, construction, maintenance standards, and noise compatibility planning and the preparation and biennial review and revision of a National Plan of Integrated Airport Systems.

The basic statutory authority for public airport development in Wisconsin is Chapter 114 of the Wisconsin Statutes, which describes the responsibilities and authority of the Department of Transportation, the revenue sources available for providing the State share of airport development, and the limits of State participation in locally sponsored airport development projects. Chapter 114 also includes a provision for initiating and sponsoring airport facility projects with State or Federal aid by a local sponsor, which can be a county, city, village, town, other owner of an eligible public-use airport, or State agency acting alone or jointly with other units of government and describes the power delegated to a local sponsor to protect aerial approaches to airports. Airport improvement projects for publicly owned airports in Wisconsin are set forth and prioritized by the Wisconsin Department of Transportation in the six-year Airport Improvement Program, an intended schedule of improvements that is conducted on a two-year cycle.

The Wisconsin Statutes also give full authority to counties, cities, towns, and villages to acquire, own, and operate airports; to use bond financing in the development of airports; and to make reasonable rules and regulations and to charge fees to pay for operating costs.

The development and operation of six of the eight publicly owned airports within the Region are governed by airport commissions or committees. These airports are Burlington Municipal Airport in Racine County, East Troy Municipal Airport in Walworth County, Kenosha Regional Airport in Kenosha County, West Bend Municipal and Hartford Municipal Airports in Washington County, and Waukesha County-Crites Field in Waukesha County. The development and operation of Milwaukee County's General Mitchell International and Lawrence J. Timmerman Airports are governed directly by the County Board of Supervisors. In the case of Burlington Municipal Airport and West Bend Municipal Airport, private citizens serve on the governing commissions or committees in addition to public officials. Four of the airports, Kenosha Regional, General Mitchell International, Lawrence J. Timmerman, and Waukesha County-Crites Field, are managed directly by governmental agencies, whereas day-to-day operations of the remaining four publicly-owned airports are managed by fixed-base operators under terms of lease agreements with the units of government.

The attainment of compatible land uses adjacent to airports, in particular for those parcels located under normal flight paths and therefore most exposed to noise and air pollution, has become recognized as an important part of airport system and master planning programs. Although it is better to avoid incompatibility problems by good land use planning from the inception of airport development, the Federal Airport Improvement Program continues to make Federal funds available for the purchase of incompatible land uses which may have, over the years, encroached upon lands near an existing airport. In addition, Federal aviation regulations set forth technical requirements for height zoning upon which local ordinances should be based, as well as runway protection zone requirements.

There are basically two types of zoning that can be used to control the use of land on and around airports in southeastern Wisconsin: comprehensive land use zoning ordinances and special-purpose height zoning ordinances in the vicinity of airports. The Wisconsin Statutes grant comprehensive land use zoning powers to county and local units of government to regulate the use of land and water; the height, size, and placement of structures; and the density of population. The Statutes grant special airport height zoning powers to public bodies that own airports. The Regional Planning Commission has prepared a zoning guide to explain the

fundamentals of good zoning practice and to present a model zoning ordinance to follow in the formation of local zoning ordinances. That guide recommends the adoption of special height zoning ordinances to limit the heights of objects around airports, and thereby protect the airspace in the vicinity of the airport and its runway approaches from the intrusion of natural or man-made objects which would interfere with the safe operation of the airport. The Wisconsin Statutes provide that any county, city, village, or town that owns an airport may protect the aerial approaches to the site by such an ordinance, regardless of whether the site and affected land are located inside or outside the corporate limits of the public airport owner. Such special-purpose height zoning must be supplemented by comprehensive zoning to assure sound onsite uses and the full compatibility of the airport and surrounding land uses, thereby avoiding noise, air pollution, traffic congestion, and safety problems.

A review of the zoning ordinances adopted by governmental units for public-use airports in the Region indicates that, as of December 1993, only Kenosha Regional and Burlington Municipal Airports have proceeded with the preparation of off-airport land use plans, as recommended in the original and the second-generation regional airport system plans. Other than these, the only other off-airport land use controls in effect are height ordinances to prevent obstructions from being placed within the airspace used by approaching aircraft. As of December 1993, there were height control ordinances in place for all publicly owned airports in the Region except East Troy Municipal and for Batten Airport. In most cases, however, the height controls are based on the existing airport layout and do not recognize such possible improvements as runway extensions as envisioned under the appropriate airport master plans and airport layout plan updates.

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Chapter VI

OBJECTIVES, PRINCIPLES, AND STANDARDS

INTRODUCTION

Planning may be defined as a rational process for formulating and meeting objectives. The formulation of objectives is, therefore, an essential task which must be undertaken before plans can be prepared. The formulation of objectives for organizations whose functions are directed primarily at a single purpose or interest, and are therefore direct and clear cut, is a relatively easy task. The seven-county Southeastern Wisconsin Planning Region, however, is composed of many diverse and often divergent interests. Consequently, the formulation of objectives for the preparation of advisory regional development plans such as this regional airport system plan is a very difficult task.

Soundly conceived regional airport development objectives should incorporate the knowledge of many people who are informed about the Region and its airports and should be established by duly elected or appointed representatives legally assigned this task, rather than by planning technicians. This is particularly important because of the value-system implications inherent in any set of development objectives. Active participation by duly elected or appointed public officials and by citizen leaders in the regional planning program is implicit in the structure and organization of the Southeastern Wisconsin Regional Planning Commission itself. Moreover, early in its existence the Commission recognized that the task of guiding the broad spectrum of related public and private development programs which would influence, and be influenced by, a comprehensive regional planning program would offer a broad opportunity for the active participation of public officials and private-interest groups in the regional planning process. In the light of this, the Commission provided for the establishment of advisory committees to assist the Commission and its staff in the conduct of the regional planning program.

The advisory committee structure created by the Commission for the reevaluation of the regional airport system plan was described in Chapter I of this report. The use of advisory committees appears to be the most practical and effective way available to involve officials, technicians, and citizens in the regional planning process and to arrive openly at decisions and action programs which can shape the physical development of the Region. Only by combining the knowledge and experience that the various advisory committee members possess about the Region can a meaningful expression of the desired direction, magnitude, and quality of regional development be obtained. One of the major tasks of these committees, therefore, is to assist in the formulation of regional development objectives, supporting planning principles, and planning standards.

Since the original and the second-generation regional airport system plans were prepared, changes have occurred in the demand for aviation services and facilities. Additional knowledge about the Region and its airports and aviation activity has been obtained and additional objectives have been developed under related regional and subregional planning programs. The degree of attainment of each of the various adopted regional airport system development objectives since the adoption of the original regional airport system plan in 1976 and of the second-generation regional airport system plan in 1987 has varied considerably. Because of this, and because of both adverse and favorable public reaction to plan implementation proposals, careful review of the regional development objectives and supporting principles and standards was deemed essential to a proper reevaluation of the adopted regional airport system plan. That review indicated that the basic objectives and supporting principles and standards continued to be valid and could be used to guide plan design and evaluation for the system plan update. This chapter sets forth the results of that review in the form of revised regional airport system development objectives, principles, and standards which have been adopted by the Commission after careful review and recommendation by the Commission staff and the study advisory committee.

BASIC CONCEPTS AND DEFINITIONS

The term "objective" is subject to a wide range of interpretation and application and is closely linked

to other terms often used in planning work which are also subject to a wide range of interpretation and application. Therefore, in order to provide a common frame of reference, the following definitions have been adopted for use in the regional planning efforts:

1. Objective: A goal or end toward the attainment of which plans and policies are directed.

2. Principle: A fundamental, primary, or generally accepted tenet used to support objectives and prepare standards and plans.

3. Standard: A criterion used as a basis of comparison to determine the adequacy of plan proposals to attain objectives.

4. Plan: A design which seeks to achieve agreed-upon objectives.

5. Policy: A rule or course of action used to ensure plan implementation.

6. Program: A coordinated series of policies and actions to carry out a plan.

Although this chapter deals only with the first three of these terms, an understanding of the interrelationship among the foregoing definitions and the basic concepts which they represent is essential to the following discussion of objectives, principles, and standards.

OBJECTIVES

In order to be useful in the regional planning process, objectives must be logically sound and related in a demonstrable and measurable way to alternative physical development proposals. Only if the objectives are clearly related to physical development and only if they are subject to objective test can an intelligent choice be made of the plan or combination of plans which best meets the agreed-upon objectives from among alternative plans.

In any consideration of objectives, it must be recognized that various private- and public-interest groups within a region as large and diverse as Southeastern Wisconsin may have varying, and at times conflicting, objectives; that many of the objectives are of a qualitative nature and are, therefore, difficult to quantify; and that many objectives which may be held to be important by the various interest groups may not be related in a demonstrable manner to physical development plans. Accordingly, the following airport system development objectives have been adopted by the Commission after careful review and recommendation by the Technical Coordinating and Advisory Committee on Regional Airport System Planning:

1. An integrated regional airport system which will effectively serve the existing and probable future interregional and intraregional air travel demand with appropriate types and adequate levels of service; alleviate air traffic congestion; and reduce travel times between the Region, its component parts, and other regions.

2. A regional airport system which will minimize accident exposure and provide increased travel safety.

3. A regional airport system which will be compatible with the existing land use patterns and adopted land use plans.

4. A regional airport system which will be properly related to the underlying and sustaining natural resource base and will minimize the existing and potential adverse effects upon that natural resource base.

5. A regional airport system which will promote flexibility, allowing air transportation service to adapt readily to changes in the demands for air transportation and to changes in aviation technology.

6. A regional airport system which will be intermodal in nature and properly related to, and integrated with, other transportation systems serving the Region.

7. A regional airport system which will be properly related to the regional public utility systems, permitting the efficient and economical provision of necessary public utility services to airport and airport-related land use development.

8. A regional airport system which will be located and designed to maintain a high aesthetic quality, with proper visual relation of the facilities to the landscape and cityscape.

9. A regional airport system which will be economical and efficient, meeting all other objectives at the lowest possible cost.

Complementing each of the foregoing airport development objectives is a planning principle and a set of planning standards, set forth in Table 70. Each set of standards is directly related to the planning principles, as well as to the objective, and serves to facilitate quantitative application of the objective in plan design, test, and evaluation. The planning principle, moreover, supports each specific objective by asserting its validity.

The planning standards adopted herein fall into two groups, comparative and absolute. The comparative standards, because of their nature, can be applied only through a comparison of alternative plan proposals. Absolute standards can be applied individually to each alternative plan proposal, since they are expressed in terms of maximum, minimum, or desirable values. The standards set forth herein should serve as aids, not only in the development, test, and evaluation of regional airport system plans, but also in the development, test, and evaluation of specific airport facility improvement plans and in the development of plan implementation policies and programs.

OVERRIDING CONSIDERATIONS

In the application of the planning standards and in the preparation of this second-generation regional airport system plan, several overriding considerations, particularly legal and financial constraints, must be recognized. First, it must be recognized that an overall evaluation of the second-generation airport system plan must be made on the basis of cost. Such an analysis may show that the attainment of one or more of the objectives or supporting standards is beyond the economic capability of the Region, and, therefore, that the objectives or standards cannot be met practicably and must either be reduced or be eliminated. Second, it must be recognized that it is unlikely that any one plan proposal will meet all the objectives and standards completely; the extent to which each objective and standard is met, exceeded, or violated must serve as a measure of the ability of each alternative plan proposal to achieve the specific objectives. Third, it must be recognized that certain objectives and standards may be in conflict, requiring resolution through compromise, and that meaningful evaluation of the updated plan may take place only through comprehensive assessment of each of the alternative plans against all the objectives and standards.

SUMMARY

This chapter has presented the airport system development objectives, principles, and standards developed and adopted by the SEWRPC Technical Coordinating and Advisory Committee on Regional Airport System Planning and the Commission itself to guide the updated airport system plan design, test, evaluation, and implementation. The nine specific airport development objectives have been reviewed in the context of changes which have occurred in the demand for aviation services and facilities, additional knowledge about the Region's airports and aviation activity, the degree to which each of the airport system development objectives has been obtained, and public reaction to various plan implementation proposals.

The standards which support the nine specific objectives also provide important guidelines for subsequent airport master plan update and preparation, facility design efforts, and related plan implementation efforts. This chapter thus documents the updated objectives and supporting standards which the recommended regional airport system plan is intended to meet and the criteria by which implementation policies and programs can be designed to carry out the second-generation system plan and ensure compatibility and consistency between individual airport improvement efforts and the regional airport system plan.

Table 70

OBJECTIVES, PRINCIPLES, AND STANDARDS

OBJECTIVE NO. 1

An integrated regional airport system which will effectively serve the existing and probable future interregional and intraregional air travel demand with appropriate types and adequate levels of service; alleviate air traffic congestion; and reduce travel times between the Region, its component parts, and other regions.

PRINCIPLE

Air transportation represents an important modal element of a balanced regional transportation system. Aircraft offer a particularly effective means for meeting the need for relatively high-speed, long-distance movement of people and goods within and beyond the Region. Good air transportation is essential to inducing certain types of commercial, industrial, and recreational development. Airport facilities are necessary to provide an adequate level of transportation service to all segments of the population, to support properly certain essential economic and social activities, and to achieve economy and efficiency in the provision of transportation service. The unavailability of the necessary type of airport within convenient driving time and distance and air traffic congestion increase the cost of transportation, necessarily resulting in higher production costs and decreasing productivity, which, in turn, adversely affects the relative market advantages of business, industrial, and recreational activities within the Region. The development of a regional airport system should, therefore, seek to maximize economy and efficiency in the provision of air transportation services to the Region and its various subareas and in all types of aviation, including scheduled and charter air carriers; regional or commuter carriers; air taxi operations; business, corporate, and commercial users; recreational, sport, and personal flying; pilot training; and military activities.

STANDARDS

1. All airports included in the regional airport system plan shall be classified in accordance with the following airport classification scheme:

Classification	Anticipated Aircraft Types Served[a]	Capability for Precision Approaches	Airport Service Area	
			Minimum Resident Population and Employment	Desirable Location
Basic Utility (BU)	All single-engine and many twin-engine general aviation aircraft under 12,500 pounds with approach speeds of less than 121 knots and wingspans of less than 49 feet	No	3,000 people or 2,000 jobs	Maximize the proportion of the resident population and jobs within 30 minutes' peak-hour ground travel time or within 15 miles of the airport
General Utility (GU)	All single-engine and twin-engine general aviation aircraft under 12,500 pounds with approach speeds less than 141 knots and wingspans of less than 79 feet	No	10,000 people or 6,500 jobs	Maximize the proportion of the resident population and jobs within 30 minutes' peak-hour ground travel time or within 15 miles of the airport
Transport-Corporate (TC)	All general aviation aircraft with approach speeds under 166 knots and with wingspans of less than 79 feet and possibly regional and commuter air carrier aircraft with approach speeds under 121 knots and with wingspans up to 118 feet	Yes	50,000 people or 33,000 jobs	Maximize the proportion of the resident population and jobs within 45 minutes' peak-hour ground travel time or within 30 miles of the airport
Air Carrier (AC)	All single-engine and multi-engine air carrier and general aviation aircraft of any weight and any approach speed and with wingspans up to 262 feet	Yes	1,000,000 people or 650,000 jobs	Maximize the proportion of the resident population and jobs within 60 minutes' peak-hour ground travel time
Heliport	Helicopters	Under special circumstances	Not applicable	As needed to serve special traffic generators effectively

Source: Federal Aviation Administration and SEWRPC.

2. Airports of the classification indicated should be provided when the forecast demand reaches the following threshold levels:

Classification	Aircraft Served[a]		Minimum Annual Critical Aircraft[b] Itinerant[c] Operations
	Aircraft Type	Aircraft Reference Code (ARC)	
Basic Utility (BU)	All single-engine and many twin-engine general aviation piston aircraft under 12,500 pounds	A-I and B-I under 12,500 pounds	500
General Utility (GU)	All single-engine and twin- engine general aviation aircraft under 12,500 pounds, both piston and turboprop	A-II, B-II, and C-II under 12,500 pounds	500
Transport-Corporate (TC)	All general aviation aircraft, including business and corporate jets and possibly regional and commuter air carrier aircraft	A-III, B-III, C-I, D-I, and D-II. Also A-II, B-I, B-II, and C-II 12,500 pounds or over	500 by business or corporate jets
Air Carrier (AC)	All air carrier and general aviation aircraft	C-III, C-IV, D-IV, and D-V	500 by transport aircraft
Heliport	Helicopters	--	400 by air taxi or 800 total

Source: Federal Aviation Administration and SEWRPC.

3. Each airport classification type included in the regional airport system plan should provide the following fundamental facilities and site area:

Facilities	Airport Classification				
	Basic Utility	General Utility	Transport-Corporate	Air Carrier	Helicopter
Primary Runway Length[d]	2,800 feet to 3,900 feet	3,900 to 4,800 feet as required by the critical aircraft	4,800 to 6,800 feet as required by the critical aircraft	6,800 to 9,800 feet as required by the critical aircraft	1.5 times length of largest helicopter
Width	60 feet	60 to 75 feet as required by the critical aircraft	75 to 100 feet as required by the critical aircraft	100 to 200 feet as required by the critical aircraft	1.5 times length of largest helicopter
Crosswind	Consider if wind coverage on primary runway is less than 95 percent; minimum 80 percent of length of primary runway	Consider if wind coverage on primary runway is less than 95 percent, minimum 80 percent of length of primary runway	Recommended if wind coverage on primary runway is less than 95 percent, minimum 80 percent of length of primary runway	Recommended if wind coverage on primary runway is less than 95 percent, minimum 80 percent of length of primary runway	Not applicable
Taxiways	Partial parallel taxiways as required for capacity and safety and appropriate connecting taxiways	Full parallel taxiway on pri mary runway at 20,000 operations, exit and other parallel and connecting taxiways when required to increase capacity or for safety	Full parallel taxiway on pri mary runway at 24,000 operations, exit and other parallel and connecting taxiways when required to increase capacity or for safety	A full parallel and connecting taxiway system sufficient to eliminate all taxiing on active runways	A pathway for hover training or ground training, connecting the takeoff and landing area with a separate terminal or service area
Minimum Land Acreage[e] (excludes noise-buffer area)	60 acres (based on single runway of minimum length)	104 to 110 acres	269 to 347 acres	As required by airfield, ap proach area, building and facility needs	As required by site
Minimum Airfield Lighting[f]	MIRL and MITL, obstruction lighting as appropriate	MIRL and MITL, obstruction lighting as appropriate	HIRL on precision instrument runway, MIRL on all other runways, MITL on taxiways, obstruction lighting as appropriate	HIRL on precision instrument runway, MIRL on other runways, MITL on taxiways, obstruction lighting as appropriate	Perimeter lighting, obstruction lighting as appropriate
Minimum Terminal NAVAIDS[g]	REILS as necessary, VASI-2 or PAPI, beacon, and lighted wind cone	VOR, or GPS approach as appropriate, REILS as necessary, and/or VASI-2 or PAPI, beacon, and lighted wind cone	ILS, OM-LOC, or GPS approach as appropriate, MALS or REILS as necessary, VASI-4 or PAPI on nonILS runways, and lighted wind cone	CAT I ILS, ALS, ASR, VASI-6 (3 bar) on non-ILS runways or PAPI, beacon, and lighted wind cone	Lighted wind cone, beacon, and landing lights as required
Aprons	For each transient on-ground aircraft and for 10 percent of total based fixed-wing aircraft, general aviation aircraft under 12,500 pounds, 360 square yards	For each transient on-ground aircraft and for 10 percent of total based fixed-wing aircraft, general aviation aircraft under 12,500 pounds, 360 square yards	For each transient on-ground aircraft and for 10 percent of total based fixed-wing aircraft, general aviation aircraft under 12,500 pounds, 360 square yards; 12,500 pounds and over, 530 square yards	Air carrier aircraft require ments based on seating capacity: 200+, 15,000 square yards; 120-199, 6,000 square yards; 75-119, 4,000 square yards; 55-74, 3,000 square yards; 64 or less 3,000 square yards	General aviation aircraft under 12,500 pounds, 360 square yards per on-ground itinerant aircraft
Terminal Size	50 square feet per peak-hour pilot and passenger for general aviation administration, lounge, and fixed-base operator areas	50 square feet per peak-hour pilot and passenger for general aviation administration, lounge, and fixed-base operator areas	50 square feet per peak-hour pilot and passenger for general aviation administration, lounge, and fixed-base operator areas	Air carrier, 150 square feet per peak-hour passenger; general aviation, same as General Utility-Stage II	Administration, lounge, and fixed-base operator areas as appropriate for size

Facilities	Airport Classification				
	Basic Utility	General Utility	Transport-Corporate	Air Carrier	Helicopter
Auto Parking	General aviation, 1.3 spaces per peak-hour pilot and passenger	General aviation, 1.3 spaces per peak-hour pilot and passenger	General aviation, 1.3 spaces per peak-hour pilot and passenger	Air carrier, 1.5 spaces per peak-hour passenger plus employee parking as appropriate	General aviation, 1.3 spaces per peak-hour pilot and passenger
Aircraft Storage Hanger Area	For general aviation aircraft under 12,500 pounds, 3,000 square feet	For general aviation aircraft under 12,500 pounds, 3,000 square feet	For general aviation aircraft under 12,500 pounds, 3,000 square feet; 12,500 pounds to 60,000 pounds, 4,000 square feet	For general aviation aircraft under 12,500 pounds, 3,000 square feet; 12,500 pounds to 60,000 pounds, 4,000 square feet; as appropriate for general aviation and air carrier aircraft over 60,000 pounds	For general aviation aircraft under 12,500 pounds, 3,000 square feet
Fixed-Base Operator/ Maintenance Hanger Areas	For general aviation aircraft with single engine, 3,700 square feet; with twin engines, 4,700 square feet	For general aviation aircraft with single engine, 3,700 square feet; with twin engines, 4,700 square feet	For general aviation aircraft with single engine, 3,700 square feet; with twin engines, 4,700 square feet; with jet engines, 6,800 square feet	For general aviation aircraft with single engine, 3,700 square feet; with twin engines, 4,700 square feet; with jet engines, 6,800 square feet; as appropriate for general aviation and air carrier aircraft over 60,000 pounds	For general aviation aircraft with single engine, 3,700 square feet; with twin engines, 4,700 square feet
T-Hanger Areas	2,370 square feet per aircraft space, including access	2,370 square feet per air craft space, including access	2,370 square feet per air craft space, including access	2,370 square feet per air craft space, including access	2,370 square feet per air craft space, including access
Tie-Down Areas	2,720 square feet per aircraft space, including access	2,720 square feet per air craft space, including access	2,720 square feet per air craft space, including access	2,720 square feet per air craft space, including access	2,720 square feet per air craft space, including access

Source: Federal Aviation Administration and SEWRPC.

4. Adequate capacity should be provided at all airports to limit takeoff and landing delays. Acceptable delays are four minutes per aircraft at air carrier airports and two minutes per aircraft at general aviation facilities.

5. Either a General Utility or Transport-Corporate airport should be provided within 30 minutes' ground travel time of all air carrier airports to provide reliever general aviation service when the air carrier airport is operating or forecast to operate at 60 percent of its annual service volume (ASV).

OBJECTIVE NO. 2

A regional airport system which will minimize accident exposure and provide increased travel safety.

PRINCIPLE

Accidents involving aircraft take a heavy toll in lives, property damage, and human suffering. Accidents contribute substantially to overall transportation costs and, in turn, increase public costs. Every attempt must be made to reduce both the incidence and severity of accidents. This requires, in addition to designing the airport system in accordance with the standards set forth herein, strict adherence to good rules and regulations of airport operation. The latter can be achieved only through effective airport and airway management.

1. All public-use airports in the regional airport system should conform to the airport planning design standards defined in Objectives No. 1 and No. 5.

2. Any structure to be constructed in the Region, particularly in the vicinity of any airport, should conform to the minimum obstruction clearance standards established in Federal Aviation Regulations Part 77, "Objects Affecting Navigable Airspace."

3. Priority should generally be given to maintaining and-or upgrading existing facilities to a safe condition before constructing new facilities.

4. Height restriction zoning ordinances that limit physical structural obstructions or the visual hazards they create should be adopted and enforced by the appropriate unit of government (local, county, State, or Federal) at all public-use airports in the regional airport system to ensure safe air traffic patterns and compatible land uses surrounding the airports.

5. Runway protection zones should be kept clear of incompatible objects and activities and not be utilized as sites for the placement of residences and places of public assembly. The area within the runway protection zone, but outside the object free area extension, may be used, if necessary, for limited uses providing they do not attract wildlife and do not interfere with air navigation aides. Automobile parking facilities are discouraged within the runway protection zone.

OBJECTIVE NO. 3

A regional airport system which will be compatible with the existing land use patterns and adopted land use plans.

PRINCIPLE

The proper allocation of uses of land can avoid or minimize hazards to health, safety, and welfare and maximize amenities and convenience. Airport facilities should be located and designed so as to minimize the potential adverse effects of airport development and operation on the surrounding land uses, to encourage the development of land uses which benefit from locations in proximity to airports, and to discourage the development of land uses which conflict with airport development and operation. Also, the regional airport system should minimize the exposure of the Region's population to harmful, as well as annoying, noise levels.

STANDARDS

1. To minimize the potential conflicts between land uses in the vicinity of airports and aircraft operations, to provide transition areas between airports and residential and similar land use areas and to prevent the further encroachment of incompatible land uses around airports, land uses and developments around airports should be permitted in accordance with the following noise estimation:

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential	Yes	No	No	No	No	No
Lodging	Yes	No	No	No	No	No
Manufacturing, Heavy, General	Yes	Yes	Yes[h]	Yes[h]	Yes[h]	No
Manufacturing, Delicate	Yes	Yes	Yes[h]	Yes[h]	No	No
Transportation	Yes	Yes	Yes[h]	Yes[h]	Yes[h]	Yes[h]
Utilities, Communication	Yes	Yes	Yes[h]	Yes[h]	No	No
Trade, Retail	Yes	Yes	Yes[h]	Yes[h]	No	No
Trade, Wholesale	Yes	Yes	Yes[h]	Yes[h]	Yes[h]	No
Government	Yes	Yes	Yes[h]	Yes[h]	No	No
Institutional, Cultural	Yes	Yes[h]	Yes[h]	No	No	No
Entertainment, Recreational	Yes	Yes	Yes[h]	No	No	No
Resource Extraction	Yes	Yes	Yes	Yes	Yes	Yes
Agriculture	Yes	Yes[h]	Yes[h]	Yes[h]	Yes[h]	Yes[h]
Livestock Farming	Yes	Yes[h]	Yes[h]	No	No	No
Undeveloped Land and Water	Yes	Yes	Yes	Yes	Yes	Yes

Source: Federal Aviation Administration and SEWRPC.

2. Airports classified as General Utility or larger, considered capable of generating airport-related urban land development, should be located so as to minimize encroachment on proposed agricultural and open land uses and to minimize requirements for extensive changes or additions to recommended urban service plan elements in adopted land use, transportation, and utility system plans.

3. Taking of homes, businesses, and industries, as well as land, for airport improvement should be minimized.

OBJECTIVE NO. 4

A regional airport system which will be properly related to the underlying and sustaining natural resource base and will minimize the existing and potentially adverse effects upon that natural resource base.

PRINCIPLE

The natural resources of the Region are limited. Therefore, it is imperative that a balance be maintained between the activities of man and the underlying and sustaining natural resource base. The proper location and design of airport facilities can minimize the potentially harmful effects of such development upon the environment and assist in preserving and protecting the natural resource base.

STANDARDS

1. Floodlands which would cause, or be subject to, flood damage should not be allocated to any airport development.

2. No airport development should be allowed to encroach upon, and obstruct the flow of, water in the perennial stream channels and floodways.

3. The destruction of wetlands, woodlands, and natural wildlife habitat areas by airport development should be minimized, consistent with safety. When it is necessary to use such lands and areas for airport development, necessary mitigation measures should be undertaken.

4. Improvements or new facilities proposed for the regional airport system should minimize any adverse impacts on historic, cultural, scenic, or parkland sites.

OBJECTIVE NO. 5

A regional airport system which will promote flexibility, allowing air transportation service to adapt readily to changes in the demands for air transportation and to changes in aviation technology.

PRINCIPLE

Aviation technology is in a constant and rapid state of change, as is reflected in changing aircraft size and performance, advances in navigational aids, and decreases in the cost of air transportation. In order to assure maximum efficiency and benefits, the regional airport system should be located and designed so as to be adaptable to potential changes in demand which may be brought about by changes in technology.

STANDARDS

1. Runways, taxiways, and aprons shall be sized so that the forecast activities will represent no more than 60 percent of the landing area system's annual service volume (ASV).

2. Airport design, in accordance with the standards developed to meet Objective No. 1, will provide sufficient land area at each airport, except where noted, for provision of the kinds of landing area modifications and additions listed below that should be constructed when aviation activity reaches the level described.

Airport Development Item	Activity Level	Remarks
Runway (additional)	60 percent of the annual service volume	Parallel preferred; same length and strength as primary if serving same aircraft; additional land area for airport may be necessary to facilitate new runway, the physical area dependent on new runway's location and length
Runway Extension	Number of annual operations by range of critical aircraft types as shown in Standard No. 2 of Objective No. 1	Extension must be justified by change in critical aircraft requirements; and additional land area for airport may be necessary to facilitate extended runway, the physical area dependent on new runway's location and length
Short Runway	75,000 total operations, including 30,000 or more transport type aircraft	Small aircraft only; not necessarily parallel; and additional land area for airport may be necessary to facilitate new runway, the physical area dependent on new runway's location and length
Extension of Short Runway	60 percent of the annual service volume	--
Additional Taxiway Exits	60 percent of the airport hourly capacity	--
Holding Apron/Bypass Taxiway	75,000 total operations, 20,000 itinerant operations, or 30 peak-hour operations	Need dependent upon aircraft mix, consider effect on NAVAIDS. limit holding apron to four positions
Terminal Aprons, Aircraft Loading Aprons, Parking Aprons	60 percent of the runway hourly capacity	--

Source: Federal Aviation Administration and SEWRPC.

3. The site area provided for airport terminal facilities should be sized so that forecast passenger and cargo demands will represent 60 percent of the airport terminal facility system's annual capacity.

4. All airport facilities within the regional system should be constructed to the minimum design standards set forth for runways, taxiways, and approach zones by the Federal Aviation Administration in its Advisory Circular No. 150/5300-13, "Airport Design," including all appropriate changes.

OBJECTIVE NO. 6

A regional airport system which will be intermodal in nature and properly related to, and integrated with, other transportation systems serving the Region.

PRINCIPLE

Air transportation is particularly multimodal by nature; almost all person trips and cargo movements made by air involve utilization of surface transportation facilities. Surface transportation facility and airport development are, therefore, highly interdependent and the efficient movement of persons and goods between surface points of origin or destination and airports is essential to the attainment of good air transportation service within the Region. Surface transportation facilities are an important consideration in airport location and development. Airport development, in turn, may generate additional loadings on the surface transportation system and may require adjustments in that system.

STANDARDS

1. Airport facilities should be planned and designed, as appropriate, to provide for the efficient interchange of passengers between air carrier and general aviation airports and other modes of passenger transportation.

2. Airport facilities should be planned and designed, as appropriate, to provide for the efficient interchange of freight, express, and mail between air carrier and general aviation airports and other modes of freight and cargo transportation.

3. The main airport entrance road should be connected directly to, or served in the manner indicated by, the following highway facilities:

Airport Classification	Highway Facility Serving the Airport
Basic Utility	Served by a country trunk arterial highway within one mile or directly connected to a local trunk arterial highway
General Utility	Directly connected to a county trunk arterial highway
Transport-Corporate	Served by a state trunk highway within two miles and directly connected to a country trunk arterial highway
Air Carrier	Directly connected to a freeway
Heliport	Directly connected to a state trunk highway within one mile

Source: Federal Aviation Administration and SEWRPC.

4. The terminal at an air carrier category airport serving scheduled air carriers and the principal or central business district of the airport service area should be directly connected by public rapid-transit or express-transit services.

5. Average auto travel time between the principal, or central, business district of the airport service area and an air carrier airport serving scheduled air carriers should not be more than 30 minutes during off-peak periods. Line-haul travel time by public transit should not exceed off-peak auto travel time by more than 50 percent.

6. General aviation shall be provided to all residents of the Region within an auto travel time not exceeding 40 minutes during off-peak periods.

7. Off-peak ground travel time between 50 percent of the Region's major retail and service and industrial centers, including concentrations of office employment and an air cargo service facility, shall not be more than 30 minutes.

OBJECTIVE NO. 7

A regional airport system which will be properly related to the regional public utility systems, permitting the efficient and economic provision of necessary public utility services to airport and airport-related land use development.

PRINCIPLE

Airport development and utility service development are interdependent in that utility services are essential to airport and airport-related land use development. Such development, in turn, generates an additional load on utility systems. Airport development should, therefore, be coordinated with utility system development to assure the economical provision of necessary public utility services, such as sewerage, water supply, power, and communication.

STANDARDS

1. Land developed, or proposed to be developed, for all Air Carrier, Transport-Corporate, and General Utility airports should be located in areas serviceable by an existing or proposed public sanitary sewerage system.

2. Land developed or proposed to be developed for all Air Carrier, Transport-Corporate, and General Utility airports should be located in areas serviceable by an existing or proposed public water system.

OBJECTIVE NO. 8

A regional airport system which will be located and designed to maintain a high aesthetic quality, with proper visual relation of the facilities to the landscape and cityscape.

PRINCIPLE

Beauty in the physical environment is conducive to the physical and mental health and well-being of people. As a major feature of the landscape and cityscape, airport and airport-related facilities have an important impact on the aesthetic quality of the total environment. As such, the regional airport system should maintain a physical environment which has both aesthetic quality and a visual relationship to the surrounding landscape and cityscape.

STANDARDS

1. Airport facilities should be located to avoid destruction of visually pleasing buildings, structures, historical landmarks, and scenic features and to avoid interference with vistas to such features.

2. Airport facility construction plans should be developed using good geometric, structural, architectural, and landscape design standards which consider the aesthetic quality of the airport facilities and the areas in which they are located.

OBJECTIVE NO. 9

A regional airport system which will be economical and efficient, meeting all other objectives at the lowest possible cost.

PRINCIPLE

The total resources of the Region are limited and any undue investment in airport facilities and services must occur at the expense of other public and private investment. Therefore, the regional airport system should minimize the total capital and operating costs for the desired level of service.

STANDARD

1. The sum of the airport facility operating and capital investment costs should be minimized.

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[a]Aircraft weights refer to maximum gross takeoff weight. Aircraft indicated are those normally expected to be accommodated under typical conditions. Specific airport needs may warrant variation in the type of aircraft served based on unique local considerations.

[b]Critical aircraft type is defined as the most demanding aircraft type whose operation at the airport establishes the minimum facility requirements.

[c]Itinerant operation is defined as an operation performed by an aircraft taking off from one airport and landing at another airport in the course of one air flight.

[d]The runway lengths prescribed assume an elevation of 1,000 feet above sea level, a mean daily maximum temperature of 83°F, zero headwind, maximum certified takeoff and landing weights, optimum flap setting for the shortest runway length (normal operation), dry runway conditions, zero runway gradient, and no displaced thresholds. Runway lengths have been rounded to the next highest 100-foot increment and are to be used for planning purposes only. During the actual design of new runways or runway improvements, individual airplane flight manuals for the critical aircraft anticipated to use the runway should be consulted for specific performance information. Runway lengths described herein are intended for aircraft types normally expected to be accommodated under typical conditions. Specific airport needs may warrant variation from these runway lengths based on unique local considerations.

[e]Based upon single runway of minimum length with minimum areas for buildings and facilities.

[f]Airfield lighting:

HIRL - High-Intensity Runway Lights
MIRL - Medium-Intensity Runway Lights
MITL - Medium-Intensity Taxiway Lights

[g]Minimum Terminal NAVAIDS (Aids to Air Navigation) if FAA minimum requirements are met:

ILS — *An Instrument Landing System provides an approach path for the exact alignment and descent of an aircraft on final approach to a runway. The system provides electronic guidance and range information as well as some visual reference information. CAT I ILS-Category I ILS provides capability for aircraft to operate down to a minimum of 200 feet decision*

height (ceiling) and 2,400 feet runway visual range (RVR), or one-half-mile visibility. CAT II ILS-Category II ILS provides capability for aircraft to operate down to a minimum of 100 feet decision height (ceiling) and 1,200 feet runway visual range (RVR). CAT III ILS- Category III ILS provides capability for aircraft to operate without a minimum decision height and a runway visual range that varies from zero to 700 feet.

ALS — *Approach Lighting System, normally a requirement when ILS is available.*

ASR — *Airport Surveillance Radar.*

VASI — *Visual Approach Slope Indicator: VASI provides a visual flight path within the approach zone at a fixed plane which an approaching pilot can see and utilize for descent guidance. The -6 indicates a three-light bar VASI used for technically sophisticated aircraft operations, such as air carrier; -4 represents a two-light bar VASI for use by less sophisticated aircraft such as corporate or business jets; and -2 represents a light bar unit that is normally used in conjunction with smaller general aviation aircraft operations.*

PAPI — *Precision Approach Path Indicators: PAPI is a system of lights arranged to provide visual descent guidance during an approach to a runway. PAPI systems serve the same function as VASI systems but have replaced VASI systems as the approach aid approved by the FAA when appropriate.*

Beacon — *Lighted beacon providing visual reference to airport location at night.*

Lighted Wind Cone — *Provides runway-use information to the pilot day or night.*

OM-LOC — *Outer Markers and Localizer Components of ILS, which can be utilized separately as aids to air navigation and also as an approach aid to a specific runway.*

MALS — *Medium Intensity Approach Light System.*

VOR — *Very High-Frequency Omnidirectional Range beacon used as an aid to air navigators.*

TVOR — *Terminal VOR located in the immediate vicinity or within property limits of an airport, which provides greater flexibility as an approach aid than does a remotely located VOR.*

REILS — *Runway End Identification Light System.*

NDB — *Nondirectional Radio Range Beacon used for air navigation.*

GPS — *Global Positioning System: The GPS is a satellite-based radio navigation system which utilizes precise range measurements from GPS satellites to determine precise position anywhere in the world. It is composed of space, control, and user elements. The space element will be composed of 24 satellites in six orbital planes. The control element consist of five monitor stations, three ground antennas and a master control station. The user element consist of antennas and receiver-processors that provide positioning, velocity, and precise timing to the user.*

[h]*This land use should be permitted only if appropriate noise level reduction features are incorporated into the design and construction of facility areas to be used by the public or employees.*

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Chapter VII

AIRPORT SYSTEM FORECASTS

INTRODUCTION

Forecasts of aviation demand provide an important basis for determining the need for new or expanded components of the Regional Airport System. By comparing existing and probable future aviation demands with the capacity of the existing system components, potential deficiencies may be identified, needed facility improvements and expansions proposed, and a schedule of the completion of the needed improvements determined. Accordingly, the regional airport system plan reevaluation effort included the preparation of revised and updated forecasts of aviation demand through the year 2010. This was accomplished through the review, reestimation, and updating, as necessary, of the existing plan forecasts. The base year for the forecasts was 1993, reflecting the most current available annual data on existing demand.

The forecasts of airport system demand presented in this chapter are divided into six categories. These categories are: 1) passenger air carrier activity, 2) general aviation activity, 3) air cargo activity, 4) military aviation activity, 5) helicopter activity, and 6) other aviation activity. The forecasts of passenger air carrier and general aviation activity are especially important since these two areas represent a very large proportion of all aviation activity in Southeastern Wisconsin.

PASSENGER AIR CARRIER FORECASTS

With respect to facility requirements to meet passenger air carrier demand, perhaps the most important forecast is that of annual air carrier passenger enplanements. The forecast of annual air carrier passenger enplanements in the Region provides the basis for developing other air carrier-related forecasts, including the number of annual aircraft operations and terminal facility requirements. Forecasts of aircraft operations may then be developed by factoring the forecast air carrier passenger volumes by the forecast aircraft size and load factor. The passenger air carrier forecasts presented in this chapter are for Milwaukee County's General Mitchell International Airport, the only airport serving scheduled passenger air carriers in the Region, and include regularly scheduled certificated air carrier, commuter carrier, and supplemental passenger air carrier activity.

Review of Existing and Past Regional Airport System Plan Forecasts

As noted, forecasts of annual passenger enplanements form the basis for developing forecasts of passenger air carrier aircraft operations for the Southeastern Wisconsin Region. Forecasts of enplaning passengers were developed under both the original and the second-generation regional airport system planning efforts. As discussed in Chapter IV and as shown in Figure 5 of this report, enplaning passenger traffic at Mitchell International has steadily increased over the long term, except during periods of severe economic recession and upon air carrier deregulation and attendant changes in the level of air carrier service at Mitchell International. Over all, this increase has been very similar to the trend of total enplaning passenger traffic in the United States. In 1993, there were a total of 2.26 million passenger enplanements at Mitchell International. For purposes of this plan reevaluation, total enplanements for 1994 were estimated, on the basis of the first ten months of 1994, to be 2.64 million.

Under the original regional airport system planning effort, total annual air carrier passenger enplanements were forecast to increase from about 1.02 million in the base year 1973 to about 2.97 million in the forecast year 1995. This forecast envisioned an increase in enplanements of about 190 percent over the base year, or an average annual increase to the year 1995 of about 5 percent.

Under the second-generation regional airport system planning effort, total annual air carrier passenger enplanements were forecast to increase from about 1.53 million in the base year 1985 to about 2.60 million in the forecast year 2010. This forecast envisioned an increase of about 70 percent over the base year, or an average annual increase to the year 2010 of about 2 percent. It should be noted that the second-generation plan forecast was significantly more conservative than the original plan forecast. This was a result of the second-generation plan forecast having been prepared during a period in the early 1980s, when severe economic recession

conditions and the impacts of airline response to industry deregulation had caused a significant reduction in passenger enplanements at Mitchell International.

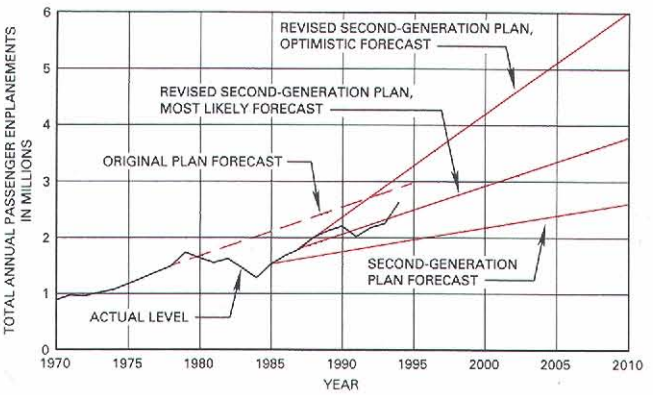
Beginning in the mid-1980s, annual enplanements at Mitchell International began to recover and, in some cases, to increase at a higher rate than enplanements nationally. As a result of this, of renewed interest in the Southeastern Wisconsin market by certain major air carriers and of interest in the possible development of Mitchell International into a major hub facility, the second-generation plan forecast was reviewed and updated by the Commission staff in late 1988.[1] Under this enplaning passenger forecast update, total annual air carrier passenger enplanements were forecast to increase from about 1.80 million in 1987 to about 3.80 million in the forecast year 2010 under what were then considered to be the most likely conditions and to about 6.00 million under optimistic conditions that assumed Mitchell International would become a major hub for at least one major airline. This forecast range reflected an average annual increase to the year 2010 of about 3 percent under the most likely conditions and of about 5 percent under conditions that assumed development of a major hub.

The forecasts of air carrier passenger enplanements may be compared to actual trends in historic passenger enplanements. As discussed in Chapter IV, enplanements at Mitchell International have fluctuated from year to year, but have exhibited an overall constant increase over the long term. From 1970 through 1993, enplanements at Mitchell International have increased at an annual average rate of about 4.5 percent. Figure 13 shows this trend, together with the passenger enplanement forecasts described above.

A comparison of these forecasts with the actual enplanements indicates that the original plan forecast proved to be very close to actual enplanements. In 1994, total enplanements were about 2.61 million, or about 0.36 million, or about 12 percent, below the 2.97 million enplanements forecast under the original regional airport system planning effort. The second-generation regional airport system plan forecasts reflected a significantly lower rate of

Figure 13

PREVIOUS REGIONAL AIRPORT SYSTEM PLAN ENPLANING PASSENGER FORECASTS FOR GENERAL MITCHELL INTERNATIONAL AIRPORT



Source: SEWRPC.

increase in passenger enplanements than did the original plan forecast. This was due to an assumption that airline deregulation would continue in the long term to reduce air carrier passenger traffic at medium-sized airports such as Mitchell International. At that time, it was not anticipated that enplanements would recover during the second half of the 1980s and into the 1990s as the regional economy recovered and as a number of large air carriers began actively competing for passengers in the Milwaukee area market. In 1994, total enplanements were about 2.64 million, about 0.73 million, or about 38 percent, above the 1.91 enplanements forecast under the second-generation regional airport system planning effort.

The most likely passenger enplanement forecast under the 1988 update of the second-generation plan forecast has been very close to actual enplanement levels. Between the end of 1993 and the end of 1994, actual enplanements increased from about 2.26 million to about 2.64 million, moving from slightly below the forecast level of 2.32 million enplanements in 1993 to slightly above the forecast level of 2.41 million enplanements in 1994. Actual enplanements remained significantly below the optimistic forecast, which assumed the development of a major hub at Mitchell International.

Forecast Procedure

The procedure for reviewing and updating the passenger air carrier forecast under this reevaluation of the regional airport system plan consisted of several steps. A number of potential projection

[1]*See SEWRPC Staff Memorandum, Review of SEWRPC Year 2010 Enplaning Passenger Forecasts for General Mitchell International Airport, December 1988.*

methods were first identified and applied. These included regression analyses of historic trends; a ratio, or "top-down," approach, based upon the regional share of U. S. passenger traffic, and a socio-economic indicator approach utilizing relationships between passenger traffic levels and certain socio-economic characteristics of the Region. The results of the applications of the various methods were then reviewed and compared to projections and forecasts prepared independently by other agencies and to the forecasts prepared under previous regional airport planning efforts. Then a "most likely" projection was adopted as the forecast. That forecast is presented here, together with an alternative projection representing a possible high-growth future. In considering the projections and forecast, that many factors affect air carrier demand and, therefore, contribute uncertainty to the forecast, must be kept in mind. The new forecast of enplaning passenger traffic was then converted into a new forecast of passenger air carrier aircraft operations.

In the development of these projections, and particularly in the selection of a forecast, consideration was given to a number of factors that may be expected to affect the passenger air carrier demand within Southeastern Wisconsin. These factors included the strength of the economy in the Upper Midwest, which has historically correlated well with enplanements; characteristics of the air carrier industry, including such factors as the creation of operational hubs, the financial condition of airline companies, and the entry into the industry of new carriers; possible changes in the future demand for business travel as a result of continuing improvements in telecommunications technology; possible changes in the future demand for leisure travel as a result of lower fares and the availability of individual disposable income; the possible development of General Mitchell International Airport as an operational hub for one or more major air carriers; the proportion of Southeastern Wisconsin residents that elect to use Chicago's O'Hare International Airport instead of Mitchell International; and the proportion of trips originating in Northern Illinois that elect to use Mitchell International instead of O'Hare.

Projections Based on Historic Trends

One way of developing air carrier passenger traffic forecasts is to project future enplanements by extrapolating of historic trends in enplanements. Such projections of future enplaning passengers at Mitchell International provide an indication of future enplaning passenger levels, assuming that the factors currently affecting air carrier travel demand remain relatively stable. If, under this approach, all the years from 1970 through 1994 are used in the regression equation, total enplanements within the Region may be expected to reach about 3.17 million by 2010. In addition, to eliminate the effect of the severe economic recession which occurred in the Region from 1979 through 1984, only the years 1985 through 1994 were then used in this application. The result was a projected total year 2010 enplanement of about 3.77 million. These projections are shown in Figure 14, together with the actual historic enplanements for comparative purposes.

Projections Based on Ratio Approach

Another way of developing air carrier passenger traffic forecasts is by the use of a projection method known as the ratio, or "top-down," approach. Under this method, projections of enplaning passengers are developed by examining the historic trend in the percentage of total U. S. air carrier passenger traffic using the airport concerned. That percentage is then applied to a design year forecast of total U. S. air carrier enplanements as prepared by the U. S. Department of Transportation, Federal Aviation Administration (FAA).

The historic trend in the percentage of total domestic enplaning passenger traffic in the United States represented by enplanements at Mitchell International is shown in Table 71. From 1970 through 1982, the share of U.S. passenger traffic at Mitchell International remained fairly stable, averaging about 0.58 percent. From 1982 through 1993, this share declined to an average of 0.45 percent. This was the result of the economic recession conditions affecting the Region during the early 1980s, together with the impacts of airline response to industry deregulation.

The most recent forecasts of U. S. aviation activity prepared by the FAA were published in 1994 and have as the base year 1993, with 2005 as the forecast year. These forecasts envision total domestic enplaning passengers to increase from about 464 million in 1993 to about 716 million by 2005, an increase of about 54 percent. The FAA forecasts thus envision an average annual growth rate of approximately 3.7 percent over the next 12 years. Extrapolating the FAA forecasts to the year 2010 provides a projection of total U. S. annual domestic air carrier enplaning passengers of approximately 821 million.

Two different scenarios were developed to represent the range of shares of the U. S. enplaning passenger

Table 71

SHARE OF DOMESTIC AIR CARRIER PASSENGER ENPLANEMENTS BOARDING AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1970-1993

Year	United States Scheduled Passenger Enplanement[a] (thousands)	General Mitchell International Airport	
		Number of Enplaned Passengers (thousands)	Percent of U. S. Total
1970	155,900	887	0.57
1971	157,000	977	0.62
1972	177,500	961	0.54
1973	183,400	1,021	0.56
1974	195,500	1,072	0.55
1975	190,700	1,177	0.62
1976	201,300	1,283	0.64
1977	224,000	1,391	0.62
1978	256,300	1,495	0.58
1979	295,400	1,740	0.59
1980	287,900	1,642	0.57
1981	274,700	1,558	0.57
1982	286,100	1,627	0.57
1983	308,200	1,463	0.47
1984	334,000	1,288	0.39
1985	370,100	1,530	0.41
1986	404,700	1,683	0.42
1987	441,200	1,799	0.41
1988	441,200	2,013	0.46
1989	443,600	2,132	0.48
1990	456,600	2,214	0.48
1991	447,300	2,028	0.45
1992	462,000	2,189	0.47
1993	463,700	2,264	0.49

[a] *Includes domestic traffic handled by large air carriers and regional and commuter air carriers.*

Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

traffic, including both originating and connecting passengers, that Mitchell International may be expected to generate. Each of these shares was then applied to the FAA nationwide forecast to arrive at projections for enplaning passengers at Mitchell International. The two scenarios include a most likely and a possible high-growth projection. Under the most likely scenario, Mitchell International's share of the nationwide domestic traffic would be expected to increase to its long-term average of about 0.58 percent, similar to the share from 1970 to 1982. The most likely scenario reflects the belief that the economy of the Upper Midwest will indeed remain strong, allowing enplaning passenger traffic at Mitchell International to remain stable. Under the high-growth scenario, that share would gradually increase to a long-term average of 0.65 percent, representing a larger share of the nationwide traffic than Mitchell International has captured in the past. This scenario assumes that the economy of the Upper Midwest will remain healthy, that use of Mitchell International as a hub by Midwest Express Airlines will continue to increase and that the number of passengers who use Mitchell International from the northern suburbs of Chicago will continue to increase significantly.

These two scenarios assume that the long-term growth at Mitchell International will continue in a manner similar to the past pattern, consistent with the overall trends at the national level. These scenarios do not assume that a major operational hub will be developed at Mitchell International by one or more major air carriers. Based on these projections, the year 2010 enplaning passenger totals at Mitchell International would be 4.76 million under the most likely projection and 5.33 million under the high-growth scenario. These projections are shown in Figure 15.

Projection Based on
Socio-Economic Indicator Approach

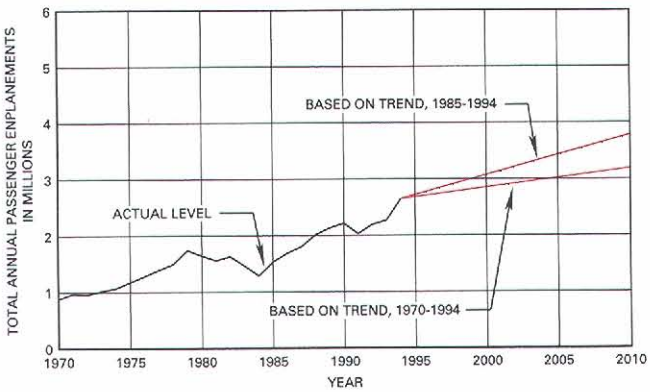
Under another method, known as the "socio-economic indicator" method, projections of air carrier passenger traffic at Mitchell International Airport were developed by establishing the relationship between enplaning passenger levels and certain socio-economic characteristics of the Region. These relationships were then applied to design year forecasts of the socio-economic characteristics prepared by the Regional Planning Commission under other planning programs. Under this approach, originating and connecting passenger traffic at Mitchell International were projected separately. In addition, consideration was given to the potential increase in the volume of originating passengers from Northeastern Illinois who might begin the air portion of their trips at Mitchell International.

Originating Passengers: Table 72 presents air carrier originating passenger traffic for Mitchell International for the years 1970 to 1993, together with several socio-economic characteristics of the Southeastern Wisconsin Region that may be expected to influence the level of originating air carrier passenger traffic. These socio-economic characteristics include regional employment, resident population, and number of households.

The level of originating air carrier passenger traffic at Mitchell International is known to be significantly related to the employment level of the Southeastern Wisconsin Region. A significant portion, up to 55 percent, of the originating air carrier passenger traffic at Mitchell International is business related; the level of regional employment provides

Figure 14

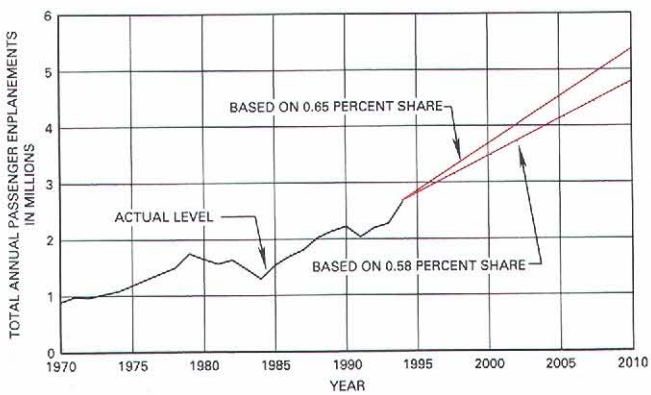
PROJECTED PASSENGER ENPLANEMENTS AT GENERAL MITCHELL INTERNATIONAL AIRPORT, BASED ON LINEAR REGRESSION ANALYSES OF HISTORIC ENPLANEMENTS



Source: SEWRPC.

Figure 15

PROJECTED PASSENGER ENPLANEMENTS AT GENERAL MITCHELL INTERNATIONAL AIRPORT, BASED ON RATIO OF NATIONAL ENPLANEMENTS



Source: SEWRPC.

an indicator of the potential level of such business-related traffic. The level of employment is also an indicator of social-recreational air travel, since the employment level is an important measure of the relative economic health of the Region and of the availability of discretionary income. As shown in Figure 16, a comparison of air carrier passenger originations at Mitchell International with regional employment during the past two decades indicates a direct positive relationship. The steady increase in employment within the Region through the 1960s and into the 1970s was accompanied by a steady and substantial increase in originating air carrier passenger traffic. The sharp decline in employment in the 1980s followed by a rebound into the 1990s was accompanied by a sharp decline and rebound in originating air carrier passenger traffic.

The following regression equation was developed to project Mitchell International air carrier passenger traffic originations through the year 2010 based upon change in Southeastern Wisconsin employment:

$$P = -3.70 \times 10^{6} + 5.684\,(E)$$

Where: P = Annual Mitchell International air carrier passenger originations

E = Total employment in Southeastern Wisconsin Region

Forecasts of employment to the year 2010 prepared by the Regional Planning Commission indicate a most likely future employment in Southeastern Wisconsin of 1,095,000 jobs in the year 2010 and, under a potential high-growth scenario, a level of 1,251,600 jobs in the year 2010. Consequently, the application of this regression equation indicates that the most likely air carrier passenger traffic originations at Mitchell International may be expected to be 2.53 million originations in the year 2010, with 3.42 million originations under a high-growth scenario.

Airline fares are another factor significantly affecting historic, and potential future, levels of originating air carrier passenger traffic at Mitchell International. Airline fares have affected historic levels of passenger traffic at Mitchell International, as increased fares in the early 1980s contributed to the decline in passenger traffic and as competitive and declining fares in the late 1980s and early 1990s contributed to increased passenger traffic. Airline fares may be expected to affect future passenger traffic as well. However, there is no source of historic Mitchell International airline fare data to permit such data to be incorporated into a regression equation and there is no forecast available of the future change in such fares. Therefore, the potential effect of future airline fares must be subjectively considered in the preparation of any enplaning passenger forecast for Mitchell International.

Originating Passengers from Northeastern Illinois: As part of the projections of air carrier passenger

Table 72

COMPARISON OF GENERAL MITCHELL INTERNATIONAL AIRPORT AIR CARRIER ORIGINATING PASSENGER TRAFFIC AND SOUTHEASTERN WISCONSIN EMPLOYMENT, POPULATION, AND HOUSEHOLDS

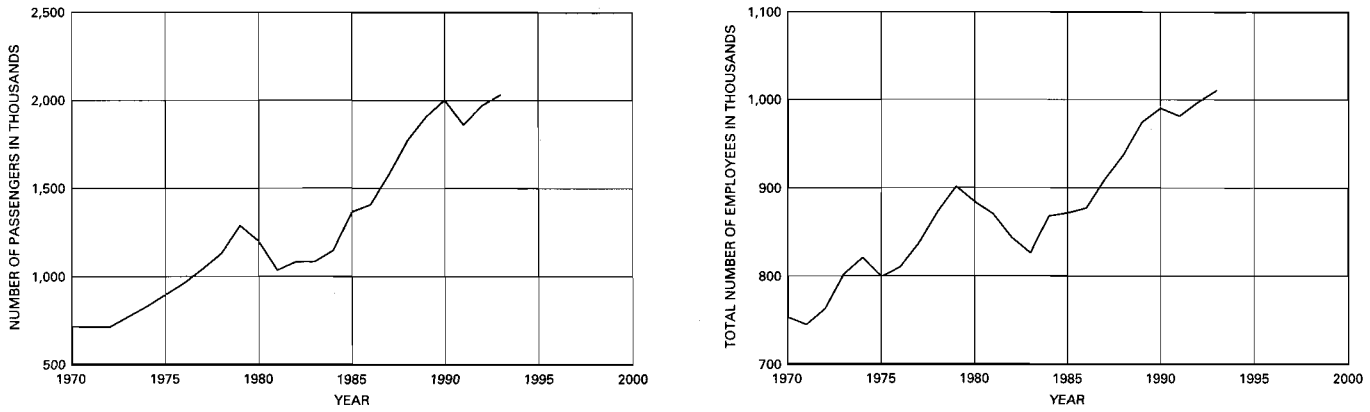
Year	General Mitchell International Air Carrier Originating Passengers	Regional Population	Regional Employment	Regional Households
1970	714,530	1,756,100	753,700	536,500
1971	--	1,763,800	744,900	--
1972	711,418	1,771,600	763,100	--
1973	770,839	1,778,400	802,300	--
1974	829,016	1,784,600	820,800	--
1975	896,828	1,788,300	799,100	--
1976	963,395	1,782,200	810,100	--
1977	1,044,768	1,776,400	837,700	--
1978	1,131,570	1,770,500	873,100	--
1979	1,287,809	1,769,500	901,700	--
1980	1,199,048	1,764,800	884,200	628,000
1981	1,036,435	1,769,700	870,500	--
1982	1,083,805	1,762,200	843,500	--
1983	1,085,714	1,743,300	826,100	--
1984	1,147,308	1,742,300	868,700	--
1985	1,367,971	1,742,700	871,900	--
1986	1,408,453	1,743,200	877,400	--
1987	1,579,240	1,742,600	910,000	--
1988	1,773,212	1,750,900	938,200	--
1989	1,906,492	1,767,800	974,600	--
1990	2,003,373	1,810,400	990,300	676,100
1991	1,861,419	1,822,000	981,400	--
1992	1,972,336	1,839,500	997,400	693,200
1993	2,033,433	1,856,300	1,010,700	703,200

Source: SEWRPC.

originations at Mitchell International, it was necessary to consider originating trips from northeastern Illinois that are using, and may be expected to use, Mitchell International. The rapidly developing area lying between Chicago's O'Hare International Airport and Mitchell International within northeastern Illinois includes Lake County, McHenry County, and suburban Cook County. During the past decade, this area has seen a dramatic increase in population, households, and employment. Because of the increasing levels of traffic and associated congestion both at Chicago O'Hare and on highway approaches to Chicago O'Hare, it is likely that a greater number of airline passengers whose trips originate in this northeastern Illinois area will choose to use Mitchell International instead of Chicago O'Hare. Surveys conducted by the Regional Planning Commission indicate that the number of annual originations from northeastern Illinois using Mitchell International has increased from a 1971 level of about 12,000, or slightly less than 2 percent of all originating passengers, to a 1989 level of about 48,000, or about 3 percent of all originating passengers. Analyses prepared as part of the Illinois-Indiana Regional Airport Study conducted by the Illinois Department of Transportation indicate that originating passengers from northeastern Illinois that elect to use Mitchell International may be expected to increase at an average annual rate of about 9 percent from 1989 to the year 2010, increasing from an estimated 68,000 annual origination passengers in 1993, or about 0.5 percent of all such passengers, to a most likely level of 227,000 passengers in the year 2010, or almost 1 percent of all such passengers, and to a potential 307,000 passengers in the year 2010, or slightly more than 1 percent of all such passengers, under a high-growth scenario. These analyses were based on extensive travel time analyses to various airports in the Chicago Region using detailed travel

Figure 16

COMPARISON OF AIR CARRIER ORIGINATING PASSENGER TREND AT GENERAL MITCHELL INTERNATIONAL AIRPORT WITH REGIONAL EMPLOYMENT TREND IN SOUTHEASTERN WISCONSIN: 1972-1993



Source: SEWRPC.

time data supplied by the Southeastern Wisconsin Regional Planning Commission and the Chicago Area Transportation Study. The rate of increase for this originating passenger traffic from northeastern Illinois at Mitchell International is significantly higher than the rate of growth for the originating passenger traffic at Mitchell International from Southeastern Wisconsin.

Connecting Passengers: In order to complete the enplaning passenger traffic forecasts at Mitchell International using the socio-economic indicator approach, it was necessary to prepare specific estimates of future connecting passengers at Mitchell International. During the past several years, considerable attention has been devoted to attempting to forecast the volume of connecting passengers at airports in the Midwest, including Mitchell International. This includes such attempts made under the work leading to the recently completed Mitchell International master plan and such attempts under the Illinois-Indiana Regional Airport Study. The latter study projected increasing air traffic congestion at Chicago O'Hare and the diversion of connecting traffic to Mitchell International and to a "new airport" proposed in the Chicago area, to be constructed principally to serve connecting traffic.

The level of future connecting air passenger traffic at Mitchell International will depend on the extent to which this airport will serve as a major hub for one or more major air carriers in the future. If this were to occur, the volume of enplaning passengers, especially those who are transferring between flights, and aircraft operations may be expected to increase significantly over present levels. It is important in this respect to note that, while Mitchell International currently serves as the operational hub for Midwest Express Airlines, it cannot be considered a major hub, such as the airports serving Chicago, Minneapolis-St. Paul, Detroit, or Memphis. In 1994, Midwest Express Airlines and its regional and commuter affiliates operated about 100 departures on a typical weekday at Mitchell International. By comparison, Northwest Airlines and its regional and commuter affiliates operate about 450 departures at Detroit, about 430 departures at Minneapolis-St. Paul, and about 210 departures at Memphis on a typical weekday in 1994. At Chicago's O'Hare Airport, United Airlines and American Airlines operate approximately 510 and 490 departures, respectively, on a typical weekday.

The most recent work emanating from the multiphase Illinois-Indiana Regional Airport Study provided several findings pertinent to the issue of potential future connecting traffic at Mitchell International. One such finding was that Chicago O'Hare may be expected to approach its practical operational capacity, even under the most conservative forecasts. As Chicago O'Hare approaches capacity, air carriers may be expected to begin shifting flights that currently serve smaller markets, such as those within a 200-to-300-mile radius of Chicago, to accommodate the growth of the larger and more profitable markets largely served by direct long distance flights, such as from Chicago to major cities

on the East and West Coasts, and international flights. This trend has already begun, as evidenced by the number of flights between smaller Wisconsin cities and Chicago O'Hare having been reduced in 1992 and 1993. Since transferring between flights will remain the principal method of serving these small and some medium-sized cities, hubbing activity that accommodates this traffic may be expected to be shifted to other airports, including, potentially, Mitchell International.

Another important finding indicated that, at major hub airports, air carriers require a strong base of originating passengers to support a viable hubbing operation. A strong base of originating passengers is necessary to support the variety of nonstop flights to many different markets, which may also serve connecting passengers. Mitchell International possesses a strong originating passenger base. Moreover, about 65 percent of the originating passengers from Mitchell International must connect through other hubs, such as O'Hare, Minneapolis-St. Paul, Detroit, and Cincinnati, to reach their final destinations. A comparison with cities with similar levels of enplanements reveals that 40 to 50 percent is a more typical percentage. This suggests that Mitchell International is underserved by nonstop flights; the potential for an airline hub exists for that reason as well.

Another finding was that a large volume of connecting passengers generated by smaller airports in Mitchell International's natural hinterland are transferring at hub airports other than Mitchell International. There are 18 airports that may be considered to constitute the Mitchell International hinterland. These include all eight Wisconsin airports with scheduled air carrier service, including Oshkosh, Appleton, Green Bay, Central Wisconsin, Rhinelander, La Crosse, Eau Claire, and Madison; the Michigan cities of Grand Rapids, Muskegon, Traverse City, Ironwood, Marquette, Escanaba, and Iron Mountain; Duluth, Minnesota; Dubuque, Iowa; and Rockford, Illinois. Of these trips, the ones that are currently connecting through O'Hare Airport represent the types of trips that could be shifted from O'Hare to a supplemental airport, such as Mitchell International, as O'Hare reaches capacity.

Finally, it should be noted that from about 1980 to 1984, both Republic and Northwest Airlines utilized Mitchell International as a mini-hub. Together, these airlines accounted for 90 to 100 scheduled departures on a typical weekday. During this period, much of the scheduled regional service from various Wisconsin cities was directed to Mitchell International to allow passengers to connect with long-distance flights. By 1985, such use of Mitchell International as a mini-hub had been largely discontinued; in 1986 Republic Airlines was merged into Northwest Airlines. From 1988 to 1992, Northwest Airlines again used Mitchell International as a mini-hub, operating up to 130 weekday departures, with much of the service again connecting various Wisconsin cities with Milwaukee.

On the basis of this analysis, it was concluded that the air carrier passenger demand prerequisites necessary for allowing Mitchell International to function as a hub airport are in place. However, to make such a hubbing operation viable, it must be recognized that one or more of the largest national airlines will have to move a substantial amount of service to Mitchell International to allow for a large variety of connections to be able to be made by passengers. This will require a major decision by management of one large airline or more large airlines after consideration of the costs and benefits of establishing such a hub.

Because of the uncertainties involved, the projected number of future connecting passengers at Mitchell International was developed as a range. Under what may be considered most likely conditions, it was assumed that Mitchell International will continue to serve a volume of connecting passengers similar to its historic range of connecting passengers. As shown in Table 29 in Chapter IV of this report, the percentage of connecting passengers at Mitchell International has varied significantly over the last two decades. Prior to deregulation of the airline industry, connecting passengers at Mitchell International comprised about 25 percent of total enplaning passengers. In the early years of the post-deregulation period, when Northwest Airlines operated a mini-hub at Mitchell International, that percentage rose to about 33 percent, then decreased sharply when Northwest Airlines decided to move all of its hubbing operations to other airports. During the early 1990s, the percentage increased again, largely due to hubbing activity by Midwest Express Airlines and its regional commuter affiliate. Connecting traffic at Mitchell is expected to further increase as a result of the anticipated continuation of overall growth in enplanements, and the increase in current hubbing operations. Therefore, under the most likely conditions, the connecting passengers may be expected to comprise about 25 percent of total enplaning passengers at Mitchell International to the year 2010, when the number of connecting passengers may be expected to approximate 893,000.

Table 73

AIR CARRIER PASSENGER TRAFFIC FORECASTS AT GENERAL MITCHELL INTERNATIONAL AIRPORT, BASED ON THE SOCIO-ECONOMIC INDICATOR METHOD: 2010

Forecast Types	Most Likely Projection	High Growth Projection
Regional Employment	1,095,000	1,251,600
Originating Passengers		
Southeastern Wisconsin Region[a]	2,451,000	3,314,000
Northeastern Illinois[b]	227,000	307,000
Originating Passenger Subtotal	2,678,000	3,621,000
Connecting Passengers	893,000	3,621,000
Total Enplaning Passengers	3,571,000	7,242,000

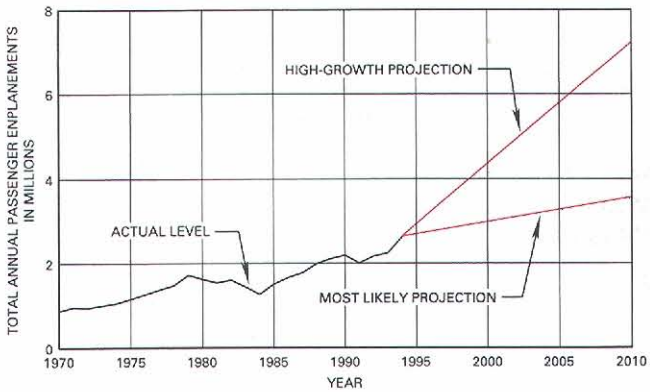
[a]*Includes all originating passengers except those from selected Northeastern Illinois counties.*

[b]*Includes Northeastern Illinois counties of Lake, McHenry, and the suburban communities of Cook county.*

Source: SEWRPC.

Figure 17

PROJECTED PASSENGER TRAFFIC AT GENERAL MITCHELL INTERNATIONAL AIRPORT, BASED ON SOCIO-ECONOMIC INDICATOR PROJECTIONS OF ENPLANING PASSENGERS



Source: SEWRPC.

Under higher growth conditions, it was assumed that Mitchell International would become a major operational hub for one or more major air carriers and thereby support a greatly increased volume of connecting passengers. As already noted, viable hubbing operations for large air carriers require a strong base of originating passengers, as well as an appropriate mix of originating and connecting passengers, at the hub airport. The experience of other hub airports and airlines that operate major hubs in the United States indicates an approximately equal mix of originating and connecting passengers at such airports. Accordingly, the projected number of connecting passengers could be expected to reach about 3.6 million by the year 2010 under a high-growth alternative. It should be noted that, under these conditions, should a hubbing operation be developed by one or more large airlines, additional flights would be added to serve Mitchell International, with a corresponding increase in the level of service to passengers. Such an increased level of service would be expected to attract additional originating passengers.

Total Enplaning Passengers: Under the socio-economic indicator forecast method, the total of projected enplaning passengers was calculated by summing the originating passengers from the Southeastern Wisconsin Region, the originating passengers generated by Northeastern Illinois, and the connecting passengers under each of three alternative future projections. The resulting projection under most likely future conditions and as well under potential high-growth future conditions is presented in Table 73. Accordingly, under this projection method, the total enplaning passengers by the year 2010 at Mitchell International may be expected to approach 3.57 million enplanements under most likely conditions and 7.24 million enplanements under potential high-growth conditions. The projections, as prepared under the socio-economic indicator approach are shown in Figure 17.

Forecasts by Others

As part of the process of reviewing and updating the passenger air carrier forecasts under the plan reevaluation, other pertinent projections of enplanements at Mitchell International were reviewed and evaluated. These include forecasts prepared under the recently completed airport master plan for Mitchell International,[2] the Federal Aviation Administration's annual terminal area forecasts,[3]

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[2]*See Howard Needles Tammen & Bergendoff, General Mitchell International Airport—Milwaukee, Wisconsin—Airport Master Plan Update, Milwaukee, Wisconsin, April 1992.*

[3]*See Federal Aviation Administration, Terminal Area Forecasts Fiscal Year 1993—2005, Washington, D. C., March 1993.*

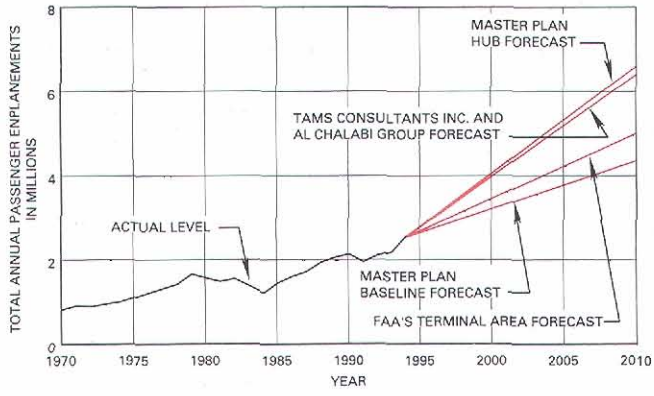
and the Illinois-Indiana Regional Airport Study.[4] Figure 18 shows these three passenger enplanement forecasts, together with the actual historic enplanements.

Forecasts of enplaning passengers were prepared under the recently completed airport master plan update for General Mitchell International Airport. Two scenarios were developed under this master plan update forecast, both for a plan design year of 2009. The first scenario, referred to as a baseline forecast, consisted, essentially, of an extrapolation of historic growth rates. Under this scenario total enplanements were forecast to reach about 4.34 million by the year 2009, of which about 890,000, or about 20 percent, would be connecting passengers. Consequently, about 3.45 million passengers, or 80 percent, would be originating passengers. The second scenario, referred to as a hub forecast, assumed that a major operating hub would be developed by one or more major air carriers at Mitchell International and total passenger enplanements would experience a connecting passenger rate associated with large hubs. Under this scenario, total enplanements were forecast to reach about 6.41 million by the year 2009, of which about 2.81 million, or 44 percent, would be connecting passengers. Consequently, about 3.60 million, or 56 percent, would be originating passengers. Extending these forecasts to the year 2010 would provide a projection of approximately 4.46 million enplaning air carrier passengers at Mitchell International under the baseline forecast and of 6.62 million enplaning air carrier passengers under the hub forecast.

Another forecast of enplanements was prepared by the Federal Aviation Administration as part of their terminal area traffic forecasting process. The FAA annually prepares traffic projections for all airports with enplaning passenger traffic in the United States. The procedure utilized is essentially a top-down approach, applying national growth rates to the current air passenger traffic at the airports considered. The most recent FAA terminal area traffic forecast shows a total of about 4.37 million enplanements at Mitchell International by the year

Figure 18

COMPARISON OF OTHER FORECASTS OF ENPLANING PASSENGER TRAFFIC AT GENERAL MITCHELL INTERNATIONAL AIRPORT



Source: SEWRPC.

2005. The forecast enplanements are not divided into originating and connecting passengers, but the forecast assumes that Mitchell International will become a hub airport. Extending this forecast to the regional airport system plan update design year 2010 provides a projection of approximately 5.10 million enplaning passengers.

A forecast of enplaning passengers at Mitchell International was also prepared as part of the work conducted under the Illinois-Indiana Regional Airport Study. While this study has been directed principally to determining the need for supplemental airport facilities in the greater Chicago area, Southeastern Wisconsin was considered to be part of that area and, therefore, enplaning passenger forecasts were prepared for Mitchell International. Air carrier enplanements at Mitchell International were projected under this forecast to approximate 6.57 million by the year 2010, of which 2.92 million, or about 44 percent, were connecting passengers and 3.65 million, or about 56 percent, were originating passengers. This forecast assumed that Mitchell International would serve an increasingly larger portion of the Chicago Region air travel demand, including additional originating traffic, and a significant portion of connecting traffic that would not be able to be accommodated at Chicago O'Hare.

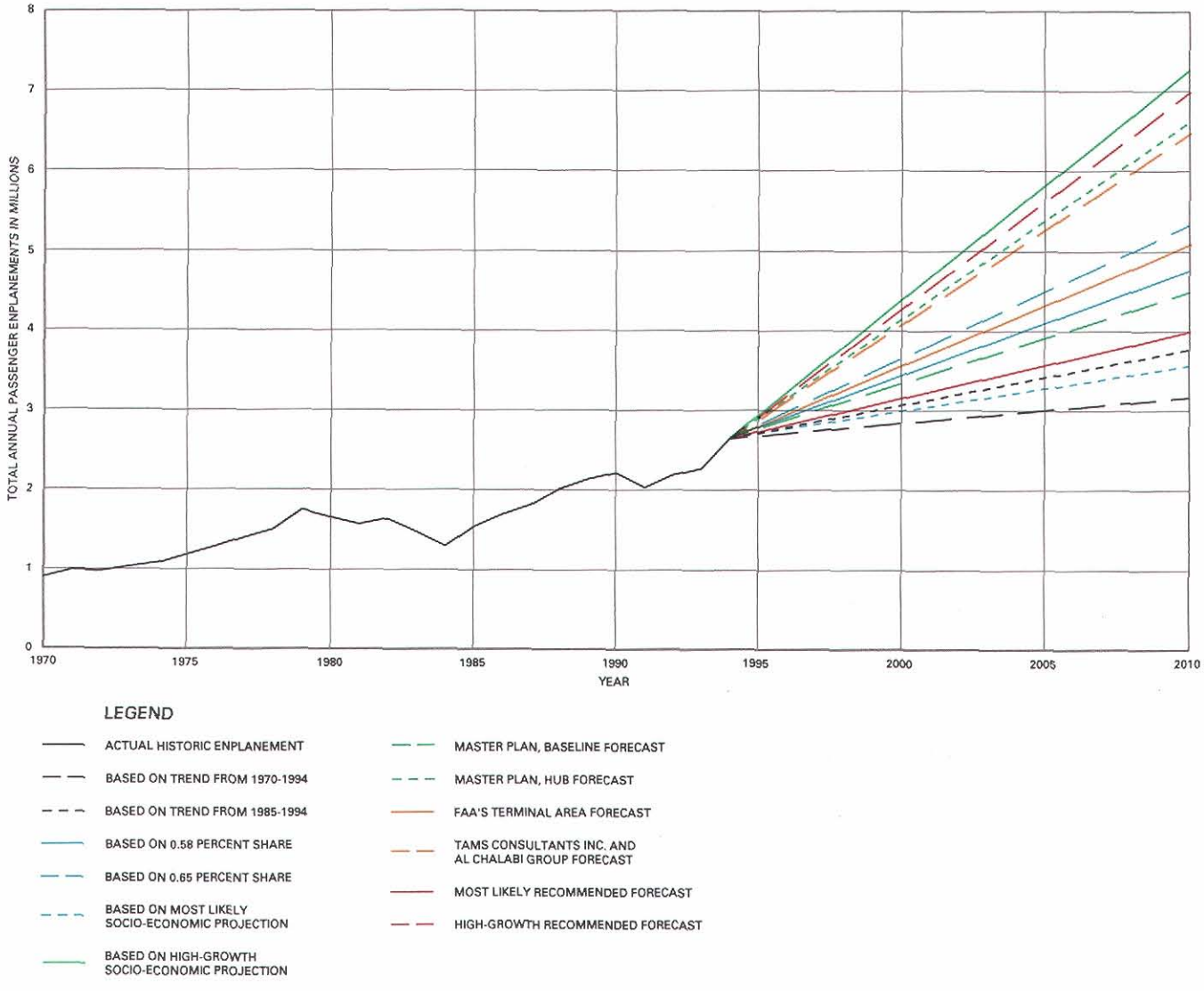
Revised Enplaning Passenger Forecast for Southeastern Wisconsin

The various projections of enplaning passenger traffic at Mitchell International were considered in preparing a revised enplaning passenger forecast for the system plan reconsideration. Figure 19 and

[4] *See The Al Chalabi Group, Ltd., South Suburban Airport Master Plan and Environmental Assessment: Needs Assessment and Enplanement Forecasts, Chicago, Illinois, July 1994, and memorandum, Enplanement Forecasts for Milwaukee's General Mitchell Field (GMIA), by The Al Chalabi Group, Ltd., September 1994.*

Figure 19

COMPARISON OF FORECASTS OF GENERAL MITCHELL INTERNATIONAL AIRPORT ENPLANING PASSENGER TRAFFIC TO THE YEAR 2010



Source: SEWRPC.

Table 74 provide a comparison of these projections. Based upon a review and comparison of the various projections and forecasts, the Advisory Committee selected as the most likely forecast level of approximately three million originating passengers, with connecting passengers comprising about 25 percent of the total. This forecast was about 10 percent greater than the projection based on the socio-economic indicator method. Accordingly, the most likely forecast level of total enplaning passengers would be about 4.00 million in the year 2010, including 3.00 million originating passenger enplanements and 1.00 million connecting passenger enplanements. A high-growth forecast was also developed to take into consideration a potential high-growth level of regional employment and possible high levels of connecting passenger traffic as a result of the introduction of large-scale hubbing activity at Mitchell International by one or more large air carriers. Under the high-growth forecast, total enplaning passengers would be about 7.00 million in the year 2010, including 3.50 million originating passenger enplanements and 3.50 million connecting passenger enplanements. These forecasts of passenger enplanements are presented in Table 75 and shown in Figure 20.

An alternate high-growth forecast was developed to take into consideration the introduction of extensive low-cost airline service. Under this alternate high-

Table 74

COMPARISON OF FORECASTS OF GENERAL MITCHELL INTERNATIONAL AIRPORT ENPLANING PASSENGER TRAFFIC TO THE YEAR 2010

Projection or Forecast	Annual Passenger Enplanements (millions)	
	Most Likely Scenario	High-Growth Scenario
Projection Based on Historic Trends	3.17	3.77
Projection Based on Ratio Approach	4.76	5.33
Projection Based on Socio-Economic Indicator Method	3.57	7.24
Airport Master Plan Forecast	4.46	6.62
FAA Terminal Area Forecast	--	5.10
Illinois-Indiana Regional Airport Study Forecast	--	6.57
Recommended Regional Airport System Plan Forecast	4.00	7.00

Source: SEWRPC.

Table 75

AIR CARRIER PASSENGER ENPLANEMENT FORECASTS AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 2010

Forecast Types	Most Likely Forecast	High-Growth Forecast
Originating Passengers:		
Southeastern Wisconsin Region[a]	2,745,000	3,200,000
Northeastern Illinois[b]	255,000	300,000
Originating Passenger Subtotal	3,000,000	3,500,000
Connecting Passengers	1,000,000	3,500,000
Total Enplaning Passengers	4,000,000	7,000,000

[a]Includes all originating passengers except those from selected Northeastern Illinois counties.

[b]Includes Northeastern Illinois counties of Lake, McHenry, and the suburban communities of Cook county.

Source: SEWRPC.

growth forecast, low-cost airline service would be introduced at Mitchell International similar to service provided by airlines, such as Southwest Airlines, Valuejet, and American Trans Air Airlines in other United States markets. This scenario assumes that the widespread availability of low-fare flight operations at Milwaukee would preclude the introduction of major hub activities by large air carriers. Under this alternate high-growth forecast, total enplanements would be about 5.00 million in the year 2010, including 4.00 million originating passenger enplanements and 1.00 million connecting passenger enplanements. Thus, the forecast year 2010 passenger enplanements under this alternate high-growth forecast would be well within the high-growth forecast of 7.00 million passenger enplanements.

Revised Air Carrier Aircraft Operations Forecast for Plan Reevaluation

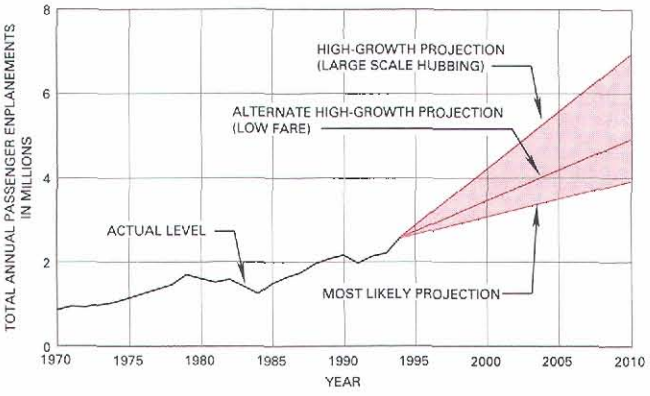
Air carrier airport capacity is measured by the number of air carrier aircraft operations that the airport can safely accommodate without inordinate delay. Therefore, to determine the relationship between capacity and use at Mitchell International and thereby the need for any long-range improvements, forecasts of enplaning passengers must be converted to forecasts of air carrier aircraft operations.

Forecasts of air carrier aircraft operations are typically prepared by applying to forecasts of enplaning air carrier passengers an estimate of the probable number of enplaning passengers per air carrier aircraft departure. Under the second-generation regional airport system plan, the number of enplaning passengers per air carrier aircraft departure at Mitchell International was envisioned to increase from approximately 36 in 1985 to about 45 in 1995, and to about 50 by the year 2010. The resultant number of air carrier aircraft operations under the 1988 update of the second-generation regional airport system plan forecast was, therefore, anticipated to be from about 84,400 operations in 1985, decreasing to about 72,000 operations under low-growth conditions and increasing to about 240,000 operations under high-growth conditions, with about 152,000 operations being the most likely level. In 1993 an estimated 118,000 air carrier aircraft operations occurred at General Mitchell International Airport. This includes all operations by large air carriers, regional and commuter air carriers, and supplemental air carriers. This was about 9 percent greater than the 108,700 operations which the updated second-generation plan forecast had indicated may occur in 1993, as shown in Figure 21.

The historic trends in the number of enplaning air carrier passengers per aircraft, the average aircraft capacity, and the enplaning load factor for aircraft departures at General Mitchell International Airport for the years 1986 through 1993 are presented in Table 37 in Chapter IV of this report for large and supplemental air carriers and in Table 38 for regional and commuter air carriers. The number of passengers per aircraft departure and the load factor at Mitchell International has typically been lower than that for the United States as a whole. This may be expected to continue, since the Milwau-

Figure 20

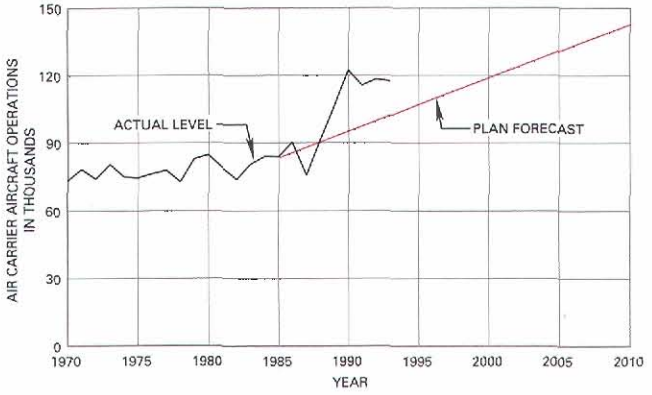
FORECAST OF ENPLANING PASSENGER TRAFFIC AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 2010



Source: SEWRPC.

Figure 21

SECOND-GENERATION REGIONAL AIRPORT SYSTEM PLAN AIR CARRIER OPERATIONS FORECAST FOR GENERAL MITCHELL INTERNATIONAL AIRPORT: 2010



Source: SEWRPC.

kee markets are smaller than many of the very highly traveled national markets, such as those on the East and West Coasts of the United States. The number of passengers for departure and the load factors for regional and commuter air carriers serving Mitchell International are closer to the corresponding national averages. A summary of the historic number of seats per departure and load factors since 1986 for both large air carriers and regional and commuter air carriers for both Mitchell International and domestic United States traffic is provided in Tables 76 and 77.

The FAA prepares national forecasts on an annual basis of the average aircraft size and the average load factor. Average aircraft size is defined as the average number of seats per departure. These two factors are utilized to determine the average number of passengers per departure. As part of the most recent FAA forecasts, the average aircraft size for large air carriers is expected to continue to increase over the long term. The forecast assumes that the average seating capacity of the domestic fleet will increase about two seats per year from 151 in 1993 to 174 by the year 2005. The FAA believes that airline management will typically adjust available seating capacity to meet demand requirements, resulting in a "normal" load factor that will not change significantly. Thus, the FAA anticipates that the domestic passenger load factor will increase only slightly, from its level of about 61 percent in 1993, to about 63 percent by 2005.

With respect to regional and commuter air carriers, the FAA has forecast that the average seating capacity of the regional and commuter fleet will also continue to increase in size, from an average of 23 seats in 1993 to 35 seats by 2005. This is anticipated as a result of such air carriers serving a greater number of primary short-haul markets and the use of more regional-type jet aircraft. The FAA anticipates that the load factor for regional and commuter air carriers will increase slightly, from its level of about 49 percent in 1993 to about 50 percent by 2005.

Historically, the average aircraft size and load factors for large air carriers at Mitchell International have followed trends similar to those nationally, that is, increasing in similar proportions over the long term. It is anticipated that these trends at Mitchell International will continue to replicate national trends.

To assist in the preparation of these forecast factors for use in this plan update, the national forecasts of average aircraft size and load factors were extended to the year 2010. Similar growth rates for these factors were then applied to the aircraft size and load factors for Mitchell International air traffic. Thus, for large air carriers at Mitchell International, the average number of seats per departure is forecast to increase to 116 by the year 2010, the enplaning load factor is forecast to increase to an average of about 52 percent and the average number of passengers per departure is forecast to increase to an average of about 61. For regional and commuter air carriers at Mitchell International, the average number of seats per departure is forecast to increase to about 55 by the year 2010, the enplaning load factor is forecast to increase to an average of almost 40 percent, and the average num-

Table 76

AVERAGE NUMBER OF SEATS PER DEPARTURE BY TYPE OF AIR CARRIER FOR GENERAL MITCHELL INTERNATIONAL AIRPORT AND TOTAL DOMESTIC UNITED STATES TRAFFIC: 1986-1993

Year	Average Number of Seats per Departure			
	Large Air Carriers		Regional and Commuter Carriers	
	General Mitchell International Airport	Domestic United States Total	General Mitchell International Airport	Domestic United States Total
1986	103.9	153.0	31.0	20.2
1987	100.0	152.5	35.5	19.7
1988	88.7	153.0	30.1	19.2
1989	101.5	152.0	24.1	20.4
1990	103.8	151.7	26.5	20.8
1991	102.6	151.1	31.1	21.5
1992	104.6	151.1	30.5	22.9
1993[a]	95.8	151.0	36.6	22.9

[a]*Estimated.*

Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

Table 77

ENPLANING LOAD FACTOR BY TYPE OF AIR CARRIER FOR GENERAL MITCHELL INTERNATIONAL AIRPORT AND TOTAL DOMESTIC UNITED STATES TRAFFIC: 1986-1993

Year	Enplaning Load Factor			
	Large Air Carriers		Regional and Commuter Carriers	
	General Mitchell International Airport	Domestic United States Total	General Mitchell International Airport	Domestic United States Total
1986	45.6	60.3	39.5	45.6
1987	58.2	61.7	39.9	46.0
1988	61.4	61.0	34.9	46.6
1989	50.0	62.0	36.7	47.8
1990	45.8	60.8	35.2	47.1
1991	45.2	60.8	33.1	46.8
1992	47.2	62.6	36.6	48.1
1993[a]	53.5	61.3	42.6	48.7

[a]*Estimated.*

Source: Federal Aviation Administration, Milwaukee County, and SEWRPC.

ber of passengers per departure is forecast to increase to an average of about 22. These data are presented in Table 78. The load factors and average number of passengers per departure for both large air carriers and regional and commuter air carriers were forecast to be somewhat higher under a high-growth future because of higher traffic levels due to hubbing activities.

These factors relating to the average aircraft size, the enplaning load factor, and the average number of passengers per departure at Mitchell International were applied to the revised enplaning passenger forecast to determine the revised number of air carrier aircraft operations for this plan update. In order to facilitate this application, the forecast of enplaning passengers was split to separate those passengers traveling by large air carriers and supplemental air carriers from those passengers traveling by regional and commuter air carriers. As noted in Chapter IV of this report, the volume and percentage of passengers traveling on regional and commuter air carriers has been increasing both nationally and at Mitchell International. For purposes of the plan reevaluation, it was assumed that large air carriers and supplemental air carriers together would continue to represent an average of 85 percent of all enplaning passengers over the long

Table 78

FORECAST LARGE AIR CARRIER AND REGIONAL/COMMUTER AIR CARRIER AIRCRAFT CAPACITY, LOAD FACTOR, AND AVERAGE NUMBER OF PASSENGERS PER DEPARTURE: 2010

Forecast Category	Future Scenario	
	Most Likely	High-Growth
Average Number of Seats per Departure		
Large Air Carriers	116.0	116.0
Regional and Commuter Carriers	54.6	54.6
Enplaning Load Factor		
Large Air Carriers	52.3	53.7
Regional and Commuter Carriers	39.5	41.7
Average Number of Passengers per Departure		
Large Air Carriers	60.7	62.3
Regional and Commuter Carriers	21.6	22.8

Source: SEWRPC.

term under the most likely future conditions; it was further assumed that regional and commuter air carriers would continue to represent an average share of 15 percent over the long term under the most likely future conditions. Under high-growth conditions that assume the development of a major hub at Mitchell International, large air carriers and regional and commuter carriers were assumed to represent averages of 80 percent and 20 percent, respectively, of all enplaning passengers.

The resultant forecasts of large air carrier, regional and commuter air carrier, and total air carrier aircraft operations at Mitchell International by the year 2010 are summarized in Table 79 and are shown in Figure 22. This forecast anticipates that by the year 2010, total annual passenger-carrying air carrier operations will increase from a level of 118,000 aircraft operations to 168,000 aircraft operations under most likely future conditions and potentially approach 303,000 aircraft operations under potential high-growth conditions that assume the introduction of large-scale hubbing activities at Mitchell International.

It is important to note that for purposes of preparing and updating the 1987 and older versions of the regional airport system plan, aircraft operations have consistently been divided into the functional categories of air carrier, general aviation, and military activity. The air carrier category has been used only for all passenger-carrying aircraft operations. Such operations are performed by large air carriers,

Table 79

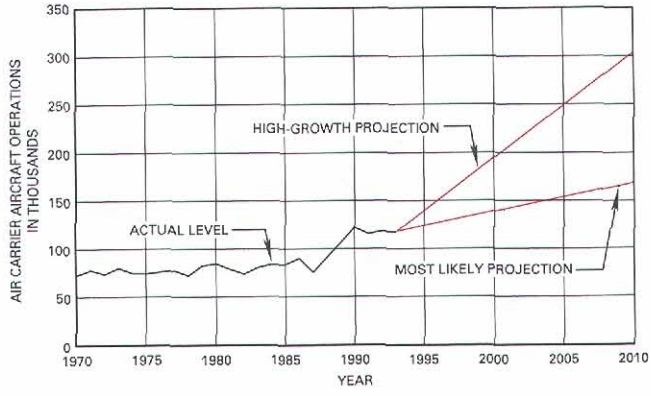
GENERAL MITCHELL INTERNATIONAL AIRPORT AIR CARRIER AIRCRAFT OPERATIONS FORECASTS: 2010

Forecast Category	Most Likely Forecast	High-Growth Forecast
Large Air Carrier Operations	112,000	180,000
Regional and Commuter Air Carrier Operations	56,000	123,000
Total Air Carrier Operations	168,000	303,000

Source: SEWRPC.

Figure 22

GENERAL MITCHELL INTERNATIONAL AIRPORT AIR CARRIER AIRCRAFT OPERATIONS FORECASTS: 2010



Source: SEWRPC.

regional and commuter carriers, and supplemental carriers. Air cargo operations have been included under the general aviation category. General Mitchell International airport, however, is required to report the same aircraft operations using somewhat different categories defined by the Federal Aviation Administration for regulatory purposes. These categories are air carrier, air taxi, general aviation, and military. Only large air carrier and supplemental operations are counted under the air carrier category, with regional and commuter and air cargo operations being counted under the air taxi category. The air carrier and air taxi categories are sometimes added together to generally represent all air carrier operations. When this is done, the air cargo operations which do not handle passengers have been included and the total level of air carrier operations using the FAA categories is about 12 percent greater than the total air carrier operations reported in the regional airport system plan update. A comparison of total 1993 aircraft operations at

Table 80

COMPARISON OF TOTAL AIRCRAFT OPERATIONS AT GENERAL MITCHELL INTERNATIONAL AIRPORT AS SUMMARIZED BY AIRPORT RECORDS AND IN REGIONAL AIRPORT SYSTEM PLAN UPDATE WORK: 1993

Category	As Summarized by Airport	As Summarized for Use in Regional Airport System Plan Update	As Summarized by Detailed Categories
Air Carrier	75,392	117,988	75,392
Regional and Commuter	--	--	42,596
Air Taxi	56,730	--	--
Air Cargo	--	--	14,134
General Aviation	63,370	77,504	63,370
Military	5,796	5,796	5,796
Total	201,288	201,288	201,288

Source: SEWRPC.

Mitchell International as summarized by airport records using the FAA categories with the total operations as summarized for use in the regional airport system plan update is provided in Table 80. This Table also categorizes the total operations at Mitchell International by more detailed categories, which provide an estimate of the actual volume of regional and commuter and air cargo aircraft operations.

GENERAL AVIATION FORECASTS

With respect to facility requirements to meet general aviation demands, an important required forecast is that of the size of the general aviation aircraft fleet in the planning area. The forecast of the aircraft fleet size provides the basis for developing other general aviation-related forecasts, including those of the composition of the general aviation fleet and the number of annual general aviation aircraft operations. The general aviation forecasts presented in this chapter are for the entire seven-county Southeastern Wisconsin Region and are intended to include general aviation aircraft used for all general aviation purposes, regardless of the based location of such aircraft.

General aviation is an important part of all aviation activity in the Southeastern Wisconsin Region. During 1993, it was estimated that 86 percent of all aircraft operations in the Region were the result of general aviation activity. The remaining activity consisted of air carrier operations, which accounted for 13 percent, and military operations, which accounted for 1 percent. In 1993, general aviation flights to and from the Region carried about 2.7 million pilots and passengers. This total may be compared to the approximately 4.5 million enplaning and deplaning passengers served by air carrier operations during the same year.

Review of Existing and Past Regional Airport System Plan Forecasts

Forecasts of the general aviation aircraft fleet size and general aviation operations in Southeastern Wisconsin form the basis for developing new and updated general aviation activity forecasts. Such forecasts were developed under both the original and second-generation regional airport system plans. Under both versions of the plan, fleet size was forecast in terms of total registered aircraft. As noted in Chapters III and IV of this report, general aviation has over the past decade experienced significant reductions in activity as measured by the number of new aircraft manufactured, total annual hours flown, activity at airports with air traffic control towers, and number of active pilots. These reductions are thought to be the result of the significantly increased cost of purchasing, maintaining, and operating general aviation aircraft. Over this same decade, however, the total fleet size, as measured by the total number of registered aircraft, both nationally and in the Region, has remained essentially stable. This indicates that the fleet as a whole is being utilized less. Nevertheless, the business and corporate aviation segment of general aviation, which is largely comprised of the high-performance aircraft such as twin-engine turboprops and jets, appears to be growing. These aircraft, however, continue to represent less than 10 percent of all active general aviation aircraft in the United States and in the Region.

Under the original regional airport system planning effort, the regional general aviation fleet was forecast to increase from about 960 aircraft in the base year of 1971 to about 3,500 aircraft by the forecast year 1995. This forecast envisioned an increase of about 260 percent over the base year, or an average annual increase in the number of based aircraft to the year 1995 of over 5 percent. As shown in Figure 23, the original general aviation fleet forecast for the Region exhibited an acceptable degree of accuracy until about 1980. The severe economic recession then experienced within the Region, coupled with the rapidly increasing cost of purchasing, maintaining, and operating general aviation aircraft, began to impact general aviation, causing stagnation in the size of the general aviation fleet.

Under the second-generation regional airport system planning effort, the regional general aviation fleet was forecast to increase from about 1,600 aircraft in 1985 to 2,400 aircraft by the forecast year of 2010, an increase of about 50 percent, or about 1.7 percent annually. As shown in Figure 23, the actual size of the general aviation fleet in 1994 was almost 1,600 aircraft, or 17 percent below the forecast size of about 1,900 aircraft for that year.

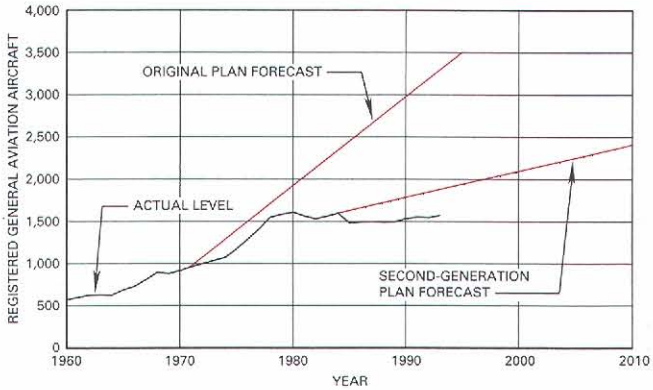
Forecast Procedure

The procedure for reviewing and updating the general aviation forecast under this reevaluation of the regional airport system plan was similar to that used in preparing the second-generation regional airport system plan. Two projection methods were utilized: a ratio approach based on the regional share of the national general aviation fleet and a socio-economic indicator approach that utilized relationships between fleet size and selected socio-economic characteristics of the Region. The two sets of projections were then examined and compared and a most likely forecast level selected, together with accompanying alternate high and low forecast levels. The forecasts of the general aviation fleet size were then converted into forecasts of the fleet composition and number of general aviation operations.

In preparing the forecast of the general aviation fleet size, measures of both registered aircraft and based aircraft were used as appropriate. As noted in Chapter IV, these represent two different means of measuring fleet size. Each of the two means provides different, but useful, information concerning historic and present fleet size and composition, and general aviation trends at the national and regional levels.

Figure 23

PREVIOUS REGIONAL AIRPORT SYSTEM PLAN REGISTERED GENERAL AVIATION FLEET SIZE FORECASTS FOR SOUTHEASTERN WISCONSIN



Source: SEWRPC.

Projection of Fleet Size
Based on Top-Down Approach

The basic procedures employed for developing both the ratio and socio-economic projections of fleet size consisted of two steps. In the first step, a base year fleet size was established for Southeastern Wisconsin, providing an estimate of the total number of aircraft and aircraft type by airport. It was determined to use the Commission estimates of based aircraft as presented in Chapter IV of this report for this purpose. There were several reasons for this determination. First, based aircraft represent the active portion of the total fleet and therefore generate activity and a demand for facilities. Second, the Federal Aviation Administration prepares forecasts of the national general aviation fleet size in terms of active, not total, aircraft. And third, the general aviation forecasts being prepared as part of the most recent update of the State airport system plan also use based aircraft.

In the second step of both procedures, the various general aviation-related trends described in Chapter IV of this report were employed, as appropriate, to develop the projections as well as anticipated future fleet composition and volume of operations. Most of these trends were based on national data compiled by the FAA relating to both registered aircraft and active aircraft and appropriate for use for long-range planning at the regional and State levels.

Under the ratio approach, a projection of the general aviation fleet was developed by determining the percentage of the national general aviation fleet

based in the Region and applying that percentage to a design year forecast of the national general aviation fleet as prepared by the FAA. The historic trends of the percentage of general aviation aircraft registered within the State and the Region are provided in Chapter IV of this report. The pertinent data are maintained by the FAA by the aircraft owner's place of residence. These data indicate that from 1960 to 1993, the share of the total national general aviation fleet based in Wisconsin has varied from 1.81 percent to 2.02 percent. During the 1980s, this share decreased to an average of about 1.85 percent, but then recovered to 2.02 percent in 1993. Over the long term, Wisconsin's share of the total national fleet has remained fairly stable at an average of about 1.92 percent.

The data also provide a historic trend in the percentage of the Wisconsin Statewide general aviation aircraft fleet registered within the Southeastern Wisconsin Region. These data indicate that from 1960 to 1993, the share of the total Statewide general aviation fleet in Southeastern Wisconsin had decreased from about 37 percent during the 1960s to about 29 percent in the 1990s, although during the same period, the actual number of aircraft registered in both the Region and State had increased significantly. It was also found that where comparable data were available, Wisconsin's share of the United States general aviation fleet for based, that is, active, aircraft has historically been very similar to its share of the total registered fleet. Also, the size of the general aviation aircraft fleet based in the Region was found to be very close to the size of the general aviation aircraft fleet registered in the Region in terms of number of aircraft and fleet composition. It was therefore appropriate to use the current number of based aircraft in Southeastern Wisconsin as the regional share of the national general aviation aircraft fleet.

The Federal Aviation Administration prepares forecasts of active general aviation aircraft for national planning purposes. The most recent forecasts prepared by the FAA were published in 1994 and have as their base year 1993 and as their forecast year 2005. These forecasts project total active general aviation aircraft in the United States to decrease slightly, from 184,400 in 1993 to 177,400 in 2005, a decrease of about 4 percent. According to the FAA forecast, the total active national fleet is expected to decrease in size to a level of about 173,300 aircraft by 1998 as a result of the retirement or deactivation of many of the older piston aircraft. The retirement of these older aircraft is expected to continue throughout the FAA's forecast period. Beginning in 1998, however, retired aircraft are expected to be replaced by new aircraft, resulting in an increase in the total fleet size from the 173,300 aircraft in 1998 to about 177,400 aircraft by 2005. The FAA forecasts thus envision an average annual growth rate of approximately 0.3 percent over the seven years from 1998 to 2005. Almost all the fleet growth is expected to be attributable to increases in the number of turboprop and jet aircraft and helicopters. Extrapolation of the FAA forecast to the year 2010, based upon the forecast increase in fleet size after 1998, provided a projection of 180,300 aircraft by the year 2010. It is important to note that the FAA general aviation forecasts are based on a set of assumptions that include an outlook for moderate and sustained growth in the national economy and the passage of product liability limitation legislation, together with a subsequent response to this legislation by small aircraft manufacturers.

Three different scenarios were developed, representing the range of shares of the national active general aviation aircraft fleet that may be expected to be based in Southeastern Wisconsin. Each of these three shares was then applied to the FAA national forecast to arrive at projections for the general aviation fleet size in the Region. These three scenarios include a no-growth, a most likely, and a high-growth projection.

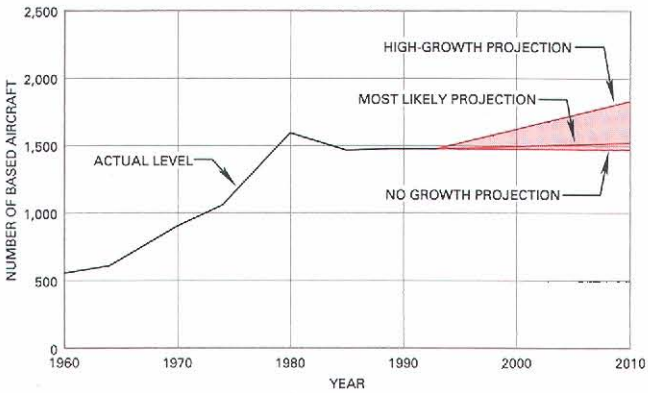
Under a most likely scenario, the regional share of the active United States general aviation fleet would be expected to remain at about the levels experienced in 1993. At the end of 1993, it was found that the 1,489 active based aircraft in the Region, about 0.85 percent of the national active fleet, estimated by the Federal Aviation Administration to be about 176,000 aircraft. The most likely scenario reflects the assumption that general aviation trends within the Region will continue to replicate trends at the national level over the long term, and the regional share will continue to approximate 0.85 percent of the national fleet. Under the no-growth scenario, the regional share of the active United States general aviation fleet would be expected to decrease to an average of about 0.82 percent, reflecting a decrease in the share of the national fleet similar to that which occurred during the early 1980s. Under the high-growth scenario, the regional share of the active United States general aviation fleet would be expected to increase gradually to an average of about 1.02 percent, reflecting an increase in the share of the national fleet to a level similar to that experienced during the 1970s, prior to the severe

economic recession and the overall decrease in general aviation activity experienced in the Region from 1979 to 1983.

On the basis of these projections, the year 2010 active based general aviation aircraft totals for the Southeastern Wisconsin Region would be expected to range from 1,480 to 1,840, with 1,530 representing the most likely projection. This range of ratio projections is shown in Figure 24. This range of projections is considerably below those presented in the second-generation plan forecast. Because these projections incorporate the national forecasts prepared by the FAA, they reflect the guarded optimism of the national forecasts. It should be noted that the most likely projection under this method represents almost no change in the number of based aircraft within the Region to the year 2010.

Figure 24

ACTIVE GENERAL AVIATION FLEET SIZE IN SOUTHEASTERN WISCONSIN, BASED ON TOP-DOWN PROJECTIONS



Source: SEWRPC.

Projection of Fleet Size Based on Socio-Economic Indicator Approach

Under the second method, known as the socio-economic indicator method, a projection of the general aviation fleet was developed by establishing relationships between the size of the general aviation fleet based in the Region and selected socio-economic characteristics of the Region. These relationships were then applied to design year forecasts of the socio-economic characteristics as prepared by the Regional Planning Commission under other planning programs. The limited availability of consistent data with respect to registered and based aircraft data below the national and Statewide levels required that registered, not based, aircraft data be utilized as a basis for this method. Also, because this projection was developed from region-level data in a "bottom-up" fashion, major factors from outside the Region, such as the impact of aircraft previously based in northeastern Illinois being relocated to Southeastern Wisconsin airports, were specifically considered.

Under this approach, the historic levels of the registered general aviation fleet within the Region for the years 1970 to 1993 were compared to the historic levels of the socio-economic characteristics of the Region that might be expected to influence the size of the general aviation fleet. These characteristics were the same ones examined under the preparation of the air carrier passenger forecasts, employment, resident population, and aggregate personal income. This comparison indicated that, more than any other socio-economic characteristic of the Region considered, employment was related to the general aviation fleet size of Southeastern Wisconsin. This was the same conclusion that was reached during preparation of the air carrier passenger forecasts, as well as under the original and second-generation regional airport system planning efforts. Accordingly, the following regression equation was developed to project the size of the registered general aviation fleet in the Region to the year 2010:

$$F = 0.00192 (E) - 263.5$$

Where: F = Size of regional general aviation fleet

E = Regional employment

Forecasts to the year 2010 prepared by the Regional Planning Commission indicate a potential range in employment in Southeastern Wisconsin from 870,900 to 1,251,600 jobs, with 1,095,000 jobs being the most likely level. Accordingly, application of the regression equation results in a size of the registered general aviation fleet in Southeastern Wisconsin from about 1,410 to about 2,140 aircraft, with about 1,750 aircraft being the most likely total.

As already noted, these projections represent the total number of registered aircraft in the general aviation fleet. These projections must, therefore, be converted to projections of active based aircraft. A review of recent aircraft inventory data for Southeastern Wisconsin indicates that active aircraft represent approximately 90 percent of aircraft registered. The projections of the registered fleet size were accordingly factored to estimate the based aircraft fleet size.

Table 81

ACTIVE GENERAL AVIATION FLEET SIZE PROJECTIONS FOR SOUTHEASTERN WISCONSIN, BASED ON THE SOCIO-ECONOMIC INDICATOR METHOD

Category Type	Existing 1993	Year 2010 Projections		
		No-Growth Projection	Most Likely Projection	High-Growth Projection
Regional Employment	1,010,700	870,900	1,051,300	1,251,600
	Number of Aircraft			
Registered Fleet Size	1,565	1,410	1,750	2,140
Active Fleet Size:				
From Southeastern Wisconsin[a]	1,357	1,117	1,378	1,676
From Northeastern Illinois[b]	132	230	260	280
Total Active Fleet Size	1,489	1,347	1,638	1,956

[a] *Includes all based aircraft except those from Northeastern Illinois.*

[b] *Includes based aircraft owned by individuals or businesses located in the Northeastern Illinois counties of Lake, McHenry, and Cook.*

Source: SEWRPC.

The potential impact on the size of the regional fleet of general aviation aircraft formerly based in northeastern Illinois and relocated to airports in Southeastern Wisconsin was also considered. It was estimated that in 1993 a total of about 130, or about 9 percent, of the 1,489 active general aviation aircraft based in the Region were owned by individuals and businesses located in northeastern Illinois. About 90 percent of the 130 aircraft concerned were based at the Kenosha Regional Airport. Most of the northeastern Illinois aircraft being relocated to Southeastern Wisconsin airports are owned by, and flown for, personal, recreational, and sport purposes and the aircraft are being relocated to avoid congestion and restrictions at airports located closer to Chicago. Also, much of this relocation appears to have occurred since 1990 and has coincided with the recent and rapid urban development of Lake and McHenry Counties in suburban Chicago.

For purposes of the system plan reevaluation, it was concluded that the recent trend in the number of based aircraft being relocated from northeastern Illinois to Southeastern Wisconsin may be expected to continue. Accordingly, the number of such relocated aircraft was assumed to increase from 130 in 1993 to 230, 260, and 280 aircraft by the year 2010 under low-growth, most likely, and high-growth futures, respectively.

Under the socio-economic indicator method, the total projected active general aviation fleet size for the Region was calculated by converting the registered general aviation fleet size projection to active fleet size and adding the aircraft that might be expected to relocate from northeastern Illinois. A summary of these results is presented in Table 81 and shown on Figure 25. Under this projection method, the year 2010 active general aviation fleet size may be expected to range from about 1,350 aircraft under no-growth to about 1,960 aircraft under high-growth conditions, with about 1,640 aircraft being the most likely projection.

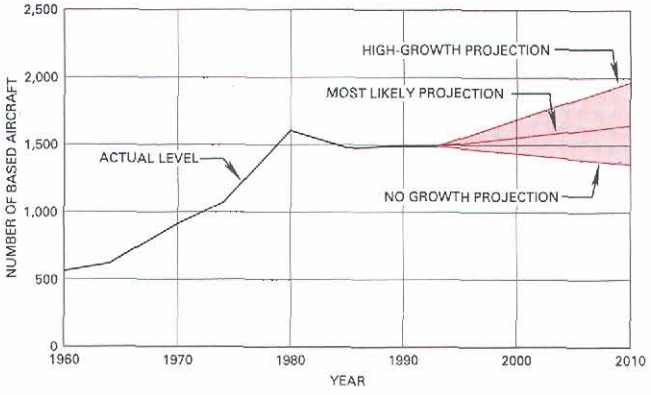
It should be noted that the assumed rate of increase in aircraft expected to relocate from northeastern Illinois airports to Southeastern Wisconsin over the plan design period is significantly higher than the rate of increase expected for the regional aircraft fleet. If the rate of growth for each of these two segments of the total fleet were assumed to be the same, then the projections would range from 1,230 aircraft under no-growth to 1,840 aircraft under high-growth conditions, with 1,510 being the most likely projection.

Revised General Aviation Fleet Size Forecast for Southeastern Wisconsin

A revised forecast of the regional general aviation fleet size was then assembled by comparing projections prepared by the two methods used and selecting a forecast figure on the basis of the careful consideration and collective judgement of the Advisory Committee. In this comparison, it was noted that the most likely projection of the number of based aircraft in the general aviation fleet prepared

Figure 25

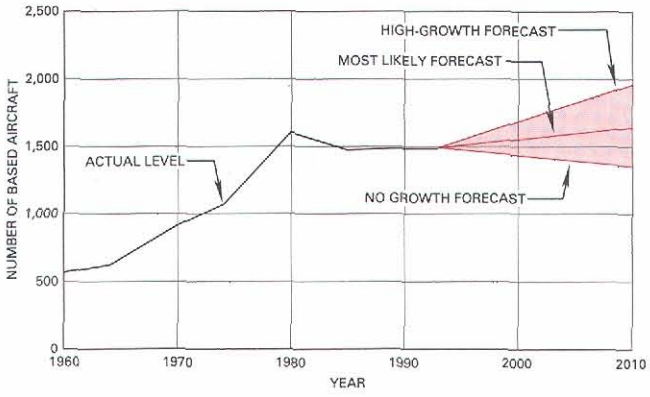
ACTIVE GENERAL AVIATION FLEET SIZE PROJECTIONS FOR BASED AIRCRAFT IN SOUTHEASTERN WISCONSIN, BASED ON THE SOCIO-ECONOMIC INDICATOR METHOD



Source: SEWRPC.

Figure 26

FORECASTS OF THE ACTIVE GENERAL AVIATION FLEET SIZE FOR SOUTHEASTERN WISCONSIN: 2010



Source: SEWRPC.

under the ratio method was 1,530, while under the socio-economic method without assuming further relocation of aircraft from northeastern Illinois, was 1,640 aircraft.

On the basis of a review and comparison of the projections provided by the two methods used, it was the conclusion of the study advisory committee that the forecast based upon the socio-economic indicator method should be selected for use in the planning effort for two principal reasons. First, it was believed that many aircraft owners who currently base their aircraft in northeastern Illinois will continue to consider relocating to other less congested airports, including those close to the Wisconsin-Illinois State line in Southeastern Wisconsin. Second, the socio-economic indicator approach offered a somewhat wider forecast range than did the ratio approach. This was concluded to be sound, considering the current uncertainty about the future status of the general aviation industry. Accordingly, the new forecasts of the regional general aviation fleet size range from 1,350 aircraft under no-growth to 1,960 aircraft under high-growth conditions with 1,640 the most likely projection, as was shown in Table 81 and shown in Figure 26. The most likely forecast level for the regional fleet assumes a long term increase of about 150 aircraft, or about 10 percent, over the 1993 level of 1,489 aircraft. This would represent about a 0.6 percent average annual increase in the size of the regional general aviation fleet to the year 2010.

In preparing the forecast of general aviation fleet size for the Region, it was recognized that home-built aircraft have become popular among some pilots during the late 1980s and early 1990s. Given the increasing cost of owning and operating small single-engine aircraft for sport and recreation purposes during this same period, home-built aircraft, because of their lower cost, have represented an increasingly popular alternative compared to conventional manufactured aircraft. After home-built aircraft are assembled, they must be registered, thereby becoming part of the active fleet. Accordingly, home-built aircraft may be expected to comprise an increasing proportion of the forecast future fleet of single-engine aircraft in the Region. The forecast assumes that some home-built aircraft are already included in the Regional fleet and that their share of the single-engine fleet will gradually increase in the future.

Forecast General Aviation Fleet Composition

Since different categories of aircraft normally have different rates of use, it was necessary to estimate the future composition of the general aviation fleet by aircraft type. The procedures used in past regional airport system planning efforts were used for this purpose.

As noted in Chapter IV of this report, the composition of the general aviation fleet within the Region historically has not differed significantly from that of the composition of the national fleet. In 1993, about 88 percent of both the active Regional and National general aviation active fleets consisted of piston aircraft; for both fleets, about 90 percent of these aircraft were single-engine aircraft. The remaining 12 percent of the respective fleets con-

Table 82

COMPARISON OF UNITED STATES AND REGIONAL ACTIVE GENERAL AVIATION AIRCRAFT FLEET COMPOSITION BY PERCENTAGE: 1983 AND 1993

Aircraft Type	United States		Region	
	1983	1993	1983	1993
Piston:				
Single-Engine	78.0	77.9	81.8	78.6
Other	11.8	10.1	10.6	9.2
Subtotal	89.8	88.0	92.4	87.8
Turboprop	2.6	2.5	1.7	4.1
Jet	1.8	2.2	1.3	2.8
Helicopter	3.0	3.1	1.9	1.2
Other[a]	2.8	4.2	2.7	4.1
Total	100.0	100.0	100.0	100.0

[a] *Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration.

sisted of turboprop and jet aircraft, helicopters, and other miscellaneous aircraft types, such as gliders. A comparison of these aircraft type shares within the national and regional fleets is provided in Table 82. Historic trends indicate that the respective shares of turboprop, jet, helicopter, and other miscellaneous aircraft types have, in general, been modestly increasing while the share of piston aircraft has been decreasing, as indicated in Table 82. As shown in that table, the share of piston-engine aircraft in the Region has decreased from 92.4 percent in 1983, to 87.8 percent in 1993. During the same period, the share of turboprop aircraft in the Regional fleet has increased from 1.7 to 4.1 percent, the share of jet aircraft has increased from 1.3 to 2.8 percent, the share of helicopters has decreased from 1.9 to 1.2 percent, and the share of other miscellaneous aircraft types has increased from 2.7 to 4.1 percent during the same 10-year period.

Forecasts prepared by the Federal Aviation Administration anticipate that these general trends with respect to fleet composition may be expected to continue to the year 2005, as shown in Table 83. Historic trends in the Regional general aviation fleet composition have been similar to the national trends. Accordingly, the revised forecast of the Regional general aviation fleet composition which is also presented in Table 83 reflects changes proportional to those in the national fleet composition. As indicated by this table, the forecast for the Region envisions a continued decrease in the proportion of the general aviation fleet comprised of piston-engine aircraft and increases in most other types of aircraft. Table 84 presents the resultant numbers of aircraft by type under each of the three alternative future scenarios considered.

Revised General Aviation Aircraft Operations Forecast

General aviation airport capacity is measured by the number of aircraft operations an airport can safely accommodate. Therefore, in order to establish a relationship between airport capacity and use at general aviation airports in the Region and, thereby, the existing and probable future need for airport improvements, forecasts of general aviation fleet size and fleet composition must be converted to forecast general aviation aircraft operations. Forecast general aviation aircraft operations are typically prepared by applying an estimate of the probable future annual hours of use of general aviation aircraft by aircraft type and an estimate of the probable future number of operations per hour of use of general aviation aircraft by aircraft type to forecasts of the general aviation fleet size.

Table 85 presents the Federal Aviation Administration forecasts of the annual number of hours of use per aircraft for each type of general aviation aircraft in the year 2005. The FAA forecasts generally envision that the average number of hours flown per aircraft will gradually return to the levels achieved prior to the decline in general aviation experienced in the 1980s and 1990s. For purposes of the regional airport system plan reevaluation, the FAA forecasts were extended to the year 2010 under

Table 83

EXISTING AND FORECAST UNITED STATES AND REGIONAL ACTIVE GENERAL AVIATION AIRCRAFT FLEET COMPOSITION BY PERCENTAGE

Aircraft Type	United States			Region	
	Existing 1993	Forecast 2005	Forecast 2010	Existing 1993	Forecast 2010
Piston:					
Single-Engine	77.9	73.9	72.9	78.6	73.0
Other	10.1	9.9	9.8	9.2	9.0
Subtotal	88.0	83.8	82.7	87.8	82.0
Turboprop	2.5	3.7	4.1	4.1	7.0
Jet	2.2	2.9	3.1	2.8	4.1
Helicopter	3.1	4.3	4.6	1.2	1.9
Other[a]	4.2	5.3	5.5	4.1	5.0
Total	100.0	100.0	100.0	100.0	100.0

[a]*Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration and SEWRPC.

Table 84

FORECAST NUMBER OF ACTIVE GENERAL AVIATION AIRCRAFT IN THE SOUTHEASTERN WISCONSIN FLEET BY TYPE: 2010

Aircraft Type	Existing 1993	Year 2010 Forecast		
		No-Growth Forecast	Most Likely Forecast	High-Growth Forecast
Piston				
Single-Engine	1,171	980	1,190	1,420
Other	137	121	147	176
Subtotal	1,308	1,101	1,337	1,596
Turboprop	61	94	115	137
Jet	41	55	67	80
Helicopter	18	25	31	38
Other[a]	61	72	88	105
Total	1,489	1,347	1,638	1,956

[a]*Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration and SEWRPC.

the assumption that much of the general aviation fleet will continue to be used more efficiently, resulting in a continuation of the increase in average hours of use. Table 85 indicates the aircraft utilization rates used in the regional airport system plan reevaluation.

Table 86 presents estimates of the number of operations per hour of general aviation aircraft use by type of aircraft. These data are available from FAA historic records and are presented in the Table for 1970, 1981, and 1992, the last being the latest year for which the data are available. These estimates

Table 85

CURRENT AND FORECAST ANNUAL HOURS OF USE OF REGISTERED GENERAL AVIATION AIRCRAFT BY AIRCRAFT TYPE IN THE UNITED STATES: 1992 EXISTING, 2005 FORECAST, AND 2010 FORECAST

Aircraft Type	Annual Hours of Use per Aircraft		
	1992 Existing	2005 FAA Forecast	2010 Forecast[a]
Single-Engine Piston	121	127	129
Other Piston	154	189	202
Turboprop	302	405	445
Jet	256	342	376
Helicopter	381	513	564
Other[b]	N/A	N/A	N/A

NOTE: N/A indicates data not available.

[a] *Extension of 2005 FAA forecast.*

[b] *Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration and SEWRPC.

Table 86

HISTORIC, CURRENT, AND FORECAST OPERATIONS PER HOUR OF GENERAL AVIATION AIRCRAFT USE BY AIRCRAFT TYPE IN THE UNITED STATES: 1970, 1981, 1992, AND 2010

Aircraft Type	Operations per Hour of Use			
	Historic 1970	Historic 1981	Existing 1992	Forecast 2010
Single-Engine Piston	4.4	4.1	3.2	3.2
Other Piston	2.0	1.9	1.9	1.9
Turboprop	2.0	2.4	2.4	2.4
Jet	1.4	1.5	1.7	1.7
Helicopter	4.3	3.4	3.7	3.7
Other[a]	4.5	3.0	2.9	2.9

[a] *Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration and SEWRPC.

indicate that some changes in use have occurred over the long term. The number of operations per hour appears to have decreased for piston-engine aircraft, helicopters, and other miscellaneous aircraft, but have increased for general aviation jets. On the basis of consideration of how these aircraft utilization rates have changed, it was concluded that the rates of operations per hour estimated for 1992 would be appropriate to use in preparation of the year 2010 forecasts.

To prepare estimates of general aviation aircraft operations in the year 2010, the forecast annual hours of use were applied to the number of operations per hour by aircraft type for the national fleet to arrive at an estimate of average annual operations per aircraft. This was done for both the national fleet and the regional fleet to adjust for any regional differences in aircraft use. Estimates of the forecast average annual operations per aircraft in the year 2010 for the Region were then calculated. Accordingly, the forecast numbers of average annual operations per aircraft in the Region were 540 for single-engine piston aircraft, 500 for multi-engine piston aircraft, 1,390 for turboprop aircraft, 830 for general aviation jet aircraft, 620 for helicopters, and 110 for other miscellaneous type aircraft.

These forecast aircraft utilization rates were then applied by aircraft type to the forecasts of active general aviation aircraft in the Region to arrive at the anticipated number of general aviation operations in the Region in the year 2010. The resultant activity forecasts are presented in Table 87 by alternative future scenarios. The estimated existing 1993 general aviation aircraft operations in the Region are also presented in this table for comparison purposes. The number of total general aviation operations in the Region is envisioned to decrease from about 796,800 operations in 1993 to about 789,500 operations under no-growth conditions and increase to about 1,146,700 aircraft operations under high-growth conditions, with a most likely forecast level of about 960,400 aircraft operations. These forecasts represent a change in general aviation activity ranging from a decrease of about 1 percent under low-growth conditions to an increase of almost 45 percent under high-growth conditions, with a most likely increase of about 20 percent between 1993 and the year 2010. The most likely forecast also represents a level of activity of about 30 percent less than the forecast level of general aviation aircraft operations envisioned in the year 2010 under the second-generation regional airport system plan. This forecast of general aviation aircraft operations is shown graphically in Figure 27.

Other Forecast Outputs

The forecast of general aviation operations in the Region was further refined to provide an estimate of

Table 87

FORECAST NUMBER OF GENERAL AVIATION OPERATIONS GENERATED BY THE ACTIVE SOUTHEASTERN WISCONSIN FLEET BY AIRCRAFT TYPE: 2010

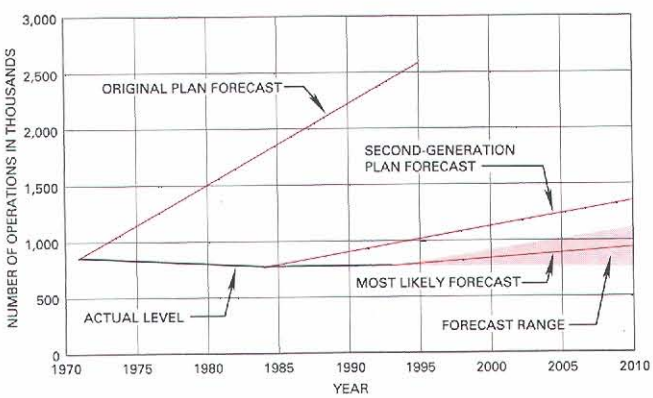
Aircraft Type	Existing 1993	Year 2010 Forecast		
		No-Growth Forecast	Most Likely Forecast	High-Growth Forecast
Fixed-Wing Aircraft				
Piston				
Single-Engine	634,700	529,200	642,600	766,800
Other	58,800	60,500	73,500	88,000
Subtotal	693,500	589,700	716,100	854,800
Turboprop	62,700	130,700	159,800	190,400
Jet	27,400	45,700	55,600	66,400
Fixed-Wing Aircraft Total	783,600	766,100	931,500	1,111,600
Helicopter	7,000	15,500	19,200	23,600
Other[a]	6,200	7,900	9,700	11,500
All Types Total	796,800	789,500	960,400	1,146,700

[a]*Includes balloons, gliders, and registered ultralights.*

Source: Federal Aviation Administration and SEWRPC.

Figure 27

FORECASTS OF GENERAL AVIATION AIRCRAFT OPERATIONS FOR SOUTHEASTERN WISCONSIN: 2010



Source: SEWRPC.

total local and itinerant general aviation operations and an estimate of total general aviation users. Local general aviation operations consist primarily of training and instructional flights. Local operations are those which occur in the local traffic pattern or within sight of a control tower; are known to be departing for, or arriving from, local practice areas generally located within a 20-mile radius of the airport; or are for the execution of simulated instrument approaches to the airport. Itinerant operations are all aircraft operations other than local operations.

Table 88 provides information showing the distribution of local and itinerant general aviation aircraft operations at public-use airports located within the Region. This Table indicates that at public-use airports in the Region with air traffic control towers, local operations account for almost 40 percent of all traffic, while itinerant operations account for about 60 percent. In 1993, three airports within the Region had air traffic control towers, General Mitchell International Airport, Lawrence J. Timmerman Airport, and Waukesha County-Crites Field. At public-use airports within the Region that do not have air traffic control towers, about 55 percent, or slightly over half of the operations were local in nature and 45 percent of the operations were itinerant. Since airports that do have control towers are likely to experience relatively high traffic levels, the potential for some congestion, and use by higher performance aircraft, these same airports would be expected to have a lower percentage of local operations, which are made up largely of training and proficiency activities. Table 88 also shows that the proportion of local and itinerant operations at airports without control towers has not significantly changed from 1984 to 1993, but may have increased somewhat at airports with control towers.

Table 88

PERCENTAGES OF LOCAL AND ITINERANT GENERAL AVIATION AIRCRAFT OPERATIONS AT PUBLIC-USE AIRPORTS IN SOUTHEASTERN WISCONSIN: 1984 AND 1993

County	Airport Name	1984		1993	
		Local	Itinerant	Local	Itinerant
Kenosha	Camp Lake	71	29	86	14
	Kenosha Municipal	55	45	57	43
	Vincent	67	33	68	32
	Westosha	50	50	51	49
Milwaukee	Mitchell International	2	98	23	77
	Rainbow	58	42	54	46
	Lawrence J. Timmerman	51	49	52	48
Ozaukee	None	--	--	--	--
Racine	Burlington Municipal	44	56	46	54
	Cindy Guntly Memorial	59	41	74	26
	Fox River	67	33	50	50
	Batten	43	57	60	40
	Sylvania	67	33	70	30
	Valhalla	33	67	33	67
Walworth	Americana[a]	19	81	--	--
	Big Foot Airfield	60	40	64	36
	East Troy Municipal	50	50	44	56
	Lake Lawn	33	67	19	81
Washington	Hahn Sky Ranch	50	50	50	50
	Hartford Municipal	58	42	60	40
	West Bend Municipal	63	37	53	47
Waukesha	Aero Park	91	9	83	17
	Capitol	59	41	70	30
	Waukesha County-Crites Field	48	52	41	59
Public-Use Airports with Air Traffic Control Towers		33	67	39	61
Public-Use Airports without Air Traffic Control Towers		54	46	55	45
All Public-Use Airports		47	53	51	49

[a] *Airport closed during 1993.*

Source: Wisconsin Department of Transportation and SEWRPC.

Estimates of general aviation users, defined as pilots and passengers, were also developed. It should be noted that general aviation pilot and passenger data are seldom collected on a continuing basis at most general aviation airports, but rather are normally available only from special surveys. The last such survey in Southeastern Wisconsin was conducted by the Regional Planning Commission in 1983 as part of the initial data collection effort for preparation of the second-generation regional airport system plan. The survey indicated that inbound and outbound flights that were surveyed averaged about 1.8 crew members and 1.4 passengers per aircraft operation, or an average of about 3.2 persons per flight. Because the nature of general aviation trip-making with respect to the types of trips made is not expected to have changed significantly over the long term, it was believed that this estimate of aircraft occupants should still be valid. Accordingly, it was estimated that the 2.55 million pilot and passenger trips made by general aviation in 1993 could be expected to increase to a total ranging from a low of 2.53 million trips to a high of 3.67 million trips by the year 2010, with the most likely level being about 3.07 million trips.

AIR CARGO FORECASTS

Because air cargo represents a rapidly expanding segment of aviation and little long-range planning has been previously conducted in this area, a Wisconsin air cargo study was undertaken as part of

the concurrent update of the State airport system plan for Wisconsin and the regional airport system plan for Southeastern Wisconsin. The Wisconsin air cargo study was prepared by consultants retained by the Wisconsin Department of Transportation and was intended to examine air cargo issues and prepare forecasts for the entire State, including the Southeastern Wisconsin Region. Accordingly, the inventory and forecasts of air cargo for the Region under the regional airport system plan reevaluation were taken from the Statewide air cargo study. Inventory findings from the Wisconsin air cargo study that are pertinent to the Southeastern Wisconsin Region are summarized below.

It was estimated that in 1993 the volume of reported air cargo that was either loaded or unloaded within Wisconsin totaled about 245 million pounds, or 122,500 tons. Of this total, about 66,000 tons, or 54 percent, consisted of overnight delivery and express shipments; about 33,000 tons, or 26 percent, consisted of other freight; and 24,000 tons, or about 20 percent, consisted of United States mail. About 102,500 tons, or over three-quarters, of the Wisconsin total air cargo volume, was handled at General Mitchell International Airport. It was also estimated that as much as 62,500 additional tons of air freight may have entered or left the State by truck to and from other airports. Most of this freight was likely to be international in nature. As of 1993, it was found that most of the international air cargo traffic to and from Wisconsin was being trucked to out-of-State airports, mostly at Chicago and Minneapolis-St. Paul. These traffic estimates represent the sum of cargo carried on board all-cargo flights and in the cargo holds of air carrier passenger flights.

To provide perspective, these air cargo volumes may be compared to air cargo volumes at other nearby large airports. For example, in 1993 the air cargo volume at Minneapolis-St. Paul International Airport was 353,500 tons. At Chicago O'Hare International Airport, the 1993 domestic air cargo volume was 850,000 tons and the international air cargo volume was 423,500 tons. By comparison, the 1993 domestic air cargo volume for the United States was about 5,000,000 tons. These statistics should be regarded as estimates, since very little hard data exist in publicly available form on the size and composition of the air cargo markets. In this respect, it should be noted that data concerning air cargo shipments do not always have to be recorded, depending upon the type of shipment and the type of air carrier involved. Within the State of Wisconsin, only six airports, Appleton, Green Bay, Madison, Mosinee, and Oshkosh, were found to have sufficient air cargo traffic to warrant maintaining data in any form. Of the six airports, only Mitchell International maintains historic air cargo data classified by specific air carrier and volume.

In conclusion, it was found that air cargo activity in general, while rapidly increasing, is also very dynamic. Much of the traffic is handled by freight forwarders and decisions concerning the most efficient and least costly way of shipping express and freight traffic may change from day to day, depending upon available air carrier capacity, available truck capacity, shipment size, and short-term changes in the cost of providing the needed service. It was also found that within the State only six airports have cargo facilities that are used on a regular basis. Most of the cargo facilities within the State are located at Mitchell International and operated by private air cargo firms.

The forecasts of air cargo traffic as prepared under the State airport system plan update included three different growth scenarios and were divided among three categories, overnight express, traditional freight, and United States mail. The express category is predominantly made up of small packages for overnight delivery. The three growth scenarios reflected low, medium, and high growth conditions for air cargo involvement. These air cargo forecasts are presented in Table 89.

Air cargo traffic at Mitchell International is expected to continue to dominate all air cargo traffic in Wisconsin, representing about 89 percent of the Statewide total by the year 2010. At Mitchell International, express and small package traffic may be expected to continue to represent the largest segment of the total air cargo movements. In total, all air cargo at Mitchell International was forecast to more than double, from about 102,000 tons in 1993 to about 287,000 tons by the year 2010 under medium-growth conditions. Under low-growth and high-growth conditions, all air cargo handled at Mitchell International was forecast to increase to about 203,000 tons and 432,000 tons, respectively, by the year 2010.

MILITARY AVIATION FORECASTS

Within Southeastern Wisconsin, aviation activity attendant to military operations has historically constituted a relatively small portion of all aviation activity. As noted in Chapter IV, most military aviation activity in 1993 occurred at only three airports in the Region, General Mitchell Inter-

Table 89

EXISTING AND PRELIMINARILY FORECAST AIR CARGO TRAFFIC LEVELS AT GENERAL MITCHELL INTERNATIONAL AIRPORT AND OTHER WISCONSIN AIRPORTS IN MILLIONS OF POUNDS

Air Cargo Category	Existing 1993	Forecast 2010		
		Low-Growth Scenario	Medium-Growth Scenario	High-Growth Scenario
General Mitchell International Airport				
Express and Small Packages	106.6	280.5	406.6	633.7
Other Freight	54.4	81.6	113.4	159.4
U. S. Mail	43.7	43.7	53.3	71.6
Total	204.7	405.8	573.3	864.7
Other Wisconsin Airports[a]				
Other Freight	36.2	45.9	64.0	90.4
U. S. Mail	4.6	4.6	5.4	6.8
Total	40.8	50.5	69.4	97.2

[a] *Includes Green Bay, Appleton, Madison, and Mosinee.*

Source: Coopers & Lybrand and Wisconsin Department of Transportation.

national Airport, West Bend Municipal Airport, and Waukesha County-Crites Field. There were no exclusively military-use airports located within the Region. Together the military units stationed within the Region accounted for 24 based fixed wing aircraft and 27 helicopters. In terms of activity, military units at these three airports together accounted for about 13,600 operations during 1993. These operations accounted for 81 percent of all military operations estimated to have occurred in the Region during 1993.

The level of such military activity in Southeastern Wisconsin has remained relatively constant since the mid-1980s and consists largely of training exercises. Any significant increase in military activity would probably be due to large-scale national defense emergencies which cannot be foreseen. Accordingly, military aircraft operations activity in Southeastern Wisconsin was forecast to remain stable at about the 1994 level, representing an annual volume of 17,000 operations, of which almost 60 percent would be conducted by helicopters. Of these total annual military operations, 6,000 would be expected to take place at Mitchell International.

HELICOPTER ACTIVITY FORECASTS

Civil helicopter activity within Southeastern Wisconsin is comparatively minimal relative to more widespread activity in other areas of the United States, especially by business and corporate users. In 1993, it was estimated that there were 18 civil helicopters based within the Region, estimated to account for about 7,000 operations, less than 1 percent of all aviation activity during the year.

The Federal Aviation Administration has forecast that the active helicopter fleet may be expected to continue to increase to the year 2005 at an average annual growth rate of about 2.4 percent. Helicopter use in Southeastern Wisconsin should also increase at about the same rate. Much of the increase will continue to be in the form of specialized operations. Accordingly, the FAA forecast growth rate was extended to the year 2010, resulting in a forecast increase in the civil helicopters based within the Region from 18 in 1993 to 25 in 2010 under low-growth conditions, to 31 under most likely conditions, and to 38 under high-growth conditions.

The FAA expects that helicopter flight-hours will experience an average annual growth rate of about 4.9 percent, with much of this growth represented by the increased use of turbine-powered helicopters. Under the regional plan reevaluation, it was assumed that most of the helicopter trips will remain relatively short, but that such use in the Region will follow forecast national trends, increasing at an average annual rate of about 4 percent through the year 2010. The average trip length of helicopters within the Region is expected to remain about the same, however, resulting in more intensive use of the regional fleet. Accordingly, the level

of civil helicopter activity within the Region is forecast to increase from the 7,000 operations in 1993 to a low of 15,500 and a high of 23,600 operations in the year 2010, with the most likely level being 19,200.

FORECASTS OF OTHER AVIATION ACTIVITY

Like military and helicopter activity, such miscellaneous aircraft activity as that generated by balloons, gliders, and ultralight aircraft, represents a very small portion of all aircraft activity in the Region. In 1993, it was estimated that such activity generated about 6,200 operations, or about 0.5 percent of all operations in Southeastern Wisconsin. Most of the aircraft in this category do not require extensive airfield facilities, if any at all, and are used only occasionally, mostly for recreation or sport purposes.

It is expected that activity in this category will continue to increase slowly as individuals with discretionary income choose these aviation activities for recreation, sport, or hobby purposes. Accordingly, the number of based aircraft in this category is estimated to increase, from 61 in 1993 to between 72 and 105 in the year 2010 with a level of 88 being the most likely. The number of operations created by these aircraft may be expected to increase from about 6,200 in 1993 to from 7,900 to 11,500 operations, with a level of 9,700 operations being the most likely by the year 2010. This forecast assumes that most of this activity will be generated by balloons and gliders, since most ultralights do not need to be registered with the FAA and are, therefore, not considered by the FAA to be aircraft in a regulatory sense.

SUMMARY

Forecasts of aviation demand provide an important basis for determining the need for new or expanded airport facilities. New year 2010 forecasts of aviation demand prepared under this regional airport system plan reevaluation include forecasts of passenger air carrier activity, general aviation activity, air cargo activity, military aviation activity, helicopter activity, and other miscellaneous aviation activity. Together, these categories of aviation demand constitute the anticipated future demand for air transportation facilities in Southeastern Wisconsin. The forecasts of aviation demand presented in this chapter constitute a revision of the forecasts prepared under the original and second-generation regional airport system planning efforts.

With respect to future air carrier passenger demand, the most important forecast component is that of annual air carrier passenger enplanements within the Region. All other measures of future air carrier demand are, in effect, based on the forecast passenger enplanements. In 1994, air carrier passenger enplanements for Southeastern Wisconsin, which occur solely at General Mitchell International Airport, were estimated to total about 2.64 million. These enplanements may be expected to increase to about 4.0 million by the year 2010 under most likely future conditions. Under high-growth conditions that include the assumption that Mitchell International will become a major air carrier hub and support a significantly greater percentage of connecting passengers, total passenger enplanements may be expected to approach 7.0 million passengers annually.

Forecasts of air carrier aircraft operations were made by applying forecasts of average aircraft size and aircraft load factors to the forecasts of enplaning air carrier passenger traffic. Under most likely future conditions, total annual air carrier operations may be expected to increase from an estimated 118,000 annual operations in 1993 to about 168,000 operations by 2010. Under high-growth conditions, that assume a significant increase in hubbing activities, total annual air carrier operations may be expected to reach about 303,000 operations by 2010.

With respect to future general aviation demand, the most important forecast component is that of the size of the regional general aviation aircraft fleet based within the Region. The aircraft fleet size provides the basis for developing all other general aviation-related forecasts, such as the composition of the general aviation fleet and the number of annual aircraft operations in the Region. As was done for the air carrier forecasts, consideration was given to national, Statewide, and regional trends, together with factors that influence the demand for general aviation facilities during the preparation of the general aviation forecasts.

The general aviation fleet based within the Region may be expected to change from the 1993 level of 1,489 aircraft by 2010 to about 1,350 aircraft under no-growth conditions and to about 1,960 aircraft under high-growth conditions by the year 2010, with a most likely forecast level of about 1,640 aircraft. The composition of the regional general aviation fleet is anticipated to change modestly over the plan design period. It is expected that the share

of single-engine and multi-engine piston aircraft will decrease from about 88 percent to about 82 percent of the total regional fleet. Furthermore, the combined shares of turboprop, jet, helicopter, and other aircraft in the regional fleet may be expected to increase from about 12 percent to about 18 percent of the total fleet.

It is also expected that overall general aviation aircraft utilization rates will increase, resulting in a higher number of average annual operations per aircraft by the year 2010 than in 1993. Given these anticipated trends for general aviation, it was forecast that the level of total general aviation fixed-wing aircraft operations in the Region may be expected to increase from an estimated 784,000 operations in 1993 to a most likely level of about 931,000 by the year 2010. Under no-growth conditions, such operations may be expected to decrease to about 766,000 operations per year; under high-growth conditions, to increase to about 1.1 million operations per year.

Other categories of regional aviation demand include military activity, helicopter activity, and miscellaneous aircraft activity. Military aircraft operations within the Region were forecast to continue to remain stable at about the 1994 level of about 17,000 operations per year. Of this total, about 60 percent were conducted by helicopters.

Civil, or nonmilitary, helicopter activity was forecast to increase by 2010 from about 7,000 operations in 1993 to a low of about 15,500 and a high of about 23,600 operations in the year 2010, with a most probable level of about 19,200 operations per year. With respect to other miscellaneous aircraft activity, the forecasts assume that most such activity will continue to be generated by balloons, gliders, and a small portion of the ultralight aircraft within the Region. Activity by these aircraft may be expected to increase from about 6,200 operations per year in 1993 to a low of about 7,900 and a high of about 11,500 operations per year, with a most probable level about 9,700 operations per year. Miscellaneous aircraft activity in most cases does not require extensive airfield facilities, if any at all.

Chapter VIII

DEFICIENCY ANALYSIS OF THE REGIONAL AIRPORT SYSTEM

INTRODUCTION

An important step in the development of a regional airport system plan is the identification of the capacity deficiencies that exist, or that may be expected to exist, by the design year of the system plan, at each of the various public airports within the Region if those airports are not improved beyond currently programmed levels. The identification of such deficiencies is essential to determining the need for improvements to public airports beyond those currently programmed and the need, if any, for the development of new airports. Such identification is also essential allowing the local, State, and Federal governments concerned to determine, upon the proposed closure of a privately owned airport within the Region, whether or not the airport should be acquired and operated by the public sector.

Five steps make up this deficiency analysis. These include: 1) distribution of existing and forecast aviation demand within the Southeastern Wisconsin Region, 2) identification of the airports within Southeastern Wisconsin which could be assumed to remain in operation to the year 2010, 3) assignment of existing and forecast regional aviation demand to this "basic" future system of public airports, 4) comparison of the assigned aviation demand to the basic airport system capacity, thereby identifying existing and probable future deficiencies, and 5) analysis of airport accessibility. Existing and future aviation demand were also assigned to the current system of public-use airports in the Region, including both publicly owned and privately owned airports, and comparisons made of assigned demand to airport capacity.

DISTRIBUTION OF EXISTING AND FORECAST REGIONAL AVIATION DEMAND WITHIN THE REGION

Chapter IV of this report described the existing air transportation demand within the Region, while Chapter VII set forth the forecast demand to the plan design year of 2010. Included were data on existing and forecast levels of air carrier passengers, air carrier aircraft operations, general aviation based aircraft, general aviation aircraft operations, air cargo activity, helicopter activity, military aircraft activity, and other miscellaneous aircraft activity. Together these existing and forecast loadings make up the total regional demand in Southeastern Wisconsin. The preparation of specific distributions of future air carrier, military, helicopter, and other miscellaneous aviation aircraft demands within the Region was found not to be necessary. This was because air carrier activity and operations were expected to continue to be limited to a single airport in the Region, General Mitchell International Airport. Military operations, helicopter operations, and miscellaneous aviation activity were found to account for a very small portion of the total regional aviation activity, were expected to remain at a relatively constant level in the future, and were expected to be limited to a small number of airports. For example, almost all military aviation activity occurs at only three airports: Mitchell International, Waukesha County-Crites Field, and West Bend Municipal Airport. The development of a distribution of general aviation demand throughout the Region, however, was essential because general aviation aircraft are based, and operations occur, at all the airport facilities throughout the Southeastern Wisconsin Region.

The basic general aviation demand forecast, set forth in Chapter VII, was developed by type of aircraft for those aircraft expected to be based at airports in Southeastern Wisconsin by individuals, businesses, and other concerns. That demand was forecast to increase from a total of 1,489 based aircraft in 1993 to 1,638 based aircraft in the year 2010. This forecast included all active aircraft; it did not include such inactive aircraft as those considered to be unairworthy, incomplete, amateur built, or known to exist in title only.

To assist in determining the distribution of existing and forecast aviation demand within the Region, it was necessary to estimate the locations of general aviation aircraft owners within the Region. The residence or business address of aircraft owners could then be compared with the airports at which the aircraft are based to understand better the relationship between the aircraft owners' addresses and the airports at which they base their aircraft. This is an important step in distributing the future

aviation demand throughout the Region, since any forecast changes in the distribution of aircraft are related to similar changes in the distribution of population and employment throughout the Region. The relation of the 1993 active general aviation aircraft fleet to airports within the Region was established from Wisconsin Department of Transportation, Bureau of Aeronautics, records which provided information on where aircraft owners based their aircraft. These data were enhanced by additional information, provided by airport staff, concerning the residences or business locations of aircraft owners. The distribution of aircraft ownership within the Region was made on the basis of 60 planning analysis areas, as shown on Map 24. An additional, 61st, planning analysis area was created for this plan update from portions of three adjacent planning analysis areas to provide a separate analysis area for the Milwaukee Central Business District. The planning analysis areas comprise rational subareas needed to analyze the distribution of general aviation demand within the Region, providing detailed resident population and economic activity data required for air transportation forecasting. The 61 planning analysis areas may be further subdivided into 1,431 traffic analysis zones for more detailed analysis, should that be required.

The existing distribution of the regional general aviation based aircraft demand by the planning analysis area of each aircraft owner is set forth in Table 90. This distribution of based aircraft is separated by aircraft type, including single-engine piston, multi-engine piston, turboprop, jet, helicopter, and other aircraft. About 86 percent of the active aircraft based at Southeastern Wisconsin airports were owned by residents or businesses within the Region. This accounted for an estimated 1,288 aircraft of all types. Another 42 active aircraft based in Southeastern Wisconsin airports were registered to owners elsewhere is Wisconsin, most of whom reside in counties bordering the Southeastern Wisconsin Region. An estimated 135 aircraft, or about 9 percent of all aircraft based in the Region, were found to be registered to owners in Northeastern Illinois, chiefly in Lake, Cook, or McHenry Counties. The remaining 24 active aircraft based at Southeastern Wisconsin airports, or a little more than 1 percent of the total, were registered to owners outside both Wisconsin and Northeastern Illinois.

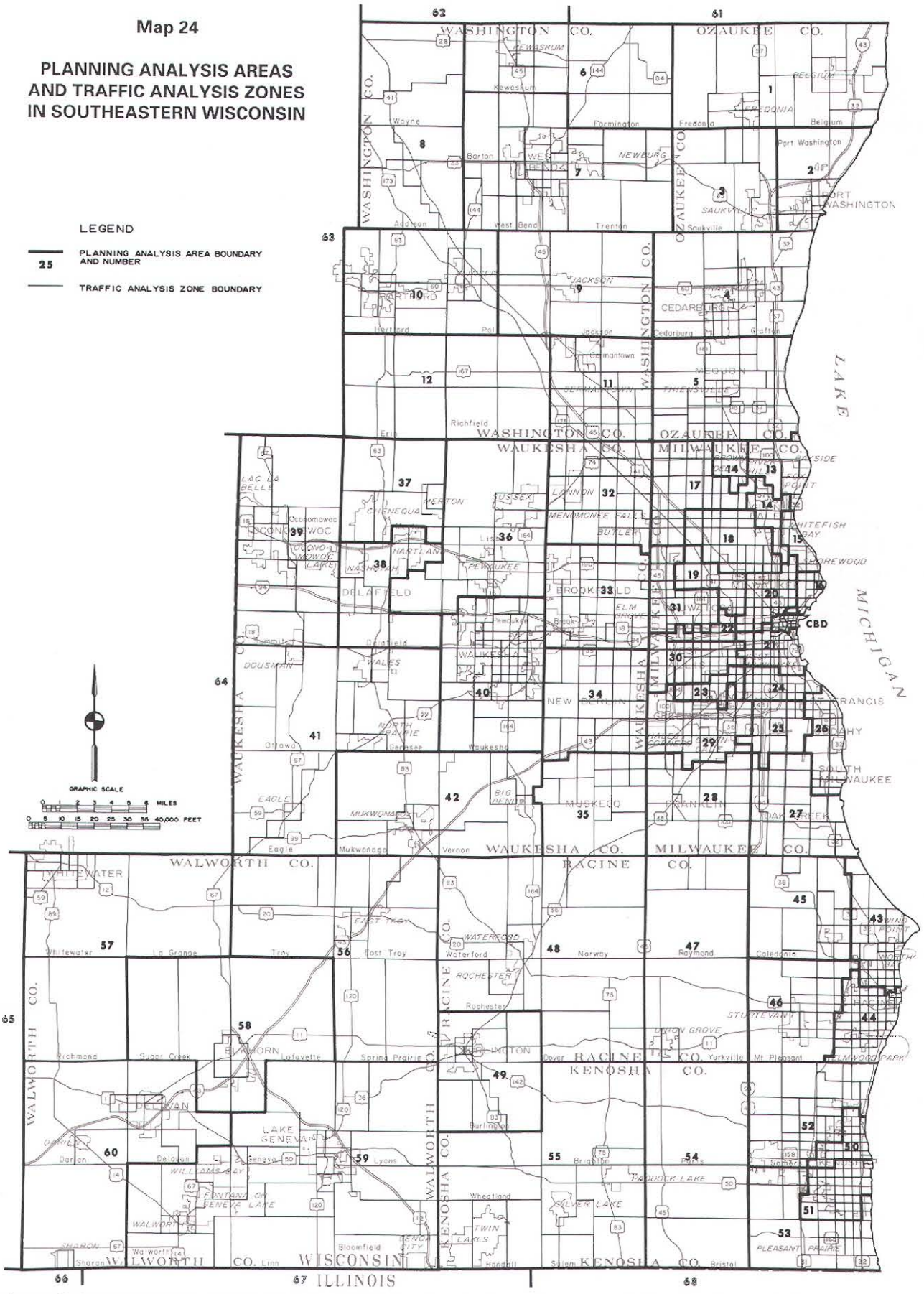
Next, it was necessary to assign the future distribution of aircraft owners throughout the Southeastern Wisconsin Region to planning analysis areas. Analysis of the geographic locations of residence or business addresses of aircraft owners within the Region in 1993 indicated that, in general, aviation aircraft ownership was positively correlated with both population and employment within the Region. It was found that many twin-engine piston aircraft and most turboprop and jet aircraft are owned and operated by businesses; thus their location is related to the location of employment. Many of the twin-engine piston aircraft and most single-engine piston aircraft and other miscellaneous aircraft are owned and operated by individuals; thus their location is related to the distribution of population within the Region. Civil helicopters are divided between business and personal owners, but represent only a small portion of the active aircraft fleet within Southeastern Wisconsin. Also, the rates of general aviation aircraft ownership, per capita and per employee, respectively, continue to be significantly higher in the urbanized portions of the outlying counties of the Region and in areas of higher per capita income. This continues a pattern found in prior regional airport system planning efforts.

The forecast increase in general aviation aircraft by type registered to individuals or businesses in the Region was forecast to increase from 1,489 in 1993 to 1,638 in 2010. This increase was apportioned to the planning analysis areas on the basis of the forecast change in the population and employment levels within the analysis areas from 1990 to 2010. In addition to distributing the forecast increase in based aircraft among the planning analysis areas, some existing based aircraft of all aircraft types were reassigned to different planning analysis areas to reflect forecast changes in the distribution of population and employment within the Region. About 100 aircraft were thus reassigned between planning analysis areas. Table 91 lists the existing 1990 and forecast 2010 population and employment levels for each planning analysis area, on the basis of the adopted Regional land use plan.

Table 92 presents the distribution of active based aircraft by type and by planning analysis area as forecast through the plan design year 2010. The distribution of forecast based aircraft was stratified by aircraft type, including single-engine piston, multi-engine piston, turboprop, jet, helicopter, and other aircraft. About 80 percent, or a total of 1,309 aircraft, of all active aircraft forecast to be based at Southeastern Wisconsin airports in 2010 may be expected to be owned by residents of, or business located within, the Region. Another 42 active aircraft based in Southeastern Wisconsin airports were assumed to continue to be registered to owners

Map 24

PLANNING ANALYSIS AREAS AND TRAFFIC ANALYSIS ZONES IN SOUTHEASTERN WISCONSIN



Planning analysis areas and traffic analysis zones constitute rational subareas for transportation planning analysis purposes and, as such, are used to assemble population, economic activity, and transportation, including air transportation, data. These areas permit a clear depiction of actual and forecast air transportation demand and air transportation facility capability interactions within the Region. Air transportation planning data are available in the Commission files for the 61 planning analysis areas and the 1,220 traffic analysis zones in the Region.

Source: SEWRPC.

Table 90

DISTRIBUTION OF EXISTING ACTIVE AIRCRAFT BASED IN THE REGION BY PLANNING ANALYSIS AREA AND BY COUNTY OF OWNER'S ADDRESS: 1993

Planning Analysis Area (by county)	Aircraft Type						Total
	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other	
Southeastern Wisconsin Counties							
Ozaukee							
1	1	--	--	--	--	--	1
2	6	1	1	--	--	--	8
3	4	2	--	--	--	--	6
4	19	--	1	2	--	1	23
5	24	3	--	--	--	2	29
Subtotal	54	6	2	2	0	3	67
Washington							
6	2	--	--	--	--	--	2
7	56	4	1	--	--	9	70
8	--	--	--	--	--	--	0
9	2	--	--	--	--	1	3
10	23	3	2	--	--	--	28
11	12	--	--	--	--	--	12
12	18	--	--	--	1	2	21
Subtotal	113	7	3	0	1	12	136
Milwaukee							
13	9	2	--	--	--	2	13
14	10	2	--	--	--	1	13
15	13	--	--	--	--	4	17
16	9	1	--	--	--	--	10
17	39	8	2	1	--	--	50
18	8	--	--	--	2	--	10
19	15	--	--	--	--	2	17
20	5	--	--	--	--	1	6
21	10	1	--	2	--	--	13
22	4	--	--	--	1	--	5
23	12	1	--	--	--	1	14
24	9	--	--	--	--	--	9
25	21	5	6	10	--	--	42
26	9	3	1	3	2	1	19
27	13	1	--	--	--	--	14
28	16	1	--	--	1	1	19
29	25	3	3	--	--	--	31
30	19	1	--	1	--	--	21
31	16	2	4	--	1	--	23
CBD	5	--	2	4	--	1	12
Subtotal	267	31	18	21	7	14	358
Waukesha							
32	18	1	2	--	--	4	25
33	46	9	4	6	--	2	67
34	17	--	1	--	--	1	19
35	7	3	--	--	--	1	11
36	31	--	4	--	1	--	36
37	11	--	--	--	--	--	11
38	16	1	--	--	--	1	18
39	20	--	--	--	--	1	21
40	53	5	--	--	1	1	60
41	19	1	1	--	--	--	21
42	18	5	--	--	--	--	21
Subtotal	256	25	12	6	2	11	312

Table 90 (continued)

Planning Analysis Area (by county)	Aircraft Type						Total
	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other	
Racine							
43	30	5	1	--	--	--	36
44	27	3	4	4	1	3	42
45	17	1	--	--	--	--	18
46	7	1	--	--	--	--	8
47	10	3	2	--	1	--	16
48	29	6	3	--	--	2	40
49	24	10	4	2	--	1	41
Subtotal	144	29	14	6	2	6	201
Kenosha							
50	6	--	--	--	--	--	6
51	14	1	--	--	--	1	16
52	19	9	--	--	--	--	28
53	4	--	--	--	--	1	5
54	5	--	--	--	--	--	5
55	26	6	2	--	--	2	36
Subtotal	74	16	2	0	0	4	96
Walworth							
56	31	--	--	--	1	3	35
57	1	--	--	--	--	--	1
58	16	1	--	--	1	--	18
59	39	4	1	--	1	2	47
60	17	--	--	--	--	--	17
Subtotal	104	5	1	0	3	5	118
Region Subtotal	1,012	119	52	35	15	55	1,288
Wisconsin Counties Bordering the Region							
Dodge	14	2	1	--	--	--	17
Fond Du Lac	3	--	--	--	--	--	3
Jefferson	3	--	--	--	--	1	4
Rock	1	1	--	--	--	--	2
Sheboygan	4	--	--	--	--	--	4
Subtotal	25	3	1	0	0	1	30
Other Wisconsin Counties	7	2	0	1	1	1	12
Northern Illinois Counties							
Boone	--	--	--	--	--	--	--
Cook	39	4	2	1	--	--	46
Du Page	3	--	--	--	--	--	3
Kane	--	--	--	--	--	--	--
Lake	56	5	4	1	1	3	70
McHenry	11	3	1	--	--	1	16
Winnebago	--	--	--	--	--	--	--
Subtotal	109	12	7	2	1	4	135
Area Outside Wisconsin and Northern Illinois	18	1	1	3	1	0	24
Total	1,171	137	61	41	18	61	1,489

Source: SEWRPC.

Table 91

ACTUAL AND FORECAST POPULATION AND EMPLOYMENT LEVELS IN THE REGION BY PLANNING ANALYSIS AREA: 1990 AND 2010

Planning Analysis Area (by county)	Population			Employment		
	1990	2010	Increment	1990	2010	Increment
Ozaukee County						
1	5,900	6,000	100	2,100	1,900	(200)
2	10,800	11,000	200	6,400	7,300	900
3	5,400	5,600	200	1,500	2,000	500
4	27,800	30,300	2,500	11,400	12,600	1,200
5	22,800	26,900	4,100	10,800	14,900	4,100
Total	72,700	79,800	7,100	32,200	38,700	6,500
Washington County						
6	6,200	6,200	0	2,100	2,500	400
7	36,000	41,600	5,600	19,400	21,700	2,300
8	4,400	4,800	400	1,500	1,200	(300)
9	7,300	7,900	600	2,500	3,100	600
10	15,700	18,100	2,400	8,200	11,300	3,100
11	13,900	22,200	8,300	5,900	6,600	700
12	11,800	11,000	(800)	2,000	1,600	(400)
Total	95,300	111,800	16,500	41,600	48,000	6,400
Milwaukee County						
13	14,000	12,700	(1,300)	4,100	4,100	0
14	24,700	25,400	700	27,900	25,200	(2,700)
15	29,900	27,800	(2,100)	10,900	12,300	1,400
16	37,700	37,600	(100)	22,200	24,200	2,000
17	55,500	70,100	14,600	40,300	45,800	5,500
18	110,700	97,500	(13,200)	45,600	45,000	(600)
19	79,400	68,600	(10,800)	20,200	19,300	(900)
20	124,500	110,600	(13,900)	53,600	54,900	1,300
21	69,100	55,800	(13,300)	34,200	37,800	3,600
22	17,300	17,300	0	8,900	8,100	(800)
23	32,600	31,900	(700)	6,900	6,500	(400)
24	53,200	48,200	(5,000)	24,000	24,500	500
25	31,100	30,300	(800)	15,800	14,600	(1,200)
26	48,700	48,000	(700)	20,600	22,400	1,800
27	19,100	32,600	13,500	19,800	26,100	6,300
28	23,000	28,500	5,500	6,000	8,200	2,200
29	57,400	64,100	6,700	22,500	21,700	(800)
30	72,200	68,700	(3,500)	47,600	46,600	(1,000)
31	52,200	50,300	(1,900)	59,800	59,800	0
CBD	7,000	8,000	1,000	87,100	105,600	18,500
Total	959,300	934,000	(25,300)	578,000	612,700	34,700
Waukesha County						
32	29,900	39,000	9,100	24,600	25,500	900
33	45,900	49,500	3,600	45,200	57,100	11,900
34	33,900	43,000	9,100	19,400	20,400	1,000
35	16,600	20,000	3,400	4,200	4,900	700
36	26,400	37,800	11,400	13,700	15,700	2,000
37	7,600	7,200	(400)	1,300	1,000	(300)
38	16,900	19,900	3,000	5,400	6,300	900
39	23,500	27,400	3,900	9,900	10,700	800
40	67,900	81,100	13,200	41,200	51,700	10,500
41	17,000	18,500	1,500	3,600	3,000	(600)
42	19,300	20,800	1,500	3,600	3,800	200
Total	304,900	364,200	59,300	172,100	200,100	28,000

Table 91 (continued)

Planning Analysis Area (by county)	Population			Employment		
	1990	2010	Increment	1990	2010	Increment
Racine County						
43	46,600	44,900	(1,700)	17,800	19,800	2,000
44	61,900	60,000	(1,900)	33,700	34,500	800
45	7,700	11,150	3,450	2,100	3,100	1,000
46	15,700	21,800	6,100	11,300	15,000	3,700
47	9,800	10,600	800	4,200	5,500	1,300
48	18,600	21,100	2,500	5,300	4,700	(600)
49	14,700	16,500	1,800	7,800	9,500	1,700
Total	175,000	186,050	11,050	82,200	92,100	9,900
Kenosha County						
50	27,400	27,500	100	8,100	8,500	400
51	52,800	51,800	(1,000)	21,600	22,100	500
52	11,100	13,000	1,900	4,900	7,400	2,500
53	8,900	19,700	10,800	3,700	13,900	10,200
54	5,500	6,100	600	3,600	6,000	2,400
55	22,500	29,800	7,300	4,600	5,100	500
Total	128,200	147,900	19,700	46,500	63,000	16,500
Walworth County						
56	10,100	11,700	1,600	2,800	2,600	(200)
57	14,600	15,100	500	6,300	6,900	600
58	10,000	11,400	1,400	6,000	7,500	1,500
59	25,400	31,100	5,700	14,400	13,700	(700)
60	14,800	18,000	3,200	7,500	9,800	2,300
Total	74,900	87,300	12,400	37,000	40,500	3,500
Total Region	1,810,300	1,911,050	100,750	989,600	1,095,100	105,500

Source: SEWRPC.

elsewhere in Wisconsin, to owners residents in, or businesses located in, counties bordering the Southeastern Wisconsin Region. An estimated 263 aircraft, or about 16 percent of all aircraft based in the Region, may be expected to be registered to owners in Northeastern Illinois, most of them owned by residents of, or businesses located in, Lake, Cook, and McHenry Counties. The remaining 24 active aircraft based at Southeastern Wisconsin airports, or a little more than 1 percent of the total, may be expected to be registered to owners outside both Wisconsin and Northeastern Illinois. It was assumed that there will continue to be a small number of aircraft owners disbursed throughout the Region who elect to base their aircraft in other areas of the State of Wisconsin or even in other states. It was assumed that the proportion of all aircraft owners within the Region represented by this small number of owners will remain about the same and continue to represent a very small number over the long term.

IDENTIFICATION OF BASIC REGIONAL YEAR 2010 AIRPORT SYSTEM AND ESTIMATION OF SYSTEM CAPACITY

The next step in the determination of existing and probable future airport deficiencies in the Region was the identification of the basic regional airport system and the determination of the capacity of each airport in that system. The basic regional airport system was assumed to consist of those airports which could reasonably be expected to remain in operation to the plan design year of 2010. This basic airport system of 10 airports is shown on Map 25; it included the eight publicly owned and

Table 92

DISTRIBUTION OF FORECAST ACTIVE AIRCRAFT IN THE REGION BY PLANNING ANALYSIS AREA AND BY COUNTY OF OWNER'S ADDRESS: 2010

Planning Analysis Area (by county)	Aircraft Type						
	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other	Total
Southeastern Wisconsin Counties							
Ozaukee							
1	1	--	--	--	--	--	1
2	7	2	1	--	--	--	10
3	4	2	--	--	--	--	6
4	21	--	1	2	--	1	25
5	27	4	--	--	--	2	33
Subtotal	60	8	2	2	0	3	75
Washington							
6	2	--	--	--	--	--	2
7	66	5	1	1	--	9	82
8	--	--	--	--	--	--	0
9	2	--	--	--	--	1	3
10	26	4	2	--	--	--	32
11	19	--	--	1	--	1	21
12	17	--	--	--	1	2	20
Subtotal	132	9	3	2	1	13	160
Milwaukee							
13	6	1	--	--	--	1	8
14	10	1	--	--	--	1	12
15	9	--	--	--	--	2	11
16	5	1	--	--	--	--	6
17	48	8	2	1	--	1	60
18	3	--	--	--	1	--	4
19	5	--	--	--	--	--	5
20	2	--	--	--	--	--	2
21	4	1	--	2	--	--	7
22	4	--	--	--	1	--	5
23	5	1	--	--	--	1	7
24	3	--	--	--	--	--	3
25	12	4	6	9	--	--	31
26	6	3	1	2	2	1	15
27	16	1	--	--	--	1	18
28	20	1	--	--	1	1	23
29	31	2	2	--	--	1	36
30	10	1	--	1	--	--	12
31	8	2	3	--	1	--	14
CBD	6	--	2	4	--	1	13
Subtotal	213	27	16	19	6	11	292
Waukesha							
32	22	1	2	--	--	4	29
33	49	9	6	7	--	2	73
34	21	--	1	--	--	1	23
35	8	3	--	--	--	1	12
36	35	--	4	--	1	1	41
37	12	--	--	--	--	--	12
38	16	1	--	--	--	1	18
39	22	--	--	--	--	1	23
40	58	5	1	--	2	2	68
41	20	1	1	--	--	--	22
42	18	5	--	--	--	--	23
Subtotal	281	25	15	7	3	13	344

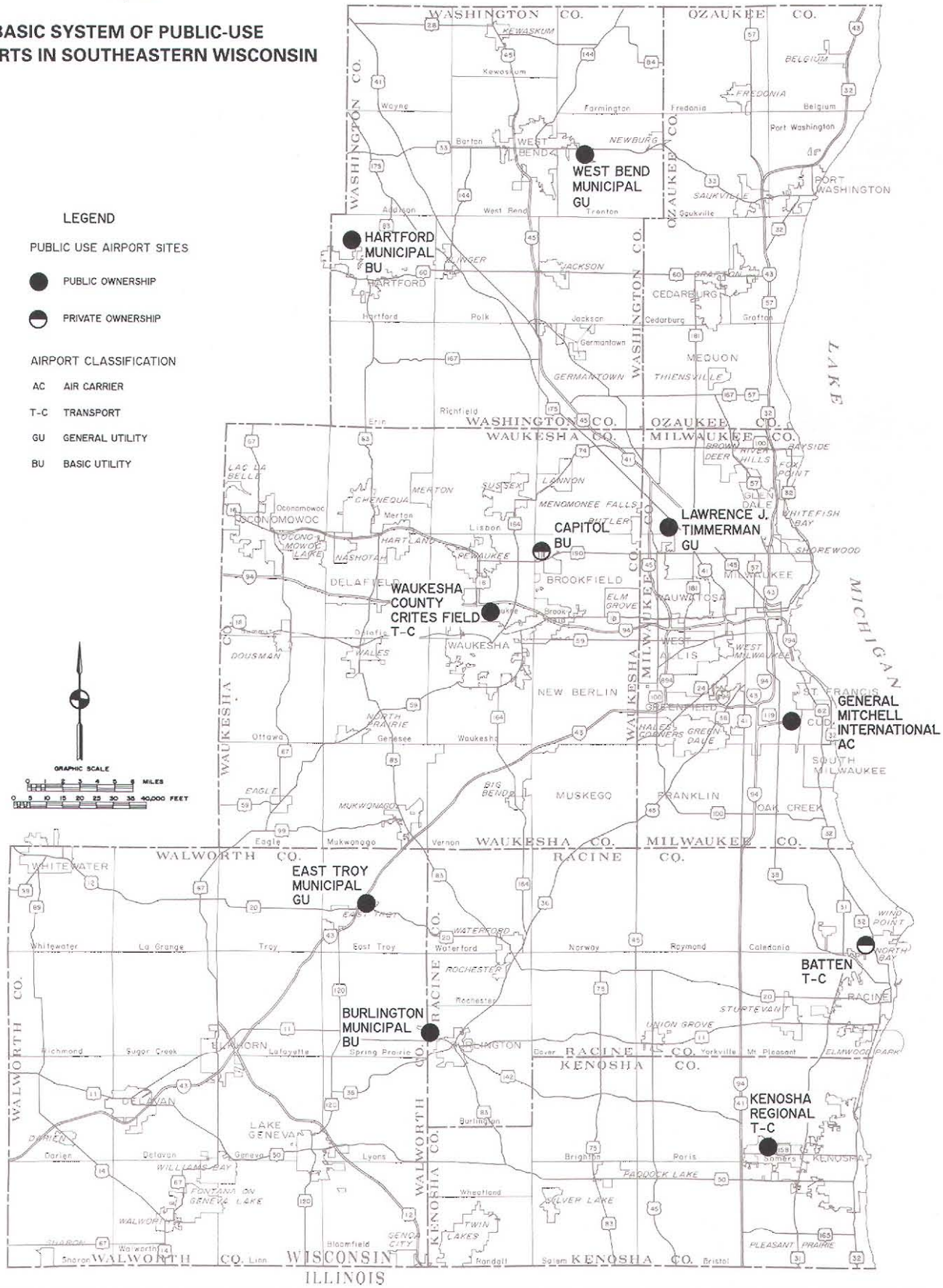
Table 92 (continued)

Planning Analysis Area (by county)	Aircraft Type						Total
	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other	
Racine							
43	29	5	1	--	--	--	35
44	28	3	7	6	1	3	48
45	17	1	--	--	--	--	18
46	10	1	1	--	--	--	12
47	10	3	2	--	1	--	16
48	29	6	3	--	--	2	40
49	25	10	5	2	--	1	43
Subtotal	148	29	19	8	2	6	212
Kenosha							
50	7	--	--	--	--	--	7
51	15	1	--	--	--	1	17
52	19	11	--	1	--	--	31
53	5	--	--	--	--	1	6
54	6	--	--	--	--	--	6
55	29	6	3	--	--	2	40
Subtotal	81	18	3	1	0	4	107
Walworth							
56	31	--	--	--	1	3	35
57	1	--	--	--	--	--	1
58	16	1	--	--	1	--	18
59	40	4	1	--	1	2	48
60	17	--	--	--	--	--	17
Subtotal	105	5	1	0	3	5	119
Region Subtotal	1,020	121	59	39	15	55	1,309
Wisconsin Counties Bordering the Region							
Dodge	14	2	1	--	--	--	17
Fond Du Lac	3	--	--	--	--	--	3
Jefferson	3	--	--	--	--	1	4
Rock	1	1	--	--	--	--	2
Sheboygan	4	--	--	--	--	--	4
Subtotal	25	3	1	0	0	1	30
Other Wisconsin Counties	7	2	0	1	1	1	12
Northern Illinois Counties							
Boone	--	--	--	--	--	--	0
Cook	48	6	18	9	5	10	96
Du Page	3	--	--	--	--	--	3
Kane	--	--	--	--	--	--	0
Lake	62	9	29	13	8	17	138
McHenry	7	5	7	2	1	4	26
Winnebago	--	--	--	--	--	--	0
Subtotal	120	20	54	24	14	31	263
Area Outside Wisconsin and in Northern Illinois	18	1	1	3	1	0	24
Total	1,190	147	115	67	31	88	1,638

Source: SEWRPC.

Map 25

BASIC SYSTEM OF PUBLIC-USE AIRPORTS IN SOUTHEASTERN WISCONSIN



To help identify existing and probable future deficiencies in the Regional airport system, a basic Regional system of public-use airports was identified. This basic system was intended to represent the minimum number of airports that could be reasonably expected to remain in operation throughout the plan design year and still meet the air transportation needs of the Region. This system consisted of 10 of the 22 airports available for public use within the Region in 1993. The 10 airports included the eight publicly owned airports and two privately owned airports; Batten Airport and Capitol Airport.

Source: SEWRPC.

operated airports in the Southeastern Wisconsin Region: General Mitchell International, Lawrence J. Timmerman, West Bend Municipal, Hartford Municipal, Waukesha County-Crites Field, Kenosha Regional, Burlington Municipal, and East Troy Municipal. Privately owned public-use airports were included in the basic system only if those airports have made substantial capital improvements to the airfield since the adoption of the first-generation regional airport system plan, have programmed substantial capital investment for the airfield for implementation in the future, or have prepared an airport master plan or airport layout plan which includes significant airfield improvements in the future. These actions would indicate evidence that a specific privately owned airport could be assured of being available for long-term use. Two public-use privately owned airports were included in the basic system: Batten Airport and Capitol Airport. These 10 airports were assumed to be developed by the year 2010 to currently programmed levels of development. Accordingly, the basic regional airport system was assumed to include 10 of the 11 airports currently in the adopted regional airport system plan. The only airport in the adopted plan not included in the basic system was Sylvania Airport.

None of the other current privately owned public-use airports in the Region were included in the basic airport system. This, however, should not be construed as a recommendation or proposal that such airports be closed by the year 2010. Rather, this assumption is necessary to determine whether governmental action would need to be considered if private airport owners proposed to close specific airports for conversion of the airport land to other uses. Historically, most privately owned public-use airports in metropolitan areas have been subject to possible closure as encroaching urban development has caused land values to increase. This, in turn, has caused airport owners to consider selling the land for urban development. Decisions by owners to close privately owned airports may be expected to be based on trends related to increasing costs of operating those airports, together with possible stagnant or declining use of general aviation aircraft, which could result in a need for less system capacity and fewer airports. Analyses using this basic airport system are intended to assist in determining whether governmental action would need to be considered to provide additional capacity at nearby airports or whether action should be taken to acquire and operate in the public interest any airport proposed to be closed.

The capacity of each airport was measured in two principal ways: airfield capacity and ability to accommodate "critical aircraft" safety. Airfield capacity was defined as the number of aircraft operations that the airport can accommodate safely and efficiently. Airfield capacity may be considered to be one of the most crucial elements of the capacity of an airport because the provision of runway and taxiway facilities to accommodate additional aircraft operations generally entails substantial cost, as well as additional land, and has potentially greater impacts than does additional terminal or ground access capacity. Airfield capacity is defined as the ability of the airport runway and taxiway facilities to accommodate aircraft takeoffs and landings safely and efficiently; it is expressed in terms of annual service volume, or ASV, as defined by the Federal Aviation Administration (FAA). The ASV is based upon the configuration of the runways and taxiways, runway use regulations and practices, aircraft mix, and weather conditions. A comparison of ASV to forecast annual demand identifies airport system capacity deficiencies in terms of airports being capable of accommodating specific volumes of aircraft operations.

The general procedures for calculating the ASV was developed by the FAA and presented in its advisory circular "Airport Capacity and Delay" and related technical guidance materials. The specific procedures followed to calculate the ASV for Southeastern Wisconsin airports were those procedures prescribed by the FAA for use in long-range planning. The annual service volumes for specific airports were calculated to reflect local airport and operating conditions and to remain consistent with the assumptions utilized during the development of annual service volumes for the same airports under the second-generation State and regional airport system plans. Consideration was also given to annual service volumes calculated in specific airport master plans. It was found that the annual service volumes calculated under the FAA long-range planning procedures were satisfactory and appropriate to use for this regional airport system plan update.

The annual service volume is a useful measure of airfield capacity and is related to aircraft delay at airports. The ratio of annual demand to the ASV, measured as a percentage of ASV for purposes of this plan update, is useful for identifying whether aircraft operations at a specific airport are beginning to cause congestion, which, in turn, may affect

the efficient and safe operation of that airport and produce unacceptable and costly delays. The ASV may be thought of as the design capacity of the airfield in question. As the ratio of the annual demand to the annual service volume increases, the traffic volume will begin inducing congestion and delays. Traffic volumes up to about 80 percent of the ASV may be expected to result in minimal congestion and delays. Traffic levels between 80 percent and 100 percent, especially above 90 percent, of the ASV may be expected to result in frequent congestion and delays. Annual aircraft operations volumes in excess of the ASV may be expected to result in extreme congestion and delay on a regular basis. The FAA uses a threshold of 60 percent of the ASV as an important capacity standard and recommends that efforts to improve airfield capacity begin when this level is reached. This is intended to leave sufficient lead time for improvements to be made so that most congestion and delays are hopefully avoided.

When the existing or forecast demand approaches the ASV, it may be necessary to examine the hourly capacity of the airfield in question. For long-range planning purposes, hourly capacities may be determined under both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions. In most instances, it is necessary to examine hourly capacities only for airports which accommodate air carrier operations or which may be forecast to experience congestion and delays. Within Southeastern Wisconsin, the review and examination of hourly airfield capacities has normally been necessary only for General Mitchell International Airport.

The estimated annual service volume for each public-use airport in the Region is given Table 93. This table also indicates the hourly capacities for each airport. No capacity is shown for Valhalla Airport. Although this airport has been designated as a public-use facility by its owner, it is not considered to be usable because of its poor condition. It was intended that these annual service volumes assume the implementation of any currently programmed airport improvements by the plan design year of 2010. The currently programmed improvements are those identified in both the Wisconsin Department of Transportation Bureau of Aeronautics 1995—2000 Six-Year Airport Improvement Program and in a current airport layout plan approved by the FAA. Implementation of most of these projects is dependent upon funding participation from the FAA, the Wisconsin Department of Transportation, and the airport owner, typically a municipality or county government. This identification of programmed airport improvements does recognize that project implementation is dependent upon project initiation by the local sponsor, as well as upon the availability of Federa; funding assistance. A review of the currently programmed airport improvement projects revealed that while a wide variety of improvements have been programmed, none would have a significant impact on airfield capacity in terms of ASV or "critical aircraft." Accordingly, the year 2010 capacity under a no-build alternative was assumed to be the same as the existing capacity for each airport. With respect to General Mitchell International Airport, the new parallel runway proposed under the recently completed airport master plan update for Mitchell International was not included under this deficiency analysis.

The other crucial measure of capacity is the critical aircraft to be accommodated at each airport. The critical aircraft concept refers to the most demanding type or family of aircraft that an airport is capable of accommodating under normal conditions on a regular basis. The critical aircraft is normally used to determine the primary runway length and related airfield design characteristics' which, in turn, define land requirements for possible airport expansion and the overall airport classification. The critical aircraft is defined in terms of the Airport Reference Code, or ARC, as defined by the FAA. The ARC is based upon the approach speed and wingspan of the critical aircraft and is used to relate airport physical design criteria to the operational and physical characteristics of the aircraft intended to use the airport.

For purposes of long-range airport system planning, the most important reason for identifying the critical aircraft for each airport is its use in determining a desirable primary runway length. The recommended length for the primary runway is typically determined in one of two ways, depending upon the type of airport. At general aviation airports, aircraft activity in normally limited to use by aircraft up to and including 60,000 pounds maximum gross weight. For these airports, the recommended runway length is designed for a family of airplanes with similar performance characteristics. Air carrier airports normally handle airplanes over 60,000 pounds maximum gross weight. At these airports, the recommended runway length is normally designed for a specific airplane make and model. The recommended runway length for a specific airplane is a function of airplane landing and takeoff operating weights, wind flap settings, airport elevation and temperature, runway surface conditions, and the maximum difference in runway center-

Table 93

ANNUAL SERVICE VOLUMES (ASVs) OF PUBLIC-USE AIRPORTS IN SOUTHEASTERN WISCONSIN: 1994 AND 2010

County	Airport Name	Existing Airport Classification[a]	Airport Capacity			
			Annual Service Volume (ASV)	60 Percent of Annual Service Volume (ASV)	Hourly Capacity (operations per hour)	
					Visual Flight Rules (VFR)	Instrument Flight Rules (IFR)
Kenosha	Camp Lake	BU	52,000	31,000	58	--
	Kenosha Regional	TR	355,000	213,000	197	62
	Vincent	BU	43,000	26,000	58	--
	Westosha	BU	195,000	117,000	104	24
Milwaukee	General Mitchell International	AC	260,000	156,000	121	56
	Rainbow	BU	101,000	61,000	67	--
	Lawrence J. Timmerman	GU	230,000	138,000	98	59
Ozaukee	None	--	--	--	--	--
Racine	Batten	TR	230,000	138,000	98	59
	Burlington Municipal	BU	207,000	124,000	98	53
	Fox River	BU	86,000	52,000	72	--
	Cindy Guntly Memorial	BU	82,000	49,000	58	--
	Sylvania	BU	109,000	65,000	105	--
	Valhalla	BU	--	--	--	--
Walworth	Big Foot Airfield	BU	54,000	32,000	58	--
	East Troy Municipal	GU	207,000	124,000	98	53
	Grand Geneva	BU	173,000	104,000	98	--
	Lake Lawn	GU	159,000	95,000	85	24
Washington	Hahn Sky Ranch	BU	53,000	32,000	59	--
	Hartford Municipal	BU	207,000	124,000	98	53
	West Bend Municipal	GU	230,000	138,000	98	59
Waukesha	Aero Park	BU	81,000	49,000	72	--
	Capitol	BU	199,000	119,000	105	--
	Waukesha County-Crites Field	TR	230,000	138,000	98	59

[a] *Classifications used in this column are: AC: Air Carrier; TR: General Aviation-Transport; GU: General Aviation-General Utility; and BU: General Aviation-Basic Utility.*

Source: Federal Aviation Administration and SEWRPC.

line elevations. For recommended primary runway lengths at both general aviation and carrier airports, consideration in the determination of primary runway lengths is given to the airport elevation, the mean daily maximum temperature during the hottest month of the year, the percentage of all specific aircraft included within families or groups of aircraft, and a percentage of useful load to be carried by the aircraft. For airports that handle air carrier and long-range business and corporate jet activity, primary runway lengths are also depended upon the length of haul for the critical aircraft. The general procedures for determining desirable primary runway lengths for different types of airports have been developed by the FAA and are presented in its advisory circular "Runway Length Requirements For Airport Design" and related technical guidance materials.

For purposes of this regional airport system plan update, a desirable primary runway length was determined for each ARC that could apply to a specific aircraft. In this way, a specific ARC, which represents the critical aircraft, could be related to a recommended airport classification and a desirable primary runway length for airports within the Southeastern Wisconsin Region. In determining these desirable primary runway lengths, consideration was given to specific aircraft types for both based and itinerant aircraft known to be used on a regular basis at airports in the Region and also to technical work already prepared as part of airports master plans for specific airports in the Region. The desirable primary runway lengths for each ARC are presented in Table 94. It is important to note that for some airport classifications there is more than one ARC, and, thus, more than one desirable primary runway length appropriate for each airport classification. This is especially relevant for Transport-Corporate airports, which may have primary runway lengths ranging from 4,800 feet to 8,200 feet. Because of the wide range of runway lengths under this classification, the critical aircraft sets represented by the ARCs were

Table 94

DESIRABLE PRIMARY RUNWAY LENGTHS FOR LONG-RANGE PLANNING OF SOUTHEASTERN WISCONSIN AIRPORTS BY AIRPORT REFERENCE CODE (ARC)

Airport Reference Code (ARC)	Aircraft Weight (in pounds)	Recommended Airport Classification	Desirable Primary Runway Length (in feet)
A - I	All	BU	2,800
B - I	Under 12,500	BU	3,900
A - II	Under 12,500	GU	3,900
B - II	Under 12,500	GU	4,400
C - II	Under 12,500	GU	4,400
A - II	12,500 and over 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
A - III	All 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
B - I	12,500 and over 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
B - II	12,500 and over 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
B - III	All 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
C - I	All 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
C - II	12,500 and over 60 Percent Useful Load 90 Percent Useful Load	TC	 4,800 6,400
C - III	All	AC	7,000
C - IV	All	AC	8,500
D - I	All 60 Percent Useful Load 90 Percent Useful Load	TC	 5,500 8,200
D - II	All 60 Percent Useful Load 90 Percent Useful Load	TC	 5,500 8,200
D - IV	All	AC	9,000
D - V	All	AC	11,000

Source: Federal Aviation Administration and SEWRPC.

subdivided into subsets that reflect the useful load that can be carried by the aircraft concerned using the runway lengths concerned. As shown in Table 94, the percentage of useful load on board the critical aircraft can make a significant difference in the length of runway required. As a practical matter, whether or not business and corporate jet aircraft are able to use a specific runway at an airport is dependent upon the pilot's decision, which, in turn, is based upon the payload, number of passengers, fuel load, length of flight, weather conditions, pilot proficiency, and corporate policy. In fact, at airports in Southeastern Wisconsin and elsewhere, pilots can, and do, safely operate business and corporate jet aircraft on runways of sufficient length for use under some, but not all, flying conditions.

ASSIGNMENT OF AVIATION DEMAND TO THE REGIONAL AIRPORT SYSTEM

The third step in the identification of deficiencies in the regional airport system was the assignment of the regional air transportation demand to alternative regional airport system configurations. In the application of this assignment, it was assumed that General Mitchell International Airport would remain the only scheduled air carrier airport within Southeastern Wisconsin and, accordingly, that all air carrier operations would continue to be accommodated at this airport. Air carrier operations require extensive and specialized facilities; thus they receive first priority in the assignment process.

Forecast military operations were next assigned to the appropriate airports. Like air carrier operations, military operations require specialized facilities found only at specific airports and, thus, must receive priority in the assignment process. The forecast military activity was assumed to continue at the same airports where such activity was occurring during 1994.

General aviation activity was next assigned to the appropriate airports. General aviation activity comprises the largest segment of all aviation activity in the Region, consisting of based aircraft and related aircraft operations. The existing 1,489 aircraft and attendant aircraft operations were assigned to individual airports of the basic regional airport system by using the numbers of active general aviation aircraft based in Southeastern Wisconsin by airport and type, as presented in Table 46 of this report. Since the basic regional system assumed that 12 of the 14 privately owned airports currently open for public use in 1994 would not be available for use, aircraft and operations at the 12 airports that were assumed not to be available had to be reassigned to the 10 airports comprising the basic system. The aircraft based at each of the 12 airports no longer available for use were reassigned to those airports in the basic system that were within a 30-minute highway travel time. Those airports that were closest within the 30-minute travel time criterion were assigned a larger proportion of based aircraft. All the based aircraft reassigned during this step were single- or multi-engine piston or other miscellaneous aircraft. Also, because of the high level of air traffic control, the large volume of air carrier operations, and the attendant potential for congestion at Mitchell International, it was assumed that small aircraft owners would not desire to relocate their aircraft to this airport. Therefore, no additional aircraft were assigned to General Mitchell International.

The assignment of the forecast level of 1,638 based aircraft to the individual airports included in the basic regional airport system was accomplished in four steps. First, based aircraft whose owners resided within the Southeastern Wisconsin Region and were forecast to be added to the Region by the year 2010 were assigned to the individual airports. Since the basic regional system assumed that 12 of the 14 privately owned airports currently open for public use in 1994 would not be available for use, aircraft at the 12 airports that were assumed not to be available had to be reassigned to the 10 airports comprising the basic system. This was accomplished in the same manner as was done for the existing demand described above.

Second, based aircraft with owners residing in Northeastern Illinois that were forecast to be added to the Region by the year 2010 were assigned to individual airports of the existing and committed system.

Third, adjustments to the assignment were made to reflect the long-term trend at General Mitchell International Airport for general aviation activity gradually to relocate to other airports in the Milwaukee metropolitan area. As the level of air carrier activity increases at Mitchell International, it was assumed that general aviation users, especially those who own piston-engine aircraft, will continue to find other airports in the Region more attractive because of less total traffic, the potential for far less traffic congestion, no large air carrier operations, and less complicated air traffic procedures

and regulations. Between 1970 and 1993, the general aviation share of all operations at Mitchell International had decreased from about 61 percent of all aircraft operations to about 38 percent. During the same period, the number of general aviation aircraft based within Milwaukee County has decreased from about 36 percent of the Region total to about 24 percent. It is expected that these general aviation-related trends will continue throughout the plan design period as long as air carrier operations continue to increase, as has been forecast. Similar shifts of general aviation based aircraft and operations may also occur at the larger general aviation reliever airports, such as Kenosha Regional and Waukesha County-Crites Field. In the case of these airports, it is likely that when activity by high-performance aircraft such as business and corporate jets increases, some small aircraft owners, particularly those who fly primarily for recreation, will move their aircraft and operations to smaller, less busy airports. These shifts in based aircraft were reflected in the assignments.

Fourth, the assigned based aircraft were used to calculate the estimated forecast 2010 aircraft operations at each airport. The resultant aircraft operations for each airport were then reviewed and compared, for reasonableness and consistency, with the existing estimated 1993 aircraft operations for each airport. It was found that operations at some general aviation airports appeared to be somewhat underestiminated and in other cases somewhat overestimated. This was found to have occurred because the average number of operations per active based aircraft at those airports differed significantly from the national and Region-wide averages utilized to calculate the forecast number of aircraft operations at each airport. The relationship between these various estimates of operations per aircraft for airports within the Region were discussed in Chapter IV of this report and highlighted in Table 61. It was therefore concluded that some adjustments should be made to the estimated number of aircraft operations for selected airports. These adjustments were reflected in the estimated forecast operations presented under this analysis.

Upon completion of these demand assignments, the number and type of aircraft assigned to each airport in the system, as well as the attendant number of aircraft operations for each type of aircraft assigned to each airport, could be summarized.

COMPARISON OF ASSIGNED AVIATION DEMAND TO AIRPORT SYSTEM CAPACITY

To identify existing and probable future airfield capacity deficiencies in the regional airport system, the existing and forecast aircraft operations were compared to airport system capacity in terms of the ability of the airport system and its individual airports to handle both forecast volumes of aircraft operations and specific types of aircraft. The comparison of existing and future aviation demand to airport capacity provides a determination of the ability of regional airport facilities to accommodate the existing and probable future aviation activity within the recommended level of service; it thus constitutes a critical step in the regional airport system planning process.

The identification of existing and probable future airfield deficiencies was accomplished by postulating a basic regional system of public-use airports. Such airfield capacity assessment includes only those airports that may reasonably be expected to remain in operation through the plan year. This basic system includes all eight publicly owned airports in the Region, together with two privately owned facilities: Batten Airport and Capitol Airport.

Existing Demand-Capacity Analysis

A comparison of the existing demand to the postulated basic regional airport system was made to identify any airfield capacity or primary runway length deficiencies. The results of the assignment of the existing 1993 aviation demand to the basic regional airport system of 10 public-use airports are summarized in Table 95.

The operation of the eight publicly owned and two privately owned public-use airports at a regional system level results in total operations that are approximately 39 percent of the total regional annual service volume. Under this basic regional airport system, the level of aircraft operations at General Mitchell International Airport would remain at approximately 77 percent of ASV. General Mitchell International has typically operated at an annual operations level between 70 and 85 percent of its ASV for the past 25 years, and in 1994 it actually operated at 83 percent. It should be noted that Milwaukee County, in September 1993, adopted a new master plan for Mitchell International that envisioned further capacity improvements.

Table 95

COMPARISON OF EXISTING DEMAND WITH THE BASIC SYSTEM'S CAPACITY

County	Airport Name	Airport Classification[a]	Assigned Aircraft by Type							Airport Capacity	Estimated 1993 Operations	
			Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[b]	Total	Annual Service Volume (ASV)	Number	Percent of ASV
Kenosha	Kenosha Regional	TR	223	27	4	2	2	2	260	355,000	103,400	29
Milwaukee	General Mitchell International	AC	31	27	31	28	--	--	117	260,000	201,288	77
	Lawrence J. Timmerman	GU	102	16	4	--	--	--	122	230,000	93,761	41
Ozaukee	--	--	--	--	--	--	--	--	--	--	--	--
Racine	Batten	TR	73	10	6	8	1	5	103	230,000	66,280	29
	Burlington Municipal	BU	116	10	1	--	2	1	130	207,000	77,125	37
Walworth	East Troy Municipal	GU	104	6	--	--	2	6	118	207,000	78,000	38
Washington	Hartford Municipal	BU	55	4	--	--	--	8	67	207,000	28,525	14
	West Bend Municipal	GU	96	11	--	--	--	16	123	230,000	82,305	36
Waukesha	Capitol	BU	105	1	--	--	--	1	107	199,000	73,410	37
	Waukesha County-Crites Field	TR	151	24	15	3	--	--	193	230,000	78,426	34
Region	Public-Use Airports	--	1,056	136	61	41	7	39	1,340	2,355,000	882,520	37
	Private-Use Airports[c]	--	115	1	--	--	11	22	149	--	22,890	--
	Total	--	1,171	137	61	41	18	61	1,489	--	905,410	--

[a] *Classifications used in this column are: AC: Air Carrier; TR: General Aviation-Transport; GU: General Aviation-General Utility; and BU: General Aviation-Basic Utility.*

[b] *Includes balloons, gliders, and registered ultralights.*

[c] *Includes aircraft not based at an airport.*

Source: SEWRPC.

One airport was found to have an existing level of operations at 40 percent or more of annual service volume: Lawrence J. Timmerman Airport. Five additional airports exhibited existing levels of operations between 30 and 40 percent of ASV. These included Burlington Municipal, East Troy Municipal, West Bend Municipal, and Capitol Airports and Waukesha County-Crites Field. The remaining public-use general aviation airports were well below the 60 percent capacity level the FAA identifies as the threshold for airport owners to begin considering airport capacity improvements. Thus, under existing levels of aviation demand and with a basic system of 10 public-use airports in operation, only General Mitchell International has the potential for experiencing airfield capacity deficiencies, given the existing level of aircraft operations and the current capacity of the airfield. The level of operations at each of the airports other than Mitchell International is sufficiently under 60 percent of the airport's ASV. This indicates that the existing regional aviation demand can be accommodated in an efficient and satisfactory manner by a basic system of these 10 airports.

It is important to note that the analyses assumed the continued operation of two privately owned airports, Batten and Capitol. If either of these airports were no longer available for use, other nearby airports in the basic system would experience increased levels of based general aviation aircraft and general aviation operations under both existing and future levels of aviation demand.

If Batten Airport became unavailable for use under existing demand conditions, the based aircraft and operations could be expected to be transferred to General Mitchell International, Kenosha Regional and Burlington Municipal Airports. Mitchell International could expect to experience an increase of 22 based aircraft and about 18,000 annual operations, increasing its annual operations level from 77 percent to 84 percent of its ASV. Kenosha Regional Airport could be expected to experience an increase of 63 based aircraft and about 40,000 annual operations, increasing its annual operations level from 29 percent to 40 percent of its ASV. Burlington Municipal Airport could be expected to experience an increase of 18

based aircraft and about 8,000 annual operations, raising its operations level from 37 percent to 41 percent of its ASV.

If Capitol Airport became unavailable for use under existing demand conditions, the based aircraft and operations could be expected to be transferred to Lawrence J. Timmerman Airport and Waukesha County-Crites Field. Timmerman Airport could be expected to experience an increase of 55 based aircraft and about 37,800 annual operations, increasing its annual operations level from 41 percent to 57 percent of its ASV. Crites Field could be expected to experience an increase of 52 based aircraft and about 35,000 annual operations, increasing its annual operations level from 34 percent to 49 percent of its ASV.

As part of this deficiency analysis, the hourly airfield capacity of General Mitchell International Airport as analyzed in the recently completed airport master plan was reviewed. As noted above, for long-range system planning purposes, review of hourly airfield capacity is normally required within the Region for Mitchell International. The FAA recommends different procedures for determining the ASV and hourly capacities for long-range planning purposes such as this regional airport system plan update than for airport master plans for individual airports, which require greater detail. Thus, some variation between capacities based on the different procedures may be expected even when calculated for the same airport.

As shown in Table 93 of this chapter, the annual service volume of Mitchell International was found to be 260,000 operations per year on the basis of existing and programmed facilities. This compares very closely with the ASV of 269,000 operations per year used in the preparation of the new master plan for Mitchell International. The hourly capacity, as is also shown in Table 93, was found to be 121 operations per hour under visual flight rule (VFR) conditions and 56 operations per hour under instrument flight rule (IFR) conditions. These also compare closely with the hourly capacities of 109 operations per hour under VFR conditions and 57 operations per hour under IFR conditions used in the preparation of the new master plan.

Given the consistency between the capacities independently determined under this regional airport system planning work and under the preparation of the new master plan for General Mitchell International, it was concluded that the numbers of peak-hour operations estimated for the new master plan could be used in the regional airport system planning effort. For Mitchell International, the new master plan in effect estimated that peak-hour operations under VFR conditions would be about 72 in 1993, or about 59 percent of the VFR hourly capacity. The master plan update estimated that peak-hour operations under IFR conditions would be about 49 in 1993, or about 87 percent of the IFR hourly capacity. At these operational levels, delays may become significant, especially under IFR conditions. The actual number of peak-hour IFR operations at Mitchell International was 45 in 1993 and 48 in 1994. A historic record of the number of peak-hour IFR operations at General Mitchell International is provided in Table 96.

Table 96

NUMBER OF PEAK-HOUR INSTRUMENT FLIGHT RULE AIRCRAFT OPERATIONS ON AN AVERAGE DAY AT GENERAL MITCHELL INTERNATIONAL AIRPORT: 1982-1994

Year	Number of Operations
1982	40
1983	42
1984	40
1985	45
1986	43
1987	37
1988	40
1989	44
1990	43
1991	40
1992	41
1993	45
1994	48

Source: Milwaukee County.

With respect to the primary runway lengths at airports in the basic regional airport system, a comparison was made between the desirable runway length for the critical aircraft type by ARC, as shown in Table 94, based on the distribution of aircraft types shown in Table 95. Information on historic and existing critical aircraft obtained from airport master plans and airport personnel was also incorporated, as appropriate. The results of this comparison of critical aircraft to the existing primary runway length is summarized in Table 97. Two airports were identified as having primary runway length deficiencies: Burlington Municipal, 300 feet, and Hartford Municipal, 900

Table 97

IDENTIFICATION OF PRIMARY RUNWAY LENGTH DEFICIENCIES UNDER EXISTING DEMAND CONDITIONS

Airport Name	Airport Reference Code (ARC) of Critical Aircraft		Primary Runway Length (in feet)		
	Based on Existing Runway Length	Based on Assignment of Based and Itinerant Aircraft	Existing	Desirable	Deficiency
Kenosha Regional	D-II[a]	D-II[a]	5,500	5,500	--
General Mitchell International	D-IV	C-III	9,690	7,000	--
Lawrence J. Timmerman	A-II[b]	B-I[b]	4,100	3,900	--
Batten	C-II[c]	B-II[c]	6,550	6,400	--
Burlington Municipal	A-I	B-I[b]	3,600	3,900	300
Sylvania	Below A-I	A-I	2,300	2,800	500
East Troy Municipal	A-II	B-I[b]	3.900	3,900	--
Hartford Municipal	A-I	B-I[b]	3,000	3,900	900
West Bend Municipal	C-II[b]	B-II[b]	4,500	4,400	--
Capitol	A-I	A-I	3,500	2,800	--
Waukesha County-Crites Field	D-II[a]	D-II[a]	5,850	5,500	--

[a] *Based on 60 percent useful load.*

[b] *Aircraft under 12,500 pounds only.*

[c] *Aircraft 12,500 pounds and over.*

Source: SEWRPC.

feet. The remaining airports in the existing and committed regional airport system were concluded to have primary runways of sufficient length to accommodate the existing aircraft expected to use the respective facilities regularly.

This analysis, however, assumed that 12 of the 14 privately owned airports currently open for public use would not be available for use. This was necessary to identify the extent of the essential system of airports necessary to meet the air transportation needs of the Region. It was also instructive to compare the performance of the basic regional system of 10 airports under the existing demand to the performance of the existing system of 22 airports currently in the Region under existing demand conditions. The results of this assignment of the existing 1993 aviation demand to the existing committed system of 22 public-use airports in the Region are summarized in Table 98. The operation of the eight publicly owned and 14 privately owned public-use airports at a regional system level results in total operations that are approximately 27 percent of the total regional ASV. This, of course, is significantly lower than the 37 percent of the total regional ASV as estimated above under the basic system since the basic system consisted of only 10 airports. Under the above analysis for the basic system of 10 airports, General Mitchell International would continue to be the only airport with operations greater than 60 percent of the airport's ASV. Since the demand level under this existing system is identical to the demand level under the basic system discussed above, a comparison of the estimated hourly demand with the hourly capacity at Mitchell International will also yield the same conclusions.

Because the regional demand was distributed among 22 airports instead of 10 airports, the levels of activity at all of the airports other than General Mitchell International were found to be below 40 percent of their respective annual service volumes. Five airports were found to have demand levels between 30 and 40 percent of the ASV, including Capitol, Lawrence J. Timmerman, Sylvania, West Bend Municipal, and Waukesha County-Crites Field. Thus, the existing system of

Table 98

COMPARISON OF EXISTING DEMAND WITH THE EXISTING SYSTEM'S CAPACITY

County	Airport Name	Airport Classification[a]	Assigned Aircraft by Type							Airport Capacity	Estimated 1993 Operations	
			Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[b]	Total	Annual Service Volume (ASV)	Number	Percent of ASV
Kenosha	Camp Lake	BU	1	--	--	--	--	--	1	52,000	1,400	3
	Kenosha Regional	TR	185	25	4	2	2	--	218	355,000	79,000	22
	Vincent	BU	1	--	--	--	--	--	1	43,000	3,100	7
	Westosha	BU	52	2	--	--	--	--	54	195,000	20,350	10
Milwaukee	General Mitchell International	AC	31	27	31	28	--	--	117	260,000	201,288	77
	Rainbow	BU	27	--	--	--	--	--	27	101,000	16,750	17
	Lawrence J. Timmerman	GU	93	16	4	--	--	--	113	230,000	88,261	38
Ozaukee	--	--	--	--	--	--	--	--	--	--	--	--
Racine	Batten	TR	52	9	6	8	1	--	76	230,000	51,250	22
	Burlington Municipal	BU	60	8	1	--	2	--	71	207,000	46,300	22
	Fox River	BU	6	--	--	--	--	--	6	86,000	4,000	5
	Cindy Guntly Memorial	BU	35	2	--	--	--	2	39	82,000	5,700	7
	Sylvania	BU	38	2	--	--	--	7	47	109,000	38,400	35
	Valhalla	BU	1	--	--	--	--	--	1	--	30	--
Walworth	Big Foot Airfield	BU	6	--	--	--	--	1	7	54,000	4,075	8
	East Troy Municipal	GU	69	5	--	--	2	4	80	207,000	55,100	27
	Grand Geneva	BU	--	--	--	--	--	--	--	--	--	--
	Lake Lawn	GU	8	--	--	--	--	--	8	159,000	35,000	22
Washington	Hahn Sky Ranch	BU	--	--	--	--	--	--	0	53,000	410	1
	Hartford Municipal	BU	55	4	--	--	--	8	67	207,000	28,320	14
	West Bend Municipal	GU	96	11	--	--	--	16	123	230,000	82,100	36
Waukesha	Aero Park	BU	10	--	--	--	--	1	11	81,000	6,000	7
	Capitol	BU	94	1	--	--	--	--	95	199,000	68,810	35
	Waukesha County-Crites Field	TR	136	24	15	3	--	--	178	230,000	71,876	31
Region	Public-Use Airports	--	1,056	136	61	41	7	39	1,340	3,370,000	907,520	27
	Private-Use Airports[c]	--	115	1	--	--	11	22	149	--	22,890	--
	Total	--	1,171	137	61	41	18	61	1,489	--	930,410	--

[a] *Classifications used in this column are: AC: Air Carrier; TR: General Aviation-Transport; GU: General Aviation-General Utility; and BU: General Aviation-Basic Utility.*

[b] *Includes balloons, gliders, and registered ultralights.*

[c] *Includes aircraft not based at an airport.*

Source: SEWRPC.

22 airports can easily accommodate the existing levels of aviation demand with no airfield capacity problems, as can the basic system of 10 public-use airports.

With respect to the primary runway lengths at airports in the existing system of 22 airports, any primary runway deficiencies under this system were found to be the same as those identified under the basic regional airport system discussed above and shown previously in Table 97. This is because all the aircraft that were reassigned from airports in the 22-airport basic system to airports in the 10-airport existing system were small piston-engine or other miscellaneous aircraft that do not normally constitute the critical aircraft. Thus, the airports with primary runway deficiencies remained Burlington Municipal, with a runway deficiency of 300 feet, and Hartford Municipal, with a runway deficiency of 900 feet. Also, since Sylvania Airport was not included under the basic regional airport system, but was included under this existing system of 22 airports, it was found to have a runway deficiency of 500 feet. The remaining airports in the existing regional airport system were concluded to have primary runways of sufficient length to accommodate the existing aircraft expected to use the respective facilities regularly.

Forecast Demand-Capacity Analysis

A comparison of the forecast design year 2010 future demand with the basic regional airport system was also made to identify any airfield capacity or primary runway-length deficiencies. The results of this assignment of the forecast year 2010 aviation demand to the basic regional airport system of 10 public-use airports are summarized in Table 99.

The operation of the eight publicly owned and two privately owned public-use airports at a regional

Table 99

COMPARISON OF FORECAST DEMAND WITH THE BASIC SYSTEM'S CAPACITY

County	Airport Name	Airport Classification[a]	Assigned Aircraft by Type							Airport Capacity	Estimated 2010 Operations	
			Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[b]	Total	Annual Service Volume (ASV)	Number	Percent of ASV
Kenosha	Kenosha Regional	TR	226	32	29	16	7	--	310	355,000	200,000	56
Milwaukee	General Mitchell International	AC	5	11	19	32	2	--	69	260,000	237,000	91
	Lawrence J. Timmerman	GU	90	19	11	--	1	--	121	230,000	90,000	39
Ozaukee	--	--	--	--	--	--	--	--	--	--	--	--
Racine	Batten	TR	75	13	14	11	1	--	114	230,000	90,000	39
	Burlington Municipal	BU	131	13	5	--	3	22	174	207,000	95,000	46
Walworth	East Troy Municipal	GU	106	8	5	--	4	16	139	207,000	89,000	43
Washington	Hartford Municipal	BU	59	5	--	--	--	8	72	207,000	35,000	17
	West Bend Municipal	TR	108	15	9	3	1	16	152	230,000	104,000	45
Waukesha	Capitol	BU	112	4	2	--	--	2	120	199,000	82,000	41
	Waukesha County-Crites Field	GU	163	26	21	5	2	2	219	230,000	139,000	60
Region	Public-Use Airports	--	1,075	146	115	67	21	66	1,490	2,355,000	1,161,000	49
	Private-Use Airports[c]	--	115	1	--	--	10	22	148	--	28,000	--
	Total	--	1,190	147	115	67	31	88	1,638	--	1,189,000	--

[a] *Classifications used in this column are: AC: Air Carrier; TR: General Aviation-Transport; GU: General Aviation-General Utility; and BU: General Aviation-Basic Utility.*

[b] *Includes balloons, gliders, and registered ultralights.*

[c] *Includes aircraft not based at an airport.*

Source: SEWRPC.

system level results in total estimated 2010 operations approximately 49 percent of the regional annual service volume. While there would be sufficient total airport capacity on a regional basis, the aircraft operations would not be evenly distributed geographically, so that some airports may be expected to operate at, or over, the 60 percent capacity threshold set by the FAA. Specifically, General Mitchell International Airport may be expected to operate at over 90 percent of its ASV, and Waukesha County-Crites Field may be expected to operate at about 60 percent of its ASV, Kenosha Regional Airport may be expected to operate at about 56 percent of its ASV. Six other airports could be expected to have levels of activity near, or somewhat above, 40 percent of their annual service volumes. These include: Lawrence J. Timmerman and Batten at 39 percent, Burlington Municipal at 46 percent, East Troy Municipal at 43 percent, West Bend Municipal at 45 percent, and Capitol Airport at 41 percent. Under this analysis, only one airport, Hartford Municipal, would remain at well under 60 percent of the ASV, at 17 percent.

It is important to note again that the analyses assumed the continued operation of two privately owned airports, Batten and Capitol. If either of these airports were no longer available for use, other nearby airports in the basic system would experience increased levels of general aviation aircraft and ground aviation operations under both existing and future based levels of aviation demand.

If Batten Airport were unavailable for use under forecast demand conditions, the based aircraft and operations concerned could be expected to be transferred to General Mitchell International, Kenosha Regional and Burlington Municipal Airports. Mitchell International could expect to experience an increase of 29 based aircraft and about 30,000 annual operations, increasing its annual operations level from 91 percent to 103 percent of its annual service volume. Kenosha Regional Airport could be expected to experience an increase of 70 based aircraft and about 52,000 annual operations, increasing its annual operations level from 56 percent to 71 percent of its ASV. Burlington Municipal Airport could be expected to experience an increase of 15 based aircraft and about 8,000 annual operations, increasing its operations level from 46 percent to 50 percent of its ASV.

If Capitol Airport were unavailable for use under forecast demand conditions, the based aircraft and operations concerned could be expected to be

transferred to Lawrence J. Timmerman Airport and Waukesha County-Crites Field. Timmerman Airport could be expected to experience an increase of 62 based aircraft and about 42,000 annual operations, increasing its annual operations level from 39 percent to 57 percent of its ASV. Crites Field could be expected to experience an increase of 58 based aircraft and about 40,000 annual operations, increasing its annual operations level from 60 percent to 78 percent of its ASV. Thus, under probable plan design year 2010 levels of future aviation demand, the continued operation of both Capitol Airport and Batten Airport may be expected to be essential in providing sufficient capacity to satisfy regional aviation demand.

With respect to the hourly airfield capacity at General Mitchell International, the hourly capacity would remain 121 operations per hour under VFR conditions and 56 operations per hour under IFR conditions, as described above for the existing demand analyses. The master plan update predicted that peak-hour operations under VFR conditions would be about 88 in the year 2007, or about 73 percent of the VFR hourly capacity. The master plan update forecast that peak-hour operations under IFR conditions would be about 58 in the year 2007, or about 104 percent of the IFR hourly capacity. Peak-hour operations in the regional airport system plan design year of 2010 may be expected to be about the same as, or slightly greater than, the master plan estimates for the year 2007. At these operational levels, delays may become significant under VFR conditions and critical under IFR conditions.

With respect to the primary runway lengths at airports in the basic regional airport system, a comparison was made between the desirable runway length for the critical aircraft type by ARC, as shown in Table 94 based on the distribution of aircraft types as shown in Table 99. Information concerning historic and existing critical aircraft obtained from airport master plans and airport personnel was also incorporated as appropriate. The results of this comparison of critical aircraft to the existing primary runway length is summarized in Table 100. Five airports were identified as having primary runway length deficiencies: Kenosha Regional, 900 feet; Burlington Municipal, 300 feet; East Troy Municipal, 500 feet; Hartford Municipal, 900 feet; and West Bend Municipal, 1,000 feet. The remaining airports in the basic regional airport system were concluded to have primary runways sufficiently long to accommodate the existing aircraft expected to use the respective facilities regularly. The primary runway length deficiencies for Burlington Municipal and Hartford Municipal Airports were also identified under the analysis of existing demand.

Special attention was given to primary runway length deficiencies identified at Transport-Corporate airports because of the larger land areas and more intensive facilities such airports require. Of the four airports in the basic regional system already classified, or recommended to be classified, as Transport-Corporate airports, the two at which primary runway length deficiencies were identified were West Bend Municipal Airport and Kenosha Regional Airport. No such runway length deficiencies were identified for Batten Airport and Waukesha County-Crites Field.

With respect to West Bend Municipal Airport, the relatively small number of forecast future based jet aircraft indicates that the forecast aircraft operations by both based and itinerant business and corporate jet aircraft are likely to be generated by predominately small- to medium-sized jets and some large aircraft, all under partially loaded conditions. Therefore, the future ARC for West Bend Municipal Airport of D-II, based on a 60 percent useful load, was determined to be appropriate.

The relatively large number of forecast future jet aircraft anticipated to be based at Kenosha Regional Airport indicates that small, medium, and large business and corporate jets may be expected to be using the airport. Also, because many of these aircraft are expected to be owned by establishments which conduct business on an international basis, the trips made with these aircraft may be expected to be significantly longer than the trips currently made out of the airport, requiring takeoffs with maximum useful loads. Thus, the future forecast ARC was determined to be C-II, based on a 90 percent useful load for the aircraft. This would enable almost all small and medium-sized business jets to use the airport on a regular basis under fully loaded conditions and also enable many of the largest business and corporate jets to use the airport on a regular basis under partially loaded conditions under an ARC of D-II, or 60 percent useful load conditions.

With respect to Batten Airport and Waukesha County-Crites Field, these two airports were found to possess primary runway lengths sufficient to accommodate the existing and forecast future criti-

Table 100

IDENTIFICATION OF PRIMARY RUNWAY LENGTH DEFICIENCIES UNDER FORECAST DEMAND CONDITIONS

Airport Name	Airport Reference Code (ARC) of Critical Aircraft		Primary Runway Length (in feet)		
	Based on Existing Runway Length	Based on Assignment of Based and Itinerent Aircraft	Existing	Desirable	Deficiency
Kenosha Regional	D-II[a]	C-II[b]	5,500	6,400	900
General Mitchell International	D-IV	D-IV	9,690	9,000	--
Lawrence J. Timmerman	A-II[c]	A-II[c]	4,100	3,900	--
Batten	C-II[d]	C-II[d]	6,550	6,400	--
Burlington Municipal	A-I	B-I[c]	3,600	3,900	300
Sylvania	Below A-I	A-I	2,300	2,800	500
East Troy Municipal	A-II	B-II[c]	3,900	4,400	500
Hartford Municipal	A-I	B-I[c]	3,000	3,900	900
West Bend Municipal	C-II[c]	D-II[a]	4,500	5,500	1,000
Capitol	A-I	A-I	3,500	2,800	--
Waukesha County-Crites Field	D-II[a]	D-II[a]	5,850	5,500	--

[a] *Based on 60 percent useful load.*

[b] *Based on 90 percent useful load.*

[c] *Aircraft under 12,500 pounds only.*

[d] *Aircraft 12,500 pounds and over.*

Source: SEWRPC.

cal aircraft. Both Batten Airport and Crites Field are able to accommodate small, medium, and large business jets under ARC of D-II at a 60 percent useful load.

It is important to note that the primary runway lengths presented herein should be regarded as desirable, not necessarily essential. It should not be assumed that improvements to provide these desirable runway lengths will be included in the system plan. The decision to include such improvements in the regional plan can only follow a comparison of the costs and benefits, the advantages and disadvantages, of the proposed improvements. Such analysis and comparison is provided in the next chapter of this report, Chapter IX, "Design and Evaluation of Alternative Airport System Improvements."

Analysis thus indicates that, should the regional airport system be reduced to a basic system by the year 2010, it is likely that only one airport, General Mitchell International Airport, will experience airfield capacity problems; two other airports may begin to experience airfield capacity problems. The two other airports where such capacity deficiencies may be expected to develop are Kenosha Regional Airport and Waukesha County-Crites Field. However, other nearby airports that are substantially below the 60 percent of annual service volume threshold are in the vicinity of these airports and would be able to provide additional capacity for the regional aviation demand. Specifically, Batten Airport is about 13 miles northeast of Kenosha Regional Airport and Capitol Airport is about five miles northeast of Crites Field. Batten Airport and Capitol Airport were forecast to operate at about 40 percent of their ASV, which would allow additional aircraft operations to be accommodated easily. In fact, as Kenosha Regional Airport and Crites Field become busier and handle increased numbers of higher-performance aircraft, recent

Table 101

COMPARISON OF FORECAST DEMAND WITH THE EXISTING SYSTEM'S CAPACITY

County	Airport Name	Airport Classification[a]	Assigned Aircraft by Type							Airport Capacity	Estimated 2010 Operations	
			Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[b]	Total	Annual Service Volume (ASV)	Number	Percent of ASV
Kenosha	Camp Lake	BU	1	--	--	--	--	--	1	52,000	1,000	2
	Kenosha Regional	TR	181	30	29	16	6	--	262	355,000	169,000	48
	Vincent	BU	1	--	--	--	--	--	1	43,000	3,000	7
	Westosha	BU	60	4	--	--	3	8	75	195,000	37,000	19
Milwaukee	General Mitchell International	AC	5	11	19	32	2	--	69	260,000	237,000	91
	Rainbow	BU	28	--	--	--	--	2	30	101,000	17,000	17
	Lawrence J. Timmerman	GU	80	19	11	--	1	--	111	230,000	84,000	36
Ozaukee	--	--	--	--	--	--	--	--	--	--	--	--
Racine	Batten	TR	52	12	14	11	1	--	90	230,000	63,000	27
	Burlington Municipal	BU	68	9	5	--	2	4	88	207,000	55,000	26
	Fox River	BU	6	--	--	--	--	--	6	86,000	3,000	4
	Cindy Guntly Memorial	BU	36	2	--	--	--	3	41	82,000	6,000	7
	Sylvania	BU	46	3	--	--	--	10	59	109,000	47,000	43
	Valhalla	BU	1	--	--	--	--	--	1	--	1,000	--
Walworth	Big Foot Airfield	BU	7	--	--	--	--	3	10	54,000	5,000	9
	East Troy Municipal	GU	69	6	5	--	2	9	90	207,000	59,000	29
	Grand Geneva	BU	--	--	--	--	--	--	--	--	--	--
	Lake Lawn	GU	8	--	--	--	1	--	9	159,000	36,000	23
Washington	Hahn Sky Ranch	BU	--	--	--	--	--	--	--	53,000	--	--
	Hartford Municipal	BU	59	5	--	--	--	8	72	207,000	35,000	17
	West Bend Municipal	GU	108	15	9	3	1	16	152	230,000	104,000	45
Waukesha	Aero Park	BU	8	--	--	--	--	2	10	81,000	5,000	6
	Capitol	BU	102	4	2	--	--	1	109	199,000	78,000	39
	Waukesha County-Crites Field	TR	149	26	21	5	2	1	204	230,000	130,000	57
Region	Public-Use Airports	--	1,075	146	115	67	21	66	1,490	3,370,000	1,175,000	35
	Private-Use Airports	--	115	1	--	--	10	22	148	--	28,000	--
	Total	--	1,190	147	115	67	31	88	1,638	--	1,203,000	--

[a] *Classifications used in this column are: AC: Air Carrier; TR: General Aviation-Transport; GU: General Aviation-General Utility; and BU: General Aviation-Basic Utility.*

[b] *Includes balloons, gliders, and registered ultralights.*

[c] *Includes aircraft not based at an airport.*

Source: SEWRPC.

experience indicates that many small aircraft owners will decide to base their aircraft at other, less busy airports.

As was done under the existing demand-capacity analysis, this analysis of the forecast demand assumed that 12 of the 14 privately owned airports currently open for public use would not be available for use. If all 14 existing privately owned airports remained open for public use, airfield capacity problems would be reduced for general aviation activity, as shown in Table 101. This is a result of the general aviation demand being distributed among a larger number of airports. Accordingly, the operation of the eight publicly owned and 14 privately owned public-use airports at a regional system level results in estimated 2010 operations that are approximately 35 percent of the regional annual service volume. General Mitchell International Airport would continue to operate at about 91 percent of its ASV, and Waukesha County-Crites Field may be expected to operate at about 57 percent of its annual service volume. Since the demand level under this basic system is identical to the demand level under the existing and committed system discussed above, a comparison of the estimated hourly demand with the hourly capacity at Mitchell International will also yield the same conclusions as under the above analysis of the existing and committed system. Estimated annual operations at five other airports may be expected to be above 30 percent of their annual service volumes. These include Kenosha Regional at 48 percent, Lawrence J. Timmerman at 36 percent, Sylvania at 43 percent, West Bend Municipal at 45 percent, and Capitol Airport at 39 percent. The level of operations at each of the 15 remaining airports is well below 60 percent of their ASV.

With respect to the primary runway lengths at airports in the existing system of 22 airports, any primary runway deficiencies under this system were found to be the same as those identified under the basic regional airport system discussed above and shown previously in Table 100. This is because all the aircraft that were reassigned from airports in the 10-airport basic system to airports in the 22-airport existing system were small piston-engine or other miscellaneous aircraft that do not normally constitute the critical aircraft. Thus, the airports with primary runway deficiencies remained: Kenosha Regional, 900 feet; Burlington Municipal, 300 feet; East Troy Municipal, 500 feet; Hartford Municipal, 900 feet; and West Bend Municipal, 1,000 feet. Also, since Sylvania Airport was not included under the basic regional airport system, but was included under this existing system of 22 airports, it was found to have a runway deficiency of 500 feet. The remaining airports in the existing regional airport system were concluded to have primary runways of sufficient length to accommodate the existing aircraft expected to use the respective facilities regularly.

AIRPORT ACCESSIBILITY DEFICIENCY ANALYSIS

The fifth step in the identification of existing and probable future regional airport system deficiencies was to identify areas of the Region inadequately served by the basic system of airports. Adequate and appropriate accessibility by Region residents and businesses to a system of public-use airports is vital to meeting the air transportation needs of the Region. The criteria used in assessing the degree of access to public-use airports in the Region were set forth in the travel time standards accompanying Objective No. 1, described in Chapter VI of this report.

Standard No. 1 of Objective No. 1 included a description of the airport service areas associated with the desirable location of airports in each classification. According to this standard, Air Carrier airports in the regional airport system should be so located as to maximize the proportion of the resident population and jobs within 60 minutes' overall ground travel time of one or more such airports. Transport-Corporate airports in the regional airport system should be so located as to maximize the proportion of the resident population and jobs within 45 minutes' overall ground travel time of one or more such airports. General Utility airports in the regional airport system should be so located as to maximize the proportion of the resident population and jobs within 30 minutes' overall ground travel time of one or more such airports. Basic Utility airports in the regional airport system should also be so located as to maximize the proportion of the resident population and jobs within 30 minutes' overall ground travel time of one or more such airports. Overall travel time is defined as the total door-to-door time to travel from origin to destination. This includes the time required to arrive at the transportation vehicle plus the over-the-road travel time.

With respect to airports classified as Air Carrier facilities, the travel time standard recommends that resident population and jobs be maximized within 60 minutes' ground travel time of one or more such airports. There is only one Air Carrier airport located in the Region, General Mitchell International Airport. Map 26 shows the areas within the Region that are within 15, 30, 45, and 60 minutes' ground travel time of Mitchell International. Because one of the primary purposes of Mitchell International is to serve enplaning and deplaning air carrier passengers, it is useful to compare the area within 60 minutes' travel time of the airport to the distribution of the Region's population. This area was found to encompass about 87 percent of the Region's geographic area and about 98 percent of the 1990 resident population and forecast year 2010 population of the Region.

The only areas found to be beyond 60 minutes' ground travel time were two areas located at the extremities of the Region. These areas included: the extreme northern portions of Ozaukee and Washington Counties along the Sheboygan and Fond du Lac County borders and the western and southwestern edges of Walworth County. The next closest Air Carrier airports with regularly scheduled air carrier service to these areas would be O'Hare International Airport in Chicago, Illinois; Dane County Regional Airport in Madison, Wisconsin; and Outagamie County Airport in Appleton, Wisconsin. All three of these airports are well beyond the boundaries of the Southeastern Wisconsin Region and only Dane County Regional Airport would be within a 60-minute ground travel time from one portion of the Region, northwestern Walworth County. It should also be noted that enplaning passenger surveys conducted by the Regional Planning Commission have indicated that many of the passengers who board scheduled

flights at Mitchell International are willing to travel by ground somewhat in excess of 60 minutes to take advantage of the service frequency and fares available at Mitchell International. Thus, nearly all of the Region's population may be considered to be within an acceptable ground travel time of Mitchell International.

With respect to airports classified as Transport-Corporate facilities, the travel time standard recommends that resident population and jobs be maximized within 45 minutes' ground travel time of one or more such airports. There are three airports located in the Region that meet Transport-Corporate requirements for this analysis: Kenosha Regional Airport, Batten Airport, and Waukesha County-Crites Field. General Mitchell International Airport also meets the requirements of a Transport-Corporate airport and may be used as such. Map 27 shows the areas within the Region that are within 15, 30, and 45 minutes' ground travel time of one or more of the Regional system airports that meet Transport-Corporate airports requirements. Two areas were found to be beyond 45 minutes' ground travel time from one or more of these airports. These included the northern portions of Ozaukee and Washington Counties and much of the central and western portions of Walworth County.

Because the primary purpose of these airports is to serve general aviation activity, it is useful to compare the area within 45 minutes' travel time of one or more of these airports to the distribution of the Region's based aircraft. The area within this 45-minute travel time boundary was found to encompass about 78 percent of the Region's geographic area, about 97 percent of the 1990 resident population and the forecast year 2010 population of the Region, and about 92 percent of the of the forecast 1,327 aircraft generated by and based within the Region. Thus, most of the Region's forecast fleet of based general aviation aircraft could be expected to be within acceptable ground travel time of one or more of the Region's Transport-Corporate airports.

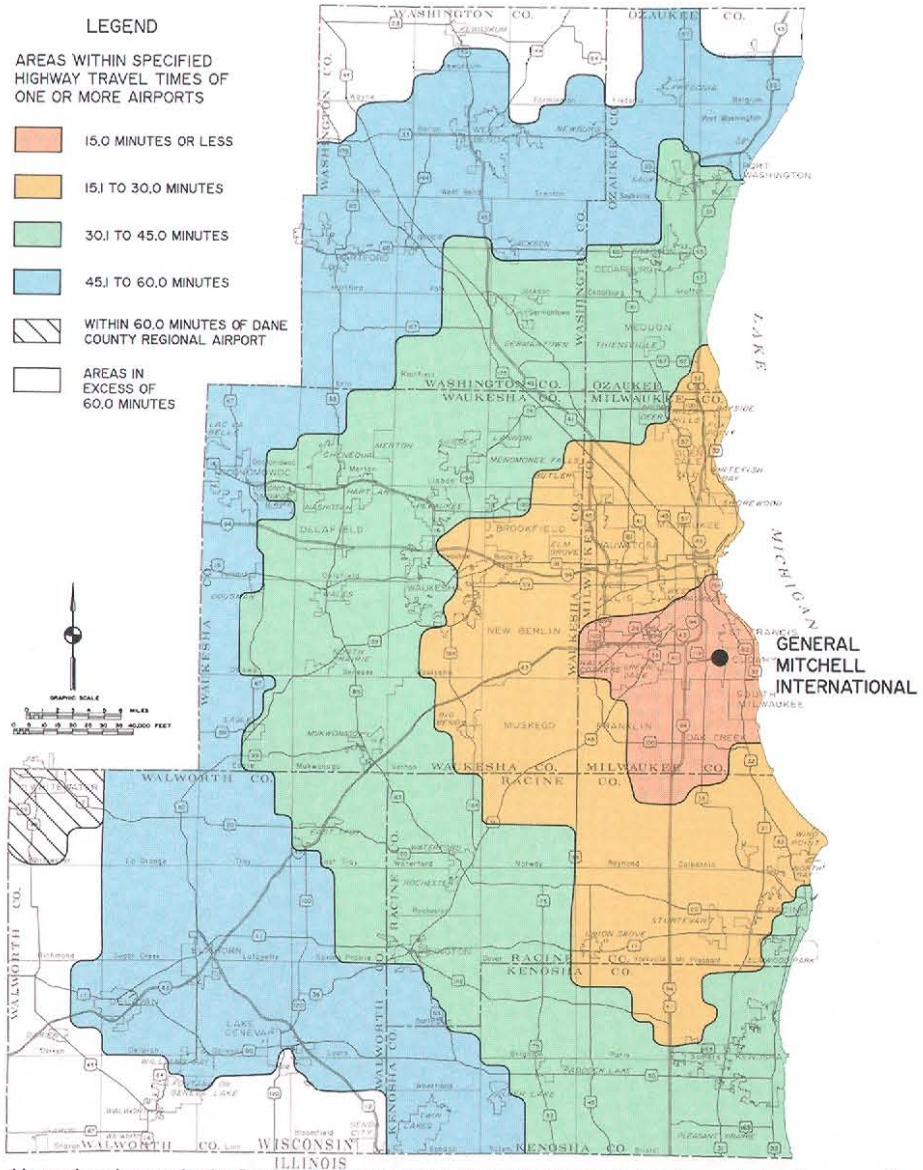
It should be noted, however, that all of the area beyond 45 minutes' ground travel time of one or more of the Region's airports was found to be within 45 minutes' ground travel time of one of three Transport-Corporate airport facilities located in counties adjacent to the Region. For example, all of the above noted area of northern Ozaukee and Washington Counties was within 45 minutes of either the Sheboygan County Memorial Airport or the Fond du Lac County Airport. These airports have a 5,400-foot-long and a 5,560-foot-long primary runway, respectively. All the above noted area of central and western Walworth County is within 45 minutes of the Rock County Airport, located midway between Janesville and Beloit. This airport has a 6,700-foot-long primary runway. Thus, when both the Region's airports and airports located in adjacent counties are considered, the entire Region may be expected to be within an acceptable ground travel time of one or more Transport-Corporate airports.

With respect to airports classified as General Utility facilities, the travel time standard recommends that resident population and jobs be maximized within 30 minutes' ground travel time of one or more such airports. There are three airports in the Region that meet General Utility requirements for this analysis: Lawrence J. Timmerman, East Troy Municipal, and West Bend Municipal Airports. The four other airports cited above that meet the requirements for either an Air Carrier or Transport-Corporate airport may also be used as a General Utility facility. Map 28 shows the areas within the Region that are within 15 and 30 minutes' ground travel time of one or more of the Regional system airports that meet General Utility airport requirements. A small number of areas were found to be beyond 30 minutes' ground travel time from one or more of these airports. These areas included the northwestern corner and the southern portion of Walworth County and a few very small pockets lying at the extremities of the Region. Because the primary purpose of these airports is to serve general aviation activity, it is useful to compare the area within 30 minutes' travel time of one or more of these airports to the distribution of the Region's based aircraft. The area within this 30 minute travel time boundary was found to encompass about 93 percent of the Region's geographic area, about 99 percent of the 1990 resident population and forecast year 2010 population of the Region, and about 96 percent of the of the forecast 1,309 aircraft generated by and based within the Region. Thus, most of the Region's forecast fleet of based general aviation aircraft could be expected to be within an acceptable ground travel time of one or more of the Region's General Utility airports.

It should be noted, however, that all of the area beyond 30 minutes' ground travel time of one or more of the Region's General Utility or larger airports was also found to be beyond 30 minutes' ground travel time of any General Utility facilities in counties adjacent to the Region. The northwestern corner of Walworth County was found to be within 30 minutes' ground travel time of Fort

Map 26

SOUTHEASTERN WISCONSIN AREAS MEETING TRAVEL TIME STANDARDS FOR AIR CARRIER AIRPORTS: 2010

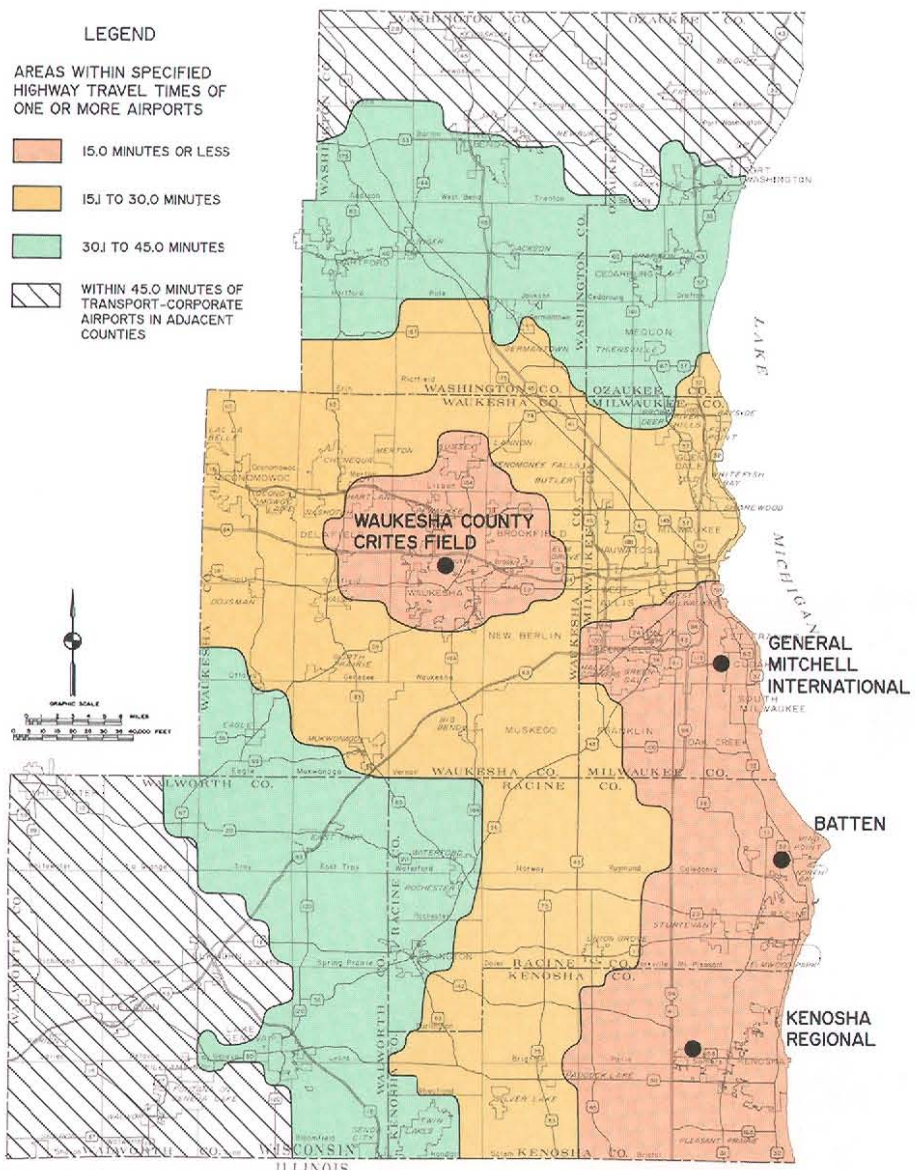


Air carrier airports in the Regional airport system should be so located as to maximize the proportion of the resident population and jobs within 60 minutes' overall ground travel time of one or more such airports. There is only one air carrier airport located in the Region, General Mitchell International Airport. The only areas found to be beyond 60 minutes' ground travel time of Mitchell International were the extreme northern portions of Ozaukee and Washington Counties and the extreme western and southwestern edges of Walworth County. Enplaning passenger surveys conducted by the Regional Planning Commission have indicated that many passengers who board scheduled flights at Mitchell International are willing to travel by ground in excess of 60 minutes to take advantage of the service frequency and fares available at the airport.

Source: SEWRPC.

Map 27

SOUTHEASTERN WISCONSIN AREAS MEETING TRAVEL TIME STANDARDS FOR TRANSPORT-CORPORATE AIRPORTS: 2010



Transport-Corporate airports in the Regional airport system should be located so as to maximize the proportion of the resident population and jobs within 45 minutes' overall ground travel time of one such airport or more. The only areas found to be beyond 45 minutes' ground travel time from one such airport or more were the extreme northern portions of Ozaukee and Washington Counties and the extreme central and western portions of Walworth County. However, all the areas in excess of 45 minutes' ground travel time of one or more of the Region's Transport-Corporate airports were found to be within 45 minutes' ground travel time of a Transport-Corporate airport in counties adjacent to the Region.

Source: SEWRPC.

Atkinson Municipal Airport, which is capable of handling many, but not all, General Utility-sized aircraft. However, this airport has a primary runway length of 3,800 feet, slightly less than the 3,900 foot primary runway length recommended for long-range system planning purposes under this plan update. Thus, when both the Region's airports and airports lying in adjacent counties are considered, a small portion of the Region may be expected to be outside the acceptable ground travel time to one or more General Utility airports.

With respect to airports classified as Basic Utility facilities, the travel time standard recommends that resident population and jobs be maximized within 30 minutes' ground travel time of one or more such airports. There are three airports in the Region that meet Basic Utility requirements for this analysis: Burlington Municipal, Hartford Municipal, and Capitol Airports. The seven other airports cited above which meet the requirements of either an Air Carrier, a Transport-Corporate, or a General Utility airport may also be used as a Basic Utility facility. Map 29 shows the areas within the Region that are within 15 and 30 minutes' ground travel time of one or more of the Regional system airports that meet General Utility airport requirements. A small number of areas were found to be beyond 30 minutes' ground travel time from one or more of these airports. These areas included the northwestern corner and the southern portion of Walworth County and a few very small areas at the extremities of the Region. Although the area included within 30 minutes of ground travel time of one or more Basic Utility airports is very similar to the area within 30 minutes' travel time of one or more General Utility airports, it should be noted that a larger proportion of the Region is within 15 minutes' of a Basic Utility airport than is within 15 minutes of a General Utility airport. This may be seen by reviewing Map 29. This is significant because a major portion of the regional general aviation fleet is composed of small aircraft intended to use Basic Utility airports.

Because the primary purpose of these airports is to serve general aviation activity, it is useful to compare the area within 30 minutes' travel time of one or more of these airports to the distribution of the Region's based aircraft. This area was found to encompass about 94 percent of the Region's geographic area, about 99 percent of the 1990 resident population and forecast year 2010 population of the Region, and about 97 percent of the of the forecast 1,309 aircraft generated by, and based within, the Region. Thus, most of the Region's forecast fleet of based general aviation aircraft could be expected to be within acceptable ground travel time of one or more of the Region's Basic Utility airports.

It should be noted, however, that much of the area beyond 30 minutes' ground travel time of one or more of the Region's airports was found to be within 30 minutes' ground travel time of one of several Basic Utility or larger airport facilities lying in counties adjacent to the Region. For example, the areas of western and southern Walworth County noted above were found to be within 30 minutes of either Rock County Airport, located midway between Janesville and Beloit; Fort Atkinson Municipal Airport; Dacy Airport, near Harvard, Illinois; or Galt Wonder Lake Airport, near Greenwood, Illinois. Dacy Airport has a 3,500-foot-long primary runway and Galt Wonder Lake Airport has a 3,200-foot-long primary runway. Thus, when both the Region's airports and airports located in adjacent counties are considered, all of the Region, except a very few small pockets, mostly in outlying rural areas, may be expected to be within an acceptable ground travel time of one or more Basic Utility airports.

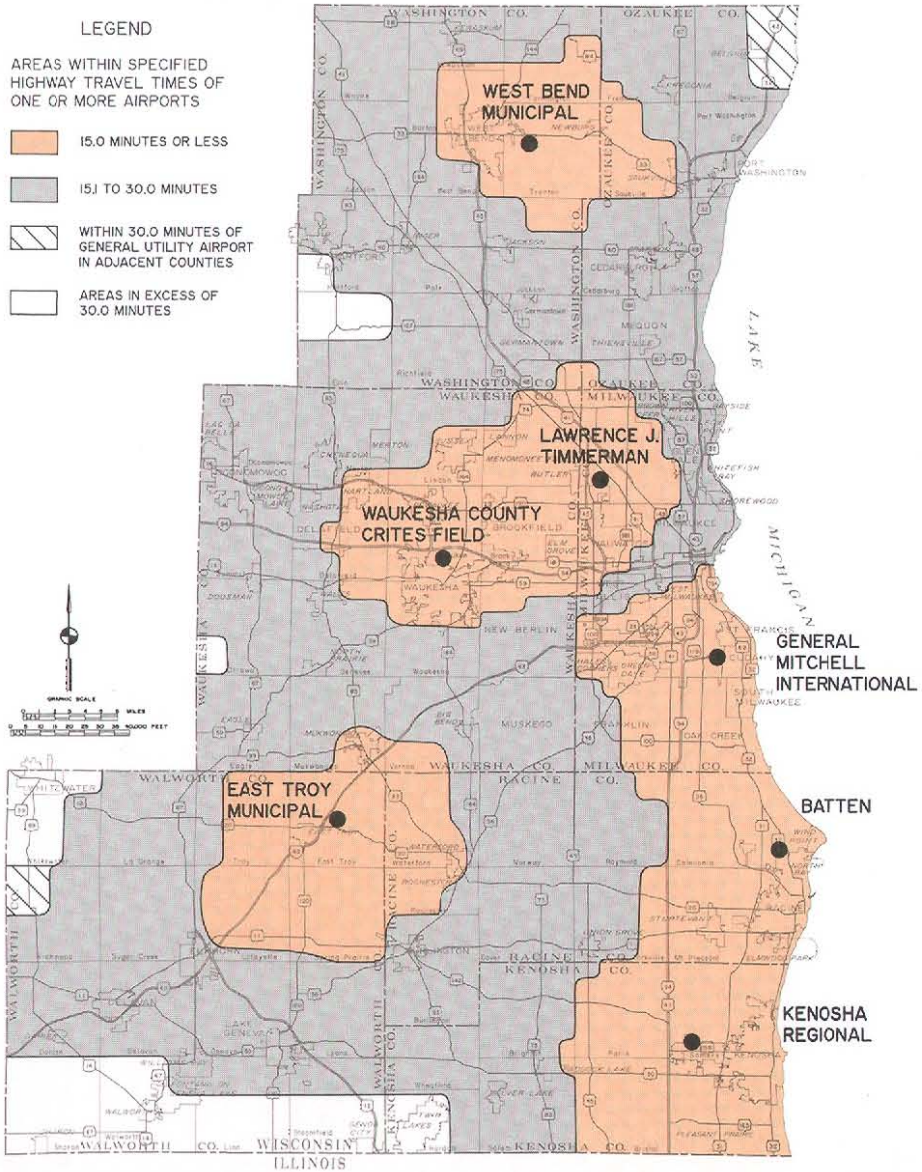
SUMMARY AND CONCLUSIONS

This chapter has identified the existing and probable future capacity deficiencies of the regional airport system. The capacity deficiencies were defined in terms of the airfield capacities of the individual airports comprising the system, the critical aircraft that must be accommodated by each airport, and accessibility to the airports. Airfield capacity and the critical aircraft are critical measures of the ability of an airport to serve aviation demand since the provision of airfield capacity to accommodate aviation demand may entail substantial cost, require large areas of land, and have potential impacts. Airfield capacity was measured in terms of the annual service volume of each airport. An important capacity threshold was defined as 60 percent of the ASV of the airport. The FAA recommends that efforts to improve airfield capacity begin when this demand level is reached. The airfield capacity of each airport was estimated on the basis of existing and programmed facilities, as summarized in Table 102.

For purposes of identifying deficiencies, two different regional airport systems were assumed. The first system consisted of only 10 of the 22 airports

Map 28

SOUTHEASTERN WISCONSIN AREAS MEETING TRAVEL TIME STANDARDS FOR GENERAL UTILITY AIRPORTS: 2010

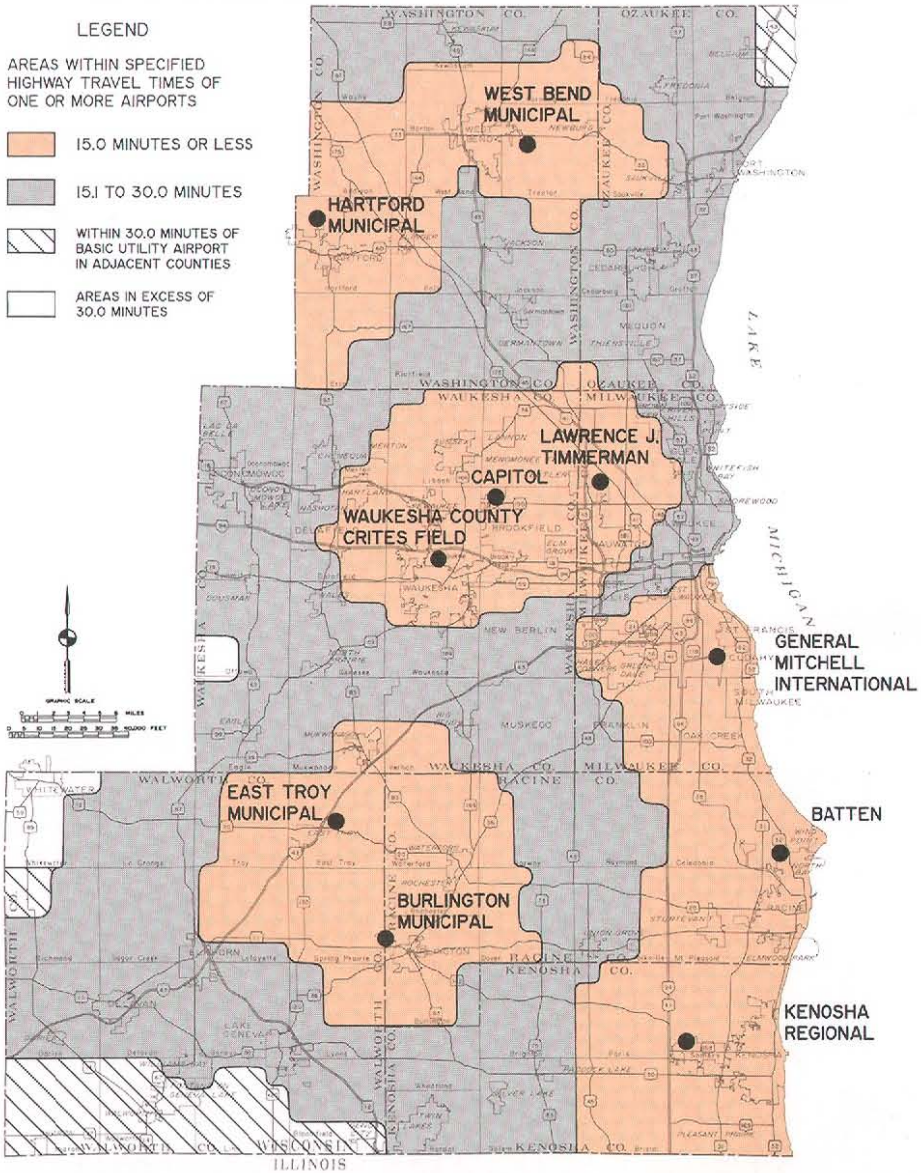


General Utility airports in the Regional airport system should be located so as to maximize the proportion of the resident population and jobs within 30 minutes' overall ground travel time of one such airport or more. The areas found to be beyond 30 minutes' ground travel time from one or more such airports included the northwestern corner and the southern portion of Walworth County and a few very small areas located at the extremities of the Region. However, most of the areas in excess of 30 minutes' ground travel time of one or more of the Region's General Utility airports were found to be within 30 minutes' ground travel time of a General Utility airport in counties adjacent to the Region.

Source: SEWRPC.

Map 29

SOUTHEASTERN WISCONSIN AREAS MEETING TRAVEL TIME STANDARDS FOR BASIC UTILITY AIRPORTS: 2010



Basic Utility airports in the Regional airport system should be located so as to maximize the proportion of the resident population and jobs within 30 minutes' overall ground travel time of one or more such airports. The areas found to be beyond 30 minutes' ground travel time from one or more such airports included the northwestern corner and the southern portion of Walworth County and a few very small areas located at the extremities of the Region. However, most of the areas in excess of 30 minutes' ground travel time of one or more of the Region's Basic Utility airports were found to be within 30 minutes' ground travel time of a Basic Utility airport in counties adjacent to the Region.

Source: SEWRPC.

Table 102

COMPARISON OF DEMAND AND CAPACITY AT PUBLIC-USE AIRPORTS IN SOUTHEASTERN WISCONSIN

County	Airport Name	Annual Service Volume (ASV) (number of operations)	Section Of Aviation Demand To Annual Service Volume			
			Existing Demand and Basic System (10 airports)	Existing Demand and Existing System (22 airports)	Forecast 2010 Demand And Basic System (10 airports)	Forecast 2010 Demand And Existing System (22 airports)
Kenosha	Camp Lake	52,000	--	.03	--	.02
	Kenosha Regional	355,000	.29	.22	.56	.48
	Vincent	43,000	--	.07	--	.07
	Westosha	195,000	--	.10	--	.19
Milwaukee	General Mitchell International	260,000	.77	.77	.91	.91
	Rainbow	101,000	--	.17	--	.17
	Lawrence J. Timmerman	230,000	.41	.38	.39	.36
Ozaukee	None	--	--	--	--	--
Racine	Batten	230,000	.29	.22	.39	.27
	Burlington Municipal	207,000	.37	.22	.46	.26
	Fox River	86,000	--	.05	--	.04
	Cindy Guntly Memorial	82,000	--	.07	--	.07
	Sylvania	109,000	--	.35	--	.43
	Valhalla	--	--	--	--	--
Walworth	Big Foot Airfield	54,000	--	.08	--	.09
	East Troy Municipal	207,000	.38	.27	.43	.29
	Grand Geneva					
	Lake Lawn	159,000	--	.22	--	.23
Washington	Hahn Sky Ranch	53,000	--	.01	--	--
	Hartford Municipal	207,000	.14	.14	.17	.17
	West Bend Municipal	230,000	.36	.36	.45	.45
Waukesha	Aero Park	81,000	--	.07	--	.06
	Capitol	199,000	.37	.35	.41	.39
	Waukesha County-Crites Field	230,000	.34	.31	.60	.57

Source: SEWRPC

available for public use in 1994, including the eight publicly owned public-use airports and two privately owned public-use airports: Batten Airport and Capitol Airport. The second system consisted of all 22 airports in the Region that were available for public use in 1994, including eight publicly owned and 14 privately owned airports. The smaller, or basic, system of airports was intended to represent the minimum system of airports that could be expected to be in operation by the design year of the system plan. This basic system included the eight airports in the Region that are publicly owned and the two privately owned public-use airports which have had substantial capital investment and are a key element of the airport system of the Region. The identification of capacity deficiencies for this smaller, basic regional airport system provided essential information that can be used by governmental units in responding to the proposed closing of a private airport. Governmental actions that could be considered include the provision of additional capacity at nearby airports and the public acquisition and operation of the privately owned airport proposed to be closed.

Analysis of the capacity of the basic regional airport system of 10 airports indicated that no major capacity deficiencies existed under 1994 levels of demand, as shown in Table 102. General Mitchell International Airport was the only airport found to be operating in excess of 60 percent of its ASV. However, it has operated at about the same level, between 70 and 80 percent, for the past 25 years. A comparison of the existing 1994 level of operations with the larger 22-airport system led to similar conclusions; the major difference was that the level of operations at many of the general aviation airports was lower because the same level of demand

was being distributed over a larger number of airports. Therefore, a basic system of 10 essential public-use airports, all of which were in operation in 1994, was found to be capable of accommodating the entire regional demand at 1994 levels.

The same analysis was performed for the long-range future demand, utilizing the plan design year of 2010. This analysis of the basic regional airport system of 10 airports indicated that by the year 2010, one significant capacity deficiency may exist, as shown in Table 102. General Mitchell International Airport could be expected to be operating at about 91 percent of its ASV, well over the 60 percent threshold. In addition, a review of the hourly capacity at Mitchell International indicated that, by the plan design year, delays may become significant under VFR conditions and critical under IFR conditions.

One other airport was also forecast to operate at or near the 60 percent of annual service volume level, Waukesha County-Crites Field. However, other nearby airports, such as Capitol Airport, which are expected to continue operating substantially below the 60 percent threshold would be able to provide additional capacity for the regional aviation demand. A comparison of the forecast level of operations with the larger 22-airport system led to similar conclusions; the major difference was that the level of operations at many of the general aviation airports was lower because the same level of demand was being distributed over a larger number of airports. Therefore, the same basic system of 10 essential public-use airports, all of which were in operation in 1994, would also be capable of accommodating the entire forecast future regional demand, but with an airfield capacity-related deficiency.

As part of this deficiency analysis, comparisons were also made between the desirable primary runway lengths at airports in the basic regional airport system and the existing and forecast critical aircraft to be accommodated at each airport. The results of this comparison for the existing demand indicated that two airports had primary runway length deficiencies. These included Burlington Municipal Airport, 300 feet, and Hartford Municipal Airport, 900 feet. The results of this comparison for the forecast future demand indicated that five airports have primary runway length deficiencies. These included Burlington Municipal Airport, 300 feet; East Troy Municipal Airport, 500 feet; Kenosha Regional Airport, 900 feet; West Bend Municipal Airport, 1,000 feet; and Hartford Municipal Airport, 900 feet. Analysis of the larger 22-airport system for the Region yielded the same results, except that, in addition, Sylvania Airport would have a primary runway length deficiency of 500 feet.

With respect to the airport accessibility portion of the deficiency analysis, areas of the Region inadequately served by the basic system of airports were identified through the use of ground travel times to one or more of the same classification airports from the various areas of the Region. This was done for each of the four airport classifications. It was found that for Air Carrier airports, most of the resident population of the Region was within an acceptable ground travel time of 60 minutes of General Mitchell International Airport, the only airport of this classification in the Region. For Transport-Corporate airports, it was found that all of the Region was within an acceptable ground travel time of 45 minutes of one or more such airports. For General Utility airports, it was found that most of Region was within an acceptable ground travel time of 30 minutes of one or more such airports. A small portion of the Region, chiefly the northwestern corner and the southern portion of Walworth County, may be expected to be outside the acceptable travel time to one or more General Utility airports. For Basic Utility airports, all of the Region except for a very few small pockets, mostly in outlying rural areas, may be expected to be within an acceptable ground travel time of one or more such airports. Overall, it was found that the Region was being adequately served and could expect to continue to be served adequately by a basic system of 10 airports, all of which were operating in 1994.

In summary, the comparison of existing and future forecast aviation demand with the regional airport system capacity in Southeastern Wisconsin indicated that the 1994 aviation demand not only can be accommodated at an acceptable level of service by the current system of 22 privately and publicly owned public-use airports in the Region, but could also be accommodated if not all private airports were to no longer be available for use in the Region except Batten Airport and Capitol Airport. Thus, analysis indicated that, to meet existing aviation demand within the Region, there is no need to pursue any major airfield improvements beyond those currently committed for purposes of increas-

ing the ASV at airports in Southeastern Wisconsin. There is a limited need to pursue primary runway extensions at only two airports: Burlington Municipal and Hartford Municipal Airports.

The analysis also indicated that some improvements beyond those currently programmed may be necessary to provide the level of service needed to meet probable future aviation demand. Importantly, General Mitchell International Airport may be expected to operate well over the 60 percent of annual service volume threshold set by the FAA. It is at this level that the FAA recommends that airport owners begin considering capacity improvements. A review of the hourly capacity at Mitchell International also indicated that, by the plan design year, aircraft operations at Mitchell International may be incurring significant delays. By the plan design year, Waukesha County-Crites Field may also be operating at or near 60 percent of ASV. A need was identified to pursue primary runway extensions at up to five airports: Burlington Municipal Airport, East Troy Municipal, Kenosha Regional, West Bend Municipal, and Hartford Municipal Airports.

Thus, as part of this regional airport system plan update effort, there is a need to examine the provision of alternative airport improvements that would mitigate the airport system deficiencies identified in this chapter. Accordingly, alternatives to the identified deficiencies are to be considered in the next chapter of this report.

Chapter IX

DESIGN AND EVALUATION OF ALTERNATIVE AIRPORT SYSTEM IMPROVEMENTS

INTRODUCTION

The purpose of this chapter is to identify and evaluate alternative regional airport system improvements intended to abate the existing and probable future regional airport system deficiencies identified in Chapter VIII. Three types of airport system deficiencies were identified: airfield capacity, primary runway length, and accessibility. Capacity deficiencies are related to the ability of airports in the regional system to accommodate the existing and forecast future volumes of aircraft operations. Primary runway length deficiencies are related to the ability of airports to accommodate the existing and forecast future types of aircraft that will be larger and of higher performance than the existing aircraft. Accessibility deficiencies are related to the areas of the Region being appropriately served by airports of the appropriate classifications.

With respect to airfield capacity, the deficiency analyses indicated that only 10 of the existing 23 public-use airports were essential and needed to be retained in operation to provide sufficient airfield capacity to satisfy the existing and probable future year 2010 aviation demand. The 10 essential airports included all eight of the publicly owned airports within the Region and two of the privately owned public-use airports in the Region, namely: Batten Airport and Capitol Airport. The deficiency analyses indicated that, in order for the Regional airport system to meet the forecast year 2010 levels of demand, all 10 of these airports would be required to remain open. The only airfield capacity deficiency that was identified was at General Mitchell International Airport under the forecast year 2010 conditions. Primary runway length deficiencies under the forecast year 2010 demand conditions were identified at five airports: Burlington Municipal Airport, East Troy Municipal Airport, Hartford Municipal Airport, Kenosha Regional Airport, and West Bend Municipal Airport.

With respect to accessibility deficiencies, most of the Region was found to be adequately served by the basic system of 10 public-use airports, all of which were in operation in 1994. This conclusion was based upon acceptable ground travel times to airports in each classification. Some areas of the Region met the travel time standards only if selected airports located in counties adjacent to the Region were also considered. Also, some areas of the Region were found to be approaching the maximum travel time limits for certain classifications of airports. Specifically, a portion of Walworth County, including the communities of Lake Geneva and Williams Bay, and portions of Washington and Ozaukee Counties, including the communities of West Bend and Cedarburg, were found to approach the forty-five-minute travel time standard for access to Transport-Corporate airports. In addition, a portion of Walworth County, including the communities of Delavan, Williams Bay, Walworth, and Lake Geneva, was found to approach the maximum 30-minute travel time standard for General Utility and Basic Utility airports.

The remainder of this chapter is divided into five sections. The first section presents and evaluates alternatives intended to address the identified airfield capacity deficiencies. The second section presents and evaluates alternatives intended to address the identified primary runway length deficiencies. The third addresses the identified airport accessibility deficiencies. The fourth section identifies a reliever airport system for Southeastern Wisconsin. The fifth provides a summary of the findings of the plan design and evaluation process.

IDENTIFICATION AND EVALUATION OF AIRFIELD CAPACITY ALTERNATIVES

The deficiency analysis presented in Chapter VIII indicated that only 10 of the 23 existing public-use airports were required to meet the existing and forecast future aviation demand within the Region. The only major capacity deficiency was expected to occur at General Mitchell International Airport under forecast year 2010 demand conditions.

The deficiency analyses concluded that General Mitchell International Airport may be expected to operate at about 90 percent of its annual service volume (ASV) by the year 2010, well above the

60 percent threshold set by the Federal Aviation Administration (FAA), at which threshold consideration of capacity improvements should be initiated. Also, by the plan design year of 2010, the existing 1994 hourly airfield capacity of 56 operations per hour may be expected to be exceeded under instrument flight rule (IFR) conditions. This deficiency may cause aircraft operations at Mitchell International to incur significant delays. Accordingly, alternative improvements that would address this airfield capacity deficiency at General Mitchell International Airport were identified and evaluated. It is important to note that the identified capacity deficiency is based upon forecasts that general aviation activity at Mitchell International will continue to decrease, from 117 based aircraft and about 77,000 operations in 1993, to 69 based aircraft and about 63,000 operations by 2010, in part because of increases in air carrier activity.

As discussed in Chapter II of this planning report, the Milwaukee County Board of Supervisors, in September 1993, adopted a new airport master plan for General Mitchell International Airport. The new master plan is intended to identify needed improvements at the airport and to provide for the orderly and timely implementation of these improvements as required by demand. The recommended airfield improvements represent a major portion of the master plan recommendations. The airport master planning effort was focused on the analyses of the airfield's ability to handle both the existing and forecast levels of aircraft operations under both good weather conditions, or visual flight rules (VFR), and under poor visibility conditions, or IFR. An important finding of these analyses was that the Mitchell International airfield capacity was adequate under VFR conditions. However, under IFR conditions, airfield capacity may be expected to be exceeded in the future. Delays in operations would begin to become significant when operations reach about 230,000 operations per year.

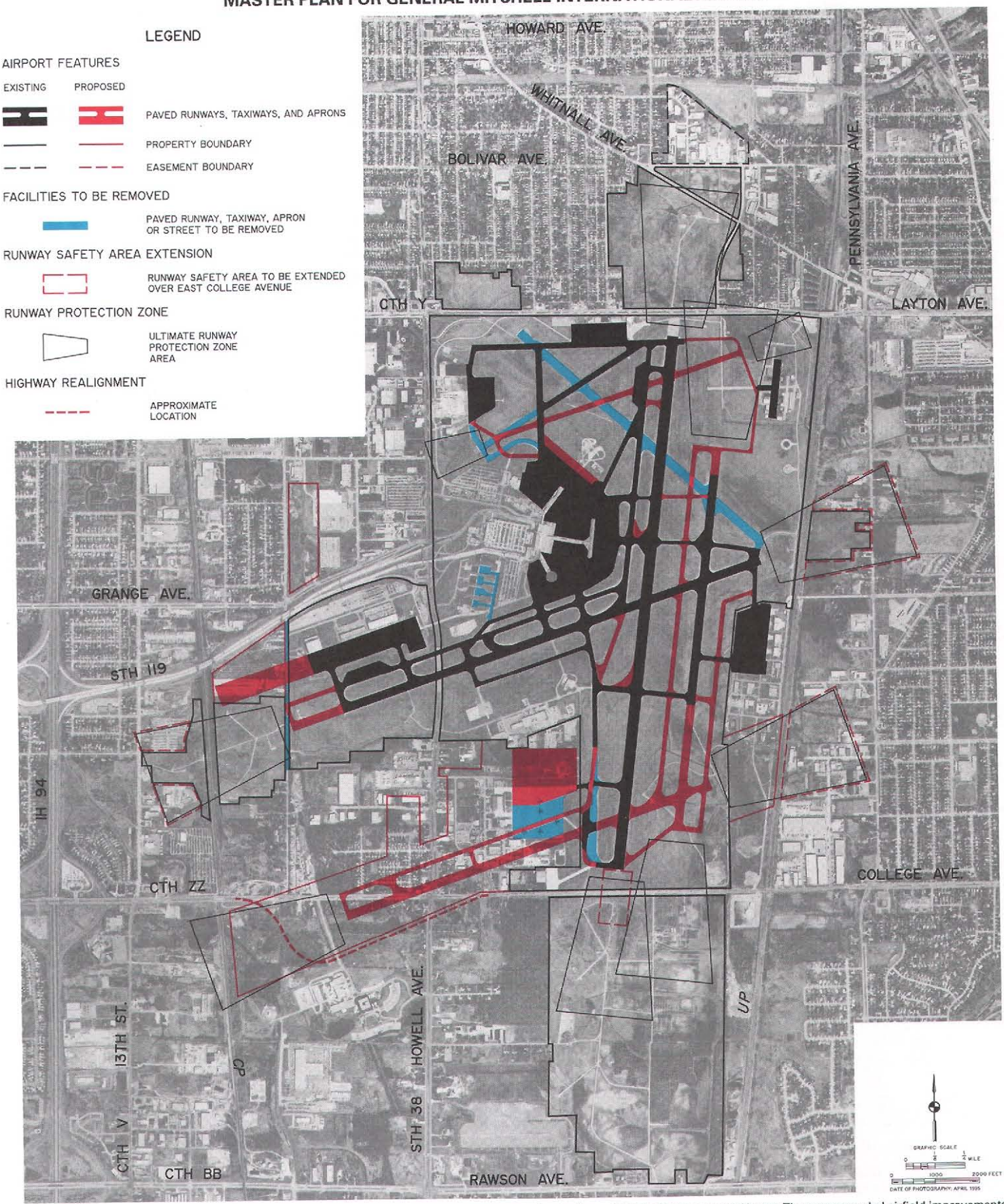
To address this deficiency, the new master plan identified and evaluated a range of improvements designed to increase airfield capacity. A total of nine specific airfield improvement alternatives were examined. Detailed descriptions of each of these alternatives are contained in Chapter VI, "Development Alternatives," of the airport master plan report. On the basis of an evaluation of the operating characteristics associated with each of the alternatives, necessary land acquisition, social and environmental impacts, and construction costs, a recommended alternative was chosen for eventual implementation.

A conceptual layout of the recommended airport master plan is shown on Map 30. The primary feature of the recommended plan is the construction of a new 7,000-foot-long runway located 3,540 feet south of, and parallel to, the primary east-west runway, 7R/25L. The recommended airfield improvements under the airport master plan update were divided into short-term improvements and long-term improvements. Short-term improvements included the long-recommended extension of runway 7R/25L by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of runway 1R/19L by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway safety overrun for the south end of runway 1L/19R; the realignment and extension of runway 7L/25R by about 1,600 feet, to a length of 4,800 feet, parallel to the existing primary east-west runway; construction of new taxiways and taxiway exits; and the decommissioning of runway 13/31. The long-term improvements consisted of the construction of the new 7,000- foot primary runway parallel to runway 7R/25L with a parallel taxiway and appropriate connecting taxiways. Unlike the recommended short-term improvements, the development of the new parallel runway will require the acquisition of land beyond the present airport boundaries, relocation of some military facilities now located on the airport, and relocation of some existing residences near the existing southwest boundary of the airport.

The new master plan for Mitchell International also included recommendations for passenger terminal improvements, air cargo facility improvements, and access and parking improvements. In addition, the master plan recommended that Milwaukee County adopt and implement a homeowner's protection program to protect the investment of homeowners and businesses in the vicinity of Mitchell International. Land needed for the construction of a new parallel air carrier runway and attendant runway protection zones is to be acquired under a program which permits property owners who so choose to remain until the area concerned is needed for construction. Upon acquisition, appraisals of the property would be based upon comparable property values in nonairport-impacted areas. For land which is not required for actual construction, but which may be impacted by aircraft noise, assistance would include a property value guarantee program, a sound insulation program, and the purchase of easements.

Map 30

RECOMMENDED AIRFIELD IMPROVEMENTS IN NEW AIRPORT MASTER PLAN FOR GENERAL MITCHELL INTERNATIONAL AIRPORT



In September 1993, the Milwaukee County Board of Supervisors adopted a new airport master plan for General Mitchell International Airport. The recommended airfield improvements under the airport master plan update were divided into short-term improvements and long-term improvements. Short-term improvements included the long-recommended extension of runway 7R/25L by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of runway 1R/19L by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway safety overrun for the south end of runway 1L/19R; the realignment and extension of runway 7L/25R by about 1,600 feet, to a length of 4,800 feet, parallel to the existing primary east-west runway; construction of new taxiways and taxiway exits; and the decommissioning of runway 13/31. The long-term improvements include the construction of a new 7,000-foot-long primary runway located 3,540 feet south of, and parallel to, the primary east-west runway, 7R/25L, together with a parallel taxiway and appropriate connecting taxiways.

Source: SEWRPC.

Projects proposed in the master plan are to be implemented only when required because of actual demand, upon approval by the Milwaukee County Board, upon completion of appropriate environmental assessment, and upon the appropriation of necessary funding.

The airfield capacity improvements recommended in the new master plan for Mitchell International are all consistent with specific recommendations contained in the first- and second-generation regional airport system plans.

The airfield capacity improvements recommended under the new Mitchell International master plan would provide the airfield capacity needed to address the identified future regional airport system capacity deficiencies. The recommended improvements, particularly, the realignment and extension to 4,800 feet of runway 7L/25R, and the construction of a new 7,000-foot-long primary runway, would increase the airfield ASV at Mitchell International from 260,000 operations per year to 455,000 operations per year, the hourly capacity under VFR conditions from 121 operations per hour to 184 per hour, and the IFR hourly capacity from 56 operations per hour to 111 operations per hour. These increases in the ASVs and hourly capacities under both VFR and IFR conditions would permit the forecast future demand at Mitchell International to be accommodated safely, efficiently, and without excessive delays through the design year 2010. Furthermore, the detailed evaluation of alternatives conducted during the preparation of the new airport master plan concluded that the recommended plan provided the needed airfield capacity with the least disruption of development adjacent to the airport. The regional airport system planning effort reaffirmed the improvements recommended in the new General Mitchell International Airport master plan.

IDENTIFICATION AND EVALUATION OF PRIMARY RUNWAY IMPROVEMENT ALTERNATIVES

Five airports were identified in Chapter VIII as having inadequate primary runway length to accommodate existing and forecast aviation activity. An appropriate set of alternatives was considered to address the deficiencies identified at each airport. An evaluation of the alternatives which focused on key differences among the alternatives was then made for each airport. The evaluation included a limited environmental assessment, which identified probable impacts on primary and secondary environmental corridors, wetlands, prime agricultural lands, and lands developed for residential, commercial, or agricultural uses. It was recognized that other factors, such as noise impacts, are also important, but are more appropriately addressed during the facilities planning stage for individual airports. Noise contours were, however, developed on the basis of recommended improvements for each airport in order to estimate areas of acceptable and unacceptable noise levels for specific land uses in the vicinity of the airports comprising the recommended regional system. These are presented as part of the recommended regional airport system plan in the next chapter of this planning report.

Burlington Municipal Airport

With respect to the Burlington Municipal Airport, the deficiency analysis found that the existing 3,600-foot primary runway length was less than desirable to accommodate both the existing and forecast critical aircraft group expected to regularly use the airport by the plan design year of 2010. The existing 3,600-foot-long primary runway is intended to accommodate small aircraft under 12,500 pounds in gross weight with an airport reference code of A-I, which includes most single-engine and some twin-engine piston aircraft.

On the basis of the forecast use of the Burlington Airport by larger aircraft used by businesses and industries in the Burlington area, a primary runway length of at least 3,900 feet is warranted. A primary runway of this length would enable aircraft with an airport reference code of A-I, A-II, and B-I to be accommodated. These airport reference codes include most single- and twin-engine piston and some turboprop general aviation aircraft. The largest of these aircraft, with an airport reference code of B-I, include twin-engine turboprop aircraft.

The City of Burlington has indicated a potential need for a primary runway at least 4,600 feet in length. Available data indicate a total of 575 operations in 1992 by aircraft with an airport reference code of B-I, which would warrant a runway length of 4,250 feet under typical loading conditions. The City of Burlington further anticipates at least 500 operations per year by small business jets with an airport reference code of B-II. Normally, the critical aircraft group that includes such small business jets would require a minimum primary runway length of 4,800 feet.

Two alternatives, based upon the analysis conducted under the regional system planning effort, were considered to address the identified primary runway

deficiency at Burlington Municipal Airport, as shown in Maps 31 and 32. The first alternative would maintain the existing primary runway length of 3,600 feet. To comply with FAA standards and guidelines, this alternative would also include completion and paving of the existing turf crosswind runway and parallel taxiway to a length of 2,900 feet.

The second alternative would include a 1,200-foot-long extension of the primary runway to a total length of 4,800 feet. To comply with FAA standards and guidelines, this alternative also includes the completion and paving of the existing turf crosswind runway and parallel taxiway to a length of 3,900 feet. Extension of the primary runway to this length would result in the airport being classified as a Transport-Corporate airport. This would be appropriate, given the ability of the airport to be able to accommodate business jets. Because Transport-Corporate airports are intended to handle high-performance aircraft, such as business jets, under all weather conditions, this alternative would also require the installation of a full instrument landing system.

Alternatives which would include a new primary runway alignment or relocation of the airport were considered, but were dismissed since there is sufficient undeveloped land surrounding the existing airport site for the extension of the principal and secondary runways and since the analyses indicated no compelling reasons to alter the airfield configuration or to relocate the airport.

A comparative evaluation of the two alternatives considered is presented in Table 103. The alternatives were evaluated in regard to the impact on aviation demand, construction costs, land requirements, environmental impact, and the probability of implementation. The key differences between the two alternatives were found to be the inability of Alternative 1, retaining the existing 3,600 primary runway length, to accommodate larger piston twin-engine and business jet aircraft and the higher development costs and land requirements of Alternative 2, extension of the primary runway to 4,800 feet.

If Alternative 1 were selected, from 500 to 600 business aircraft operations would need to use another airport in the Region, the most likely one being Kenosha Regional Airport located about 22 miles and about 35 minutes' highway travel time away from the Burlington Municipal Airport. If Alternative 2 was selected, the same business aircraft operations could be accommodated at Burlington Municipal Airport. In addition, this alternative would improve the accessibility of business aviation users of turboprop aircraft and the smaller business jets to an appropriate category of airport not only in the Burlington area, but also in the communities of Elkhorn, Lake Geneva, and Williams Bay. Alternative 2 would require the acquisition of 160 additional acres of land in fee simple, the acquisition of easements over an additional 36 acres of land, and $2.1 million more in construction costs than Alternative 1. The additional land and capital costs attendant to Alternative 2 are largely the result of the larger safety areas required for a runway with an instrument landing system.

It was concluded by the Advisory Committee that Alternative 2, extension of the primary runway to a length of 4,800 feet, should be included in the new regional system plan with respect to the development of the Burlington Municipal Airport. This alternative would best serve the future aviation demand in this portion of the Region by providing an appropriately sized facility for private and business users of larger general aviation aircraft in western Racine County and much of central Walworth County. It was noted that the improvements required to upgrade Burlington Municipal Airport to a Transport-Corporate facility would not have to be implemented all at once, but could be staged. Also, a significant portion of the development costs entailed would be required for the extension of the crosswind runway to meet FAA standards; this would be required under any alternative.

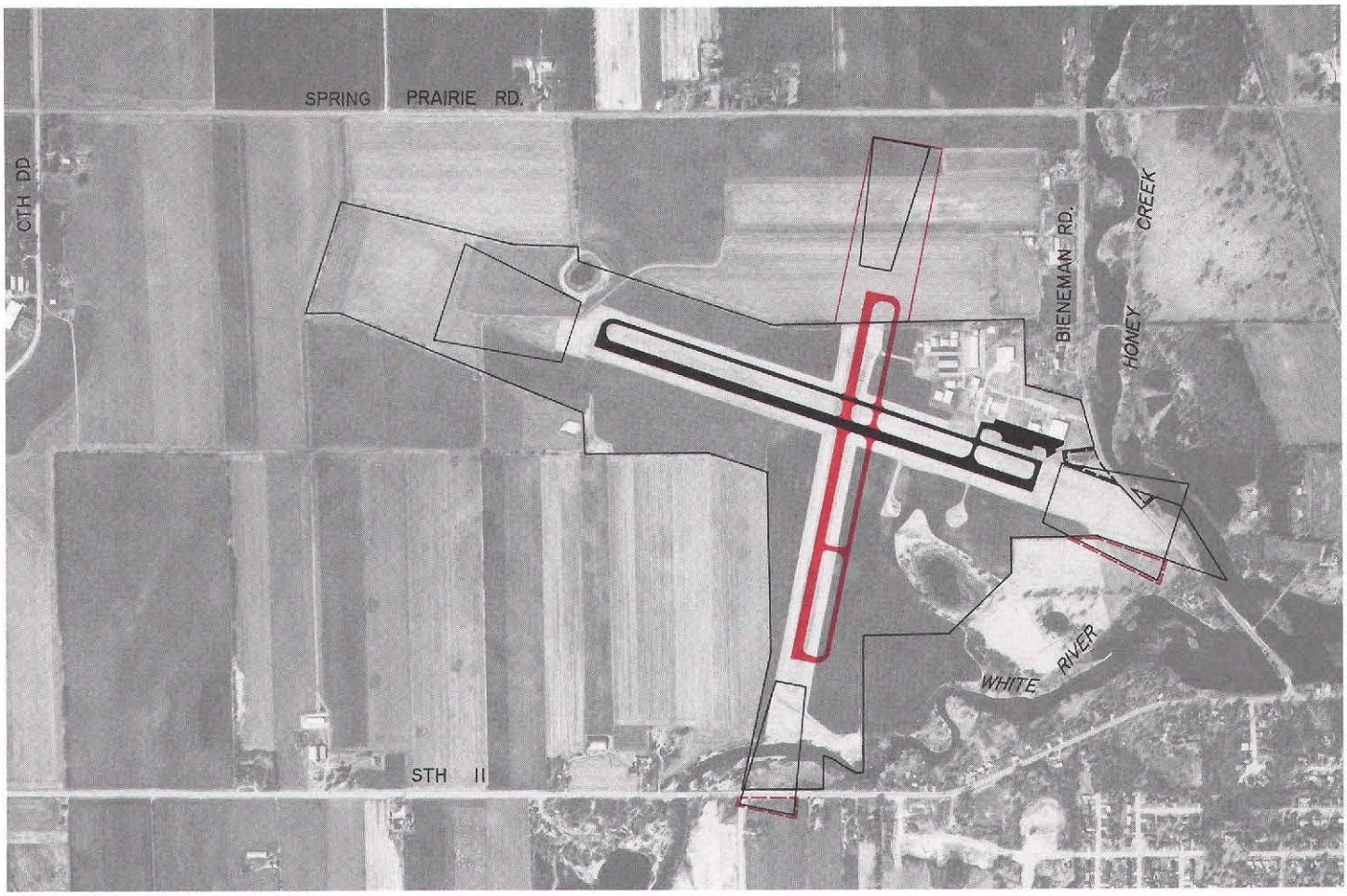
East Troy Municipal Airport

In the case of the East Troy Municipal Airport, the deficiency analysis found that the existing 3,900-foot-long primary runway was of sufficient length to accommodate the existing 1994 demand, but was less than desirable to accommodate the forecast critical aircraft group expected to use the airport regularly by the plan design year of 2010. The existing 3,900-foot-long primary runway is intended to accommodate small aircraft of under 12,500 pounds in gross weight with airport reference codes of A-I, A-II, and B-I, which include most single-engine and twin-engine piston aircraft and some turboprop general aviation aircraft.

The desirable primary runway length under forecast future demand conditions was determined to be 4,400 feet, considering the forecasts prepared under the regional airport system planning effort.

Map 31

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 1 FOR BURLINGTON MUNICIPAL AIRPORT

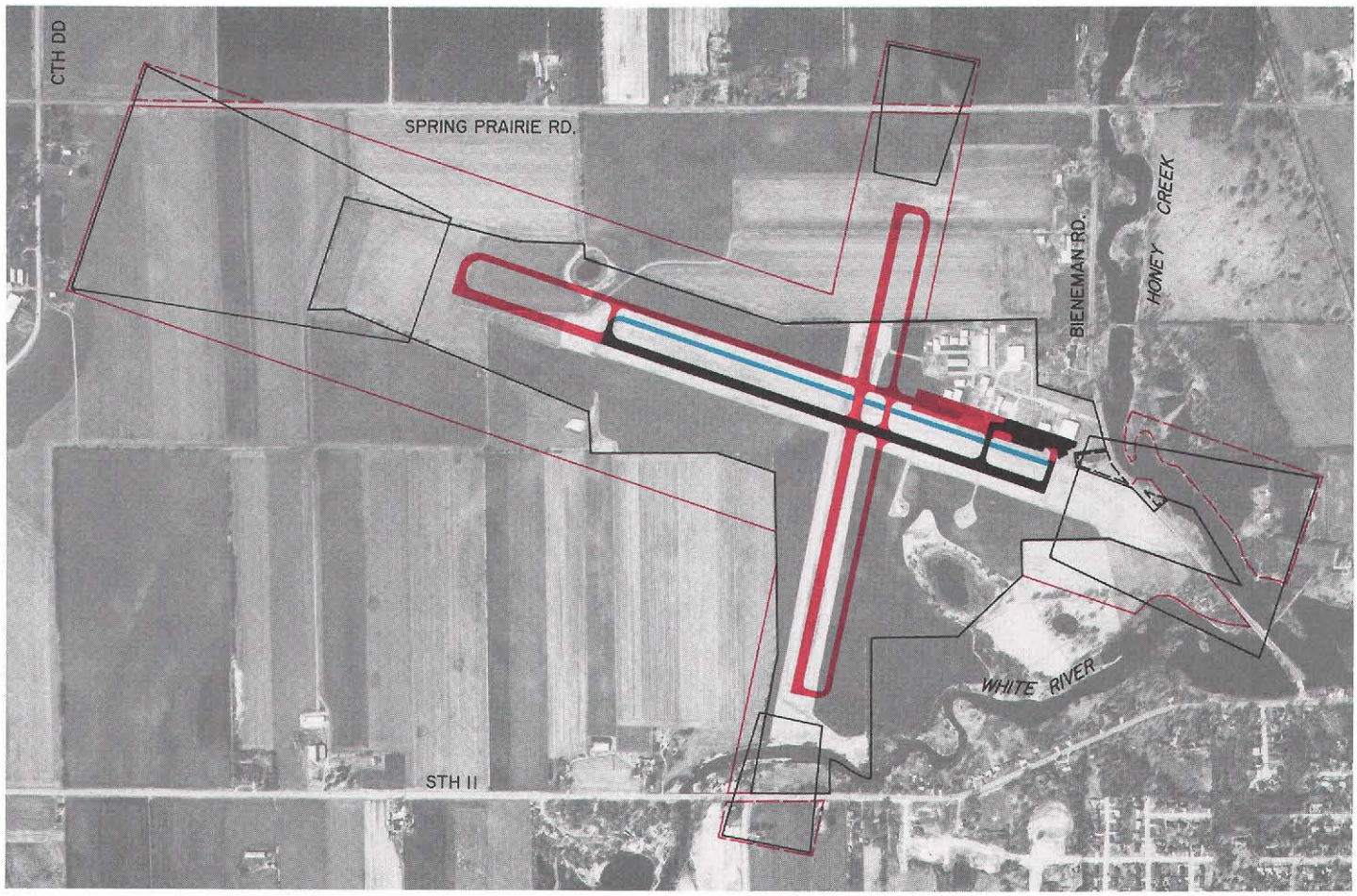


Source: SEWRPC.

A primary runway of this length would enable all small aircraft of under 12,500 pounds gross weight with an airport reference code of A-I, A-II, B-I, B-II, or C-II to be accommodated. These airport reference codes include virtually all single- and twin-engine piston and turboprop general aviation aircraft. The largest of these aircraft, with an airport reference code of B-II, includes twin-engine turboprop aircraft. The activity generated by the larger general aviation aircraft at East Troy Municipal Airport may be expected to be the result of greater use of the airport by businesses and industries in Walworth County and result in some based aircraft and operations moving away from busier airports within the Region, including General Mitchell International Airport. Thus,

Map 32

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 2 FOR BURLINGTON MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING PROPOSED

PAVED RUNWAYS, TAXIWAYS, AND APRONS

PROPERTY BOUNDARY

EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

FACILITY TO BE REMOVED

PAVED TAXIWAY TO BE REMOVED

GRAPHIC SCALE

0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

East Troy Municipal Airport may be expected to continue and increase in providing relief to Mitchell International.

Two alternatives, based upon the analysis conducted under the regional system planning effort, were considered to address the identified primary runway deficiency at East Troy Municipal Airport, as shown on Maps 33 and 34. The first alternative would maintain the existing primary runway length of 3,900 feet. To comply with FAA standards and guidelines, this alternative would normally include the completion and paving of the existing turf crosswind runway and parallel taxiway to a length of 3,200 feet.

The second alternative would include a 500-foot-long extension of the primary runway to a total

Table 103

EVALUATION OF ALTERNATIVE PRIMARY RUNWAY LENGTHS AT BURLINGTON MUNICIPAL AIRPORT

Key Consideration	Alternative 1: Existing 3,600-Foot Primary Runway	Alternative 2: Extend Primary Runway to 4,800 Feet
Impact on Aviation Demand	Capable of handling only single-engine and some twin-engine piston aircraft. Many types of multi-engine and business jet aircraft would have to use another airport, the nearest of which is located 35 minutes' highway travel time away	Capable of handling all single-engine and most multi-engine piston and some business jet aircraft
Construction Cost[a]	$940,000	$3,040,000[b]
Land Requirements	Acquisition of 20 acres of prime agricultural land in fee simple for extension of cross-wind runway Acquisition of runway protection zone easements over three acres of other agricultural land	Acquisition of 180 acres of land in fee simple, of which 157 acres are prime agricultural, 18 acres are other agricultural, three acres are primary environmental corridor, and two acres are residential, for the extension of the primary and crosswind runways Two residences and one group of farm buildings to be acquired or relocated Acquisition of runway protection zone easements over 39 acres of land, of which 14 acres are prime agricultural, 14 acres are primary environmental corridor, and four acres are other agricultural
Environmental Impact	No primary or secondary environmental corridors or isolated natural areas to be disturbed No wetland areas to be disturbed	No secondary environmental corridors or isolated natural areas to be disturbed About two acres of primary environmental corridor along the White River to be acquired but not disturbed for protecting the runway safety area for Runway 01. Another one acre of wetland will be acquired, but not disturbed
Probability of Implementation	High. Land acquisition required only for extension of crosswind runway. No home or business relocation necessary	Medium. Significant land acquisition is required for the extension of the primary and crosswind runways, with acquisition or relocation of two residences and one farm necessary

[a]Construction costs were estimated only for items required for a comparison of the airfield improvements included under each alternative and do not include the cost of terminal, hangar, airfield lighting, and other improvements that would be common to any alternative.

[b]Includes installation of full instrument landing system.

Source: SEWRPC.

length of 4,400 feet. To comply with Federal standards and guidelines, this alternative would normally include the completion and paving of the existing turf crosswind runway and parallel taxiway to a length of 3,600 feet.

Alternatives which include a primary runway realignment or relocation were considered, but were dismissed because there is sufficient undeveloped land surrounding the existing airport site for possible extension of the primary runway and because such alternatives had been recently considered under the environmental assessment conducted prior to the construction in 1988 of the now existing 3,900-foot-long primary runway.

The approved airport layout plan for the East Troy Municipal Airport includes a paved crosswind runway and taxiway with a length of 2,380 feet. This is shorter than the recommended crosswind runway length under either of the two alternatives considered under the system planning effort. This

Table 104

EVALUATION OF ALTERNATIVE PRIMARY RUNWAY LENGTHS AT EAST TROY MUNICIPAL AIRPORT

Key Consideration	Alternative 1: Existing 3,900-Foot Primary Runway	Alternative 2: Extend Primary Runway to 4,400 Feet
Impact on Aviation Demand	Capable of handling only single-engine and twin-engine piston and some turboprop aircraft. Larger turboprop aircraft used for business purposes would have to use another airport, the nearest of which is located 35 minutes' highway travel time away	Capable of handling all single-engine and multi-engine piston, and turboprop aircraft, and therefore most non-jet business aircraft
Construction Cost[a]	$700,000	$880,000
Land Requirements	All land and easements already owned by Village	All land and easements already owned by Village
Environmental Impact	No primary or secondary environmental corridors or isolated natural areas to be disturbed No wetland areas to be disturbed	No secondary environmental corridors or isolated natural areas to be disturbed. Some trees on 12 acres of primary environmental corridor for which an easement has already been acquired may need to be trimmed or cleared to prevent obstructions from penetrating Runway 26 approach surface No wetland areas to be disturbed
Probability of Implementation	High. No land acquisition required and no home or business relocation necessary	High. No land acquisition required and no home or business relocation necessary

[a]*Construction costs were estimated only for items required for a comparison of the airfield improvements included under each alternative and do not include the cost of terminal, hangar, navigational aids, and other improvements that would be common to any alternative.*

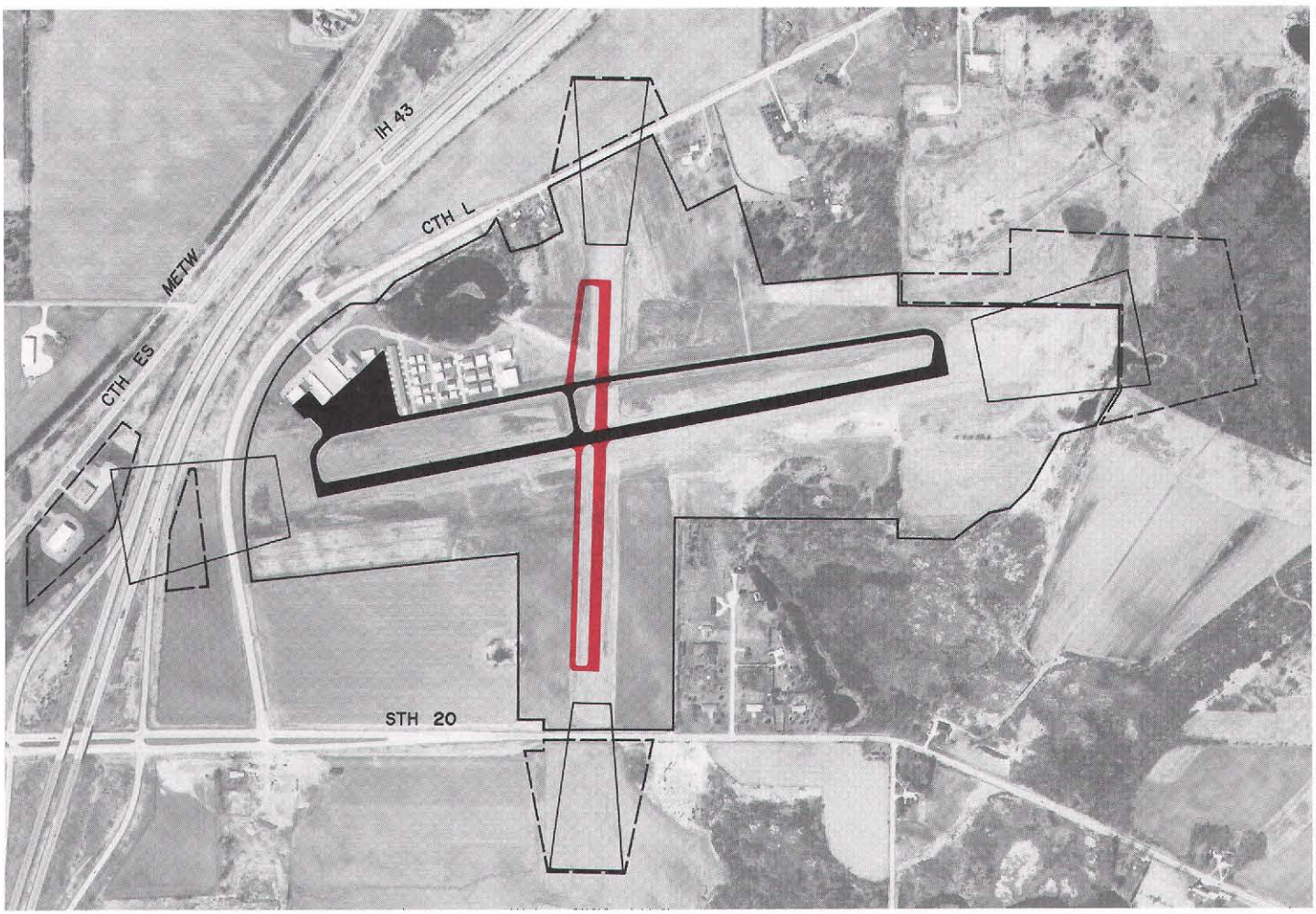
Source: SEWRPC.

shorter crosswind runway length was included in the airport layout plan because it was the longest that could be constructed on the existing site without relocating STH 20, running along the south side of the airport, or CTH L along the north side of the airport. Because of the cost and disruption involved in relocating either highway, it was concluded that a crosswind runway length of 2,380 feet, as proposed on the airport layout plan, should be the maximum length considered under both alternatives herein identified. Although this length of crosswind runway does not meet Federal standards, it would be adequate for use by a wide variety of small single- and twin-engine piston aircraft with an airport reference code of A-I.

A comparison of the two alternatives considered is presented in Table 104. The alternatives were evaluated with respect to the impact on aviation demand, construction costs, land requirements, environmental impact, and the probability of implementation. The key differences between the two alternatives were found to be the inability of Alternative 1, retaining the existing 3,900-foot primary runway, to accommodate the full range of aircraft anticipated to use the airport in the future, and the higher construction cost of Alternative 2, extension of the primary runway to 4,400 feet. If Alternative 1 were adopted, from 3,000 to 4,000 business aircraft operations would have to use another airport in the Region and from two to three twin-engine turboprop aircraft would have to be based at another airport in the Region. The most likely airport to which this activity would be relocated is Waukesha County-Crites Field, about 21 miles and about 35 minutes' highway travel time distant from the East Troy Municipal Airport. Another possible airport to which this activity might be relocated is the Burlington Municipal Airport, if the primary runway of that airport were extended to a length of 4,800 feet as proposed herein. Burlington Municipal Airport is located about 13 miles and about 20 minutes' highway travel time from the East Troy Municipal Airport. Alternative 2 requires

Map 33

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 1 FOR EAST TROY MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRON
	(NONE)	PROPERTY BOUNDARY
	(NONE)	EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

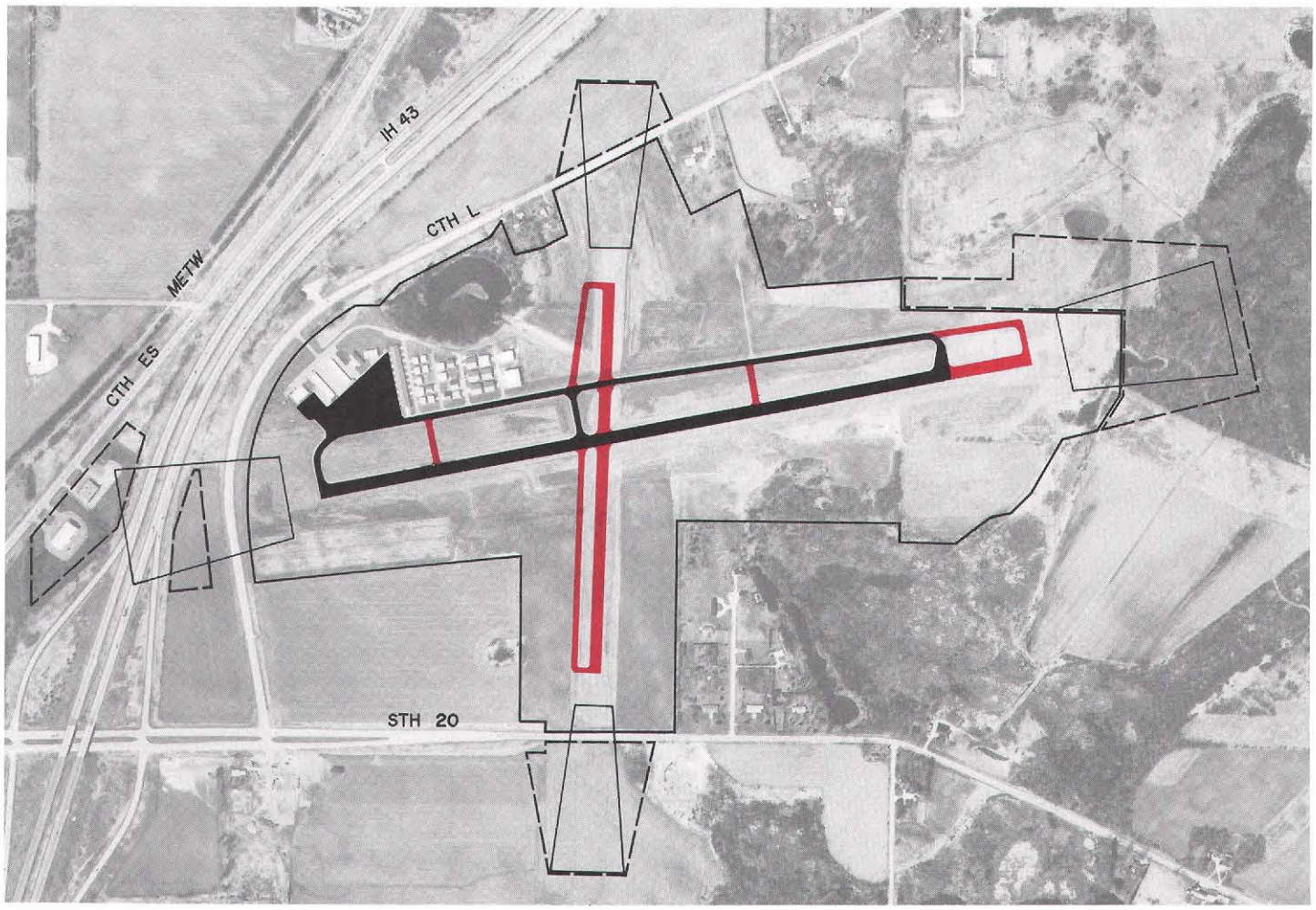
Source: SEWRPC.

an additional $180,000 in construction costs as compared with Alternative 1. In addition, some trees on about 12 acres of wooded primary environmental corridor located adjacent to the airport may need to be trimmed or cleared so as to not constitute obstructions for approaching aircraft.

It was concluded by the Advisory Committee that Alternative 2, extension of the primary runway to a length of 4,400 feet, should be included in the new regional airport system plan with respect to the development of the East Troy Municipal Airport. It was noted that development of a paved crosswind

Map 34

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 2 FOR EAST TROY MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRON
	(NONE)	PROPERTY BOUNDARY
	(NONE)	EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

runway and taxiway would be limited to a length 2,380 feet. It was also noted that much of the development costs were required by the construction of the crosswind runway and parallel taxiway: they would be required under any alternative.

Hartford Municipal Airport

With respect to the Hartford Municipal Airport, the deficiency analysis found that the existing 3,000-foot primary runway length was less than desirable to accommodate both the existing and

forecast critical aircraft group expected to use the airport regularly by the plan design year of 2010. The existing 3,000-foot-long primary runway is intended to accommodate small aircraft of under 12,500 pounds gross weight with an airport reference code of A-I, which includes most single-engine and some twin-engine piston aircraft.

On the basis of the forecasts prepared under the regional airport system planning effort, the desirable primary runway length was determined to be 3,900 feet. A primary runway of this length would enable all small aircraft of under 12,500 pounds gross weight with an airport reference code of A-I, A-II, and B-I to be accommodated. These airport reference codes include almost all single- and multi-engine piston and many of the turboprop general aviation aircraft. Aircraft with an airport reference code of B-I include twin-engine piston aircraft and twin-engine turboprop aircraft. The activity generated by the larger general aviation aircraft at Hartford Municipal Airport may be expected to be the result of greater use of the airport by businesses and industries in the Hartford area.

As noted in Chapter II of this report, in 1993 the City completed a revision of the airport layout plan for Hartford Municipal Airport, resulting in a significantly different proposed airfield configuration than had been recommended in the previous airport layout plan and in the second-generation regional airport system plan. The previous airport layout plan and regional airport system plan recommended the construction of a new 4,400-foot-long primary runway and taxiway on a new northeast-southwest alignment and the extension of the existing 3,000-foot-long northwest-southeast runway and taxiway to 3,500 feet for use as the crosswind runway. The new airport layout plan recommends construction of a new 4,900-foot primary runway on a new north-south alignment as well as the extension of the existing 3,000-foot-long-foot primary runway to 3,900 feet use as the crosswind runway.

The inclusion of a 4,900-foot-long primary runway in the new airport layout plan was predicated on the more optimistic of two forecast scenarios prepared under an airport needs study conducted for the City of Hartford.[1] In this needs study, a "normal growth" forecast assumed that future activity levels at the airport would reflect State and National trends. Under this "normal growth" forecast, the critical aircraft group was determined to be comprised of business aircraft with an airport reference code of B-I, requiring a primary runway length of 3,900 feet. The "greater than normal growth" forecast, prepared under the same needs study, assumed the relocation of based aircraft from the Milwaukee metropolitan area to Hartford Municipal Airport; increased use of the airport by high- performance business aircraft; increased use of the airport by Quad/Graphics Inc., a major printing firm; and the basing of some of the Quad/Graphics business aircraft fleet at Hartford. Under this "greater than normal growth" forecast, the critical aircraft group was determined to be business jet aircraft with an airport reference code of B-II, requiring a primary runway length of 4,900 feet. It should be noted that the Quad/Graphic Hartford plant is one of four company plants in Wisconsin; the others are located at Sussex and Duplainville, both near Waukesha County Crites-Field, and at Lomira, near the Fond du Lac County Airport.

On the basis of the deficiency analyses conducted under the regional system planning effort and upon review of the new airport layout plan adopted by the City of Hartford, three alternatives were initially considered by the Study Advisory Committee. These alternatives were a "no-build" alternative, an alternative which would extend the existing primary runway to 3,900 feet with a runway configuration similar to that used in historic City of Hartford airport master plans and regional airport system plans, and an alternative which would construct a new 4,900-foot primary runway on a north-south alignment, as proposed in the City's current master plan.

In response to concerns about the conformance between the local and regional plans, expressed by the City of Hartford through the Study Advisory Committee, an intergovernmental meeting was held on October 11, 1995, to discuss improvement alternatives for the Hartford Municipal Airport. Additional improvement alternatives were developed and evaluated as a result of this meeting. These alternatives were intended, not only to accommodate a 3,900-foot-long primary runway as envisioned under both the regional airport system plan forecast and the City master plan "normal-growth" forecast, but also to allow for the possible extension of the primary runway to 4,900

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[1]*See Michael C. Rose and Associates, Inc., Forecast of Aviation Demand and Critical Aircraft: Hartford Municipal Airport, Palatine, Illinois, October 1989.*

feet. In addition, the City of Hartford specifically requested that an additional alternative be examined which would presume the closing of the Hartford Municipal Airport.

The alternative proposing the closing of Hartford Municipal Airport and removal of the airport from the regional airport system plan may be expected to have implications for costs and levels of service. With respect to costs, closing of the airport may be expected to result in some cost reductions and revenue increases for the City; it would also result, however, in some additional costs. Cost reductions would include elimination of capital improvement and annual operating cost subsidies. Potential revenues would result from the sale and redevelopment of the airport lands for urban uses.

The annual operating cost of the airport, estimated to average about $47,000, is partially funded by user charges, including fuel-flowage fees, hangar leases and rentals, and other space rentals. Any shortfall in annual revenues earned from these sources must be offset by funds provided by the City from general property- tax revenues. From 1990 through 1994, the amount of the annual City subsidy of airport operating costs approximated $34,000. The City of Hartford has also contributed the local share of capital expenditures for airport improvements. The annual local cost of such improvements has ranged from no expenditure to about $60,000 annually from 1990 through 1994, with an average annual expenditure of about $16,000.

There is also a potential for the City to realize revenue from the lease or sale of lands currently occupied by the airport. Portions of the existing airport have been graded for the airfield and terminal; the entire 195-acre site may have potential for redevelopment as a commercial or industrial park. The sale value of the airport land may be expected to approximate $600,000, representing an annual revenue to the year 2010 of about $40,000.

Possible costs to the City related to airport closing would include repayment of Federal funds invested in the airport. The FAA has indicated that the City of Hartford would be responsible for repayment of Federal funds received under the Federal Airport Development Program. Normally, when such funds are received by airport owners such as the City of Hartford, the owner must agree to maintain the airport in a safe, usable condition and open to the public for 20 years from the date of the agreement. The City has received one Federal grant for capital improvements during the past 20 years, consisting of $538,000 received in 1988 primarily for runway taxiway and apron reconstruction and the purchase of easements. The City would be required to repay this amount if it were to close the airport before 2009, when its obligation to maintain the improvements covered under the 1988 grant expires. Should the City determine to close the airport, the amount to be reimbursed by the City to the Federal government would be an estimated $36,000 annually to the year 2010. The City received one other federal grant for the airport in the amount of $90,000 for the purchase of land and airfield improvements for the airport in 1958. The City's obligation to reimburse the Federal government for land acquisition does not end 20 years after the grant, but continues indefinitely. If the land is converted to other than airport purposes, the City would be required to repay 50 percent of the fair market value of the land. If the land was sold for $600,000, $300,000 would have to be repaid to the Federal Government, or the equivalent of about $20,000 annually to the year 2010.

Another cost to the City of Hartford airport upon closing would probably be the loss to the City of $22,000 in City property-tax revenue generated by privately owned hangars at the airport. While it may be argued that this property-tax revenue loss may be offset by the property-tax revenue generated by a commercial or industrial park developed on the airport site, there is other vacant land in the vicinity of the airport, as well as an existing City industrial park, which could accommodate such a development; the conversion of the airport to such use does not represent a unique opportunity to obtain such revenue.

Another debit for the City would be the cost of terminating long-term leases of airport land to private companies to build hangars. Assuming an estimated value of those hangars of $2,000,000 and assuming that the City may be liable for one-half of their value on the basis of the terms and remaining life of the leases, the cost to the City may be estimated to be $67,000 annually to the year 2010.

A comparison of the additional costs to the City attendant to the airport closing with the additional revenues and cost reductions is presented in Table 105. It should be noted that these annualized costs are presented in a simplified format, which does not include the time value of money. In

Table 105

ANNUALIZED COST IMPLICATIONS TO THE CITY OF HARTFORD OF CLOSING HARTFORD MUNICIPAL AIRPORT: 1996-2010

Results if Airport is Closed	New Expenses Reduced or Revenues Reduced	Cost Savings or New Revenues
Elimination of Annual Operating Cost Subsidy	--	$34,000
Elimination of Capital Cost Subsidy	--	16,000
Sale of Airport Lands	--	40,000
Repayment of 1958 FAA grant	$ 20,000	--
Repayment of 1988 FAA grant	36,000	--
Loss of Hanger Property Tax Revenue	22,000	--
Termination of FBO/hangar agreements	67,000	--
Total	$145,000	$90,000

Source: SEWRPC.

summary, the additional expenses to the City to the year 2010 are estimated to total annually $145,000. This includes $20,000 to repay the Federal government for a 1958 airport land acquisition grant, $36,000 to repay the Federal government for a 1988 airport capital improvement grant, $22,000 for loss of airport hangar facility City property taxes, and $67,000 to reimburse airport hangar owners for the loss of their use of the hangars. The savings or new revenues to the City may be expected to total $90,000, including elimination of the $34,000 annual airport operating subsidy, $16,000 estimated annual City share of airport future capital expenditures, and $40,000 revenue from sale of airport lands. Thus, closing the airport may be expected to represent an additional annual cost of $55,000 to the City.

With respect to the level of service, the closing of Hartford Municipal Airport may be expected to have an effect on the regional airport system and on the accessibility of Hartford area businesses and residents to general aviation airport facilities. The closing of Hartford Municipal Airport may be expected to divert general aviation traffic to the remaining airports in the regional airport system. Table 106 indicates the forecast number of based aircraft and number of annual aircraft operations that may be expected by the year 2010 to move to other airports in the Region if the Hartford Municipal Airport were closed. Each of the airports to which Hartford Municipal Airport based aircraft and aviation activity may be expected to be diverted would remain well within design capacity, that is, with annual activity levels under 60 percent of corresponding ASVs. Thus, the regional airport system, together with certain airports located beyond but near to the boundaries of the Region, has sufficient excess airfield capacity to absorb the existing and forecast year 2010 activity attendant to the potential closing of Hartford Municipal Airport. Thus, the retention of Hartford Municipal Airport in service is not essential to avoid capacity problems at, and expansion of, other airports within Southeastern Wisconsin.

With respect to level of service, the principal impact of the closing of Hartford Municipal Airport would be a decline in accessibility to general aviation airport facilities for Hartford area businesses and residents. The regional airport system planning standards recommended that a Transport-Corporate airport be located to maximize the proportion of residences and jobs within 45 minutes' ground travel time, or within 30 miles, of such an airport. A General Utility airport should be located to maximize the population and jobs within 30 minutes' ground travel time, or with 15 miles of such an airport. Table 107 indicates the airports located closest to the City of Hartford, together with their classification and the distances and ground travel times from the City of Hartford. As shown by this table, the City of Hartford is 40 minutes' ground travel time and 27 miles from Waukesha County-Crites Field. a Transport-Corporate airport, and 35 minutes' ground travel time and 21 miles from West Bend Municipal Airport, which is recommended to be improved to a Transport-Corporate

Table 106

FORECAST YEAR 2010 REDISTRIBUTION OF GENERAL AVIATION AIRCRAFT AND ACTIVITY AFTER CLOSING OF HARTFORD MUNICIPAL AIRPORT

Airport Name	Forecast Year 2010 Activity at Airport Receiving Diverted Aircraft and Operations, Assuming Hartford Municipal Airport Remains in Operation			Activity Relocated to Other Airports, Assuming Closure of Hartford Municipal Airport		
	Number of Based Aircraft	Annual Operations	Percent of Annual Service Volume (design capacity) Utilized by Forecast Year 2010 Total Operations	Number of Diverted Based Aircraft	Total Estimated Additional Annual Operations	Percent of Annual Service Volume (design capacity) Utilized by Forecast Year 2010 Total Operations (including diverted operations)
Capitol	109	78,000	39	17	7,890	43
Dodge County	47	28,400	12	20	10,720	17
East Troy Municipal	90	59,000	29	1	540	29
Lawrence J. Timmerman	111	84,000	36	7	3,780	38
Watertown Municipal	87	49,000	21	4	2,160	22
West Bend Municipal	152	104,000	45	23	10,150	50
Total	--	--	--	72	35,240	--

Source: SEWRPC.

Table 107

GROUND TRAVEL TIMES AND DISTANCES BETWEEN THE CITY OF HARTFORD AND CLOSEST AIRPORTS

From City of Hartford to:			
Airport Name	Airport Classification	Driving Distance in Miles	Travel Time in Minutes
Dodge County	General Utility	20	35
Fond du Lac County	Transport-Corporate	39	50
Watertown Municipal	General Utility	32	50
Waukesha County -Crites Field	Transport Corporate	27	40
West Bend Municipal	General Utility	21	35

Source: SEWRPC.

facility. Thus, the City of Hartford could still be considered to be adequately served by regional airport system facilities for aircraft requiring a Transport-Corporate airport. Such aircraft would consist primarily of business and corporate jets, which are forecast to account for between one-half percent and 4 percent of the general aviation traffic generated by the Hartford area. Most general aviation traffic using Hartford Municipal Airport may be expected to continue to be small single- and twin-engine piston and turboprop aircraft, requiring a General Utility airport. However, the closest General Utility airports is located in excess of 30 minutes' ground travel time and more than 15 miles away from the City of Hartford. The closest are Dodge County Airport, near the City of Juneau, and West Bend Municipal Airport, both located about 35 minutes and 20 miles away. Waukesha County-Crites Field, although classified as a Transport-Corporate airport, would also be able to serve the needs of a General Utility facility, but it is located 40 minutes and 27 miles away. Therefore, if Hartford Municipal Airport were closed, the City of Hartford would be considered to have inadequate accessibility to a General Utility airport and would incur ground travel times and distances in excess of those considered acceptable.

There may be economic development implications for the City of Hartford area connected with the airport closing. Some businesses desire locations near general aviation airports. A 1987 Regional Planning Commission survey of business aviation needs identified desirable travel time distances from industrial and business locations to general aviation airports. Of the 170 businesses responding

to this survey that either owned or leased an aircraft, the average ground travel distance reported between the locations of the responding firms and the general aviation airports they used was about nine miles. While about one-half of the responding firms reported that they were located within six miles of the airport they used, only about one in five firms was located 15 miles or more away. The responding firms also indicated that they believe their aircraft could be based at an airport up to 18 miles away without causing "disruption" of their business- related aviation activities. Thus, while 15 miles appeared to be a maximum acceptable distance from a general aviation airport, a distance of about 10 miles appeared to represent a maximum desirable distance for the businesses surveyed. For those firms that owned or leased aircraft and responded to the survey the convenience of being located near a general aviation airport capable of handling business aircraft ranked ahead of many other factors considered when evaluating new or existing sites for expansion. Among those firms that owned or leased their own general aviation aircraft, only "taxes" and "highway availability" were rated more often as very important to plant location or expansion decisions.

Upon due consideration of the factors involved, the Advisory Committee recommended that Hartford Municipal Airport be kept in operation as an integral part of the regional airport system. Although the airport would not be essential for providing needed systemwide capacity, its closing may be expected to result in increased annual costs to the City of Hartford. In addition, closing of the airport would reduce the accessibility of businesses and residents of the City to adequate general aviation airport facilities and may adversely affect economic development efforts with respect to the City's proposed major regional industrial center.

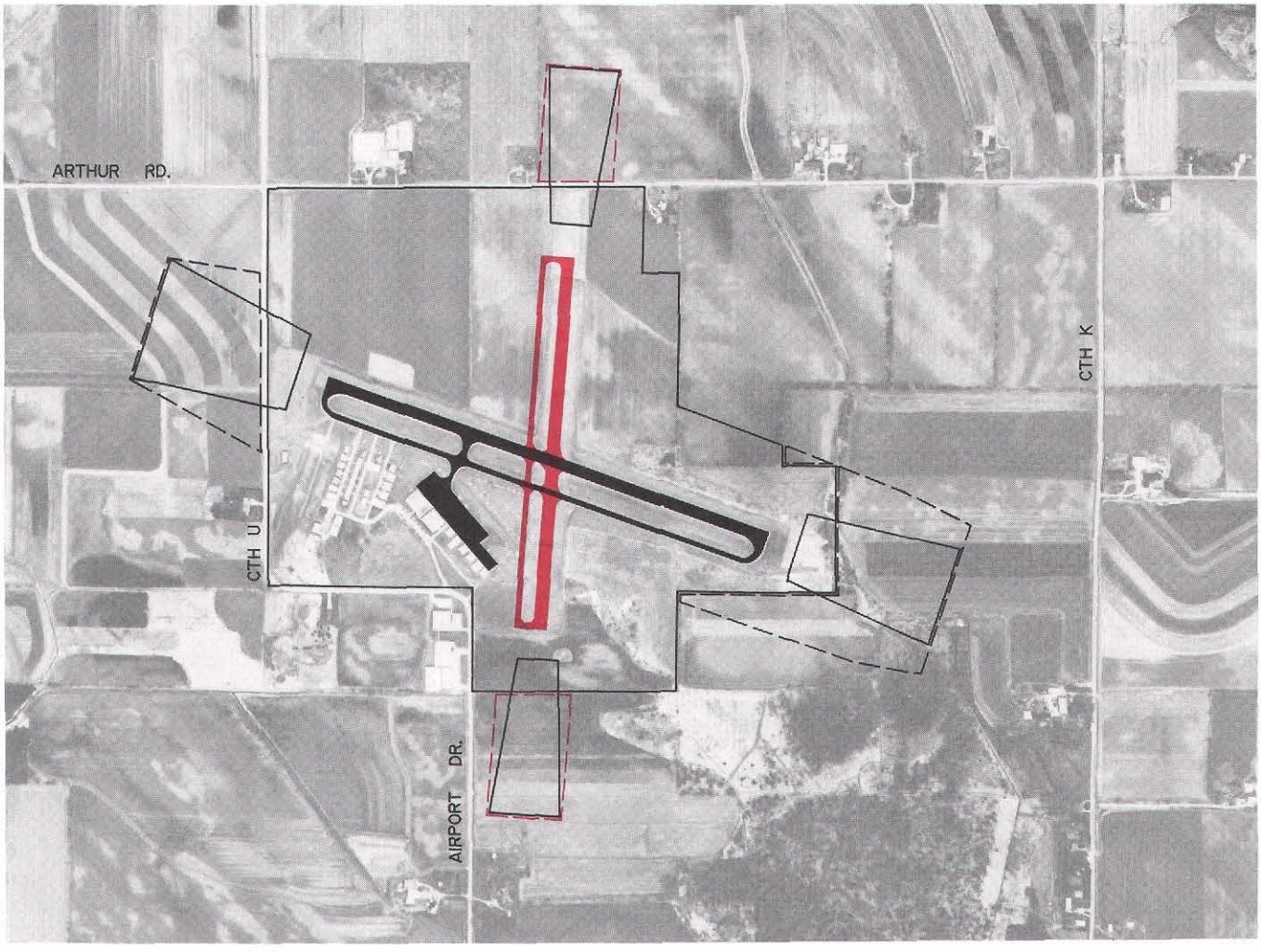
As noted earlier, six alternatives were considered with respect to maintaining and improving Hartford Municipal Airport. The first alternative, a "no-build" alternative, would maintain the existing primary runway length of 3,000 feet on the existing northwest-southeast alignment, as shown in Map 35. To comply with FAA standards and guidelines, Alternative 1 also proposes completion and paving of the existing turf crosswind runway and parallel taxiway to a length of 2,400 feet. This alternative would have a wind rose coverage of about 97 percent and a capital cost of about $0.7 million. It was recommended that Alternative 1 be rejected from further consideration because it did not include a primary runway with a length sufficient to accommodate the type of twin-engine aircraft expected to use the airport by the plan design year, even under the normal growth forecasts prepared for both the City master plan and the Regional Airport System Plan.

The second alternative would include the construction of a new primary runway on a northeast-southwest alignment to a length of 3,900 feet with a parallel taxiway. To comply with FAA standards and guidelines, this alternative also includes the extension of the existing paved crosswind runway and parallel taxiway to 3,200 feet. The existing north-south turf runway would remain as is. This alternative is shown in Map 36 and represents a primary runway option similar in concept to, but 500 feet shorter than, that recommended under the second-generation regional airport system plan and in the airport layout plan preceding the present plan. This alternative would have a wind rose coverage of about 98 percent, assuming the retention of all three runways. Without the north-south turf runway, the wind rose coverage would be about 87 percent. The capital cost of this alternative would be about $1.9 million. It was recommended that Alternative 2 be rejected from further consideration because it would not provide wind rose coverage of at least 95 percent on the basis of the alignment of the two paved runways.

The third alternative would include construction of a new primary runway and parallel taxiway on a north-south alignment to a length of 3,900 feet, with the option to extend the runway and taxiway to an ultimate length of 4,900 feet. Development of Alternative 3 could thus occur in two phases, as shown in Map 37. Under the first phase, a new primary runway and parallel taxiway would be constructed on a north-south alignment to a length of 3,900 feet. Under the second phase, the primary runway and parallel taxiway would be extended to 4,900 feet. Extension of the primary runway to 4,900 feet would occur only as warranted by demand. To comply with FAA standards and guidelines, this alternative would also include the extension of the existing 3,000-foot-long northwest-southeast runway to a length of 3,200 feet under the first phase, with eventual extension to 3,900 feet under the second phase, as the crosswind runway. The airfield configuration under this alternative is identical to that included in the recently City-adopted airport layout plan. This alternative would have a wind rose coverage of about 97 percent and a capital cost of about $8.4 million, including development to an

Map 35

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 1 FOR HARTFORD MUNICIPAL AIRPORT



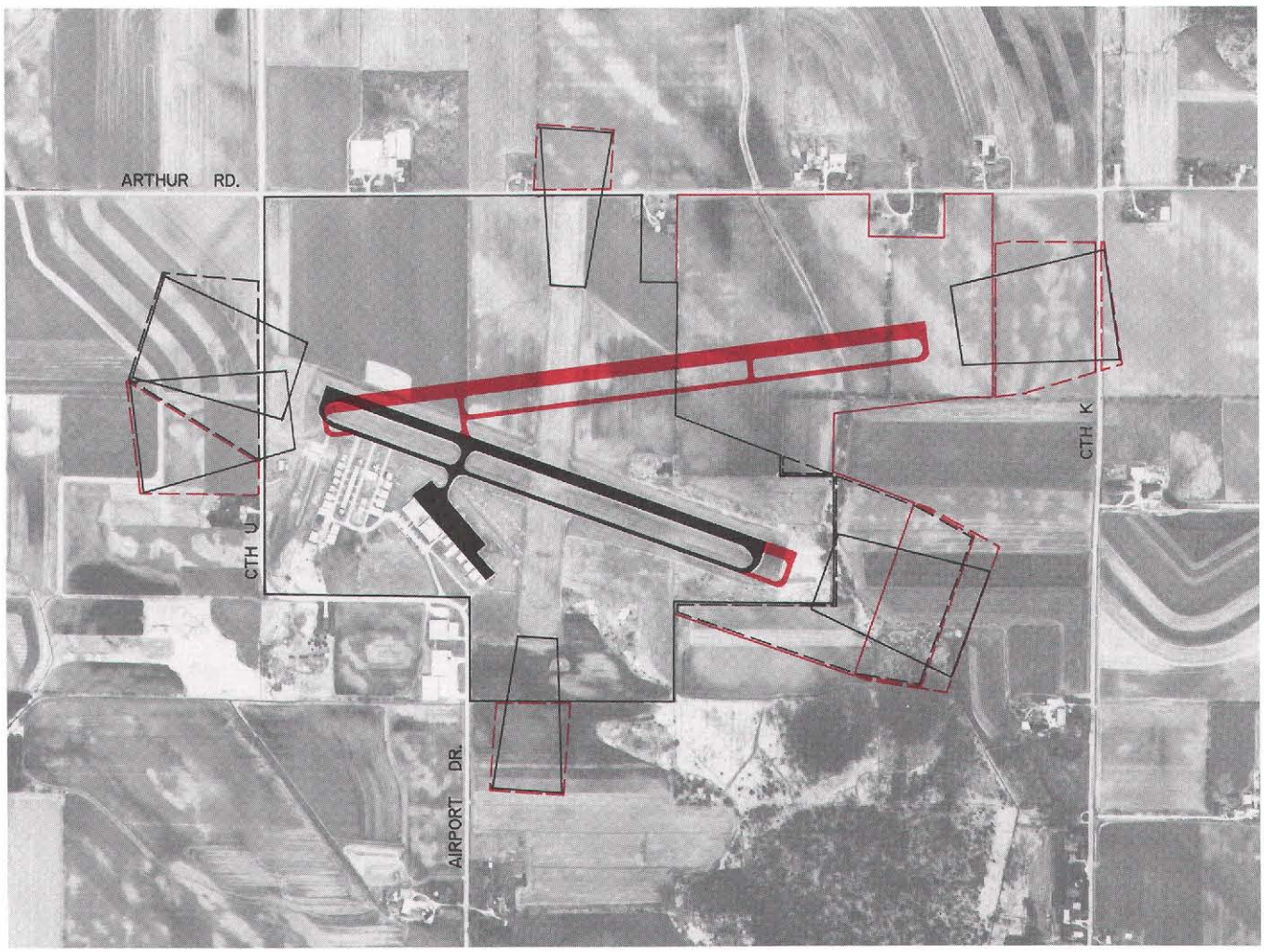
Source: SEWRPC.

ultimate runway length of 4,900 feet. The capital cost of the first phase, the runway extension to 3,900 feet, is estimated at about $5.7 million.

This alternative, even under the first phase, would require that Arthur Road either be relocated or placed under a bridge structure carrying the primary runway and taxiway. Arthur Road is recommended in the adopted regional transportation system plan and the adopted Washington County jurisdictional highway system plan to become a county trunk highway and provide a second major arterial route from the Hartford area to USH 41. Comparison of the options for maintaining Arthur

Map 36

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 2 FOR HARTFORD MUNICIPAL AIRPORT

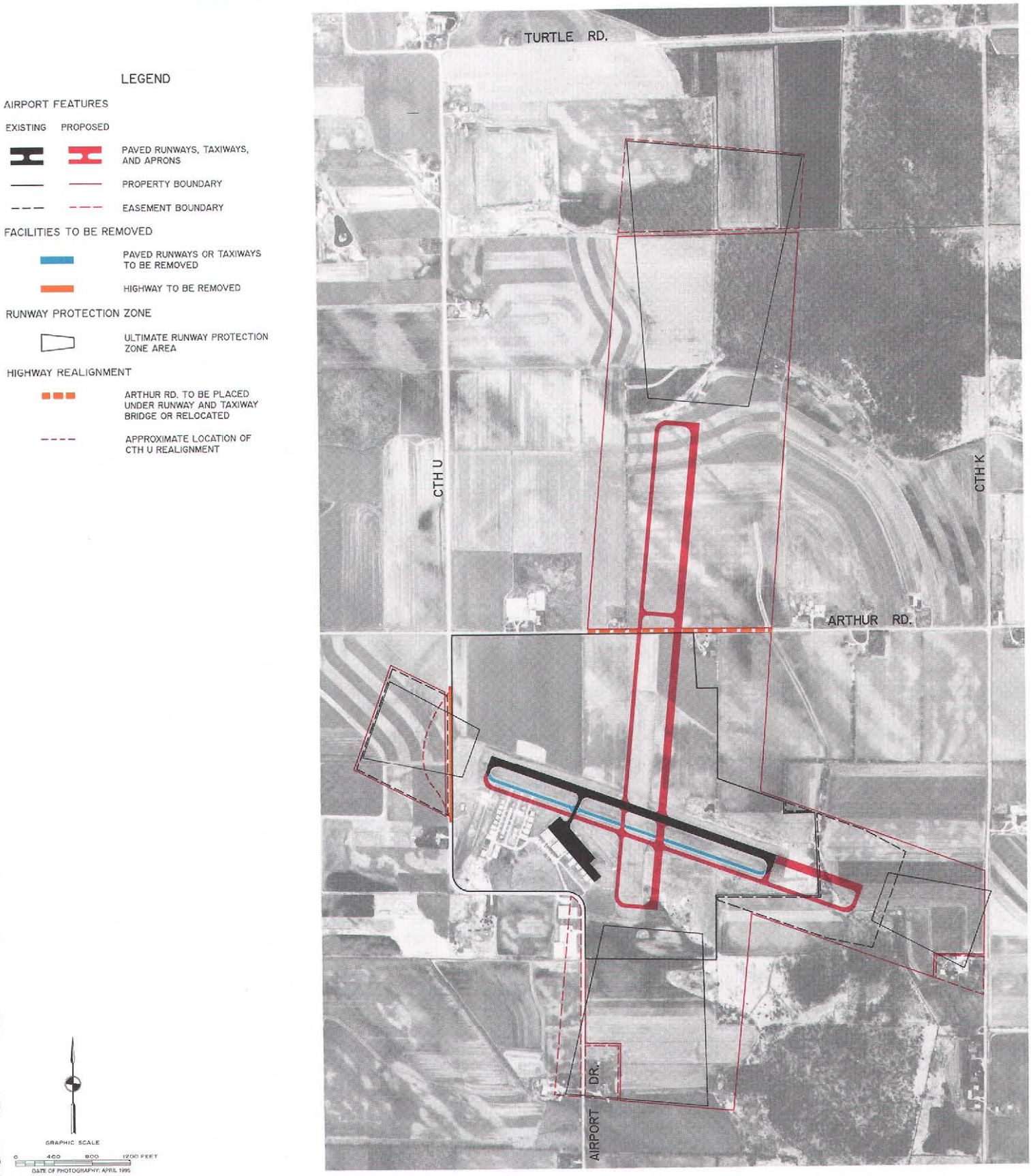


Source: SEWRPC.

Road as a major arterial indicates that placing the runway and taxiway on a bridge over Arthur Road would be slightly less costly then relocating the facility. The estimated capital costs of this alternative, therefore, include constructing the runway on a bridge over Arthur Road. Also, even under the first phase, a segment of Airport Road adjacent to the west side of the airport would require relocation to provide sufficient land for the required runway safety area. The second phase would also require

Map 37

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 3 FOR HARTFORD MUNICIPAL AIRPORT



Source: SEWRPC.

lowering or relocating two segments of the electric power transmission line to the south and east of the airport.

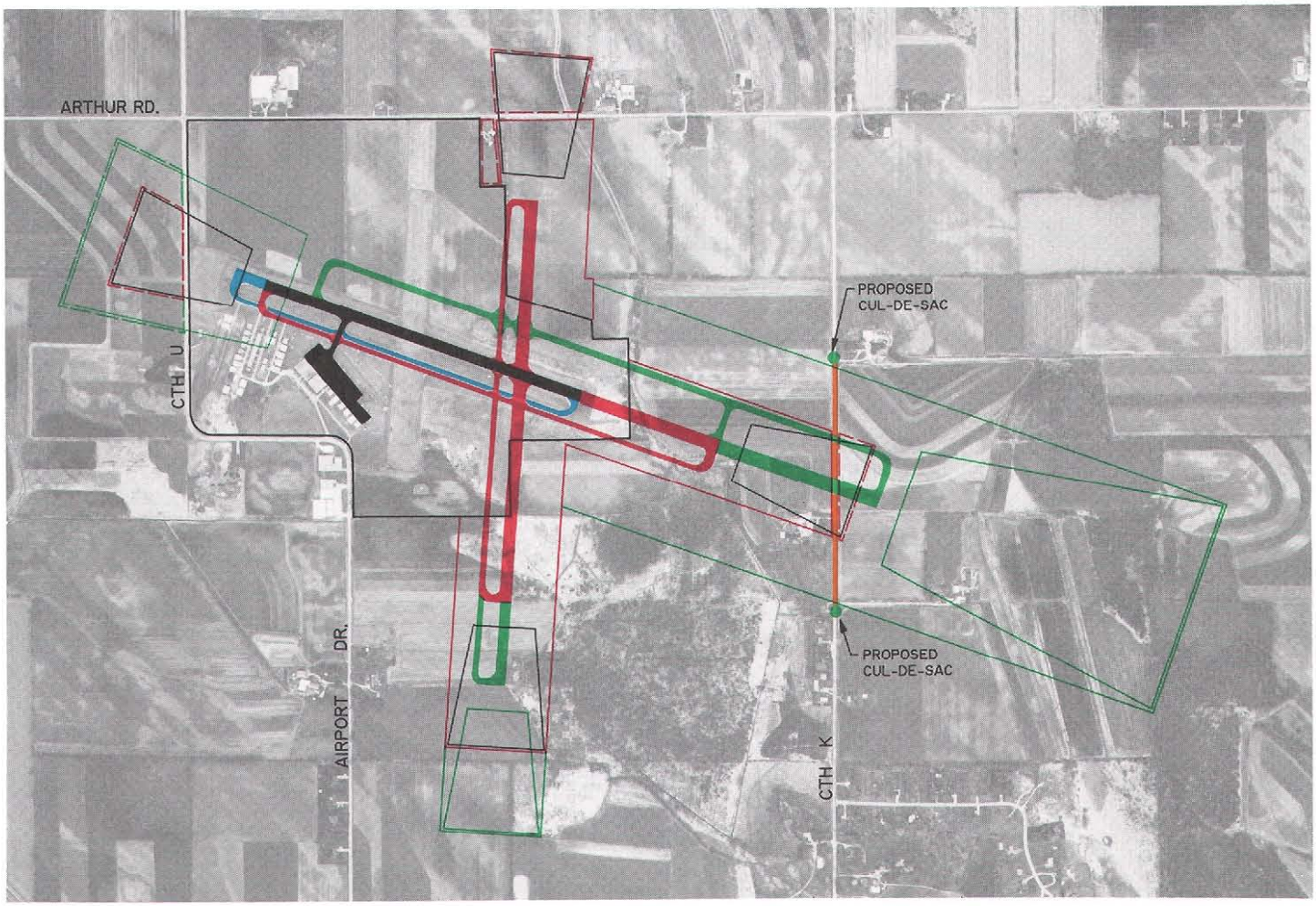
The fourth alternative would include the extension of the existing paved runway to 3,900 feet, with the option to extend the runway and taxiway to an ultimate length of 4,900 feet on the present northwest-southeast alignment. Development of Alternative 4 could thus occur in two phases, as shown on Map 38. Under the first phase, the existing runway and parallel taxiway would be extended to a length of 3,900 feet. Under the second phase, the primary runway and taxiway would be extended to a length of 4,900 feet. Extension of the primary runway to 4,900 feet would occur only as warranted by demand. To comply with FAA standards and guidelines, this alternative would also include the construction of a new crosswind runway and parallel taxiway to a length of 3,200 under the first phase, with eventual extension to 3,900 feet under the second phase. This alternative would have wind rose coverage of about 97 percent and a capital cost of about $5.8 million, including development with an ultimate runway length of 4,900 feet. The capital cost of the first phase of the runway extension to 3,900 feet is estimated to be $2.1 million. The first phase would require the lowering or relocation of two short segments of the electric power transmission line, each about 600 feet in length, located to the south and east of the airport. The second phase would require the closing of what is now CTH K, which is recommended under the adopted regional transportation system plan and County jurisdictional highway system plan to be downgraded to a nonarterial facility, and the relocation of a 1.6-mile-long segment of the electric power transmission line.

Consideration was also given to a modified version of the fourth alternative, under which the 4,900-foot-long primary runway would remain in the same orientation as under the basic alternative, but would be moved to the west so as to minimize the impact on areas to the east of the existing airport site. This modification, referred to as Alternative 4A, is shown on Map 39. There were two differences identified between Alternative 4 and 4A. One is that the runway would ultimately be located further to the west. The other difference is that Alternative 4A would require the closing of what is now CTH U, instead of CTH K, as required under Alternative 4. CTH U is also proposed to be downgraded from an arterial to a nonarterial facility. Under Alternative 4, CTH K to the east of the existing airport site would not need to be closed until the primary runway was extended from 3,900 feet to 4,900 feet. Under Alternative 4A, Airport Road (CTH U) would need to be closed for the initial extension of the existing runway to 3,900 feet. The truncated portion of Airport Road south of the segment to be closed could be extended westward and connected with the planned extension of Arthur Road at an additional cost of about $600,000. This alternative would have a wind rose coverage of about 97 percent and a capital cost of about $5.3 million to reach the ultimate 4,900-foot runway length. The estimated capital cost of the first phase, the runway extension to 3,900 feet, is $2.0 million. The first phase would require the relocation of a 1,200-foot-long segment of the electric power transmission line located to the south and east of the airport. The second phase would require the relocation of a 1.2-mile-long segment of the electric power transmission line to a new alignment.

The fifth alternative considered would include construction of a new primary runway and parallel taxiway on a northeast-southwest alignment to a length of 3,900 feet, with the plan to extend the runway and taxiway to an ultimate length of 4,900 feet. Development of Alternative 5 could thus occur in two phases, as shown on Map 40. Under the first phase, a new primary runway and parallel taxiway would be constructed to a length of 3,900 feet. Under the second phase, the primary runway and parallel taxiway would be extended to 4,900 feet. Extension of the primary runway to 4,900 feet would occur only when demand warranted. To comply with FAA standards and guidelines, this alternative would also include the construction of a new crosswind runway and taxiway to a length of 3,200 feet under the first phase, with second-phase extension to 3,900 feet. This alternative would have a wind rose coverage of about 97 percent and a capital cost of about $5.6 million for an ultimate runway length of 4,900 feet. The capital cost of the first phase, the runway extension to 3,900 feet, is estimated to be $ 3.5 million. The first phase would require the lowering or relocation of a 700-foot-long segment of the electric power transmission line located south of the airport. The second phase would require the relocation of a 0.4-mile-long segment of this electric power transmission line and would also require the closing of a portion of what is now Airport Road (CTH U). As already noted, this road is proposed to be downgraded to a nonarterial facility in the adopted regional system plan. The closing would need to be made for the extension of the runway to 4,900 feet. The truncated

Map 38

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 4 FOR HARTFORD MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	ADDITIONAL POSSIBLE FUTURE EXPANSION	
			PAVED RUNWAYS, TAXIWAYS, AND APRONS
			PROPERTY BOUNDARY
(NONE)			EASEMENT BOUNDARY

AIRPORT FACILITIES TO BE REMOVED

- PAVED RUNWAY AND TAXIWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS
- HIGHWAY TO BE REMOVED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA REQUIRED FOR PROPOSED IMPROVEMENTS
- RUNWAY PROTECTION ZONE AREA REQUIRED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

GRAPHIC SCALE
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 39

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 4A FOR HARTFORD MUNICIPAL AIRPORT

LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	ADDITIONAL POSSIBLE FUTURE EXPANSION	
			PAVED RUNWAYS, TAXIWAYS, AND APRONS
			PROPERTY BOUNDARY
(NONE)			EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

- PAVED RUNWAY AND TAXIWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS
- HIGHWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA REQUIRED FOR PROPOSED IMPROVEMENTS
- RUNWAY PROTECTION ZONE AREA REQUIRED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

HIGHWAY REALIGNMENT

- APPROXIMATE LOCATION OF ARTHUR ROAD EXTENSION

GRAPHIC SCALE

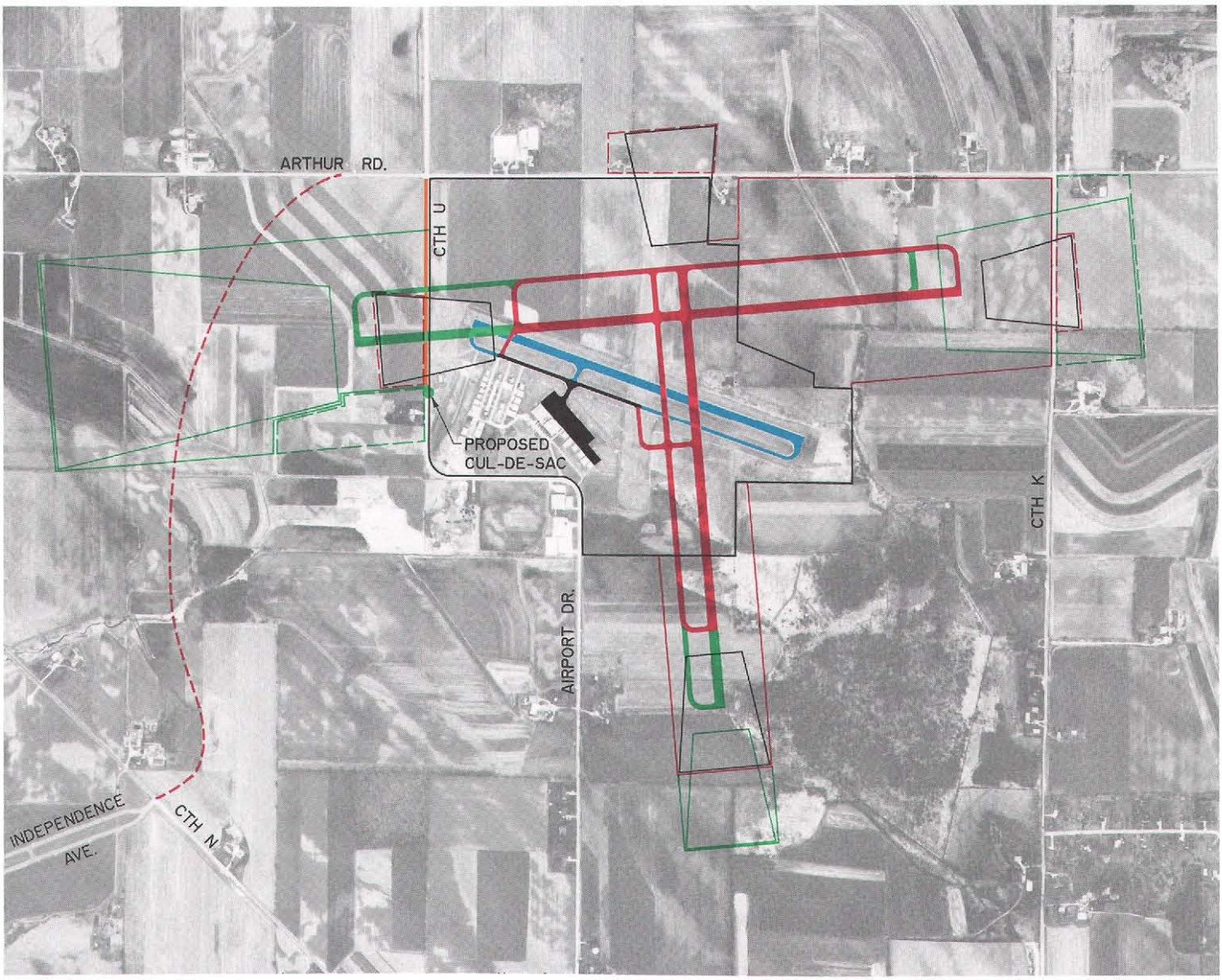
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 40

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 5 FOR HARTFORD MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	ADDITIONAL POSSIBLE FUTURE EXPANSION	
▬	▬	▬	PAVED RUNWAYS, TAXIWAYS, AND APRONS
—	—	—	PROPERTY BOUNDARY
(NONE)	- - -	- - -	EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

- PAVED RUNWAY AND TAXIWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS
- HIGHWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA REQUIRED FOR PROPOSED IMPROVEMENTS
- RUNWAY PROTECTION ZONE AREA REQUIRED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

HIGHWAY REALIGNMENT

- APPROXIMATE LOCATION OF ARTHUR ROAD EXTENSION

GRAPHIC SCALE
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

portion of Airport Road south of the portion to be closed could be extended westward and connected with the planned extension of Arthur Road at an additional cost of about $600,000.

A comparison of the six alternatives that propose either the maintenance or the expansion of Hartford Municipal Airport is presented in Table 108. As already noted, Alternatives 1 and 2 were rejected from further consideration. In addition, a "no-build" alternative that would propose the closing of the airport was also rejected from further consideration. The remaining four alternatives proposing the provision of a 3,900-foot-long runway with possible extension to 4,900 feet are all able to meet the general aviation airport service requirements of the Hartford area. These four Alternatives were identified as Alternatives 3, 4, 4A, and 5; they were further evaluated with respect to a number of factors including: the impact on aviation demand, land requirements, environmental impacts, wind coverage, construction cost, highway impacts, and impacts on electric power transmission lines.

With respect to the impact on aviation demand, overall land requirements, overall environmental impacts, and wind coverage, all four alternatives all similar. In terms of aviation demand, all four alternatives would be adequate to serve the critical aircraft forecast to use the airport under normal growth conditions with a 3,900-foot-long runway and could adequately serve the critical aircraft forecast under high-growth conditions with an extension of the primary runway to 4,900 feet. All four alternatives would require land acquisition for the ultimate extension of the primary runway. A total of from about 260 to 310 acres of land would be required, depending on the alternative. Most of the land required would be prime agricultural land, but some would be primary and secondary environmental corridor lands. Some wetlands would be disturbed and portions of between seven to nine farms would need to be acquired. Mitigation of the wetland disruption will probably be necessary through wetland replacement at another nearby site. From about 25 to 50 acres of easements would also need to be acquired. The four alternatives were found to have virtually identical wind rose coverage.

With respect to construction costs, Alternatives 4, 4A, and 5 were found to be similar, with total construction costs of between $5.3 and $5.8 million. Alternative 3 had an estimated capital cost of $8.4 million, primarily because of the need to accommodate the primary runway and parallel taxiway on a bridge structure over Arthur Road. Consideration of only the first phase construction costs indicated that Alternatives 4 and 4A would have the lowest capital costs, about $2.0 million, significantly less than the first-phase cost of Alternative 5, estimated to be $3.5 million. The construction cost of the first phase of Alternative 3, $5.7 million, was the highest among the alternatives because of the immediate need to provide a bridge over Arthur Road.

Highway impacts would vary with the alternative considered. Alternative 3 was found to have the most significant highway impact, since Arthur Road would either have to be relocated or would require bridge construction to accommodate the primary runway and parallel taxiway. In addition, a segment of existing CTH U along the west side of the airport would need to be relocated to provide a runway safety area. Both impacts would occur during the initial phase of airport expansion. Under Alternative 4, a segment of CTH K would have to be closed; under Alternative 5, a segment of CTH U would have to be closed. However, neither of these roads would have to be closed until the primary runway was extended from 3,900 feet to 4,900 feet. Under Alternative 4A, a segment of CTH U would also have to be closed when the first phase of runway extension to 3,900 feet was undertaken.

Impacts on the electric power transmission line located to the south and east of the existing airport site would also vary with the alternative. Under Alternative 3, two sections of the line totaling 2,200 feet in length would ultimately be relocated. Under Alternative 4, 8,200 feet of line would ultimately be relocated. Under Alternative 4A, 6,100 feet of line would ultimately be relocated. Under Alternative 5, 2,000 feet of line would ultimately be relocated.

On the basis of the comparative evaluation made, Alternative 4 was recommended to be included in the new regional airport system plan for the Hartford Municipal Airport. This alternative proposes the extension of the existing primary runway on a northwest-southeast alignment to a length of 3,900 feet in an easterly direction, with the possible ultimate extension to 4,900 feet. Alternative 4 was recommended because it enabled the airport to handle all single-engine and most multi-engine general aviation aircraft; it also preserved the option of handling many of the business and corporate jets. Accommodating such demand was considered to be important because of the anticipated

industrial growth and expansion in the City of Hartford, which should have adequate access to a general aviation airport. Alternative 4 enabled the continued use at the existing paved runway and permitted deferment of much of the construction cost and impacts on surrounding lands. Thus, the impacts and capital costs associated with extension of the primary runway to 4,900 feet would be realized only when and if the need for such a runway extension became certain, making implementation of this alternative easier and more likely than other improvement alternatives.

Kenosha Regional Airport

With respect to the Kenosha Regional Airport, the deficiency analysis found that the existing 5,500-foot-long primary runway length was adequate to accommodate the existing demand, but less than desirable to accommodate the forecast critical aircraft group expected to use the airport regularly by the plan design year 2010. The existing 5,500-foot-long primary runway is intended to accommodate virtually all small piston-engine and turboprop aircraft of under 12,500 pounds gross weight, with airport reference codes of A-I, B-I, A-II, B-II, and C-II, as well as large turboprop aircraft and corporate and business jets of over 12,500 pounds gross weight under 60 percent useful load conditions, with airport reference codes of A-II, A-III, B-I, B-II, B-III, C-I, C-II, D-I, and D-II. The desirable primary runway length under the forecast future demand conditions was determined, on the basis of the forecast prepared under the regional airport system planning effort, to be 6,400 feet. A primary runway of this length would continue to allow all small piston-engine and turboprop aircraft to be accommodated and would also allow most large turboprop and corporate and business jet aircraft, which currently use the airport under 60 percent useful load conditions, to be accommodated under 90 percent useful load conditions. Also, the largest corporate jet aircraft with an airport reference code of D-I and D-II would continue to be accommodated under 60 percent useful load conditions as they are currently. It should be noted that a primary runway length of 6,400 feet is intended to accommodate neither the largest military aircraft nor large air carrier jet aircraft.

Aviation activity which may be anticipated to use the longer 6,400-foot primary runway may be expected to result from two factors. These include wider use by area businesses and industries in the greater Kenosha area and a continuation of the trend for aviation-based aircraft and operations moving away from General Mitchell International Airport and from airports in northeastern Illinois. Thus, Kenosha Regional Airport may be expected to continue and to increase its function as a reliever airport for Mitchell International and for the airports in northeastern Illinois.

As noted in Chapter II of this planning report, since 1992 the City of Kenosha has been considering the potential need to expand the airport. This consideration has been motivated in part by the desire of the City to make the airport financially self-sufficient, possibly by attracting additional corporate business and air cargo traffic. During 1992, work was begun by the City on a new airport master plan for the Kenosha Regional Airport. Much of this work was initially directed at examining the benefits and costs of expanding the airport and lengthening the primary runway. Ultimate primary runway lengths of up to 9,000 feet were considered. In addition, the City considered undertaking a special air cargo needs study intended to assist in determining the potential for future development of the airport as a regional air cargo center. These City study efforts generated significant concern and debate about the need for airport expansion on the part of local officials, businessmen, industrialists, airport users, and surrounding landowners. As a result, completion of the new airport master plan and initiation of the special air cargo needs study were, as of April 1995, indefinitely postponed. To address the concerns raised by the City studies, the Mayor and Common Council of the City of Kenosha, in November 1994 created a special committee to consider airport expansion, marketing, and operations. This committee was expected to make its findings and recommendations by October 1995.

Because of the various issues related to the potential expansion of the Kenosha Regional Airport, the Commission staff carefully reviewed all the general aviation forecasts prepared for the Airport. On the basis of that review, it was concluded that the types of based aircraft and the number of aircraft operations that may be reasonably anticipated at Kenosha Regional Airport by the year 2010 as set forth in Chapters VII and VIII of this planning report were appropriate. The finding that a larger number and greater variety of corporate and business aircraft may be expected to use the airport in the future was deemed reasonable. Also, the finding that a larger number of corporate and business aircraft will in the future be more likely to make longer trips with heavier

Table 108

EVALUATION OF ALTERNATIVE PRIMARY RUNWAY LENGTHS AT HARTFORD MUNICIPAL AIRPORT

Key Consideration	Alternative 1: Maintain Existing 3,000-Foot Primary Runway on Northwest-Southeast Alignment	Alternative 2: Construct New 3,900-Foot Primary Runway on Northeast-Southwest Alignment	Alternative 3: Construct New 3,900-Foot Primary Runway on North-South Alignment with Possible Extension to 4,900 feet
Impact on Aviation Demand	Capable of handling only single-engine and some twin-engine piston aircraft. Many multi-engine piston aircraft, most turboprop aircraft, and all business jet aircraft would have to use another airport, the nearest of which is located 30 minutes' highway travel time away	Capable of handling all single-engine and multi-engine piston, and many of the turboprop aircraft. The largest turboprop and business jet aircraft would have to use another airport, the nearest of which is located 30 minutes' highway travel time away	Capable of handling all single-engine and most multi-engine aircraft and anticipated business jets
Construction Cost[a] First Phase Second Phase Total	-- -- $728,000	-- -- $1,944,000	$5,692,000 2,720,000 $8,412,000
Land Requirements	No land acquisition required in fee simple Acquisition of runway protection zone easements over 18 acres prime agricultural land	Acquisition of 82 acres of land in fee simple, of which 80 acres are prime agricultural land and two acres are primary environmental corridor, for the construction of a new primary runway. Portions of two farms to be acquired Acquisition of easements over 41 acres of land, of which 36 acres are prime agricultural land and five acres are primary environmental corridor, for the provision of runway protection zones. Easements are over four farms	Acquisition of 311 acres of land in fee simple, of which 261 acres are prime agricultural land, 17 acres are primary environmental corridor, 29 acres are secondary environmental corridor, and 4 acres are farm residences and buildings, for the construction of a new primary runway. Portions of seven farms to be acquired Acquisition of easements over 49 acres of land, of which 29 acres are prime agricultural land, 10 acres are secondary environmental corridors, and 10 acres are farm residences and buildings, for the provision of runway protection zones. Easements are over six farms and two commercial parcels
Environmental Impacts	No primary or secondary environmental corridors or isolated natural areas to be disturbed No wetland areas to be disturbed	About 500 feet of stream would need to be relocated at end of Runway 29 extension About three acres of wetlands to be disturbed with mitigation likely	About 500 feet of stream would need to be bridged at end of Runway 29 extension About four acres of wetlands to be disturbed with mitigation likely
Wind Coverage	97 percent	87 percent	97 percent
Highway Impacts	--	--	Arthur Road, which is recommended to become a County trunk highway, would need to be relocated or bridged between CTH K and CTH U at a cost of about $3.0 million. A portion of CTH U would require relocation at a cost of about $350,000. Both projects would be necessary for the first phase of runway extension
Electrical Power Line Impacts	--	--	About 2,200 feet of electric power transmission line would need to be relocated.
Probability of Implementation	High. Only easement acquisition required for crosswind runway protection zones. No other major expansion effort necessary	Low. Significant land acquisition required for construction of new primary runway. Would not provide for possible extension of primary runway to handle business jets	Low. Significant land acquisition required for construction of new primary runway. Conflict with new Washington County Jurisdictional Highway Plan requiring significant cost to accommodate Arthur Road during first phase of runway extension. Highest total cost of all alternatives

Table 108 (continued)

Key Consideration	Alternative 4: Extend Primary Runway on Northwest-Southeast Alignment to 3,900 Feet in Easterly Direction with Possible Extension to 4,900 Feet	Alternative 4A: Extend Primary Runway on Northwest-Southeast Alignment to 3,900 Feet in Westerly Direction with Possible Extension to 4,900 Feet	Alternative 5: Construct New 3,900-Foot Primary Runway on Northeast-Southwest Alignment with Possible Extension to 4,900 Feet
Impact on Aviation Demand	Capable of handling all single-engine and most multi-engine aircraft and anticipated business jets	Capable of handling all single-engine and most multi-engine aircraft and anticipated business jets	Capable of handling all single-engine and most multi-engine aircraft and anticipated business jets
Construction Cost[a] First Phase Second Phase Total	 $2,148,000 3,689,000 $5,837,000	 $1,985,000 3,338,000 $5,323,000	 $3,484,000 2,116,000 $5,600,000
Land Requirements	Acquisition of 281 acres of land in fee simple, of which 226 are prime agricultural land, 47 acres are primary environmental corridors, and eight acres are farm residences and buildings, for the extension of the primary runway. Portions of eight farms to be acquired Acquisition of easements over 35 acres of land, of which 31 acres are prime agricultural land, and four acres are farm residences and buildings, for the provision of runway protection zones Easements are over four farms	Acquisition of 301 acres of land in fee simple, of which 258 acres are prime agricultural land and 37 acres are primary environmental corridors and six acres are farm residences and buildings, for the extension of the primary runway. Portions of nine farms to be acquired Acquisition of easements over 23 acres of land, of which 16 acres are prime agricultural land and seven acres are farm residences and buildings, for the provision of runway protection zones. Easements are over three farms	Acquisition of 257 acres of land in fee simple, of which 245 acres are prime agricultural land and 12 acres are primary environmental corridors, for the construction of a new primary runway. Portions of nine farms to be acquired Acquisition of easements over 48 acres of land, of which 42 acres are prime agricultural land and six acres are farm residences and buildings, for the provision of runway protection zones. Easements are over five farms
Environmental Impact	About 500 feet of stream would need to be bridged at end of Runway 29 extension About 13 acres of wetlands and one acre of woodlands to be disturbed with mitigation likely	About 500 feet of stream would need to be bridged at end of Runway 29 extension About 12 acres of wetlands and one acre of woodlands to be disturbed with mitigation likely	About 500 feet of stream would need to be bridged at end of Runway 29 extension About six acres of wetlands and one acre of woodlands to be disturbed with mitigation likely
Highway Impacts	CTH K, which is recommended to become a local road, would need to be closed under the second phase of runway extension	CTH U, which is recommended to become a local road, would need to be closed under the first phase of runway extension	CTH U, which is recommended to become a local road, would need to be closed under the second phase of runway extension
Wind Coverage	97 percent	97 percent	97 percent
Electrical Power Line Impacts	About 8,200 feet of electric power transmission line would need to be relocated	About 6,100 feet of electric power transmission line would need to be relocated	About 2,000 feet of electric power transmission line would need to be relocated
Probability of Implementation	Medium. Significant land acquisition required. Extension of existing primary runway could be staged	Medium. Significant land acquisition required. Extension of existing primary runway could be staged	Low to medium. Significant land acquisition required for construction of new primary runway

[a]Construction costs do not include those costs associated with new or expanded terminal and hangar facilities related to increased activity levels which costs would be the same under all alternatives.

Source: SEWRPC.

payloads was also deemed to be reasonable, given the larger number of total corporate and business aircraft expected to conduct operations at the Kenosha Regional Airport, the location of the airport in the Milwaukee-Chicago Metropolitan corridor, and the increase in business activity expected by firms in both Kenosha County and in northeastern Illinois.

The Commission staff also carefully reviewed the potential for the development of the Kenosha Regional Airport into an air cargo center on the basis of the findings of a Statewide study of air cargo movement conducted by the Wisconsin Department of Transportation as part of the effort to prepare a new State airport system plan. That effort was conducted concurrently with the regional

airport system planning effort. The findings of this Statewide air cargo study indicate that, by the year 2010, General Mitchell International Airport may be expected to continue to carry about 85 percent of all air cargo traffic in Wisconsin. Almost all the remaining air cargo traffic in Wisconsin may be expected to be distributed among six other airports: Appleton, Green Bay, Janesville, Mosinee, Madison, and Oshkosh. The findings of the Statewide air cargo study provide no indication that the air cargo traffic at Kenosha Regional Airport may be expected to increase significantly over recent levels.

The Statewide air cargo study noted that air cargo traffic to and from northeastern Illinois may be expected to increase, but that such traffic may be expected to follow the traffic patterns already established by private-sector air cargo and freight forwarding companies. Thus, the probability of attracting additional air cargo traffic to and from northeastern Illinois can only be determined on the basis of a detailed marketing study specifically designed to address this potential market. Regardless of the probability of attracting higher volumes of air cargo traffic to Kenosha Regional Airport, the extension of the primary runway to 6,400 feet would permit a wide variety of larger multi-engine turboprop aircraft used for air cargo services to use the airport.

Three alternatives were considered on the basis of the deficiency analysis conducted under the regional system planning effort in order to address the identified primary runway deficiency at the Kenosha Regional Airport. These alternatives are shown in Maps 41, 42, and 43. The first alternative would maintain the existing primary runway length of 5,500 feet. To comply with FAA standards and guidelines, this alternative also includes a crosswind runway and parallel taxiway of 4,400 feet. The existing crosswind runway is already 4,440 feet long. Accordingly, the first alternative considered would maintain the existing airfield configuration, consisting of a 5,500-foot-long primary runway and parallel taxiway on a northeast-southwest alignment, a 3,300-foot parallel runway also on a northeast-southwest alignment, and a 4,440-foot-long crosswind runway and parallel taxiway on a northwest-southeast alignment.

The second alternative considered would include a 900-foot extension of the primary runway and parallel taxiway to a total length of 6,400 feet. A primary runway of this length would allow the airport to handle the critical aircraft group identified under the forecast future aviation demand conditions. To comply with FAA standards and guidelines, this alternative also includes the extension of the crosswind runway and parallel taxiway to 5,200 feet.

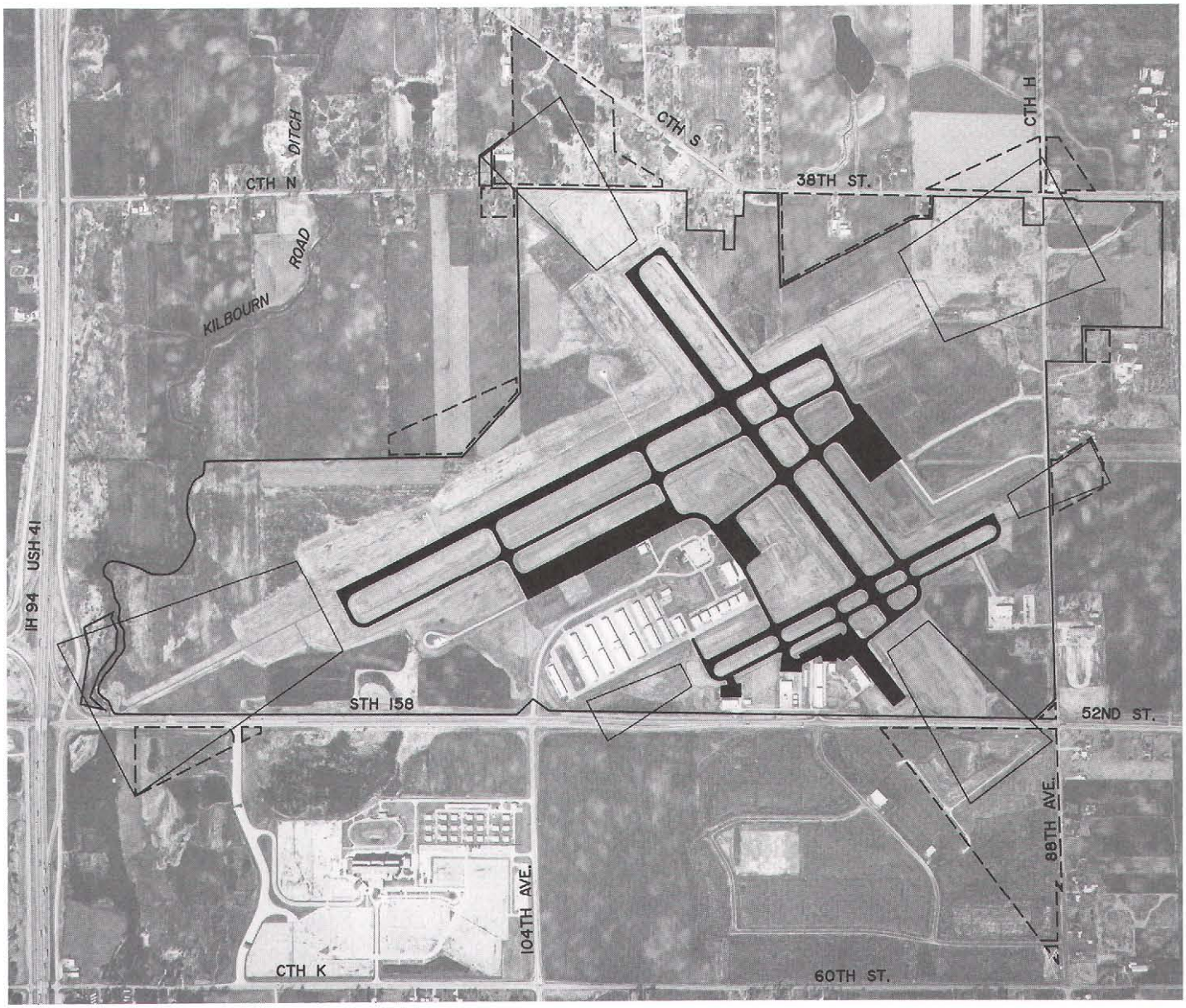
The third alternative considered also includes a 900-foot extension of the primary runway and parallel taxiway to a total length of 6,400 feet but would maintain the crosswind runway at the existing length of 4,440 feet. This alternative would provide the benefits of a longer primary runway length to meet forecast future demand but would minimize disruption of adjacent land uses north of the airport.

Alternatives including a new primary runway alignment and relocation of the airport were also considered, but were dismissed because of the large investment of public funds already made at the existing site and because there were no compelling reasons to alter the airfield configuration or to relocate the airport.

An evaluative comparison of the three alternatives considered is presented in Table 109. The alternatives were evaluated with regard to the impact on aviation demand, construction costs, land requirements, environmental impact, and probability of implementation. Key differences were identified among the three alternatives in regard to each of these considerations. With respect to the impact on aviation demand, all three alternatives would be capable of accommodating virtually all single-engine and twin-engine piston and turboprop aircraft under 12,500 pounds in gross weight, as well as a wide variety of larger turboprop aircraft over 12,500 pounds in gross weight and virtually all business and corporate jet aircraft. However, under Alternative 1, which maintains the existing primary runway length of 5,500 feet, most of the larger turboprop aircraft and business and corporate jets could be accommodated, but only under 60 percent useful load conditions. Aircraft unable to use Kenosha Regional Airport with a primary runway length of 5,500 feet would need to use other airports within the Region, including Batten Airport, some 17 miles and about 25 minutes' highway travel time northeast of Kenosha Regional Airport, or General Mitchell International Airport, some 29 miles and about 30 minutes' highway travel time north of Kenosha Regional Airport. Batten Airport has a primary runway length of 6,500 feet, while Mitchell International has a primary runway of 9,600 feet.

Map 41

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 1 FOR KENOSHA REGIONAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
	(NONE)	PAVED RUNWAYS, TAXIWAYS, AND APRONS
——	(NONE)	PROPERTY BOUNDARY
– – –	(NONE)	EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

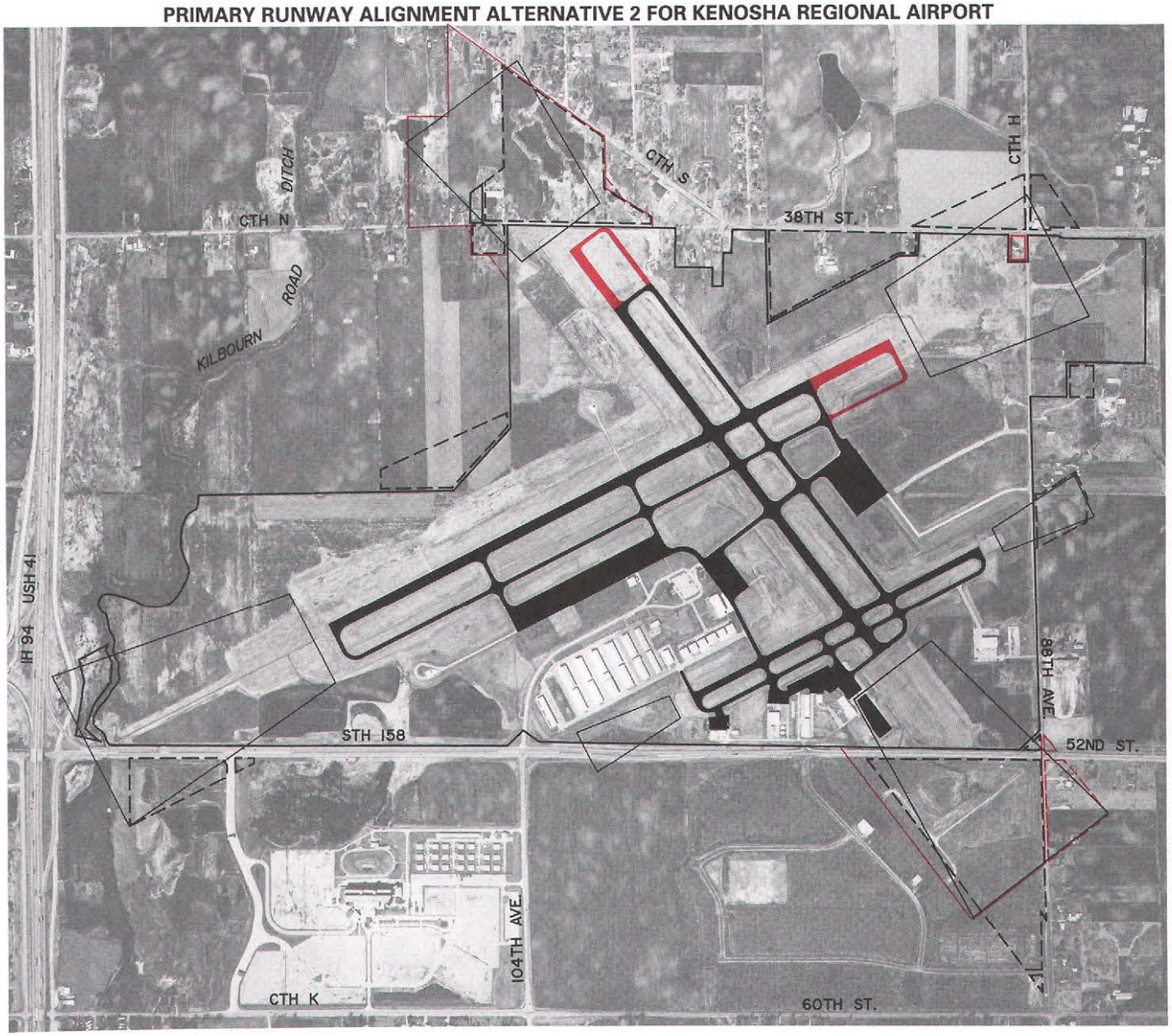
GRAPHIC SCALE
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 42

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 2 FOR KENOSHA REGIONAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
		EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

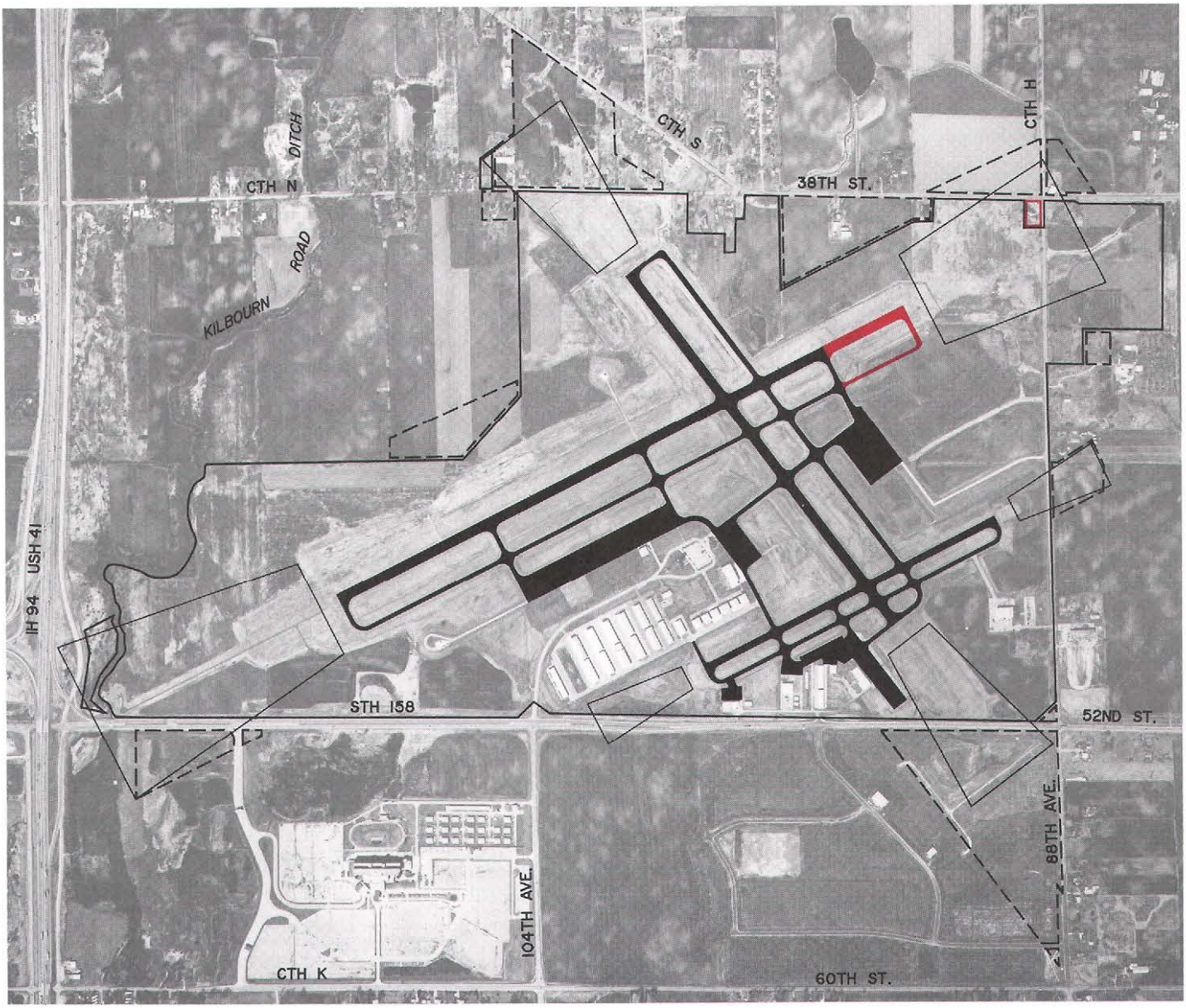
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 43

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 3 FOR KENOSHA REGIONAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
	(NONE)	EASEMENT BOUNDARY

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Table 109

EVALUATION OF ALTERNATIVE PRIMARY RUNWAY LENGTHS AT KENOSHA REGIONAL AIRPORT

Key Consideration	Alternative 1: Existing 5,500-Foot Primary Runway and 4,440-Foot Crosswind Runway	Alternative 2: Extend Primary Runway to 6,400 Feet and Crosswind Runway to 5,200 Feet	Alternative 3: Extend Primary Runway to 6,400 Feet and Keep Crosswind Runway at 4,440 Feet
Impact on Aviation Demand	Capable of handling all piston and turboprop aircraft and larger turboprop and business and corporate jet aircraft partially loaded to 60 percent useful load conditions. All turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use other airports, such as Batten, located 25 minutes' highway travel time away, or General Mitchell International, located 30 minutes' highway travel time away	Capable of handling all piston, turboprop, and business and corporate jet aircraft. The largest turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use another airport, such as General Mitchell International, located 30 minutes' highway travel time away	Capable of handling all piston, turboprop, and business/corporate jet aircraft. The largest turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use another airport, such as General Mitchell International, located 30 minutes' highway travel time away
Construction Cost[a]	None	$2,950,000	$510,000
Land Requirements	No land acquisition required in fee simple No easements required	Acquisition of 115 acres of land in fee simple, of which 46 acres are prime agricultural land, nine acres are isolated natural resource areas, 22 acres are residential, five acres are manufacturing, and 33 acres are other agricultural lands, for the extension of the crosswind runway Acquisition of runway protection zone over 12 acres of land of which one acre is prime agricultural land, 9 acres are residential, and 2 acres are manufacturing Extension of the crosswind runway would require the relocation of 17 residences and one manufacturer, and closing of CTH N for about one-half mile between STH 142 and IH 94	Acquisition of one acre of manufacturing land in fee simple for the provision of runway protection zones No easements required
Environmental Impact	No primary or secondary environmental corridor, or isolated natural areas to be disturbed No wetlands to be disturbed.	Two acres of isolated natural resource area which are also wetlands would be needed for Runway 14 safety area. Mitigation would be likely. Another 10 acres of wetlands would be acquired but not disturbed	No primary or secondary environmental corridors or isolated natural acres to be disturbed No wetlands to be disturbed
Probability of Implementation	High. No land or easement acquisition necessary	Low. Significant land acquisition required for construction of crosswind runway extension with attendant disruption to existing residences and a business	High. Only one acre of land acquisition and no easement acquisition necessary

[a]*Construction costs were estimated only for items required for a comparison of the airfield improvements included under each alternative and do not include the cost of terminal, hangar, and other improvements that would be common to any alternative.*

Source: SEWRPC.

Under Alternatives 2 and 3, which include an extension of the primary runway to 6,400 feet, most of the larger turboprop aircraft over 12,500 pounds in gross weight and business and corporate jets would be able to use Kenosha Regional Airport under 90 percent useful load conditions. This capability is considered important for business and corporate jet aircraft, which need to fly long trip stages from the Kenosha Regional Airport, and the larger turboprop aircraft, which need to carry nearly full payloads to accommodate industrial shipments or air cargo movements. With an extension of the primary runway to 6,400 feet, as proposed under Alternatives 2 and 3, the only

nonair carrier or nonmilitary aircraft types that would be unable to use the airport on a regular basis under 90 percent useful load conditions would be the largest corporate aircraft, with airport reference codes of D-I and D-II. Such aircraft represent a very small proportion of all types of business and corporate jet aircraft. Such aircraft operating under 90 percent useful load conditions would need to use the nearest airport with suitable facilities, General Mitchell International Airport, about 29 miles and 30 minutes' highway travel time to the north.

The major difference between Alternatives 2 and 3 is the extension of the crosswind runway from a length of 4,440 feet to 5,200 feet under Alternative 2. The primary purpose of this runway extension would be to accommodate most of the aircraft that use the airport during times when the primary runway would be unusable because of severe crosswinds. It is estimated that such conditions may be expected no more than 10 percent of the time.

With respect to the other key differences among the alternatives, the construction costs of the airfield improvements are significantly higher for Alternative 2 than for Alternatives 1 and 3, primarily because of the acquisition of businesses and residences necessary to extend the crosswind runway under Alternative 2. Alternative 3 would require the acquisition of only a small amount of additional land for airport development, while Alternative 2 would require the acquisition of a significant amount of land for the extension of the crosswind runway.

Alternatives 1 and 3 would not disrupt any primary or secondary environmental corridors, isolated natural areas, or wetlands. Alternative 2 would require the conversion of about two acres of wetlands to airport use. Alternative 2 would also require the closing of 38th Street for about one-half mile, between STH 142 and IH 94, in the Town of Somers, to allow for the crosswind runway extension. Thirty-eighth Street is currently maintained as CTH N, but is recommended to be converted to a local nonarterial street under the recent third-generation regional transportation system plan.

With respect to the probability of implementation, Alternatives 1 and 3 may be expected to have a high probability of implementation because most of the site has already been acquired for airport purposes. Conversely, Alternative 2 may be expected to have a low probability of implementation because of the disruption of local businesses and residences involved in land acquisition for the extension of the crosswind runway.

The Advisory Committee concluded that Alternative 3 should be included in the new regional airport system plan with regard to the development of the Kenosha Regional Airport. Alternative 3 includes the extension of the existing primary runway from a length of 5,500 feet to 6,400 feet, but maintains the crosswind runway at its existing length of 4,440 feet. It was noted that both Alternatives 2 and 3 would serve the future demand at the airport as forecast under the regional airport system planning effort. While none of the alternatives considered would be capable of accommodating the very largest types of corporate jets under 90 percent useful load conditions, such use was concluded to represent a very small fraction of all activity at this airport and could be more cost- effectively accommodated at General Mitchell International Airport, which is directly accessible from Kenosha Regional Airport via IH 94. It was further noted that while Alternatives 2 and 3 were comparable, the major difference was the longer crosswind runway under Alternative 2. It was further concluded that a crosswind runway longer than the existing 4,440 feet would be required for only a very small number of aircraft operations annually under the most extreme weather conditions. However, the development costs of Alternative 2 were estimated to be over five times greater than those of Alternative 3. It was therefore concluded that Alternative 3 would provide essentially the same aviation benefits as Alternative 2, but without the disruption to existing development on the north side of the airport.

West Bend Municipal Airport

With respect to the West Bend Municipal Airport, the deficiency analysis found that the existing 4,500-foot primary runway length was adequate to accommodate the existing demand but was less than adequate to accommodate the forecast critical aircraft group expected to use the airport regularly by the plan design year 2010. The existing 4,500-foot-long primary runway is intended to accommodate virtually all small piston and turboprop aircraft of under 12,500 pounds in gross weight with airport reference codes of A-I, B-I, A-II, B-II, and C-II.

The desirable primary runway length under future demand conditions was determined, on the basis of the forecasts prepared under the regional airport system planning effort, to be 5,500 feet. A

primary runway of this length would not only be able to continue to accommodate virtually all small piston and turboprop aircraft, but could also accommodate a variety of larger turboprop aircraft of over 12,500 pounds in gross weight and most business and corporate jets, although the latter only under 60 percent useful load conditions. Such large turboprop and jet driven aircraft have airport reference codes of A-II, A-III, B-1, B-II, B-III, C-I, C-II, D-I, and D-II. It should be noted that a primary runway length of 5,500 feet would accommodate neither the largest military aircraft nor large air carrier type jet aircraft. The activity generated by the larger general aviation aircraft at West Bend Municipal Airport may be expected to be related to increased use by businesses and industries in Washington and Ozaukee Counties and to based general aviation aircraft and operations relocating from busier airports, including General Mitchell International Airport. Thus, West Bend Municipal Airport may be expected to increase its importance as a reliever airport for Mitchell International.

As noted in Chapter II of this report, the City of West Bend in 1990 initiated implementation of the long-recommended primary runway extension at the airport by undertaking a runway extension feasibility study and the preparation of a purpose and need statement in cooperation with the Wisconsin Department of Transportation. The former was completed in May 1993[2], the latter in April 1994[3]. These studies revalidated the need for a 5,500-foot-long primary runway, a full instrument landing system, and expansion of the terminal area at West Bend Municipal Airport, all as recommended in both the first- and second-generation regional airport system plans.

With respect to the runway extension, 10 alternatives were identified and evaluated including alternatives under which the primary runway and parallel taxiway construction would require the relocation of STH 33, placing STH 33 into an underpass below the extended primary runway and taxiway, relocating a portion of the Milwaukee River, bridging the Milwaukee River, and reconstruction on a significantly different alignment.

During February 1995, work was begun on the required environmental assessment for the proposed improvements. The assessment is intended to evaluate the alternatives identified in the runway feasibility study as well as any potential new alternatives that may be proposed. Completion of the environmental assessment was anticipated in 1996. In May 1995, the advisory committee guiding the environmental assessment concluded that the detailed assessment should be focused on five specific alternatives, one of which represents the no-build alternative. The no-build and the four action alternatives were also considered in the regional airport system planning effort to address the identified primary runway deficiency at the West Bend Municipal Airport. These alternatives are shown in Maps 44, 45, 46, 47, and 48.

The first alternative considered would maintain the existing primary runway length of 4,500 feet as well as the same general airfield configuration. To comply with FAA standards and guidelines, this alternative would require a crosswind runway and parallel taxiway of 3,600 feet in length. The existing crosswind runway is already 3,900 feet in length. However, review of the existing airfield configuration as depicted on the current airport layout plan indicated that the existing runway safety areas are of insufficient length to meet FAA standards. In addition, some hangar facilities in the terminal area would need to be relocated to permit the parallel taxiway for the northwest-southeast runway to be completed. To allow for runway safety areas of adequate size, a 1.9- mile-long segment of STH 33 would require relocation to a new alignment about one-quarter mile north of the existing alignment. Analysis of the existing airfield, with the primary runway length remaining at 4,500 feet, indicated that converting the northeast-southwest runway to the primary runway would be preferable to continued use of the northwest-southeast runway as the primary runway. This would be more cost-effective, less disruptive to the residences along STH 33, and allow for future airport terminal expansion in the area northeast of the existing terminal area. Accordingly, the first alternative envisions the existing airfield configuration to be maintained, consisting of a 4,500-foot-long primary runway and parallel taxiway on a northeast-southwest alignment and a 3,900-foot-long crosswind runway and parallel taxiway on a northwest-southeast alignment.

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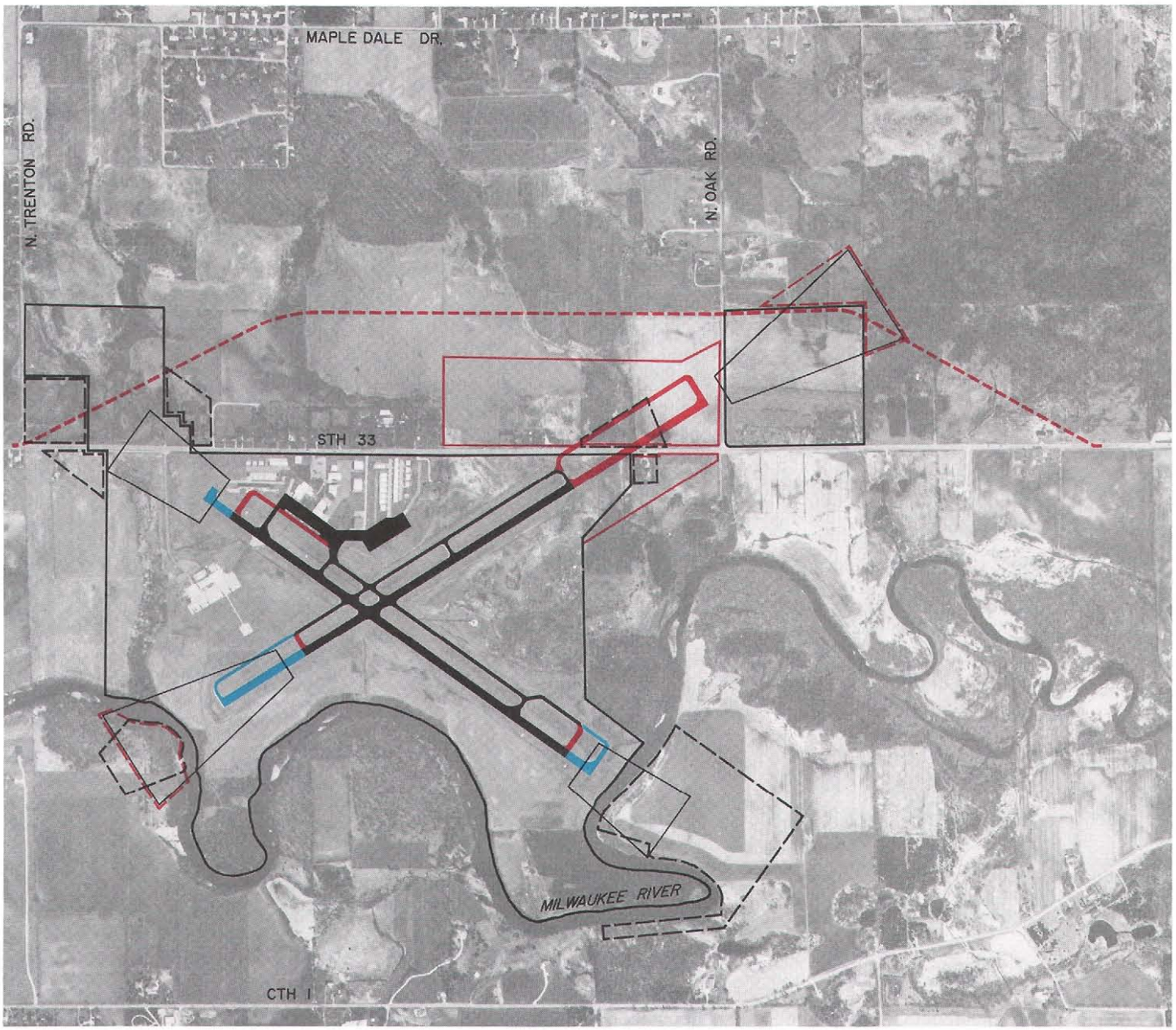
[2]*See Wisconsin Department of Transportation, West Bend Airport Runway Feasibility Study, May 1993.*

[3]*See Wisconsin Department of Transportation, Purpose and Need Statement for Proposed Improvements at the West Bend Municipal Airport, West Bend, Wisconsin, April 1994.*

Map 44

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 1 FOR WEST BEND MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING PROPOSED

- PAVED RUNWAYS, TAXIWAYS, AND APRONS
- PROPERTY BOUNDARY
- EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

- PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

- APPROXIMATE LOCATION

GRAPHIC SCALE

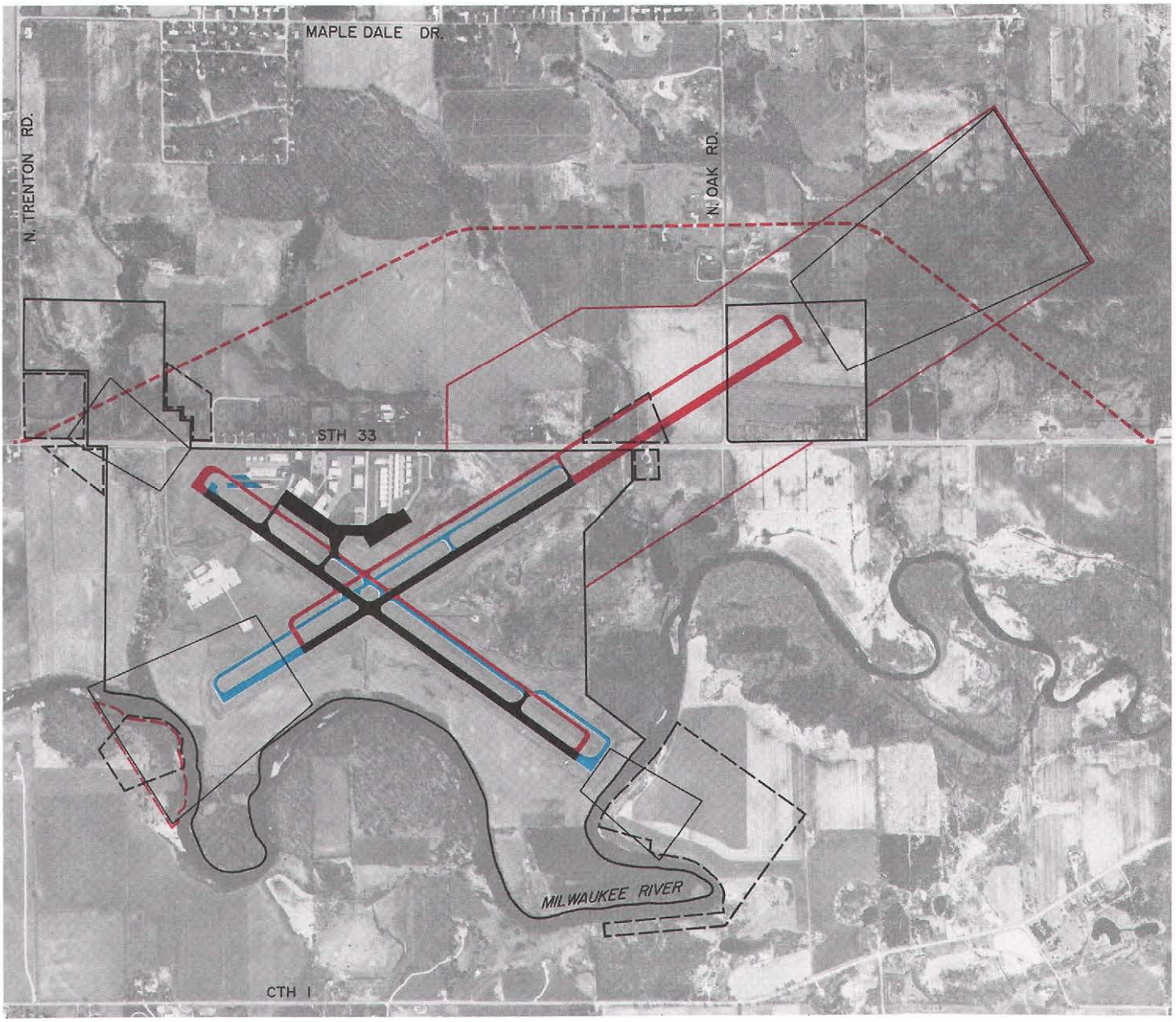
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 45

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 2 FOR WEST BEND MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING PROPOSED

PAVED RUNWAYS, TAXIWAYS, AND APRONS

PROPERTY BOUNDARY

EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

APPROXIMATE LOCATION

GRAPHIC SCALE

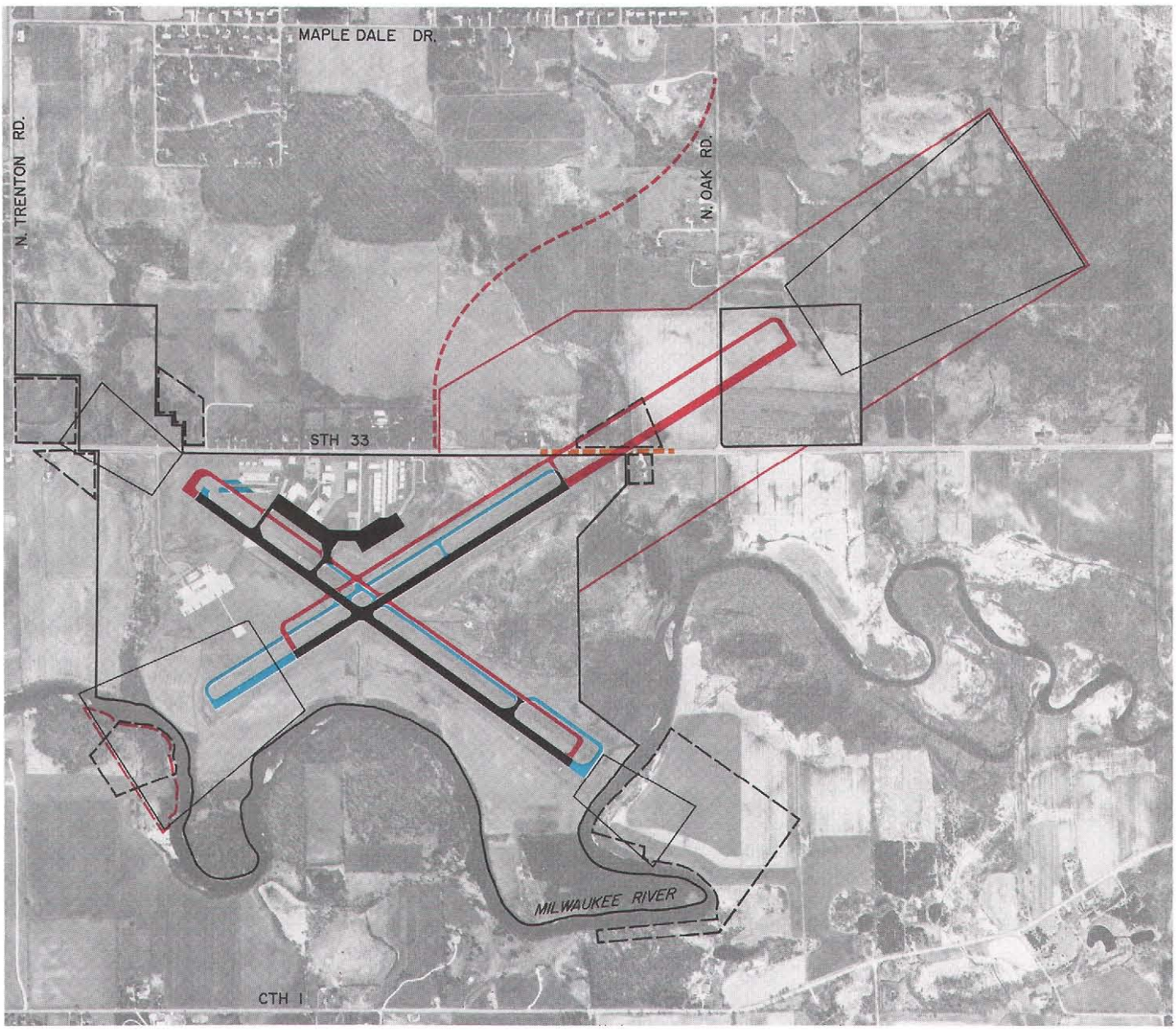
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 46

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 3 FOR WEST BEND MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING PROPOSED

- PAVED RUNWAYS, TAXIWAYS, AND APRONS
- PROPERTY BOUNDARY
- EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

- PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

- APPROXIMATE LOCATION
- STH 33 TO BE PLACED IN TUNNEL UNDER RUNWAY AND TAXIWAYS

GRAPHIC SCALE

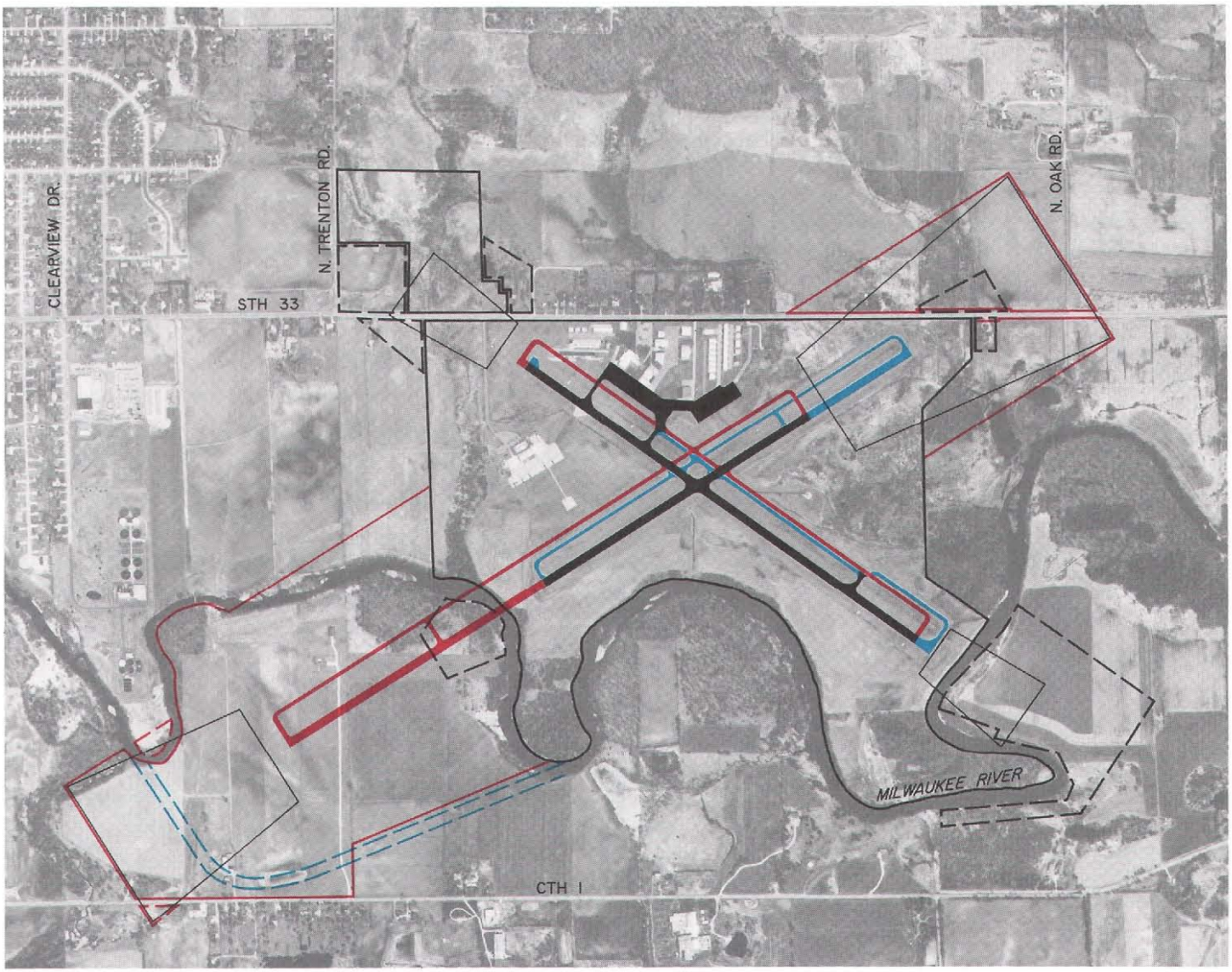
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 47

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 4 FOR WEST BEND MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING PROPOSED

PAVED RUNWAYS, TAXIWAYS, AND APRONS

PROPERTY BOUNDARY

EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

RIVER RELOCATION

RIVER RELOCATION

GRAPHIC SCALE

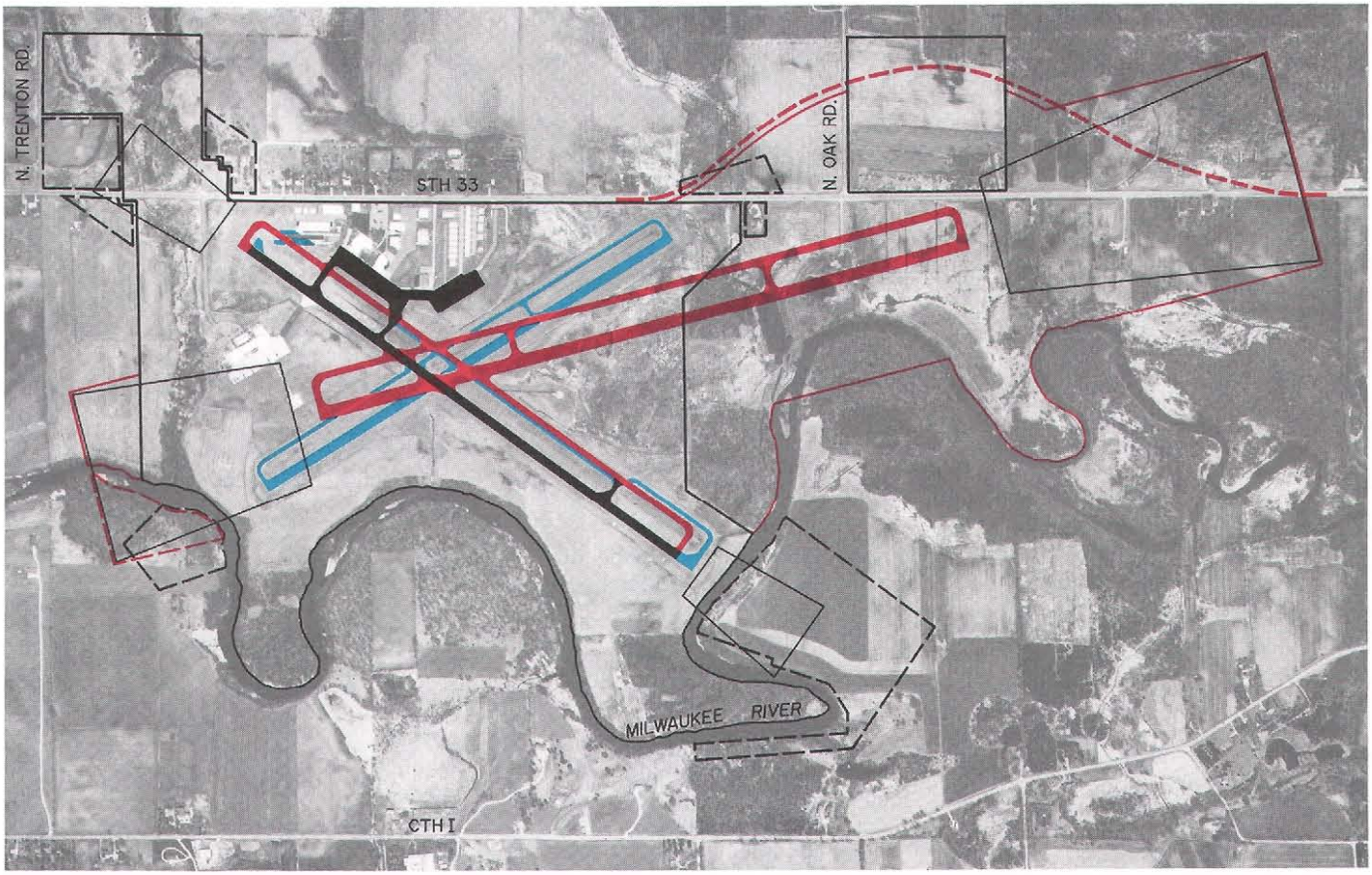
0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 48

PRIMARY RUNWAY ALIGNMENT ALTERNATIVE 5 FOR WEST BEND MUNICIPAL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
		EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

APPROXIMATE LOCATION

GRAPHIC SCALE

0 400 800 1600 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

The second alternative considered represents the airfield configuration recommended in the adopted airport master plan and the second-generation regional airport system plan as of January 1995. This alternative includes the widening from 75 feet to 100 feet and lengthening from 3,900 feet to 5,500 feet of the existing northeast-southwest crosswind runway to convert that secondary runway into a new primary runway. The new primary runway would permit the airport to accommodate the critical aircraft identified under the forecast future demand conditions. To comply with Federal standards and guidelines, this alternative would require a crosswind runway and parallel taxiway of 4,400 feet in length. The existing primary runway, which would become the crosswind runway, is already 4,500 feet in length. Future terminal expansion would occur in the area northeast of the existing terminal area. This alternative would require the relocation of a 2.2 mile long segment of STH 33 to a new alignment about one-half mile north of the existing alignment.

The third alternative considered also includes the widening from 75 feet to 100 feet and the lengthening from 3,900 to 5,500 feet of the existing northeast-southwest crosswind runway to convert that secondary runway to a new primary runway. Unlike Alternative 2, STH 33 under this alternative would remain on its existing horizontal alignment. The new primary runway and taxiway would be carried over the highway on a bridge. This would require the depression of the highway to below the existing ground level. In addition, about one mile of North Oak Road would have to be relocated to the west to connect with STH 33 and to allow for future terminal expansion envisioned to occur in the area northeast of the existing terminal area. To comply with Federal standards and guidelines, this alternative would require a crosswind runway and parallel taxiway of 4,400 feet in length. The existing primary runway, which would become the crosswind runway, is already 4,500 feet in length and would be shortened by 100 feet to allow for the required runway safety areas. Future terminal expansion would occur in the area northeast of the existing terminal area.

The fourth alternative considered also includes the widening from 75 feet to 100 feet and the lengthening from 3,900 feet to 5,500 of the existing northeast-southwest crosswind runway to convert that secondary runway to a new primary runway. The new primary runway, however, would be extended in a southwesterly direction so as to not interfere with the alignment of STH 33. This would require the relocation of a 1.3-mile-long segment of the Milwaukee River to provide sufficient area for the extension of the runway and taxiway, the provision of an adequate runway safety area, and the provision of a future terminal expansion area. To comply with FAA standards and guidelines, this alternative would require a crosswind runway and parallel taxiway of 4,400 feet in length. The existing primary runway, which would become the crosswind runway, is already 4,500 feet long but would be shortened by 100 feet to allow for runway safety areas of appropriate size.

The fifth alternative considered includes the reorientation, lengthening, and widening of the existing northeast-southwest crosswind runway to become a new primary runway. The new primary runway and parallel taxiway would be 75 feet wide and 5,500 feet long on an orientation of North 70 degrees East. This alternative would require the relocation of STH 33 for about one mile at the east end of the airport to allow for an adequate runway safety area and for future terminal expansion. To comply with FAA standards and guidelines, this alternative would require a crosswind runway and parallel taxiway of 4,400 feet in length. The existing primary runway, which would become the crosswind runway, is already 4,500 feet long but would be shortened by 100 feet to allow for a runway safety area.

The alternative of completely relocating the airport to a new site in the West Bend area was also considered. This alternative, however, was dismissed from further consideration under the regional airport system planning effort for several reasons. First, a new Transport-Corporate category airport would require a site of at least 700 acres in size. This land requirement would dwarf the amount of land required to expand the existing airports under any of the alternatives. Second, a new airport site should be located on the periphery of the City of West Bend to continue providing an adequate level of service within the overall system. However, the urban development occurring around the periphery of the City of West Bend, together with the generally rolling topography common in the West Bend area, would make it difficult to locate a relatively level and undeveloped site of sufficient size for such an airport. Third, given the land uses in the area concerned, the development of a new site may be expected to result in greater disruption than expansion of the existing site. A new airport site would require, not only the acqui-

sition of existing residential uses, but also the acquisition of prime agricultural lands and conversion of such lands to nonfarm uses. Fourth, a large and ongoing investment of public funds has already been made at the existing airport site. The development of a new site may require the reimbursement of the Federal funding involved by the City of West Bend. Fifth, the extension of essential utilities and municipal services, including adequate ground transportation access, would be needlessly costly, given the availability of such utilities and services at the existing site. Finally, the site for the development of a new airport would probably be far enough away from the City of West Bend that it would probably lose the City as an airport sponsor. In that case, the next most likely sponsor could be expected to be Washington County, which has not shown any interest in sponsorship of an airport.

The advantages and disadvantages of each of the five alternatives considered are summarized and compared in Table 110. The alternatives considered were evaluated with respect to the impact on aviation demand, construction costs, land requirements, environmental impacts, and probability of implementation. Key differences among the five alternatives were identified under each of these considerations. With respect to the impact on aviation demand, all five alternatives would be capable of accommodating virtually all single-engine and twin-engine piston and turboprop aircraft, although only those under 12,500 pounds in gross weight. Alternatives 2 through 5, however, would also be capable of accommodating a wide variety of business and corporate jet aircraft under 60 percent useful load conditions. The new forecast of future general aviation aircraft activity in the Region anticipates the need to accommodate such demand at West Bend Municipal Airport over the plan design period.

With respect to other key differences among the action alternatives, Alternative 5 would have the lowest construction cost, $11.2 million, while Alternative 2 would have the highest, $18.2 million. All the alternatives would require some land acquisition, ranging from about 210 acres under Alternative 3 to about 260 acres under Alternative 4, and would entail some relocation costs. Alternatives 1, 2, and 5 would require the relocation of STH 33, although the length of the relocated segment would vary with each alternative. Alternative 3 would require the construction of a runway and taxiway bridge over STH 33 as well as the relocation of a segment of a local road. Alternative 4 would require the relocation of a reach of the Milwaukee River. The acreages of environmentally important lands that would be affected vary with the alternative, from about 60 acres under Alternative 4 to about 110 acres under Alternative 2. Such lands would need to be acquired for airfield improvements under these alternatives, as well as for provision of adequate runway protection zones, and highway relocations, if necessary. With respect to the probability of implementation, Alternative 4 may be expected to have the lowest such probability. Alternative 4 may be expected to have significant environmental impacts because of the relocation of a reach of the Milwaukee River, an action requiring Wisconsin Department of Natural Resources approval.

Upon consideration of these alternatives, the Advisory Committee concluded that Alternative 5 would provide the most effective option for the improvement of West Bend Municipal Airport because it had the lowest construction cost of the four action alternatives and was judged to be the least disruptive to the surrounding area. Alternative 5 of the four action alternatives includes the construction of a new 5,500-foot-long primary runway on a new alignment and the relocation of an approximately one-mile segment of STH 33. The existing 4,500-foot-long primary runway would be converted to a crosswind runway and be shortened by 100 feet to allow sufficient area for runway safety areas. It was noted by the Advisory Committee that an environmental assessment of the four action alternatives considered were still being conducted as the new regional airport system plan was being completed. It was accordingly recognized that the preferred alternative for development of a 5,500-foot-long primary runway at West Bend Municipal Airport may change on the basis of the findings of the environmental assessment.

IDENTIFICATION AND EVALUATION OF AIRPORT ACCESSIBILITY DEFICIENCY IMPROVEMENT ALTERNATIVES

The deficiency analysis presented in Chapter VIII indicated that the seven-county Region was well served by a basic system of 10 public-use airports. Two areas were found to meet the airport accessibility travel time standards only marginally: east-central Washington County and west-central Ozaukee County, combined, and southern Walworth County, as shown on Map 49.

Table 110

EVALUATION OF ALTERNATIVE PRIMARY RUNWAY LENGTHS AT WEST BEND MUNICIPAL AIRPORT

Key Consideration	Alternative No. 1: Maintain Existing Primary Runway Length of 4,500 Feet	Alternative No. 2: Extend Existing Runway to 5,500 Feet and Relocate STH 33	Alternative No. 3: Extend Existing Runway to 5,500 Feet and Construct Bridge Over STH 33	Alternative No. 4: Extend Existing Runway to 5,500 Feet and Relocate Milwaukee River	Alternative No. 5: Construct 5,500-Foot Runway on New Alignment and Relocate STH 33
Impact on Aviation Demand	Capable of handling all single-engine and multi-engine piston and turboprop aircraft and, therefore, most nonjet business aircraft. Business and corporate jet aircraft would have to use other airports, such as Fond du Lac County, Sheboygan County Memorial, Waukesha County-Crites Field, or General Mitchell International. These airports are located from 45 to 50 minutes' highway travel time away	Capable of handling all piston and turboprop aircraft and larger turboprop and business and corporate jet aircraft partially loaded to 60 percent useful load conditions. All turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use General Mitchell International, located 50 minutes' highway travel time away	Capable of handling all piston and turboprop aircraft and larger turboprop and business and corporate jet aircraft partially loaded to 60 percent useful load conditions. All turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use General Mitchell International, located 50 minutes' highway travel time away	Capable of handling all piston and turboprop aircraft and larger turboprop and business and corporate jet aircraft partially loaded to 60 percent useful load conditions. All turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use General Mitchell International, located 50 minutes' highway travel time away	Capable of handling all piston and turboprop aircraft and larger turboprop and business and corporate jet aircraft partially loaded to 60 percent useful load conditions. All turboprop and business and corporate jet aircraft in excess of a 60 percent useful load would have to use General Mitchell International, located 50 minutes' highway travel time away
Construction Cost[a]	$4,140,000	$18,200,000[b]	$17,500,000[b]	$13,200,000	$11,200,000
Land Requirements	Would require conversion of existing crosswind runway to primary runway and provision of adequate runway safety areas, therefore requiring the relocation of two residences and a 1.9-mile segment of STH 33, and additional airport terminal area. Portions of five farms to be acquired These improvements would require acquisition of 96 acres of land in fee simple, of which 61 acres are prime agricultural land, 22 acres are primary environmental corridor, two acres are secondary environmental corridor, one acre is residential, and 10 acres are other agricultural lands Also, acquisition of runway protection zone easements over 20 acres of land, of which eight acres are prime agricultural land, 11 acres are primary environmental corridor, and one acre is other agricultural land	Extension of the existing crosswind runway to become the new primary runway would require the relocation of four residences, one business, and a 2.2-mile segment of STH 33, and additional terminal area. Portions of nine farms to be acquired These improvements would require acquisition of 236 acres of land in fee simple, of which 110 acres are prime agricultural land, 106 acres are primary environmental corridor, one acre is secondary environmental corridor, one acre is residential, and 18 acres are other agricultural lands, for extension of runway, terminal area, and relocation of STH 33 Also, acquisition of runway protection zone easements over 12 acres of land, of which two acres are prime agricultural land, eight acres are primary environmental corridor, and two acres are other agricultural lands	Extension of the crosswind runway to become the new primary runway would require the relocation of four residences, one business, and a 1.0-mile segment of N. Oak Road, and additional terminal area. Portions of eight farms to be acquired These improvements would require acquisition of 207 acres of land in fee simple, of which 102 acres are prime agricultural land, 92 acres are primary environmental corridor, one acre of secondary environmental corridor, one acre is residential, and 12 acres are other agricultural lands, for terminal area, and relocation of N. Oak Road Also, acquisition of runway protection zone easements over 11 acres of land, of which two acres are prime agricultural land, seven acres are primary environmental corridor, and two acres are other agricultural lands	Extension of the crosswind runway to become the new primary runway would require the relocation of five residences, all or part of eight farms, and a 1.3-mile segment of the Milwaukee River, and additional terminal area These improvements would require acquisition of 265 acres of land in fee simple, of which 191 acres are prime agricultural land, 61 acres are primary environmental corridor, three acres are residential, and 10 acres are other agricultural lands, for the extension of runway, terminal area, and relocation of the river Also, acquisition of runway protection zone easements over three acres of land, of which one acre is primary environmental corridor, and two acres are residential lands	Construction of a new primary runway on a new alignment would require the relocation of six residences and one business, a portion of the Army National Guard facility, all or part of six farms, a 1.1-mile segment of STH 33, and additional terminal area These improvements would require acquisition of 252 acres of land in fee simple, of which 103 acres are prime agricultural land, 92 acres are primary environmental corridor, three acres are residential, and 54 acres are other agricultural lands, for extension of runway, terminal area, and relocation of STH 33. Also, acquisition of runway protection zone easements over 10 acres of land, of which eight acres are primary environmental corridor, and two acres are other agricultural lands
Environmental Impact	Acquisition of land would require 22 acres of primary environmental corridor, two acres of secondary environmental corridor, and no isolated natural areas. Existing trees on such lands may have to be cleared or topped Acquisition of 23 acres of wetlands, of which 20 acres would be impacted and require mitigation	Acquisition of land would require 106 acres of primary environmental corridor, one acre of secondary environmental corridor, and no isolated natural areas. Existing trees on such lands may have to be cleared or topped Acquisition of 102 acres of wetlands,of which 40 acres would be impacted and require mitigation	Acquisition of land would require 92 acres of primary environmental corridor, one acre of secondary environmental corridor, and no isolated natural areas. Existing trees on such lands may have to be cleared or topped Acquisition of 86 acres of wetlands,of which 24 acres would be impacted and require mitigation	Acquisition of land would require 61 acres of primary environmental corridor, and no secondary environmental corridor areas or isolated natural areas. Existing trees on such lands may have to be cleared or topped Acquisition of 47 acres of wetlands,of which 15 acres would be impacted and require mitigation	Acquisition of land would require 92 acres of primary environmental corridor, and no secondary environmental corridor or isolated natural areas. Existing trees on such lands may have to be cleared or topped. Acquisition of 80 acres of wetlands,of which 27 acres would be impacted and require mitigation
Probability of Implementation	Low. Provision of adequate runway safety areas will require some land acquisition, relocation of STH 33, disruption of some environmental areas, and mitigation of wetland impacts without providing any improvement to the airport's ability to handle future aviation demand	Medium. Represents development that has been long recommended in adopted airport master plan and regional airport system plan. Significant land acquisition required for construction of new primary runway extension with attendant disruption to some existing residences and environmental areas. Relocation of STH 33 required. Mitigation of disruption to wetlands likely to be necessary	Medium. Significant land acquisition required for construction of new primary runway extension with attendant disruption to some existing residences and environmental areas. Construction of runway and taxiway bridge over STH 33 required. Mitigation of disruption to wetlands likely to be necessary	Low. Significant land acquisition required for construction of new primary runway extension with attendant disruption to some existing residences and farms. Significant impacts to environmental area expected due to the relocation of a portion of the Milwaukee River. Obtaining consensus among agencies and units of government for relocation of river likely to be difficult	Medium. Significant land acquisition required for construction of new primary runway extension with attendant disruption to some existing residences and environmental areas. Relocation of STH 33 required. Mitigation of disruption to wetlands likely to be necessary

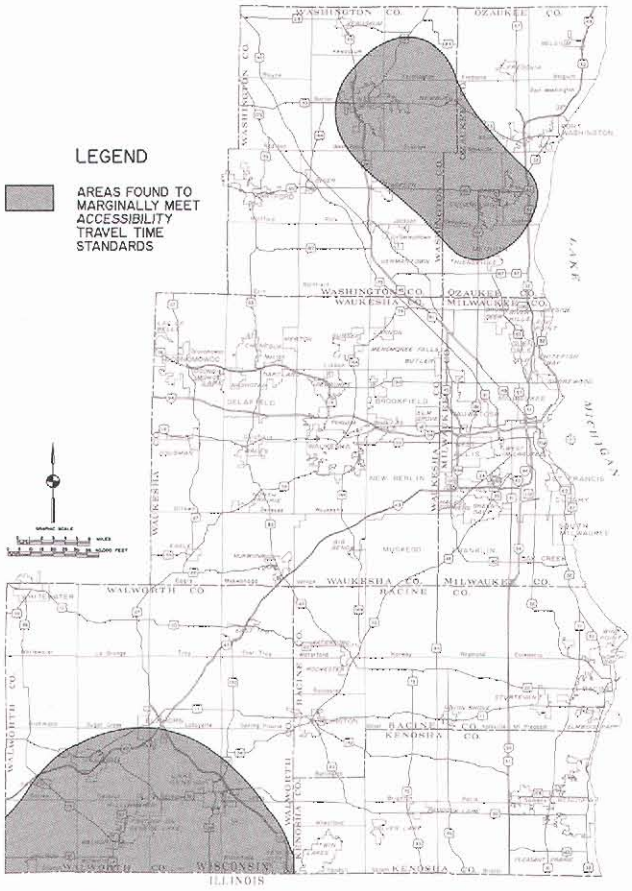
[a]Construction costs were estimated based only upon items required for a comparison of the airfield improvements included under each alternative and do not include the cost of terminal, hangar, airfield lighting, and other improvements that would be common to any alternative.

[b]Includes installation of full instrument landing system.

Source: Coffman Associates, for the City of West Bend, and SEWRPC.

Map 49

AIRPORT ACCESSIBILITY DEFICIENCIES IN THE EXISTING REGIONAL AIRPORT SYSTEM: 1994



The deficiency analysis indicated that the seven-county Southeastern Wisconsin Region would be well served by a basic system of 10 public-use airports. However, two areas were found to meet the airport accessibility travel time standards only marginally. The first area included both a portion of east-central Washington County and a portion of west-central Ozaukee County. The second area included a portion of southern Walworth County.

Source: SEWRPC.

Washington and Ozaukee County Accessibility

Portions of Washington and Ozaukee Counties near the communities of West Bend and Cedarburg were found to be approaching the 45-minute travel time standard for Transport-Corporate airports. The nearest Transport-Corporate airports to these portions of Washington and Ozaukee Counties were Sheboygan County Memorial Airport, Fond du Lac County Airport, Waukesha County-Crites Field, and General Mitchell International Airport. An analysis of highway travel times from these portions of Ozaukee and Washington Counties to West Bend Municipal Airport indicated that the development of West Bend Municipal Airport from a General Utility airport to a Transport-Corporate airport, recommended in the system plan, would significantly reduce such travel times in Ozaukee and Washington Counties and fully address this accessibility problem. West Bend Municipal Airport is well located to serve much of Ozaukee and Washington Counties. Thus, improvement of West Bend Municipal Airport to Transport-Corporate standards would not only accommodate forecast aviation demand in this area of the Region, but also would improve airport accessibility. Accordingly, it was determined that there was no further need to examine other alternatives for improving the accessibility of airports to general aviation users in the Ozaukee and Washington County portions of the Region.

Walworth County Accessibility

A portion of Walworth County near the communities of Lake Geneva, Williams Bay, Delavan, and Walworth was found to be approaching the 45-minute travel time standard for Transport-Corporate airports, as well as the 30-minute travel time standard for General Utility and Basic Utility airports. The Transport-Corporate airport facilities nearest to this portion of Walworth County were the Rock County Airport, located between the Cities of Janesville and Beloit, and Kenosha Regional Airport. The General Utility and Basic Utility airports nearest to this portion of Walworth County were Lake Lawn Airport, near the City of Delavan, and Grand Geneva Airport, near the City of Lake Geneva. Both airports were privately owned and, while open for use by the general public, had little or no fixed-base operator facilities and no hangar storage space. In addition, neither airport is currently included in the regional airport system plan as an essential airport to be maintained over the long-term future. The public-use airports nearest to this portion of Walworth County included in either the regional airport system plan for Southeastern Wisconsin or the State airport system plans for either Wisconsin or Illinois include East Troy Municipal Airport; Burlington Municipal Airport; Rock County Airport; Fort Atkinson Municipal Airport; Dacy Airport, near the City of Harvard, Illinois; and Galt Wonder Lake Airport, near the City of Greenwood, Illinois.

An analysis of highway travel times from this portion of Walworth County to existing and potential new sites for Transport-Corporate, General Utility, and Basic Utility Airports indicated that a

potential general aviation airport of a suitable classification located in central Walworth County, particularly in the City of Elkhorn area, would serve to reduce such travel times and address this issue of accessibility. The only airport currently included within the regional airport system plan within Walworth County is East Troy Municipal Airport, located in the northeastern corner of Walworth County. Because an airport centrally located in the Elkhorn area would improve the accessibility for this portion of Walworth County, the desirability of including such an airport in the regional airport system plan for Southeastern Wisconsin was further assessed.

The original, first-generation, regional airport system plan, completed in 1976, recommended that an airstrip on the south side of the City of Elkhorn, Gruenwald Field, be developed into a public-use general aviation airport to serve much of Walworth County. The City of Elkhorn in 1976 requested that such an airport be deleted from the regional airport system plan. Gruenwald Field was subsequently abandoned by the owner in 1984. The second-generation regional airport system plan, completed in 1987, recommended more extensive improvements at East Troy Municipal Airport than would have been the case had Gruenwald Field been retained in the plan. In 1988, the City of Elkhorn requested that consideration be given to the development of a general aviation airport in the Elkhorn area and the addition of such general aviation airport to the regional airport system plan. With the assistance of State of Wisconsin Department of Transportation, Bureau of Aeronautics, the Commission initiated a aviation needs study of the Elkhorn area in 1989, the findings of which have been incorporated into the regional airport planning effort.

Three full-service general aviation airports included in the regional airport system plan currently serve the Elkhorn area. These include East Troy Municipal Airport, currently classified as a General Utility facility, located 13 miles northeast of Elkhorn; Burlington Municipal Airport, currently classified as a Basic Utility facility, located 15 miles east of Elkhorn; and Rock County Airport, currently classified as an Air Carrier airport but functioning principally as a Transport-Corporate facility, located 39 miles west of Elkhorn. There are also two privately owned public-use airports located in the vicinity of Elkhorn: Lake Lawn Airport located five miles southwest of Elkhorn, and Grand Geneva Airport, located 11 miles south of Elkhorn, at Lake Geneva. Both airports, intended primarily to serve resort activity, with paved runways, have little or no fixed-base operator services and no aircraft storage facilities. Lake Lawn Airport has an effective runway length of about 4,100 feet. Grand Geneva Airport, formerly referred to as Americana Airport, has an effective runway length of about 3,500 feet. It was closed in October 1991, but reopened in August 1994.

Of the aircraft currently registered to Elkhorn area individuals and businesses, about one-third are based at, and use, Burlington Municipal Airport; about one-quarter are based at, and use, other nearby public-use airports, primarily East Troy Municipal, but also Lake Lawn, Grand Geneva, Fox River, and Palmyra Municipal Airports; the remainder are based at, and use, private airstrips or are kept at off-airport locations. Of the business-related aviation activity generated by the Elkhorn area, over two-thirds of the aircraft operations were estimated to occur at either Burlington Municipal or Lake Lawn Airports.

The general aviation activity generated in the Elkhorn area can be measured in terms of the number and type of based aircraft and the number of aircraft operations. Nonbusiness-related general aviation activity may be expected to continue to account for most of the general aviation traffic generated by the Elkhorn area. The number of aircraft which may be expected to be based at an airport in the Elkhorn area was estimated to increase from 29 in 1990 to 44 in 2010. Most of these aircraft would be of a single-engine piston aircraft. The demand for business jet operations may be expected to be relatively small and performed by itinerant aircraft based outside of Walworth County. Accordingly, the critical aircraft type for an airport in the Elkhorn area was identified as a medium-sized twin-engine turbocraft seating six to eight people with an airport reference code of B-I.

The total number of general aviation operations that may be expected to be generated by the Elkhorn area was estimated to increase from about 17,000 in 1990 to about 26,000 by the year 2010. Of these, business-related operations were estimated to increase from about 2,300 in 1990, about 13 percent of all operations, to about 9,200 in the year 2010, about 35 percent of all operations.

The results of a business and corporate aviation survey conducted as part of the second-generation regional airport system planning effort indicated

that a distance of about 10 miles and a travel time of 15 minutes appears to represent an appropriate maximum desirable distance between business locations and appropriately sized airports. In comparison, the generally accepted maximum driving distances and travel times from residences and jobs to various classifications of airports are 15 miles and 30 minutes for Basic Utility and General Utility airports and 30 miles and 45 minutes for Transport-Corporate airports.

On the basis of these analyses, it may be concluded that Burlington Municipal and East Troy Municipal Airports may be expected to provide an adequate level of service, in terms of accessibility, capacity, and services and facilities, for all nonbusiness-related general aviation activity expected to be generated by the Elkhorn area. These same airports, however, may not be expected to provide an adequate level of service for business and corporate general aviation services expected to be generated by the Elkhorn area in terms of accessibility, especially if a shorter driving distance of 10 miles and a travel time of 15 minutes are used as standards.

Lake Lawn Airport may be expected to serve the existing and forecast future business and nonbusiness aviation needs generated by the Elkhorn area in terms of accessibility, convenience, and capacity, but not in terms of fixed-base operator services or aircraft hangar facilities. Grand Geneva Airport would be limited as to the type of business aircraft that could be accommodated because its useful runway length has recently been shortened from 4,100 feet to 3,500 feet. There is, however, no guarantee that either of these privately owned public-use airports will continue to operate over the long term.

The principal general aviation-related deficiency impacting the Elkhorn area was identified as a lack of appropriate airport facilities close enough to be readily accessible and convenient to Elkhorn area businesses and offering at least the basic airport services and facilities and capable of relied upon being available over the long term future. It was estimated that, in 1990, about 2,300, about 13 percent, of the 17,400 total airport operations that may be expected to be generated by the Elkhorn area, were of a business or corporate nature. By the year 2010, it was estimated that about 9,200, 35 percent, of the forecast 26,400 operations, would be of a business or corporate nature. Thus, the volume of business-related aviation activity generated by the Elkhorn area that may lack appropriate facilities within an appropriate distance was found to be modest.

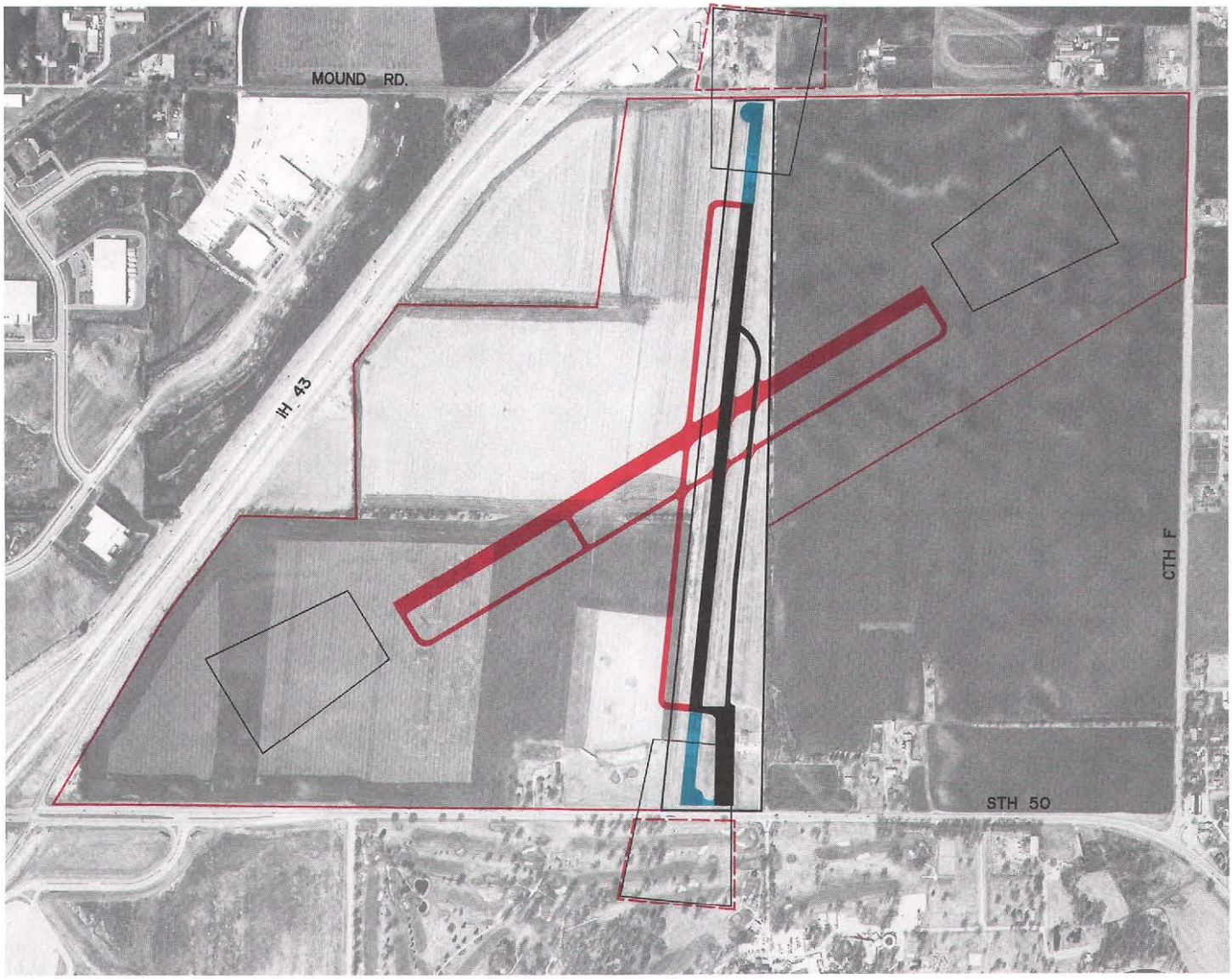
Three alternatives addressing the accessibility deficiency in the Elkhorn area were considered. Under the first alternative, the Elkhorn area would continue to be served primarily by the Burlington Municipal and East Troy Municipal Airports. Under this alternative, no new airports would be added to the regional airport system plan within Walworth County. This alternative assumes that the primary runway at Burlington Municipal Airport will ultimately be extended to 4,800 feet, as recommended in the preliminary regional airport system plan. Thus, larger turboprop and business jet aircraft operations generated by business activity in much of Walworth County would be able to be accommodated at Burlington Municipal Airport. General aviation operations by smaller general aviation aircraft could be accommodated at both Burlington Municipal and East Troy Municipal Airports.

Under the second alternative considered, an existing airport site in the Elkhorn area would be included in the regional system plan. Such an existing airport site would have to be capable of being improved to a General Utility airport, with a minimum primary runway length of 3,900 feet. A primary runway of this length would enable all small aircraft of under 12,500 pounds gross weight with a airport reference code of A-I, A-II, and B-I to be accommodated. These airport reference codes include almost all single- and multi-engine piston aircraft and many of the turboprop general aviation aircraft, but not business and corporate jets. Although there were an insufficient number of business and corporate jet operations forecast in the year 2010 to warrant the development of a longer primary runway, the alternative airport sites analyzed were sized so that the primary runway, at some time beyond the plan design year of 2010, could be extended to a length of 4,800 feet to accommodate a variety of business or corporate jets. To comply with FAA standards and guidelines, this alternative would also include the provision of a paved crosswind runway and parallel taxiway at least 3,200 feet long. Only one existing airport site in the Elkhorn area was found to be a promising alternative in this regard, Lake Lawn Airport, located about eight miles southwesterly of the City of Elkhorn. This alternative is shown on Map 50.

Under the third alternative considered, a new airport site would be acquired and developed in the

Map 50

ELKHORN AREA AIRPORT ALTERNATIVE 2



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
(NONE)		EASEMENT BOUNDARY

FACILITIES TO BE REMOVED

PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Elkhorn area. Such a new airport would function as a General Utility airport, with a primary runway length of 3,900 feet. To comply with FAA standards and guidelines, this alternative also includes the provision of a crosswind runway at least 3,200 feet long,as well as sufficient area for the development of adequate terminal facilities. A primary runway of this length would enable all small aircraft of under 12,500 pounds gross weight with a airport reference code of A-I, A-II, and B-I to be accommodated. These airport reference codes include almost all single- and multi-engine piston aircraft and many of the turboprop general aviation aircraft, but not business and corporate jets. Although there were an insufficient number of forecast business and corporate jet operations in the year 2010 to warrant the development of a longer primary runway, the alternative airport sites analyzed were sized so that the primary runway, at some time beyond the plan design year 2010, could be extended to a length of 4,800 feet to accommodate a variety of business or corporate jets.

The identification of adequate alternative airport sites utilized a number of screening criteria, including proximity to the City of Elkhorn; suitable service area; a level, open, and solid airport site; appropriate surrounding topography; compatible surrounding development; minimal use of environmental corridors; absence of conflicts with the airspace of other already established airports; and adequate local access to the local and regional highway system. On the basis of these screening criteria, five potential new airports sites were identified in the Elkhorn area, as shown on Map 51. A comparison of these five potential sites indicated many similarities. For purposes of the regional airport system planning update, one of these sites was selected to represent the third alternative: the Jackson Creek site, lying about four miles south of downtown Elkhorn and about two miles south of the Elkhorn industrial park. This site is shown in Map 52.

An evaluative comparison of the three alternatives considered is presented in Table 111. The alternatives were evaluated regarding the impact on aviation demand, construction costs, land requirements, environmental impact, and the probability of implementation. With respect to the impact on aviation demand, Alternatives 2 and 3 would provide an airport facility capable of handling a wide variety of single-engine, multi-engine, and turboprop general aviation aircraft. Alternative 1 would require that general aviation activity generated in the Elkhorn area continue to be accommodated at nearby airports, such as Burlington and East Troy Municipal airports. The small number of business jet aircraft operations expected to be generated by the Elkhorn area would be required to use Burlington Municipal Airport under any of the alternatives, assuming that the primary runway at Burlington Municipal Airport is extended to 4,800 feet, as recommended in the preliminary regional system plan.

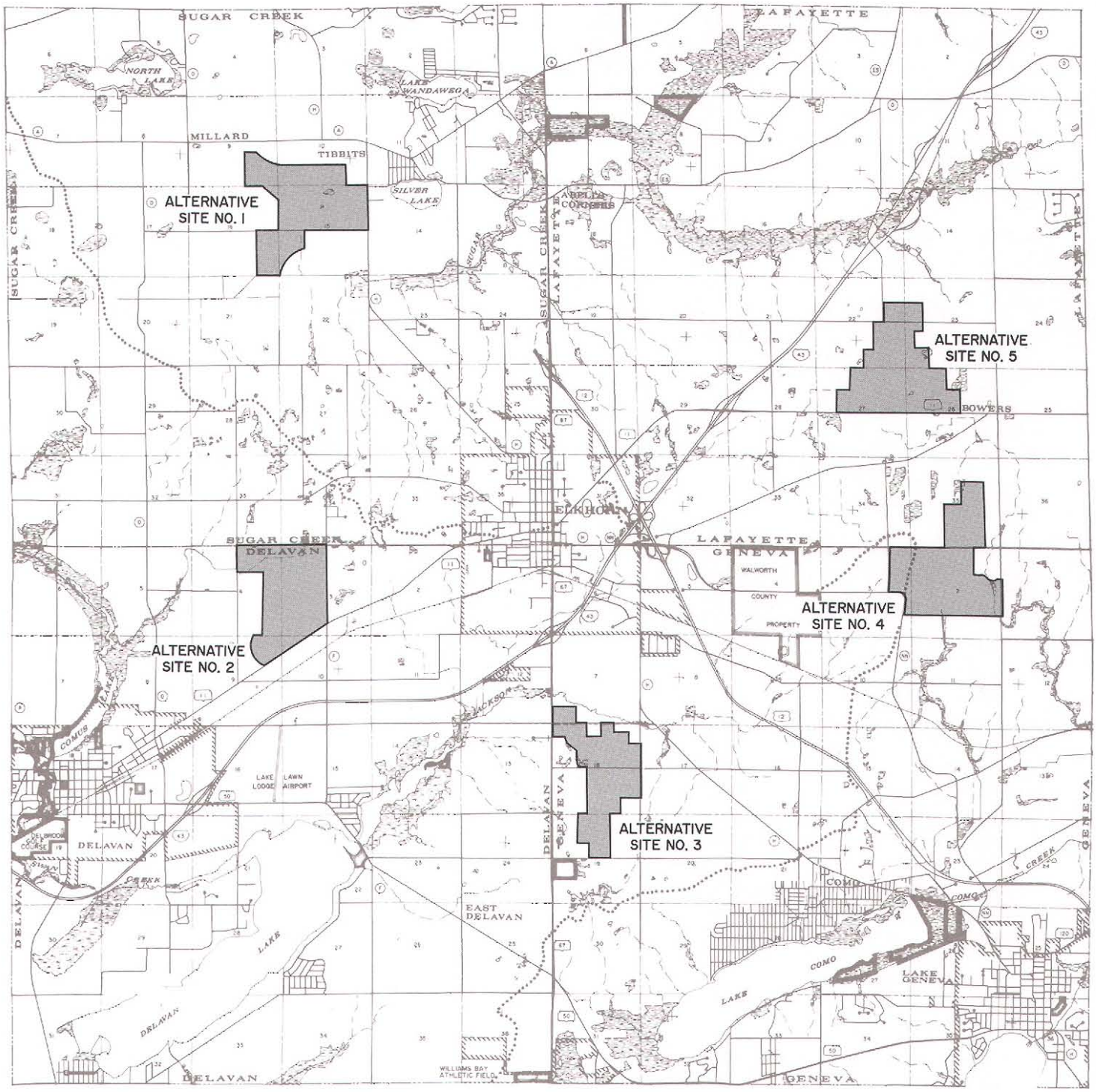
With respect to other key differences among the alternatives, the construction costs of the airfield improvements are significant under Alternatives 2 and 3. Likewise, land requirements under Alternatives 2 and 3 would be similar. Much of the land required is prime agricultural land. Under Alternative 3, one segment of a local road would be closed and one segment of another local road would be relocated. There would be no construction or land acquisition costs under Alternative 1, since this alternative includes no airport development. The environmental impact under all three alternatives may be expected to be minimal.

With respect to the probability of implementation, Alternative 1 may be expected to have the highest probability of implementation because it would maintain the status quo. Alternatives 2 and 3 would have a low probability of implementation for several reasons. First, the construction cost for developing either a new site or the existing Lake Lawn Airport site into a General Utility airport meeting FAA standards would be significant. Even though some of this cost might be covered by State and Federal funding, the local share would still range between $500,000 and $1 million. Second, the sites concerned would require the conversion of from 400 to 600 acres of prime agricultural land. Third, there is little indication that strong support exists for such an airport development project among the local elected officials and residents. Close cooperation among, and strong support for the development from, local municipalities and Walworth County would be vital. Fourth, such a project would require the county or a local unit of government to act as a sponsor. Because there does not appear to be strong or widespread support for such an airport development in Walworth County, it does not appear likely that the County or a local unit of government would be willing to act as sponsor.

It was accordingly concluded by the Advisory Committee that Alternative 1 would be best. This alternative assumes that general aviation airport

Map 51

ALTERNATIVE SITES FOR A NEW GENERAL AVIATION AIRPORT IN THE ELKHORN AREA

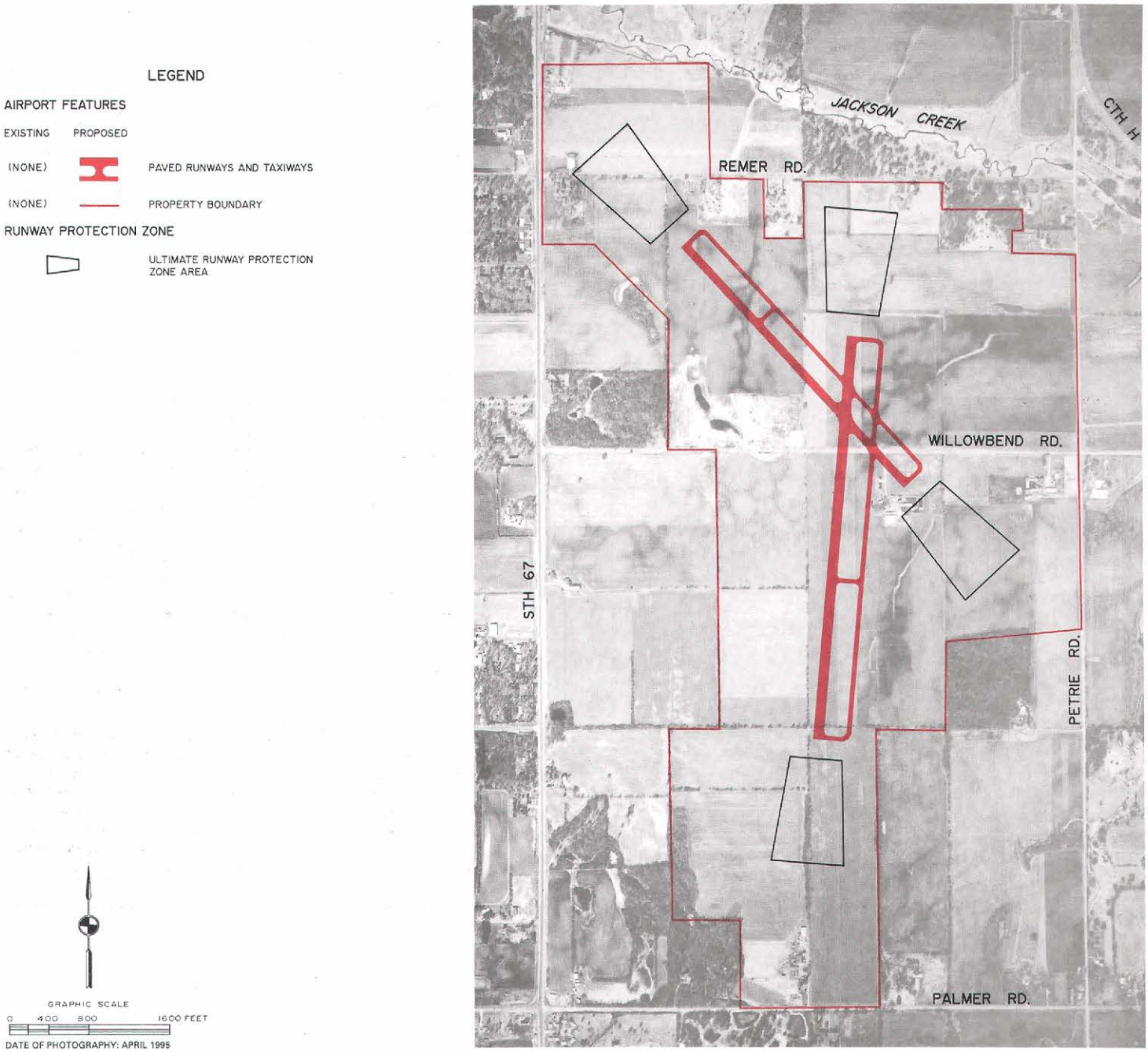


One of three alternatives considered to address the identified accessibility deficiency for general aviation airports in Walworth County consisted of acquiring and developing a new airport site in the vicinity of Elkhorn. Such a new airport would function as a General Utility airport and would need to comply with Federal Aviation Administration standards and guidelines for airfield location and design. Five potential new sites were identified in the Elkhorn area for such an airport.

Source: SEWRPC.

Map 52

ELKHORN AREA AIRPORT ALTERNATIVE 3



Source: SEWRPC.

service will continue to be provided to the Elkhorn area primarily by Burlington Municipal Airport and by East Troy Municipal Airport. It was noted that, while the Elkhorn area maybe expected to generate a modest level of general aviation activity, such activity, in terms of based aircraft and annual aircraft operations, was not nearly enough to warrant the development of a new airport. Furthermore, much of the existing and forecast future general aviation activity may be expected to be of a personal or nonbusiness nature and related to use of small single-engine and the smallest twin-engine aircraft. In addition, both East Troy Municipal Airport, which is only 15 minutes' highway driving time away from the Elkhorn area via IH 43, and Burlington Municipal Airport, which is only 20 minutes' highway travel time away via STH 11, are capable of handling all single-engine, multi-

Table 111

EVALUATION OF AIRPORT ALTERNATIVES FOR THE ELKHORN AREA

Key Consideration	Alternative 1: Service Provided by Nearby Existing Airports	Alternative 2: Development of Lake Lawn Airport	Alternative 3: Development of a New Airport Site
Impact on Aviation Demand	Anticipated general aviation activity generated by the Elkhorn area would continue to be accommodated by the other nearby airports, principally, Burlington Municipal Airport, which is located 15 miles and 20 minutes' highway travel time away, and East Troy Municipal Airport, which is located 13 miles and 15 minutes' highway driving time away	Capable of handling all single-engine multi-engine, and most turboprop aircraft and, therefore, most nonjet business aircraft	Capable of handling all single-engine multi-engine, and most turboprop aircraft and, therefore, most nonjet business aircraft
Construction Cost[a]	None	$11.2 million	$7.4 million
Land Requirements	None	Acquisition of 410 acres of land in fee simple, of which 40 acres are the existing airport lands, 226 acres are undeveloped land zoned for commercial or residential use, and 144 acres are prime agricultural lands. Portions of two farms to be acquired	Acquisition of 610 acres of land in fee simple, of which 559 acres are prime agricultural land. Nine acres are isolated natural area, six acres are secondary environmental corridor, and 36 acres are other agricultural lands. All or portions of 12 farms to be acquired. About 0.7-mile of Remer Road to be relocated and about 0.7-mile of Willow Bend Road to be closed
Environmental Impact	None	No primary or secondary environmental corridors or isolated natural areas would be disturbed No wetland areas would be disturbed	Nine acres of isolated natural resource area and six acres of secondary environmental corridor would be needed for airport development Some 12 acres of wetlands would be required for airport development
Probability of Implementation	High. Would require no action by Elkhorn area officials	Low. Significant land acquisition required and significant capital investment with appropriate local share would be required. A local unit of government would have to sponsor airport site development. The likelihood of such a willing local sponsor to begin implementation appears very low	Low. Significant land acquisition required and significant capital investment with appropriate local share would be required. A local unit of government would have to sponsor airport site development. The likelihood of such a willing local sponsor to begin implementation appears very low

[a]*Construction costs do not include those costs associated with new or expanded terminal and hangar facilities related to increased activity levels which costs would be the same under all alternatives.*

Source: SEWRPC.

engine, and most turboprop aircraft and also have fixed-base operator and aircraft storage facilities available. Moreover, Burlington Municipal Airport is recommended to be improved to accommodate a wider variety of business aircraft. Importantly, under Alternative 1, a significant increase in the capital cost of the regional airport system plan would be avoided, from 400 to 600 acres of prime agricultural land would be kept in agricultural use, and the challenge of identifying a local sponsor for the major airport development project would not have to be faced.

IDENTIFICATION OF A REVISED AND UPDATED REGIONAL SYSTEM OF RELIEVER AIRPORTS

The revised and updated system plan is to recommend a regional system of airports, identifying the type and function of each airport in the system, including the identification of reliever airports for the major commercial airport serving the Region, General Mitchell International Airport. Since Mitchell International is expected to be the only scheduled air carrier airport within the Region

through the plan design year of 2010, the remaining airports of the basic regional system of airports should be expected to accommodate much of the general aviation activity that might otherwise be using Mitchell International. These general aviation airports are intended to serve the entire area within an acceptable distance and travel time and to act as reliever airports as well.

The FAA defines reliever airports as airports functioning to relieve congestion at a commercial service airport and to provide community access to general aviation facilities. Within the Southeastern Wisconsin Region, reliever airports are intended to divert general aviation aircraft operations away from Mitchell International and effect a better allocation of general aviation demand among all the airports of the Region. In previous regional airport system planning efforts, such a system of reliever airports was concluded to be critical to maintaining the efficient and safe operation of Mitchell International. Should any of the outlying reliever airports become unavailable in the future, a significant portion of the activity accommodated at these airports would be expected to be redirected towards Mitchell International, causing congestion, excessive delays, and potential safety hazards. Thus, the continued efficient and safe operation of Mitchell International is dependant in part upon an adequately improved and maintained system of reliever airports in Southeastern Wisconsin.

Following careful review of the forecasts, analyses, and alternatives under the regional airport system planning effort, the Advisory Committee recommended that all 10 general aviation airports already in the plan be designated as reliever airports, eliminating the need to develop and evaluate alternative reliever airport systems under the regional airport system plan update. The 10 relievers airports were divided into two tiers of relievers.

The Advisory Committee requested that consideration be given to adding Sylvania Airport to the regional airport system plan, designating it as a reliever airport in the system plan. In making this request the Committee recognized that Sylvania Airport continues to act as a reliever airport to other area airports that accommodate corporate and business activity. This issue was accordingly addressed on the basis of whether or not this airport was needed within the Region to accommodate specialized uses, such as sport, recreation, and training activity, thereby providing relief to other airports in the system plan tended to accommodate significant volumes of higher performance activity, such as business, corporate, and commercial aircraft operations. The following findings were made with respect to this issue.

In 1993, there were 47 aircraft based at Sylvania Airport and the facility experienced 38,400 annual aircraft operations. With respect to based aircraft, Sylvania Airport ranked twelfth highest of the 22 public-use airports within Southeastern Wisconsin. With respect to annual aircraft operations, Sylvania Airport ranked tenth highest. Thus Sylvania Airport exhibited activity levels similar to those of other general aviation airports in the regional airport system, such as Burlington Municipal and Hartford Municipal. The historic trend in the number of based aircraft at Sylvania Airport has been varied; that number was 34 in 1971, decreased to 28 in 1984, and then increased to 47 in 1993. The number of annual operations, however, has increased steadily, from 12,000 in 1971 to 16,300 in 1984, to 38,400 in 1993, and is forecast to increase to 47,000 by 2010.

The FAA has established criteria for the designation of reliever airports. Those criteria require that a reliever airport must provide either substantial capacity relief or instrument flight training relief as evidenced by either a current or forecast activity level of at least fifty based aircraft, a current or forecast activity level of at least 25,000 annual itinerant operations, or a current or forecast activity level of at least 35,000 annual local operations, or a determination by the Regional Administrator of the FAA that the airport is a desirable location for instrument training activity. Sylvania Airport's current level of 47 based aircraft is forecast to increase to 59 by the year 2010. Because the number of based aircraft may be expected to exceed the threshold level of 50 aircraft during the plan design period, Sylvania Airport would meet the FAA criteria for reliever airports. With respect to aircraft operations, annual itinerant operations at the Airport may be expected to increase from 11,500 in 1993 to 14,100 in 2010; annual local operations may be expected to increase from 26,900 in 1993 to 32,900 in 2010.

Sylvania Airport provides a facility that attracts specialized types of aircraft operations that are not desirably accommodated at other airports within the regional system plan. Such specialized recreation

and sport operations as glider activity, as well as pilot training and proficiency operations, are characterized by speed and maneuvers significantly different from those of the usual general aviation activity, especially with respect to higher performance aircraft, such as business and corporate jets. The operating efficiency and safety of the regional airport system can be enhanced by separating, to the maximum extent possible, sport, recreation, and training activity from other general aviation activity. Sylvania Airport helps achieve such separation by providing an alternative airfield for sport, recreation, and training activities to other airports in the regional system plan.

Sylvania Airport was included in earlier generations of the Regional and State airport system plans. The retention of Sylvania Airport in the Regional airport system plan has received significant local support in the past because the airport was perceived to have a positive impact on economic development efforts in the IH-94 South freeway corridor and because it handles sport and training activity that Batten Airport does not wish to accommodate. Furthermore, the Racine County Board of Supervisors has supported keeping Sylvania Airport in the plan. In April of 1987, the Racine County Board of Supervisors unanimously adopted a resolution recommending that the Sylvania Airport be retained in the airport system plan for the Southeastern Wisconsin Region. The resolution further stated that the ownership of the airport should remain in the private sector; Racine County would consider sponsorship of this airport only if a change in ownership that would result in the abandonment of the airport and conversion to other land uses were contemplated.

Inclusion of Sylvania Airport in the new Regional airport system plan would increase the total airfield capacity of the regional airport system by about 108,000 operations annually. This additional airfield capacity is not needed on a systemwide basis. In terms of the total number of forecast design year 2010 aircraft operations in the plan, sufficient excess capacity would be available at other nearby public airports in the plan, especially Burlington Municipal and Batten Airports.

Inclusion of Sylvania Airport in the new Regional airport system plan would increase the total capital cost for airport improvements in the new plan by about $2 million dollars. If the airport would need to be publicly acquired, an additional $800,000 capital cost would be incurred. Any significant expansion of Sylvania Airport would probably require public funding assistance for land acquisition and airfield improvements. To be eligible for such assistance as a privately-owned public-use facility, it will be necessary for Sylvania Airport to be designated as a reliever airport. In addition, a commitment to contribute the necessary local share of capital funding will be required from either the private airport owner or a local public sponsor.

Given these findings, the Advisory Committee recommended that Sylvania Airport be retained as a reliever airport in the new Regional airport system plan. It was noted that while this airport would not be necessary for maintaining sufficient systemwide capacity and is not intended to be equipped for instrument training, the current role of the airport in serving a significant volume of activity generated by small general aviation aircraft, particularly sport and recreation aircraft, within the Region was recognized as important. By attracting such activity away from other airports in the regional system that accommodate business, corporate and commercial aircraft activity, such as Batten Airport, Kenosha Regional Airport, and General Mitchell International Airport, Sylvania Airport may be expected to continue to contribute to a safer, less congested, system of public airports within Southeastern Wisconsin.

The first tier of reliever airports includes those intended to operate as the principal relievers, providing alternatives to Mitchell International, for the operation of the highest-performance general aviation aircraft, such as business and corporate jets. First-tier reliever airports must be well located throughout the Region in order to provide an alternative to Mitchell International. These airports include Batten Airport, Burlington Municipal Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. All the first-tier reliever airports should ultimately be equipped with a full instrument landing system and be classified as Transport-Corporate airports. As of May 1995, three of these airports, Batten and Kenosha Regional Airports and Waukesha County-Crites Field, were classified as Transport-Corporate airports. The fourth airport, West Bend Municipal, was classified as a general utility airport, but has been recommended to be improved and upgraded to Transport-Corporate standards. The fifth airport, Burlington Municipal, was classified as a Basic Utility airport, but is recommended under this regional airport system plan update to be improved and upgraded to Transport-Corporate

standards. As of May 1995, all these airports except Burlington Municipal were designated by the FAA as reliever airports.

The second tier of reliever airports includes airports intended to attract both smaller business and nonbusiness general aviation aircraft away from Mitchell International and to relieve the first-tier reliever airports by attracting smaller aircraft from the latter. The second-tier reliever airports are intended to provide the airport capacity needed to accommodate efficiently the smaller general aviation aircraft within the Region. These airports include Lawrence J. Timmerman Airport, Capitol Airport, Hartford Municipal Airport, East Troy Municipal Airport, and Sylvania Airport. Lawrence J. Timmerman Airport and East Troy Municipal Airport are recommended to be maintained as General Utility airports. Hartford Municipal Airport is recommended to be improved to General Utility standards, while Capitol and Sylvania Airports are recommended to be maintained as Basic Utility airports. As of May 1995, two of these airports, Lawrence J. Timmerman and Capitol, were designated by the FAA as reliever airports. The distribution of first- and second-tier reliever airports within the southeastern Wisconsin Region is shown on Map 53.

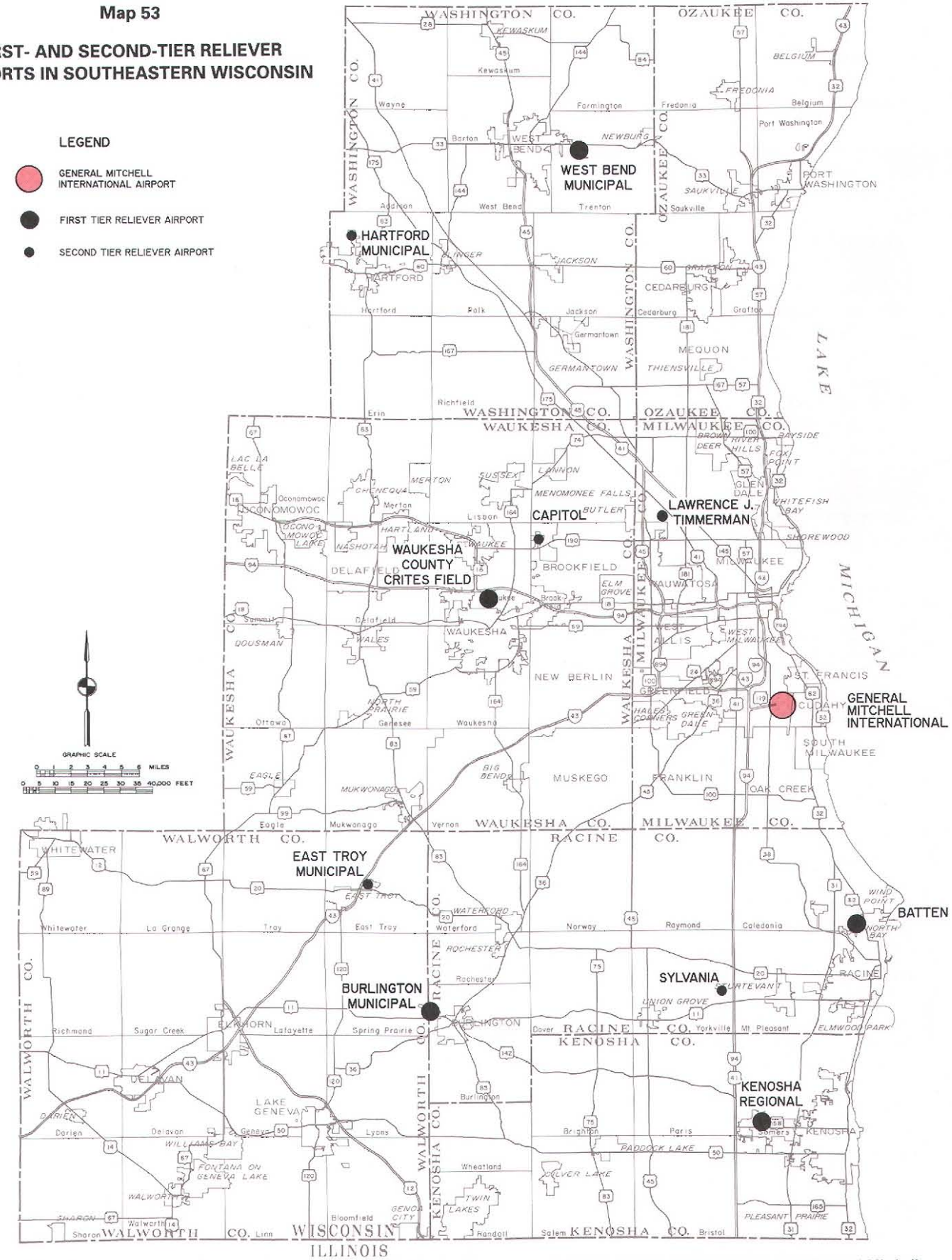
The importance of an adequate system of reliever airports for the Southeastern Wisconsin Region is emphasized by a determination of the additional general aviation activity that may be expected to be imposed on General Mitchell International Airport if one or more of the reliever airports were not available. For each of the airports identified as either a first- or second-tier reliever airport a redistribution of the based aircraft and annual operations to other airports was made under the assumption that the airport would no longer be available for use. Based on this assumption, Table 112 presents the number of based aircraft and the number of annual operations that may be expected to be imposed on Mitchell International by the elimination of each airport.

Under the existing capacity conditions at Mitchell International, its annual service volume was calculated at about 260,000 operations. In 1994, Mitchell International operated at 83 percent of its ASV. The forecast year 2010 level of demand at Mitchell International was estimated at about 237,000 operations. This would result in Mitchell International operating at 91 percent of its ASV, even with all of the surrounding reliever airports in operation. This is well above the 60 percent threshold which is recommended by the FAA to be the level at which the airport owners concerned should begin considering airfield capacity improvements. Diversion of some activity from other reliever airports in the Region may be expected to result in Mitchell International operating at between 92 and 117 percent of its ASV a level varying depending upon the reliever airport assumed to be eliminated, as shown in Table 112. In some cases, the based aircraft and aircraft operations indicated may all be expected to be diverted from the specific reliever airport concerned back to Mitchell International. In other cases, the based aircraft and aircraft operations indicated may be expected to be diverted from the specific reliever airport concerned to another general aviation airport in the Region. This, in turn, may be expected to cause based aircraft and aircraft operations from that airport to be diverted back to Mitchell International. Thus, with activity levels at Mitchell International expected to continue to increase, the diversion of any additional general aviation activity back to Mitchell International may be expected to jeopardize the continued safe and efficient operation of the airport, further increasing its level of operations to, and above, the 60 percent of ASV level. If two or more of the reliever airports were no longer available, the volume of traffic diverted back to Mitchell International could be even greater than that shown in Table 112.

Under the planned future capacity conditions at Mitchell International, its annual service volume was calculated at about 455,000 operations. This assumed the implementation of major planned airfield improvements at Mitchell International, including provision of a third parallel primary runway, which would provide additional airfield capacity. If all the reliever airports remained in operation, the forecast year 2010 level of demand at Mitchell International was estimated to be 237,000 operations, resulting in an activity level at 52 percent of the ASV. This is below the 60 percent threshold recommended by the FAA as the level at which airport owners should begin considering airfield capacity improvements. Diversion of some activity from other reliever airports within the Region back to Mitchell International may be expected to increase the ASV at Mitchell International to between 53 and 67 percent, depending upon the specific released airport concerned, as shown in Table 112. The planned increase in the airfield capacity at Mitchell International could

Map 53

FIRST- AND SECOND-TIER RELIEVER AIRPORTS IN SOUTHEASTERN WISCONSIN



Within the southeastern Wisconsin Region, reliever airports are intended to divert general aviation aircraft operations away from General Mitchell International Airport, promoting the continued efficient and safe operation of Mitchell International and effecting a better allocation of general aviation demand among all the airports of the Region. All 10 general aviation airports considered for inclusion in the Regional system plan should be designated as reliever airports. The 10 reliever airports were divided into two categories: a first tier and a second tier of reliever airports. The first tier was intended to accommodate corporate jet aircraft and other general aviation aircraft. The second tier was intended to accommodate general aviation aircraft except corporate jet aircraft.

Source: SEWRPC.

Table 112

POTENTIAL GENERAL AVIATION ACTIVITY DIVERTED BACK FROM OTHER AIRPORTS TO GENERAL MITCHELL INTERNATIONAL AIRPORT

Airport from Which General Aviation Activity Would Be Diverted Back to General Mitchell International Airport	Activity Diverted Back to General Mitchell International Airport			
	Estimated Number of Based Aircraft Diverted to General Mitchell International Airport	Estimated Diverted 2010 Operations	Resulting Percent of Annual Service Volume	
			Based on Existing Capacity at General Mitchell International Airport[a]	Based on Planned Future Capacity at General Mitchell International Airport[b]
Burlington Municipal	10	6,410	93	53
Batten	34	29,780	103	59
Kenosha Regional	95	67,192	117	67
Waukesha County-Crites Field	54	40,138	107	61
West Bend Municipal	28	27,025	102	58
Capitol	16	13,349	96	55
East Troy Municipal	11	7,670	94	54
Hartford Municipal	6	4,000	92	53
Lawrence J. Timmerman	41	34,953	105	60
Sylvania	12	10,886	95	54

[a]*Annual service volume of 260,000 operations; 237,000 operations, representing 91 percent of existing capacity, expected in year 2010 if planned system of relievers provided.*

[b]*Annual service volume of 455,000 operations; 237,000 operations, representing 52 percent of existing capacity, if planned system of relievers provided.*

Source: SEWRPC.

ultimately reduce some of the future need for reliever airport capacity in the regional airport system, specifically, the need for reliever capacity at Sylvania, Hartford, Burlington Municipal, East Troy Municipal, and Capitol Airports. However, such improvements at Mitchell International may expected to be implemented over a relatively long period of time. It was therefore concluded that the reliever airport system capacity provided by the general aviation airports recommended for inclusion in the regional airport system plan will be necessary for the safe and efficient operation of the entire regional airport system during at least the next two decades.

SUMMARY

This chapter has identified and evaluated alternative regional airport system improvements which could address the existing and probable future regional airport system deficiencies identified in the previous chapter. Three types of airport system deficiencies were identified: airport capacity, primary runway length, and accessibility.

Airfield capacity deficiencies were related to the ability of airports in the regional system to accommodate existing and forecast aircraft operations. The deficiency analysis conducted indicated that only 10 of the existing 23 public-use airports were essential and needed to be retained in operation to provide sufficient airfield capacity to satisfy the existing and forecast year 2010 aviation demand. The 10 essential airports included all eight of the publicly owned airports within the Region and two of the privately owned public-use airports in the Region, Batten and Capitol Airports. The deficiency analysis further indicated that in order for the regional airport system to adequately meet the forecast levels of demand, all 10 of these airports would be required to remain in open use. The only airfield capacity deficiency identified, under

forecast conditions, was at General Mitchell International Airport, particularly with respect to the hourly capacity under IFR conditions.

It was concluded, on the basis of the airfield capacity deficiency analysis, that the airfield capacity improvements recommended under the recently completed General Mitchell International Airport master plan would provide the capacity needed to address these deficiencies. The primary features of these improvements included: the construction of a new 7,000-foot-long runway located about 3,500 feet south of, and parallel to, the primary east-west runway, 7R-25L; the extension of runway 7R-25L by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of 1R-19L by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway safety overrun for the south end of runway 1L-19R; the realignment and extension of runway 7L-25R by about 1,600 feet, to a length of 4,800 feet, parallel to the existing primary east-west runway; construction of new taxiways and taxiway exits; and the decommissioning of runway 13-31.

It was noted that the airfield capacity improvements recommended in the new master plan for Mitchell International are all consistent with specific recommendations contained in the first- and second-generation regional airport system plans. The evaluation of alternatives conducted during the preparation of the new airport master plan concluded that the recommended plan provided the needed airfield capacity with the least disruption to development adjacent to the airport. The regional airport system planning effort reaffirmed the need for the improvements recommended in the new Mitchell International master plan.

Primary runway length deficiencies were related to the ability of airports to accommodate the existing and forecast types of aircraft that will be larger and of higher performance than the existing aircraft. Primary runway length deficiencies under the forecast year 2010 demand conditions were identified at five airports: Burlington Municipal Airport, East Troy Municipal Airport, Hartford Municipal Airport, Kenosha Regional Airport, and West Bend Municipal Airport. Appropriate sets of alternatives were identified and considered to address the deficiencies at each airport. An evaluation of the alternatives for each airport was then made, focusing on key differences among the alternatives regarding the impact on aviation demand, construction costs, land requirements, environmental impacts, and the probability of implementation.

With respect to the Burlington Municipal Airport, it was concluded that the recommended alternative should include the extension of the primary runway from an existing length of 3,600 feet to an ultimate length of 4,800 feet. This would change the classification of the airport from Basic Utility to Transport-Corporate and would improve the level of service to business aviation users of turboprop aircraft and smaller business jets, not only in the Burlington area, but also for the communities of Elkhorn, Lake Geneva, and Williams Bay. The implementation of this extension and such related improvements as the construction of a paved crosswind runway and taxiway and the provision of an instrument landing system would require the acquisition of land and easements, the use of some environmental corridor lands for airport purposes, and the relocation of a small number of residences.

With respect to the East Troy Municipal Airport, it was concluded that the recommended alternative should include the extension of the primary runway from an existing length of 3,900 feet to an ultimate length of 4,400 feet. This would not change the classification of the airport as a General Utility facility but may be expected to result in greater use of the airport by businesses and industries in Walworth County and to increase its importance as a reliever airport for Mitchell International. The implementation of this extension and such attendant improvements as the construction of a paved crosswind runway and taxiway would not require any land acquisition. Some minor disruption to wooded areas in environmental corridors may result, however, from the clearing of obstructions for runway approaches.

With respect to the Hartford Municipal Airport, it was concluded that the recommended alternative should include the construction of a new 3,900-foot-long primary runway and the extension of the existing paved runway, to be used as the crosswind runway from an existing length of 3,000 feet to 3,200 feet. This would change the classification of the airport from Basic Utility to General Utility. The construction of the new runway, as an extension of the existing runway by 200 feet, and attendant improvements would include the acquisition of land and easements and the use of some environmental corridor lands.

With respect to Kenosha Regional Airport, it was concluded that the recommended alternative should include the extension of the primary runway from an existing length of 5,500 feet to an ultimate length of 6,400 feet. The crosswind runway would remain at its existing length of 4,440 feet. The classification of the airport would not change from that of a Transport-Corporate, but the recommended runway extension would allow most large most turboprop and corporate and business jet aircraft which currently use the airport under partially loaded conditions to be accommodated under a full or nearly full load. Thus, this airport may be expected to increase in importance as a reliever airport for Mitchell International as well as for the airports in northeastern Illinois. The implementation of this improvement would require the acquisition of only a small amount of land and would not affect any environmental corridor lands or require the relocation of residences or arterial streets and highways.

With respect to West Bend Municipal Airport, it was concluded that the recommended alternative should include the extension and realignment of the primary runway and taxiway from an existing length of 4,500 feet to an ultimate length of 5,500 feet. This would change the classification of the airport from General Utility to Transport-Corporate. The implementation of this and attendant improvements, such as the installation of an instrument landing system, would require the acquisition of land and easements; the use of some environmental corridor lands; and the relocation of some residences, a portion of a National Guard facility, and a segment of STH 33.

Most of the Region was found to be adequately served by the basic system of 10 public-use airports, all of which were in operation in 1994. However, some areas of the Region met the travel time standards used to measure such accessibility only if selected airports in counties adjacent to the Region were considered. Also, these areas of the Region were found to be approaching the maximum travel time limits for certain airport classifications. One such area consisted of a portion of Washington and Ozaukee Counties near the communities of West Bend and Cedarburg. This area was found to be approaching the 45-minute travel time standard for access to Transport-Corporate type airports. The long recommended improvement of the West Bend Municipal Airport from a General Utility facility to a Transport-Corporate facility would bring this area into compliance with the recommended standard, capable of accommodating a variety of business jet aircraft.

The only other area of the Region with an identified accessibility deficiency was a portion of Walworth County near the communities of Delavan, Williams Bay, Walworth, and Lake Geneva. This area was found to be approaching the maximum travel time limit of 45 minutes for access to Transport-Corporate type airports and the maximum 30-minute travel time limit for access to General Utility and Basic Utility airports. Several alternatives were examined to address this deficiency. The alternatives considered included the development of an existing airport site in the Elkhorn area and the development of a new airport site in the Elkhorn area. It was concluded that the area should continue to be served by the provision of airport service provided principally by Burlington Municipal Airport and by East Troy Municipal Airport. Both airports were found to be well located to serve to much of central and southern Walworth County. Furthermore, the recommended improvement of Burlington Municipal Airport from a Basic Utility airport to a Transport-Corporate airport, accommodating a variety of business jet aircraft would meet the aviation needs of this area adequately. The recommended response would avoid a significant increase in the capital cost of implementing the regional airport system plan and avoid the need to identify a new local sponsor for a major airport development project.

As part of this regional system airport planning effort, a regional system of reliever airports was also identified. Reliever airports have the function of relieving congestion at the sole commercial service airport within the region, General Mitchell International Airport, and of providing adequate access to general aviation facilities. Such a system of reliever airports was concluded in previous regional system planning efforts to be critical to maintaining the efficient and safe operation of Mitchell International and avoiding excessive congestion, delays, and potential safety hazards at that airport. The revised and updated system plan recommended that the 10 general aviation airports already in the plan be retained to serve as reliever facilities to General Mitchell International Airport.

The recommended system of reliever airports was divided into two tiers. The first is to consist of

those reliever airports that are intended to attract the highest-performance general aviation aircraft, such as business and corporate jets. These airports include Batten Airport, Burlington Municipal Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The second is to consist of those airports intended to attract both smaller business aircraft and non-business aircraft. These airports include Lawrence J. Timmerman Airport, Capitol Airport, Hartford Municipal Airport, East Troy Municipal Airport, and Sylvania Airport.

Chapter X

RECOMMENDED AIRPORT SYSTEM PLAN

INTRODUCTION

This chapter presents a recommended system of airports which can provide the Southeastern Wisconsin Region with safe and efficient air transportation facilities to the year 2010. This recommended airport system plan is largely based upon a preliminary system plan which was presented at a series of public meetings and hearings and has been modified to respond to the hearing comments. The recommended regional airport system consists of a basic system of 11 airports, all of which are currently open for use by the general public. Eight of these airports are publicly owned; three are privately owned. The plan recommends the continued operation of, but not necessarily the acquisition of, the three privately owned airports. Public acquisition of these three airports is recommended only if private operation is proposed to be discontinued. The plan recognizes that this basic system of 11 airports may be supplemented by up to 12 privately owned and operated airports that are also open to public use.

The 11 airports comprising the basic system are identified and described in terms of their recommended classification; capacity, that is, volume of aircraft operations that can be accommodated; and the types of aircraft that can be accommodated. These characteristics determine the required size of the airport site and the type and extent of major facilities necessary at each airport. The plan provides recommendations for each of the 11 airports comprising the basic system with respect to necessary major improvements, including land acquisition and runway, apron, navigational aid, and terminal facility improvements, and with respect to control of surrounding land uses to provide for the safe and efficient operation of the airport. The capital investment required to improve each of the 11 airports composing the basic system in accordance with the plan recommendations is estimated and the institutional structure necessary to carry out the recommendations of the plan described. This new regional airport system plan is also compared to the second-generation regional airport system plan, adopted by the Regional Planning Commission in 1987.

The development of this regional airport system plan for Southeastern Wisconsin was based upon extensive study, including the conduct of inventories of the existing airport system facilities and of aviation demand in the Region. Analyses of the various types of aviation activity allowed forecasts of future levels of aviation activity to be prepared for air carrier operations, general aviation, and military aviation. Analyses were conducted of the ability of the existing regional airport system to satisfy the existing and forecast demand. Major deficiencies related to the existing and probable future capacity, primary runway length, and accessibility were identified and alternative improvements to address these deficiencies were then identified and evaluated. The analyses then indicated that, assuming implementation of certain improvements, the existing and future forecast aviation demand can be accommodated at an acceptable level of service by a system of eight publicly owned airports and three privately owned airports. Thus it was concluded that, to meet the existing and probable future aviation demand within the Region, there was no need to ensure the continued operation of a system consisting of more than these 11 public-use airports.

This chapter presents the preliminary recommended plan as taken to public meetings and hearing, a summary of the public reaction to the preliminary plan, the Advisory Committee response to the public comment, and the final recommended plan.

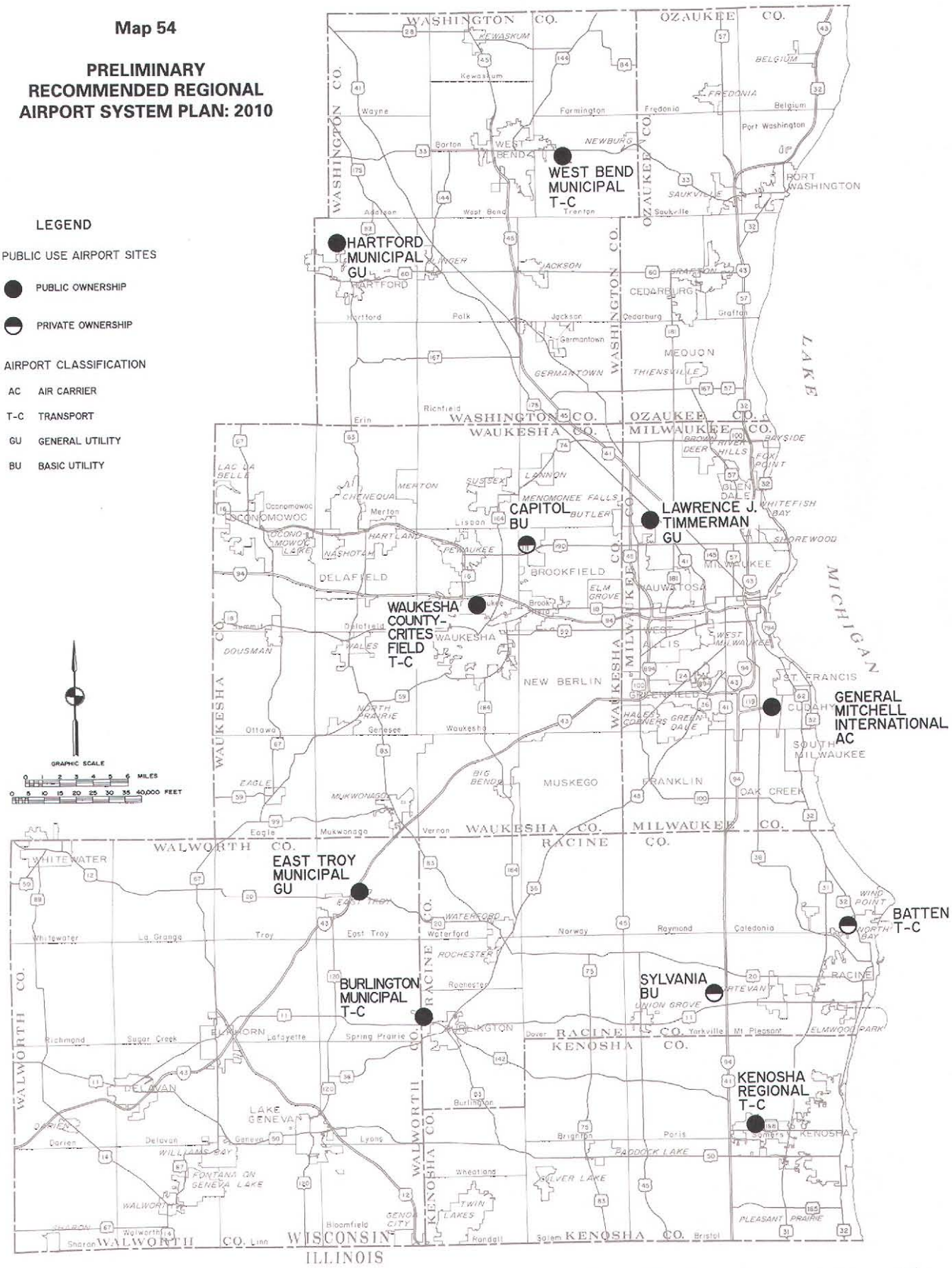
THE PRELIMINARY RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN

The preliminary regional airport system plan taken to public hearing recommends serving the aviation needs of Southeastern Wisconsin to the year 2010 with eight publicly owned and three privately owned airports, all of which were in operation in 1995. Thus, the plan does not envision the development of any new airports within the Region. This preliminary regional airport system plan is shown on Map 54.

The preliminary plan recommends that eight of the 11 airports undergo major airfield improvements

Map 54

PRELIMINARY RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN: 2010



The preliminary regional airport system plan recommends the minimum number and types of airports essential to accommodate the existing and probable future aviation demand in southeastern Wisconsin. The system consists of 11 airports, all of which are currently open for use by the general public, eight of which are presently publicly owned, and three of which are privately owned. The plan does not recommend the closing of any privately owned airports not included within the system plan and, in fact, recognizes that the continued operation of such airports may permit the deferral of some of the improvements recommended for the 11 airports in the Regional system plan.

Source: SEWRPC.

during the plan design period. The major improvements at five of these airports involve extension of the airport's primary runway, enabling either larger and higher performance aircraft to be accommodated or the types of aircraft now handled to continue to be accommodated, but under a wider range of aircraft loading and weather conditions. These five airports are Burlington Municipal, East Troy Municipal, Hartford Municipal, Kenosha Regional, and West Bend Municipal. The plan recommends that one airport, General Mitchell International, undergo major airfield improvements, including the construction of a new air carrier runway to increase airfield capacity to accommodate better the forecast air carrier aviation demand, especially under Instrument Flight Rule (IFR) conditions. The major improvements recommended at the remaining two airports involve airport reconstruction the better to meet standards promulgated by the Federal Aviation Administration (FAA) with respect to runway and taxiway design, airfield safety clearances, runway approach areas, airspace protection, and obstructions. These two airports are Capitol Airport and Sylvania Airport.

The recommended improvements would result in a change of the FAA classification for three of the 11 airports concerned, Burlington Municipal, Hartford Municipal, and West Bend Municipal. The plan recommends that steps be taken, as may be necessary, to assure the continued availability for public use of three privately owned airports, Capitol, Batten, and Sylvania Airports, as important elements of the regional airport system.

The proper performance of the regional airport system plan does not depend upon the continued operation of other privately owned airports in Southeastern Wisconsin, some of which were open to the public in 1995 and some of which were restricted to private use. The airport system plan thus defines the minimum number and type of airports considered essential to accommodate the existing and probable future aviation demand in Southeastern Wisconsin. It should be noted, however, that the continued operation of other privately owned airports in the Region but not included in the regional airport system plan has the potential to permit the deferral of some of the improvements recommended for the airports that do comprise the essential regional airport system.

The recommended regional airport system includes one Air Carrier (AC) airport, five airports classified as Transport-Corporate (T-C) airports, three airports classified as General Utility (GU) airports, and two airports classified as Basic Utility (BU) airports. The single Air Carrier airport is Milwaukee County's General Mitchell International Airport. The five Transport-Corporate airports are Batten Airport, Burlington Municipal Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The three General Utility airports are East Troy Municipal Airport, Hartford Municipal Airport, and Lawrence J. Timmerman Airport. The two Basic Utility airports are Capitol Airport and Sylvania Airport.

The plan envisions that General Mitchell International Airport will continue to be the only airport serving scheduled air carriers within the Region through the planning period. Also, Mitchell International is expected to accommodate much of the future military aviation activity in the Region, significant segments of the general aviation activity, particularly activity by the highest-performance corporate aviation aircraft, and significant amounts of air taxi and air cargo service. Burlington Municipal Airport, West Bend Municipal Airport, Waukesha County-Crites Field, Batten Airport, and Kenosha Regional Airport are expected to serve, not only personal and recreational aviation activity, but also significant levels of business and corporate aviation activity, air taxi service, and small air cargo shipments. The remaining airports, Hartford Municipal, Lawrence J. Timmerman, East Troy Municipal, Capitol, and Sylvania Airports, are expected to serve significant levels of sport, recreational, and personal aviation activity and activity by the smaller aircraft used for business and commercial purposes.

The 10 airports within the system plan that are limited to general aviation activities perform a critical function of relieving the aviation demand at Mitchell International, the largest public-use airport in the Region. The analyses described in Chapter VIII of this report indicated that Mitchell International may be expected to operate over design capacity, that is, over 60 percent of its annual service volume, under future conditions even if all the privately owned, public-use airports remain available for use. Mitchell International is not expected to operate over capacity if the long range improvements proposed for the airport are implemented and if much of the general aviation demand in Southeastern Wisconsin can be served by the system of reliever airports. Should any of these reliever airports become unavailable, a significant portion of the activity presently accommodated at these airports may be expected to be

diverted to Mitchell International, causing congestion, excessive delays, and potential safety hazards. Thus, the efficient and safe operation of Mitchell International is dependent upon an adequately maintained system of reliever airports in Southeastern Wisconsin.

Description of Individual Airport Improvements

As already noted, the essential system recommended in the plan consists of 11 airports. Each is herein described in terms of 1) its existing and future classification with respect to the geographic area it is identified to serve and its role in the regional airport system, 2) airfield improvements necessary to provide sufficient capacity to accommodate its share of the aviation activity of the Region, 3) other onsite improvements that may be required to accommodate probable future aviation activity, and 4) off-site land use development desirable to achieve compatibility between adjacent land use activities and aviation activity at the airport.

The development of recommended improvements for each of the 11 airports was based on three major considerations. First, the recommended alternatives described in Chapter IX of this report were incorporated into the system plan as improvements at airports for which either airfield capacity, primary runway length, or accessibility deficiencies were identified. These deficiencies and the improvements recommended to address them directly affect the ability of the regional airport system to accommodate the existing and forecast future demand. Second, the FAA airfield design standards which may affect the land and improvement requirements for airports were applied. These standards typically vary with different airport classifications. While many of the standards do not directly affect an airport's airfield capacity, primary runway length, or accessibility, the standards do affect the land requirements as well as the safe and efficient performance of the airport. Consideration of these basic airfield design standards was an important consideration in the development of the airport improvements to be included in the recommended system plan. Third, airport improvements proposed in the most recent versions of airport master planning work and airport layout plans for individual airports were considered, together with improvements programmed by airport owners.

The accompanying tables describe the type and extent of airport site and facility development required at each of the 11 airports under the recommended plan. The tables describe the major improvements needed to develop each airport from its present classification and operational capability to the airport classification recommended in the new regional airport system plan. The precise dimensioning and detailing of these facilities is left to subsequent airport master planning efforts, which are required to further refine, detail, and carry out the recommended system plan. The improvement recommendations set forth in the tables are accompanied by information on certain airport characteristics, including the existing and recommended airport classification, the existing and recommended airfield capacity, and the existing and recommended capability to operate under IFR.

The recommended major improvements for each airport in the system may be divided into five categories: 1) land, 2) airfield facilities including pavement features, airfield lighting, and navigational aids, 3) terminal area facilities, 4) aircraft hangars and storage, and 5) other improvements, such as off-site automobile parking, roadway, and utility facilities. The ultimate actual size of several of the airport characteristics listed, including the apron size, administration and terminal building size, automobile parking, and aircraft hangars and storage facilities, will depend upon the extent to which privately owned, public-use airports do, or do not, remain open over the plan design period, as well as upon the ability of the airport owners and fixed-base operators to market and promote each airport concerned. This recognizes that the actual demand for such facilities as aircraft hangars is best judged by the airport owner, since over the plan design period the demand for such facilities will develop at different rates at each of the individual airports comprising the system.

For each airport included in the new regional airport system plan, recommendations for the uses of surrounding lands are presented. These recommendations identify lands not now owned by the airport that either should be maintained as open land to be used as runway-protection zones for aircraft operational safety reasons or should be restricted to selected land uses to avoid conflicts between the surrounding areas and the noise and safety hazards generated by airport operations.

The lands recommended to remain as runway-protection zones are located at the end of each runway and were defined by the application of airport engineering standards. The areas recommended to be restricted to selected land uses were defined through the development of average day-night sound level (DNL) noise contours, using the methodology recommended by the FAA. The FAA

recognizes 65 DNL as the level up to which all land uses and related structures may be considered compatible without restrictions. Therefore, in areas lying outside the 65 DNL contour, virtually any type of land use consistent with county and local plans can be permitted, because these areas are considered to have minimal to moderate exposure, with aircraft noise considered to be at a "normally acceptable" level. Land uses in areas between the 65 DNL and 75 DNL contours are considered to have significant exposure, with airport noise considered to be "normally unacceptable." In these areas, residential land use is not a compatible use and should not be permitted. Also, some institutional, commercial, and recreational land uses are compatible only if noise reduction measures are incorporated into the design and construction of the buildings. Only land uses such as manufacturing, transportation, utilities, retail and wholesale trade, agriculture, and open land should normally be permitted. Land areas inside 75 DNL contour are considered to have severe exposure, with airport noise being considered "clearly unacceptable." These areas should be contained within the airport boundaries and should include only selected commercial, industrial, and transportation land uses, as well as open lands, and then only when appropriate noise-level-reduction measures are incorporated into any buildings.

The locations of these noise contours for the individual airports are an important consideration in land use planning and zoning in the vicinity of airports. Maps are provided below of those of the 11 airports in the recommended system which generate sufficient noise levels. These show the location and configuration of the forecast year 2010 65 DNL, 70 DNL, and 75 DNL noise contours, where applicable (see Maps 56, 58, 62, 64, 66, and 72). The forecast year 2010 noise contours at each of the 11 airports in the recommended plan may be expected to vary from, and will generally exceed, noise contour lines subsequently developed in Federal Aviation Regulation Part 150 noise studies prepared for each airport. This is because Part 150 noise studies estimate existing and short-range future—five years—noise levels. The noise contours prepared under the regional airport system plan represent forecasts to the year 2010 and are prepared within the context of the regional airport system plan, thus assuming that all aviation activity in the Region in the year 2010 occurs at the 11 plan recommended airports.

General Mitchell International Airport: As already noted, it is recommended that Mitchell International remain the sole Air Carrier airport within the Region, providing adequate facilities to accommodate the air carrier aircraft operations necessary to serve the needs of the greater Milwaukee area and Southeastern Wisconsin. Although the present terminal and airfield facilities are adequate to accommodate the existing scheduled air carrier activity, it is recommended that the improvements recommended in the recently completed airport master plan and reaffirmed in the deficiency analysis conducted under this new regional airport system plan be implemented through the plan design period to accommodate the forecast levels of general aviation, air carrier, and military operations more safely and efficiently.

To accommodate the anticipated types and levels of aviation traffic, several major improvements are recommended, as identified in Table 113 and shown on Map 55. These improvements include the realignment and extension to 4,800 feet of the existing parallel east-west runway, 7L/25R; the construction of a new 7,000-foot-long primary runway and parallel taxiway located about 3,500 feet south, of and parallel to, the existing primary east-west runway, 7R/25L; the extension of the primary east-west runway, 7R/25L, by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of the parallel north-south runway, 1R/19L, by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway-safety overrun for the south end of the north-south primary runway, 1L/19R; and the eventual decommissioning of the general aviation runway, 13/31. The implementation of these improvements will require the acquisition of land easements beyond the present airport boundaries, relocation of some military facilities currently located at the airport, and relocation of some existing residences near the present southwest boundary of the airport.

Recommended improvements to the terminal area facilities include construction of additional gates and expansion of automobile parking facilities for the air carrier passenger terminal, construction of additional apron and terminal facilities for the air cargo terminal, and relocation of existing general aviation hangars now located immediately south of the air carrier passenger terminal. Implementation of these airfield improvements will require the relocation of a one-mile-long segment of E. College Avenue and placing S. Howell Avenue in a tunnel beneath the new east-west primary runway and taxiway to be constructed, the construction of a bridge structure to carry the runway-safety overrun for runway 1L/19R over E. College Avenue, and the

Table 113

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR GENERAL MITCHELL INTERNATIONAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Air Carrier	Air Carrier
Based Aircraft (number)	117	69
Airport Reference Code	D-IV	D-IV
Annual Operations (number)	201,288	237,000
Airfield Capacity		
Annual Service Volume	260,000	260,000
VFR (Hourly Capacity)	121	121
IFR (Hourly Capacity)	56	56
IFR Capability	Precision approach	Precision approach
Land Requirements		
Airport Site (acres)	2,218	2,667
Easements (acres)	40	56
Airfield Facilities		
Runways		
Primary (length x width, in feet)	9,690 x 200	9,690 x 200
Parallel North-South (length x width, in feet)	4,150 x 150	7,000 x 150
Primary East-West (length x width, in feet)	8,011 x 150	9,011 x 150
Parallel East-West (length x width, in feet)	3,163 x 100	4,800 x 100
New Parallel (length x width, in feet)	--	7,000 x 150
Runway 13/31 (length x width, in feet)	5,868 x 150	To be decommissioned
Taxiways	Full parallel taxiway system	Full parallel taxiway system
Apron (square feet)		
Air Carrier	3,049,200	1,910,600
General Aviation	682,200	625,300
Air Cargo	603,000	726,300
Runway Lighting	HIRL on RWY's 1L/19R and 7R/25L, and MIRL on all other RWY's	HIRL on RWY's 1L/19R and 7R/25L, and MIRL on all other RWY's
Visual Approach Aids	REIL on RWY 7R/25L; VASI on RWY's 13/31, 7L/25R and 25L; PAPI on RWY's 1L/19R and 7R; wind indicator and beacon	REIL on RWY 7C/25C, 1L/19R; VASI on RWY's 7L/25R and 25C; PAPI on RWY's 1L/19R, 1R/19L, 7R/25L and 7C; wind indicator and beacon
Instrument Landing Aids	ILS category III on RWYs 1L, ILS category I on RWYs 7R and 19R; LOC on RWY 25L; and NDB on approach to airport	ILS category III on RWYs 1L, ILS category I on RWY's 7C and 19R; LOC on RWY 25L; and NDB on approach to airport
Terminal Area Facilities		
Air Carrier		
Administration/Terminal Building (square feet)	525,400[a]	691,200[a]
Passenger Gates	42	68
Automobile Parking (spaces)	8,800	11,800
General Aviation		
Administration/Terminal Building (square feet)	6,100	4,400
Automobile Parking (spaces)	300	170
Air Cargo		
Administration/Terminal Building (square feet)	170,600	290,500
Service Roads (miles)	8.8	8.8
Large Hangars (square feet)	298,700	184,000
T-Hangars (spaces)	34	20

[a] *Includes all revenue and non-revenue space*

Abbreviations used in this table

HIRL - High Intensity Runway Lights
IFR - Instrument Flight Rules
ILS - Instrument Landing System
LOC - Localizer
MIRL - Medium Intensity Runway Lights
NBD - Nondirectional Beacon
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules

Source: Wisconsin Department of Transportation, Milwaukee County, and SEWRPC.

closing of a 0.8-mile long segment of S. Sixth Street. Table 114 presents the estimated costs required to implement the recommended improvements.

As long as the regional system of 10 general aviation airports recommended in the system plan is maintained and improved so as to permit the diversion of the general aviation traffic away from Mitchell International, the recommended runway and taxiway configuration for Mitchell International should be adequate to accommodate the forecast level of operations over the next 15 years. Each

Table 114

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT GENERAL MITCHELL INTERNATIONAL AIRPORT

Recommended Improvement	Size	1995 Dollars
Land		
Acquire Additional Land Fee Simple[a]	449 acres	$140,910,000
Acquire Easements	100 acres	210,000
Airfield		
Realign and Extend RWY 07L/25R	4,800 X 100 feet	5,190,000
Construct RWY 07R/25L[c]	7,000 x 100 feet	74,280,000
Lengthen RWY 07C/25C[b]	1,000 x 150 feet	3,230,000
Lengthen RWY 01R/19L	2,850 x 150 feet	9,080,000
Construct Parallel Taxiway between RWY 01R/19L and RWY 01L/19R and other Connecting Taxiways[a]	6,475 x 75 feet	7,530,000
Construct High Speed Exits	Item	3,240,000
Expand Air Carrier Apron	Item	4,490,000
Expand Air Cargo Apron	Item	8,320,000
Repair and Reconstruct Pavement Surfaces	Item	14,810,000
Install Tunnel at College Ave. Under Runway Safety Area	Item	7,740,000
Terminal Area Facilities		
Air Carrier		
Expand Terminal Building and add Additional Gates	165,800 square feet	105,230,000
Other Terminal Improvements	Item	2,660,000
Construct Additional Parking Structure	3,000 spaces	41,240,000
Other Parking Improvements	Item	3,470,000
Air Cargo		
Expand Terminal Facilities	119,900 square feet	12,710,000
Other		
Fueling Facility Improvements	Item	1,960,000
Maintenance and Utility Improvements	Item	7,100,000
Storm Water Drainage System Improvements	Item	6,970,000
Construct Ramps at STH 119 and S. 6th Street	Item	1,060,000
Noise Compatibility Program		
Mitigation Measures	Item	45,650,000
Related Facility Improvements	Item	3,820,000
Total	--	$510,900,000

[a] *Includes acquisition of lands for airfield improvements and noise control program; and acquisition and relocation of attendant development on these lands.*

[b] *Includes extension of parallel taxiway.*

[c] *Includes construction of parallel taxiway.*

Abbreviations used in this table
PAPI - Precision Approach Path Indicator REIL - Runway End Identifier Lights RWY - Runway

Source: Wisconsin Department of Transportation, Milwaukee County, and SEWRPC.

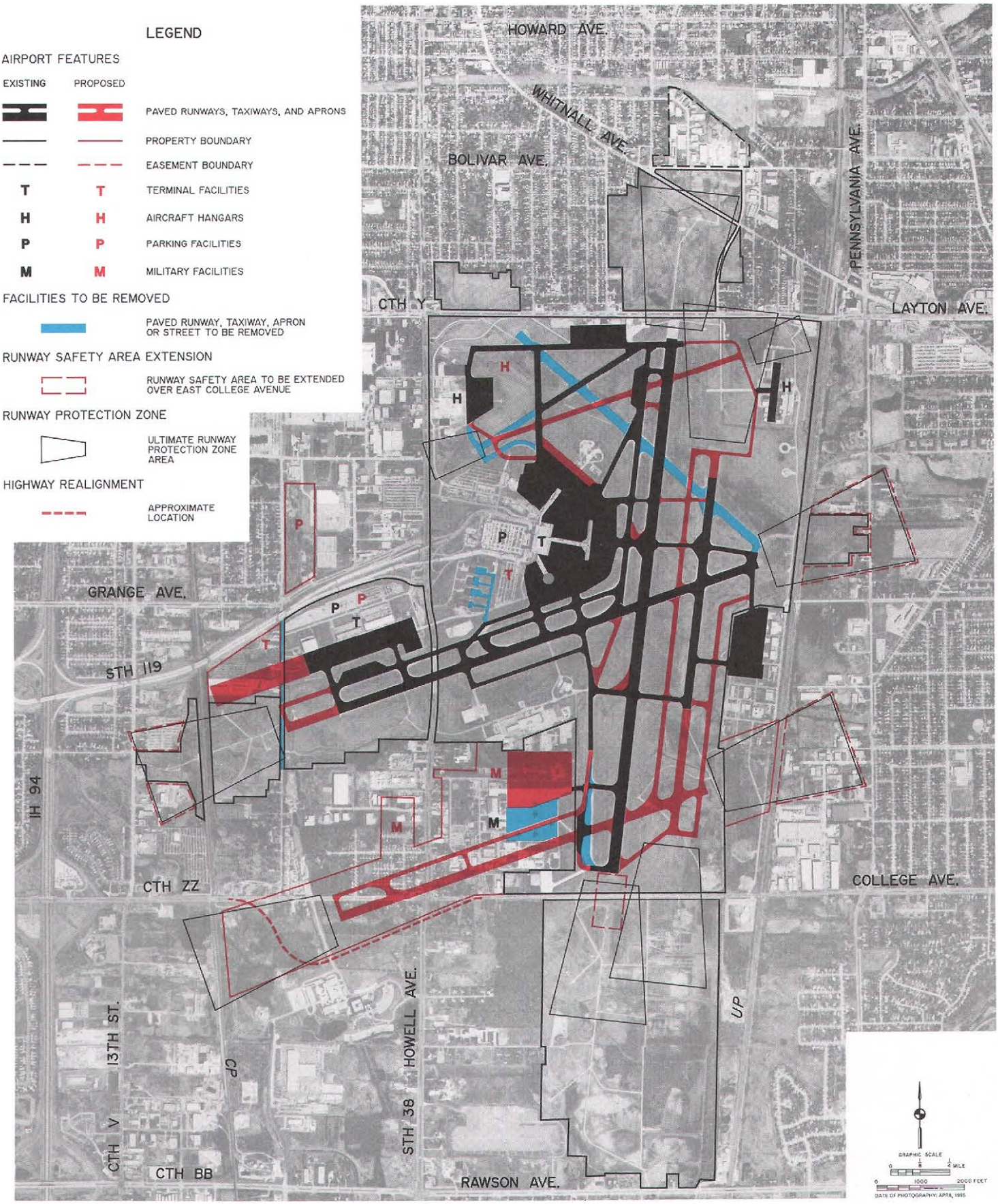
of the 10 general aviation airports in the regional airport system plan potentially provide some relief to Mitchell International. Some of these airports, however, have the potential of providing greater relief than others owing to their ability to accommodate a full range of general aviation aircraft and to their proximity to Mitchell International. Of the 10 reliever airports, Batten, Kenosha Regional, Burlington Municipal, Waukesha County-Crites Field, and West Bend Municipal are particularly important because these airports are recommended to function as Transport-Corporate airports, capable of accommodating all types of general aviation aircraft, including business and corporate jets, and are envisioned to provide a complete range of facilities and services, including lighting and navigational aids, indoor and outdoor aircraft storage, and maintenance, repair, and charter services.

Ground transportation access under the plan would be provided to Mitchell International via STH 119, a direct freeway connection to the Milwaukee County freeway system, S. Howell Avenue (STH 38), and E. Layton Avenue (CTH Y). The airport terminal areas for both the scheduled air carriers and the general aviation activities are located within the existing metropolitan Milwaukee public sewer service area.

In 1993, a new airport master plan was completed for Mitchell International. Map 56 shows the noise

Map 55

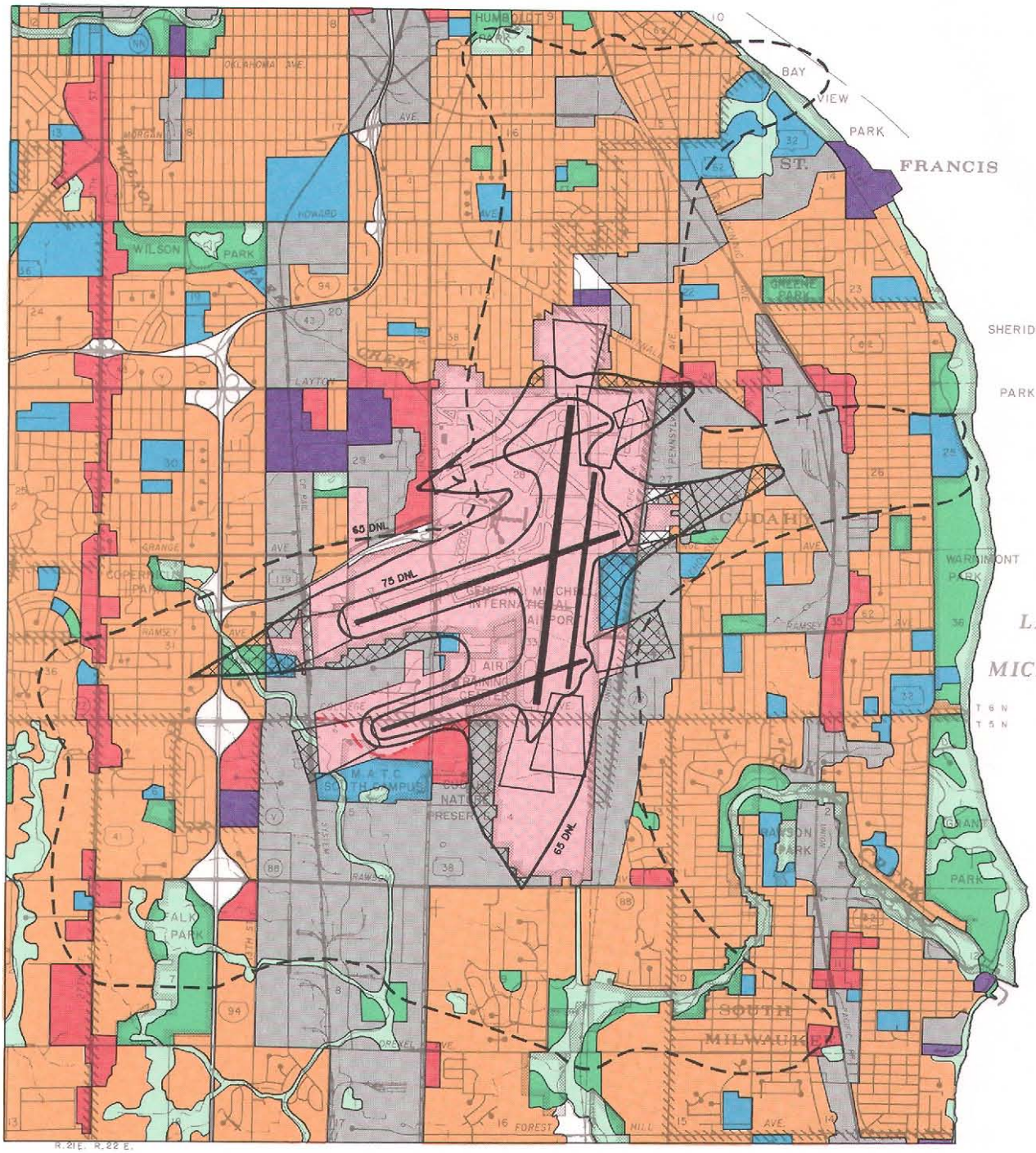
RECOMMENDED SITE IMPROVEMENT PLAN FOR GENERAL MITCHELL INTERNATIONAL AIRPORT: 2010



Source: SEWRPC.

Map 56

AREA LAND USE PLAN FOR GENERAL MITCHELL INTERNATIONAL AIRPORT: 2010



LEGEND

- EXISTING AND PROPOSED AIRPORT LANDS
- 65 DNL — EXISTING 65 DNL NOISE EXPOSURE CONTOUR
- 65 DNL — FUTURE 65 DNL NOISE EXPOSURE CONTOUR
- 75 DNL — FUTURE 75 DNL NOISE EXPOSURE CONTOUR
- RUNWAY PROTECTION ZONE
- PROPOSED HIGHWAY REALIGNMENT

PREDOMINANT LAND USE

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATION, AND UTILITY
- GOVERNMENTAL AND INSTITUTIONAL
- RECREATIONAL
- AREAS IN WHICH NEW, EXPANSION, OR REPLACEMENT DEVELOPMENT SHOULD BE LIMITED TO COMPATIBLE OBJECTS AND LAND USES
- AGRICULTURE AND OTHER OPEN LANDS
- PRIMARY ENVIRONMENTAL CORRIDOR, SECONDARY ENVIRONMENTAL CORRIDOR, AND ISOLATED NATURAL RESOURCE AREAS

GRAPHIC SCALE
0 1/2 1 MILE
0 2000 4000 FEET

Source: SEWRPC.

contours developed for the airport as part of this work and the recommended land use pattern for the airport environs.

Batten Airport: It is recommended that Batten Airport remain classified as a Transport-Corporate airport and continue to be maintained over the plan design period to meet these standards. The analyses conducted under this plan update did not reveal any deficiencies with respect to capacity or primary runway length for this airport. However, some improvements were found to be warranted, including land and easement acquisition to provide the necessary runway-safety areas and object-free areas, the construction of connecting taxiways, and the expansion of hangar facilities. The major improvements necessary to accomplish this are identified in Table 115 and shown on Map 57.

With these improvements, the airport should be able effectively and safely to serve virtually all single-engine piston, twin-engine piston, and turboprop aircraft and virtually all business and corporate jets when normally operated under 60 percent load conditions. Thus, general aviation aircraft with airport reference codes of A-I, A-II, A-III, B-I, B-II, B-III, C-I, C-II, D-I, and D-II could be accommodated. Annual aircraft operations at this airport maybe expected to increase from about 51,000 in 1993 to about 63,000 in 2010. Any aircraft 12,500 pounds or over, which includes most business and corporate jets, could normally be accommodated only under 60 percent load conditions. The recommended improvements would allow the airport to continue to function as an important reliever airport for General Mitchell International Airport and the primary general aviation airport for much of Racine County. Table 116 presents the estimated capital costs of implementing the recommended improvements.

Ground transportation access is provided to Batten Airport by STH 38, which is about one-half-mile from the airport entrance, and by N. Green Bay Road, a local arterial highway. The airport terminal area lies within the City of Racine public sewer service area.

Map 58 shows the noise contours for the airport based on the year 2010 level of aviation activity and the recommended land use pattern for the airport environs.

Burlington Municipal Airport: It is recommended that Burlington Municipal Airport, which is currently classified as a Basic Utility airport, be developed over the plan design period to Transport-Corporate standards. The major improvements necessary to accomplish this were recommended in Chapter IX of this report and described in Table 117 and shown on Map 59. They include extension of the primary runway by 1,200 feet, to a total length of 4,800 feet, paving of the crosswind runway and taxiway to a length of 3,900 feet, land and easement acquisition to enable this airfield expansion, installation of an instrument landing system, and the expansion of terminal and hangar facilities. The parallel taxiway for the primary runway would need to be extended and eventually relocated farther away from the runway to meet FAA requirements for taxiway separations plus installation of a full instrument landing system.

With these improvements, the airport would be able effectively and safely to serve all small single-engine, twin-engine piston, and turboprop aircraft and also a wide variety of small to medium business and corporate jets under most weather conditions. Thus, general aviation aircraft with airport reference codes of A-I, A-II, A-III, B-I, B-II, B-III, C-I, and C-II could be accommodated, although any aircraft 12,500 pounds or over, including business and corporate jets, could be accommodated only under 60 percent load conditions. Annual aircraft operations at the airport may be expected to increase from about 46,000 in 1993 to about 55,000 in 2010. The recommended improvements would allow the airport to function as an important reliever airport for General Mitchell International Airport, as well as the primary general aviation airport for much of western Racine and Kenosha Counties and Walworth County. Table 118 presents the size and estimated capital costs required to implement the recommended improvements.

Ground transportation access is provided to Burlington Municipal Airport by STH 11, which is less than one-half mile from the airport entrance via a local road. The airport terminal area is located within the City of Burlington public sanitary sewer service area and can be connected to the sanitary sewer system as facilities are extended.

Map 60 shows the recommended land use pattern for the airport environs.

Kenosha Regional Airport: It is recommended that Kenosha Regional Airport remain classified as a Transport-Corporate airport and continue to be developed over the plan design period to meet the standards. The major improvements necessary to accomplish this were recommended in Chapter IX

Table 115

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR BATTEN AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Transport-Corporate	Transport-Corporate
Based Aircraft (number)	76	90
Airport Reference Code	D-II[a]	D-II[a]
Annual Operations (number)	51,250	63,000
Airfield Capacity		
Annual Service Volume	230,000	230,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	59	59
IFR Capability	Precision approach	Precision approach
Land Requirements		
Airport Site (acres)	408	431
Easements (acres)	26	140
Airfield Facilities		
Runways		
Primary (length x width, in feet)	6,556 x 100	6,556 x 100
Crosswind (length x width, in feet)	4,824 x 100	4,824 x 100
Taxiways	Full Parallel taxiway system	Full Parallel taxiway system
Apron (square feet)	492,150	116,000
Runway lighting	HIRL on RWY 4/22 and MIRL on RWY 14/32	HIRL on RWY 4/22 and MIRL on RWY 14/32
Visual Approach Aids	REIL on RWY's 04/22 and 14 and VASI on RWY 22	REIL on RWY's 04/22 and 14/32; VASI on RWY 22; and PAPI on RWY's 14/32 and 04
Instrument Landing Aids	ILS Category I on RWY 4; NDB and VOR on approach to airport	ILS Category I on RWY 4; NDB and VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	3,400	6,500
Automobile Parking (spaces)	180	170
Service Roads (miles)	0.4	0.4
Large Hangars (square feet)	108,400	95,000
T-Hangars (spaces)	32	65

[a] *Based on 60 percent useful load for aircraft over 12,500 pounds.*

Abbreviations used in this table
- HIRL - High Intensity Runway Lights
- IFR - Instrument Flight Rules
- ILS - Instrument Landing System
- MIRL - Medium Intensity Runway Lights
- NDB - Nondirectional Radiobeacon
- PAPI - Precision Approach Path Indicator
- REIL - Runway End Identifier Lights
- RWY - Runway
- VASI - Visual Approach Slope Indicator
- VFR - Visual Flight Rules
- VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, Racine Commercial Airport Corporation, and SEWRPC.

of this report and are described in Table 119 and shown on Map 61. These include eventual extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 6,400 feet, and the expansion of terminal and hangar facilities.

With these improvements, the airport would be able effectively and safely to serve all small single-engine piston, twin-engine piston, and turboprop aircraft and also a wide variety of small, medium, and large business and corporate jets under most weather conditions. Thus, general aviation aircraft with airport reference codes of A-I, A-II, A-III, B-I, B-II, B-III, C-I, C-II, D-I, and D-II will be accommodated, although some of the largest business and corporate jets could be accommodated only under 60 percent load conditions. Annual aircraft operations at the airport may be expected to increase from about 79,000 in 1993 to 169,000 in 2010. These improvements will also allow the airport to con-

Map 57

RECOMMENDED SITE IMPROVEMENT PLAN FOR BATTEN AIRPORT: 2010

LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
H	H	PAVED RUNWAYS, TAXIWAYS, AND APRONS
——	——	PROPERTY BOUNDARY
– – –	– – –	EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

APPROXIMATE LOCATION

GRAPHIC SCALE

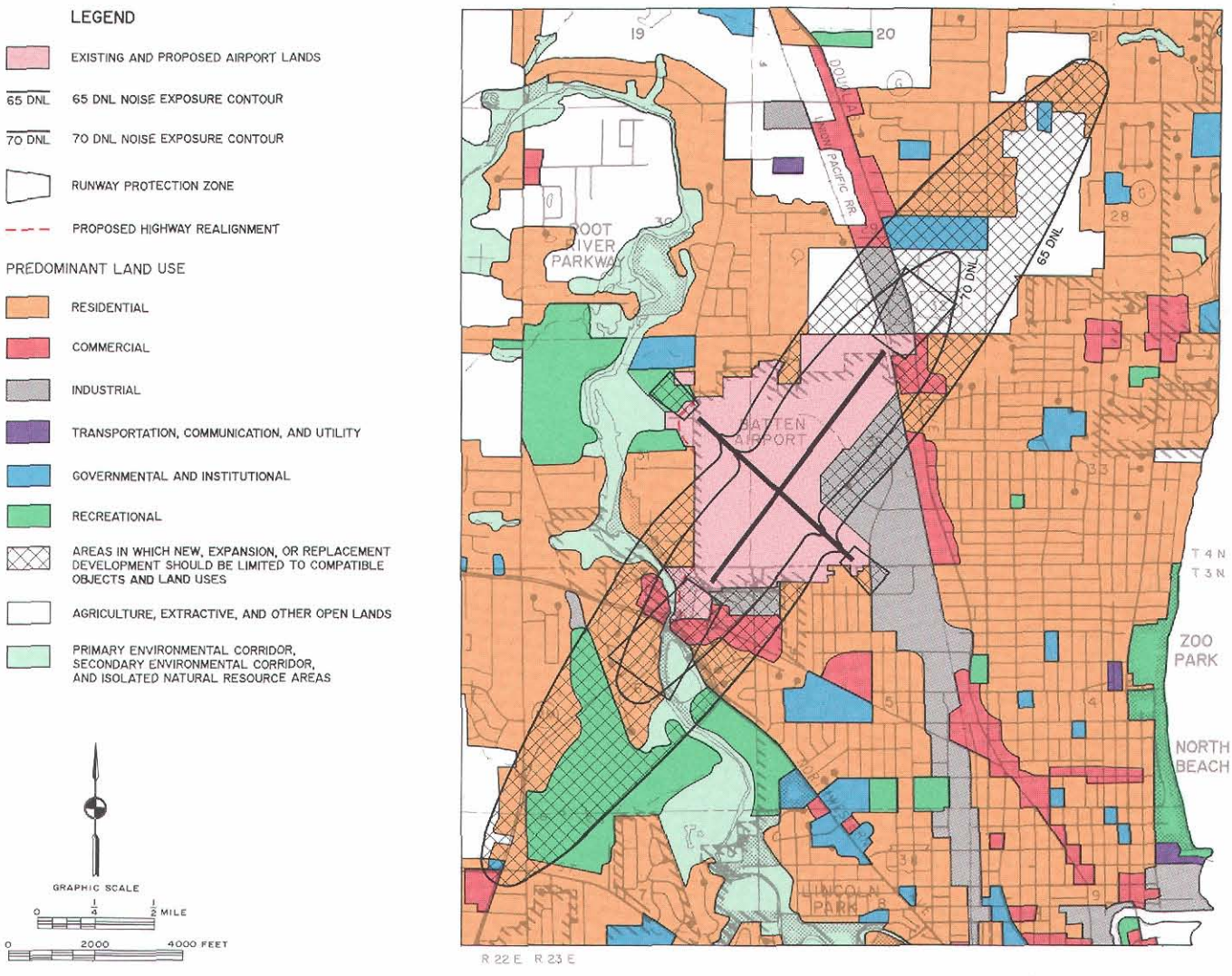
0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 58

AREA LAND USE PLAN FOR BATTEN AIRPORT: 2010



Source: SEWRPC.

tinue functioning as a reliever airport for General Mitchell International Airport as well as for airports in northeastern Illinois and the primary general aviation airport for much of Kenosha County. Table 120 presents the estimated capital costs required to implement the recommended improvements.

Ground transportation access is provided directly to Kenosha Regional Airport by STH 158. The airport entrance is located one mile east of IH 94 and USH 41. The airports terminal area is located within the proposed City of Kenosha public sewer service area and can be connected to the sanitary sewer system as facilities are extended.

Map 62 shows the noise contours for the airport based on the year 2010 level of aviation activity and the recommended land use pattern for the airport environs.

Waukesha County-Crites Field: It is recommended that Waukesha County-Crites Field remain classified as a Transport-Corporate airport and continue to be developed over the plan design period to meet these standards. The analyses conducted under this plan update did not reveal any deficiencies with respect to capacity or primary runway length for Waukesha County-Crites Field. Application of the basic airfield design standards, however, indicated that some improvements were warranted.

Table 116

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT BATTEN AIRPORT

Recommended Improvement	Size	1995 dollars
Land		
Acquire Additional Land Fee Simple [a]	58 acres	$ 4,080,000
Acquire Easements	114 acres	148,000
Airfield		
Repair and Reconstruct Pavement Surfaces	Item	2,240,000
Connecting Taxiway	3,280 X 40 feet	330,000
Install REIL on All Paved Runways	1 set	15,000
Install PAPI on All Paved Runways	3 sets	60,000
Terminal Area Facilities		
Expand Administration/Terminal Building	3,100 square feet	202,000
Hangars/Aircraft Storage		
Construct T-Hangars	33 spaces	545,000
Other		
Miscellaneous Obstruction Removal	Item	970,000
Relocate N. Green Bay Road at Northwest Corner of Airport	0.3 miles	700,000
Relocate N. Green Bay Road at Southwest Corner of Airport	0.3 miles	2,700,000
Total	--	$11,990,000

[a] *Includes acquisition of 19 residences.*

Abbreviations used in this table
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights

Source: Wisconsin Department of Transportation, Racine Commercial Airport Corporation, and SEWRPC.

These include relocation of the parallel taxiway for both the primary and crosswind runways, relocation and expansion of the apron and attendant connecting taxiways, and relocation and expansion of the airport terminal, fixed-based operator hangars, and aircraft storage hangars presently located in the northeast corner of the airport. The major improvements necessary to accomplish this as identified in Table 121 and shown on Map 63.

With these improvements the airport would be able effectively and safely to serve all single-engine piston, twin-engine piston and turboprop aircraft and also most small, medium, and large business and corporate jets under most weather conditions. Annual aircraft operations at the airport are expected to increase from about 72,000 in 1993 to about 130,000 in 2010. Thus general aviation with airport reference codes of A-I, A-II, A-III, B-I, B-II, B-III, C-I, C-II, D-I, and D-II would be accommodated, although any aircraft of 12,500 pounds or over, including most business and corporate jets, could normally be accommodated only under 60 percent load conditions. These improvements would also allow the airport to continue functioning as an important reliever airport for General Mitchell International Airport and as the primary general aviation airport for much of Waukesha County. Table 122 presents the estimated capital costs required to implement the recommended improvements.

Ground transportation access is provided directly by three major county trunk highways, CTH JJ, along the north side of the airport, CTH J, along the east side of the airport, and CTH F, along the south side of the airport. The airport entrance is located about one-half mile south of an interchange of IH 94 and STH 16. The airport terminal area is located within the proposed City of Waukesha public sanitary sewer service area and can be connected to the sanitary sewer system as facilities are extended. Water service to the site is currently provided by the Town of Pewaukee water system.

Table 117

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR BURLINGTON MUNICIPAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Basic Utility	Transport-Corporate
Based Aircraft (number)	71	88
Airport Reference Code	A-I	B-II[a]
Annual Operations (number)	46,300	55,000
Airfield Capacity		
Annual Service Volume	207,000	207,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	53	53
IFR Capability	Nonprecison approach	Precision approach
Land Requirements		
Airport Site (acres)	240	420
Easements (acres)	9	48
Airfield Facilities		
Runways		
Primary (length x width, in feet)	3,601 x 75	4,800 x 75
Crosswind (length x width, in feet)	2,600 x 165 (turf)	3,900 x 75
Taxiways	Full parallel taxiway for RWY 11/29	Full parallel taxiway system
Apron (square feet)	45,000	123,000
Runway Lighting	MIRL on RWY 11/29,	HIRL on all paved RWY's
Visual Approach Aids	VASI on RWY 29	REIL on all paved RWY's, VASI on RWY 29 and PAPI on RWY's 1/19 and 11
Instrument Landing Aids	VOR on approach to airport	Full ILS and VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	4,500	4,100
Automobile Parking (spaces)	40	110
Service Roads (miles)	0.2	0.5
Large Hangars (square feet)	59,100	36,000
T-Hangars (spaces)	25	75

[a] *Based on 60 percent useful load for aircraft over 12,500 pounds.*

Abbreviations used in this table
IFR - Instrument Flight Rules
ILS - Instrument Landing System
MIRL - Medium Intensity Runway Lights
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules
VOR - Very High Frequency Omnidirectional Range Station

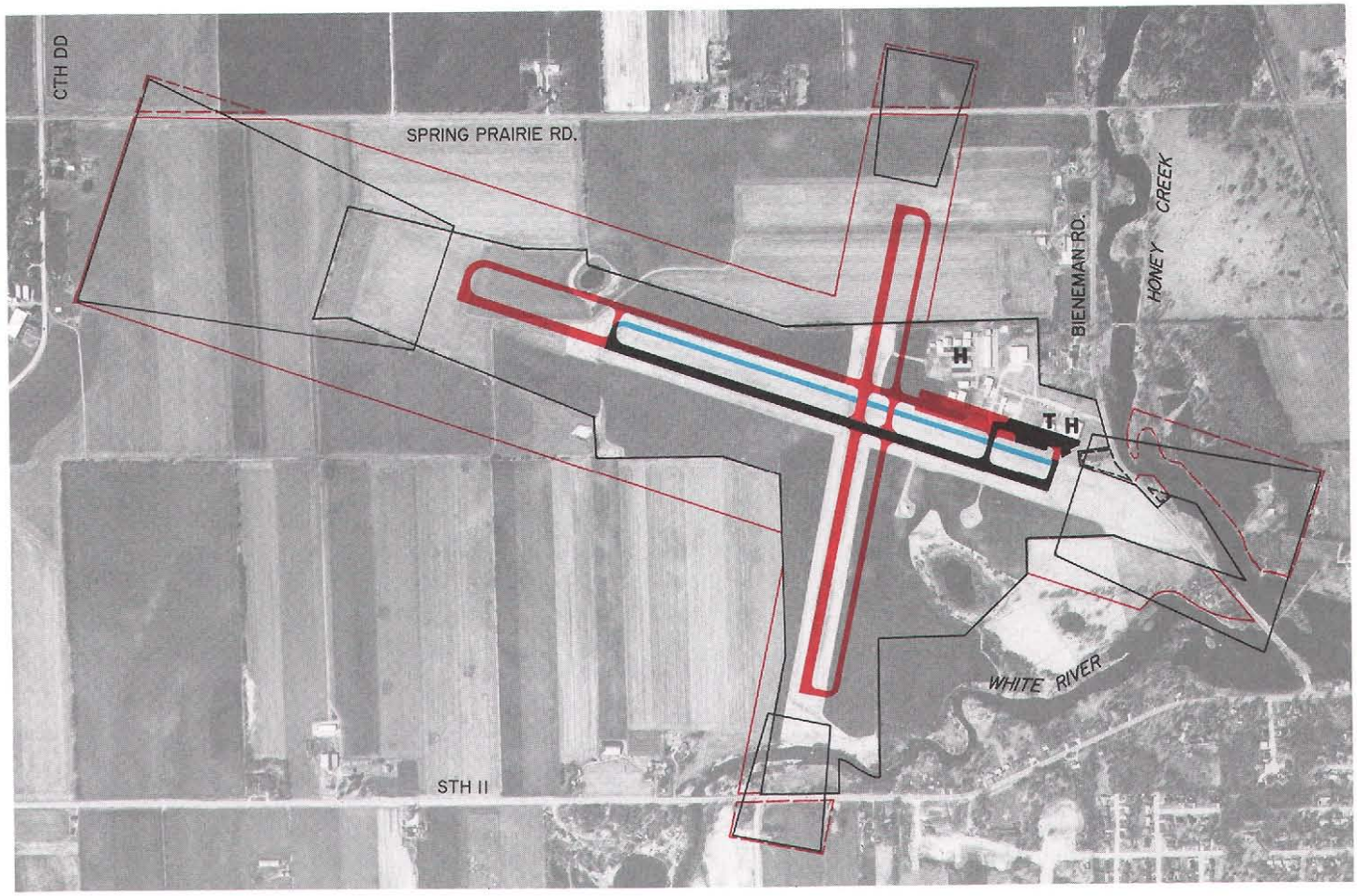
Source: Wisconsin Department of Transportation, City of Burlington, and SEWRPC.

Map 64 shows the noise contour for the airport based on the year 2010 level of aviation activity and the recommended land use pattern for the airport environs.

West Bend Municipal Airport: It is recommended that West Bend Municipal Airport, which is currently classified as a General Utility airport, be developed over the plan design period to Transport-Corporate standards. The major improvements necessary to accomplish this were recommended in Chapter IX of this report and described in Table 123 and shown on Map 65. They include construction of a new 5,500-foot-long primary runway and parallel taxiway on a new northeast-southwest alignment; conversion of the exiting 4,500-foot-long primary runway to the new crosswind runway by shortening it by 100 feet to allow sufficient area for runway-safety areas, land and easement acquisition for airfield expansion, installation of an instrument landing system, and the expansion of terminal and hangar facilities. About a one-mile

Map 59

RECOMMENDED SITE IMPROVEMENT PLAN FOR BURLINGTON MUNICIPAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
H	H	PAVED RUNWAYS, TAXIWAYS, AND APRONS
——	——	PROPERTY BOUNDARY
– – –	– – –	EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	(NONE)	AIRCRAFT HANGARS

FACILITY TO BE REMOVED

PAVED TAXIWAY TO BE REMOVED

RUNWAY PROTECTION ZONE

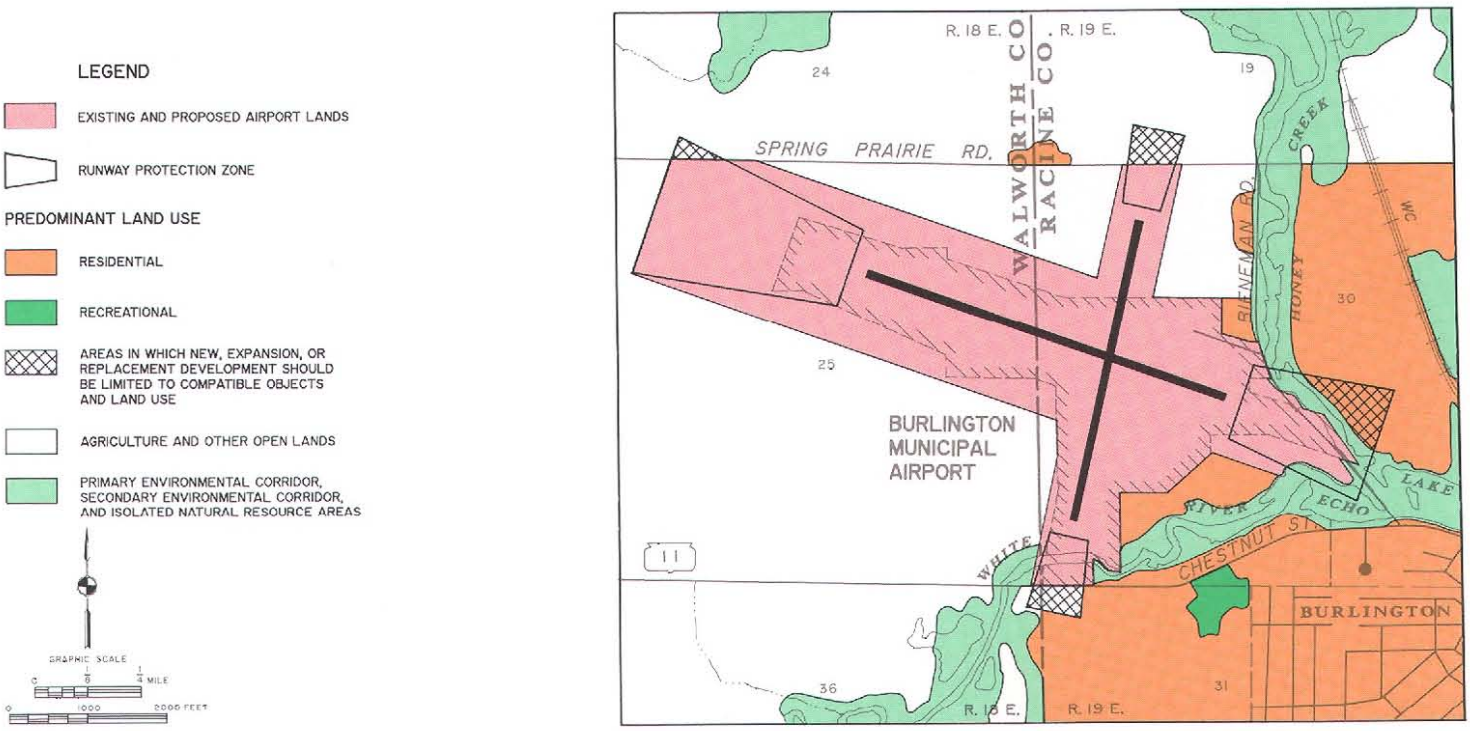
ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 60

AREA LAND USE PLAN FOR BURLINGTON MUNICIPAL AIRPORT: 2010



Source: SEWRPC.

Table 118

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT BURLINGTON MUNICIPAL AIRPORT

Recommended Improvement	Size of Improvement	1995 dollars
Land		
Acquire Additional Land Fee Simple[a]	180 acres	$ 435,000
Acquire Easements	39 acres	39,000
Airfield		
Construct RWY 01/19	3,900 x 75 feet	975,000
Lengthen RWY 11/29	1,199 X 75 feet	508,000
Relocate and Extend Parallel Taxiway for 11/29	4,100 x 40 feet	410,000
Construct Full Parallel Taxiway for 01/19	4,800 x 40 feet	480,000
Construct Apron	78,000 square feet	332,000
Repair and Reconstruct Pavement Surfaces	Item	180,000
Install REIL on All Paved Runways	2 sets	30,000
Install PAPI on the Primary Runway	3 sets	60,000
Install ILS	Item	750,000
Terminal Area Facilities		
Expand Parking Area	70 spaces	134,000
Hangars/Aircraft Storage		
Construct T-Hangars	50 spaces	825,000
Other		
None	--	--
Total	--	$5,158,000

[a] *Includes cost of wetland mitigation.*

Abbreviations used in this table

ILS - Instrument Landing System
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation, City of Burlington, and SEWRPC.

Table 119

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR KENOSHA REGIONAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Transport-Corporate	Transport-Corporate
Based Aircraft (number)	218	262
Airport Reference Code	D-II[a]	C-II[b]
Annual Operations (number)	79,000	169,000
Airfield Capacity		
Annual Service Volume	355,000	355,000
VFR (Hourly Capacity)	197	197
IFR (Hourly Capacity)	62	62
IFR Capability	Precision Approach	Precision Approach
Land Requirements		
Airport Site (acres)	887	888
Easements (acres)	162	162
Airfield Facilities		
Runways		
Primary (length x width, in feet)	5,500 x 100	6,400 x 100
Parallel (length x width, in feet)	3,300 x 75	3,300 x 75
Crosswind (length x width, in feet)	4,440 x 100	4,440 x 100
Taxiways	Full parallel taxiway system	Full parallel taxiway system
Apron (square feet)	969,975	482,000
Runway Lighting	HIRL on RWY's 6L/24R and 14/32, and MIRL on RWY 6R/24L	HIRL on RWY's 6L/24R and 14/32, and MIRL on 6R/24L
Visual Approach Aids	REIL and VASI on RWY 14/32; VASI on RWY 6R/24L; REIL and PAPI on RWY 6L/24R	REIL and VASI on RWY 14/32; VASI on RWY 6R/24L; REIL and PAPI on RWY 6L/24R
Instrument Landing Aids	ILS category I on RWY 6L, NDB and VOR on approach to airport	ILS category I on RWY 6L, NDB and VOR on approach to airport
Terminal Area Facilities[c]		
Administration/Terminal		
Building (square feet)	4,400	18,650
Automobile Parking (spaces)	290	480
Service Roads (miles)	1.6	1.6
Large Hangars (square feet)	141,500	270,000
T-Hangars (spaces)	157	312

[a] *Based on 60 percent useful lod for aircraft over 12,500 pounds.*

[b] *Based on 90 percent useful load for aircraft over 12,500 pounds.*

[c] *Includes facilities used by Gateway Technical Institute.*

Abbreviations used in this table
- HIRL - High Intensity Runway Lights
- IFR - Instrument Flight Rules
- ILS - Instrument Landing System
- MIRL - Medium Intensity Runway Lights
- NDB - Nondirectional Radiobeacon
- PAPI - Precision Approach Path Indicator
- REIL - Runway End Identifier Lights
- RWY - Runway
- VASI - Visual Approach Slope Indicator
- VFR - Visual Flight Rules
- VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, City of Kenosha, and SEWRPC.

Table 120

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT KENOSHA REGIONAL AIRPORT

Recommended Improvement	Size of Improvements	1995 dollars
Land		
Acquire Additional Land Fee Simple [a]	1 acre	$ 200,000
Airfield		
Lengthen RWY 06L/24R	900 x 100 feet	225,000
Extend Parallel Taxiway for 06L/24R	1,350 x 35 feet	135,000
Relocate Instrument Landing System Equipment	Item	100,000
Repair and Reconstruct Pavement Surfaces	Item	2,320,000
Terminal Area Facilities		
Expand Administration/Terminal Building	14,250 square feet	926,000
Expand Parking Area	190 spaces	365,000
Hangars/Aircraft Storage		
Construct Large Hangars	128,500 square feet	2,723,000
Construct T-Hangars	155 spaces	2,558,000
Other		
None	--	--
Total	--	$9,552,000

[a] *Includes acquisition of one business.*

Abbreviation used in this table
RWY - Runway

Source: Wisconsin Department of Transportation, City of Kenosha, and SEWRPC.

segment of STH 33 would require relocation to accommodate the new primary runway alignment and additional terminal area.

With these improvements, the airport would be able to serve with effectiveness and safely virtually all single-engine piston, twin-engine piston, and turboprop aircraft as well as a wide variety of small, medium, and large business and corporate jets under most weather conditions. Thus, general aviation aircraft with airport reference codes A-I, A-II, A-III, B-I, B-II, B-III, C-I, C-II, D-I, and D-II would be able to be accommodated, although any aircraft 12,500 pounds or over, which includes most business and corporate jets, could be accommodated only under 60 percent load conditions. Annual aircraft operations at the airport may be expected to increase from about 82,000 in 1993 to about 104,000 in 2010. These improvements would allow the airport to continue functioning as a reliever airport for General Mitchell International Airport as well as the primary general aviation airport for much of Washington County and Ozaukee County. Table 124 presents the estimated costs required to implement the recommended improvements.

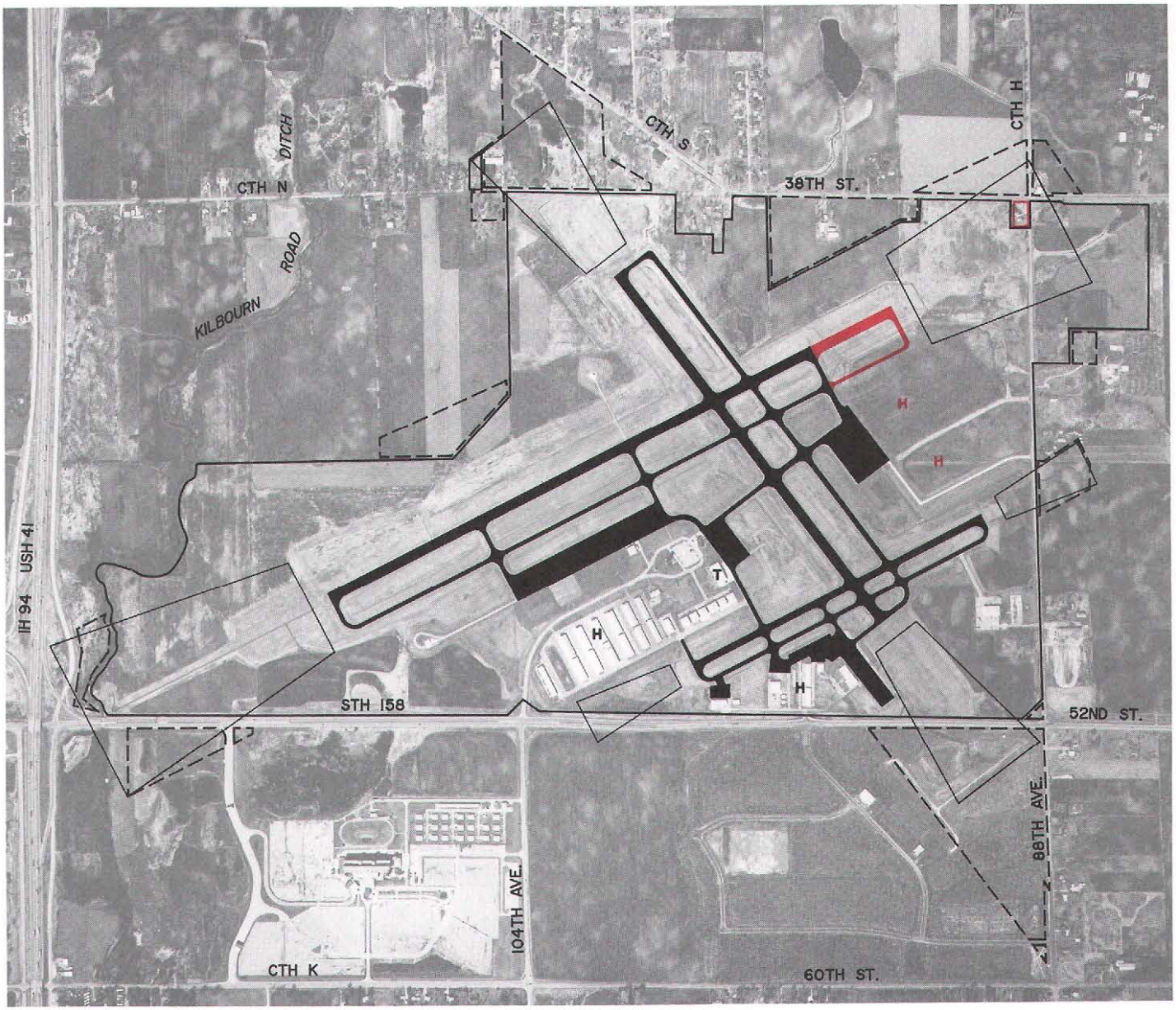
Ground transportation access is provided directly to West Bend Municipal Airport by STH 33. The airport terminal area is located within the City of West Bend public sanitary sewer service area and can be connected to the sanitary sewer system as facilities are extended.

Map 66 shows the noise contour for the airport based on the year 2010 level of aviation activity and the recommended land use pattern for the airport environs.

In February 1995, the City of West Bend began work on the required environmental assessment for the proposed primary runway extension. In May 1995, the advisory committee guiding the preparation of the environmental assessment concluded that the assessment should be focused on five specific alternatives. The assessment is to evaluate these alternatives as well as any potential new alternatives that may be proposed. As of March 1996, as the airport system plan was being completed, the environmental assessment was still underway and the City of West Bend had not yet decided upon a final alternative. It was accordingly recognized that the preferred alternative for

Map 61

RECOMMENDED SITE IMPROVEMENT PLAN FOR KENOSHA REGIONAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
	(NONE)	EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

RUNWAY PROTECTION ZONE

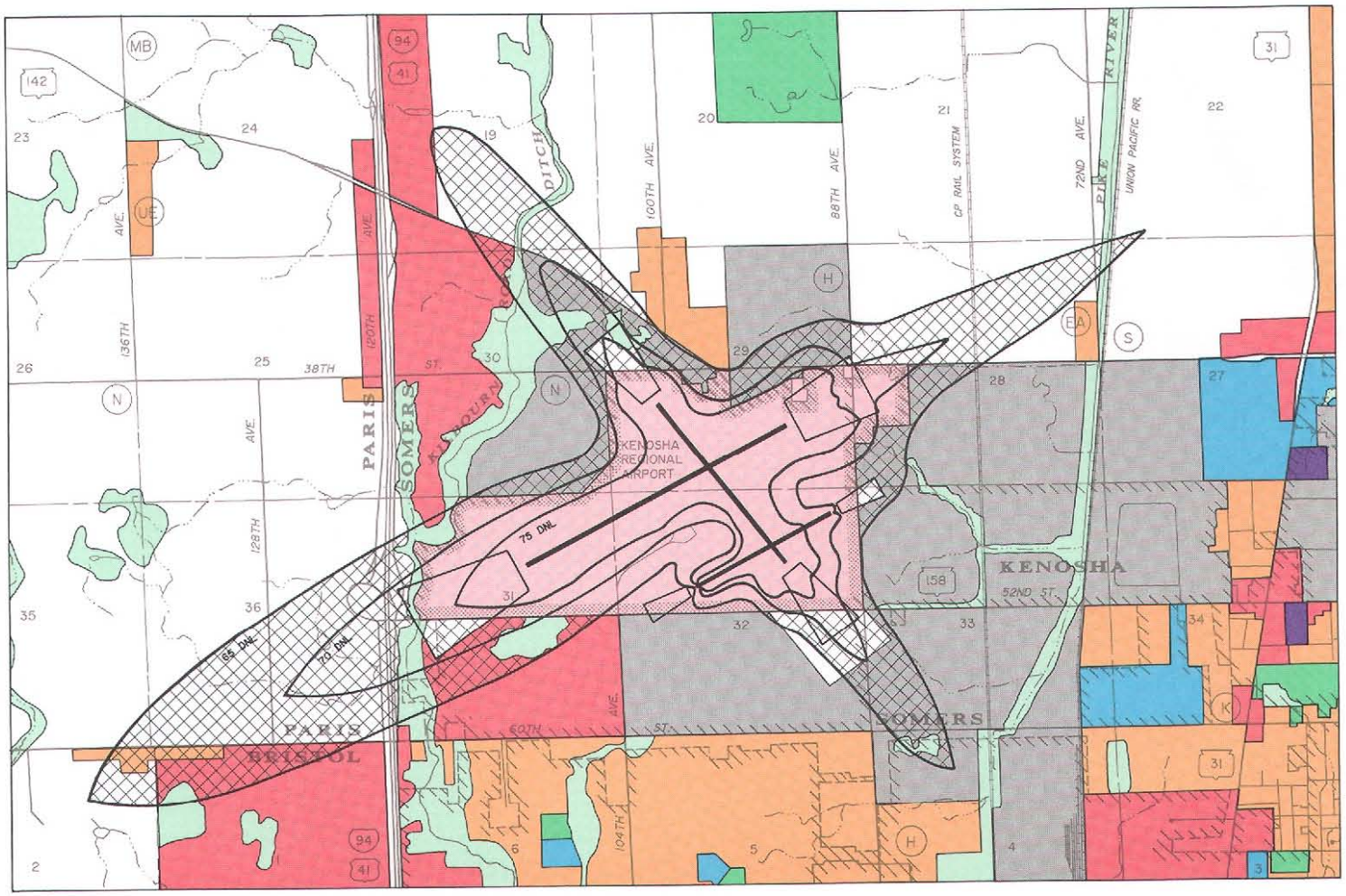
ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL, 1990

Source: SEWRPC.

Map 62

AREA LAND USE PLAN FOR KENOSHA REGIONAL AIRPORT: 2010



LEGEND

- EXISTING AND PROPOSED AIRPORT LANDS
- 65 DNL NOISE EXPOSURE CONTOUR
- 70 DNL NOISE EXPOSURE CONTOUR
- 75 DNL NOISE EXPOSURE CONTOUR
- RUNWAY PROTECTION ZONE

PREDOMINANT LAND USE

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATION, AND UTILITY
- GOVERNMENTAL AND INSTITUTIONAL
- RECREATIONAL
- AREAS IN WHICH NEW, EXPANSION, OR REPLACEMENT DEVELOPMENT SHOULD BE LIMITED TO COMPATIBLE OBJECTS AND LAND USES
- AGRICULTURE AND OTHER OPEN LANDS
- PRIMARY ENVIRONMENTAL CORRIDOR, SECONDARY ENVIRONMENTAL CORRIDOR, AND ISOLATED NATURAL RESOURCE AREAS

GRAPHIC SCALE

0 1/4 1/2 MILE

0 2000 4000 FEET

Source: SEWRPC.

Table 121

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR WAUKESHA COUNTY-CRITES FIELD

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Transport-Corporate	Transport-Corporate
Based Aircraft (number)	178	204
Airport Reference Code	D-II[a]	D-II[a]
Annual Operations (number)	71,876	130,000
Airfield Capacity		
Annual Service Volume	230,000	230,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	59	59
IFR Capability	Nonprecision approach	Precision approach
Land Requirements		
Airport Site (acres)	543	543
Easements (acres)	97	97
Airfield Facilities		
Runways		
Primary (length x width, in feet)	5,850 x 100	5,850 x 100
Crosswind (length x width, in feet)	3,599 x 75	3,599 x 75
Taxiways	Full parallel taxiway system	Full parallel taxiway system
Apron (square feet)	228,100	320,000
Runway Lighting	HIRL on RWY 10/28 and MIRL on RWY 18/36	HIRL on RWY 10/28 and MIRL on RWY 18/36
Visual Approach Aids	REIL on RWY 28 and VASI on RWY 10/28	REIL and VASI on RWY 10/28 and REIL and PAPI on RWY 18/36
Instrument Landing Aids	LOC on RWY 10; NDB and VOR on approach to airport	Full ILS on RWY 10; NDB and VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	3,000	9,400
Automobile Parking (spaces)	220	244
Service Roads (miles)	1.0	1.8
Large Hangars (square feet)	84,600	125,000
T-Hangars (spaces)	97	172

[a]*Based on 60 percent useful load.*

Abbreviations used in this table
- HIRL - High Intensity Runway Lights
- IFR - Instrument Flight Rules
- ILS - Instrument Landing System
- MIRL - Medium Intensity Runway Lights
- PAPI - Precision Approach Path Indicator
- REIL - Runway End Identifier Lights
- RWY - Runway
- VASI - Visual Approach Slope Indicator
- VFR - Visual Flight Rules
- VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, Waukesha County, and SEWRPC.

development of a 5,500-foot-long primary runway at West Bend Municipal Airport as identified in the system plan may change on the basis of the findings of the environmental assessment.

East Troy Municipal Airport: It is recommended that East Troy Municipal Airport remain classified as a General Utility airport and continue to be developed over the plan design period to meet these standards. The major improvements necessary to accomplish this were identified in Chapter IX of this report and are described in Table 125 and shown on Map 67. They include extension of the primary runway and parallel taxiway by 500 feet, to an ultimate length of 4,400 feet; paving the crosswind runway and taxiway to a length of 2,380 feet; and the expansion of terminal and hangar facilities.

Table 122

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT WAUKESHA COUNTY-CRITES FIELD

Recommended Improvement	Size of Improvements	1995 dollars[a]
Land		
None	--	--
Airfield		
Relocate Full Parallel Taxiway for 10/28	6,750 x 40 feet	$ 2,400,000
Construct Full Parallel Taxiway for 18/36	4,500 x 40 feet	1,066,000
Relocate and Expand Apron	680,850 square feet	5,629,000
Repair and Reconstruct Pavement Surfaces	Item	400,000
Install REIL on All Paved Runways	3 sets	33,000
Install PAPI on All Paved Runways	2 sets	54,000
Complete ILS System	Item	450,000
Terminal Area Facilities		
Relocate and Expand Administration/Terminal Building	9,400 square feet	1,757,000
Relocate and Expand Parking Area	244 spaces	105,000
Hangars/Aircraft Storage		
Construct Corporate Hangar Area	86,400 square feet	1,140,000
Construct Individual Hangars	128 spaces	760,000
Other		
Guidance Signs/Runway Threshold Relocation	Item	223,000
Total	--	$14,017,000

[a]*Preliminary.*

Abbreviations used in this table
ILS - Instrument Landing System
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights

Source: Wisconsin Department of Transportation, Waukesha County, and SEWRPC.

With these improvements, the airport would be able to serve all general aviation aircraft under 12,500 pounds with airport reference codes A-I, A-II, B-I, and B-II effectively and safely under a variety of weather conditions. Annual aircraft operations at the airport may be expected to increase from about 55,000 in 1993 to about 59,000 in 2010. This would enable virtually all small single-engine, most twin-engine, and many turboprop aircraft to be accommodated under a wide range of weather conditions. These improvements would also allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system, as well as serving as the primary general aviation airport for much of Walworth County and southern Waukesha County. Table 126 presents the estimated capital costs required to implement the recommended improvements.

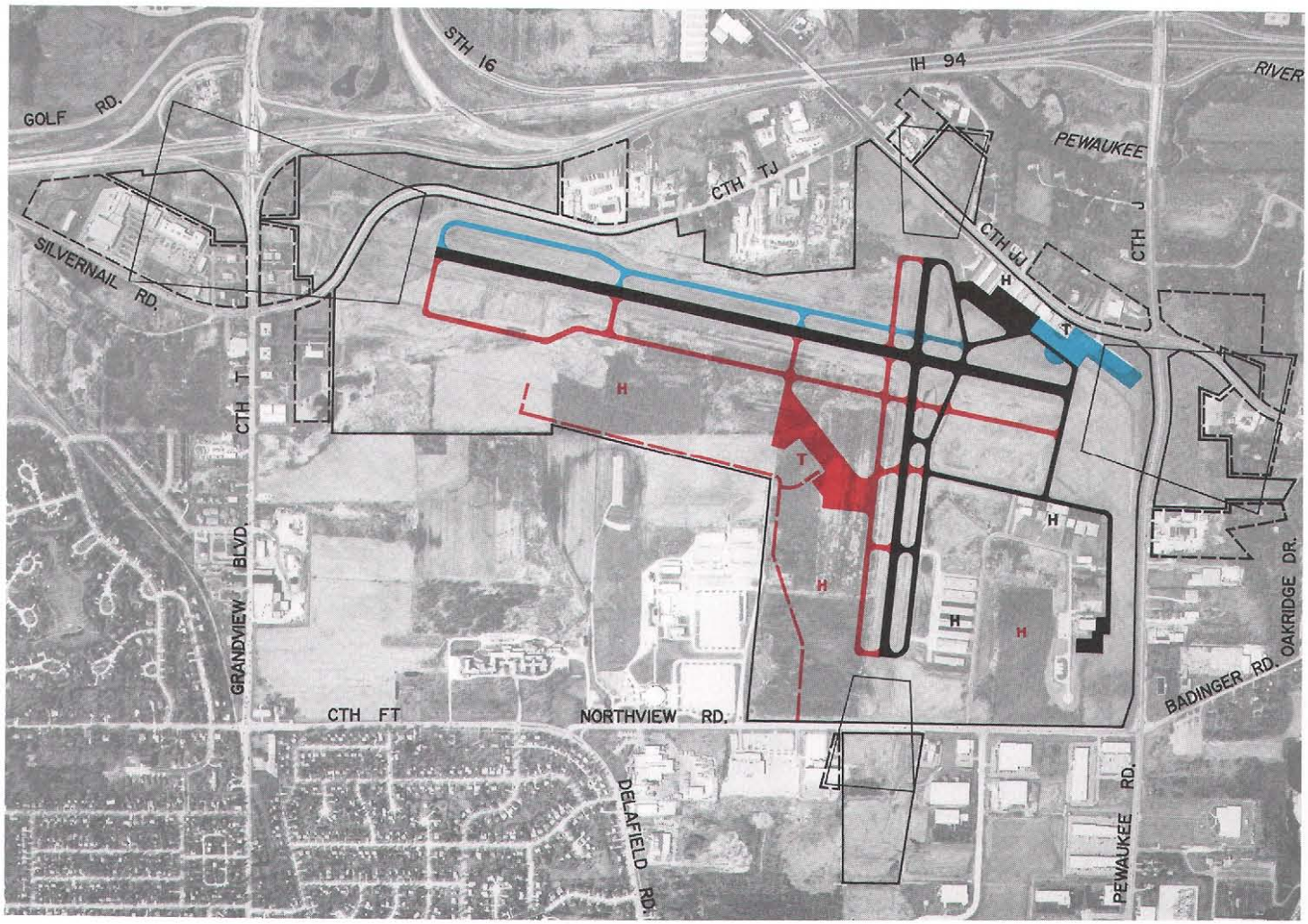
Ground transportation access is provided to East Troy Municipal Airport by IH 43 and STH 20, which are less than one-half mile from the airport entrance via CTH L. The airport terminal area is located within the proposed Village of East Troy public sanitary sewer service area and can be connected to the sanitary sewer system as facilities are extended.

Map 68 shows the recommended land use pattern for the airport environs.

Hartford Municipal Airport: It is recommended that Hartford Municipal Airport, which is currently classified as a Basic Utility airport, be maintained in service and developed over the plan design period to General Utility standards. Such development would be undertaken in such a manner as to preserve the option to further develop the airport to Transport-Corporate standards at a later date. The

Map 63

RECOMMENDED SITE IMPROVEMENT PLAN FOR WAUKESHA COUNTY-CRITES FIELD: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS AND TAXIWAYS
	(NONE)	PROPERTY BOUNDARY
	(NONE)	EASEMENT BOUNDARY
T	T	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS
(NONE)		NEW ACCESS ROAD

FACILITIES TO BE REMOVED

PAVED TAXIWAYS, APRON, OR PARKING AREA TO BE REMOVED

RUNWAY PROTECTION ZONE

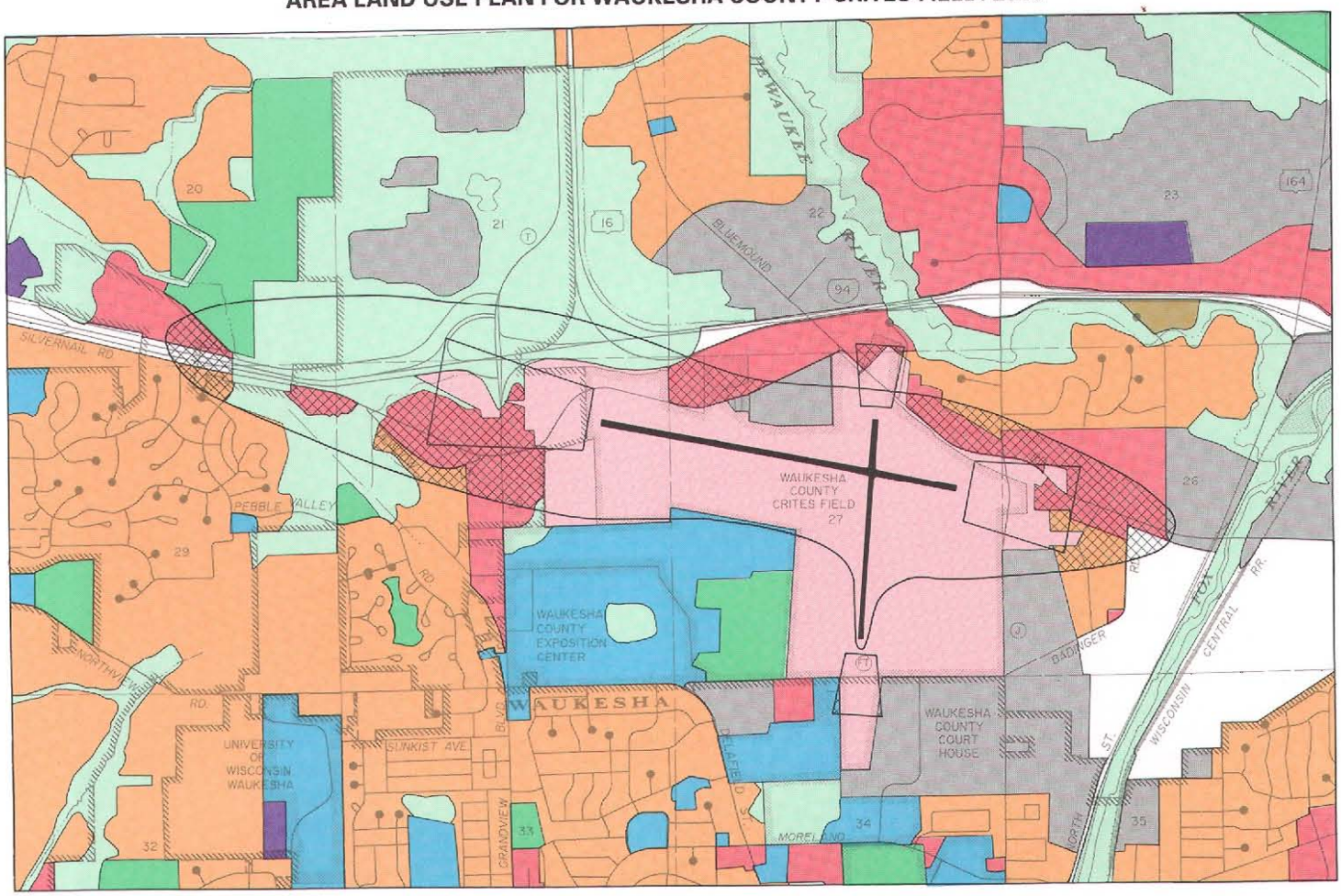
ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 64

AREA LAND USE PLAN FOR WAUKESHA COUNTY-CRITES FIELD: 2010



LEGEND

- EXISTING AND PROPOSED AIRPORT LANDS
- 65 DNL NOISE EXPOSURE CONTOUR
- RUNWAY PROTECTION ZONE

PREDOMINANT LAND USE

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATION, AND UTILITY
- GOVERNMENTAL AND INSTITUTIONAL
- RECREATIONAL
- AREAS IN WHICH NEW, EXPANSION, OR REPLACEMENT DEVELOPMENT SHOULD BE LIMITED TO COMPATIBLE OBJECTS AND LAND USES
- AGRICULTURE, EXTRACTIVE, AND OTHER OPEN LANDS
- PRIMARY ENVIRONMENTAL CORRIDOR, SECONDARY ENVIRONMENTAL CORRIDOR, AND ISOLATED NATURAL RESOURCE AREAS

GRAPHIC SCALE
0 1/2 1 MILE
0 1000 2000 FEET

Source: SEWRPC.

Table 123

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR WEST BEND MUNICIPAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Transport-Corporate	Transport-Corporate
Based Aircraft (number)	123	152
Airport Reference Code	C-II[a]	D-II[b]
Annual Operations (number)	82,100	104,000
Airfield Capacity		
Annual Service Volume	230,000	230,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	59	59
IFR Capability	Nonprecision approach	Precision approach
Land Requirements		
Airport Site (acres)	367	619
Easements (acres)	81	91
Airfield Facilities		
Runways		
Primary (length x width, in feet)	4,500 x 75	5,500 x 100
Crosswind (length x width, in feet)	3,900 x 75	4,400 x 75
Taxiways	Full parallel taxiway for RWY 6/24; partial parallel taxiway for RWY 13/31	Full parallel taxiway system on all paved RWY's
Apron (square feet)	112,000	212,000
Runway Lighting	MIRL on RWY's 13/31 and 6/24	HIRL on RWY 08/26 and MIRL on RWY 13/31
Visual Approach Aids	REIL and VASI on RWY 13/33	REIL and VASI on RWY 13/31 and REIL and PAPI on RWY 08
Instrument Landing Aids	LOC on RWY 31; VOR and NDB on approach to airport	Full ILS on RWY 26; VOR and NDB on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	4,100	7,450
Automobile Parking (spaces)	120	190
Service Roads (miles)	0.2	0.5
Large Hangers (square feet)	67,100	72,000
T-Hangers (spaces)	60	120

[a] *aircraft under 12,500 pounds only.*

[b] *Based on 60 percent useful load.*

Abbreviations used in this table
- HIRL - High Intensity Runway Lights
- IFR - Instrument Flight Rules
- ILS - Instrument Landing System
- LOC - Localizer
- MIRL - Medium Intensity Runway Lights
- NDB - Nondirectional Radiobeacon
- PAPI - Precision Approach Path Indicator
- REIL - Runway End Identifier Lights
- RWY - Runway
- VASI - Visual Approach Slope Indicator
- VFR - Visual Flight Rules
- VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, City of West Bend, and SEWRPC.

major improvements necessary to accomplish this were identified in Chapter IX of this report and are described in Table 127 and shown on Map 69. They include extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 3,900 feet; paving the crosswind runway and parallel taxiway to 3,200 feet; land and easement acquisition to enable this airfield expansion; and the expansion of terminal and hangar facilities. If it is found in the future that expansion of the airport to Transport-Corporate standards is warranted, the primary runway and parallel taxiway would be extended under a later phase of development to a length of 4,900 feet, the crosswind runway and parallel taxiway would be extended to a length of 3,900 feet, and an instrument landing

Table 124

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT WEST BEND MUNICIPAL AIRPORT

Recommended Improvement	Size of Improvements	1995 dollars
Land		
Acquire Additional Land Fee Simple	252 acres	$ 1,347,000
Acquire Easements	10 acres	10,000
Airfield		
Construct RWY 08/26	5,500 X 100 feet	5,314,000
Shorten RWY 13/31	100 x 75 feet	25,000
Construct Full Parallel Taxiway for 08/26	6,500 x 40 feet	2,657,000
Relocate and Extend Parallel Taxiway for 13/31	4,650 x 40 feet	465,000
Expand Apron	100,000 square feet	425,000
Repair and Reconstruct Pavement Surfaces	Item	1,030,000
Install REIL on All Paved Runways	1 set	15,000
Install PAPI on All Paved Runways	1 set	20,000
Install ILS System	Item	750,000
Terminal Area Facilities		
Expand Administration/Terminal Building	3,350 square feet	218,000
Expand Parking Area	70 spaces	134,000
Hangars/Aircraft Storage		
Construct Large Hangars	4,950 square feet	104,000
Construct T-Hangars	60 spaces	990,000
Other		
Relocate Section of STH 33	Item	1,235,000
Relocate Army Helipad	Item	455,000
Total	--	$15,194,000

Abbreviations used in this table
ILS - Instrument Landing System
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation, City of West Bend, and SEWRPC.

system would be installed. Additional land and easement acquisition would be necessary to enable this later expansion.

With the recommended improvements, the airport would be able effectively and safely to serve all small single-engine piston and twin-engine piston aircraft as well as many turboprop aircraft under a variety of weather conditions. Annual aircraft operations at the airport are expected to increase from about 28,000 in 1993 to about 35,000 in 2010. This would enable all single-engine piston, most twin-engine piston, and many turboprop aircraft to be accommodated under a wide range of weather conditions. These improvements would also allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and for other large general aviation airports in the regional airport system, as well as serving as a primary general aviation airport for western Washington County and northern Waukesha County. Table 128 presents the estimated capital costs required to implement the recommended improvements to develop the airport to General Utility standards.

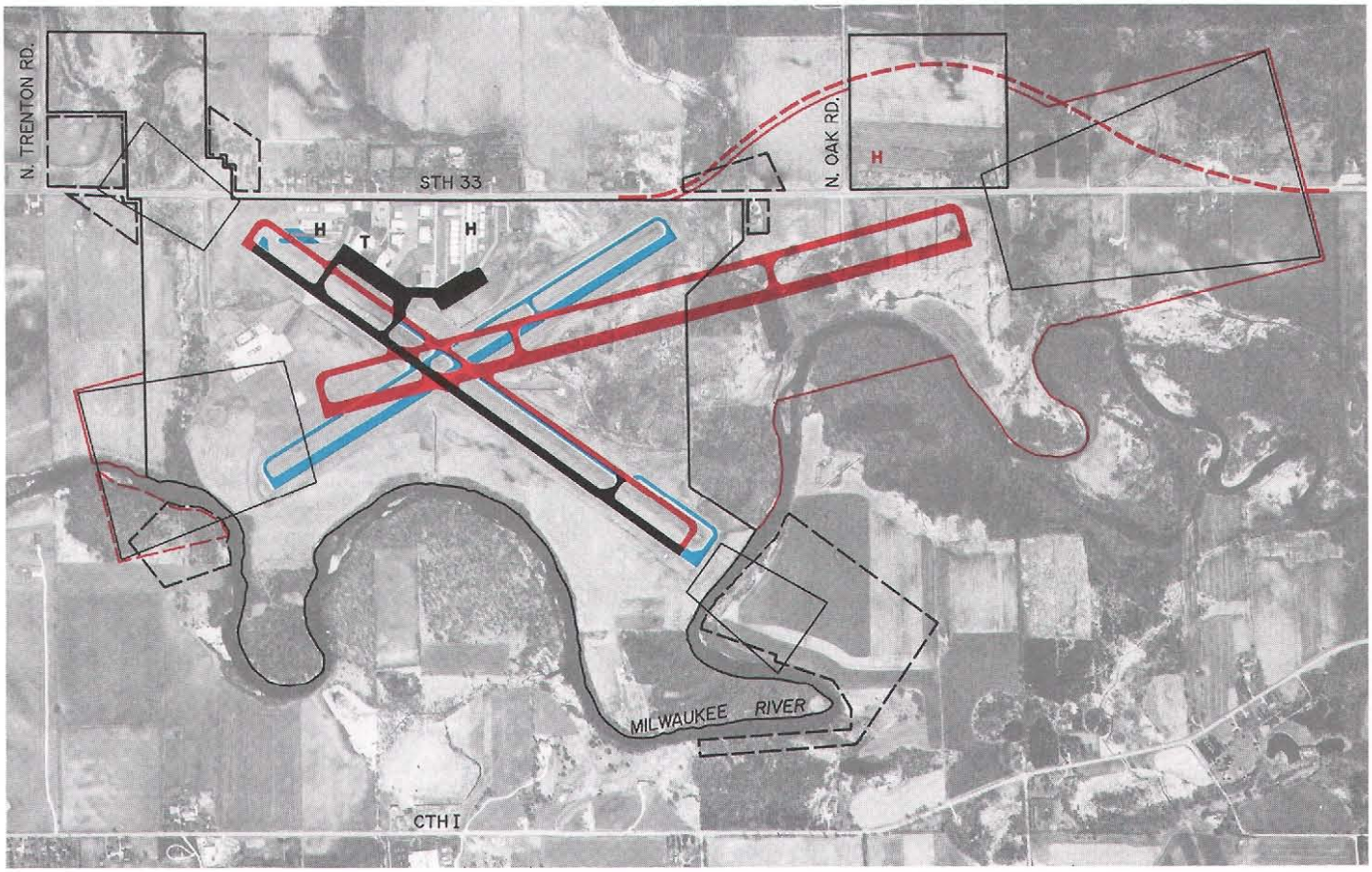
Ground transportation access is provided to Hartford Municipal Airport by CTH U. The airports terminal area is located within the proposed City of Hartford public sanitary sewer service area and can be connected to the sanitary sewer system as facilities are extended.

Map 70 shows the recommended land use pattern for the airport environs.

Lawrence J. Timmerman Airport: It is recommended that Lawrence J. Timmerman Airport remain classified as a General Utility airport and continue to be maintained over the plan design

Map 65

RECOMMENDED SITE IMPROVEMENT PLAN FOR WEST BEND MUNICIPAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
		EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

FACILITIES TO BE REMOVED

PAVED RUNWAYS OR TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

HIGHWAY REALIGNMENT

APPROXIMATE LOCATION

GRAPHIC SCALE

0 400 800 1200 FEET

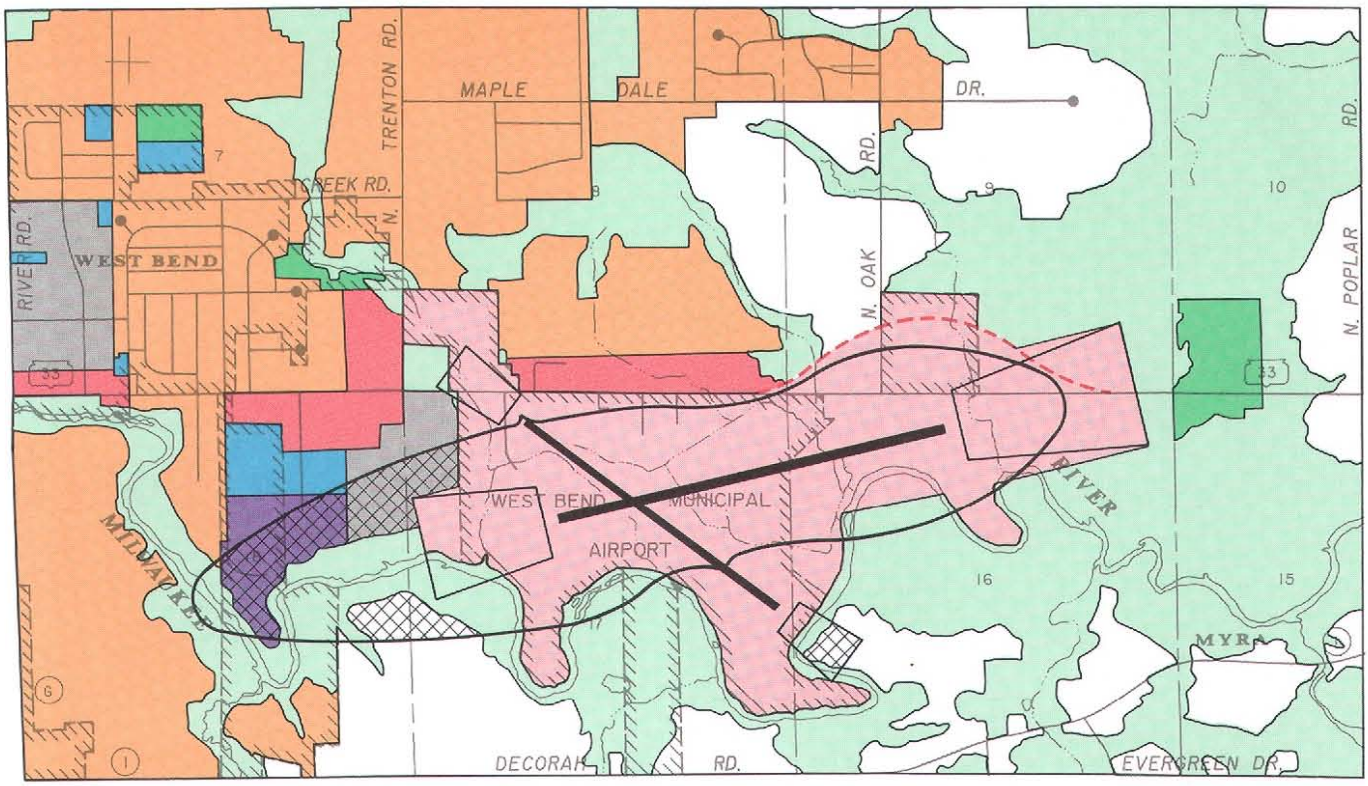
DATE OF PHOTOGRAPHY: APRIL 1995

NOTE: IN FEBRUARY 1995, THE CITY OF WEST BEND BEGAN WORK ON THE ENVIRONMENTAL ASSESSMENT REQUIRED FOR THE IMPLEMENTATION OF THE LONG-PROPOSED PRIMARY RUNWAY EXTENSION. IN MAY 1995, THE ADVISORY COMMITTEE GUIDING THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT CONCLUDED THAT THE ASSESSMENT SHOULD BE FOCUSED ON FIVE SPECIFIC ALTERNATIVES, ONE OF WHICH IS SHOWN ON THIS MAP. THE ENVIRONMENTAL ASSESSMENT IS STILL UNDER WAY AND THE CITY OF WEST BEND AND WISCONSIN DEPARTMENT OF TRANSPORTATION HAVE NOT YET DECIDED UPON A FINAL RECOMMENDED RUNWAY EXTENSION PLAN.

Source: SEWRPC.

Map 66

AREA LAND USE PLAN FOR WEST BEND MUNICIPAL AIRPORT: 2010



LEGEND

- EXISTING AND PROPOSED AIRPORT LANDS
- 65 DNL NOISE EXPOSURE CONTOUR
- RUNWAY PROTECTION ZONE
- PROPOSED HIGHWAY REALIGNMENT

PREDOMINANT LAND USE

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATION, AND UTILITY
- GOVERNMENTAL AND INSTITUTIONAL
- RECREATIONAL
- AREAS IN WHICH NEW, EXPANSION, OR REPLACEMENT DEVELOPMENT SHOULD BE LIMITED TO COMPATIBLE OBJECTS AND LAND USES
- AGRICULTURE AND OTHER OPEN LANDS
- PRIMARY ENVIRONMENTAL CORRIDOR, SECONDARY ENVIRONMENTAL CORRIDOR, AND ISOLATED NATURAL RESOURCE AREA

Source: SEWRPC.

Table 125

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR EAST TROY MUNICIPAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	General Utility	General Utility
Based Aircraft (number)	80	90
Airport Reference Code	A-II	B-II
Annual Operations (number)	55,100	59,000
Airfield Capacity		
Annual Service Volume	207,000	207,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	53	53
IFR Capability	Nonprecision	Nonprecision
Land Requirements		
Airport Site (acres)	215	215
Easements (acres)	60	60
Airfield Facilities		
Runways		
Primary (length x width, in feet)	3,900 x 75	4,400 x 75
Crosswind (length x width, in feet)	2,400 x 150 (turf)	2,380 x 75
Taxiways	Full parallel taxiway on RWY 8/26	Full parallel taxiway system on all paved RWYs
Apron (square feet)	124,900	194,000
Runway Lighting	MIRL on RWY 8/26	MIRL on all RWY's
Visual Approach Aids	REIL on RWY 8/26 and PAPI on RWY 8	REIL on all RWY's and PAPI on RWY 8/26
Instrument Landing Aids	VOR on approach to airport	VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	1,100	6,700
Automobile Parking (spaces)	40	170
Service Roads (miles)	0.3	0.5
Large Hangars (square feet)	6,400	27,000
T-Hangars (spaces)	56	74

Abbreviations used in this table
IFR - Instrument Flight Rules
MIRL - Medium Intensity Runway Lights
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VFR - Visual Flight Rules
VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, Village of East Troy, and SEWRPC.

period to meet these standards. The analyses conducted under this plan update did not reveal any deficiencies with respect to capacity or primary runway length for Lawrence J. Timmerman Airport. No major improvements are necessary at this airport, although some improvements are recommended as identified in Table 129 and shown on Map 71. These include the acquisition of additional easements to protect the runway approaches, improvement to the terminal and hangar facilities, a minor extension of the crosswind runway by 98 feet to meet Federal design standards, and the removal of a portion of parking lot currently within a runway object-free area.

Maintaining the airport to General Utility standards would enable this airport safely and effectively to serve all general aviation aircraft under 12,500 pounds with airport reference codes of A-I, A-II, A-III, B-I under a variety of weather conditions. Annual aircraft operations at the airport may be expected to decrease slightly from the 1993 level of about 88,000 to about 84,000 by the year 2010. The airport would be able to continue to accommodate all single-engine piston, most twin-engine piston, and many turboprop aircraft under a wide range of weather conditions. It is intended that Lawrence J. Timmerman Airport continue functioning as an important reliever airport for Gen-

Table 126

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT EAST TROY MUNICIPAL AIRPORT

Recommended Improvement	Size of Improvement	1995 dollars
Land		
None	--	--
Airfield		
Pave RWY 18/36	2,380 x 75 feet	$ 559,000
Lengthen RWY 08/26	500 X 75 feet	118,000
Extend Parallel Taxiway for 08/26	500 x 40 feet	50,000
Construct Full Parallel Taxiway for 18/36	2,380 x 40 feet	238,000
Expand Apron	69,100 square feet	276,000
Repair and Reconstruct Pavement Surfaces	Item	240,000
Install REIL on All Paved Runways	2 sets	30,000
Install PAPI on Primary Runway	1 set	20,000
Terminal Area Facilities		
Expand Administration/Terminal Building	5,600 square feet	364,000
Expand Parking Area	130 spaces	250,000
Hangars/Aircraft Storage		
Construct Large Hangars	20,600 square feet	437,000
Construct T-Hangars	18 spaces	297,000
Other		
None	--	--
Total	--	$2,879,000

Abbreviations used in this table
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation, Village of East Troy, and SEWRPC.

eral Mitchell International Airport and serving as the primary general aviation airport for northern Milwaukee County and southern Ozaukee County. Table 130 presents the recommended improvements and estimated capital costs required to maintain the airport.

Ground transportation access is provided directly to Lawrence J. Timmerman Airport by W. Appleton Avenue (USH 41) and the airport is within one-and-one-half miles of STH 100, USH 45, and USH 145. Two major crosstown arterials, W. Silver Spring Drive (CTH E) and W. Hampton Avenue (CTH EE), are also closely adjacent to the airport. The airport terminal area lies within the Milwaukee public sanitary sewer service area.

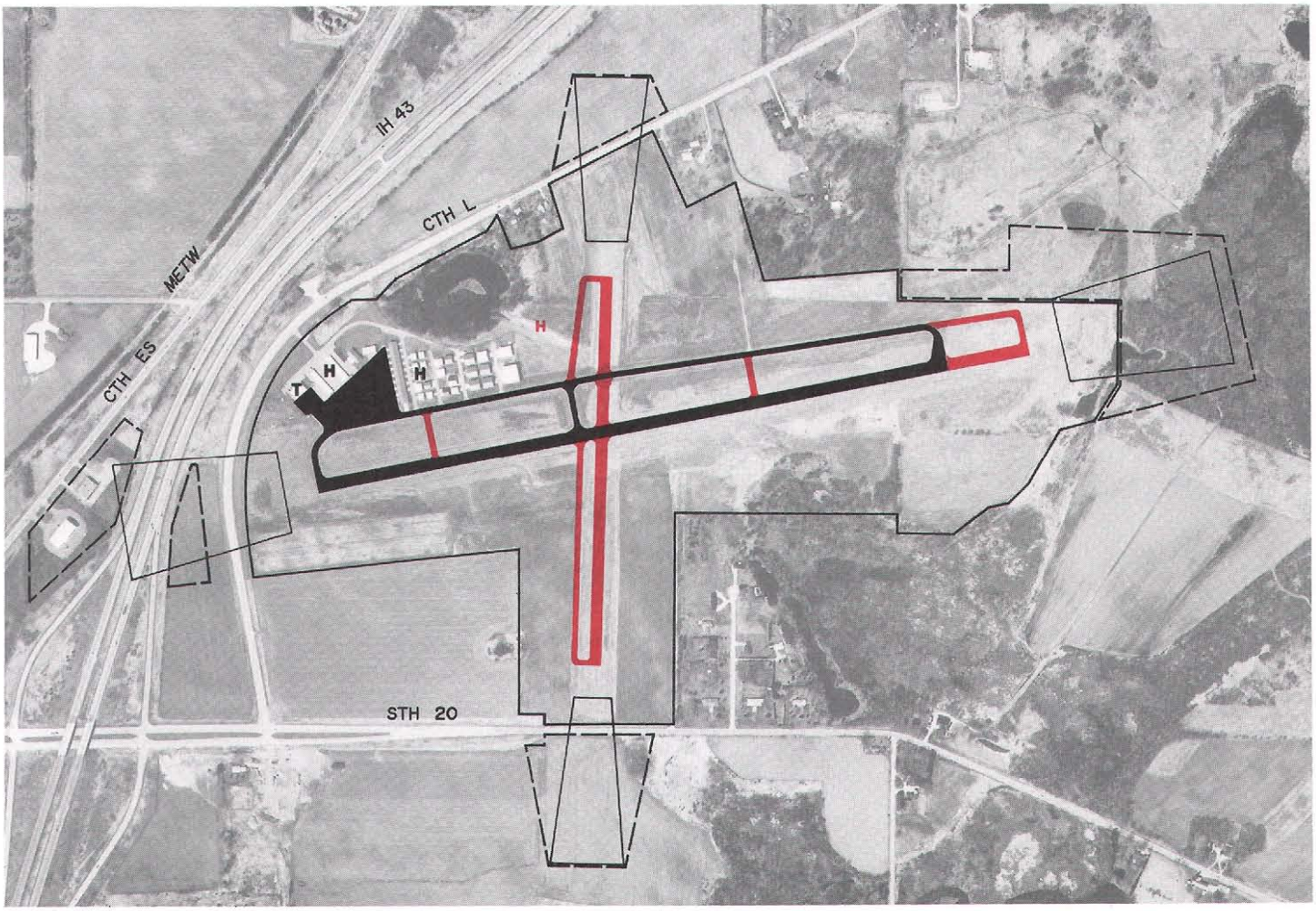
Map 72 shows the noise contour for the airport based on the year 2010 levels of aviation activity and the recommended land use pattern for the environs.

Capitol Airport: It is recommended that Capitol Airport remain classified as a Basic Utility airport and continue to be developed over the plan design period to meet these standards. The analyses conducted under this plan update did not reveal any deficiencies with respect to capacity or primary runway length for Capitol Airport. Nevertheless, a number of improvements related to airfield design were found to be desirable. These include reconstruction and widening of the primary runway to a length of 3,600 feet, paving and extension of a crosswind runway to a length of 2,600 feet, construction of partial parallel taxiways for the primary and crosswind runways, land and easement acquisition to enable the recommended airfield expansion, construction of an apron, and expansion of terminal and hangar facilities. The major improvements necessary to accomplish this are identified in Table 131 and shown on Map 73.

With these improvements, the airport would be able effectively and safely to serve all general aviation aircraft under 12,500 pounds with an airport reference code of A-I. Annual aircraft operations at the airport are expected to increase from about 69,000 in 1993 to about 78,000 in 2010. This would enable most single-engine piston and

Map 67

RECOMMENDED SITE IMPROVEMENT PLAN FOR EAST TROY MUNICIPAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRON
——	(NONE)	PROPERTY BOUNDARY
– – –	(NONE)	EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

RUNWAY PROTECTION ZONE

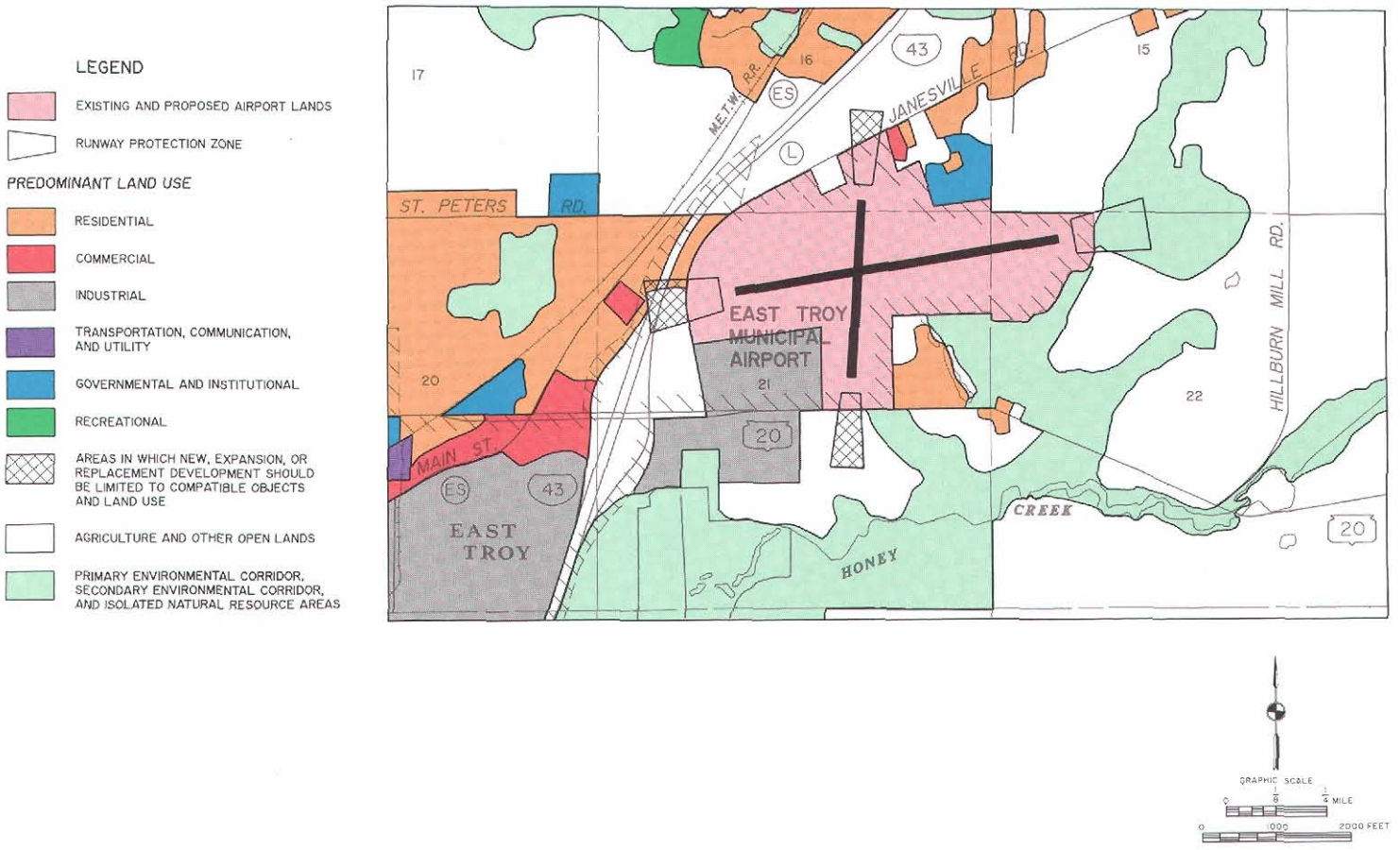
ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1600 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 68

AREA LAND USE PLAN FOR EAST TROY MUNICIPAL AIRPORT: 2010



Source: SEWRPC.

a variety of twin-engine piston aircraft to be accommodated under a wide range of weather conditions. The recommended improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other large general aviation airports in the regional airport system, as well as serving as an important general aviation airport for much of Waukesha County. Table 132 present the estimated capital costs to implement the recommended improvements.

Capitol Airport is located relatively close to two other general aviation airports included in the regional airport system plan. Capitol Airport is about four miles northeast of Waukesha County-Crites Field and about seven miles westerly of Lawrence J. Timmerman Airport. Capitol Airport is also about 1.5 miles southwest of Aero Park Airport, a privately-owned public-use facility not included in the regional airport system plan as an essential facility. The master plan for Capitol Airport completed in 1990 addressed the issue of possible airspace conflicts between Capitol Airport and these other nearby airports.

The master planning effort concluded that both Capitol and Aero Park Airports could continue to operate safely if the primary runway direction at Capitol Airport were changed from a north-south orientation to an east-west orientation, as is recommended in the regional airport system plan, and if specific changes are made at Aero Park Airport, either through letter of agreement between the respective airport owners or by purchase of specific air rights to Aero Park Airport by the owner of Capitol Airport. Such changes at Aero Park would include closing of turf runway 5/23, establishment

Table 127

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR HARTFORD MUNICIPAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Basic Utility	General Utility
Based Aircraft (number)	67	72
Airport Reference Code	A-I	A-II
Annual Operations (number)	28,320	35,000
Airfield Capacity		
Annual Service Volume	207,000	207,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	53	53
IFR Capability	Nonprecision approach	Nonprecision approach
Land Requirements		
Airport Site (acres)	201	301
Easements (acres)	44	64
Airfield Facilities		
Runways		
Primary (length x width, in feet)	3,001 x 75	3,900 x 75
Crosswind (length x width, in feet)	2,250 x 195 (turf)	3,200 x 75
Taxiways	Full parallel taxiway for RWY 11/29	Full parallel taxiway system on all paved RWY's
Apron (square feet)	72,000	68,000
Runway Lighting	MIRL on RWY 11/29	MIRL on all paved RWY's
Visual Approach Aids	REIL and PAPI on RWY 11/29	REIL and PAPI on RWY's 18L/36R and 11/29
Instrument Landing Aids	VOR and NDB on approach to airpot	VOR and NDB on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	3,100	2,500
Automobile Parking (spaces)	45	65
Service Roads (miles)	0.3	0.4
Large Hangars (square feet)	52,900	16,000
T-Hangars (spaces)	30	61

Abbreviations used in this table
IFR - Instrument Flight Rules
MIRL - Medium Intensity Runway Lights
NBD - Nondirectional Radiobeacon
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VFR - Visual Flight Rules
VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, City of Hartford, and SEWRPC.

of a new east-west turf runway, and restriction of operations to ultra-light aircraft with the exception of single-engine aircraft used for parachute drops.

Concern had previously been expressed by the fixed-base operator at Waukesha County-Crites Field in a 1982 letter regarding operations at Capitol Airport, especially under Instrument Flight Rules conditions. The Capitol Airport master planning effort noted that a FAA study[1] concluded that IFR traffic at Crites Field would not be affected by operations at Capitol Airport since it is the responsibility of pilots to remain outside the controlled airspace for Crites Field during weather conditions that prohibit operation under Visual Flight Rules (VFR) or to obtain appropriate air traffic control clearance to enter any portion of the controlled airspace and thereby to be properly separated from other IFR traffic. The Capitol Airport master planning study further noted that the FAA also determined that traffic patterns at the

[1]*See letter in Federal Aviation Administration Airspace Case No. 82-AGL-413-NRA, addressed to Mr. Dean W. Mitchell, Owner, Capitol Airport, dated February 22, 1983.*

Table 128

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT HARTFORD MUNICIPAL AIRPORT

Recommended Improvement	Size	1995 dollars
Land		
Acquire Additional Land Fee Simple	100 acres	$ 200,000
Acquire Easements	20 acres	20,000
Airfield		
Relocate and Pave RWY 18/36 [a]	3,200 x 75 feet	812,000
Lengthen RWY 11/29 [a]	1,240 x 75 feet	496,000
Construct Full Parallel Taxiway for 18/36	3,640 x 40 feet	364,000
Relocate and Extend Parallel Taxiway for 11/29	4,300 x 40 feet	430,000
Repair and Reconstruct Pavement Surfaces	Item	240,000
Install REIL on All Paved Runways	2 sets	30,000
Install PAPI on All Paved Runways	2 sets	40,000
Terminal Area Facilities		
Expand Parking Area	20 spaces	38,000
Service Road	0.1 mile	49,000
Hangars/Aircraft Storage		
Construct T-Hangars	31 spaces	512,000
Other		
None	--	--
Total	--	$3,231,000

[a] *Includes minor relocation of an electric power transmission line at a cost of about $60,000.*

Abbreviations used in this table
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation, City of Hartford, and SEWRPC.

two airports under VFR conditions should not overlap and thereby cause conflicts. The redirection of primary runway traffic at Capitol Airport, as recommended in the regional airport system plan, to an east-west direction will serve further to reduce the potential conflict between traffic at the two airports.

The master planning effort for Capitol Airport did not include any airspace analysis beyond a five-mile radius of the Airport; therefore it did not identify any potential airspace conflicts with Lawrence J. Timmerman Airport.

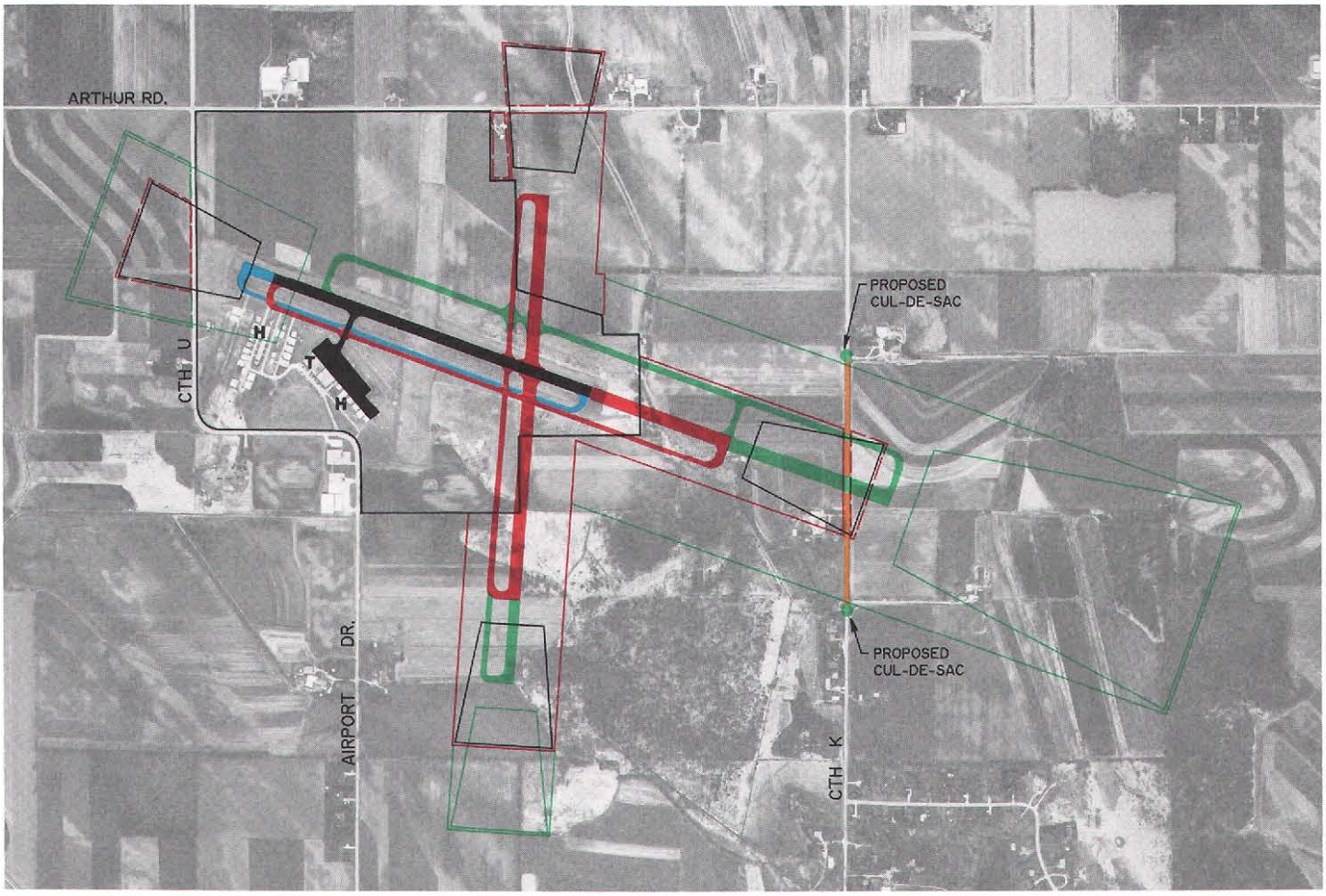
Ground transportation access is provided by STH 190, which is located within one-half mile of the airport entrance. The airport terminal area is located within the proposed City of Brookfield public sewer service area and can be connected to the sanitary sewer system as facilities are extended. Map 74 shows the recommended land use pattern for the airport environs.

Sylvania Airport: It is recommended that Sylvania Airport, which is currently improved to below Basic Utility standards, be developed over the plan design period to Basic Utility standards. The major improvements necessary to accomplish this are identified in Table 133 and shown on Map 75 and include construction of a new primary runway and parallel taxiway to 2,800 feet, construction of a new crosswind runway to a length of 2,200 feet, land and easement acquisition to enable this airfield expansion, and relocation and expansion of the terminal and hangar facilities.

With these improvements, the airport would be able effectively and safely to serve all general aviation aircraft under 12,500 pounds with an airport reference code of A-I. Annual aircraft operations at the

Map 69

RECOMMENDED SITE IMPROVEMENT PLAN FOR HARTFORD MUNICIPAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	ADDITIONAL POSSIBLE FUTURE EXPANSION	
			PAVED RUNWAYS, TAXIWAYS, AND APRONS
			PROPERTY BOUNDARY
(NONE)			EASEMENT BOUNDARY
T	(NONE)	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	(NONE)	(NONE)	AIRCRAFT HANGARS

AIRPORT FACILITIES TO BE REMOVED

- PAVED RUNWAY AND TAXIWAY TO BE REMOVED FOR PROPOSED IMPROVEMENTS
- HIGHWAY TO BE REMOVED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

RUNWAY PROTECTION ZONE

- ULTIMATE RUNWAY PROTECTION ZONE AREA REQUIRED FOR PROPOSED IMPROVMENTS
- RUNWAY PROTECTION ZONE AREA REQUIRED FOR ADDITIONAL POSSIBLE FUTURE EXPANSION

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 70

AREA LAND USE PLAN FOR HARTFORD MUNICIPAL AIRPORT: 2010

Source: SEWRPC.

airport are expected to increase from about 38,000 in 1993 to about 47,000 in 2010. This would enable most small single-engine piston and many twin-engine piston aircraft to be accommodated under a wide range of weather conditions. These improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system, as well as serving as an important general aviation airport for personal, sport, recreational, and training activities for much of Racine and Kenosha Counties and southern Milwaukee County. Table 134 presents the estimated capital costs required to implement, the recommended improvements.

Ground transportation access is provided directly to Sylvania Airport by an IH 94 and USH 41 frontage road. Sylvania Airport is located one-half mile north of the interchange between IH 94 and STH 11 and one mile south of the interchange between IH 94 and STH 20. The airport lies outside any sanitary sewer service area, necessitating the continued use of onsite sewage-disposal facilities.

Map 76 shows the recommended land use pattern for the airport environs.

Airfield Layout and Federal Aviation Administration Standards

Some of the airports in the recommended system have airfield features which currently do not meet Federal Aviation Administration design standards. Most of these existing deficiencies would be resolved by the improvements recommended for each airport in the system plan. However, some deficiencies at some of the airports would not be resolved. These deficiencies include, in some cases, crosswind run-

Table 129

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR LAWRENCE J. TIMMERMAN AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	General Utility	General Utility
Based Aircraft (number)	113	111
Airport Reference Code	A-II[a]	A-II[a]
Annual Operations (number)	88,261	84,000
Airfield Capacity		
Annual Service Volume	230,000	230,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	59	59
IFR Capability	Nonprecision approach	Nonprecision approach
Land Requirements		
Airport Site (acres)	420	420
Easements (acres)	1	30
Airfield Facilities		
Runways		
Primary (length x width, in feet)	4,107 x 75	4,107 x 75
Parallel (length x width, in feet)	3,251 x 275 (turf)	3,251 x 275 (turf)
Crosswind (length x width, in feet)	3,202 x 75	3,300 x 75
Parallel (length x width, in feet)	2,859 x 275 (turf)	2,859 x 275 (turf)
Taxiways	Full parallel taxiway system on all paved RWY's	Full parallel taxiway system on all paved RWY's
Apron (square feet)	263,900	168,000
Runway Lighting	MIRL on RWY's 04L and 15L	MIRL on all paved RWY's
Visual Approach Aids	REIL on RWY's 04L/22R and 15L VASI on RWY's 04L/22R and 15L/33R	REIL on RWY's 04L/22R and 15L/33R VASI on RWY's 04L/22R and 15L/33R
Instrument Landing Aids	LOC on RWY 15L, VOR on approach to airport	LOC on RWY 15L, VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	6,000	6,400
Automobile Parking (spaces)	220	170
Service Roads (miles)	0.7	0.7
Large Hangars (square feet)	40,000	64,000
T-Hangars (spaces)	118	95

[a]*Aircraft under 12,500 pounds only.*

Abbreviations used in this table
IFR - Instrument Flight Rules
LOC - Localizer
MIRL - Medium Intensity Runway Lights
REIL - Runway End Identifier Lights
RWY - Runway
VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules
VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, Milwaukee County, and SEWRPC.

way length, runway-safety areas, object-free areas, and runway-protection zones, and are not recommended to be resolved because of attendant disruption of existing development and capital costs. These exceptions are described in the following sections of this chapter.

Crosswind Runway Lengths: The Federal Aviation Administration recommends that crosswind runway length be at least 80 percent of the primary runway length. To provide maximum wind coverage, the crosswind runway is typically located at, or close to, right angles with the primary runway. On the basis of the primary and crosswind runway lengths recommended for the 11 airports comprising the recommended system, five airports will have a crosswind runway length of less than 80 percent of the primary runway length, as shown in Table 135.

The crosswind runway length at Kenosha Regional Airport is recommended to remain at 4,440 feet,

Table 130

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT LAWRENCE J. TIMMERMAN AIRPORT

Recommended Improvement	Size	1995 dollars
Land		
Acquire Easements	29 acres	$ 121,000
Airfield		
Extend RWY 4L22R	98 x 75 feet	23,000
Extend Parallel TWY	98 x 40 feet	30,000
Repair and Reconstruct Pavement Surfaces	Item	490,000
Install REIL on All Paved Runways	2 sets	30,000
Terminal Area Facilities		
Replace and Expand Administration/Terminal Building	6,400 square feet	416,000
Hangars/Aircraft Storage		
Construct Large Hangars	24,000 square feet	509,000
Replace T - Hangers	50	825,000
Other		
Remove Portion of Parking Lot Within Object Free Area	Item	50,000
Total	--	$2,494,000

Abbreviations used in this table
REIL - Runway End Identifier Lights

Source: Wisconsin Department of Transportation, Milwaukee County, and SEWRPC.

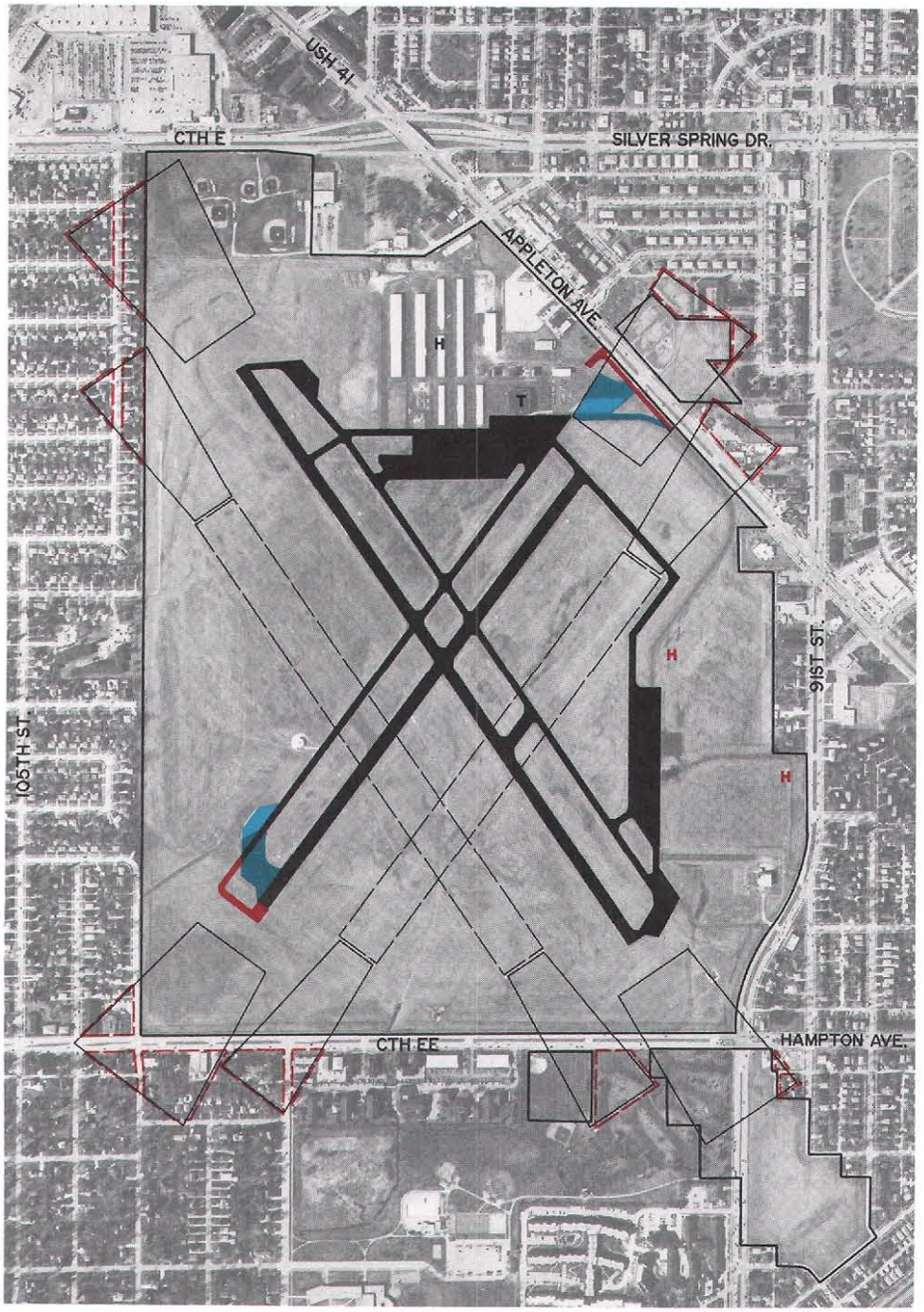
which is about 69 percent of the recommended new primary runway length of 6,400 feet. Extending the crosswind runway beyond its current length would require the displacement of existing development located to the north of the airport. The extension would require the acquisition of about 114 acres of land devoted to residential and industrial use, as well as some prime agricultural lands and isolated natural resource areas. The extension would require the relocation of 16 residences and one industrial establishment. In addition, easements would have to be obtained over an additional 12 acres of land devoted to residential, industrial, and agricultural uses for the needed runway-protection zone. Also, a segment of CTH N along the north side of the airport would have to be closed. This segment of CTH N is identified as a nonarterial facility in the adopted regional transportation system plan and the adopted Kenosha County jurisdictional highway system plan. Thus, extension of the crosswind runway beyond its current length may be expected to cause significant disruption of existing land uses. The capital cost of the extension, including land and easement acquisition, is estimated to total $2.5 million. Accordingly, the extension of the crosswind runway is not recommended.

The length of the crosswind runway at Waukesha County-Crites Field is recommended to remain at 3,600 feet, which is about 62 percent of the recommended existing primary runway length of 5,850 feet. Two alternatives for extending the crosswind runway were examined, using the two alternatives identified in a preliminary study conducted for Waukesha County in April 1994 by the consulting firm of Mead & Hunt, Inc. The first alternative assumed extension of the crosswind runway to the north and the second alternative assumed extension of the crosswind runway to the south. The analysis by the Commission staff concluded that extension of the crosswind runway to the south would be less costly and have fewer impacts on surrounding land uses.

Extending the crosswind runway beyond its current length would require the displacement of existing development lying to the south of the airport. The extension would require the acquisition of about 13 acres of land devoted to proposed industrial and existing commercial use and the relocation of two commercial establishments. The extension would also require the terminal and apron already proposed to be relocated to the southwest corner of the

Map 71

RECOMMENDED SITE IMPROVEMENT PLAN FOR LAWRENCE J. TIMMERMAN AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
	(NONE)	TURF RUNWAY
	(NONE)	PROPERTY BOUNDARY
(NONE)		EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

FACILITIES TO BE REMOVED

PAVED TAXIWAYS, ROAD, AND PARKING AREA TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

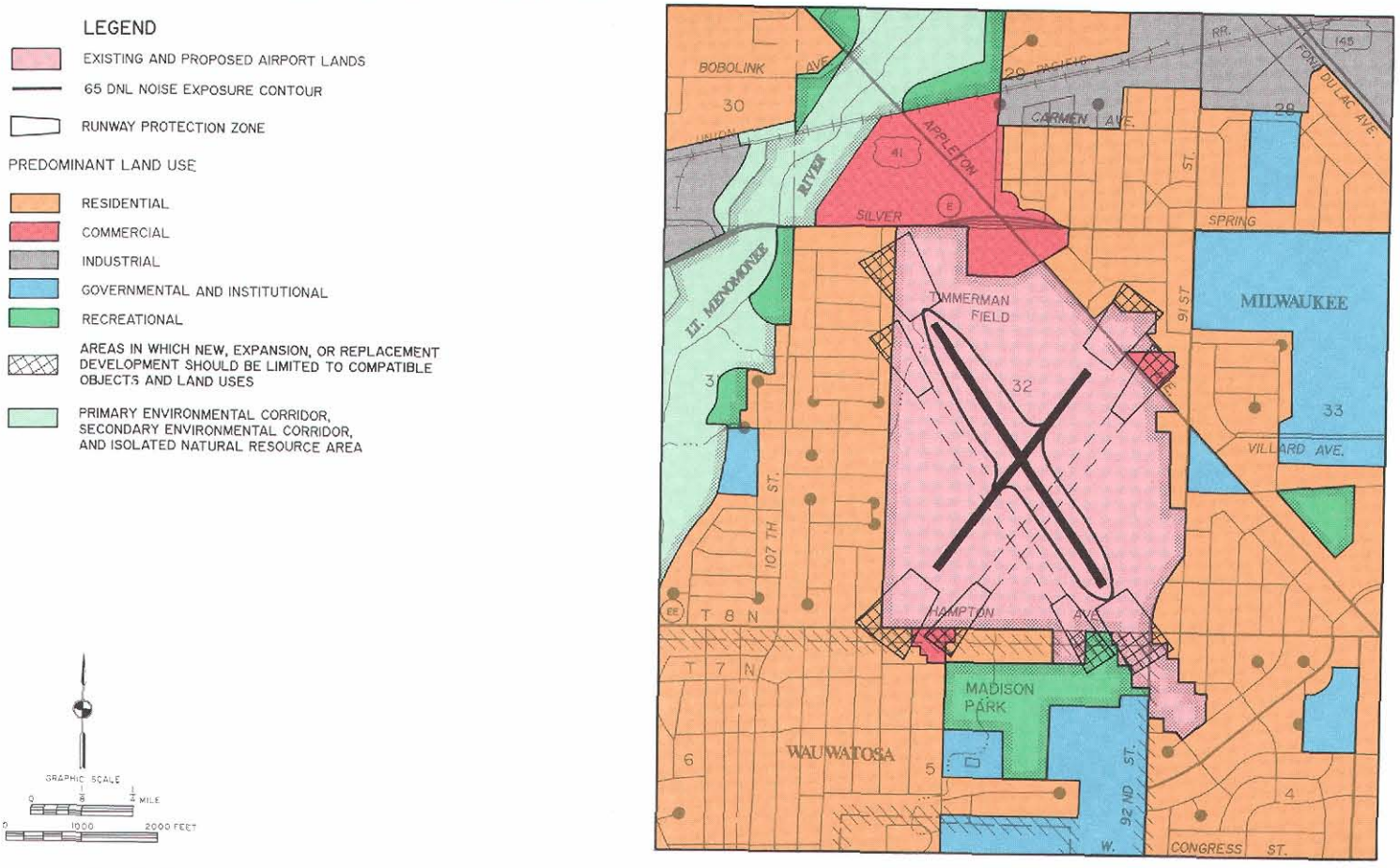
0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 72

AREA LAND USE PLAN FOR LAWRENCE J. TIMMERMAN AIRPORT: 2010



Source: SEWRPC.

airport be redesigned or relocated to another area to meet runway visibility standards set by the FAA. Also, a segment of CTH FT along the south side of the airport would have to be placed in a tunnel beneath the extended runway and attendant taxiway. CTH FT is identified as an arterial facility in the adopted regional transportation system plan and the adopted Waukesha County jurisdictional highway plan. Thus, extension of the crosswind runway beyond its current length may be expected to cause significant disruption of existing land uses. The capital cost of the extension, including land and easement acquisition is estimated to total $15.4 million. This includes the use of three acres of land already owned by Waukesha County but reserved for industrial park use. Accordingly, the extension of the crosswind runway is not recommended.

The length of the usable crosswind runway at Batten Airport varies with the direction in which the runways are being used, because of displaced thresholds at the northwest and southeast ends of the runway. The length of the crosswind runway pavement is recommended to remain at 4,824 feet, which provides between 62 percent and 76 percent of the recommended existing primary runway length, the usable distance of which is about 5,800 feet. Extending the crosswind runway beyond its current usable length by elimination of the displaced thresholds would require the displacement of existing development northwest of the airport. The extension would require the acquisition of about 32 acres of land in residential and institutional uses and a nature center. The extension would require the relocation of 22 residences, the acquisition of a portion of the River Bend

Table 131

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR CAPITOL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Basic Utility	Basic Utility
Based Aircraft (number)	95	109
Airport Reference Code	A-I	A-I
Annual Operations (number)	68,810	78,000
Airfield Capacity		
Annual Service Volume	199,000	199,000
VFR (Hourly Capacity)	105	105
IFR (Hourly Capacity)	--	--
IFR Capability	None (VFR)	Nonprecision approach
Land Requirements		
Airport Site (acres)	200	282
Easements (acres)	--	53
Airfield Facilities		
Runways		
Primary (length x width, in feet)	3,500 x 44	3,600 x 75
Crosswind (length x width, in feet)	3,270 x 100 (turf)	2,600 x 75
Taxiways	Partial parallel taxiway for RWY 3/21	Partial parallel taxiway system for paved RWY's
Apron (square feet)	25,200	110,000
Runway Lighting	MIRL on RWY 3/21 only	MIRL on all paved RWY's
Visual Approach Aids	REIL on RWY 21	REIL and PAPI on all paved RWY's
Instrument Landing Aids	None	NDB on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	1,800	7,200
Automobile Parking (spaces)	20	190
Service Roads (miles)	--	0.3
Large Hangars (square feet)	9,900	27,000
T-Hangars (spaces)	44	105

Abbreviations used in this table
IFR - Instrument Flight Rules
MIRL - Medium Intensity Runway Lights
NDB - Nondirectional beacon
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VFR - Visual Flight Rules

Source: Wisconsin Department of Transportation and SEWRPC.

Nature Center, and the acquistion of a portion of the land currently used by a senior citizen retirement complex. Also, a segment of N. Green Bay Road along the west side of the airport would have to be relocated. This segment of N. Green Bay Road is identified as an arterial facility in the adopted regional transportation system plan and the adopted Racine County jurisdictional highway system plan. Thus, extension of the crosswind runway beyond its current length may be expected to cause significant disruption of existing land uses. The capital cost of the extension including land and easement acquisition is estimated to total $3.9 million. Accordingly, the extension of the crosswind runway is not recommended.

The crosswind runway at East Troy Municipal Airport is recommended to be 2,380 feet long, which is about 54 percent of the recommended new primary runway length of 4,400 feet. Extending the crosswind runway beyond this length would require the acquisition of about 30 acres of prime agricultural lands and one acre of residential land. In addition, an easement would have to be obtained over one additional acre of land devoted to agricultural use for the needed runway- protection

Table 132

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT CAPITOL AIRPORT

Recommended Improvement	Size	1995 dollars
Land		
Acquire Additional Land Fee Simple	82 acres	$ 900,000
Acquire Easements	53 acres	100,000
Airfield		
Reconstruct RWY 03/21	2,600 x 75 feet	520,000
Pave and Extend RWY 09/27	3,600 x 75 feet	1,352,000
Construct Partial Parallel Taxiway for 03/21	2,210 x 35 feet	188,000
Construct Partial Parallel Taxiway for 09/27	2,040 x 35 feet	173,000
Construct Apron	84,200 square feet	253,000
Connecting Taxiway	1,400 x 35 feet	119,000
Install REIL on All Paved Runways	3 sets	45,000
Install PAPI on All Paved Runways	4 sets	80,000
Install NDB	Item	35,000
Terminal Area Facilities		
Expand Administration/Terminal Building	5,400 square feet	351,000
Expand Parking Area	170 spaces	326,000
Hangars/Aircraft Storage		
Construct Large Hangars	17,100 square feet	362,000
Construct T-Hangars	61 spaces	1,007,000
Other		
Service roads	0.3 miles	147,000
Total	--	$5,958,000

Abbreviations used in this table
NDB - Nondirectional beacon
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation and SEWRPC.

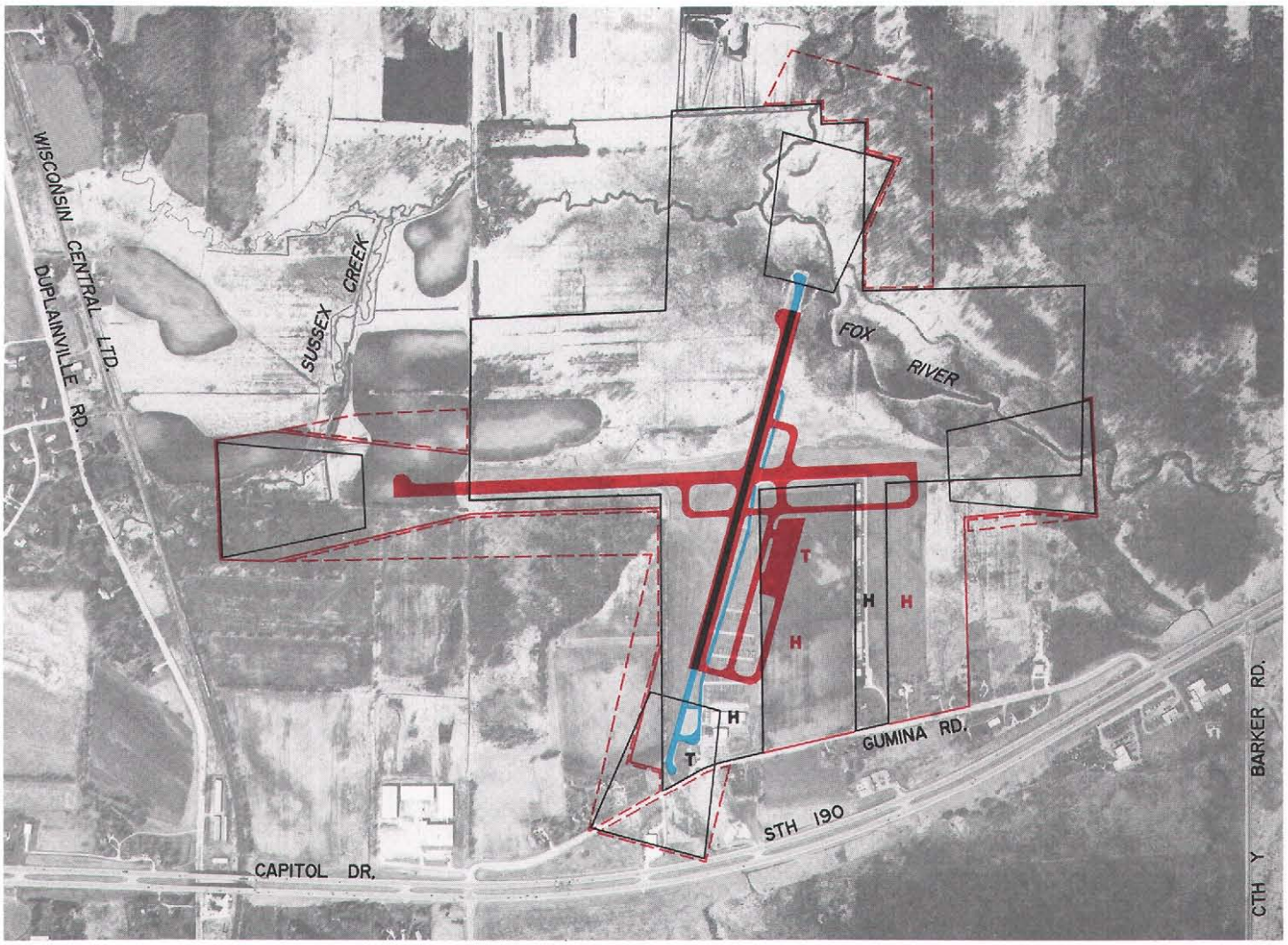
zones. Also, a segment of CTH N along the north side of the airport would have to be relocated. CTH N is identified as an arterial facility in the adopted regional transportation system plan and the adopted Walworth County jurisdictional highway system plan. The capital cost of the extension, including land and easement acquisition, is estimated to total $2.2 million. Thus, extension of the crosswind runway beyond the recommended length would require a significant capital expenditure and may be expected to cause significant disruption of the existing land uses. Accordingly, the extension of the crosswind runway is not recommended.

The crosswind runway at Capitol Airport is recommended to be 2,600 feet in length, which is about 72 percent of the recommended new primary runway length of 3,600 feet. Extending the crosswind runway beyond the existing length would require the acquisition of about 20 acres of lands already devoted to, or already zoned for, commercial use. The extension would require the acquisition of two businesses and the relocation of Gumina Road. Thus, extension of the crosswind runway beyond its recommended length may be expected to cause significant disruption of existing land uses. The capital cost of the extension, including land acquisition, is estimated to total $1.1 million. Accordingly, the extension of the crosswind runway beyond the proposed 2,600 feet is not recommended.

Runway-Safety Areas, Object-Free Areas, and Runway-Protection Zones: The Federal Aviation Administration recommends that runway-safety areas, object-free areas, and runway-protection zones be provided for each runway at an airport. A runway-safety area is defined as a rectangular area surrounding a runway which has been properly leveled and is capable of supporting an aircraft under dry conditions to help minimize damage to the aircraft or injury to its occupants in the event the aircraft undershoots, overruns, or veers off, the runway

Map 73

RECOMMENDED SITE IMPROVEMENT PLAN FOR CAPITOL AIRPORT



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
(NONE)		EASEMENT BOUNDARY
T	T	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGARS

FACILITIES TO BE REMOVED

PAVED RUNWAYS AND TAXIWAYS TO BE REMOVED

RUNWAY PROTECTION ZONE

ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE

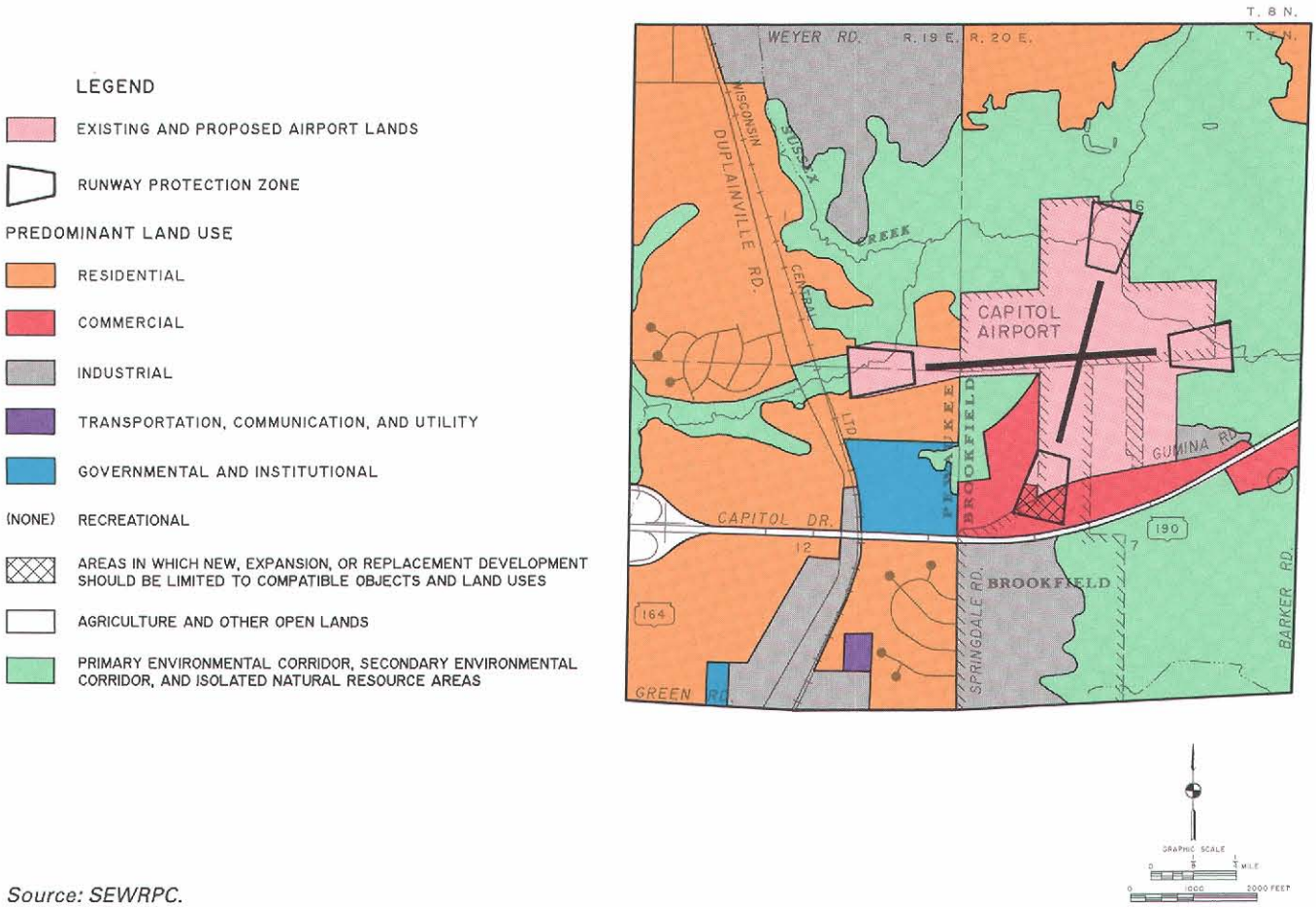
0 400 800 1200 FEET

DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 74

AREA LAND USE PLAN FOR CAPITOL AIRPORT: 2010



Source: SEWRPC.

pavement. The runway-safety area also provides access for emergency and maintenance equipment. An object-free area is defined as a larger rectangular area surrounding a runway or taxiway which is to be kept clear of all objects protruding above the elevation of the runway-safety-area edge, except for those objects that are essential for air navigation or aircraft ground maneuvering. The runway-safety area is located within the object-free area; the size of both varies with the classification of the particular runway and with the type of aircraft and operations it is intended to accommodate. The FAA recommends that these areas be owned by the airport and be kept clear of any other land uses.

A runway-protection zone, formerly referred to as a "clear zone," is defined as a trapezoid-shaped area at each end of a runway lying below the aircraft approach paths. It should be kept clear of incompatible structures and land uses, including particularly those that may create a place of public assembly. The FAA specifically notes that places of public assembly are defined to include, but are not limited to, residences, churches, schools, hospitals, office buildings, and shopping centers. Runway-protection zones are intended, not only to preclude obstructions that may be hazardous to aircraft operations, but also to ensure the safety of people and property on the ground. The size of a runway-protection zone varies with the classification of the particular runway and with the type of aircraft and operations it is intended to handle. The FAA recommends that airports should also own the property within runway-protection zones and keep those areas clear of any incompatible uses.

The relationship of the runway-safety areas, object-free areas, and runway-protection zones to the

Table 133

AIRPORT IMPROVEMENT RECOMMENDATIONS FOR SYLVANIA AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Basic Utility	Basic Utility
Based Aircraft (number)	47	59
Airport Reference Code	A-1	A-1
Annual Operations (number)	38,400	47,000
Airfield Capacity		
Annual Service Volume	109,000	109,000
VFR (Hourly Capacity)	105	105
IFR (Hourly Capacity)	None	None
IFR Capability	None	None
Land Requirements		
Airport Site (acres)	34	173
Easements (acres)	None	4
Airfield Facilities		
Runways		
Primary (length x width, in feet)	2,300 X 33	2,800 X 60
Crosswind (length x width, in feet)	None	2,250 X 66
Taxiways	None	Full parallel taxiway system on all paved RWY's
Apron (square feet)	34,100	64,800
Runway Lighting	LIRL	MIRL on all paved RWY's
Visual Approach Aids	Wind Indicator	REIL and PAPI on RWY's 09/27 and 18/36 and wind indicator
Instrument Landing Aids	None	None
Terminal Area Facilities		
Administration/TerminalBuilding (square feet)	900	3,650
Automobile Parking (spaces)	15	95
Service Roads (miles)	0.2	0.4
Large Hangars (square feet)	2,600	3,000
T-Hangars (spaces)	20	48

Abbreviations used in this table
IFR - Instrument Flight Rules
LIRL - Light Intensity Runway Lights
MIRL - Medium Intensity Runway Lights
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VFR - Visual Flight Rules

Source: Wisconsin Department of Transportation and SEWRPC.

actual runway is shown on Figure 28. The runway-safety area and object-free area extend into the runway-protection zone. The portion of the runway-protection zone outside the object-free area and runway-safety area is referred to as the controlled-activity area. While it is desirable that all of the runway-protection zone be kept clear of all incompatible objects and land uses, some limited uses may be permitted within the controlled-activity area, provided the uses do not attract wildlife and do not interfere with safe aircraft navigation. These uses could include agricultural operations other than forestry and livestock raising, golf courses but not attendant clubhouses, and automobile parking, if such automobile parking is located outside the object-free area extension. In addition, streets, highways, and rail lines may be permitted as long as the vehicles would not normally be required to stop within the runway-protection zone and the vehicles and roadway facilities, such as signs and lighting masts, do not penetrate the approach surface for the runway concerned.

As noted above, runway-protection zones should not contain any incompatible objects or land uses. However, the runway protection zones for eight of the 11 airports in the new regional airport system plan did in 1995 contain incompatible land uses

Table 134

ESTIMATED CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS AT SYLVANIA AIRPORT

Recommended Improvement	Size	1995 dollars
Land		
Acquire Additional Land Fee Simple	142 acres	$ 298,000
Acquire Easements	4 acres	4,000
Airfield		
Construct RWY 09/27	2,800 x 60 feet	560,000
Construct RWY 18/36	2,250 x 60 feet	450,000
Construct Full Parallel Taxiway for 09/27	3,250 x 35 feet	276,000
Relocate and Expand Apron	64,800 square feet	194,000
Connecting Taxiway	300 x 35 feet	26,000
Install REIL on All Paved Runways	2 sets	30,000
Install PAPI on All Paved Runways	2 sets	40,000
Terminal Area Facilities		
Relocate and Expand Administration/Terminal Building	3,650 square feet	237,000
Relocate and Expand Parking Area	95 spaces	182,000
Hangars/Aircraft Storage		
Construct Large Hangars	3,000 square feet	64,000
Construct T-Hangars	16 spaces	264,000
Other		
None	--	--
Total	--	$2,625,000

Abbreviations used in this table
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

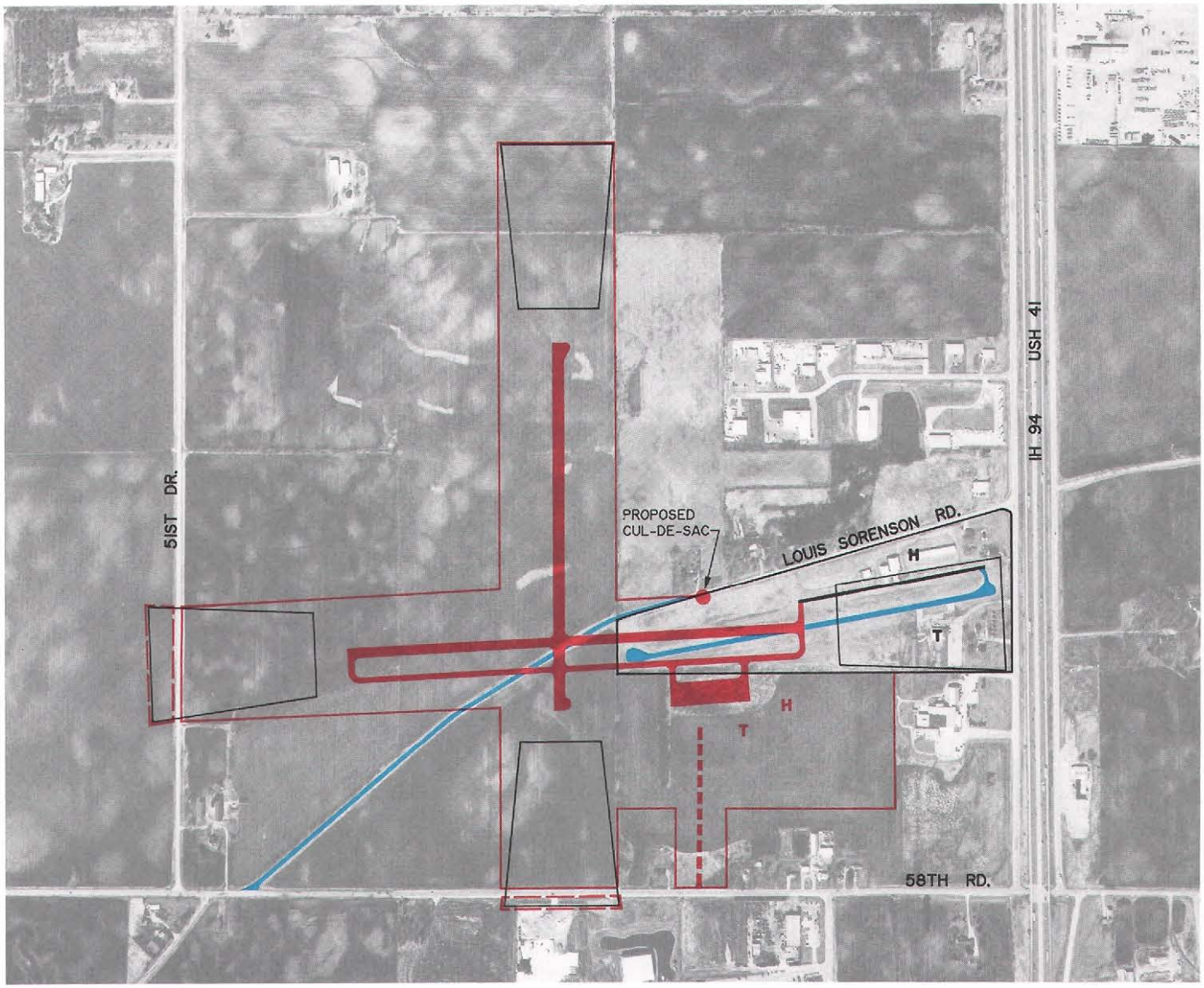
Source: Wisconsin Department of Transportation and SEWRPC.

as described in Table 136. The incompatible land uses in the runway-protection zones currently contain single- and multi-family residences, restaurants, stores, and offices, many of which have been long established. It is recommended that such incompatible land uses ultimately be cleared from the runway-protection zones. It is recognized, however, that removing, relocating, or otherwise eliminating the incompatible land uses may be expected to be difficult and costly and require a period of time extending beyond the design year of the new regional airport system plan, 2010. Clearing the runway-protection zones of incompatible uses may be practical only gradually as individual parcels concerned become available, or as structures in the areas concerned reach the end of their useful lives and funds to purchase the parcels and structures become available.

It is recommended that further development of incompatible objects or land uses in the runway-protection zones be precluded by the use of both general and special-purpose zoning. It is also recommended that each of the 11 airports comprising the recommended regional airport system seek to provide, over time, runway-protection zones which meet FAA standards, addressing the issues concerned in the master plan for each airport. Also, each airport owner should work with the concerned and affected county and local units of government to place areas within the runway-protection zones in a land use zoning district which would prohibit the construction and use of buildings and objects which do not conform to Federal standards. Application of a more suitable and restrictive zoning district in the runway-protection zone may cause buildings and other structures to become nonconforming uses under the terms of the zoning ordinance, with the ability to repair or reconstruct such nonconforming use limited by ordinance. The objective of the nonconforming use provision of community zoning ordinances is the eventual elimination of the nonconforming building or structure. Once nonconforming buildings and structures

Map 75

RECOMMENDED SITE IMPROVEMENT PLAN FOR SYLVANIA AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
		PAVED RUNWAYS, TAXIWAYS, AND APRONS
		PROPERTY BOUNDARY
(NONE)		EASEMENT BOUNDARY
T	T	TERMINAL-ADMINISTRATION BUILDING
H	H	AIRCRAFT HANGAR
(NONE)		NEW ACCESS ROAD

FACILITIES TO BE REMOVED

PAVED RUNWAY, TAXIWAYS, APRON, AND ROAD TO BE REMOVED

RUNWAY PROTECTION ZONE

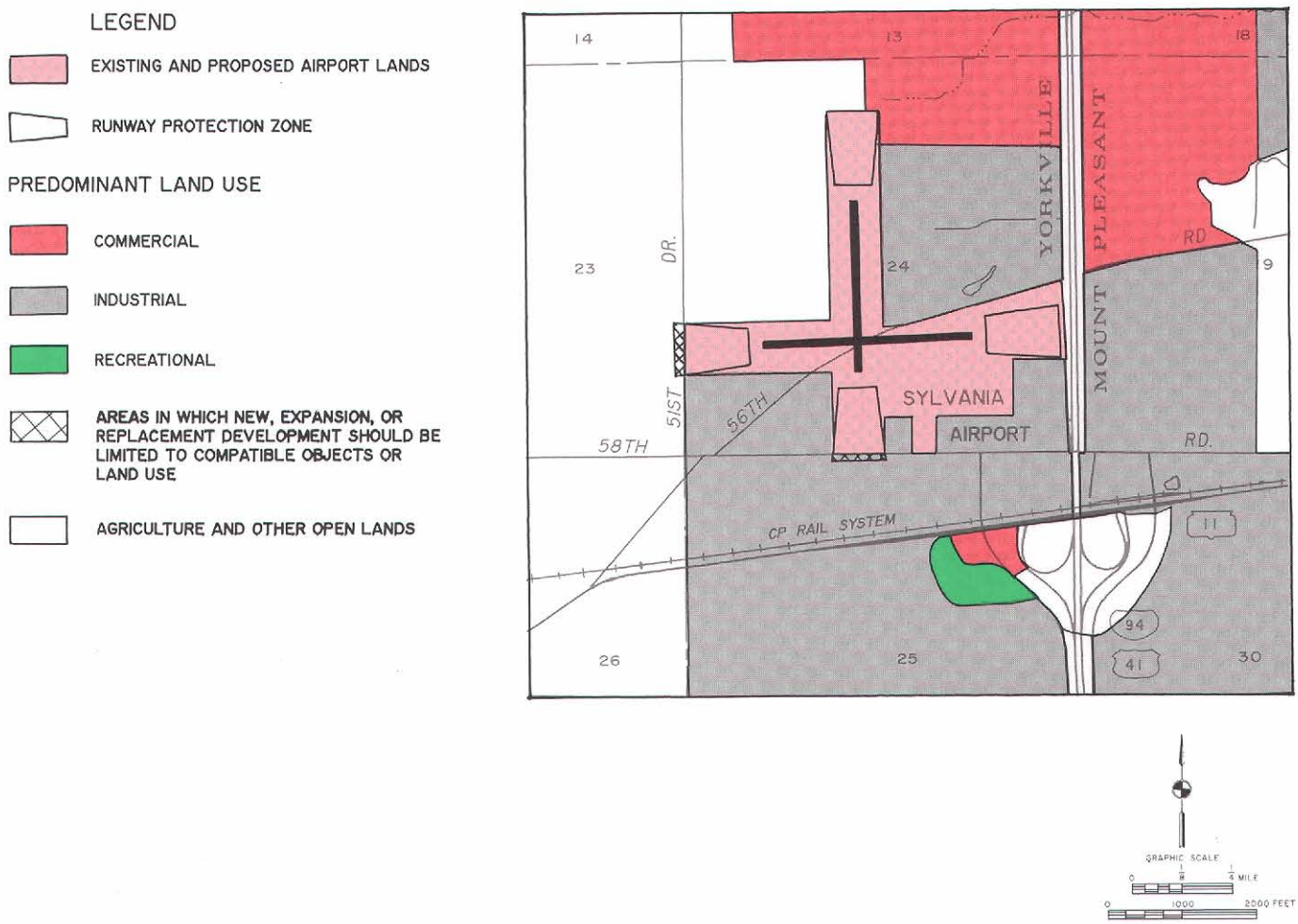
ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 76

AREA LAND USE PLAN FOR SYLVANIA AIRPORT: 2010



Source: SEWRPC.

within the runway-protection zone are ready to be abandoned or demolished, the airport should acquire the land once occupied by those buildings or structures and proceed with the clearance.

In spite of the practical difficulties entailed, it is desirable that runway-safety areas and object-free areas meeting FAA standards be provided. On the basis of the ultimate airfield layout recommended for the 11 airports comprising the recommended regional airport system, runway-safety areas and object-free areas not meeting FAA standards were identified at two airports: Batten Airport and Waukesha County-Crites Field.

At Batten Airport in 1995, runway-safety and object-free areas for both the primary and crosswind runways contained incompatible objects and land uses. The runway-safety and object-free areas at the southeast end of the crosswind runway meet the Federal standards by virtue of its threshold being relocated in a northwesterly direction a distance of 400 feet. Providing standard-sized runway-safety and object-free areas for the southwest end of the primary runway would require the acquisition of about 22 acres of land devoted residential, commercial, and manufacturing uses, including seven acres of primary environmental corridor and six residences. Providing standard-sized runway-safety and object-free areas for the northwest end of the crosswind runway would require the acquisition of about 32 acres of land devoted to residential and industrial uses, including four acres of primary environmental corridor and 22 residences.

Table 135

RECOMMENDED PRIMARY AND CROSSWIND RUNWAY LENGTHS FOR AIRPORTS IN THE NEW REGIONAL AIRPORT SYSTEM PLAN

Airport Classification and Name	Primary Runway Length (in feet)		Crosswind Runway Length (in feet)			
			Existing		Recommended	
	Existing	Recommended	Length	Percent of Primary Runway Length	Length	Percent of Prmary Runway Length
Air Carrier						
General Mitchell International	9,690	9,690	8,011	83	9,011	93
Transport-Corporate						
Batten	5,852[a]	5,852[a]	4,424	76	4,424[a]	76
Burlington Municipal	3,601	4,800	2,600	72	3,900	81
Kenosha Regional	5,499	6,400	4,440	81	4,440	69
Waukesha County-Crites Field	5,850	5,850	3,599	62	3,599	62
West Bend Municipal	4,500	5,500	3,900	87	4,400	80
General Utility						
East Troy Municpal	3,900	4,400	2,400	62	2,380	54
Hartford Municipal	3,001	3,900	2,250	75	3,200	82
Lawrence J. Timmerman	4,107	4,107	3,202	78	3,300	80
Basic Utility						
Capitol	3,500	3,600	3,270	93	2,600	72
Sylvania	2,300	2,800	--	--	2,250	80

[a]*Longest useable runway length with displaced thresholds.*

Source: SEWRPC.

Also, two segments of N. Green Bay Road along the west side of the airport would have to be relocated. These segments of N. Green Bay Road are identified as arterial facilities in the adopted regional transportation system plan and the adopted Racine County jurisdictional highway system plan. The capital cost of providing these runway-safety and object-free areas including land acquisition and road reconstruction is estimated to total $10.2 million. Provision of these areas was recommended in the first- and second-generation regional airport system plans and continues to be recommended as part of the new regional airport system plan.

Providing standard-sized runway-safety and object-free areas for the northeast end of the primary runway would require the acquisition of about 48 acres of land devoted to transportation, commercial, industrial, and extraction uses. Provision of these areas to meet Federal standards fully would require the relocation of USH 32 and Three Mile Road along the north and east sides of the airport and relocation of the Union Pacific Railroad main line. Both USH 32 and Three Mile Road are identified as arterial facilities in the adopted regional transportation system plan and the adopted Racine County jurisdictional highway system plan. Relocation of these highways could require the filling in of portions of a large quarry. Relocating the rail line and filling in portions of the quarry were concluded to be impractical. Accordingly, the runway-safety and object-free areas for this runway end need to continue to accommodate both the highways and the railway line concerned. The airport should work to avoid the placement on any further nonconforming land uses or objects within these runway-safety and object-free areas.

At Waukesha County-Crites Field in 1995, the runway-safety and object-free areas at both the east and west ends of the primary runway contained incompatible uses. Those uses included CTH J, along the east side of the airport, and CTH TJ, along the west side of the airport. Both CTH J and CTH TJ are identified as arterial facilities in the adopted regional transportation system plan and the adopted Waukesha County jurisdictional highway system plan. The relocation of these highways would entail substantial costs and is not recommended.

Figure 28

RELATIONSHIP OF RUNWAY-SAFETY AREA, OBJECT-FREE AREA, CONTROLLED-ACTIVITY AREA, AND RUNWAY-PROTECTION ZONE TO RUNWAY PAVEMENT

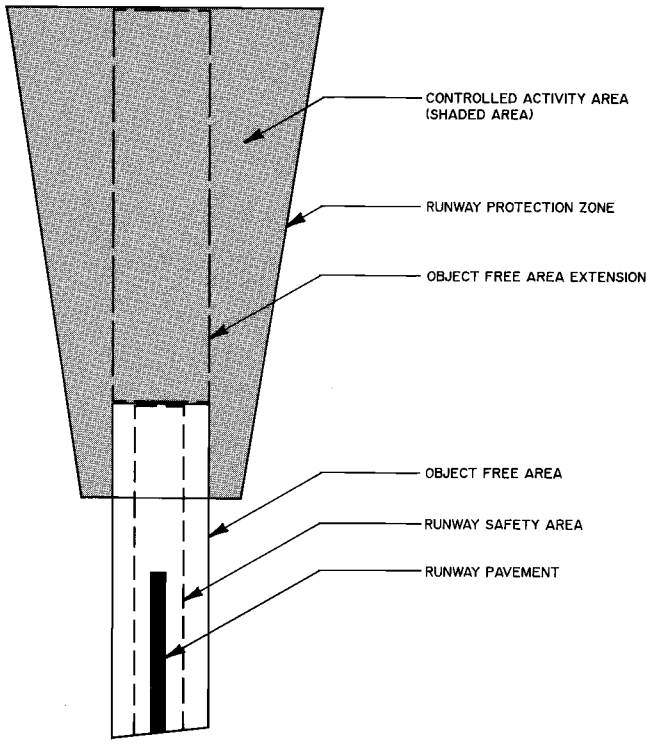


FIGURE NOT DRAWN TO SCALE

NOTE: THIS DIAGRAM IS INTENDED ONLY TO SHOW THE GENERAL RELATIONSHIP OF THE SPECIFIED AREAS TO THE RUNWAY PAVEMENT. THE EXACT DIMENSIONS OF EACH OF THESE AREAS WILL BE DEPENDENT UPON THE SPECIFIC AIRPORT AND RUNWAY CLASSIFICATION, THE TYPE OF AIRCRAFT EXPECTED TO UTILIZE THE RUNWAY, THE TYPE OF INSTRUMENT APPROACH, AND THE APPLICABLE FEDERAL AVIATION ADMINISTRATION DESIGN STANDARDS FOR SUCH AREAS.

Source: Federal Aviation Administration and SEWRPC.

RECOMMENDED INSTITUTIONAL STRUCTURE

During the preparation of the first-generation regional airport system plan, alternative institutional arrangements for plan implementation were examined. The alternatives included 1) continuing existing municipal and county sponsorship of publicly owned airports in the system plan and seeking new local public sponsors for privately owned airports in the system plan, as may become necessary, 2) seeking county sponsorship of all public airports in the system plan, 3) seeking county and multi-county sponsorship of all public airports in the system plan, 4) seeking establishment of a regional airport authority to own and operate all public airports in the system plan, and 5) seeking State ownership and operation of all public airports in the system plan. A modification to the fourth alternative, or option, would be the establishment of local airport authorities. This alternative would require the adoption of State enabling legislation. Application of this alternative would also require local governments that own airports to transfer airport property, facilities, and control to the authority. The general-purpose local units of government concerned would no longer have financial obligations with respect to the airports concerned. An airport authority would need to generate its own revenues for operation and improvements and could be given powers of taxation. It is generally thought that management and operation of an airport can be conducted more efficiently and effectively under a special-purpose authority. The price of this efficiency and effectiveness, however, would be the removal of control over airport development and funding from the general-purpose unit of government concerned. Interest in this concept has been expressed by the Wisconsin Airport Managers Association, which, in 1996, was exploring the legislative actions necessary to facilitate such an option. Following consideration of these alternatives, including consideration of the probability of implementation, the alternative proposing county sponsorship of all public airport facilities was recommended as the most practicable institutional structure for implementation of the then-recommended plan under existing legislation. This recommendation was made for the following reasons:

1. Three of the largest and most important airports included in the system plan were already owned and operated by counties: General Mitchell International and Lawrence J. Timmerman Airports by Milwaukee County and Waukesha County-Crites Field by Waukesha County.

2. The remaining nine airports included in the first-generation system plan were either privately owned (four airports) or owned by cities or villages (five airports). Given that the service area of each of these airports was much broader than the corporate limits of the city or village in which the airport was located and given the capital investment necessary to implement the plan, it was determined to be inappropriate to recommend either continued or new city, village, or town ownership and operation of these nine airport facilities.

Table 136

RUNWAY-PROTECTION ZONES CONTAINING INCOMPATIBLE USES ACCORDING TO RECOMMENDED AIRFIELD DEVELOPMENT PLAN FOR AIRPORTS IN THE NEW REGIONAL AIRPORT SYSTEM PLAN

Airport Classification and Name	Runway			Incompatible Use or Obstruction
	Number	Type	Planned Runway End	
Air Carrier				
General Mitchell International	1R/19L	Parallel	North	1 Driving Range
	7C/25C	Primary	West	1 Auto Salvage Yard and 1 Bus Servicing Facility
	7C/25C	Primary	East	5 Single-Family Residences, 8 Multi-Family Residences, and 5 Commercial Establishments
	7R/25L	Parallel	East	3 Manufacturing Establishments and 2 Commercial Establishments
Transport-Corporate				
Batten	04/22	Primary	Southwest	1 Motel, 8 Commercial Establishments, and 13 Single-Family Residences
	04/22	Primary	Northeast	1 Manufacturing Establishment, 1 Auto Salvage Yard, 1 Quarry, and 1 Drive-Thru Bank
	14/32	Crosswind	Northwest	9 Single-Family Residences, and 1 Nature Center
	14/32	Crosswind	Southeast	1 Manufacturing Establishment, 1 Automobile Emission Testing Facility, 2 Multi-Family Residences, and 12 Single-Family Residences
Burlington Municipal	11/29	Primary	East	1 Farm and 6 Single-Family Residences
	01/19	Crosswind	South	2 Farms
Kenosha Regional	6L/24R	Primary	East	1 Tavern
	14/32	Crosswind	North	1 Manufacturing Establishment and 3 Single-Family Residences
Waukesha County-Crites Field	10/28	Primary	East	1 Banquet Hall/Office Building, 1 Restaurant, and 3 Single-Family Residences
	10/28	Primary	West	1 Shopping Center (consisting of 20 Commercial Establishments and 3 Restaurants within the Runway Protection Zone), 1 Office Building, 6 Restaurants, 2 Commercial Establishments, and 3 Banks
	18/36	Crosswind	North	1 Commercial Establishment
West Bend Municipal	--	--	--	None
General Utility				
East Troy Municipal	--	--	--	None
Hartford Municipal	11/29	Primary	East	1 Farm
Lawrence J. Timmerman	15L/33R	Primary	Northwest	17 Single-Family Residences
	15L/33R	Primary	Southeast	1 Golf Course and 5 Single-Family Residences
	4L/22R	Crosswind	Southwest	5 Office Buildings and 6 Single-Family Residences
	4L/22R	Crosswind	Northeast	Airport Parking Lot and 2 Multi-Family Residences
	15R/33L	Parallel Turf	Northwest	22 Single-Family Residences
	15R/33L	Parallel Turf	Southeast	1 Golf Course
	4R/22L	Parallel Turf	Southwest	2 Office Buildings, 8 Multi-Family Residences, and 3 Single-Family Residences
	4R/22L	Parallel Turf	Northeast	1 Tavern, and 3 Commercial Establishments
Basic Utility				
Capitol	03/21	Crosswind	South	1 Driving Range and 1 Commercial Establishment
Sylvania	--	--	--	None

Source: SEWRPC.

3. The likelihood of establishing airport functional responsibility at the county level in the five counties which then did not either own or operate airports was judged to be much higher than the likelihood of establishing multi-county authorities or commissions or of establishing a regional authority, even though the distribution of costs on a per capita basis would be more equitable under such areawide authorities.

Since the completion and adoption of the first-generation regional airport system plan in 1976, none of the five county governments that were then recommended under the original regional airport system plan to assume ownership and operation of an airport facility have taken any action in this respect. Indeed, as of December 1995, sponsorship of each of the airports in the second-generation regional airport system plan also included in the first-generation plan and was to have changed to county ownership remained unchanged from that of 1976.

In recent years there have been studies of different institutional structures for the management of General Mitchell International Airport. One such study, commissioned by the Wisconsin Department of Transportation, Bureau of Aeronautics, identified the advantages and disadvantages of having a regional airport authority operate Mitchell International.[2] Another study was prepared by The Wisconsin Policy Research Institute, Inc., a private organization established to study public policy issues in Wisconsin.[3] This feasibility study proposed that Mitchell International be sold or leased by Milwaukee County to a professional airport management firm. The study postulated that such "privatization" would encourage effective response to revenue-producing opportunities, reduce operating expenses, and approach major expansion projects more effectively.

This lack of motion toward any county sponsorship of airports may be attributed to several factors. First, some counties have explicitly indicated reluctance to assume the ownership and operation of an airport since such sponsorship would, in a time of strained fiscal resources, represent a new responsibility requiring county expenditures. Second, existing municipal and private owners and operators of airports have not requested the counties to assume airport operations. Some municipal airport operators clearly desire to retain control of the airport facility for a number of reasons, including proximity to the community and perception of the facility as an asset to economic development. Third, county sponsorship has obviously not been needed for the privately owned airports included in the system plan, since these airports have remained open for public use. One of these airports, Batten, has actively pursued the major improvements recommended under the first- and second-generation regional airport system plans. Another airport, Capitol, has had an airport master plan and airport layout plan prepared. Fourth, no major airport capacity deficiencies have developed since the completion of the original plan, since several of the public airports, including General Mitchell International Airport, Waukesha County-Crites Field, East Troy Municipal Airport, and Kenosha Regional Airport, have actively pursued improvements. General aviation demand in the Region has actually decreased significantly since the preparation of the first-generation system plan.

On the basis of consideration of these and other factors, a number of conclusions concerning a recommended institutional arrangement for airport system development were reached by the Commission staff and Advisory Committee during preparation of the second-generation regional airport system plan in 1987. First, it was concluded that the range of alternatives defined under the first-generation airport system plan was exhaustive and that there were no other feasible alternatives. Second, it was concluded that the alternatives which proposed multi-county, regional, or State ownership and operation of airports were highly unlikely to be implemented. Third, it was concluded that county sponsorship of all airports was also highly unlikely to be implemented, judging on the basis of the experience over the previous two decades.

Accordingly, the institutional arrangement recommended for airport system development within the Region under the second-generation regional

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[2]*See KPMG Peat Marwick, Final Report: Milwaukee Airport Authority Feasibility Study, September 1992.*

[3]*See Robert W. Poole, Jr., "The Privatization of Milwaukee County's General Mitchell International Airport: A Feasibility Study," Wisconsin Policy Research Institute Report, Vol. 7, No. 5 (July 1994).*

airport system plan in 1987 simply entailed a continuation of the arrangement in place at the 11 airports constituting the recommended regional airport system, three of which were county owned, five of which were municipally owned, and three of which were privately owned, with change to be initiated only as necessary to retain all 11 key airports in operation. Upon review and consideration of these recommendations from the first- and second-generation regional airport system planning efforts, the staff and Advisory Committee preparing the new regional airport system plan found that these conclusions concerning the institutional arrangement for airport sponsorship remained valid. Thus, it was recommended that the institutional arrangement for implementation of the new regional airport system plan should continue to consist of the structure in place at the 11 airports comprising the system.

Changes in the sponsorship of individual airports are recommended to be initiated only as necessary to retain all 11 essential airports in operation. When such change is necessary, consideration should be given to county sponsorship, since such sponsorship would provide a more equitable balance between the benefits of the airport services provided and the cost of airport ownership and operation under city or village sponsorship. Thus, it is recommended that the three privately owned public-use airports, Batten Airport, Capitol Airport, and Sylvania Airport, continue to be privately owned and operated, and that public ownership of any of these airports be pursued only if the private operators propose to close an airport.

CAPITAL COSTS OF RECOMMENDED IMPROVEMENTS

The recommended improvements at the 11 airports comprising the recommended regional airport system will require a significant public investment over the course of the plan design period. The extent to which these recommendations will be carried out will depend upon the initiative of the local airport sponsor, the need for such improvements as generated by actual future growth of aviation activity within the Region, and the extent to which the privately owned airports in the Region not included in the recommended regional system plan become unavailable for use, resulting in the movement of their based aircraft and operations to one of the airports included in the recommended system plan.

The estimated capital costs of improving each airport in the regional airport system to the level recommended in the plan are summarized in Table 137. The total cost of all recommended improvements is estimated to approximate $584.0 million. This represents an average annual capital investment of about $38.9 million to the year 2010. The total capital costs for the improvements recommended through the year 2010 at each airport were categorized according to type of improvement: land acquisition, airfield, offsite highway facilities, terminal area facilities, hangars and aircraft storage, and onsite service roads.

Some of these improvements may be considered more essential to the provision of the level of service envisioned under the system plan than others. Particularly important are land acquisition; such airfield improvements as the construction and repair of runways, taxiways, and aprons; the installation of lighting and navigational aids; and offsite highway improvements necessary to construct or extend a runway or to protect the approach areas of runways. These improvements are considered necessary for an airport to perform safely and efficiently. The capital cost of such essential improvements to the 11 airports comprising the recommended regional system is estimated to be about $382.5 million, or about 65 percent of the total cost of all improvements recommended under the third-generation plan. This represents an average annual capital investment of about $25.5 million over the plan design period.

Because of its unique size and function in the Region, the estimated cost of $329.6 million for the essential improvements at General Mitchell International Airport is significantly higher than the cost of the essential improvements for the other 10 general aviation airports in the system plan combined, an estimated $52.9 million. The estimated total capital cost of the essential improvements for the 10 general aviation airports represent an average annual capital investment of about $3.5 million, while the capital costs of the essential improvements at General Mitchell International Airport alone represent an annual investment of about $22.0 million.

The major airport improvements other than those considered essential include terminal and administration buildings, automobile parking facilities, hangars and aircraft storage buildings, and paved

Table 137

SUMMARY OF ESTIMATED CAPITAL COSTS BY IMPROVEMENT TYPE FOR THE REGIONAL AIRPORT SYSTEM PLAN

County	Airport	Essential Improvements			Other Improvements			Total
		Land Acquisition	Airfield Improvements	Offsite Highway Facilities	Terminal Area Facilities	Hangars/ Aircraft Storage	Onsite Service Roads	
Kenosha	Kenosha Regional	$ 200,000	$ 2,780,000	--	$ 1,291,000	$ 5,281,000	--	$ 9,552,000
Milwaukee	General Mitchell International	141,120,000	187,380,000	$1,060,000	181,340,000	--	--	510,900,000
	Lawrence J. Timmerman	121,000	623,000	--	416,000	1,334,000	--	2,494,000
Racine	Burlington Municipal	474,000	3,725,000	--	134,000	825,000	--	5,158,000
	Batten	4,228,000	3,615,000	3,400,000	202,000	545,000	--	11,990,000
	Sylvania	302,000	1,576,000	--	419,000	328,000	--	2,625,000
Walworth	East Troy Municipal	--	1,531,000	--	614,000	734,000	--	2,879,000
Washington	Hartford Municipal	220,000	2,412,000	--	87,000	512,000	--	3,231,000
	West Bend Municipal	1,357,000	11,156,000	1,235,000	352,000	1,094,000	--	15,194,000
Waukesha	Capitol	1,000,000	2,765,000	--	677,000	1,369,000	$147,000	5,958,000
	Waukesha County-Crites Field	--	10,255,000	--	1,862,000	1,900,000	--	14,017,000
Total		$149,022,000	$227,818,000	$5,695,000	$187,394,000	$13,922,000	$147,000	$583,998,000

Source: SEWRPC.

onsite service roads. Because these types of improvement are not considered to be essential for the safe and efficient operation of aircraft, they often do not receive the same priority as improvements such as runways and navigational aids. Some of these improvements, such as aircraft hangars, may be self-amortizing through user fees and other service charges. Because they are revenue-producing facilities, they are not eligible for Federal funding assistance. The capital cost of such improvements is estimated to be about $201.5 million over the plan design period, representing about 35 percent of the total cost of all recommended improvements. These costs represent an average annual capital investment of about $13.4 million. The estimated cost of these recommended improvements at General Mitchell International Airport represents about $181.3 million, or about 90 percent of the total cost of these improvements. This represents an average annual capital investment of about $12.1 million. The estimated capital cost of these improvements for the 10 general aviation airports together represents about $20.2 million, or an average annual capital investment of about $1.3 million.

The feasibility of implementing the improvements recommended over the next 15 years under the regional airport system plan can be assessed by comparing the estimated capital costs required to implement the plan with the historical capital expenditures for these 11 airports. During the 10 year period from 1986 through 1995, improvements totaling $117.1 million were made at the 11 airports. As summarized in Table 138, this represents an average annual capital investment of about $11.7 million during the 10 year period. Of the $117.1 million used for capital investments at the 11 airports during this time, about $80.1 million, or 68 percent of the total, represented Federal funding assistance; about $16.5 million, or about 14 percent, represented State funding assistance; and about $20.4 million, or about 17 percent, represented funding contributed by the local airport sponsor.

The historic investment includes only those improvements funded under the Airport Improvement Program for which information was readily available. Typically, the cost of improvements funded under these programs has been shared by the Federal government, the State government, and the local airport owner. The investment in airport facilities identified herein includes neither the improvements of navigational aids funded under the Federal Facilities and Equipment Program nor airport hangars, which are ineligible for public funding because they are revenue-producing facilities. The cost of these improvements over the past 10 years would significantly increase the total investment made from 1986 through 1995.

As already noted, the estimated average annual investment required to implement the improvements recommended in the regional airport system plan is about $38.9 million. The estimated average annual

Table 138

CAPITAL EXPENDITURES AT AIRPORTS INCLUDED IN THE REGIONAL AIRPORT SYSTEM PLAN: 1986-1995

County	Airport	Estimated Capital Investment			
		Federal Share	State Share	Local Share	Total
Kenosha	Kenosha Regional	$14,257,887	$ 2,439,246	$ 1,484,633	$ 18,181,766
Milwaukee	General Mitchell International	38,791,865	9,522,859	15,931,631	64,246,355
	Lawrence J. Timmerman	1,052,206	215,486	215,486	1,483,178
Racine	Burlington Municipal	--	--	--	--
	Batten	11,781,437	1,159,125	1,288,926	14,229,488
	Sylvania	--	--	--	--
Walworth	East Troy Municipal	1,789,179	112,100	112,100	2,013,379
Washington	Hartford Municipal	504,000	28,000	28,000	560,000
	West Bend Municipal	838,260	454,570	129,570	1,422,400
Waukesha	Capitol	108,000	6,000	6,000	120,000
	Waukesha County-Crites Field	11,003,300	2,605,128	1,204,128	14,812,556
Total		$80,126,134	$16,542,514	$20,400,474	$117,069,122

Note: The totals shown in this table represent only those improvements funded through the Federal Airport Improvement Program or Airport Development Aid Program.

Source: Wisconsin Department of Transportation and SEWRPC.

investment required to implement the improvements recommended for General Mitchell International Airport alone is about $34.1 million. The estimated average annual investment required to implement only the essential airfield improvements recommended for General Mitchell International Airport is about $22.0 million. This may be compared with the average annual investment of about $6.4 million that has been made for improvements at Mitchell International during the past 10 years. The increase in the average annual investment required is largely due to the much larger scale of improvements recommended for General Mitchell International Airport under the new plan. For example, the new recommendations include a significant level of capital costs related to implementation of a Noise Compatibility Program for areas surrounding Mitchell International and the planned construction of a new parallel air carrier runway and taxiway.

Funding assistance for the capital costs of major improvements and operating costs at General Mitchell International Airport is unique in that it utilizes a variety of funding sources and user charges. These include Federal entitlement funds for primary commercial service airports, additional Federal discretionary funds for primary commercial service airports, State transportation funds, funding agreements with tenant airline companies, rental and lease agreements with concessionaires, and local funds through tax revenues and bonding capability. In addition, Mitchell International has the ability to levy passenger facility charges and use the revenue for such improvements. In any case, concurrence of the tenant airline companies at Mitchell International with Milwaukee County concerning the need for, and timing of, specific improvements will be required and may be expected as the need for such improvements becomes evident.

The estimated average annual investment required to implement the improvements recommended for the 10 airports in the plan that serve only general aviation traffic, that is, all the airports except Mitchell International, is about $4.9 million. The estimated average annual investment required to implement only the essential airfield improvements recommended for the 10 airports in the plan that serve only general aviation traffic is about $3.5 million. These estimates may be compared with the average annual investment of about $5.3 million that has been made for improvements at the 10 general aviation airports during the past 10 years for essential improvements only. Thus, the estimated annual investment required to imple-

Table 139

SUMMARY OF ESTIMATED CAPITAL COSTS BY PROGRAMMED IMPROVEMENT FOR THE REGIONAL AIRPORT SYSTEM PLAN

County	Airport	Programmed Improvements	Additional Long-Range Airfield Improvements Essential to Airport Operation	Other Additional Long-Range Improvements	Total
Kenosha	Kenosha Regional	$ 1,430,000	$ 1,550,000	$ 6,572,000	$ 9,552,000
Milwaukee	General Mitchell International	58,768,000	270,792,000	181,340,000	510,900,000
	Lawrence J. Timmerman	226,000	518,000	1,750,000	2,494,000
Racine	Burlington Municipal	1,148,000	3,051,000	959,000	5,158,000
	Batten	5,529,000	5,714,000	747,000	11,990,000
	Sylvania	--	1,878,000	747,000	2,625,000
Walworth	East Troy Municipal	--	1,531,000	1,348,000	2,879,000
Washington	Hartford Municipal	--	2,632,000	599,000	3,231,000
	West Bend Municipal	850,000	12,898,000	1,446,000	15,194,000
Waukesha	Capitol	--	3,765,000	2,193,000	5,958,000
	Waukesha County-Crites Field	12,607,000	--	1,410,000	14,017,000
Total		$80,558,000	$304,329,000	$199,111,000	$583,998,000

Source: SEWRPC.

ment the general aviation portion of the plan, including either all improvements or only the essential improvements, is less than the historic investment over the past 10 years.

Table 139 presents estimates of the total cost of all planned improvements and of the total cost of improvements already programmed by the airport owners for each of the 11 airports included in the system plan. Identification of the programmed improvements was based on the most recent available version of the Wisconsin Department of Transportation Bureau of Aeronautics' Five-Year Airport Improvement Program, published in February 1996. The total cost of the programmed improvements at General Mitchell International Airport is about $58.8 million, or about 12 percent of the estimated $510.9 million in capital costs required to implement all the recommended improvements. The total cost of the programmed improvements at the 10 general aviation airports is about $21.8 million, or about 30 percent of the estimated $73.1 million in capital costs required to implement all the recommended improvements. Also, the cost of the programmed improvements at the 10 general aviation airports represents about 41 percent of the $53.0 million cost of the improvements considered most essential to the implementation of the general aviation element of the plan. Thus, the improvements already programmed for implementation during the first five years of the plan design period of the new regional airport system plan represent a significant portion of all improvements required to implement the general aviation portion of the plan.

Although many of the programmed improvements are tentatively scheduled for implementation over the period 1995 to 2000, it must be recognized that some of these programmed improvements may be delayed beyond 2000 as a result of changes in Federal, State, and local funding programs and priorities. It is, nevertheless, likely that these improvements will be implemented during the plan design period, if not by the end of 2000. In addition, a substantial portion of the total investment required to implement all the recommended improvements, about $22.4 million, may be attributed to the repair and reconstruction of airfield pavement surfaces over the next 15 years. These costs are included in the long-range facility improvement cost estimate because these are significant and are eligible for Federal and State aids, but may be considered, in actuality, to be maintenance costs.

Most of the essential general aviation airport improvements recommended under the system plan are eligible for Federal and State aids, including the construction and rehabilitation and extension of runways and taxiways, land acquisition, and the installation of airfield lighting and navigational aids. Since the local sponsor's or airport owner's share of the cost of such improvements typically constitutes the smallest share, the local sponsors may be expected to remain aggressively in favor of implementing the recommended improvements. Moreover, the 11 public-use airports in the new plan are among the busiest in the State of Wisconsin and, in addition, perform a critical reliever function to General Mitchell International Airport, the busiest airport in Wisconsin. These airports should therefore receive high priority among the other public-use airports of Wisconsin for funding assistance through the Wisconsin Department of Transportation's Airport Improvement Program if the local airport sponsor maintains an aggressive posture in favor of airport development.

On the basis of the historical capital expenditures for major airport improvements in the Region and the ongoing implementation of improvements recommended under the original system plan and the second-generation plan, it may be concluded that this update of the regional airport system plan is financially realistic and attainable.

AIRCRAFT OPERATION CONSIDERATIONS

In the first- and second-generation regional airport system plans, a number of aircraft operational considerations were evaluated and recommended. These included noise-abatement measures at General Mitchell International Airport, directed traffic patterns at certain general aviation airports, installation of air traffic control towers at certain general aviation airports, and restricted flight training activities at certain general aviation airports. These considerations were reevaluated in the preparation of this update of the regional airport system plan.

Noise-Abatement Measures

Under the first-generation regional airport system plan, various measures to reduce the impact of jet aircraft at General Mitchell International Airport were recommended. Since the preparation of the first-generation system plan, the responsible officials at General Mitchell International have instituted and maintained a set of operating restrictions intended to minimize aircraft noise impacts on surrounding residential areas. To further mitigate noise impacts, an airport noise-abatement plan refining the recommendations contained in the first-generation regional airport system plan was completed for Milwaukee County in 1981.[4] This noise and land use compatibility study was prepared under the Federal Aviation Regulation (FAR) Part 150 program, which establishes a uniform national method for developing and documenting airport noise-control programs. The purpose of Part 150 noise and land use compatibility studies is to minimize aircraft noise and maintain compatible land uses around airports. Part 150 studies are voluntary studies that are initiated and overseen by airport sponsors or owners with cooperation from other related organizations. Part 150 studies allow airports to become eligible for Federal funding in partial support of noise-control measures. The 1981 Part 150 study for General Mitchell International Airport was revised in 1988,[5] and again in 1993.[6]

The 1993 revision of the Part 150 study recommended a noise-compatibility program consisting of three major elements: noise-abatement measures, land use management measures, and program management procedures. The noise-abatement measures recommended the continuation of existing airport operating procedures involving runway utilization, engine run-up operations, and adjusted departure procedures; as well as new measures, including installation of additional navigation equipment to assist aircraft in maintaining proper flight tracks and construction of a noise-suppression pen for engine maintenance work. The land use management element recommended a noise-mitigation program that included the purchase of selected residential buildings located within noise-impacted areas, provision of a sound-insulation program for residential and institutional buildings in specific noise-impacted areas;

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[4]*See CH^{2}M-Hill, Engineering Consultants, Airport Noise Abatement Plan Report, Milwaukee County General Mitchell Field, Milwaukee, June 1981.*

[5]*See CH^{2}M-Hill, Engineering Consultants, General Mitchell International Airport, FAR Part 150 Airport Noise Compatibility Plans, Milwaukee, January 1988.*

[6]*See Coffman Associates, Inc., General Mitchell International Airport, FAR Part 150 Noise Compatibility Study, Milwaukee, January 1988.*

acquisition of undeveloped lands currently zoned for residential use; coordination with surrounding communities to develop a plan for rezoning and redevelopment of lands in runway approach areas; and working with surrounding communities to insure compatible zoning codes with respect to airport operations. The noise-compatibility plan assumed the continuation of noise-abatement and mitigation efforts beyond the minimum five year time frame required by the FAA at least to the year 2000. The noise-compatibility study was adopted by the Milwaukee County Board of Supervisors in September 1993.

A Part 150 noise and land use compatibility study was initiated in 1992 for Kenosha Regional Airport, which resulted in two sets of proposed noise-abatement measures. One consisted of noise-mitigation strategies and included specific operating procedures involving runway utilization, discouraging nighttime engine maintenance run-ups, designation of a specific airfield location to perform aircraft engine run-ups, and implementation of an informal noise-abatement program using pilot notices, airfield signs, and communication with surrounding land owners. The other set consisted of land use management strategies and included acquisition of incompatible land uses in selected noise-sensitive areas, development of a conceptual area land use plan, and cooperation with surrounding communities to adopt an airport overlay zoning district. In January 1996, work on this study effort was halted by the City of Kenosha pending further consideration of airport improvement alternatives.

It should be noted that, since completion of the first-generation regional airport system plan, technical improvements by engine manufacturers have made jet aircraft engines quieter, partially in response to more restrictive standards set by the Federal Aviation Administration. Nevertheless, jet aircraft noise remains a problem. Therefore, recommendations resulting from Part 150 studies should be implemented to minimize the undesirable impacts of airport noise and conflicts between airport operations and adjacent established land uses. It is also recommended that the study for General Mitchell International Airport be revised and updated as necessary, especially with respect to any major airfield improvements, and that the study for Kenosha Regional Airport be completed.

Part 150 noise and land use compatibility studies have not been undertaken for any other airport included in the recommended regional airport system. Most airport noise-related concerns arise at airports that handle large commercial, air carrier, or business and corporate jet aircraft. Within Southeastern Wisconsin such airports would include those either currently classified, or recommended to be classified, as Air Carrier or Transport-Corporate facilities. Accordingly, it is recommended that owners of airports that already perform the role of a Transport-Corporate airport or that are recommended to perform the role of a Transport-Corporate airport consider the preparation and maintenance of airport noise control programs as envisioned in Federal Aviation Regulation Part 150. These airports include Batten Airport and Waukesha County-Crites Field, which are already classified as Transport-Corporate facilities, and Burlington Municipal Airport and West Bend Municipal Airport, which are recommended to be developed to Transport-Corporate facility standards.

Nonstandard Traffic Patterns

The second-generation regional airport system plan recommended that nonstandard right-hand traffic patterns be maintained or established at Batten Airport, Burlington Municipal Airport, Waukesha County-Crites Field, and West Bend Municipal Airport to keep aircraft from flying over residential areas. The traffic pattern of an airport prescribes a standard, or usual, path to be followed by aircraft landing at, and taking off from, the airport. At most general aviation airports in the United States, the standard left-turn pattern is used since it provides the pilot with maximum visibility of adjacent aircraft and air traffic. At some airports, however, nonstandard air traffic patterns are followed, which involve right turns or, in some cases, restriction of all or some aircraft operations to one side of the airport. Caution must be exercised in the use of, or change to, nonstandard operational patterns in that, unless otherwise informed, pilots will probably enter the airport pattern assuming the standard left-hand pattern. Most general aviation airports, however, are not likely to have an air traffic control tower to warn pilots of such a nonstandard traffic pattern. At airports that have air traffic control towers, such nonstandard traffic patterns do not exist, and are not necessary, since tower personnel coordinate the activity and direct arriving and departing aircraft along specific paths that are designed to abate noise over nearby residential areas.

Normally, the airport owner or operator is responsible for establishing the traffic pattern.

The Federal Aviation Administration recommends certain minimum operating altitudes and procedures and may make appropriate recommendations concerning traffic patterns if a detailed airspace analysis has been undertaken for a particular airport. Specific aircraft operating procedures at individual airports are most appropriately set forth in pilot-oriented publications such as airport directories, published approach procedures, and notices to airmen. In 1995, of the airports identified above that were recommended in the second-generation regional airport system plan to have right-hand traffic patterns, only Burlington Municipal and West Bend Municipal did have such traffic patterns.

In order to avoid public opposition to aircraft operations at these airports, it remains desirable to direct aircraft activity away from residential areas. Therefore, the maintenance or establishment of right-hand traffic patterns continues to be recommended for Batten Airport, Burlington Municipal Airport, Kenosha Regional Airport, West Bend Municipal Airport, and Waukesha County-Crites Field.

Air Traffic Control Towers

The second-generation regional airport system plan, completed in 1987, recommended the maintenance of already established air traffic control towers at General Mitchell International Airport, Lawrence J. Timmerman Airport, and Waukesha County-Crites Field and the installation of new air traffic control towers at Burlington Municipal Airport, Batten Airport, Kenosha Regional Airport and West Bend Municipal Airport. Since the completion of the second-generation plan, only Kenosha Regional Airport has constructed and commissioned an air traffic control tower.

The need for an air traffic control tower at an airport is normally determined by either traffic volume or by special safety considerations. The Federal Aviation Administration uses a rigorous procedure to determine if an airport is a candidate for establishment of a control tower. First, the FAA applies the most current annual operations data in the equation shown at the bottom of this page to compute a ratio sum:

$$\text{Ratio Sum} = \frac{\text{Air Carrier Operations}}{38{,}000} + \frac{\text{Air Taxi Operations}}{90{,}000} + \frac{\text{Itinerant General Aviation Operations}}{160{,}000} + \frac{\text{Local General Aviation Operations}}{280{,}000} + \frac{\text{Itinerant Military Operations}}{48{,}000} + \frac{\text{Local Military Operations}}{90{,}000}$$

If the ratio sum is equal to, or greater than, 1.0, then the airport becomes a candidate for establishment of a tower. Once an airport is a candidate for the provision of a tower, economic justification must be provided through a benefit-cost analysis. An airport may be exempted from meeting the criteria because of unusual, site-specific factors.

The general aviation airports in Southeastern Wisconsin report very small amounts of air carrier, air taxi, and military operations. Thus, justification for candidacy for establishment of a tower is likely to be based primarily on the volume of local and itinerant general aviation traffic. For Southeastern Wisconsin general aviation airports, the tower establishment criteria suggest that between 200,000 and 250,000 annual aircraft operations would be necessary to make an airport a candidate for a control tower. Of the airports within the Region that do not already have air traffic control towers, neither the existing, nor forecast future, levels of activity approach this level.

Safety and operational considerations unique to a specific airport, such as nonstandard traffic patterns, may also warrant the installation and operation of an air traffic control tower. Three of the airports included in the recommended regional airport system without air traffic control towers do employ nonstandard traffic patterns, Burlington Municipal, Capitol, and West Bend Municipal. These airports have apparently operated in a safe manner and have been free of accidents resulting from traffic control conflicts. This may be expected to continue, given the relatively small increase in aviation activity forecast at these airports over the plan design period. Accordingly, this update of the regional airport system plan does not recommend any additional installation and operation of air traffic control towers at any of the airports comprising the recommended system.

In making this recommendation it is recognized that it would be desirable to have air traffic control towers at all airports recommended to be maintained or improved to Transport-Corporate standards: Batten Airport, Burlington Municipal Airport, and West Bend Municipal Airport. Future levels of aircraft operations at these airports, however, are not expected to be high enough during the plan design period for these airports to qualify as candidates under FAA criteria. Therefore, the decision to install and operate a control tower will probably rest with the airport owner. The airport

owner must consider local conditions, such as safety factors, the type of traffic, compatibility with the adjacent developed lands, and the cost and ease of obtaining liability insurance for the airport. In addition, the airport owner will have to consider the initial construction costs and the ongoing operating costs of a control tower.

An air traffic control tower of an appropriate size for a general aviation airport may be expected to require a capital investment ranging from $250,000 for a small portable tower to about $1,000,000 for a permanent structure, including the necessary basic avionics equipment. It is also estimated that the annual operating cost of such a facility may be expected to approximate $150,000.

Restricted Flight Training

The second-generation regional airport system plan also recommended the diversion of training activity from certain airports within the Region as a means of reducing the nuisance effects of aircraft operations over developed areas. It was recognized that implementing such restrictions could reduce the attractiveness of a particular airport to some users, who may then choose to base their aircraft at another airport free of restrictions. Also, since flight training activities normally represent a substantial portion of the income of the fixed-base operator at a general aviation airport, such restrictions may adversely affect the revenues of such operators. This may not be desirable, since the presence of a strong fixed-base operator is crucial to providing services necessary for all airport users, including businesses and corporations. In addition, this may result in the need for a greater annual public operating subsidy for the airport.

Under the second-generation regional airport system planning effort, it was recommended that repetitive touch-and-go training operations, which represent a part of the training activity, be discouraged at Batten Airport, Lawrence J. Timmerman Airport, and Waukesha County-Crites Field. In order to avoid public opposition to the continued operation of these airports, it is essential that airport owners and operators be highly sensitive to impacts on surrounding land uses, monitor airport noise-related impacts, and reconsider flight training policies as appropriate. It would be desirable if such activity were not encouraged at these airports but directed to other airports more remote from the most intensively developed urban areas of the Region. It would also be desirable for airport owners to continue noise-abatement policies and related flight and operational procedures, adjusting those policies and procedures as dictated by changing airport and surrounding land use conditions.

COMPARISON OF THE NEW THIRD-GENERATION REGIONAL AIRPORT SYSTEM PLAN WITH THE SECOND-GENERATION REGIONAL AIRPORT SYSTEM PLAN

The regional airport system plan for Southeastern Wisconsin, as herein described, consists of a system of 11 public-use airports intended to serve the aviation needs of the Region to the year 2010. The following section of this chapter provides a comparison of the major recommendations contained in this new system plan with those contained in the second-generation system plan.

Kenosha County

For Kenosha County, both the second-generation plan and the new regional airport system plan include a single public-use airport: Kenosha Regional Airport, recommended to be maintained as a Transport-Corporate facility. The new plan recommends one improvement not included in the second-generation plan, the eventual extension of the primary runway by 900 feet, to an ultimate length of 6,400 feet, to enable aircraft that already use the airport to take off safely with full payloads under most weather conditions. This improvement would not change the airport's classification nor the type of aircraft intended to be accommodated and would, with the exception of about one acre, be on land already occupied by the airport.

Milwaukee County

With respect to Milwaukee County, both the second-generation plan and the new plan include two public-use airports: General Mitchell International Airport, which is recommended to be maintained as the Region's sole air carrier airport, and Lawrence J. Timmerman Airport, which is recommended to be maintained as a General Utility facility. For General Mitchell International, the recommendations in the new plan include a number of airfield-capacity-related improvements that were not included in the second-generation plan. The most significant of these is the construction of a new 7,000-foot-long air carrier runway and taxiway parallel to, and south of, the existing east-west

primary runway. The new plan reconfirms the continued need for Lawrence J. Timmerman Airport, which remains an important airport facility for diverting general aviation activity from General Mitchell International. The new plan recommends no improvements to Timmerman Airport other than for terminal and hangar facilities and for pavement maintenance.

Ozaukee County

In Ozaukee County, both the second-generation plan and the new plan recommend no public airports. The general aviation forecasts permit the general aviation demand generated by Ozaukee County to be adequately served by nearby West Bend Municipal and Lawrence J. Timmerman Airports.

Racine County

As to Racine County, both the second-generation plan and the new plan include three public-use airports. These are Batten Airport, recommended to be maintained as a Transport-Corporate facility; Burlington Municipal Airport, recommended to eventually be improved to Transport-Corporate status; and Sylvania Airport, recommended to be improved eventually to Basic Utility standards. The new regional airport system plan foresees Batten Airport and Sylvania Airport continuing to serve the same role as envisioned under the second-generation plan.

The recommended improvements for Batten Airport under the new plan are the same as the recommendations included in the second-generation plan, intended to provide improved runway-safety areas, object-free areas, and runway-protection areas, as well as to minimize obstructions. The recommended improvements for Sylvania Airport under the new plan continue to focus on improving the airport facilities to Basic Utility standards, including an ultimate primary runway length of 2,800 feet, or 500 feet longer than the existing runway. The recommended improvements for Burlington Municipal Airport under the new plan reflect a significant change from those recommended in the second-generation plan. The new plan recommends that Burlington Municipal Airport ultimately be improved to Transport-Corporate standards, a higher classification than the Basic-Utility classification recommended under the second-generation plan. Thus, the primary runway is recommended to be extended ultimately from its current length of 3,600 feet to a length of 4,800 feet to accommodate some business jet activity. The airport is expected to continue its role in serving as a reliever to General Mitchell International Airport and serving as the principal general aviation airport for much of Walworth County and western Racine County.

Walworth County

In regard to Walworth County, both the second-generation and the new plans include a single public-use airport, East Troy Municipal Airport, recommended to be maintained as a General Utility facility. Accordingly, East Troy Municipal Airport is anticipated to perform the same role within the new regional airport system plan as envisioned under the second-generation regional airport system plan, but with its primary runway recommended to be extended eventually from a current length of 3,900 feet to 4,400 feet.

Washington County

With respect to Washington County, both the second-generation and the new plans include two public-use airports. The airports are West Bend Municipal Airport, which is recommended to eventually be improved up to a Transport-Corporate facility, and Hartford Municipal Airport, which is recommended to be improved eventually to General Utility status. While both Washington County airports are envisioned to perform the same role under the new plan as under the second-generation plan, the recommended airfield configurations for each airport under the new plan differ from those presented under the second-generation plan. The recommended improvements for Hartford Municipal Airport include a primary runway length 500 feet shorter under the new plan than was recommended in the second-generation plan and a recommended airfield configuration that better utilizes the exiting runways at the airport. Unlike the second-generation plan, the new plan recognizes and provides for the possible future extension of the primary runway to handle some business jets. The recommended airfield configuration for West Bend Municipal Airport continues to include a 5,500-foot-long runway as was done under the second-generation plan, but represents a refinement of the recommendations in the second-generation plan to better address environmental corridor and highway relocation concerns in the area, as well as the need for additional area for terminal development. The recommended improvements will enable the airport to continue performing its role as a major reliever airport to General Mitchell International Airport and as the primary general aviation airport serving much of Washington and Ozaukee Counties.

Waukesha County

In Waukesha County, both the second-generation and the new plans include two public-use airports. These are Waukesha County-Crites Field, recommended to be maintained as a Transport-Corporate facility, and Capitol Airport, recommended to be maintained as a Basic Utility facility. Under the new regional airport system plan, both essential Waukesha County airports are envisioned as performing the same role as recommended under the second-generation plan. There are some differences in the recommendations between the second-generation and new plans. For example, the recommended improvements for Waukesha County-Crites Field include the eventual relocation of selected taxiways and terminal and hangar facilities on the existing airfield to conform better to FAA standards for runway-safety areas, object-free areas, and elimination of obstructions, as well as to provide additional area for terminal facility improvement and expansion. The recommended improvements for Capitol Airport have been modified to provide for partial parallel taxiways in selected areas to reduce the impact on surrounding wetland areas.

Other Public-Use Airports

Both the second-generation regional airport system plan and this update of the regional airport system plan identify 11 public-use airports as essential to the provision of an adequate regional airport system. Although the updated plan recommends specific improvements for only this minimal system of 11 public-use airports, the plan recognizes the effect and importance of the existing privately owned, public-use and private-use airports within the Region. The majority of these privately owned airports, particularly those that are restricted to private use, are intended to serve one or two based aircraft and log a very small number of annual operations. Some of the privately owned airports open to public use, however, accommodate a substantial number of based aircraft and a large number of annual operations. All privately owned airports typically serve only the smallest types of single-engine, propeller-driven, general aviation aircraft.

All the privately owned airports, particularly those open to public use, support the regional airport system by reducing the demand for facilities and services at those public-use airports included within the plan. While the private airports are not vital to the provision of a basic system of airport facilities within the Region, it was recognized in this and past regional airport system planning efforts that such airports may remain in operation. Moreover, to the extent that these airports do remain in operation, especially those that are open to use by the public, the demand on those airports included in the new plan will be reduced and the need for some improvements can be deferred, specifically, those improvements related to expanding airport capacity to handle a larger number of single-engine, propeller-driven, general aviation aircraft, including increased hangars, and terminal facilities.

PUBLIC REACTION TO THE PRELIMINARY RECOMMENDED PLAN

The preliminary findings and recommendations of the new regional airport system plan were presented at a series of three public hearings held by the Technical Coordinating and Advisory Committee on behalf of the Regional Planning Commission during June 1996. The purpose of these informational meetings and hearings was to provide public officials and interested citizens an opportunity to ask questions about, and provide comments on, the proposed new regional airport system plan. The hearings were held on June 20, 1996, at the Milwaukee County Courthouse Annex in Milwaukee, Wisconsin; June 26, 1996, at the Kenosha County Center in Bristol, Wisconsin; and June 27, 1996, at the Washington County Public Agency Center in West Bend, Wisconsin. Each public hearing was preceded by an informational meeting beginning at 4:00 p.m. and continuing to 7:00 p.m., which afforded interested individuals an opportunity to review the findings and recommendations of the proposed new plan, to discuss the proposed plan directly with Commission staff, and to ask questions about the preliminary plan. The public hearings began at 7:00 p.m. with a staff presentation on the preliminary plan, after which comments were received from those attending the hearing. All concerned were notified that the record of the hearings would be kept open to July 7, 1996, to facilitate the submission of written comments.

For use in connection with the meetings and hearings, the Commission prepared and widely distributed an issue of the SEWRPC Newsletter, Vol. 36, No. 3, May-June 1996, which presented, in summary form, the findings and preliminary recommendations of the regional airport system planning effort. The entire issue of the Newsletter was devoted to a description of the proposed new regional airport system plan.

To announce the public hearings, a Commission news release was sent to 28 daily and weekly newspapers, 14 radio stations, and 11 television stations throughout Southeastern Wisconsin. The release contained a brief summary of the preliminary plan recommendations and provided the schedule for the public hearings. As a result, a number of newspapers published articles concerning the preliminary plan and hearings two weeks prior to, and in the week immediately preceding, the hearings. In addition, a display announcement of the meetings and hearings appeared in the main section of the June 12, 1996, edition of the Milwaukee Journal Sentinel. Also, the public hearings were announced in the first week of June to all local governments within Southeastern Wisconsin and to all other citizens and public officials on the Commission Newsletter mailing list by a special brochure indicating the availability of the Newsletter and the schedule of public informational meetings and hearings.

The record of the public hearings, together with attendant correspondence and supporting materials, was published by the Commission for distribution to the Advisory Committee and Commission members and is available for review at the Commission offices. More specifically, the record of the public hearings, including a transcript of the comments on the preliminary plan, attendance records, meeting announcements, written comments, and pertinent newspaper articles, is documented in Record of Public Informational Meetings and Public Hearings—Preliminary Regional Airport System Plan for Southeastern Wisconsin: 2010.

Careful examination of the record of the public hearings indicated general support for the recommended system of 11 public-use airports, including General Mitchell International Airport and the 10 general aviation airports proposed under the plan to be maintained to meet the commercial, business, personal, and military aviation needs of the Region to the year 2010. No comments were made which proposed deletion of any of these 11 airports from the regional airport system plan; no comments were made proposing the addition of any airports to this proposed system of 11 essential airports. Moreover, a number of those making comments in opposition to proposed improvements at some of the 11 airports indicated support for the continued operation of the airports at their existing level of development and the inclusion of those airports in the system plan.

The record of the public hearings indicates that only support was expressed for the continued maintenance and proposed improvements at General Mitchell International Airport and Lawrence J. Timmerman Airport in Milwaukee County, Waukesha County-Crites Field in Waukesha County, Sylvania Airport in Racine County, and Hartford Municipal Airport in Washington County. The record of public hearings further indicates that no comments were made concerning the continued maintenance and proposed improvements at Capitol Airport in Waukesha County and Batten Airport in Racine County.

The record indicates that much of the attention at the hearings was directed toward the recommendations concerning the proposed improvements to the Burlington Municipal Airport in Racine County, Kenosha Regional Airport in Kenosha County, and West Bend Municipal Airport in Washington County. Statements of both opposition and support were expressed for the improvements at each of these three airports. The record of the public hearings further indicates that only one comment was made in opposition to the proposed improvements at the East Troy Municipal Airport.

The following sections of this chapter summarize in greater detail the public reaction to the preliminary recommended regional airport system plan as expressed at the public hearings, including the reaction provided in written comments received by the Commission during and following the hearings. In addition, the Advisory Committee response to the public reaction is documented.

Comments Related to General Mitchell International Airport and Lawrence J. Timmerman Airport in Milwaukee County

The General Mitchell International Airport Director indicated that the proposed major improvements at General Mitchell International Airport and the proposed minor improvements at Lawrence J. Timmerman Airport were consistent with, and would serve to reaffirm, County airport plans and programs adopted by the Milwaukee County Board of Supervisors.

Comments Related to Waukesha County-Crites Field in Waukesha County

The Waukesha County Board of Supervisors Public Works Committee and the Waukesha County Airport Commission indicated implied support for the

proposed inclusion of Waukesha County-Crites Field in the preliminary regional airport system plan and for the proposed improvements to that airport. These bodies, however, indicated concern that current airport improvement projects, which represent an initial stage in the implementation of improvements proposed in the system plan to the year 2010, will receive less than traditional funding shares of total project cost through Federal and State grant programs. This reduction in Federal and State support and concomitant need to increase County support is due to actual reductions in Federal funding made in 1996. The Airport Commission and Public Works Committee were particularly concerned that Waukesha County's fair share of Federal and State airport funding from aviation user charges would not be received, resulting in the need to increase local property-tax-based funding.

Comments Related to Sylvania Airport in Racine County

Support was expressed for the proposed inclusion of Sylvania Airport in the preliminary plan and its proposed reconstruction to meet Basic Utility standards. Support was expressed by the existing private owner of the airport, a group of business owners along IH 94 in Racine County whom Sylvania Airport may be expected to serve, and a business in Racine County which has operated aircraft at Sylvania Airport.

Comments Related to Hartford Municipal Airport in Washington County

Support was expressed by the City Airport Manager on behalf of the City of Hartford for the proposed inclusion of Hartford Municipal Airport in the plan and for the proposed improvements.

Comments Related to East Troy Municipal Airport in Walworth County

One comment was received concerning East Troy Municipal Airport, expressing opposition to the proposed extension of the primary runway from 3,900 to 4,400 feet and the paving of the crosswind runway of 2,380 feet. The comment was made by a Walworth County Board Supervisor who represents the area surrounding the airport. Concern was expressed with respect to the noise and nuisance impacts of the current skydiving, flight instruction, and pleasure-flight passenger operations at the airport. It was further stated that no local businesses make use of the airport.

Comments Related to West Bend Municipal Airport in Washington County

Both support of, and opposition to, the proposed improvements at the West Bend Municipal Airport was expressed. Those expressing support included representatives of the City of West Bend and the West Bend Economic Development Corporation. Statements of support cited the aircraft operation safety benefits of the proposed runway extension, its benefits for the promotion of the maintenance and development of the West Bend area economy, its standing as a long recommended improvement in the regional airport system plan and local plans over the past 20 years, and endorsements by the City of West Bend Airport Commission, City Plan Commission, and Common Council, as well as the West Bend Area Chamber of Commerce and the West Bend Economic Development Corporation. Representatives of the City of West Bend indicated that the City is currently conducting an environmental assessment of alternative ways of extending the primary runway. They indicated that the configuration shown in the regional airport system plan for the proposed development of a 5,500-foot runway would appear to address many of the land acquisition and environmental impact concerns which have been raised concerning the runway extension over the past several years.

Those expressing concern over, and opposition to, the preliminary proposed improvements at West Bend Municipal Airport included a member of the Town Board of the Town of Trenton. Concerns with respect to the proposed improvements included noise, air quality, and impacts of both surface traffic and air traffic; on land values; the cost of the proposed improvements; and the potential for accidents endangering residents of surrounding areas. The Town of Trenton Supervisor cited the Town's desire to be an active participant in the City airport planning effort in order to assure that impacts of airport improvements on the Town would be minimized. Questions were also raised concerning the potential need for the proposed primary runway extension. Suggestions were made that existing Transport-Corporate airports near the Cities of Oshkosh and Sheboygan provided adequate service to the West Bend area. One citizen expressing opposition to the proposed runway extension, however, also stated that the proposed configuration of the runway extension shown in the preliminary regional airport system plan would have significantly less impacts in the Town than the other runway exten-

sion alternatives identified to date by the City of West Bend.

Comments Related to Kenosha Regional Airport in Kenosha County

Both support and opposition were expressed with respect to the proposed improvements for the Kenosha Regional Airport. Those expressing support cited the potential of the proposed primary runway extension from 5,500 to 6,400 feet for further development of the Kenosha area economy, as well as the safety benefits of the runway extension. Those expressing support noted that inclusion of the runway improvement in the regional airport system plan was only the first step in the lengthy process of airport development, a process which would require further detailed studies by the City of Kenosha over the next 15 years. Such studies would include the preparation of a new airport master plan, a benefit-cost analysis and environmental impact assessment of any proposed improvements, and, possibly, a public referendum.

Those expressing opposition cited the existing and potential increased impacts of noise, air pollution, and safety hazards on the surrounding residential areas; and the incompatibility of the airport with existing and planned residential development in the vicinity of the airport. Also cited were the existing stormwater drainage problems in the vicinity of the airport, existing runway-protection zone conflicts with existing development on the northwest end of the crosswind runway, and proposed airport zoning which would limit urban development opportunities in the vicinity of the airport. Those expressing concern with, and opposition to, the proposed runway extension also questioned the need for the improvement, noting that no other Transport-Corporate airport in Southeastern Wisconsin would have a runway length approaching 6,400 feet and that the runway extension would serve only to permit some corporate jets to utilize the airport under more fully loaded conditions on international flights. It was also noted that Batten Airport, with a usable primary runway length of about 5,800 feet, and Waukegan Regional Airport, with a primary runway length of 6,000 feet, could adequately serve larger aircraft from the Kenosha area. Finally, those citing opposition to the airport noted actions taken by local government to indicate opposition to any runway extension, including such actions by the Town of Bristol, the Town of Somers, Kenosha County, the City of Kenosha, and a study committee appointed by the Mayor of the City of Kenosha to study airport expansion needs and also the results of a referendum within the City of Kenosha.

Comments Related to Burlington Municipal Airport in Racine and Walworth Counties

Both support and opposition were expressed regarding the proposed improvements at Burlington Municipal Airport. Support for the extension of the primary runway was expressed by the Airport Manager and an existing aircraft operator. Reasons cited in support of the extension included improved safety and the potential for promoting the Burlington area economy. Support for the proposed improvements was qualified, with those submitting comments indicating support only for an extension of the primary runway from its existing 3,600 feet length to 4,300 feet, not to the 4,800 feet proposed in the new regional airport system plan. This qualified support included that provided by the Airport Manager.

Those stating opposition to the proposed improvements cited the impacts on existing and planned residential development in the vicinity of this airport, including the potential for aircraft accidents to involve nearby residences; possible adverse impacts on the environment, including the effects of additional stormwater runoff on the White and Fox Rivers; and noise and air quality impacts. Importantly, opposition was expressed to taking prime agricultural land for runway extension. It was noted that one large farm would be affected by the necessary land acquisition, resulting in a loss of over 100 acres of farmland and splitting the farm into several odd-shaped parcels, difficult to work efficiently. The impact on this farm was cited by many expressing opposition, who also noted that the farm has been in active use since before the Civil War and supported 13 families. Those expressing opposition also questioned the need for the runway extension, suggesting that East Troy Municipal Airport, Kenosha Regional Airport, and Rock County Airport would serve the Burlington area and Walworth County adequately. Those expressing opposition also questioned whether any local businesses currently use the airport, or would use an expanded airport in the future.

ADVISORY COMMITTEE RESPONSE TO PUBLIC COMMENT ON PRELIMINARY PLAN

In response to the public comment received at the public hearings held on the preliminary plan, as well as to written comments received following the hearings, the Advisory Committee determined that

the recommended new regional airport system should consist of the system of 11 essential airports identified in the preliminary plan. Moreover, since only statements of support were received with respect to seven of those 11 airports, the Advisory Committee also determined that recommendations in the recommended system plan should remain unchanged from those contained in the preliminary plan for those seven airports: General Mitchell International Airport, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, Capitol Airport, Batten Airport, Sylvania Airport, and Hartford Municipal Airport. With respect to the other four airports comprising the recommended regional system, East Troy Municipal, West Bend Municipal, Kenosha Regional, and Burlington Municipal, the Advisory Committee carefully considered the public comments received at the public hearings in support of and opposition to the proposed improvements.

East Troy Municipal Airport in Walworth County

In regard to East Troy Municipal Airport, one statement of opposition was received at the public hearing, expressing concern with the repetitive nature and the noise and nuisance impacts of the skydiving, flight instruction, and passengers' pleasure-flight operations at the airport, expressing the belief that no businesses use the airport. Airport officials, however, indicated that businesses in the East Troy and Walworth County areas do indeed use the airport to serve company officials and employees, clients, guests, and suppliers. Local business users include Moxness Products Inc., Wisconsin Oven Corporation, Alpine Valley Music Theater, Instrument Development Corporation, Crucible Materials-Trent Tube Division, and Seaquist Closings. In addition, Scott Industries, which is constructing a new manufacturing plant in the area, has indicated the firm will use the airport when the plant is completed.

The proposed extension of the primary runway from 3,900 to 4,400 feet and the paving of the crosswind runway to 2,380 feet proposed in the preliminary plan are consistent with the adopted Village master plan for the airport, in place for over 10 years. Also, such extension of the primary runway and paving of the crosswind runway would neither encourage nor discourage the current skydiving, flight instruction, and pleasure-flight activity. Therefore, the Advisory Committee determined that the recommendations contained in the preliminary system plan for the improvement of the East Troy Municipal Airport should remain unchanged in the recommended plan.

West Bend Municipal Airport in Washington County

With respect to West Bend Municipal Airport, statements of opposition were made questioning the need for the proposed primary runway extension, citing the availability of Transport-Corporate airports at Sheboygan and Oshkosh. Concerns were also expressed over the need to acquire additional land and the impact of aircraft flights over residential areas. Whittman Regional Airport, in the City of Oshkosh, is classified as an Air Carrier airport and is located an estimated 60 minutes' highway travel time from the West Bend area during the midday and 63 minutes' highway travel time during morning and evening peak-traffic hours. Sheboygan County Memorial Airport, in the Town of Sheboygan Falls, is classified as a Transport-Corporate airport and lies an estimated 48 minutes' highway travel time from the West Bend area during the midday and 52 minutes' highway travel time during morning and evening peak-traffic hours. The closest airports which can accommodate Transport-Corporate aircraft are Waukesha County-Crites Field, which is located an estimated 38 minutes' highway travel time during midday from the West Bend area and 42 minutes' during peak-traffic hours; General Mitchell International Airport, which is located an estimated 47 minutes' highway travel time at midday and 54 minutes' during peak-traffic hours; and Fond du Lac County Airport, a Transport-Corporate airport, which is distant an estimated 46 minutes' highway travel time during the midday and 48 minutes' during peak traffic hours. The regional airport system plan standard for accessibility to a Transport-Corporate airport is 45 minutes; businesses using corporate aviation have indicated in Commission surveys that a 15-minute accessibility is desired. Statements of support for the airport expansion cited its benefits for safety and for the promotion and development of the West Bend area economy. Thus, on the basis of accessibility criteria, the Advisory Committee determined that the regional airport system plan should continue to recommend the development of the West Bend Municipal Airport as a Transport-Corporate airport.

The Advisory Committee determined to recommend further that the environmental assessment being undertaken in 1996 by the City of West Bend with respect to the expansion of the airport to Transport-Corporate standards recommend the implemen-

tation of the airfield configuration for an expanded West Bend Municipal Airport proposed in this regional plan.

Kenosha Regional Airport in Kenosha County

As to Kenosha Regional Airport, statements of opposition were made questioning the need for extending the primary runway from 5,500 to 6,400 feet. Some statements indicated that no other Transport-Corporate airport in the seven-county Southeastern Wisconsin Region had a runway length approaching 6,400 feet, while others suggested that Batten Airport in the City of Racine, with a usable runway length of about 5,800 feet, and Waukegan Regional Airport, with a usable runway length of 6,000 feet, would adequately serve the Kenosha area. Yet others indicated that the proposed runway extension would serve only to permit corporate jets currently using the airport to make international flights. Those expressing opposition to the runway extension stated concerns for noise and the safety of nearby residential development and identified existing problems of stormwater drainage and runway-protection-zone conflicts with existing development.

Statements of support cited benefits for safety and benefits for the development and maintenance of the Kenosha area economy.

The Advisory Committee determined that the recommendations contained in the preliminary system plan for the improvement of the Kenosha Regional Airport should remain unchanged in the recommended plan, including the recommendation to extend the primary runway from 5,500 to 6,400 feet. In making this recommendation, the Advisory Committee recognized that the proposed runway extension would not permit accommodation of any corporate jets larger than those currently using the airport and that the runway extension and attendant safety and protection areas could be provided essentially within the lands currently owned by the airport, with only about one acre of land needing to be acquired for full implementation of the recommended improvements.

The Advisory Committee noted that the inclusion of the runway extension in the regional system plan was only the first step in the airport development process. Including the extension in the regional system plan would give the City of Kenosha, as the owner of the airport, the option of proceeding with the improvement when found needed, but would not require the City to do so. Further, more detailed study, including the preparation of a master plan update, a benefit-cost analysis, and an environmental impact assessment would be required before any proposed improvements could be made. A study committee appointed by the Mayor of the City of Kenosha recently determined not to proceed with such further, more detailed studies at this time.

The Advisory Committee further recommended that prior to any further local consideration of a runway extension, Kenosha Regional Airport should address existing stormwater drainage problems, runway-protection zone conflicts, and noise impacts. The study of stormwater drainage should identify existing problems in the vicinity of the airport, quantify the stormwater runoff which occurs as a result of the airport, and examine and recommend alternatives to minimize that runoff and abate existing stormwater drainage problems in the vicinity of the airport. The study of existing runway-protection zone conflicts should identify all existing conflicts within runway object-free and runway-protection-zone areas and present short- and long-term recommendations for addressing those conflicts. The study should involve the Wisconsin Department of Transportation, Bureau of Aeronautics, and the U. S. Department of Transportation, Federal Aviation Administration, as well as Kenosha County and the Towns of Bristol, Paris, and Somers and Village of Pleasant Prairie, so that cooperative intergovernmental agreement can be reached with respect to those conflicts which are to be eliminated and the schedule for elimination.

The airport should also conduct a Federal Aviation Administration Part 150 noise study identifying existing noise levels generated by the airport, as well as projected future noise levels, and should recommend measures to reduce such levels. This study should also be conducted in close cooperation with Kenosha County, the Towns of Bristol, Paris, and Somers, and the Village of Pleasant Prairie.

Burlington Municipal Airport
in Racine and Walworth Counties

With respect to the Burlington Municipal Airport, statements of opposition questioned the need for the proposed primary runway extension from 3,600 to 4,800 feet, including whether any local businesses currently use, or in the future may be expected to use, the airport. Those expressing opposition to the airport also stated concerns with respect to safety hazards to nearby residences, effects of additional stormwater runoff, and noise impacts.

Substantial opposition was expressed to prime agricultural land for the proposed improvements and for the severing effects on a large farm in the area. The proposed primary runway extension to 4,800 feet would affect one large farm, resulting in the loss of over 100 acres of farmland and splitting the farm into odd-shaped parcels difficult to work efficiently.

According to the operator of the Burlington Municipal Airport and surveys of existing businesses in the Burlington area, these local businesses have indicated that they currently use the airport or would use an expanded airport in the future: Arens Controls; Martin Electronics; Yunker Industries, Inc.; Heizler Photography; J. W. Peters; First Bank Southeast; and Service Master L.P.

The Advisory Committee determined to recommend a substantial reduction in the proposed improvements for the Burlington Municipal Airport included in the preliminary plan. The Advisory Committee determined to include in the final plan a recommended runway extension from 3,600 to only 4,300 feet, a significant reduction from the 4,800 feet recommended in the preliminary plan. The final proposed runway extension, because it would be significantly shorter than the preliminary recommended extension and because it would not involve the installation of an instrument landing system, could be implemented entirely within existing airport boundaries. In addition, the Advisory Committee recommended that the proposed paving of the existing turf crosswind runway be limited to a length of 2,300 feet, which would be 53 percent of the length of the primary runway. This is consistent with the airport layout plan for Burlington Municipal Airport and would provide an adequate crosswind runway for smaller aircraft, which are in greatest need of a crosswind runway. These changes in the plan recommendations eliminate the need for any land acquisition. Acquisition of over 100 acres of prime agricultural land acquisition were entailed under the initial proposed 4,800-foot primary runway extension.

The recommended reduced length of the primary runway for Burlington Municipal airport would mean that this airport would be upgraded only from a Basic Utility to a General Utility Airport. The proposed runway extension is consistent with an existing runway extension project currently proposed and programmed by the City of Burlington. However, it does not provide for any further extension of that runway to the year 2010. Such limiting of the runway extension in the regional airport system plan is consistent, however, with the support expressed for runway improvements by the Manager of the Burlington Municipal Airport.

FINAL REGIONAL AIRPORT SYSTEM PLAN

The final regional airport system plan envisions a basic system of 11 airports, all of which are currently open for use by the general public, as shown on Map 77. Table 140 summarizes the airports included in the plan and the improvements recommended at each. The major difference between the final plan and the preliminary plan as taken to public hearing is with respect to the Burlington Municipal Airport, where the primary runway extension from an existing 3,600 feet was recommended to be reduced from an ultimate length of 4,800 feet to an ultimate length of 4,300 feet. The revised site plan and land use plan for that airport are shown on Maps 78 and 79 and the revised final improvements for that plan are summarized in Tables 141 and 142. The capital costs of the final airport system plan are shown in Table 143 and are reduced from those presented for the preliminary plan. The final distribution of first- and second-tier reliever airports with the Southeastern Wisconsin Region is shown on Map 80.

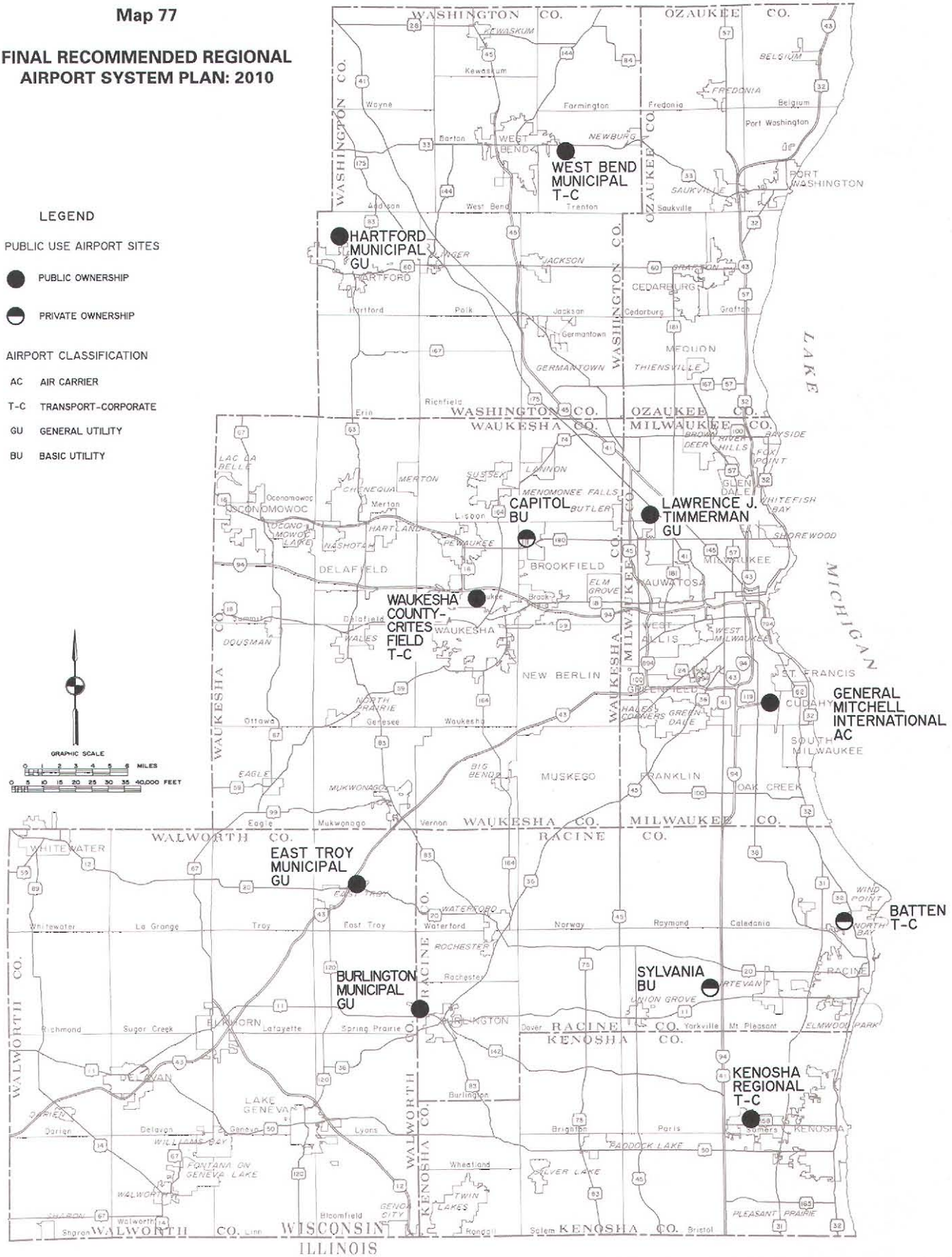
SUMMARY

The recommended, regional airport system plan defines the minimum number and type of airports considered essential to accommodate the existing and probable future aviation demand in Southeastern Wisconsin. It consists of a basic system of 11 airports, all of which are currently open for use by the general public. Eight of these airports are currently publicly owned; three are privately owned. The plan recommends the continued operation of, but not necessarily the public acquisition of, the three privately owned airports. Public acquisition of these three airports is recommended only if private operation were proposed to be discontinued. The plan recognizes that this basic system of 11 airports may be supplemented by the 12 privately owned and operated airports also existing within the Region in 1995. The plan also recognizes that the continued operation of these airports has the potential to permit the deferral of some of the improvements recommended for the airports in the regional system plan.

The preliminary recommended new regional airport system plan was the subject of a series of

Map 77

FINAL RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN: 2010



The new regional airport system plan recommends the minimum number and types of airports essential to accommodate the existing and probable future aviation demand in Southeastern Wisconsin. The system consists of 11 airports, all of which are currently open for use by the general public, eight of which are presently publicly owned, and three of which are privately owned. The plan does not recommend the closing of any privately owned airports not included within the system plan and, in fact, recognizes that the continued operation of such airports may permit the deferral of some of the improvements recommended for the 11 airports in the Regional system plan.

Source: SEWRPC.

Table 140

FINAL RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN: 2010

County	Airport	Major Airport Characteristics		Recommended Major Improvements	Table in Report Describing All Recommended Improvements
		Recommended Classification	Recommended Primary Runway Length (in feet)		
Kenosha	Kenosha Regional	Transport-Corporate	6,400	Extend primary runway from 5,500 to 6,400 feet	119
Milwaukee	General Mitchell International	Air Carrier	9,690 and 9,011	Construct new 7,000-foot parallel air carrier runway and taxiway, construct runway safety area over E. College Avenue for north-south primary runway, realign and extend parallel general aviation runway to 4,800 feet, extend north-south parallel runway and taxiway by 2,850 feet, construct additional connecting taxiways and high speed runway exits, expand air carrier passenger and air cargo terminal facilities, and continue to implement noise compatibility and mitigation measures.	113
	Lawrence J. Timmerman	General Utility	4,107	--	129
Racine	Burlington Municipal	General Utility	4,300	Extend primary runway from 3,600 to 4,300 feet. Pave crosswind runway and parallel taxiway to 2300 feet.	141
	Batten	Transport-Corporate	6,556	Acquire land, relocate N. Green Bay Road, and remove obstructions for runway safety areas and approaches.	115
	Sylvania	Basic Utility	2,800	Relocate and extend primary runway from 2,300 to 2,800 feet. COonstruct crosswind runway and relocate terminal facilities.	133
Walworth	East Troy Municipal	General Utility	4,400	Extend primary runway from 3,900 to 4,400 feet. Pave crosswind runway and parallel taxiway.	125
Washington	Hartford Municipal	General Utility	3,900	Extend primary runway from 3,000 to 3,900 feet. Relocate and pave crosswind runway and parallel taxiway.	127
	West Bend Municipal	Transport-Corporate	5,500	Extend primary runway from 4,500 to 5,500 feet. Complete parallel taxiway for crosswind runway, provide additional terminal facilities, and install full instrument landing system.	123
Waukesha	Capitol	Basic Utility	3,600	Construct replacement primary runway to 3,600 feet. Reconstruct northeast-southwest runway as crosswind runway, construct partial parallel taxiways, and relocate and expand terminal facilities.	131
	Waukesha County-Crites Field	Transport-Corporate	5,850	Relocate parallel taxiway for primary runway, construct parallel taxiway for crosswind runway, relocate and expand terminal apron and facilities, and complete full instrument landing system.	121

Source: SEWRPC.

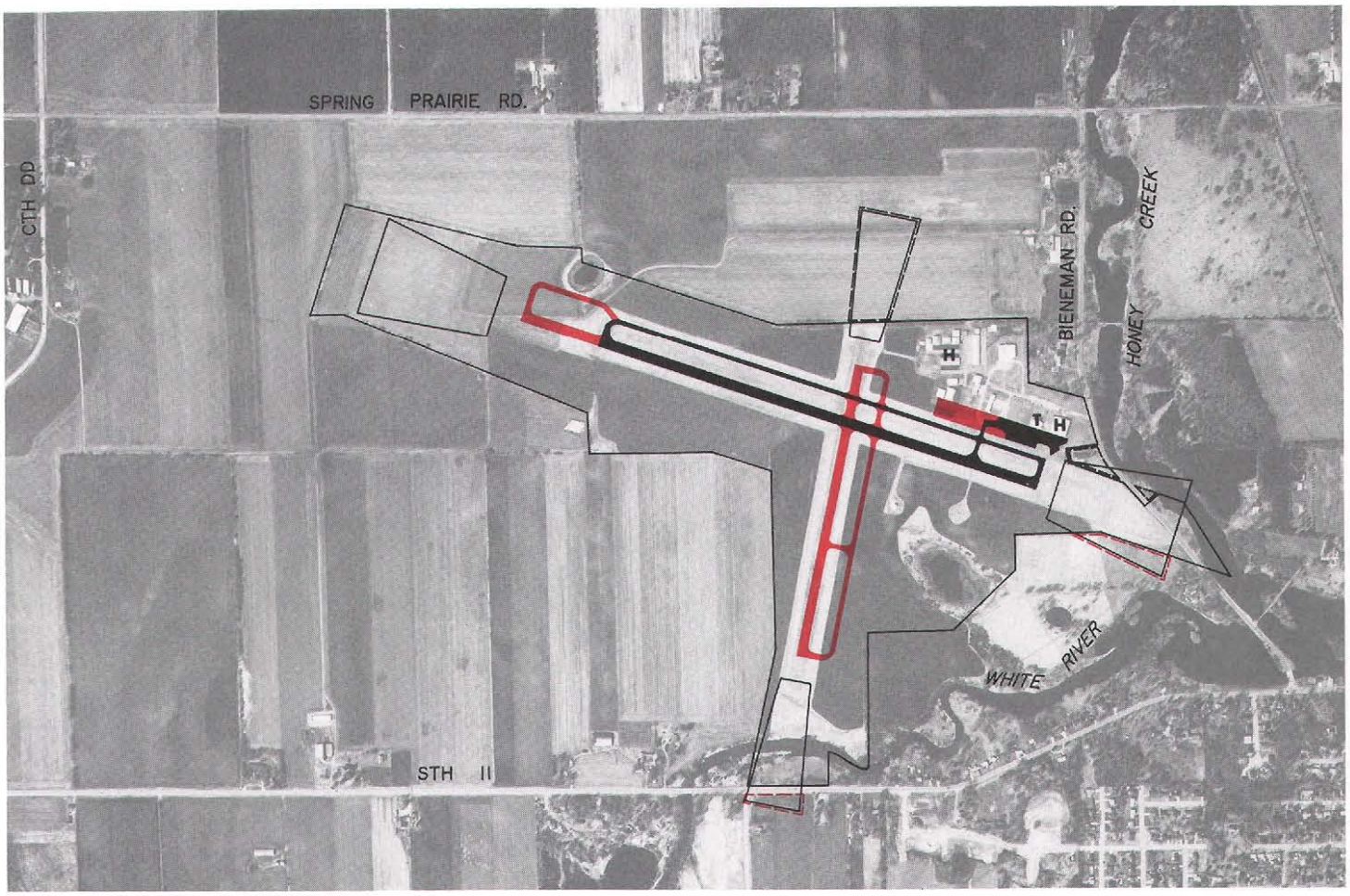
public hearings held by the Technical Coordinating and Advisory Committee on behalf of the Regional Planning Commission during June 1996. Each public hearing was preceded by an informational meeting which afforded interested individuals an opportunity to review the findings and recommendations of the proposed new plan and to ask questions about and discuss the proposed plan directly with Commission staff. The meetings and public hearings were attended by a total of 159 persons; 24 letters were received for the record following the public hearings.

Careful examination of the record of the public hearings indicated general support for the recommended system of 11 public-use airports, including General Mitchell International Airport and the 10 general aviation airports. No comments were made to delete of any of these 11 airports from the regional airport system plan; no comments were made proposing the addition of any airports to this proposed system of 11 essential airports. Moreover, a number of those making comments in opposition to proposed improvements at some of the 11 airports indicated support for the continued operation of the airports at their existing level of development and the inclusion of those airports in the system plan.

The record of the public hearings indicated that only support was expressed for the continued maintenance and proposed improvements at General

Map 78

FINAL RECOMMENDED SITE IMPROVEMENT PLAN FOR BURLINGTON MUNICIPAL AIRPORT: 2010



LEGEND

AIRPORT FEATURES

EXISTING	PROPOSED	
▬	▬	PAVED RUNWAYS, TAXIWAYS, AND APRONS
——	(NONE)	PROPERTY BOUNDARY
– – –	– – –	EASEMENT BOUNDARY
T	(NONE)	TERMINAL-ADMINISTRATION BUILDING
H	(NONE)	AIRCRAFT HANGARS

RUNWAY PROTECTION ZONE

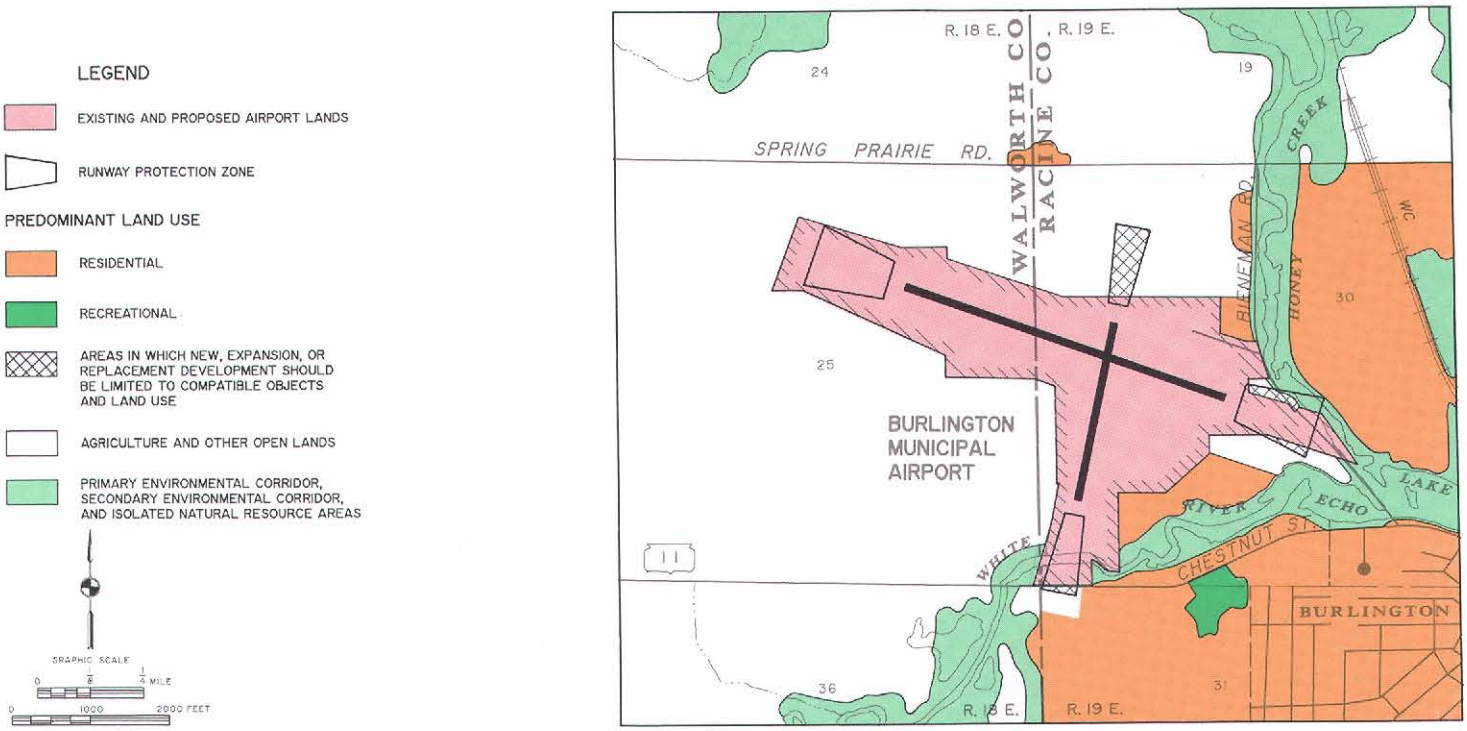
▱ ULTIMATE RUNWAY PROTECTION ZONE AREA

GRAPHIC SCALE
0 400 800 1200 FEET
DATE OF PHOTOGRAPHY: APRIL 1995

Source: SEWRPC.

Map 79

FINAL RECOMMENDED AREA LAND USE PLAN FOR BURLINGTON MUNICIPAL AIRPORT: 2010



Source: SEWRPC.

Mitchell International Airport and Lawrence J. Timmerman Airport in Milwaukee County, Waukesha County-Crites Field in Waukesha County, Sylvania Airport in Racine County, and Hartford Municipal Airport in Washington County. The record of public hearings further indicated that no comments were made concerning the continued maintenance and proposed improvements at Capitol Airport in Waukesha County and Batten Airport in Racine County.

The record indicated that much of the attention at the hearings was directed at the recommendations concerning the proposed improvements to the Burlington Municipal Airport in Racine County, Kenosha Regional Airport in Kenosha County, and West Bend Municipal Airport in Washington County. Statements of both opposition and support were expressed for the improvements at each of these three airports. The record of the public hearings further indicated that only one comment was made in opposition to the proposed improvements at the East Troy Municipal Airport.

In response to the public comments received at the public hearings and to written comments received following the hearings, the Advisory Committee determined that the recommended new plan should continue to consist of the system of 11 essential airports identified in the preliminary plan. Moreover, because only statements of support were received with respect to proposed improvements at seven of those 11 airports, the Advisory Committee also determined that recommendations concerning those improvements in the new system plan should remain unchanged from those contained in the preliminary plan. The seven airports include General Mitchell International Airport, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, Capitol Airport, Batten Airport, Sylvania Airport, and Hartford Municipal Airport. With respect to the remaining four airports comprising the recommended regional system, East Troy Municipal Airport, West Bend Municipal Airport, Kenosha Regional Airport, and Burlington Municipal Airport, the Advisory Committee carefully considered the public comments received at the public hearings in support of, and opposition to, the proposed improvements.

Upon that consideration, the Advisory Committee determined that the recommendations contained in the preliminary system plan for the improvements at three of these airports, East Troy

Table 141

FINAL RECOMMENDED AIRPORT IMPROVEMENT RECOMMENDATIONS FOR BURLINGTON MUNICIPAL AIRPORT

Characteristic	Existing	Forecast or Recommended in Year 2010
General Information		
Airport Classification	Basic Utility	General Utility
Based Aircraft (number)	71	88
Airport Reference Code	A-I	B-II
Annual Operations (number)	46,300	55,000
Airfield Capacity		
Annual Service Volume	207,000	207,000
VFR (Hourly Capacity)	98	98
IFR (Hourly Capacity)	53	53
IFR Capability	Nonprecison approach	Nonprecision approach
Land Requirements		
Airport Site (acres)	240	240
Easements (acres)	9	13
Airfield Facilities		
Runways		
Primary (length x width, in feet)	3,601 x 75	4,300 x 75
Crosswind (length x width, in feet)	2,600 x 165 (turf)	2,300 x 75
Taxiways	Full parallel taxiway for RWY 11/29	Full parallel taxiway system
Apron (square feet)	45,000	123,000
Runway Lighting	MIRL on RWY 11/29	MIRL on all paved RWY's
Visual Approach Aids	VASI on RWY 29	REIL on all paved RWY's, VASI on RWY 29 and PAPI on RWY's 1/19 and 11
Instrument Landing Aids	VOR on approach to airport	VOR on approach to airport
Terminal Area Facilities		
Administration/Terminal Building (square feet)	4,500	4,100
Automobile Parking (spaces)	40	110
Service Roads (miles)	0.2	0.5
Large Hangars (square feet)	59,100	36,000
T-Hangars (spaces)	25	75

Abbreviations used in this table
IFR - Instrument Flight Rules
MIRL - Medium Intensity Runway Lights
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway
VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules
VOR - Very High Frequency Omnidirectional Range Station

Source: Wisconsin Department of Transportation, City of Burlington, and SEWRPC.

Municipal Airport, West Bend Municipal Airport, and Kenosha Regional Airport, should remain unchanged in the recommended plan but should include careful consideration of environmental assessment, stormwater drainage, runway-protection zones, noise levels, and surrounding community coordination and involvement issues, as appropriate for each airport.

With respect to Burlington Municipal Airport, the Advisory Committee determined that a substantial reduction in the proposed improvements for the Burlington Municipal Airport included in the preliminary plan was warranted in response to the public comment. In the final plan, a recommended runway extension from 3,600 feet to only 4,300 feet was included, a significant reduction from the 4,800 feet recommended in the preliminary plan. Also, the installation of an instrument landing system was no longer included in the plan and the proposed paving of the existing turf crosswind runway was limited to a length of 2,300 feet instead of the 3,900 feet, as proposed in the preliminary plan. These improvements could be implemented entirely within existing airport boundaries and would eliminate the need for significant acquisition of prime agricul-

Table 142

ESTIMATED CAPITAL COSTS OF FINAL RECOMMENDED IMPROVEMENTS FOR BURLINGTON MUNICIPAL AIRPORT

Recommended Improvement	Size of Improvement	1995 dollars
Land		
Acquire Easements	4 acres	$ 4,000
Airfield		
Construct RWY 01/19	2,300 x 75 feet	575,000
Lengthen RWY 11/29	699 X 75 feet	420,000
Extend Parallel Taxiway for 11/29	900 x 40 feet	90,000
Construct Full Parallel Taxiway for 01/19	2,700 x 40 feet	270,000
Expand Apron	78,000 square feet	345,000
Repair and Reconstruct Pavement Surfaces	Item	180,000
Install REIL on All Paved Runways	2 sets	30,000
Install PAPI on the Primary Runway	3 sets	60,000
Terminal Area Facilities		
Expand Parking Area	70 spaces	134,000
Hangars/Aircraft Storage		
Construct T-Hangars	50 spaces	825,000
Other		
None	--	--
Total	--	$2,933,000

Abbreviations used in this table
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Lights
RWY - Runway

Source: Wisconsin Department of Transportation, City of Burlington, and SEWRPC.

tural lands surrounding the airport. The recommended reduced length of the primary runway would mean that Burlington Municipal Airport would be upgraded only from a Basic Utility to a General Utility airport.

The new regional airport system plan recommends that six of the 11 airports undergo major airfield improvements during the plan design period. These improvements would enable these airports to accommodate safely larger and higher performance aircraft and significant increases in aviation demand or the same types of aircraft currently accommodated, but under a wider range of aircraft loading and weather conditions. These improvements would result in a change of the FAA classification for three of the six airports concerned. The recommended regional airport system includes one Air Carrier (AC) airport, four airports classified as Transport-Corporate (T-C), four airports classified as General Utility (GU), and two airports classified as Basic Utility (BU). The single air carrier airport is Milwaukee County's General Mitchell International Airport. The four Transport-Corporate airports are Batten Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The four General Utility airports are Burlington Municipal Airport, East Troy Municipal Airport, Hartford Municipal Airport, and Lawrence J. Timmerman Airport. The two Basic Utility airports are Capitol Airport and Sylvania Airport.

The plan envisions that General Mitchell International Airport will remain the only airport within the Region serving scheduled air carriers throughout the planning period. The other 10 airports are intended to perform a critical function in relieving general aviation demand at General Mitchell International, decreasing congestion, delays, and potential safety hazards at that airport. Based upon their ability to accommodate a wide range of general aviation aircraft types and upon proximity to Mitchell International, the most important, or first-tier, reliever general aviation airports are envisioned to be Batten Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The second tier of reliever

Table 143

SUMMARY OF ESTIMATED CAPITAL COSTS BY IMPROVEMENT TYPE FOR THE FINAL REGIONAL AIRPORT SYSTEM PLAN

County	Airport	Essential Improvements			Other Improvements			Total
		Land Acquisition	Airfield Improvements	Offsite Highway Facilities	Terminal Area Facilities	Hangars/ Aircraft Storage	Onsite Service Roads	
Kenosha	Kenosha Regional	$ 200,000	$ 2,780,000	--	$ 1,291,000	$ 5,281,000	--	$ 9,552,000
Milwaukee	General Mitchell International	141,120,000	187,380,000	$1,060,000	181,340,000	--	--	510,900,000
	Lawrence J. Timmerman	121,000	623,000	--	416,000	1,334,000	--	2,494,000
Racine	Burlington Municipal	4,000	1,970,000	--	134,000	825,000	--	2,933,000
	Batten	4,228,000	3,615,000	3,400,000	202,000	545,000	--	11,990,000
	Sylvania	302,000	1,576,000	--	419,000	328,000	--	2,625,000
Walworth	East Troy Municipal	--	1,531,000	--	614,000	734,000	--	2,879,000
Washington	Hartford Municipal	220,000	2,412,000	--	87,000	512,000	--	3,231,000
	West Bend Municipal	1,357,000	11,156,000	1,235,000	352,000	1,094,000	--	15,194,000
Waukesha	Capitol	1,000,000	2,765,000	--	677,000	1,369,000	$147,000	5,958,000
	Waukesha County-Crites Field	--	10,255,000	--	1,862,000	1,900,000	--	14,017,000
Total		$148,552,000	$226,063,000	$5,695,000	$187,394,000	$13,922,000	$147,000	$581,773,000

Source: SEWRPC.

airports includes Burlington Municipal Airport, East Troy Municipal Airport, Capitol Airport, Hartford Municipal Airport, Lawrence J. Timmerman Airport, and Sylvania Airport, which are intended to relieve not only General Mitchell International Airport, but also the first tier of reliever airports.

The plan provides recommendations for each of the 11 airports comprising the recommended regional system with respect to necessary major improvements, including land acquisition and runway, apron, navigational aid, and terminal facility improvements, as well as recommendations for the control of surrounding land uses at each airport to provide for safe and efficient operation. A description of the type and extent of airport site and facility development required at each of the 11 airports in the regional airport system plan is presented. The precise dimensioning of these facilities is left to airport master planning efforts, required to further refine, detail, and carry out the recommended regional airport system plan.

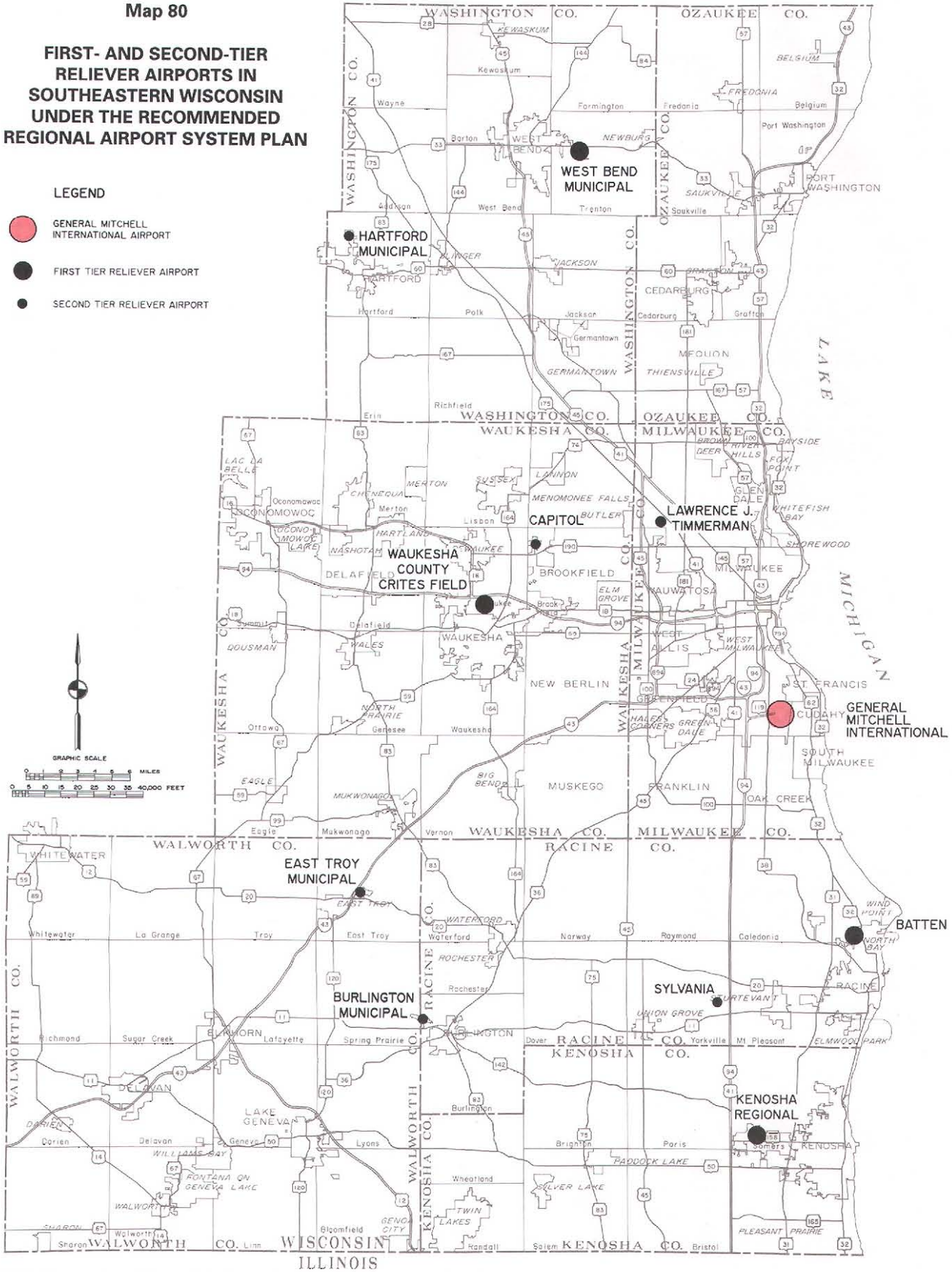
General Mitchell International Airport

It is recommended that Mitchell International remain the sole Air Carrier airport within the Region, providing adequate facilities to accommodate all types of aircraft up to, and including, large commercial air carrier aircraft, large military aircraft, and high-performance corporate aircraft. It is recommended that the improvements recommended in the recently completed airport master plan, and reaffirmed in the deficiency analysis conducted under his regional airport system planning effort be implemented over the plan design period to more safely and efficiently accommodate the forecast levels of air carrier, military, and general aviation operations. These improvements include the realignment and extension to 4,800 feet of the existing parallel east-west runway, 7L/25R; the construction of a new 7,000-foot-long primary runway and parallel taxiway sited about 3,500 feet south of, and parallel to, the existing primary east-west runway, 7R/25L; the extension of the primary east-west runway, 7R/25L, by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of the parallel north-south runway, 1R/19L, by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway-safety overrun for the south end of the north-south primary runway, 1L/19R; and the eventual decommissioning of the general aviation runway, 13/31.

The implementation of these needed improvements will require the acquisition of land and easements beyond the present airport boundaries, relocation of some military facilities now located on the airport site, and relocation of some existing residences near the existing southwest boundary of the airport. Improvements to the terminal area facilities include construction of additional gates and expan-

Map 80

FIRST- AND SECOND-TIER RELIEVER AIRPORTS IN SOUTHEASTERN WISCONSIN UNDER THE RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN



Within the southeastern Wisconsin Region, reliever airports are intended to divert general aviation aircraft operations away from General Mitchell International Airport, promoting the continued efficient and safe operation of Mitchell International and effecting a better allocation of general aviation demand among all the airports of the Region. All 10 general aviation airports considered for inclusion in the Regional system plan should be designated as reliever airports. The 10 reliever airports were divided into two categories: a first tier and a second tier of reliever airports. The first tier was intended to accommodate corporate jet aircraft and other general aviation aircraft. The second tier was intended to accommodate general aviation aircraft except corporate jet aircraft.

Source: SEWRPC.

sion of automobile parking facilities for the air carrier passenger terminal, construction of additional apron and terminal facilities for the air cargo terminal, and relocation of existing general aviation hangars now located immediately south of the air carrier passenger terminal. Implementation of the needed airfield improvements will also require the relocation of a one-mile-long segment of E. College Avenue and placing S. Howell Avenue in a tunnel beneath the proposed new east-west primary runway and taxiway, the construction of a bridge to carry the runway-safety overrun for runway 1L/19R over E. College Avenue, and closing a 0.8-mile-long segment of S. 6th Street.

Batten Airport

It is recommended that Batten Airport remain classified as a Transport-Corporate airport and continue to be maintained over the plan design period to meet these standards. The analyses conducted under the system planning effort did not reveal any deficiencies with respect to capacity or primary runway length at this airport. However, some improvements were found to be warranted, including land and easement acquisition to provide necessary runway-safety and object-free areas, the construction of connecting taxiways, and the expansion of hangar facilities.

With the recommended improvements, the airport would be able to serve virtually all single-engine piston, twin-engine piston, and turboprop aircraft and most business and corporate jets effectively and safely. These improvements would allow the airport to continue to function as an important reliever airport for General Mitchell International Airport and as the primary general aviation airport for the greater Racine area.

Burlington Municipal Airport

It is recommended that Burlington Municipal Airport, which is currently classified as a Basic Utility airport, be developed over the plan design period to General Utility standards. The major improvements necessary to accomplish this include extending of the primary runway by 700 feet, to a total length of 4,300 feet, paving the crosswinds runway and taxiway to a length of 2,300 feet, and expanding terminal and hangar facilities.

With these improvements, the airport would be able effectively and safely to serve all single-engine and most twin-engine piston aircraft and many turboprop aircraft. These improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other larger General Aviation airports in the regional airport system and a primary General Aviation airport for much of western Racine and Kenosha Counties and portions of Walworth County.

Kenosha Regional Airport

It is recommended that Kenosha Regional Airport remain classified as a Transport-Corporate airport and continue to be developed over the plan design period to meet the associated standards. The major improvements necessary to accomplish this include eventual extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 6,400 feet, and the expansion of terminal and hangar facilities. If the City of Kenosha elects to proceed with the improvements, it is recommended that, prior to such action, the airport master plan be updated and include a benefit-cost analysis and appropriate environmental assessment work, a stormwater drainage study be conducted to address existing drainage problems in the vicinity of the airport, a study of existing runway-protection-zone conflicts be conducted to address long-term solutions to runway-protection-zone issues, and a FAR Part 150 noise study be conducted. It was recommended that consideration of these issues in the airport area be conducted by the City of Kenosha in close cooperation with Kenosha County, the Towns of Bristol, Paris, and Somers, and the Village of Pleasant Prairie.

With these improvements, the airport would be able effectively and safely to serve all small single-engine piston, twin-engine piston, and turboprop aircraft, as well as virtually all small, medium, and large business and corporate jets. These improvements will also allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and for airports in northeastern Illinois and as the primary general aviation airport for the greater Kenosha area.

Waukesha County-Crites Field

It is recommended that Waukesha County-Crites Field remain classified as a Transport-Corporate airport and continue to be developed over the plan design period to meet the related standards. The analyses conducted under the system planning effort did not reveal any deficiencies with respect to capacity or primary runway length at this airport. Application of the basic airfield design standards, however, indicated that some improvements were warranted. These include relocation of the parallel taxiway for both the primary and crosswind runways; relocation and expansion of

the apron and attendant connecting taxiways; and relocation and expansion of the airport terminal, fixed-base operator hangars, and aircraft storage hangars now located in the northeast corner of the airport. The parallel taxiway for the primary runway would need to be relocated so that the centerline of the taxiway is at least 400 feet from the centerline of the runway, an increase of 200 feet, to meet FAA requirements for taxiway separation.

With these improvements the airport would be able effectively and safely to serve all single-engine piston, twin-engine piston, and turboprop aircraft and also most business and corporate jets. These improvements would also allow the airport to continue functioning as an important reliever airport for General Mitchell International Airport and the primary general aviation airport for much of Waukesha County.

West Bend Municipal Airport

It is recommended that West Bend Municipal Airport, which is currently classified as a General Utility airport, be developed over the plan design period to Transport-Corporate standards. The major improvements necessary to accomplish this include construction of a new 5,500-foot-long primary runway and parallel taxiway on a new northeast-southwest alignment; conversion of the exiting 4,500-foot-long primary runway to the new crosswind runway by shortening it to 4,400 feet, that is, by 100 feet, to provide sufficient space for runway-safety areas; land and easement acquisition to enable the recommended airfield expansion; installation of an instrument landing system; and expansion of terminal and hangar facilities. About a one-mile segment of STH 33 would require relocation to accommodate the new primary runway alignment and additional terminal area.

With these improvements, the airport would be able effectively and safely to serve virtually all single-engine piston, twin-engine piston, and turboprop aircraft and most business and corporate jets. These improvements would allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and as the primary general aviation airport for much of Washington and Ozaukee Counties.

East Troy Municipal Airport

It is recommended that East Troy Municipal Airport remain classified as a General Utility airport and continue to be developed over the plan design period to meet the associated standards. The major improvements necessary to accomplish this include extension of the primary runway and parallel taxiway by 500 feet, to an ultimate length of 4,400 feet, paving of the crosswind runway and taxiway to a length of 2,380 feet, and expansion of terminal and hangar facilities.

With these improvements, virtually all small single-engine, most twin-engine, and many turboprop aircraft could be accommodated. These improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system, as well as serving as the primary general aviation airport for much of Walworth County and southern Waukesha County.

Hartford Municipal Airport

It is recommended that Hartford Municipal Airport, which is currently classified as a Basic Utility airport, be maintained in service and developed over the plan design period to General Utility standards. Such development is recommended to be undertaken in such a manner as to preserve the option to develop the airport to Transport-Corporate standards at a later date. The major improvements necessary to accomplish this include extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 3,900 feet; paving of the crosswind runway and parallel taxiway to a length of 3,200 feet; land and easement acquisition to enable the recommended airfield expansion; and the expansion of terminal and hangar facilities. If it is found that expansion of the airport to Transport-Corporate standards is warranted in the future, the primary runway and parallel taxiway would be extended under a later phase of development to a length of 4,900 feet, the crosswind runway and parallel taxiway would be extended to a length of 3,900 feet, and an instrument landing system would be installed. Additional land and easement acquisition would be necessary to enable this later expansion.

With the recommended improvements, the airport would be able effectively and safely to serve all small single-engine piston and twin-engine piston aircraft and many turboprop aircraft. These improvements would also allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and for other large general aviation airports in the regional airport system and serve as a primary general aviation airport for western Washington County and northern Waukesha County.

Lawrence J. Timmerman Airport

It is recommended that Lawrence J. Timmerman Airport remain classified as a General Utility airport and continue to be maintained over the plan design period to the meet the related standards. The analyses conducted under the system planning effort did not reveal any deficiencies with respect to capacity or primary runway length at this airport. Some improvements are recommended, however, including the acquisition of additional easements to protect the runway approaches and improvements to the terminal and hangar facilities.

Maintaining the airport to General Utility standards will enable this airport to continue to accommodate all single-engine piston, most twin-engine piston, and many turboprop aircraft. It is intended that Lawrence J. Timmerman Airport continue functioning as an important reliever airport for General Mitchell International Airport and serve as the primary general aviation airport for northern Milwaukee County and southern Ozaukee County.

Capitol Airport

It is recommended that Capitol Airport remain classified as a Basic Utility airport and continue to be developed over the plan design period to meet the associated standards. The analyses conducted under the system planning effort did not reveal any deficiencies with respect to capacity or primary runway length for Capitol Airport. Nevertheless, some improvements related to airfield design were found to be desirable. These include reconstruction and widening of the primary runway to 3,600 feet, paving and extension of a crosswind runway to 2,600 feet, construction of partial parallel taxiways for the primary and crosswind runways, land and easement acquisition to enable the recommended airfield expansion, construction of an apron; and expansion of terminal and hangar facilities.

With these improvements, the airport would be able effectively and safely to accommodate most single-engine piston and twin-engine piston aircraft. These improvements would also allow the airport to continue functioning as a reliever airport for General Mitchell International Airport and for other large general aviation airports in the regional airport system and as an important general aviation airport for much of Waukesha County.

Sylvania Airport

It is recommended that Sylvania Airport, which is currently below Basic Utility standards, be developed over the plan design period to Basic Utility standards. The major improvements necessary to accomplish this include construction of a new primary runway and parallel taxiway 2,800 feet, construction of a new crosswind runway to 2,200 feet, land and easement acquisition to allow the needed airfield expansion, and relocation and expansion of the terminal and hangar facilities.

With these improvements, the airport would be able effectively and safely to serve most small single-engine piston aircraft and many twin-engine piston aircraft. These improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system, as well as serving as an important general aviation airport for personal, sport, recreational, and training activities for much of Racine and Kenosha Counties and southern Milwaukee County.

Airfield Layout and Federal Aviation Administration Standards

Some of the airports in the recommended system have airfield features which currently do not meet FAA design standards. Most of these existing deficiencies would be resolved by the improvements recommended at each airport in the system plan. However, some deficiencies would not be resolved. These include, in some cases, crosswind runway length, runway-safety and object-free areas, and runway-protection zones.

With respect to crosswind runway lengths, the FAA recommends that the length of such runways be at least 80 percent of the primary runway length. Considering the primary runway lengths recommended for the 11 airports comprising the regional system, six airports will have a crosswind runway of less than 80 percent of the primary runway length. Two of these airports, Waukesha County-Crites Field and Batten Airport, currently have crosswind runways which are less than 80 percent of the primary runway length, while another three, Burlington Municipal Airport, East Troy Municipal Airport, and Capitol Airport, do not currently have paved crosswind runways. The existing crosswind runway at Kenosha Regional Airport currently is 80 percent of the primary runway length, but will be only about 69 percent of the length of the recommended new primary runway.

Extending the crosswind runways beyond the existing lengths would, depending upon the individual airport, require the acquisition of land in existing

residential, commercial, and industrial uses or in primary environmental corridor; and the relocation of segments of arterial highway facilities. Extension of these crosswind runways may therefore be expected to cause significant disruption to existing land uses and have high associated capital costs. Therefore, extension of the crosswind runways at the six airports concerned beyond the existing lengths is not recommended.

The Federal Aviation Administration also recommends that runway-safety and object-free areas and runway-protection zones be provided for each runway at an airport. The size of each of these areas varies with the classification of the particular runway and the type of aircraft it is intended to accommodate; it is prescribed by Federal standards. In general, runway-safety and object-free areas should be kept clear of all objects and buildings except those that are essential for air navigation purposes. Similarly, runway-protection zones should be kept clear of incompatible structures and land uses, particularly those that may create a place of public assembly. Therefore, these areas should be owned by the airport. In 1995 some of the runway-protection zones at eight of the 11 airports comprising the recommended system did include incompatible land uses.

This chapter identified the areas concerned and the types and extent of the incompatible land uses. The runway-protection zones concerned contained single- and multi-family residences, restaurants, stores, and offices, many of which had been long established. While it was recommended that such incompatible land uses be cleared from the runway-protection zones, it was recognized that such clearance would be difficult and costly and require a long time, extending beyond the design year 2010 of the system plan. Accordingly, it was recommended that each of the airports in the recommended system work, over time, toward the provision of runway-protection zones that meet Federal standards fully, addressing the issues and costs concerned in each airport master plan. It is further recommended that each airport work with the county and local units of government concerned to place runway-protection zones in a land use zoning district which would prohibit the construction and use of objects and buildings conflicting with FAA standards, in order eventually to eliminate nonconforming buildings and structures, and acquire all lands within the runway-protection zones. In any case, it is recommended that further development of incompatible objects or land uses in the runway-protection zones be precluded.

Recommended Institutional Structure

The recommended institutional arrangement for regional airport system development simply entails a continuation of the institutional arrangement in place at the 11 key airports included in the recommended regional airport system, three of which are county owned, five of which are municipally owned, and three of which are privately owned. It is recommended that any changes in the ownership pattern be initiated only as necessary to retain in operation the 11 key airports comprising the system. When such change is necessary, consideration should be given to county sponsorship, since such sponsorship would provide a more equitable balance between the benefits of the airport services provided and the distribution of the cost of airport ownership and operation.

Capital Costs of Recommended Improvements

The total cost of all recommended improvements at the 11 airports comprising the recommended regional airport system was estimated to be approximately $581.8 million, or an average annual capital investment of about $38.8 million to the year 2010. The total cost of all essential improvements, such as land acquisition; runway, taxiway, and apron improvements; and airfield lighting and navigation improvements, at the 11 airports was estimated to be approximately $380.3 million, or an average annual capital investment of about $25.4 million. The total cost of all other improvements, such as terminal buildings, automobile parking, and aircraft hangars, at the 11 airports was estimated to be approximately $201.5 million, or an average annual capital investment of about $13.4 million.

At General Mitchell International Airport, the total cost of all recommended improvements was estimated to be approximately $510.9 million, or an average annual capital investment of about $34.1 million to the year 2010. The total cost of all essential improvements, such as land acquisition; runway, taxiway, and apron improvements; and airfield lighting and navigation improvements, at Mitchell International was estimated to be approximately $329.6 million, or an average annual capital investment of about $22.0 million. The total cost of all other improvements, such as terminal buildings and automobile parking, at Mitchell International was estimated to be approximately $181.3 million, or an average annual capital investment of about $12.1 million.

At the 10 general aviation airports in the plan, the total cost of all recommended improvements was estimated to be approximately $70.9 million, or an

average annual capital investment of about $4.7 million to the year 2010. The total cost of all essential improvements, such as land acquisition; runway, taxiway, and apron improvements; and airfield lighting and navigation improvements, at the 10 general aviation airports was estimated to be approximately $50.8 million, or an average annual capital investment of about $3.4 million. The total cost of all other improvements, such as terminal buildings, automobile parking, and aircraft hangars, at the 10 general aviation airports was estimated to be approximately $20.1 million, or an average annual capital investment of about $1.3 million.

The feasibility of implementing the recommended improvements in the regional airport system plan was assessed by comparing the estimated capital costs required to implement the plan with the capital expenditures made for the 11 airports during the past 10 years. During the period from 1986 through 1995, improvements totaling approximately $117.1 million were made at the 11 airports, or an average annual capital investment of about $11.7 million.

At General Mitchell International Airport, improvements totaling approximately $64.2 million were made during the 10-year period, or an average annual capital investment of about $6.4 million. As noted above, the annual cost over the 15-year plan design period of the Mitchell International improvements is an estimated $34.1 million, which significantly exceeds the estimated $6.4 million expended annually at Mitchell International over the last 10 years. The significantly greater cost of Mitchell International is a result of its unique size and function, and of the substantial capacity expansion proposed in this plan, much of which has a design life which extends beyond the year 2010 plan design period. The funding of facility capital and operating costs at Mitchell International is also unique, in that it includes Federal and State aids, user charges, and funding by the commercial air carriers serving the airport. These commercial air carriers have indicated in the preparation of the new master plan for Mitchell International that they will provide the local funding of the planned improvements as they are programmed to meet improvement needs.

At the 10 general aviation airports, improvements totaling approximately $52.9 million were made during the 10-year period, or an average annual capital investment of about $5.3 million for what may be considered only essential improvements. The estimated average annual investment required to implement the improvements recommended for the 10 airports in the plan that serve only general aviation traffic, that is, all of the airports except Mitchell International, is about $4.7 million. The estimated average annual investment required to implement only the essential airfield improvements recommended for the 10 airports in the plan that serve only general aviation traffic is about $3.4 million. Both of these amounts are less than the average annual investment of about $5.3 million that has been made for essential improvements at the 10 general aviation airports during the past 10 years.

Aircraft Operation Restrictions

In the first and second-generation regional airport system plans, a number of aircraft operational considerations were evaluated and recommended. These included noise-abatement measures at General Mitchell International Airport, directed traffic patterns at certain general aviation airports, installation of air traffic control towers at certain general aviation airports, and restricted flight training activities at certain general aviation airports. These considerations were reevaluated in the regional system planning effort.

With respect to noise-abatement, the continued implementation of the recommendations set forth in the noise and land use compatibility study prepared for General Mitchell International Airport under the Federal Aviation Regulation Part 150 program was found to provide the best means of minimizing the undesirable impacts of airport noise and conflicts between airport operations and adjacent land uses. The FAR Part 150 study for Mitchell International was first prepared in 1983 and revised and updated in 1988 and in 1993. The study makes General Mitchell International Airport eligible for Federal funding in partial support of recommended noise-abatement and land use management measures. It is recommended that this study continue to be revised and updated as necessary, especially with respect to any major airfield improvements that may be implemented at General Mitchell International Airport.

Work was begun in 1992 on an FAR Part 150 Study for Kenosha Regional Airport; however, the work was halted in January 1996 by the City of Kenosha, pending further consideration of airport improvement alternatives. As of 1995, FAR Part 150 noise and land use compatibility studies have not been

completed for any other airport included in the recommended regional airport system. It was noted that most airport-noise-related concerns in Southeastern Wisconsin may be expected to occur at airports that are either currently classified, or are recommended to be classified, as Air Carrier or Transport-Corporate facilities because these types of facilities accommodate large commercial, air carrier, or business and corporate jet aircraft. Accordingly, it was recommended that owners of airports that already perform the role of a Transport-Corporate airport, or that are recommended to perform the role of a Transport-Corporate airport, undertake the preparation and maintenance of an airport noise control program as outlined by FAR Part 150. In addition to Kenosha Regional Airport, these airports include Batten Airport and Waukesha County-Crites Field, which is already classified as Transport-Corporate facilities, and West Bend Municipal Airport, which is recommended to be developed to Transport-Corporate standards.

With respect to nonstandard traffic patterns, the second-generation regional airport system plan recommended that right-hand traffic patterns be maintained or established at Batten Airport, Burlington Municipal Airport, Waukesha County-Crites Field, and West Bend Municipal Airport to direct aircraft away from overflights of residential areas in order to avoid public opposition to aircraft operations at these airports. Therefore, the maintenance or establishment of right-hand traffic patterns continues to be recommended for these airports.

With respect to air traffic control towers, the need for such facilities is normally determined by either traffic volume or by special safety considerations. Federal Aviation Administration criteria suggest that between 200,000 and 250,000 annual aircraft operations would be necessary for a general aviation airport to be considered for a control tower. Of the airports within the Region that do not already have air traffic control towers, none have either existing or forecast levels of activity approaching the necessary levels. The public-use airports within the Region have generally operated in a safe manner and have been free of undue accidents resulting from traffic control conflicts. This situation may be expected to continue, given the relatively small increase in aviation activity forecast over the plan design period. Accordingly, no new air traffic control towers are recommended to be installed at any of the airports comprising the recommended system.

With respect to restrictions on flight training activities, the second-generation plan recommended that repetitive touch-and-go operations be discouraged at Batten Airport, Lawrence J. Timmerman Airport, and Waukesha County-Crites Field as a means of reducing the nuisance effects of aviation activities over the most intensely developed urban areas of the Region. It would be desirable if such activity were not encouraged at these airports, but rather directed to other airports more removed from the most intensively developed urban areas of the Region.

Comparison of the New Regional Airport System Plan with the Second-Generation Regional Airport System Plan

The regional airport system plan for Southeastern Wisconsin, as described herein, consists of a system of 11 public-use airports intended to serve the aviation needs of the Region to the year 2010. This section presents a comparison, by county, of the major recommendations contained in the new, third-generation system plan with those contained in the second-generation plan. The two plans were found to differ with respect to the recommendations made for airports in Kenosha, Milwaukee, Racine, Washington, and Waukesha Counties. The two system plans were found to be essentially the same with respect to the recommendations made for Ozaukee County and for Walworth County.

With regard to Kenosha County, both system plans include one airport, Kenosha Regional Airport, and recommend that it be maintained as a Transport-Corporate facility. The new system plan recommends the eventual extension of its primary runway by 900 feet, to 6,400 feet to enable aircraft that already use the airport to take off safely with full payloads. The second-generation plan recommended a primary runway length of only 5,500 feet.

In the case of Milwaukee County, the recommendations in the new system plan for General Mitchell International Airport include a number of improvements related to airfield capacity not included in the second-generation plan. The most significant of these is the eventual construction of a new 7,000-foot-long air carrier runway and taxiway to the south of, and parallel to, the existing east-west primary runway. The new plan reconfirms the continued need for Lawrence J. Timmerman Airport but does not recommend any airfield changes there. Timmerman Airport is expected to remain an important reliever for General Mitchell International Airport.

With regard to Racine County, both system plans include three public-use airports. The new regional airport system plan foresees Batten Airport and Sylvania Airport continuing to serve the same functions envisioned under the second-generation plan. The recommended improvements in the new system plan for Burlington Municipal Airport, however, reflect a change from those recommended in the second-generation plan. The new plan recommends that Burlington Municipal Airport ultimately be improved to a General Utility standards, a higher classification than Basic Utility, which was the recommended classification of this airport under the second-generation plan. Thus, its primary runway is recommended ultimately to be extended from its 1995 length of 3,600 feet to 4,300 feet.

As to Washington County, both plans continue to include two public-use airports, West Bend Municipal Airport and Hartford Municipal Airport. Both airports are envisioned to serve the same functions they did under the second-generation plan, although the new recommended airfield configurations differ from those proposed under the second-generation plan. At West Bend Municipal Airport, which continues to be recommended to be improved to a Transport-Corporate facility with a 5,500-foot-long primary runway, the airfield layout in the new plan has been refined the better to address concerns in the area for environmental corridor and highway relocation and the need for additional area for terminal development. At Hartford Municipal Airport, which continues to be recommended to be improved to a General Utility facility with a 3,900-foot primary runway, the airfield layout was revised the better to utilize the existing runways and to provide for the possible future extension of the primary runway to handle some business jets.

With regard to Waukesha County, both system plans continue to include two public-use airports, Waukesha County-Crites Field and Capitol Airport. Both airports are envisioned to serve the same functions as under the second-generation plan, although some recommended improvements differ. At Crites Field, which continues to be recommended to be maintained as a Transport-Corporate facility with a 5,850-foot primary runway, the eventual relocation of existing taxiways and terminal and hangar facilities is recommended to conform better to FAA standards for runway-safety areas, object-free areas, and obstructions, as well as to provide additional area for terminal facility improvement and expansion. At Capitol Airport, which continues to be recommended to be maintained as a Basic Utility facility with a 3,600-foot primary runway, the recommended improvements have been modified to provide for partial parallel taxiways in selected areas. This will reduce the need to utilize surrounding wetland areas.

Both the new and second-generation regional airport system plans recommend systems of public-use airports which include the minimum number of airports and improvements necessary to serve the existing and probable future aviation needs of the Region adequately and safely. Although specific recommendations for improvements are included in the plan for only the minimal system of 11 public-use airports, the new plan, like the second-generation plan and the original plan, recognizes the effect and importance of the existing privately owned, public-use and private-use airports within the Region. In fact, the privately owned airports support the regional airport system by reducing or deferring the demand for facilities and services at those public-use airports included in the plan.

Chapter XI

PLAN IMPLEMENTATION

INTRODUCTION

The recommended third-generation airport system plan for the seven-county Southeastern Wisconsin Region, as described in Chapter X of this report, consists of three main elements: 1) an airport facility improvement element, including recommendations for the construction or installation of runways, taxiways, navigational aids, and terminal facilities at the airports which constitute the recommended airport system for the seven-county Region, together with recommendations concerning the imposition of nonstandard air traffic patterns and the restriction of certain types of activity at selected airports; 2) an airport airspace protection element relating to these airports, and 3) an airport area land use plan element for the immediate area surrounding each of the airports. In a practical sense, however, the regional airport system plan is not complete until the steps required to implement the plan, that is, to convert the plan into action plans and policies, have been specified.

This chapter is therefore presented as a guide for use in implementation of the third-generation regional airport system plan. Basically, it outlines the actions which must be taken by the various levels and agencies of government and private parties concerned if the third-generation plan is to be fully carried out over the next 15 to 20 years. Those units and agencies of government that have plan adoption and implementation powers applicable to the plan are identified, necessary or desirable formal plan adoption actions specified, and specific implementation actions recommended for each of the units and agencies of government and private parties concerned with the airport facility construction, airport airspace protection, and airport area land use elements. Toward this end, specific recommendations are made concerning jurisdictional responsibilities for each of the airports included in the recommended regional airport system plan. Finally, financial and technical assistance programs available to aid in the implementation of the airport system plan are discussed.

The plan implementation recommendations contained in this chapter are, to the maximum extent practicable, based upon, and related to, the existing governmental structure and governmental programs and are largely predicated upon existing legislation. Because of the ever present possibility of unforeseen changes in economic conditions, State and Federal legislation, case law decisions, governmental organization, and tax and fiscal policy, it is not possible to declare once and for all time exactly how a process as complex as airport system plan implementation should be administered and financed. In the continuing regional planning program for Southeastern Wisconsin, therefore, it will be necessary periodically to update, not only the regional airport system plan elements and the data and forecasts on which these plan elements are based, but also the elements recommended herein for plan implementation.

BASIC CONCEPTS AND PRINCIPLES

It is important to recognize that plan implementation measures should be based upon a full understanding of the objectives underlying the recommendations contained in formally adopted plans. Thus, action policies and programs should not only be preceded by formal plan adoption and, following such adoption, be consistent with the adopted plans, but should also emphasize the implementation of the most important and essential elements of the plan and those areas of action which will have the greatest impact on guiding and shaping development in accordance with the objectives underlying the plan.

Substantial implementation of the regional airport system plan will be achieved if all the airports identified in the recommended plan are retained in public-use and improved according to the recommended development program and if appropriate aircraft operating restrictions and compatible land use development adjacent to airports can be achieved both to minimize the adverse impacts of aircraft operations on the surrounding areas and to assure safe aircraft operation. In addition, since the third-generation regional airport system plan has been prepared within the framework of a comprehensive planning program, it is important to implementation of the plan that certain other regional plan elements, in particular the regional land use and surface transportation plans, be sub-

stantially implemented. Failure to implement the regional land use plan substantially will probably create additional airport system development problems, particularly in and around those airports recommended to be improved in what are today largely rural areas. Failure to implement the surface transportation plan substantially will result in a lower level of accessibility to the airport facilities than contemplated.

The relationship of the regional airport system plan to other types and levels of planning must also be understood for proper plan implementation. As discussed earlier in this report, Federal legislation envisions two basic levels, or types, of planning at the State or local levels of government for assuring that airport system development is carried out in the most cost-effective manner. At the most general level is the system plan, of which the recommended airport system plan set forth in the preceding chapter of this report is an example. For a particular planning area, the system plan is intended to determine the number and type of airports required to meet forecast aviation demands, to define the particular function which each airport in the overall system should perform, to specify the general location of each of the airports included in the system plan, to identify the general runway and associated taxiway configurations, and to determine the major types of improvements needed at each identified airport site. Good planning practice would dictate that an airport system plan for a large metropolitan region such as Southeastern Wisconsin be an integral part of both the State and Federal level airport system plans.

The second type of plan represents a more detailed level of airport planning and consists of the preparation of master plans for each airport identified in a system plan. Airport master plans are intended to refine and detail the recommendations of the regional airport system plan. Specifically, such plans should specify precise land area requirements for acquisition and protection, provide a detailed airport layout plan, include financial feasibility analyses and a capital improvement budget, provide information on the impact of facility improvements on the environment, and provide for local level citizen participation in the planning effort. Whereas the preparation of the airport system plan is primarily the responsibility of the State agency responsible for aeronautics, in coordination with the Regional Planning Commission for metropolitan areas for which a regional airport system plan is necessary, the preparation of airport master plans is primarily the responsibility of the implementing local agencies of government or airport sponsors.

It is extremely important to airport system plan implementation that all public officials and citizens concerned recognize that development of a coordinated regional airport system is important to meeting the fast, long-distance transportation needs of the resident population and of local businesses and industries and that the development of such a system is, therefore, vital to the continued economic growth and social development of the Region. Such recognition is particularly important because plan implementation will require not only action by the units and agencies of government directly involved in airport ownership and development, but also cooperative and related actions by many other units and agencies of government. Failure of one unit of government to implement a major element of the recommended system plan may adversely affect many other governmental units and agencies, thereby detracting from the ability of the entire Region to accommodate the forecast aviation demand in a safe, cost-effective manner or to achieve the compatible land use pattern deemed desirable around the airports in the Region. It is essential, too, that the State and Federal implementing agencies recognize the needs of Southeastern Wisconsin, particularly when the funds are apportioned for the needed airport improvements, since the Region has the largest and densest concentrations of people in the State and the most significant concentrations of economic activity.

PLAN IMPLEMENTATION ORGANIZATIONS

Although the Regional Planning Commission can promote and encourage plan implementation in various ways, the completely advisory role of the Commission makes actual implementation of the recommended regional airport system plan entirely dependent upon action by local, State, and Federal units and agencies of government and by certain private concerns. These agencies include general-purpose local units of government, such as cities, villages, towns, and counties; State agencies, such as the Wisconsin Department of Transportation, Bureau of Aeronautics; and Federal agencies, such as the U. S. Department of Transportation, Federal Aviation Administration. Because of the many and varied governmental agencies concerned with airport and airport land use development, it becomes exceedingly important to identify those agencies having the legal authority and financial capability to implement the recommended plan most effec-

tively. Accordingly, those agencies whose actions will have a significant effect either directly or indirectly upon the successful implementation of the recommended regional airport system plan and whose full cooperation in plan implementation will be essential are identified and discussed below. The agencies are, for convenience, discussed by level of government; however, the interdependence among the various levels and agencies of government and the need for close intergovernmental coordination cannot be overemphasized.

Local Agencies

Local-level agencies concerned with airport system development include counties, cities, villages, and towns. Under Section 114.11 of the Wisconsin Statutes, counties, cities, villages, and towns are authorized to acquire, establish, construct, own, control, lease, improve, maintain, and operate airports or landing fields within or outside their jurisdictional limits. The local units of government are further empowered to provide for the regulation of such airports and landing fields so long as such regulation does not conflict with rules and regulations promulgated by the Federal government. Section 114.11 further authorizes the governing body of any county, city, village, or town to appropriate monies to any other county, city, village, or town for the acquisition, improvement, or operation of an airport by any county, city, village, or town or any combination of such municipalities.

Clearly, local units of government in Wisconsin have sufficient statutory authority to implement the airport facility improvement element of the recommended regional airport system plan. As discussed in Chapter IV of this report, eight airports in the Region are currently owned and operated by local units of government. Three of the eight are owned and operated by counties: General Mitchell International Airport and Lawrence J. Timmerman Airport by Milwaukee County and Waukesha County-Crites Field by Waukesha County; four are owned and operated by cities: Burlington, Hartford, Kenosha, and West Bend; and one is owned and operated by a village: East Troy. To a large degree, municipal ownership and operation of airports has resulted from a desire to attract and serve commerce and industry.

Areawide Level Agencies

Statutory provisions exist for the creation of certain areawide agencies which could implement the regional airport system plan. These agencies include union airports, cooperative contract commissions, and multi-modal transportation authorities. In addition, it is conceivable that enabling legislation could be secured to permit the formation of regional or areawide airport authorities or of local airport authorities. The creation of such authorities would require State legislation and local action, which would remove airport development discussions from the purview of elected officials and grant such purview to appointed officials and would also provide tax levy powers to the authority. As was concluded under the original regional airport system plan and its second-generation update, such agencies and authorities may be expected to be difficult to implement within Southeastern Wisconsin.

State Agencies

At the State level, the following agencies have either general or specific planning authority and certain plan implementation powers important to the adoption and implementation of the regional airport system plan.

Wisconsin Department of Transportation: Responsibility for the planning and development of all modes of transportation in Wisconsin is centered in the Wisconsin Department of Transportation. Of particular importance to implementation of the regional airport system plan within the Department of Transportation are the Division of Infrastructure Development, Bureau of Aeronautics; the Division of Transportation Investment Management; and the Division of Districts, District 2 Office, of the Wisconsin Department of Transportation.

The Division of Infrastructure Development, through its Bureau of Aeronautics, represents the State in the supervision, promotion, and development of a Statewide system of publicly used airports and acts as the local government airport owner's agent in all projects involving State and Federal aid. The Bureau of Aeronautics is responsible for developing the State of Wisconsin six-year airport improvement program. The Bureau promotes aviation education, assists airport operators in soundly managing their facilities, conducts safety and training programs for Wisconsin pilots, and coordinates the State aviation interests with those of other States and the Federal government. As such, the Bureau represents the key State agency in implementation of the regional airport system plan.

The Division of Transportation Investment Management, Bureau of Planning, is responsible for providing guidance and advice to all the divisions in the Department of Transportation and performs an important role in development of State transportation policy, including the development of

multi-modal transportation policy and system plans. The latter include a State airport system plan. The preparation of a regional airport system plan for Southeastern Wisconsin should be coordinated with the Statewide system planning effort.

The Division of Districts, District 2 Office, is in charge of all matters in Southeastern Wisconsin pertaining to the expenditure of State and Federal funds for the improvement of highways. The Division lays out, constructs, and maintains the State trunk highway system and advises towns, villages, cities, and counties with regard to the construction and maintenance of local roads and bridges. With respect to the regional airport system plan, the District 2 Office should perform an important function in assuring the development of adequate surface transportation access to each of the identified airport sites.

Although the State of Wisconsin has historically not been involved in the development and operation of a system of State-owned airport facilities, in Section 114.33 of the Wisconsin Statutes there exists authority for any State agency to initiate and sponsor an airport project in the same manner as a county, city, village, or town would. This authority would appear to provide a basis for the establishment of a system of State-operated airports. The State of Wisconsin does own Volk Field in the Village of Camp Douglas, Juneau County, which is the responsibility of the Department of Military Affairs.

Wisconsin Department of Natural Resources: In performing its environmental and natural resource protection function, the Wisconsin Department of Natural Resources is responsible for securing compliance with Federal air quality standards and has broad authority in the areas of water quality control and water regulation. Since airports are considered indirect sources of air pollution, and since the development of airport sites could have an impact on wetlands and floodplains, it is important that the Department of Natural Resources be cognizant of and ultimately endorse the regional airport system plan.

Wisconsin Department of Administration: The Wisconsin Department of Administration provides for the integration of State-level functional planning and serves as the State clearinghouse under Gubernatorial Executive Order No. 29 (GEO-29). Accordingly, the Department performs an important function with respect to the review of all applications for Federal airport development grants and, as such, is an important plan implementation agency for the regional airport system plan.

Wisconsin Department of Development: The Wisconsin Department of Development has authority to review proposed municipal incorporations, consolidations, and annexations. The Department is specifically directed by Section 114.31(6) of the Wisconsin Statutes to make available, in cooperation with the Bureau of Aeronautics, technical services to local units of government in the State in the development of aeronautics. Accordingly, this Department also performs an important plan implementation function.

Wisconsin Department of Agriculture, Trade and Consumer Protection: In performing its soil and water conservation function, this Department is responsible for reviewing and commenting on rules relating to soil and water conservation, administering the State of Wisconsin's farmland preservation program, and reviewing all county erosion control plans and the annual and long-range county land conservation plans. Thus, the review by this Department of airport improvement projects involving erosion control or the acquisition of farmlands could be required.

Federal Agencies

At the Federal level, the following agencies administer Federal programs that can have important effects upon implementation of the third generation regional airport system plan.

U. S. Department of Transportation: Two administrations within the U. S. Department of Transportation, the Federal Aviation Administration and the Federal Highway Administration, represent key implementation agencies with respect to the regional airport system plan. The Federal Aviation Administration in particular provides financial support for the development of airport master plans and the undertaking of land acquisition and capital improvement programs at airports included in approved system plans; sponsors aviation research and development: and provides technical assistance and advisory services on airport planning, design, construction, and maintenance. The Federal Highway Administration provides financial support for the development of highways, including important support through the Federal Aid Primary, Federal Aid Secondary, and Federal Aid Urban systems for the development of State, county, and local trunk highways. Such highways provide impor-

tant surface transportation access to all of the airports included in the recommended regional airport system plan.

U. S. Environmental Protection Agency: This agency has broad powers under Federal legislation to promulgate standards and guidelines and to review and monitor compliance with and achievement of air quality, noise level, and water quality standards. Thus, this agency is the key Federal agency involved in the control and management of air quality and noise levels, both of which are significant to airport development and operation, and of water quality, which could be affected by airport development. Accordingly, it is important that this agency review and endorse the recommended regional airport system plan.

U. S. Army Corps of Engineers: The Corps of Engineers administers a regulatory program relating to the discharge of dredge and fill materials into the waters of the United States and adjacent wetlands. This program is administered pursuant to Section 404 of the Federal Water Pollution Control Act as amended in 1972. The administration of this program with respect to the management of wetlands will affect the implementation of the proposed airport improvements.

Private Concerns

The development and implementation of the regional airport system plan in Southeastern Wisconsin involves not only the above-mentioned units and agencies of government, but also a number of private individuals, partnerships, and corporations, that historically have been involved in airport system development. Indeed, three of the 11 airports recommended for inclusion in the preliminary third-generation regional airport system plan are currently privately owned and operated. These are Batten Airport, Capitol Airport and Sylvania Airport. As a practical matter, these three airports may need to be publicly acquired if the private operators should propose to close them.

In addition, it is important that the owners of other private airports understand the significance and impact of the third-generation regional airport system plan. While the public may continue to play a very important role in the development of the regional airport system, private enterprise may be expected to continue to play a significant role in meeting aviation demand. Accordingly, it is important that these interests be cognizant of the third-generation regional airport system plan.

PLAN ADOPTION AND INTEGRATION.

Upon adoption of the third-generation regional airport system plan by formal resolution of the Southeastern Wisconsin Regional Planning Commission, in accordance with Section 66.945(10) of the Wisconsin Statutes, the Commission will transmit a certified copy of the resolution adopting the third-generation airport system plan, together with a copy of that plan itself, to all local legislative bodies within the Southeastern Wisconsin Region and to all the aforesaid existing local, areawide, State, and Federal agencies and private concerns that have potential plan implementation functions.

Adoption, endorsement, or formal acknowledgement of the third-generation regional airport system plan by the local legislative bodies and the existing local, areawide, State, and Federal agencies and private parties concerned is highly desirable toward assuring a common understanding between the public and private sectors and among the several governmental levels. Such adoption, endorsement, or formal acknowledgement also enables the programming of the necessary plan implementation work, and is, in some cases, required by the Wisconsin Statutes before certain planning actions can proceed, as in the case of city, village, and town plan commissions created pursuant to Section 62.23 of the Statutes. In addition, formal plan adoption may be required for eligibility for State and Federal financial aid. It is extremely important to understand that adoption of the recommended regional airport system plan by any unit or agency of government pertains only to the statutory duties and functions of the adopting agencies, and does not, and cannot, in any way preempt or commit action by another unit or agency of government acting within its own area of functional and geographical jurisdiction. A model resolution for adoption of the third-generation regional airport system plan is included in Appendix B.

Upon adoption or endorsement of the revised regional airport system plan by a unit or agency of government, it is recommended that the policy-making body of the unit or agency direct its staff to review in detail the elements of the plan. Once such review is completed, the staff can propose to the policy-making body for its consideration and approval the steps necessary to integrate the regional airport system plan elements fully into the plans and programs of the unit or agency of government.

Local Agencies

1. It is recommended that the Milwaukee County Board of Supervisors formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Transportation and Public Works Committee.

2. It is recommended that the Waukesha County Board of Supervisors formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation of the appropriate standing subcommittees of the County Board as identified by the County Board Chair, and the Waukesha County Airport Commission.

3. It is recommended that the Walworth and Washington County Boards of Supervisors formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by their respective County Park and Planning Commissions.

4. It is recommended that the Kenosha, Ozaukee, and Racine County Boards of Supervisors formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by their respective County Land Use, Zoning, and Planning and Development Committees.

5. It is recommended that the City Council of the City of Kenosha formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Airport Commission and City Plan Commission.

6. It is recommended that the City Council of the City of Burlington formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Airport Committee and the City Plan Commission.

7. It is recommended that the City Council of the City of Hartford formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Airport Committee and the City Plan Commission.

8. It is recommended that the City Council of the City of West Bend formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Airport Commission and the City Plan Commission.

9. It is recommended that the Village Board of the Village of East Troy formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by the Airport Committee and the Village Plan Commission.

10. It is recommended that the governing bodies of all other cities, villages, and towns within the Region formally adopt the third-generation regional airport system plan by resolution, pursuant to Section 66.945(12) of the Wisconsin Statutes, after review and recommendation by appropriate committees and local plan commissions.

11. It is recommended that the plan commissions of all cities, villages, and towns within the Region formally adopt the third-generation regional airport system plan, as it affects them, by resolution, pursuant to Sections 66.945(12) and 62.23(3)(b) of the Wisconsin Statutes, and certify such adoption to their respective governing bodies.

State Agencies

1. It is recommended that the Wisconsin Department of Transportation endorse the third-generation regional airport system plan, include that plan as an integral part of the new State of Wisconsin airport system plan, and certify the plan to the U. S. Department of Transportation, Federal Aviation Administration. It is further recommended that the staffs of the Wisconsin Department of Transportation's Division of Infrastructure Development and Bureau of Aeronautics, the Division of Transportation Investment Management's Bureau of Planning, and the Division of District's District 2 Office integrate the third-generation regional airport system plan

elements into their broad range of transportation planning and development responsibilities and assist in coordinating plan implementation activities over the next 15 to 20 years.

2. It is recommended that the Wisconsin Natural Resources Board endorse the third-generation regional airport system plan and direct its staff in the Wisconsin Department of Natural Resources to recognize the plan recommendations, as appropriate, in the exercise of its authority.

3. It is recommended that the Wisconsin Department of Administration endorse the third-generation regional airport system plan and utilize the plan recommendations, as appropriate, in the exercise of its State planning and State GEO-29 clearinghouse functions.

4. It is recommended that the Wisconsin Department of Development endorse the third-generation regional airport system plan and integrate the plan into its activities with respect to promoting economic development and with respect to administering any Federal and State grant-in-aid programs.

5. It is recommended that the Wisconsin Department of Agriculture, Trade and Consumer Protection endorse the third-generation regional airport system plan and refer the plan to the Land Conservation Board and direct that Board to utilize the plan recommendations, as appropriate, in carrying out its various responsibilities governing farmland preservation and soil and water conservation.

6. It is recommended that the Wisconsin Department of Revenue conduct a study of whether property taxes should be paid on runway object-free and safety areas and on lands included in runway protection zones, which must be kept clear of any development, by privately owned public-use airports recommended as essential airports in regional and State airport system plans. The feasibility of achieving such property-tax relief is uncertain, since most types of developments are required by zoning ordinances to keep some portion of their property clear of development. The State airport system plan does not clearly identify essential privately owned public-use airports and airport lands are assessed and taxed at their fair market value regardless of their existing use.

Federal Agencies

1. It is recommended that the U. S. Department of Transportation formally acknowledge the third-generation regional airport system plan upon its inclusion in the new State of Wisconsin airport system plan and include the plan in the National Plan of Integrated Airport Systems and that the Department, through the Federal Aviation Administration and Federal Highway Administration, utilize the third-generation plan recommendations in its broad range of airport and highway development responsibilities. The National Plan of Integrated Airport Systems should be amended by adding Sylvania Airport to the plan and by revising the airport classifications, or "airport roles," to those classifications recommended in the third-generation plan described herein. The third-generation regional airport system plan includes one airport classified as an Air Carrier (AC) airport: General Mitchell International Airport; four airports classified as Transport Corporate (TC) airports: West Bend Municipal Airport, Waukesha County-Crites Field, Batten Airport, and Kenosha Regional Airport; four airports classified as General Utility (GU) airports: Burlington Municipal Airport, Hartford Municipal Airport, Lawrence J. Timmerman Airport, and East Troy Municipal Airport; and two airports classified as Basic Utility (BU) airports: Capitol Airport and Sylvania Airport. The ten general aviation airports in the third-generation regional airport system plan should be designated "relievers" to Milwaukee's General Mitchell International Airport. Because some of these airports perform a greater reliever function than others because of their ability to accommodate a wider range of aircraft and because of their proximity to General Mitchell International Airport, it is recognized that the most important relievers are Batten Airport, Waukesha County-Crites Field, Kenosha Regional Airport, and West Bend Municipal Airport and followed by Burlington Municipal Airport, East Troy Municipal Airport, Capitol Airport, Lawrence J. Timmerman Airport, Hartford Municipal Airport, and Sylvania Airport. It is recommended that the Federal Aviation

Administration consider the relative importance of these reliever facilities in making funding assistance decisions for airport improvements in Southeastern Wisconsin.

2. It is recommended that the U. S. Environmental Protection Agency formally acknowledge the third-generation regional airport system plan and recognize the plan recommendations in exercising its air quality and noise level control management authority.

3. It is recommended that the U. S. Army Corps of Engineers formally acknowledge the third-generation regional airport system plan and utilize the plan recommendations, as appropriate, in carrying out its regulatory program relative to the placement of fill in wetlands.

Private Concerns

It is recommended that those private individuals, partnerships, and corporations currently owning and operating airport facilities in the Region that would be directly affected by the plan recommendations, including, but not necessarily limited to, the owners of Batten Airport, Capitol Airport, and Sylvania Airport, formally acknowledge and adopt the third-generation regional airport system plan and cooperate with the units and agencies of government concerned in securing successful long-term implementation of the plan.

AIRPORT FACILITY IMPROVEMENT ELEMENT IMPLEMENTATION

The recommended improvements at each of the airports identified in the preliminary third-generation regional airport system plan were fully described in Chapter X of this report. Such improvements include, as appropriate at each airport site, land acquisition for site expansion, clear- zone protection, and aircraft noise protection; airfield improvements, including the construction of new runways and taxiways and the paving, widening, strengthening, and realigning of existing runways and taxiways, as well as the construction of additional parking aprons and the installation of lighting and navigational aids; terminal area improvements, including the expansion of existing or construction of new terminal and administration buildings and the expansion of auto parking and service roads; hangar area improvements, including the expansion of hangar storage and service areas; ground access improvements; and utility service improvements. In addition, the plan recommends the imposition of certain operational requirements at selected airports in the system, such as nonstandard air traffic patterns, the restriction of certain types of flight activity, and the construction and operation of air traffic control towers.

If fully carried out, the regional airport system would consist of one airport classified as an Air Carrier facility: General Mitchell International Airport; four Transport-Corporate airports: Kenosha Regional, Batten Airport, Waukesha County-Crites Field, and West Bend Municipal; four General Utility airports: Burlington Municipal, East Troy Municipal, Hartford Municipal, and Lawrence J. Timmerman Airport; and two Basic Utility airports: Burlington Municipal and Sylvania Airport. A summary of the cost estimates of carrying out the recommended improvements at each of the airports is also set forth in Chapter X.

The airport improvements recommended under the third-generation plan are all for sites that are currently used as airports and open to the general public. There are no recommendations for the development of new airports or for the development of any private airport sites that are not currently open to the public. Furthermore, all the airports in the third generation plan are publicly owned except Batten, Sylvania, and Capitol Airports. Public acquisition of these three airports is recommended only in the event that the private operators propose to close the airports in the future. In such an event, it is recommended that Racine County, through the Racine County Board of Supervisors, upon recommendation of the appropriate agencies and committees, acquire and assume responsibility for Batten and Sylvania Airports and that Waukesha County, through the Waukesha County Board of Supervisors, upon recommendation of the appropriate agencies and committees, acquire and assume responsibility for Capitol Airport.

An important and necessary part of the airport facility improvement element is the preparation of airport master plans. It is recommended that a master plan be either prepared or revised, as may be appropriate, for each of the airports included in the third-generation plan. As noted in Chapter II of this report, airport master planning is required to refine and detail the recommendations of the regional airport system plan and thus establish eligibility for Federal financial aid under the Airport and Airway Improvement Act of 1982 and it amendments. It is recommended that such airport master plans, in addition to refining and detailing the facility improvement requirements set forth in the regional plan, include more detailed land use

Table 144

RECOMMENDED TIME FRAMES FOR COMPLETION OF MASTER PLANS FOR AIRPORTS IN THE REGIONAL AIRPORT SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN

Airport Name	Completion or Most Recent Update		Recommended preparation, Completion, or Next Update of Airport Master Plan
	Airport Layout Plan	Airport Master Plan	
General Mitchell International	1992	1992	2002-2005
Batten	1983	--	1997-2000
Kenosha Regional	1977[a]	1977[a]	1997-2000
Waukesha County-Crites Field	1993	1983	1997-2000
West Bend Municipal	1977	1977[b]	1997-2000
East Troy Municipal	1985	--	1997-2000
Hartford Municipal	1992	1991	2002-2005
Lawrence J. Timmerman	--[c]	--	1997-2000
Burlington Municipal	1978	--	1997-2000
Capitol	1992	1990	2002-2005
Sylvania	--	--	1997-2000

[a] *Airport master plan and layout plan was initiated in 1993, but dropped in 1995.*

[b] *Feasibility study of expansion alternatives completed in 1993. Environmental assessment underway.*

[c] *Portions of airport layout plan completed in 1968. Master plan scheduled to be initiated in 1996.*

Source: SEWRPC

plans and height limitation zoning maps for the impact area surrounding the airport.

As of March 1996, the master planning efforts for the 11 airports in the third-generation regional airport system plan were in various stages of completion. Accordingly, it is recommended that the following master planning efforts be undertaken by the airport owners concerned in accordance with the time frames identified in Table 144:

1. For the six airports for which airport master plans have been completed, including General Mitchell International Airport, Kenosha Regional Airport, Hartford Municipal Airport, Waukesha County-Crites Field, West Bend Municipal Airport, and Capitol Airport, it is recommended that the master plans be reviewed and revised as necessary.

2. For the four airports for which some airport master planning work, such as the preparation of an airport layout plan, has been undertaken, including Burlington Municipal, East Troy Municipal, Batten, and Lawrence J. Timmerman Airports, it is recommended that the work completed to date be updated as necessary and that the remainder of the airport master plan be completed.

3. It is recommended that, following the designation of Sylvania Airport as a reliever to General Mitchell International Airport by the Federal Aviation Administration, the owners of Sylvania Airport undertake a master planning effort for the airport.

AIRPORT AIRSPACE PROTECTION PLAN ELEMENT IMPLEMENTATION

The third-generation regional airport system plan includes an element relating to the protection of airspace around airports in order to ensure safe aircraft operations. More specifically, the plan recommends that the U. S. Department of Transportation, Federal Aviation Administration, obstruction criteria be used to define the general height

restrictions attendant to all airports included in the regional system. The height of buildings and other structures around airports can be regulated by local public airport sponsors through the enactment of height restriction ordinances under the authorization provided in Section 114.136 of the Wisconsin Statutes. This authorization permits public sponsors to regulate the height of structures within three miles of a publicly owned airport in order to prevent the construction of tall objects that would endanger safe aircraft operation. Section 114.135 of the Wisconsin Statutes further allows a public airport owner to negotiate the purchase of, or acquire by eminent domain if necessary, the air rights to any property which might contain structures or objects that endanger safe airport operations.

At the present time, height control zoning ordinances are in effect for the following public-use airports: Burlington Municipal, Batten Airport, Kenosha Regional Airport, General Mitchell International Airport, Lawrence J. Timmerman Airport, Hartford Municipal Airport, West Bend Municipal Airport, and Waukesha County-Crites Field. No height control zoning restrictions are in effect at Capitol Airport, East Troy Municipal Airport, or Sylvania Airport. It is important to note, however, that the height limitations for seven of these eight airports are based on the existing airfield layout and facilities and do not necessarily recognize the recommended improvements such as runway extensions or the installation of instrument landing systems. The height limitation zoning ordinance for Waukesha County-Crites Field, however, is based on improvements identified in the current airport layout plan and, therefore, does take into account the anticipated future improvements recommended in the new regional airport system plan. It is envisioned that one of the specific outputs of the airport master planning efforts recommended above will be the identification of needed changes to height control zoning ordinances and the enactment of new ordinances where necessary. Accordingly, upon either the update or completion of the master planning effort at each of the airports included in the regional system plan, it is recommended that the appropriate public agencies take action to review and change existing, or enact new, airport height control ordinances in order to properly protect the airspace at the individual airports concerned.

Under Section 114.135 of the Wisconsin Statutes, special permits from the Wisconsin Secretary of Transportation are required to erect buildings, structures, or towers that are more than 500 feet above ground level within one mile of an airport, or that exceed 150 feet above ground level if the structure would be above the slope of 1 foot vertical for each 40 feet horizontal from the nearest airport boundary. It is recommended that, in carrying out responsibilities pertaining to this regulatory statute, the Wisconsin Secretary of Transportation utilize the third-generation regional airport system plan for Southeastern Wisconsin, as well as any master plans prepared and adopted for facilities included in the updated regional airport system plan, as appropriate, in discharging this responsibility under this statute.

AIRPORT AREA LAND USE PLAN ELEMENT IMPLEMENTATION

The third-generation regional airport system plan includes a general plan for the development of land uses in the general impact area around each of the airport sites. These general land use plans seek to prevent incompatible land use development within the airport environs and thus minimize nuisances that develop between aircraft operations and neighboring land uses. It is essential that these general airport land use plans be refined and detailed in two ways. First, the plan should be further refined and detailed as an essential element of the airport master planning effort for each of the identified sites. Advisory committees established to assist in the airport master planning effort should include responsible public officials from all local communities in the airport environs having land use control authority. The airport master planning effort is thus envisioned as a step toward achieving a local consensus on land use development in the airport area.

Upon completion of the airport master plans, it is recommended that each individual municipality, in those cases where airports are located in urban or urbanizing areas, further refine and detail the airport area land use plan to the neighborhood level of planning detail, as recommended by the Regional Planning Commission under the adopted regional land use plan.[1] The preparation of detailed neighborhood land use development plans represents an essential step toward assuring that future urban development will be carried out in a manner fully

[1]*Such a plan has been prepared by the City of Kenosha for Kenosha Regional Airport. See City of Kenosha Department of City Development, Airport Land Use Plan: Kenosha Municipal Airport, November 1985.*

compatible with not only the land use development objectives expressed in regional and local land use plans, but also the airport development objectives expressed in the regional airport system plan and in any airport facility master plans.

Upon completion of the master planning effort at each airport included in the regional system plan, it is recommended that those cities, villages, and towns involved review their local land use zoning ordinances to determine what adjustments, if any, are needed to ensure that the land use development allowed by the zoning ordinance is fully compatible with the land use development objectives expressed in the airport area land use plan. With respect to those airports located in urban or urbanizing areas, it is recommended that such zoning ordinance and zoning district map adjustments take place at the time of completion of the airport area land use plan and again at the completion of any detailed neighborhood land use plans for neighborhoods in areas influenced by airports.

State legislation enacted in March 1986 requires any county, city, village, or town which has a development plan to identify on that plan all publicly owned or operated airports, along with an attendant "airport-affected area." The airport-affected area is established by agreement between the concerned county, city, village, or town and the airport owner. The agreed-upon airport-affected area may not extend more than three miles beyond the boundaries of the airport. In the absence of such an agreement, the airport-affected area includes all the area located within three miles of the boundaries of the airport. Within the airport-affected area, the airport owner is granted the right to protest any proposed zoning change. One result of this legislation is that any municipality making a zoning change in an airport-affected area cannot do so without an extraordinary vote of approval from its governing body if the airport owner protests the change. This legislation affects all publicly owned airports in Southeastern Wisconsin except those in Milwaukee County and provides a tool for municipal airport owners to use in protecting airports from the encroachment of incompatible land uses in the areas immediately surrounding the airport.[2] It is important to note that this recent legislation does not apply to public-use airports that are privately owned, such as Batten, Capitol, and Sylvania Airports. It is therefore recommended that the Wisconsin Department of Transportation seek and support appropriate amendments to this legislation both to enable Milwaukee County properly to protect its airports and to apply these zoning procedures to all public-use airports in the State of Wisconsin identified in regional and State airport system plans, regardless of whether the ownership of those airports is public or private.

Another important plan implementation tool, the official map, is currently not available for use in Wisconsin for the reservation of land for public airport development. As discussed in SEWRPC Planning Guide No. 2, Official Mapping Guide, proper application of the official map allows a community to precisely designate right-of-way lines and site boundaries for streets, highways, parkways, and playgrounds. It would appear that the official map could similarly be used advantageously to protect land needed for airport site development. Accordingly, it is recommended that the Wisconsin Department of Transportation seek appropriate legislation to enable local public airport sponsors to place lands needed for airport site development on duly adopted official maps. It is envisioned, in this respect, that such legislation would require the preparation and adoption of an airport master plan before any lands for airport development could be placed upon an official map.

FINANCIAL AND TECHNICAL ASSISTANCE

Upon adoption of the third-generation regional airport system plan, it becomes necessary for the governmental units and agencies concerned effectively to utilize all sources of financial and technical assistance available for the timely execution of the recommended plan. In addition to current property-tax revenues and user fees, the agencies and units of government concerned with airport development can make use of State and Federal grants-in-aid. In addition, the local public airport sponsors can also take advantage of technical assistance available through the Wisconsin Department of Transportation, Division of Infrastructure Development, Bureau of Aeronautics.

Federal Airport Development Aid Program

As discussed in Chapter IV of this report, the U. S. Department of Transportation, Federal Avia-

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[2]*As of 1996, the airports in southeastern Wisconsin affected by this legislation included West Bend Municipal Airport, Hartford Municipal Airport, Waukesha County-Crites Field, East Troy Municipal Airport, Burlington Municipal Airport, and Kenosha Regional Airport.*

tion Administration, administers a Federal airport improvement program authorized by the Airport and Airway Improvement Act of 1982 and its amendments. This program provides for Federal aids of up to 90 percent of the total allowable project costs for eligible capital improvement and land acquisition programs, as well as for the preparation of airport master plans. Eligible items include land acquisition; site preparation; runway, taxiway, and parking apron improvements; airfield lighting; street and roadway work related to airport development; obstruction removal; fences; and navigational and landing aids. Ineligible airport development items include hangar construction, runway maintenance, construction and lighting of public parking areas, and improvement of offsite roadways.

State Airport Development Aid Program

This program, authorized by Sections 114.34 and 114.35 of the Wisconsin Statutes, provides for State funds to aid local public sponsors in undertaking airport development projects. For those project items eligible for Federal aid, the statutes provide that the State may fund up to one-half of the non-Federal share. For projects not involving Federal aid, the State program may provide up to 80 percent of the cost of most projects. The State may not participate in the cost of hangar construction; the State cost-sharing on a building construction or improvement project may not exceed $500,000.

Technical Assistance

Technical services, including planning and engineering services, to local public airport sponsors are provided by the Wisconsin Department of Transportation, Division of Infrastructure Development, Bureau of Aeronautics, pursuant to Section 114.31(6) of the Wisconsin Statutes. In addition, the Bureau of Aeronautics acts as an agent for local public airport sponsors for airport development projects involving State and Federal aid. The Bureau of Aeronautics has prepared an information brochure entitled "Airport Development Information Booklet," which is intended to guide plan implementation activities. The U. S. Department of Transportation, Federal Aviation Administration, also provides technical assistance and advisory services on airport master planning and on the development of airport design, construction, and maintenance standards. Such Federal assistance is available through the Wisconsin Department of Transportation, Bureau of Aeronautics.

SUBSEQUENT ADJUSTMENT OF THE PLAN AND CONTINUING PLANNING PROCESS

No plan can be permanent in all of its aspects or precise in all of its elements. The very definition and characteristics of areawide planning suggest that an areawide plan such as the regional airport system plan, to be viable and of use to local, areawide, State, and Federal units and agencies of government and to private interests, must continually be adjusted through formal amendments, extensions, additions, and refinements to reflect changing conditions. The Wisconsin Legislature clearly foresaw this when, in Section 66.945(9) of the Wisconsin Statutes, it gave the regional planning commissions the power to amend, extend, or add to the master plan or carry any part or subject matter into greater detail.

Amendments, extensions, and additions to the regional airport system plan will be forthcoming not only from the Commission under the continuing regional planning programs, but also from local and areawide agencies as they prepare more detailed master plans for airport facilities; from State agencies as they adjust and refine Statewide plans; and from Federal agencies as new policies are established or modified, as new programs are created, or as existing programs are expanded or curtailed.

All of these adjustments or refinements will require the utmost cooperation by the local, areawide, State, and Federal units and agencies of government and private interests, as well as coordination by the Southeastern Wisconsin Regional Planning Commission, which has been empowered under Section 66.945(8) of the Wisconsin Statutes to act as a coordinating agency for programs and activities of the local units of government. To achieve this coordination between the local, State, and Federal programs most effectively and efficiently, and therefore to assure the timely adjustment of the regional airport system plan, it is recommended that all of the aforesaid local, State, and Federal agencies with various plan and plan implementation powers advise and transmit all subsequent planning studies, plan proposals and amendments, and plan implementation devices to the Southeastern Wisconsin Regional Planning Commission for consideration as to integration into, and adjustment of, the third-generation regional airport system plan. Of particular importance in this

respect will be the continuing role of the Technical Coordinating and Advisory Committee on Regional Airport System Planning in intergovernmental coordination and the role of the Regional Planning Commission itself under the grant review authority set forth in State of Wisconsin Governor's Executive Order No. 29 (GEO29).

In order to ensure the continued viability of the regional airport system plan and the modification and adjustment of the system plan as may be necessary over time, a continuing regional airport system planning program is necessary. A continuing regional airport system planning program for Southeastern Wisconsin is envisioned to include, but not necessarily be limited to, the following elements: 1) the monitoring of aviation activity in the Region to establish the validity of the forecasts on which the system plan is based, 2) the monitoring of implementation of the regional airport system plan, 3) the provision of assistance to airport operators, sponsors, and public agencies toward implementation of the regional airport system plan, and 4) a determination as to whether or not the regional airport system plan requires a modification or adjustment and, if so, what actions will be necessary.

A number of factors that affect the demand for airport facilities in Southeastern Wisconsin contribute to the need for such a continuing program, including the possible future closing of privately owned airports in the Region, the continuing impact of Chicago's O'Hare International Airport on operations at General Mitchell International Airport, possible future changes in scheduled air carrier service to Milwaukee brought about by deregulation of the industry, the growing use of general aviation aircraft and facilities by businesses, and the increasing use of Southeastern Wisconsin airports by residents of northeastern Illinois. Because of the unique and complex character of the Milwaukee metropolitan area and the limited space available for the construction of new airports or the expansion of existing airports, it is essential that the forecasts and plan implementation actions be carefully monitored over time.

Accordingly, it is recommended that the Southeastern Wisconsin Regional Planning Commission include airport system planning in its continuing land use-transportation planning efforts for the Southeastern Wisconsin Region. To facilitate this, it is recommended that the Regional Planning Commission file with the Wisconsin Department of Transportation a proposed work program for such a continuing regional airport system planning effort. It is further recommended that the Wisconsin Department of Transportation include the continuing airport system planning effort for the Region in its application to the Federal Aviation Administration for a Statewide continuing airport system planning effort. In this respect, it is also recommended that the Federal Aviation Administration and the Wisconsin Department of Transportation provide continuing financial assistance in this work. Finally, the conclusions and recommendations of the continuing airport system planning effort for the Region should be integrated with the work of the Statewide continuing airport system planning effort.

SUMMARY

This chapter has described the various means available, and has recommended specific procedures, for implementation of the third-generation regional airport system plan. The most important recommended plan implementation actions are summarized below by level and responsible agency or unit of government.

Local Level

City Councils, Village Boards, and Town Boards: It is recommended that, upon referral to, and upon recommendation of, the local plan commission, each city council, village board, and town board within the Region, as appropriate:

1. Adopt the third-generation regional airport system plan as a guide to development in the community, as that plan affects each community.

2. Continue development and operation of existing municipally owned airports (Cities of Burlington, Hartford, Kenosha, and West Bend, and Village of East Troy).

3. Review and revise previously completed master plans for airport facilities (Cities of Hartford, Kenosha, and West Bend).

4. Complete master plans for airport facilities and review and revise whatever master planning work had been done previously (City of Burlington and Village of East Troy).

5. Cooperate with the respective county boards of supervisors and municipal airport owners in conducting airport master planning programs, in preparing airport area land use plans, and in implementing such plans through appropriate adjustments to local zoning ordinances and zoning district maps (all cities, villages, or towns located in airport influence areas).

6. Upon completion of airport master plans, amend existing or enact new airport area height control ordinances to protect airspace for all airports included in the third-generation regional airport system plan (all cities, villages, or towns located in airport influence areas).

7. Upon completion of airport master plans, place future airport site areas on local official maps (all cities, villages, or towns located in airport influence areas).

Plan Commissions of Cities, Villages, and Towns: It is recommended that the plan commissions of all cities, villages, or towns within the Region:

1. Adopt the third-generation regional airport system plan as a guide to development in the community and certify such adoption to the local governing body.

2. As appropriate, cooperate in the preparation of airport master plans and integrate plan recommendations into comprehensive local master plans.

3. As appropriate, review, and recommend changes to, local land use controls to reflect properly the recommendations contained in the regional airport system plan and any local airport master plans.

County Boards of Supervisors: It is recommended that the county boards of supervisors of the seven counties in the Region, upon recommendation of the appropriate agencies and committees:

1. Adopt the third-generation regional airport system plan as it applies to each county as a guide to airport system development in the county.

2. Continue development and operation of existing county-owned airports (Milwaukee and Waukesha Counties).

3. Review and revise previously completed master planning work and complete master plans for all county-owned airport facilities included in the regional airport system plan (Milwaukee and Waukesha Counties).

4. Upon completion of airport master plans, amend existing or enact new airport area height control ordinances to protect airspace for all airports included in the third-generation regional airport system plan.

5. Cooperate in the preparation of detailed land use plans for airport influence areas and in the adjustment of existing zoning and other land use control ordinances to properly reflect such plans.

6. Acquire those existing privately owned airports included in the third-generation regional airport system plan and assume responsibility for the development and operation of such airports if the private owners propose to close their respective facilities (Racine and Waukesha Counties).

Areawide Level

Regional Planning Commission: It is recommended that the Southeastern Wisconsin Regional Planning Commission:

1. Mount a continuing regional airport system planning effort as an integral part of the continuing regional land use-transportation study for Southeastern Wisconsin and file with the Wisconsin Department of Transportation a proposed work program for such a continuing planning effort.

2. Maintain the Technical Coordinating and Advisory Committee on Regional Airport System Planning as a continuing advisory committee under Section 66.945(7) of the Wisconsin Statutes.

3. Include in its unified annual work program the preparation of airport master plans for airports included in the recommended regional airport system, upon the request of an appropriate airport sponsor.

4. Assist airport sponsors in the preparation of airport master plans, including the airport area land use elements of such plans.

State Level

Wisconsin Department of Transportation: It is recommended that the Wisconsin Department of Transportation:

1. Endorse the third-generation regional airport system plan, include the plan as an integral part of the updated State of Wisconsin airport system plan and certify the plan to the U. S. Department of Transportation, Federal Aviation Administration.

2. Utilize the plan, as appropriate, in its broad range of agency responsibilities relating to airport and highway development.

3. Utilize the plan, as appropriate, in carrying out its responsibility for tall-structure permits pursuant to Section 114.135 of the Wisconsin Statutes.

4. Seek enabling legislation to permit local public airport sponsors, including counties, to place lands needed for airport site development on duly adopted official maps.

5. Seek appropriate amendments to existing legislation to require that airport lands and "airport-affected areas" for all public-use airports in the State of Wisconsin identified in regional and State airport system plans be identified on any county, city, village, or town development plans.

6. Provide technical services to local public airport sponsors.

7. Direct all available State development aids toward projects found to be in accordance with the regional airport system plan and any airport master plans prepared for airports included in the regional airport system.

8. Provide appropriate financing for the continuing regional airport system planning effort.

Wisconsin Department of Natural Resources: It is recommended that the State Natural Resources Board:

1. Endorse the third-generation regional airport system plan.

2. Direct its staff in the Wisconsin Department of Natural Resources to recognize the plan recommendations, as appropriate, in the exercise of the Department's air authority.

Wisconsin Department of Administration: It is recommended that the Wisconsin Department of Administration:

1. Endorse the third-generation regional airport system plan.

2. Utilize the plan recommendations, as appropriate, in the exercise of its State planning and State grant review (GEO-29) clearinghouse functions.

Wisconsin Department of Development: It is recommended that the Wisconsin Department of Development:

1. Endorse the third-generation regional airport system plan.

2. Integrate the plan recommendations, and integrate the plan into its activities with respect to reviewing subdivision plats, and administering Federal and State grant-in-aid programs.

Wisconsin Department of Agriculture, Trade and Consumer Protection: It is recommended that the Wisconsin Department of Agriculture, Trade and Consumer Protection:

1. Endorse the third-generation regional airport system plan.

2. Refer the plan to the Land Conservation Board and direct that Board to utilize the plan recommendations, as appropriate, in carrying out its various responsibilities governing farmland preservation and soil and water conservation.

Federal Level

U. S. Department of Transportation, Federal Aviation Administration: It is recommended that the U. S. Department of Transportation, Federal Aviation Administration:

1. Formally acknowledge the third-generation regional airport system plan upon its inclusion in the updated State of Wisconsin airport system plan.

2. Include the third-generation regional airport system plan in the National Plan of Integrated Airport Systems, amending the latter plan, as appropriate, to reflect the regional plan recommendations.

3. Utilize the plan recommendations, as appropriate, in the discharge of its broad range of agency responsibilities relating to airport development, including the provision of air traffic control towers and navigational aids and the provision of Federal airport development funds.

4. Provide appropriate financing for the continuing regional airport system planning effort.

U. S. Department of Transportation, Federal Highway Administration: It is recommended that the U. S. Department of Transportation, Federal Highway Administration:

1. Formally acknowledge the third-generation regional airport system plan.

2. Utilize the plan recommendations, as appropriate, in its broad range of agency responsibilities relating to highway development, including the provision of Federal highway aids in support of surface transportation improvements to airports included in the regional airport system plan.

U. S. Army Corps of Engineers: It is recommended that the U. S. Army Corps of Engineers:

1. Formally acknowledge the third-generation regional airport system plan and utilize the plan recommendations, as appropriate, in carrying out its regulatory program relative to the placement of fill in wetlands.

Private Concerns

With respect to the owners and operators of private airport facilities in the Region, it is recommended that:

1. The owners and operators of Batten, Capitol, and Sylvania Airports formally acknowledge the third-generation regional airport system plan and cooperate with the units and agencies of government concerned in securing the successful, long-term implementation of the plan.

2. Undertake or complete, as appropriate, airport master plans for those airports included in the third-generation regional airport system plan.

3. Continue development and operation of the privately owned airports included in the third-generation regional airport system plan.

4. Cooperate with the appropriate units and agencies of government in the preparation of airport area land use plans and the amendment of existing, or enactment of new, airport area height control ordinances to protect airspace for those airports included in the third-generation regional airport system plan.

Chapter XII

SUMMARY AND CONCLUSIONS

INTRODUCTION

Adequate commercial and general aviation facilities are essential to support the economic development of a large urban region like Southeastern Wisconsin. Regional Planning Commission studies have shown that over one-half of all commercial air travel and about one-third of all general aviation travel with origins and destinations within the Region is made for business purposes. Convenient air transportation facilities and services are an important consideration in decisions concerning the expansion of existing, and the location of new, economic enterprises within the Region. Because of the importance of airports to the economic development of the Region and because airports involve relatively permanent facilities with substantial construction costs and potential environmental impacts, sound long-range planning for the provision and improvement of airports is essential.

It is essential, moreover, that, in a large urban region such as Southeastern Wisconsin, individual airports be planned as integral parts of an areawide system. Five factors combine to make it necessary to approach airport planning on such a basis.

The first such factor is the areawide nature of airport service areas. Regional Planning Commission studies have clearly shown that the origins and destinations of both person and truck trips centered on major airports within the Region are widely dispersed. The location of airport facilities thus becomes, in part, a regional problem of properly relating the service areas of each individual airport to the service areas of other airports within the Region and, in turn, to the regional land use pattern and supporting surface transportation system so as to provide the highest level of air transportation service practicable at the lowest cost.

A second factor which compels a regional approach to airport facility planning is the need to integrate airport development with surface transportation system development properly. The ability of an airport to perform its primary function efficiently as a transportation terminal is determined to a considerable extent by the quality of the surface transportation facilities linking the airport to its service area. Moreover, since airports are major surface traffic generators, they must be considered in the planning and development of the surface transportation system.

A third factor which compels a regional approach to airport facility planning and development is the need to coordinate airport development with land use development. The land use pattern is a major determinant of the location, extent, and character of the service area of an airport and of the specific need for air transportation services. Airport location and development are, in turn, important determinants of land use development, enhancing and attracting certain kinds of commercial, industrial, and recreational development while depreciating and discouraging other kinds of land use development. Safe airport operations demand that certain restrictions be placed on the kinds of land uses and the height of structures in the surrounding areas. These restrictions may require cooperative intergovernmental action on an areawide basis. Thus, both the positive and negative effects of major airport facilities on land use are areawide, extending well beyond the boundaries of single municipalities and, in a large urban region, even single counties.

A fourth factor which compels a regional approach to airport facility planning and development is the considerations entailed in airport siting and spacing. Airport site selection and delineation are heavily influenced by airway and air traffic patterns, runway orientation, and instrument approach procedures, as well as by airport service areas, land use compatibility, and surface transportation facilities. Such siting and spacing, therefore, require a cooperative inter-governmental approach, an approach that can best be achieved at the regional level.

A fifth and final factor which compels a regional approach to airport facility planning is the need to coordinate airport facility development within large urban regions and within the Southeastern Wisconsin Region properly to relate such development to the National Plan of Integrated Airport Systems and to the State airport system plan in order to achieve a single, integrated airport system which

operates effectively and efficiently as well as safely. The amount and character of the air traffic utilizing any given airport are influenced by the location and capacity of adjacent airports. This means that development decisions relating to any single airport can be properly made only within the context of an areawide system plan. Economy may dictate the development of alternative airport capacity in adjacent locations rather than the expansion of any one airport. Economy may also dictate the integration of privately owned airports into the public airport system. Finally, because airport service areas extend over large areas, the development of airport facilities may affect the physical, social, and economic development of many communities. The localized nature of airport ownership and development makes it difficult for any higher level of government to impose the decisions required to provide an economical, effective, and integrated areawide system of commercial and general aviation airports. Rather, such decisions must come from a consensus among the many governmental and private agencies involved. This consensus can best be achieved at the regional level.

The Commission first prepared an airport system plan for the Southeastern Wisconsin Region in 1975 at the request of Milwaukee County and the Wisconsin Department of Transportation.[1] That original, or first-generation, plan was based upon extensive inventories conducted in 1971 and had a design year of 1995. The Commission prepared a second-generation regional airport system plan in 1987, also at the request of the Wisconsin Department of Transportation. The second-generation plan was based on extensive inventories of existing facilities, based aircraft, aircraft operations, and user needs, including massive personal interviews of enplaning passengers at General Mitchell International Airport, conducted in 1983 through 1985, and had a design year of 2010.[2] The new regional airport system plan presented in this report serves to refine, and to revise as necessary, the second-generation plan. The new plan recommends a coordinated set of airport facility and service improvements that will provide the seven-county Southeastern Wisconsin Region with an airport system able to serve the business and personal general aviation needs of the area, as well as the scheduled air carrier and military aviation needs, in an efficient and cost-effective manner through the plan design year 2010. The plan is based on thorough inventories and analyses of the existing airport facilities and attendant capacities and of aviation demand in the Region, careful consideration of probable future aviation demand, and extensive evaluation of alternative airport improvements which could adequately meet the existing and probable future aviation demands. The plan recommendations and the findings of the supporting inventories, analyses, forecasts, and evaluation of alternatives are summarized in this planning report, which thereby updates and replaces the original airport system plan report.

The plan has been prepared in sufficient depth and detail to provide a sound basis for the review of Federal and State grant applications in support of airport facility improvements by the Commission and by the Federal and State agencies concerned, as well as a basis for the preparation of airport master plans and the design and construction of airport improvements. The plan not only considers and recommends the number, type, size, and location of airports needed to serve the Region to the plan design year 2010, but also considers and recommends runway orientation and length for each existing and proposed public-use airport within the Region, specifies navigational aid and site requirements in sufficient detail to permit the advance reservation of land for needed facilities or facility expansion, recommends compatible land uses in the vicinity of all public-use airport facilities, and recommends the organizational and institutional measures necessary for implementation of the recommended public airport facility improvements. The plan recognizes the interrelationships existing between land use and surface transportation and airport facility development, and relates each individual airport to all other airports in the regional system.

This report, in addition to describing the recommended airport system plan, presents the findings of new inventories of existing airport facilities, aviation services, and aeronautical activity; new forecasts of demand for scheduled air passenger, general aviation, and air cargo service; new analyses of the capacity of both existing and planned airport facilities and a comparison of those capacities to the existing and forecast aviation demands; and an evaluation of alternative facility and service

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[1]*See SEWRPC Planning Report No. 21, A Regional Airport System Plan for Southeastern Wisconsin, December 1975.*

[2]*See SEWRPC Planning Report No. 38, A Regional Airport System Plan for Southeastern Wisconsin: 2010, May 1987.*

improvements designed to alleviate any identified deficiencies. In addition to describing the needed improvements at the individual public airports in the recommended regional airport system, this report presents and estimates the costs thereof and makes recommendations concerning the means of implementation of the improvements.

There were three reasons for the preparation of a new regional airport system plan at this time.

First, proposals had been advanced for major airport development projects in the Kenosha, Burlington, Elkhorn, and Hartford areas, projects not recommended in the current regional airport system plan. Proper consideration of these proposals required evaluation within the context of a regional airport system plan.

Second, the extent to which the existing regional airport system plan had been implemented needed to be reviewed. Planning is a cyclical process, alternating between areawide systems planning and local project planning, with the project planning phase of a cycle providing invaluable feedback to the system planning phase of the next cycle. A new plan was necessary to reflect local implementation progress and to consider new alternative that may be required to meet future needs.

Third, there was a need to maintain consistency between the regional airport system plan and the Statewide airport system plan. Because the airport system plan for Southeastern Wisconsin constitutes a major component of the system plan for the entire State, it is important that the regional and State system plans be fully coordinated. The preparation of a new State airport system plan was begun in 1993 by the Wisconsin Department of Transportation, necessitating the updating of the regional plan at the same time.

The technical work for the new regional airport system plan was performed by the Commission staff with assistance provided by cooperating government agencies and airport owners and operators. The work of the study was guided by a Technical Coordinating and Advisory Committee on Regional Airport System Planning consisting of representatives from both private and public agencies concerned with, and knowledgeable about, airport system development within Southeastern Wisconsin.

STATUS OF THE EXISTING PLAN

As already noted, in 1976 the Commission adopted the first regional airport system plan for Southeastern Wisconsin, for a 1995 design year. That plan was revised, updated, and extended to the design year 2010 in 1987 with the adoption of the second-generation regional airport system plan. A system of 11 public-use airports for the Region was recommended at that time, which airports were intended to serve the future aviation needs of the Region for at least a 20-year period. Of the 23 public-use airports which existed within the Region in 1987, the plan found that the continued operation of only the 11 identified airports was truly essential and that public funds for airport improvement and maintenance should be dedicated to these 11 airports, eight of which were then publicly owned and three privately owned. The plan further recommended specific facility improvements at each of the 11 airports and the completion of airport master plans for each airport in the system. The plan also identified necessary restrictions regarding aircraft operations, proposed height zoning restrictions near airports to protect airport airspace, and provided generalized land use plans to help assure compatible land use development near airport sites.

Many of the key recommendations of the first two regional airport system plans have been implemented. Airport master plans, which provide detailed, site-specific recommendations for the long-range development of individual airports, have been completed for six airports: Kenosha Regional Airport, West Bend Municipal Airport, General Mitchell International Airport, Hartford Municipal Airport, Waukesha County-Crites Field, and Capitol Airport, the last a privately owned airport. An important part of an airport master plan, the airport layout plan, has been completed for three additional airports, Burlington Municipal Airport, East Troy Municipal Airport, and Batten Airport, the latter also a privately owned airport.

Improvements made at Milwaukee County's General Mitchell International Airport have included expansion and modernization of the airline passenger terminal, reconstruction and improvement of runways and taxiways, and land acquisition to provide for runway-protection zone areas, thereby decreasing potential land use conflicts and enhancing implementation of noise abatement measures.

Significant improvements have also been made at East Troy Municipal Airport, Batten Airport, Kenosha Regional Airport, and Waukesha County-Crites Field, and some improvements have been made at Hartford Municipal Airport, Burlington Municipal Airport, and West Bend Municipal Airport. These improvements include runway and taxiway construction and extensions, installation of improved airfield lighting and navigation aids, expansion of general aviation servicing and hangar areas, and improvements of such support facilities as service roads and fencing. At three airports in the planned system, Sylvania Airport, Timmerman Airport and Capitol Airport, however, little or no improvements have been made.

INVENTORY, ANALYSIS, AND FORECAST FINDINGS

Existing Regional Air Transportation System

In 1995, there were 103 airports of all types in operation within Southeastern Wisconsin. Of these, Milwaukee County's General Mitchell International Airport was the largest, as well as the only airport serving scheduled air carriers. General aviation public-use airports accounted for another 22 of the 103 airports. Of these 22 airports, seven were publicly owned: Burlington Municipal, East Troy Municipal, Hartford Municipal, Kenosha Regional, Lawrence J. Timmerman, and West Bend Municipal Airports, and Waukesha County-Crites Field. The remaining 15 general aviation public-use airports were privately owned: Aero Park, Batten Airport, Big Foot Airfield, Camp Lake, Capitol, Fox River, Grand Geneva, Cindy Guntly Memorial, Hahn Sky Ranch, Lake Lawn Lodge, Rainbow[3], Sylvania, Valhalla, Vincent, and Westosha. The remaining 80 airports in Southeastern Wisconsin were privately owned and not open to use by the general public. Of these 80 airports, two were seaplane bases and 24 were heliports.

Six of the 22 general aviation public-use airports within the Region have been designated by the Federal Aviation Administration as "reliever" airports, providing capacity relief from congestion at General Mitchell International Airport: Kenosha Regional Airport, Batten Airport, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, West Bend Municipal Airport, and Capitol Airport.

The Federal Aviation Administration (FAA) has adopted an airport classification system for the purpose of specifying design standards for the various types and sizes of airports.

Airports are classified according to a system that is generally based upon the size and performance of the aircraft that are intended to use the airport. The current classification system specified by the FAA includes four basic categories.

A Basic Utility (BU) airport is intended to serve all small single-engine piston aircraft and many of the smaller twin-engine piston aircraft with a maximum gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are used for a wide variety of activities, including recreational and sport flying, training, agricultural purposes, and some business and charter flying. Such an airport would have a primary runway length ranging from 2,800 to 3,900 feet. Of the 23 public-use airports, seven, Big Foot Airfield, Hartford Municipal, Burlington Municipal, Grand Geneva, Capitol, Westosha, and Hahn Sky Ranch, are currently classified as Basic Utility airports.

A General Utility (GU) airport is intended to serve virtually all small general aviation single-and twin-engine aircraft, both piston and turboprop, with a maximum takeoff weight of 12,500 pounds or less. The larger aircraft that this type of airport is intended to serve typically seat from six to 14 people and are widely used for business, corporate, and commercial flying. Such an airport would have a primary runway length ranging from 3,900 to 4,800 feet. Of the 23 public-use airports, four, East Troy Municipal, Lawrence J. Timmerman, Lake Lawn Airport, and West Bend Municipal, are currently classified as General Utility airports.

A Transport-Corporate (T-C) airport is intended to serve business and corporate jets as well as virtually all small single-and twin-engine general aviation aircraft, both piston and turboprop. This type of airport is not intended to serve scheduled air carriers. The larger aircraft that this type of airport is intended to serve are typified by high-performance business jets that seat from 10 to 14 people and have a maximum takeoff weight of

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[3]*In late 1996, it was expected that Rainbow Airport's lease with Milwaukee County would not be renewed and the lands currently occupied by the airport would be converted to park use. The land on which Rainbow Airport is located is part of the Root River Parkway. Accordingly, at this time, it was expected that Rainbow Airport would be permanently closed by the end of 1996.*

between 12,500 and 60,000 pounds. Such an airport would have a primary runway with a minimum length of 4,800 feet. Of the 23 public-use airports, three, Batten Airport, Kenosha Regional, and Waukesha County-Crites Field, are currently classified as Transport-Corporate airports.

An Air Carrier (AC) airport can be long-haul, medium-haul, or short-haul, and is intended to serve all aircraft up to, and including, large jet airliners and military transports. Long-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of over 1,500 miles. Milwaukee County's General Mitchell International Airport is classified as a long-haul Air Carrier airport. Medium-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of between 500 and 1,500 miles. Short-haul Air Carrier airports are intended to serve scheduled nonstop airline markets and routes of less than 500 miles. Long-haul Air Carrier airports would have a primary runway length ranging from 8,800 to 9,800 feet, medium-haul Air Carrier airports would have a primary runway length ranging from 6,500 to 8,800 feet, and short-haul Air Carrier airports would have a primary runway length ranging from 5,500 to 6,500 feet. Throughout the State of Wisconsin, Air Carrier airports typically have primary runways that vary in length from 6,500 to 9,700 feet. Within the Southeastern Wisconsin Region, General Mitchell International Airport is the only airport classified as an Air Carrier facility.

The facilities remaining at eight public-use airports, Camp Lake, Vincent, Rainbow, Fox River, Cindy Guntly Memorial, Sylvania, Valhalla, and Aero Park, currently fall below the minimum requirements necessary for classification as a Basic Utility airport.

Two other categories of airports are military-use airports and heliports. There were no exclusive military-use airports within the Region in 1995, although General Mitchell International Airport and West Bend Municipal Airport were joint civilian-military facilities. None of the 24 heliports in the Region was open to use by the general public.

Existing and Forecast Aeronautical Activity

The inventory of existing aeronautical activity and the forecasts of air transportation demand were updated as part of the new regional airport system planning effort for Southeastern Wisconsin. The inventory findings and forecasts were related to air carrier activity, general aviation activity, and military aviation activity. The forecast of aviation demands provides an important basis for considering the need for new or expanded components of the regional airport system.

Air Carrier Activity: During the 1960s, passenger enplanements at General Mitchell International Airport increased steadily at an average annual rate of about 9 percent and, during the 1970s, at an average annual rate of about 6 percent. From 1980 to 1984, however, passenger enplanements at General Mitchell International Airport decreased at an average annual rate of about 5 percent. This decline occurred when Southeastern Wisconsin experienced a period of severe economic recession and Milwaukee's former importance as a center for connecting flights was reduced as a result of the deregulation of the airline industry. Since 1985, passenger enplanements have increased at anaverage annual rate of 5.5 percent, to a total of 2.6 million enplaning passengers in 1995. By the year 2010, enplaning passenger levels at General Mitchell International Airport may be expected to approximate 4.0 million under the most probable conditions. This forecast level of enplaning passenger traffic represents an increase of over 50 percent over the 1995 level of 2.6 million enplaning passengers, or an average increase of about 3 percent per year to the year 2010. This forecast of enplaning passengers was based upon continued regional population, household, and employment growth as envisioned in the Commission's year 2010 intermediate forecasts of demographic and economic change within the Region and also assumed continued competitive airline fares, with an increase in hub-oriented airline operations.

A survey of enplaning passengers conducted in 1989 at General Mitchell International Airport indicates that most enplaning passengers, 74 percent, began their trips within the Region; about 43 percent of all enplaning passengers began their trips in Milwaukee County. These percentages are similar to those found in 1971, when Commission surveys found that 72 percent of the enplaning passengers began their trips within the Region and 54 percent of all enplaning passengers did so within Milwaukee County. The trip destinations of enplaning passengers included virtually every major city in the United States, as well as many in foreign countries, with the largest number of destinations being in Florida, California, and New York. The primary purposes of air carrier travel were work-related, stated by 54 percent of enplaning passengers, and social-recreation-vacation, stated by 33 percent of enplaning passengers.

About 75 percent of enplaning passengers reached General Mitchell International Airport by automobile in 1989, a figure not substantially different from the corresponding percentage in 1971. Passengers tend most often to be male and middle-aged, although the percentage of female passengers increased from 29 percent in 1971 to 40 percent in 1989. The median age of passengers, 41 years, was the same in both 1971 and 1989. The median annual household income of passengers, expressed in constant 1995 dollars, was $65,000 in 1971 and $68,000 in 1989. Special surveys of residents of Southeastern Wisconsin who use Chicago O'Hare International Airport rather than General Mitchell International Airport indicate that the proportion of such passengers has not changed significantly between 1970 and 1989, remaining at about 20 percent of all enplaning passengers who are residents of the Region.

Although passengers remain the predominant air carrier traffic base for General Mitchell International Airport, substantial volumes of air cargo and airmail are also accommodated there, both in the cargo compartments of passenger aircraft and in all-cargo aircraft. The volume of air cargo enplaned and deplaned has increased substantially since 1985, totaling about 26,000 tons in 1971, 24,000 tons in 1985, and 80,500 tons in 1993. Forecasts of future air cargo activity envision continued increase, to a level of 207,000 tons by the year 2010, an annual growth rate of about 6 percent per year. The volume of airmail enplaned and deplaned at General Mitchell International Airport has steadily increased, from 11,000 tons in 1971 to about 17,000 tons in 1985 and to about 22,000 tons in 1993. The most likely forecast for airmail envisions an annual growth rate of about 1.5 percent per year, to an annual level of 27,000 tons of airmail by the year 2010. Exclusive cargo flights at General Mitchell International Airport accounted for only about 1 percent of total aircraft operations during 1995; even under the highest-growth forecasts they are expected to continue to constitute a very small proportion of total activity to the year 2010.

Air carrier operations at General Mitchell International Airport totaled 118,000 during 1995, having increased from 74,000 in 1970 and 84,000 in 1985. A total of about 168,000 air carrier operations is forecast at General Mitchell International Airport for the year 2010. Air carrier operations are forecast to continue to increase at a slightly lower rate than passenger enplanements. The number of enplaning passengers per aircraft departure at General Mitchell International Airport increased from 30 in 1970 to 40 in 1985, has remained at about 40 in 1995, and is forecast to increase to about 50 by the year 2010.

General Aviation Activity: The extent of general aviation activity is measured by the number of aircraft registered and based in the Region, as well as by the number of annual aircraft operations, that is, landings and takeoffs that occur at airports in the Region. With respect to aircraft, there were 1,490 active general aviation aircraft based in the Region in 1993, representing about 29 percent of all general aviation aircraft in the State of Wisconsin. This compares to about 960 general aviation aircraft in the Region during 1971, or, at that time, 37 percent of all such aircraft in Wisconsin, and about 1,350 general aviation aircraft in the Region in 1984, or about 32 percent of all such aircraft in Wisconsin. General aviation aircraft based in Wisconsin have consistently constituted about 2 percent of all general aviation aircraft in the United States over the past 25 years. The size of the general aviation fleet in the Region was estimated to range from 1,350 to 1,960 general aviation aircraft by the year 2010, with a forecast level of 1,640 aircraft. This forecast level represents an average annual increase of less than 1 percent in the size of the Region's general aviation fleet to the year 2010.

In 1993, the general aviation aircraft fleet based in Southeastern Wisconsin consisted of 79 percent small, single-engine, propeller-driven aircraft; 9 percent small, twin-engine, propeller-driven aircraft; 4 percent large, multi-engine aircraft; 3 percent jet aircraft; 1 percent helicopters; and 4 percent other aircraft, such as balloons and sailplanes. The year 2010 forecasts for the regional general aviation fleet envision the share of small, single-engine, propeller-driven aircraft decreasing to 73 percent; the share of small, twin-engine, propeller-driven aircraft remaining at 9 percent; the share of large, multi-engine aircraft increasing to 7 percent; and the share of jet aircraft increasing to 4 percent of the regional fleet. The shares of helicopters and "other" aircraft are forecast to increase modestly to 2 percent and 5 percent, respectively, of the regional fleet.

The most active general aviation pilots within the Region are those who fly for pay, such as instructors, inspectors, air taxi pilots, and corporate pilots. Inbound and outbound general aviation flights average 1.8 crew members and 1.4 passengers per flight. The most common trip purposes are social-recrea-

tional activities, to conduct work-related business, or to improve flight proficiency.

General aviation aircraft operations at all public-use airports were estimated to total about 797,000 in 1993, an increase from the 680,000 operations during 1984 and 773,000 operations in 1971. Of the 23 public-use airports in Southeastern Wisconsin, it was estimated that nine, General Mitchell International Airport, Lawrence J. Timmerman Airport, West Bend Municipal Airport, Kenosha Regional Airport, Waukesha County-Crites Field, Capitol Airport, Batten Airport, East Troy Municipal Airport, and Burlington Municipal Airport, together accounted for over 80 percent of all general aviation operations within the Region at public-use airports. General aviation activity in Southeastern Wisconsin experienced steady growth throughout most of the 1970s, reaching record or near-record levels in 1978. From 1979 through 1983, annual activity declined due to the severe economic recession and the increasing costs of purchasing, operating, and maintaining general aviation aircraft. In 1985, activity once again began to rise. The number of general aviation operations in the Southeastern Wisconsin Region is forecast to increase to about 960,000 by the year 2010, an increase of about 18 percent over the 1993 level.

Other segments of general aviation activity include helicopter activity and ultralight activity. Helicopter activity, although increasing, represents a very small portion of total general aviation activity in Southeastern Wisconsin. In 1993, there were only 18 nonmilitary helicopters based in the Region, an increase of four over the 1985 level. Ultralights, which are essentially small gliders assembled from kits and powered by small engines, have enjoyed increased popularity among sports fliers. Ultralights represent an inexpensive way for nonfliers to pursue an initial interest in flying, as well as a way for regularly licensed pilots who can no longer afford to maintain their own airplanes to keep flying. Although helicopter and ultralight activity may be expected to increase in the future, along with the remaining segments of general aviation, it was assumed for regional airport system planning purposes that general aviation activity as a whole will not be substantially affected by these two types of flying.

Military Aviation Activity: Although there are no explicitly military-use airports located in Southeastern Wisconsin, significant military aviation activity does occur at General Mitchell International Airport and West Bend Municipal Airport. Overall, the level of military aircraft operations within the Region has been relatively stable, at about 15,000 operations in 1971, 21,000 operations in 1985, and 17,000 operations in 1993. For regional airport system planning purposes, it was assumed that the number of military aircraft operations in Southeastern Wisconsin will remain at about the 1993 level.

Legal and Institutional Considerations

Public airport development in the Region involves Federal, State, and local units and agencies of government, as well as private interests. Effective airport system development in the Region therefore requires close cooperation and coordination among these agencies and interests. The local unit of government owning or desiring to sponsor airport facility development must look to the Wisconsin Department of Transportation and the Federal Aviation Administration for technical and financial assistance. Airport development within the Region will depend upon local sponsors to initiate expansion and acquisition of existing airports in accordance with the recommendations of the regional airport system plan. Normally, such a sponsor must be a public agency or governmental unit. Only if the proposed improvement project involves an airport designated by the Federal Aviation Administration as a "reliever" airport is a private sponsor eligible for Federal and State financial assistance. Batten Airport and Capitol Airport are presently the only privately owned airports in the Region which meet this requirement. Availability of local funds to match State and Federal funds available for airport development will depend upon the local sponsor's willingness to fund airport projects in competition with other demands for public financing. Monies for Federal funding assistance are generated entirely from air transportation system user fees and taxes.

The State of Wisconsin also provides funds for airport development. Airport improvement projects in Wisconsin are set forth and prioritized by the Wisconsin Department of Transportation in a five-year airport improvement program, a schedule of improvements that is revised on a biennial basis. Only those airports included in the Wisconsin airport system plan are eligible for State airport aid. Like Federal funds, State funds for airport development are derived from user fees and taxes.

DEFICIENCY ANALYSIS OF EXISTING AND COMMITTED AIRPORT SYSTEM

An important step in the development of the new regional airport system plan was the identification of capacity and runway-length deficiencies, both current deficiencies and those which may be expected to exist by the design year of the system plan if the public-use airports of the Region are not improved beyond current levels. This identification of deficiencies was essential to determining the need for improvements to public airports and the need, if any, for the development of new airports. Such an identification was also essential to permit the local governments and State and Federal agencies concerned to determine, upon the proposed closing of any privately owned airports within the Region, whether or not those airports are vital to maintaining an adequate system of airport facilities to serve future levels of aviation demand in Southeastern Wisconsin and, therefore, whether or not they should be acquired and operated by the public.

Airport capacity deficiencies were identified through comparisons of the forecast annual aviation demand with the annual airfield capacity for each airport in the system. Airfield capacity is the critical measure of the ability of an airport to serve aviation demand, because the provision of the airport runways and taxiways needed to safely and efficiently accommodate a specified number of aircraft takeoffs and landings normally entails greater cost and disruption than the provision of terminal or ground access facilities. Airfield capacity is defined by the Federal Aviation Administration as the number of aircraft operations equal to 60 percent of an airport's annual service volume, or maximum capacity. A variety of factors are considered in determining an airport's annual service volume, including the configuration of the runways and taxiways, aircraft operational regulations and practices, the mix of different aircraft types, and weather conditions. Under a given set of conditions, when the annual number of forecast aircraft operations exceeds 60 percent of the airport's annual service volume, traffic congestion will begin to affect the safe and efficient operation of the airport, which will experience increasingly unacceptable and costly delays.

For the purposes of identifying deficiencies, two different regional airport systems were analyzed. One system consisted of all 23 airports in the Region which were available for public use, including eight publicly owned and 15 privately owned airports. The second system consisted of only 10 of the 23 airports available for public use: the eight publicly owned public-use airports and two privately owned public-use airports, Batten Airport and Capitol Airport. This smaller, or basic, system of airports was intended to represent the minimum number of airports that could reasonably be expected to remain in service through the plan design year. Although a privately owned airport, Batten Airport has undergone significant capital improvements in recent years, serves substantial aviation demand, has been identified as a reliever airport to General Mitchell International Airport, and has been recommended to be in the regional airport system since adoption of the original regional airport system plan. Capitol Airport serves substantial aviation demand, has undergone detailed airport master planning, has been identified as a reliever airport to General Mitchell International Airport, and was recommended to be in the regional airport system under the existing regional airport system plan. The analysis of the capacity deficiencies associated with the basic regional airport system provides information that will be important in determining the need for governmental action when the closing of private airports within the Region is proposed. Such governmental action could include the provision of additional capacity at nearby publicly owned airports or public acquisition and operation of the privately owned airport whose closure is proposed.

Only one capacity deficiency was determined to exist under current levels of demand under either of the airport systems identified above. A comparison of the existing operations to the existing and committed capacity at the airports involved indicated that the level of operations at each airport was below each airport's airfield capacity, with the exception of General Mitchell International Airport, where operations were determined to exceed capacity.

Probable future year 2010 capacity deficiencies were also determined by comparing forecast demand to existing airport capacity under each of the two airport systems. Again, only one capacity deficiency was determined to exist. The analyses indicated that even if all 23 current public-use airports in the Region remained open to the year 2010, General Mitchell International Airport could be expected to operate substantially over capacity.

The deficiency analysis also indicated that two airports had primary runway lengths inadequate to accommodate existing aircraft demands: Burlington Municipal Airport, which had a primary-runway-

length deficiency of 300 feet, and Hartford Municipal Airport, which had a primary-runway-length deficiency of 900 feet. The results of this analysis under the forecast future year 2010 demand indicated that three additional airports may be expected to experience primary-runway-length deficiencies by the year 2010: East Troy Municipal Airport (500 feet), Kenosha Regional Airport (900 feet), and West Bend Municipal Airport (1,000 feet).

With respect to providing the Region with adequate accessibility to the range of airports, those areas of the Region inadequately served by the basic system of 10 airports were identified through analysis of ground travel times from all areas of the Region to one or more airports of each Federal Aviation Administration classification. It was determined that for Air Carrier airports, nearly all of the resident population of the Region was within an acceptable ground travel time of 60 minutes of General Mitchell International Airport. For Transport-Corporate airports, it was determined that all of the Region was within an acceptable ground travel time of 45 minutes of one or more such airports, with the exception of western Walworth County and northern Ozaukee and Washington Counties. For General Utility airports and Basic Utility airports, all of the Region, except for a very few small areas located mostly in outlying rural areas, northeastern Ozaukee County and northwestern and southwestern Walworth County, may be expected to be within an acceptable ground travel time of 30 minutes of one or more such airports.

DESIGN AND EVALUATION OF ALTERNATIVE AIRPORT SYSTEM IMPROVEMENTS

The deficiency analysis of the existing and committed airport system indicated three potential problems: 1) inadequate airfield capacity at General Mitchell International Airport under existing and probable future conditions, 2) primary runway lengths inadequate to accommodate existing or future forecast aircraft demand, or both, at five general aviation airports, and 3) inadequate accessibility to a Transport-Corporate airport in western Walworth County, including the Elkhorn area, and in northern Ozaukee and Washington Counties.

With respect to the airfield capacity deficiency at General Mitchell International Airport, it was concluded that the airfield capacity improvements recommended under the recently completed General Mitchell International Airport master plan would provide the capacity needed to address these deficiencies. The principal capacity expansion improvement recommended involves the construction of a new air carrier runway, specifically, a new 7,000-foot-long runway envisioned to be located about 3,500 feet south of and parallel to the existing primary east-west air carrier runway. The construction of the new parallel runway recommended in the new master plan for Mitchell International is consistent with recommendations in the first- and second-generation regional airport system plans. The evaluation of alternative locations for the new runway conducted during the preparation of the new airport master plan concluded that the recommended location provided the needed capacity with the least disruption. Under previous regional airport system plans, the issue of relocating General Mitchell International Airport was thoroughly investigated and rejected. Also, the potential of resolving the capacity deficiency by relocating General Mitchell International general aviation traffic was evaluated and dismissed.

As noted above, primary-runway-length deficiencies were identified at five airports: Burlington Municipal Airport, East Troy Municipal Airport, Hartford Municipal Airport, Kenosha Regional Airport, and West Bend Municipal Airport. Alternatives involving extending existing runways and constructing new runways to permit accommodation of existing aircraft under larger loads, or of larger and higher-performance aircraft, were identified and evaluated with respect to ability to serve existing and forecast aviation demand, construction costs, land acquisition requirements, and environmental impacts.

Another deficiency identified, as noted above, was inadequate accessibility in two areas of the Region to Transport-Corporate airports. The portions of northern Ozaukee and Washington Counties centered on the communities of Port Washington and West Bend were determined to be outside the 45-minute travel-time standard for access to Transport-Corporate airports. The long-recommended improvement of West Bend Municipal Airport from a General Utility airport to a Transport-Corporate airport would permit the areas involved to meet this standard.

The other area of the Region with an accessibility deficiency to Transport-Corporate airports was western Walworth County, whose travel time to such airports was determined to be approaching and exceeding the maximum-travel-time standard of 45 minutes for access to such airports. Several alternatives were examined to address this deficiency, including the improvement of an existing

privately owned airport site in the Elkhorn-Delavan area, the development of a new airport in the Elkhorn area, and the improvement of Burlington Municipal Airport to Transport-Corporate standards. Burlington Municipal Airport is approximately 12 miles and 20 minutes' travel time from the Elkhorn area. The improvement of Burlington Municipal Airport from a Basic Utility-category airport to a Transport-Corporate—category airport was ultimately recommended, as it was needed as well to serve forecast aviation demand in the Burlington area, was supported by the City of Burlington, and entailed significantly lower capital and operating costs and land acquisition needs than the other alternatives considered.

The deficiency analysis of the existing regional airport system indicated that only 10 of the existing 23 public-use airports were essential to be retained in operation to provide sufficient airfield capacity to satisfy the existing and forecast year 2010 aviation demand, and to provide desirable accessibility to airports of all types from all parts of the Region. The 10 essential airports included all eight of the publicly owned airports within the Region and two privately owned public-use airports: Batten Airport and Capitol Airport.

It was determined, however, to continue to recommend that Sylvania Airport be included as an 11th recommended airport in the regional airport system plan. Sylvania Airport serves a significant volume of activity generated by small general aviation aircraft, particularly sport and recreation aircraft. By attracting such activity away from other airports in the regional system that accommodate business, corporate, and commercial aircraft activity and that operate in densely populated urban areas, Sylvania Airport may be expected to contribute to a safer, less congested system of public-use airports within Southeastern Wisconsin and to assist in reducing the impacts of such airports on developed urban areas.

RECOMMENDED REGIONAL AIRPORT SYSTEM PLAN

The new regional airport system plan recommends the minimum number and type of airports considered essential to accommodate the existing and probable future aviation demand in Southeastern Wisconsin. It envisions a basic system of 11 airports, all of which are currently open for use by the general public. Eight of these airports are currently publicly owned, and three, Batten, Capitol, and Sylvania Airports, are privately owned. The plan recommends the continued operation of, but not necessarily the public acquisition of, the three privately owned airports. Public acquisition of these three airports is recommended only if the operation of these airports is proposed to be discontinued. The plan recognizes that this basic system of 11 airports may be supplemented by 12 additional existing privately owned public-use airports and that the continued operation of these additional privately owned airports could permit the deferral of some of the aircraft-storage-related and other general-aviation-capacity-related improvements recommended for the 11 airports in the regional system plan. The plan neither recommends the closing of any of these additional airports nor relies upon their continued existence.

A preliminary version of the new regional airport system plan was the subject of a series of public hearings held by the Technical Coordinating and Advisory Committee on behalf of the Regional Planning Commission during June 1996. Each public hearing was preceded by an informational meeting which afforded interested individuals an opportunity to review the findings and recommendations of the proposed new plan and to ask questions about and discuss the proposed plan directly with Commission staff. The meetings and public hearings were attended by a total of 159 persons; 24 letters were received for the record following the public hearings.

Careful examination of the record of the public hearings indicated general support for the recommended system of 11 public-use airports, including General Mitchell International Airport and the 10 general aviation airports. No comments were made which proposed deletion of any of these 11 airports from the regional airport system plan, and no comments were made proposing the addition of any airports to this proposed system of 11 essential airports. Moreover, a number of those making comments in opposition to proposed improvements at some of the 11 airports indicated support for the continued operation of the airports at their existing level of development and the inclusion of those airports in the system plan.

The record of the public hearings indicated that only support was expressed for the continued maintenance and proposed improvements at General Mitchell International Airport and Lawrence J. Timmerman Airport in Milwaukee County, Waukesha County-Crites Field in Waukesha County, Sylvania Airport in Racine County, and Hartford Municipal Airport in Washington County. The

record of public hearings further indicated that no comments were made concerning the continued maintenance and proposed improvements at Capitol Airport in Waukesha County, and Batten Airport in Racine County.

The record indicated that much of the attention at the hearings was directed toward the recommendations concerning the preliminary plan proposed improvements to the Burlington Municipal Airport in Racine County, Kenosha Regional Airport in Kenosha County, and West Bend Municipal Airport in Washington County. Statements of both opposition and support were expressed for the improvements at each of these three airports. The record of the public hearings further indicated that only one comment was made with regard to the East Troy Municipal Airport in opposition to the proposed improvements at that airport.

In response to the public comments received at the public hearings and to written comments received following the hearings, the Advisory Committee determined that the recommended new plan should continue to consist of the system of 11 essential airports identified in the preliminary plan. Moreover, as only statements of support were received with respect to proposed improvements at seven of those 11 airports, the Advisory Committee also determined that recommendations concerning those improvements in the new system plan should remain unchanged from those contained in the preliminary plan. The seven airports include General Mitchell International Airport, Lawrence J. Timmerman Airport, Waukesha County-Crites Field, Capitol Airport, Batten Airport, Sylvania Airport, and Hartford Municipal Airport. With respect to the remaining four airports comprising the recommended regional system, East Troy Municipal Airport, West Bend Municipal Airport, Kenosha Regional Airport, and Burlington Municipal Airport, the Advisory Committee carefully considered the public comments received at the public hearings in support of, and opposition to, the proposed improvements. Based upon that consideration, the Advisory Committee determined that the recommendations contained in the preliminary system plan for the improvements at three of these airports, East Troy Municipal Airport, West Bend Municipal Airport, and Kenosha Regional Airport, should remain unchanged in the recommended plan, but should include careful consideration of environmental assessment, stormwater drainage, runway-protection zone, noise levels, and surrounding community coordination and involvement issues, as appropriate for each airport.

With respect to Burlington Municipal Airport, the Advisory Committee determined that a substantial reduction in the proposed improvements for the Burlington Municipal Airport as included in the preliminary plan were warranted in response to the public comment. In the final plan, a recommended runway extension from 3,600 feet to only 4,300 feet was included, a significant reduction from the 4,800 feet recommended in the preliminary plan. Also, the installation of an instrument landing system was no longer included in the plan and the proposed paving of the existing turf crosswind runway limited to a length of 2,300 feet instead of the 3,900 feet as proposed in the preliminary plan. These improvements could be implemented entirely within existing airport boundaries and would eliminate the need for significant acquisition of prime agricultural lands surrounding the airport. The recommended reduced length of the primary runway would mean that Burlington Municipal Airport would be upgraded only from a Basic Utility to a General Utility airport.

The final version of the new regional airport system plan recommends that six of the 11 airports undergo major airfield improvements during the plan design period. These improvements would enable these airports to safely accommodate larger and higher-performance aircraft, significant increases in aviation demand or the same types of aircraft currently accommodated, but under a wider range of aircraft loading and weather conditions. These improvements would result in a change of the Federal Aviation Administration classification for three of the six airports concerned. The recommended regional airport system includes one Air Carrier (AC) airport; four airports classified as Transport-Corporate (T-C) airports; four airports classified as General Utility (GU) airports; and two airports classified as Basic Utility (BU) airports. The single air carrier airport is Milwaukee County's General Mitchell International Airport. The four Transport-Corporate airports include Batten Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The four General Utility airports include Burlington Municipal Airport, East Troy Municipal Airport, Hartford Municipal Airport, and Lawrence J. Timmerman Airport. The two Basic Utility airports consist of Capitol Airport and Sylvania Airport.

The plan envisions that General Mitchell International Airport will remain the only airport serving scheduled air carriers within the Region through the planning period. The other 10 airports are intended not only to serve as the primary general

aviation airports in subareas of the Region, but also to perform a critical function in relieving general aviation demand at Mitchell International, decreasing congestion, delays, and potential safety hazards at that airport. On the basis of their ability to accommodate a wide range of general aviation aircraft types and their proximity to Mitchell International, the most important, or "first-tier," reliever general aviation airports are envisioned to be Batten Airport, Kenosha Regional Airport, Waukesha County-Crites Field, and West Bend Municipal Airport. The second tier of envisioned reliever airports includes Burlington Municipal Airport, East Troy Municipal Airport, Capitol Airport, Hartford Municipal Airport, Lawrence J. Timmerman Airport, and Sylvania Airport. The second-tier airports are intended to relieve General Mitchell International Airport through their relief of the first-tier reliever airports.

The plan sets forth recommendations for improvements for each of these 11 airports, including land acquisition and runway, apron, navigational aid, and terminal facility improvements, as well as recommendations for the control of surrounding land uses at each airport to provide for safe and efficient operation. Key recommendations are summarized as follows:

General Mitchell International Airport

It is recommended that General Mitchell International Airport remain the sole Air Carrier airport within the Region, providing facilities adequate to accommodate all types of aircraft up to, and including, large commercial air carrier aircraft, large military aircraft, and high-performance corporate aircraft. It is recommended that the improvements proposed in the recently completed airport master plan and reaffirmed in the deficiency analysis conducted under the current regional airport system planning effort be implemented over the plan design period to more safely and efficiently accommodate the forecast levels of air carrier, military, and general aviation operations. These improvements include the realignment and extension to 4,800 feet of the existing parallel east-west runway 7L/25R; the construction of a new 7,000-foot-long primary runway and parallel taxiway located about 3,500 feet south of, and parallel to, the existing primary east-west runway, 7R/25L; the extension of the primary east-west runway, 7R/25L, by almost 1,000 feet, to an ultimate length of 9,000 feet; the extension of the parallel north-south runway, 1R/19L, by about 2,850 feet, to an ultimate length of 7,000 feet; the construction of a runway safety overrun for the south end of the north-south primary runway, 1L/19R; and the eventual decommissioning of the general aviation runway, 13/31.

The implementation of these needed improvements will require the acquisition of land and easements beyond the present airport boundaries, relocation of some military facilities currently located on the airport site, and relocation of some existing residences near the existing southwest boundary of the airport. Recommended improvements to the terminal area facilities include construction of additional gates and expansion of automobile parking facilities for the air carrier passenger terminal, construction of additional apron and terminal facilities for the air cargo terminal, and relocation of existing general aviation hangars currently located immediately south of the air carrier passenger terminal. Implementation of the needed airfield improvements will also require the relocation of a one-mile-long segment of College Avenue and the placement of S. Howell Avenue in a tunnel beneath the new east-west primary runway and taxiway proposed to be constructed, the construction of a bridge structure to carry the runway safety overrun for runway 1L/19R over E. College Avenue, and the closing of a 0.8-mile-long segment of S. 6th Street.

Batten Airport

It is recommended that Batten Airport remain classified as a Transport-Corporate airport and continue to be maintained over the plan design period to meet the standards for that classification. Some improvements were determined to be warranted, including land and easement acquisition to better provide necessary runway safety and object-free areas, the construction of connecting taxiways, and the expansion of hangar facilities.

With the recommended improvements, the airport would be able to continue effectively and safely to serve virtually all single-engine piston, twin-engine piston, and turboprop aircraft, as well as most business and corporate jets. These improvements would allow the airport to continue to function as an important reliever airport for General Mitchell International Airport and the primary general aviation airport for the greater Racine area.

Kenosha Regional Airport

It is recommended that Kenosha Regional Airport remain classified as a Transport-Corporate airport and continue to be maintained over the plan design period to meet the standards for that classification. To accommodate existing corporate jet aircraft under a full range of weather and load conditions

better, the eventual extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 6,400 feet, is recommended during the plan design period. Also recommended is the expansion of terminal and hangar facilities.

With these improvements, the airport would be able to serve all small single-engine piston, twin-engine piston, and turboprop aircraft, as well as virtually all small-, medium-, and large-sized business and corporate jets effectively and safely. These improvements will also allow the airport to continue functioning as an important reliever airport for General Mitchell International Airport and for airports in northeastern Illinois and also serve as well as the primary general aviation airport for the greater Kenosha area.

If the City of Kenosha elects to proceed with the improvements, it is recommended that, prior to such action, the airport master plan be updated and include a benefit-cost analysis and appropriate environmental assessment work, a stormwater drainage study be conducted to address existing drainage problems in the vicinity of the airport, a study of existing runway-protection zone conflicts be conducted to address long term solutions to runway-protection zone issues, and a Federal Aviation Administration Part 150 noise study be conducted. It was recommended that consideration of these issues in the airport area be conducted by the City of Kenosha in close cooperation with Kenosha County, the Towns of Bristol, Paris, and Somers, and the Village of Pleasant Prairie.

Waukesha County-Crites Field

It is recommended that Waukesha County-Crites Field remain classified as a Transport-Corporate airport and continue to be maintained over the plan design period to meet the standards for that classification. Improvements recommended include relocation of the parallel taxiways for both the primary runway and crosswind runway; relocation and expansion of the apron and attendant connecting taxiways; and relocation and expansion of the airport terminal, fixed-based-operator hangars, and aircraft storage hangars presently located in the northeast corner of the airport. The parallel taxiway for the primary runway would need to be relocated so that the centerline of the taxiway is at least 400 feet from the centerline of the runway, an increase of 200 feet, to meet Federal Aviation Administration requirements for taxiway separation.

With these improvements, the airport would be able to serve all single-engine piston, twin-engine piston, and turboprop aircraft, as well as most business and corporate jets effectively and safely. These improvements would also allow the airport to continue functioning as an important reliever airport for General Mitchell International Airport and serve as the primary general aviation airport for much of Waukesha County.

West Bend Municipal Airport

It is recommended that West Bend Municipal Airport, which is currently classified as a General Utility airport, be improved over the plan design period to Transport-Corporate standards. The major improvements necessary to accomplish this include construction of a new 5,500-foot-long primary runway and parallel taxiway on a new approximately northeast-southwest alignment, conversion of the existing 4,500-foot-long primary runway to be the new crosswind runway, land and easement acquisition to enable the recommended airfield expansion, installation of an instrument landing system, and expansion of terminal and hangar facilities. A segment of STH 33 approximately one mile in length would require relocation to accommodate the new primary runway alignment and terminal area.

With these improvements, the airport would be able to serve virtually all single-engine piston, twin-engine piston, and turboprop aircraft, as well as most business and corporate jets effectively and safely. These improvements would allow the airport to continue functioning as an important reliever airport for General Mitchell International Airport and as the primary general aviation airport for much of Washington and Ozaukee Counties.

Burlington Municipal Airport

It is recommended that Burlington Municipal Airport, which is currently classified as a Basic Utility airport, be improved over the plan design period to General Utility standards. The major improvements necessary to accomplish this include extension of the primary runway by 700 feet, to a total length of 4,300 feet, paving of the crosswind runway and taxiway to a length of 2,300 feet, and expansion of terminal and hangar facilities.

With these improvements, the airport would be able to serve all single-engine and most twin-engine piston aircraft and many turboprop aircraft effectively and safely. These improvements would also allow the airport to continue to function as a

reliever airport for General Mitchell International Airport and for other larger General Aviation airports in the regional airport system and serve as a primary General Aviation airport for much of western Racine and Kenosha Counties and portions of Walworth County.

East Troy Municipal Airport

It is recommended that East Troy Municipal Airport remain classified as a General Utility airport and continue to be maintained over the plan design period to meet the standards for that classification. Improvements recommended include extension of the primary runway and parallel taxiway by 500 feet, to an ultimate length of 4,400 feet; paving of the crosswind runway and taxiway to a length of 2,380 feet; and the expansion of terminal and hangar facilities.

With these improvements, virtually all small single-engine, most twin-engine, and many turboprop aircraft may be accommodated at the airport. These improvements would also allow the airport to continue to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system and serve as the primary general aviation airport for much of Walworth County and southern Waukesha County.

Hartford Municipal Airport

It is recommended that Hartford Municipal Airport, which is currently classified as a Basic Utility airport, be improved over the plan design period to General Utility standards. The improvements recommended include extension of the primary runway and parallel taxiway by 900 feet, to an ultimate length of 3,900 feet; paving and extension of the existing crosswind turf runway and parallel taxiway to a length of 3,200 feet; land and easement acquisition to enable the recommended airfield expansion; and the expansion of terminal and hangar facilities. If it is found that expansion of the airport to Transport-Corporate standards is warranted in the future, the primary runway and parallel taxiway could be extended under a later phase of development to a length of 4,900 feet; the crosswind runway and parallel taxiway could be extended to a length of 3,900 fee, and an instrument landing system could be installed. Additional land and easement acquisition would be necessary to enable this later expansion. Such additional improvements are not, however, being recommended at this time.

With the recommended improvements to General Utility standards, the airport would be able to serve all small single-engine piston and twin-engine piston aircraft as well as many turboprop aircraft effectively and safely. These improvements would allow the airport to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system and serve as the primary general aviation airport for western Washington County and northwestern Waukesha County.

Lawrence J. Timmerman Airport

It is recommended that Lawrence J. Timmerman Airport remain classified as a General Utility airport and continue to be maintained over the plan design period to meet the standards for that classification. Improvements recommended include the acquisition of additional easements to protect runway approaches, and improvements to terminal and hangar facilities.

Maintaining this airport to General Utility standards will enable the airport to continue to accommodate all single-engine piston, most twin-engine piston, and many turboprop aircraft. It is intended that Lawrence J. Timmerman Airport continue functioning as an important reliever airport for General Mitchell International Airport and serving as the primary general aviation airport for northern Milwaukee County and southern Ozaukee County.

Capitol Airport

It is recommended that Capitol Airport remain classified as a Basic Utility airport, and continue to be developed over the plan design period to better meet the standards for that classification. Improvements recommended include reconstruction and widening of the existing turf crosswind runway to provide a new primary runway with a length of 3,600 feet, reconstruction and extension of the existing primary runway to provide a crosswind runway with a length of 2,600 feet, construction of partial parallel taxiways for the primary and crosswind runways, land and easement acquisition to enable the recommended airfield expansion, construction of an apron; and expansion of terminal and hangar facilities.

With these improvements, the airport would be able to accommodate most single-engine piston and a variety of twin-engine piston aircraft effectively and safely. These improvements would also allow the airport to continue functioning as a reliever

airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system and serving as an important general aviation airport for much of Waukesha County.

Sylvania Airport

It is recommended that Sylvania Airport, which currently does not meet Basic Utility airport standards, be improved over the plan design period to such standards. The improvements recommended include construction of a new primary runway and parallel taxiway to a length of 2,800 feet, construction of a new crosswind runway to a length of 2,200 feet, land and easement acquisition to enable the needed airfield expansion, and relocation and expansion of the terminal and hangar facilities.

With these improvements, the airport would be able to serve most small single-engine piston aircraft and many twin-engine piston aircraft effectively and safely. These improvements would also allow the airport to function as a reliever airport for General Mitchell International Airport and for other larger general aviation airports in the regional airport system and serve as an important general aviation airport for personal, sport, recreational, and training activities for Racine, Kenosha, and Milwaukee Counties.

Capital Costs of Recommended Improvements

The total capital cost of all recommended improvements at the 11 airports, expressed in constant 1995 dollars, is approximately $582 million to the year 2010, of which about $511 million may be attributed to improvements at General Mitchell International Airport and about $71 million to improvements at the 10 general aviation airports. The significantly greater costs for Mitchell International are a result of its unique size and function and of the substantial capacity expansion proposed under the recommended plan, much of which has a design life which extends beyond the plan design period. The funding of facility capital and operating costs at Mitchell International is also unique in that it includes Federal and State aids, user charges, and funding by the commercial air carriers serving the airport. These commercial air carriers have indicated in the preparation of the Mitchell International master plan that they will provide the local funding of the planned airport improvements as they are programmed to meet improvement needs.

The feasibility of implementing the improvements at the 10 general aviation airports recommended over the plan design period under the proposed new plan can be assessed by comparing the estimated capital costs required to implement the new regional airport system plan with historical capital expenditures for these 10 airports. During the 10-year period from 1986 through 1995, improvements totaling $53 million were made at the 10 airports, representing an average annual capital investment of $5.3 million. Of this total, about 78 percent came from Federal funding assistance, about 14 percent came from State funding assistance, and about 8 percent came from funding contributed by the local airport sponsors. The estimated average annual investment of $4.7 million required to implement the general aviation airport element of the new regional airport system plan is less than the average annual investment of $5.3 million made for the 10 general aviation airports during the past 10 years.

While the estimated average annual investment required to implement the general aviation airport element of the new plan is less than the average annual investment made for the 10 general aviation airports during the past 10 years, it was recognized that less Federal funding may become available for airport improvement projects in the future than has been the case in the recent past. For example, because the collection of Federal airport improvement trust fund revenues through passenger ticket sales by air carriers had been allowed by the Congress to lapse, a decrease in available funds over the next few years may be expected. Therefore, future levels of Federal funding may be somewhat lower than past levels. This may require that some of the improvements identified in the new plan be delayed by the local airport sponsors, pending Federal funding availability.

PLAN IMPLEMENTATION

The recommended regional airport system plan for Southeastern Wisconsin cannot be considered complete until the steps required to implement the plan, that is, to convert the plan into action plans and policies, have been specified. The legal and governmental framework of the Southeastern Wisconsin Region is such that the existing State, county, and local units and agencies of government, and certain private concerns, can implement all of the major recommendations of the new regional airport system plan. The planning report recommends a comprehensive, cooperative, intergovernmental plan implementation program indicating the specific actions which will be required of each level, agency, and unit of government involved, as

well as of concerned private-sector interests, if the updated plan is to be fully implemented.

During the preparation of the original regional airport system plan in 1975, alternative regional airport system institutional arrangements were examined in detail. It was recognized at that time that county sponsorship of public airport facilities was the best institutional structure for implementation of the then-recommended plan, because three large airports, General Mitchell International Airport, Lawrence J. Timmerman Airport, and Waukesha County-Crites Field, were already county-owned and because it was more feasible to obtain county ownership of airports than multi-county or State ownership in the five counties in the Region not then owning or operating an airport. In addition, given the broad service area for most of the airports and the size of the capital investment required, municipal ownership would not have resulted in an equitable distribution of costs and benefits from airport operations. Over the following 10-year period, none of the five county governments that were recommended to assume ownership and operation of an airport facility under the original regional airport system plan took any action in this respect. Therefore, sponsorship of the nine airports in the original regional airport system plan which were recommended to be placed under county ownership remained unchanged from that which existed in 1975.

There are several reasons why broader county sponsorship of airports did not occur. In a time of constrained fiscal resources, assuming ownership and operation of an airport represents an unwanted additional program of county expenditures. Moreover, the existing municipal and private owners of the airports concerned did not request county sponsorship. Most current proprietors apparently wished to retain ownership and several, including the private owners of Batten Airport and Capitol Airport, actively pursued major improvements.

Based upon consideration of these and other factors, the Commission staff and the Advisory Committee, during the preparation of the second-generation regional airport system plan in 1987, reached a number of conclusions concerning the institutional structure for plan implementation. First, the range of alternatives identified under the original airport system plan was determined to be exhaustive and no other feasible alternatives were found to exist. Second, the alternatives which proposed multi-county, regional, or State ownership and operation of airports had to be rejected again because they continued to be impractical to implement. Third, county sponsorship of all airports was also determined to be impractical to implement, based upon the experience since the adoption of the first-generation plan.

Accordingly, the recommended institutional arrangement for regional airport system development in the second-generation plan adopted in 1987 involved continuation of the arrangement in place at the 11 key airports in the regional air-port system plan, three of which were county-owned, five of which were municipally owned, and three of which were privately owned, and it was recommended that any changes be initiated only as necessary to retain the 11 key airports in opera-tion. When such change became necessary, consideration was to be given to county sponsorship because such sponsorship would provide a reasonably equitable balance of the benefits of the airport services provided with the cost of airport ownership and operation.

Because this recommended institutional arrangement remained unchanged from 1987 to 1996, and because, under this arrangement, significant implementation of the second-generation plan has been achieved, the continuation of existing airport sponsorship, considering change only as necessary to continue airport operations and achieve plan implementation, continues to be recommended under the proposed new regional airport system plan.

COMPARISON OF THE PROPOSED NEW REGIONAL AIRPORT SYSTEM PLAN WITH THE EXISTING REGIONAL AIRPORT SYSTEM PLAN

The proposed new regional airport system plan for Southeastern Wisconsin, as noted above, envisions a basic system of 11 public-use airports intended to serve the aviation needs of the Region to the year 2010. The key differences between the new, updated system plan and the existing plan are as follows:

Kenosha County

Both system plans include one airport, Kenosha Regional Airport, and recommend that airport to be maintained as a Transport-Corporate facility. The new system plan recommends the eventual extension of the primary runway by 900 feet, to a length of 6,400 feet, to enable aircraft that already use the airport to safely take off with full payloads. The existing plan recommends a primary runway length of 5,500 feet.

Milwaukee County

The recommendations in the new system plan for General Mitchell International Airport include a number of airfield-capacity-related improvements. The most significant of these recommendations is the eventual construction of a new 7,000-foot-long air carrier runway and taxiway to be located south of, and parallel to, the existing east-west primary runway. Both plans confirm the continued need for Lawrence J. Timmerman Airport, but do not recommend any airfield changes there. Timmerman Airport is expected to remain an important reliever facility for General Mitchell International Airport.

Racine County

Both system plans include three public-use airports. The new plan envisions Batten Airport and Sylvania Airport continuing to serve the same functions as those envisioned under the existing plan. The improvements recommended in the new system plan for Burlington Municipal Airport, however, reflect a change from those recommended in the existing plan. The new plan recommends that Burlington Municipal Airport be improved to a General Utility facility, a higher classification than Basic Utility, the currently recommended classification. Under the new plan, the primary runway is recommended to be extended from its present length of 3,600 feet, to a length of 4,300 feet.

Walworth County

Both system plans include a single public-use airport, East Troy Municipal Airport, which is recommended to be maintained as a General Utility facility. Accordingly, East Troy Municipal Airport is anticipated to perform the same role under the proposed new regional airport system plan as that envisioned under the existing plan. It is recommended that the airport's primary runway eventually be extended from its current length of 3,900 feet to 4,400 feet.

Washington County

Both system plans include two public-use airports: West Bend Municipal Airport and Hartford Municipal Airport. Both airports are envisioned to serve the same functions as those defined in the existing plan, although the new recommended airfield configurations differ from those identified in the existing plan. At West Bend Municipal Airport, which continues to be recommended to be improved to a Transport-Corporate facility with a 5,500-foot-long primary runway, the proposed airfield layout in the new plan has been refined to better address environmental corridor and highway relocation concerns in the area, as well as the need for additional area for terminal development. At Hartford Municipal Airport, which continues to be recommended to be improved to a General Utility facility with a 3,900-foot-long primary runway, the airfield layout was revised to better utilize the existing airport runways.

Waukesha County

Both system plans include two public-use airports: Waukesha County-Crites Field and Capitol Airport. Both airports are envisioned to serve the same functions under the two plans, although some recommended improvements differ. At Crites Field, which continues to be recommended to be maintained as a Transport-Corporate facility with a 5,850-foot-long primary runway, the eventual relocation of existing taxiways and terminal and hangar facilities is recommended to better conform to Federal Aviation Administration standards for runway-safety areas, object-free areas, and obstructions, as well as to provide additional area for terminal facility improvement and expansion. At Capitol Airport, which continues to be recommended to be maintained as a Basic Utility facility with a 3,600-foot-long primary runway, the recommended improvements have been modified to provide for partial parallel taxiways.

Other Public-Use Airports

Both the proposed new and the existing regional airport system plans recommend systems of public airports that include the minimum number of airports and improvements necessary to adequately and safely serve the existing and probable future aviation needs of the Region. Eleven public-use airports are included in the new regional airport system plan; the same 11 are included in the existing plan. Although specific recommendations for improvements are included only for this minimum system of 11 public-use airports, the proposed new plan, like the prior plans, recognizes the effect and importance of the existing privately owned public-use and private-use airports within the Region.

All the privately owned airports, particularly those open to public use, support the regional airport system by reducing the demand for facilities and services at those public-use airports specifically included within the plan. While those private airports not specifically in the plan are not vital to the provision of a basic system of airport facilitie within the Region, it remains recognized that such airports may continue to operate. To the extent that these airports do remain in operation, especially those that are open to use by the public, the demand

at those airports included in the new plan will be reduced. Moreover, the need for some improvements at those airports in the new plan can be deferred, specifically those improvements related to expanding general-aviation-related airport capacity to handle a larger number of single- engine propeller general aviation aircraft, including additional hangars, tie-downs, and terminal facilities.

CONCLUSION

The new regional airport system plan is proposed to revise an important element of the comprehensive plan for the physical development of the seven-county Southeastern Wisconsin Region. Together with the regional transportation system plans for highways, transit, and pedestrian- and bicycle-way facilities, the regional airport system plan provides the Region, its public officials, and its citizens with a sound, coordinated guide to transportation facility development. The plan is based upon extensive inventories and analyses of the current regional air transportation system and consideration of the extent to which the prior plans have been implemented. The plan has been endorsed by an Advisory Committee consisting of knowledgeable and experienced representatives from both private and public agencies concerned about airport system development within Southeastern Wisconsin.

The regional airport system plan includes definitive recommendations for airport facility construction and operation, including recommendations for runway, taxiway, navigational aid, and associated terminal facility improvements, as well as the imposition of nonstandard air traffic patterns and aircraft activity restrictions; airport airspace protection; and land use for the areas immediately surrounding each of the airports included in the airport system plan. Within the context of the overall regional planning program, the recommended regional airport plan should meet all applicable Federal and State planning requirements for system-level planning. As such, it should provide a sound basis for the preparation of airport facility master plans, for the approval of State and Federal grants-in-aid, and for prudent local capital investment.

APPENDICES

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Appendix A

FEDERAL AVIATION ADMINISTRATION SCHEME FOR CLASSIFYING AIRPORTS BY ROLE

The Federal Aviation Administration (FAA) uses three distinct airport classification schemes for airport planning purposes. One of these three classification schemes is used for specifying the appropriate role, one for specifying the appropriate service level, and one for specifying the appropriate design standards applicable to specific airports. Of these three classification systems, the one used to specify the airport role is perhaps the most commonly used, especially by elected officials and the general public. The airport role determines the design of a particular airport and this, in turn, influences the specific aircraft the airport can accommodate or, in the case of air carrier airports, the routes and markets served on the basis of nonstop city pairs.

When the second-generation regional and State airport system plans were being prepared in 1987, the airport classification scheme using the BU-I, BU-II, GU-I, GU-II, and T designations developed by the FAA, as described in Chapter II of this report, was used to identify the appropriate function of each airport in the two systems. Since then, the FAA, for purposes of defining the function of individual airports within the national system, uses a more general nomenclature. The various airport functions, as defined by the FAA, are listed in Table A-1 and described below. The new classification scheme and nomenclature was used in this reevaluation of the second-generation airport system plan to ensure compatibility with the national plan.

A Basic Utility airport is intended to serve all small single-engine piston aircraft and many of the smaller twin-engine piston aircraft with a maximum gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are used for a wide variety of activities including recreational and sport flying, training, agricultural purposes, and some business and charter flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of from 2,800 to 3,900 feet.

A General Utility airport is intended to serve virtually all small general aviation single- and twin-engine aircraft, both piston and turboprop, with a maximum takeoff weight of 12,500 pounds or less. The larger aircraft that this type of airport is intended to serve typically seat from six to 14 people and are widely used for business, corporate, and commercial flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of from 3,900 to 4,800 feet.

A Transport airport, referred to as a Transport-Corporate airport within the context of this regional airport system plan reevaluation, is intended to serve business jets and transport aircraft as well as virtually all small general aviation aircraft. Although this type of airport is not intended to serve scheduled air carriers, its facilities may be designed to accommodate aircraft of a size similar to that of aircraft typically used by commuter and regional airlines and by many air cargo operators. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of from 4,800 to 6,800 feet.

Air Carrier airports are intended to serve all aircraft up to, and including, large jet airliners and military transports. Long-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of over 1,500 miles. Milwaukee County's General Mitchell International Airport is classified as a long-haul air carrier airport. Within Southeastern Wisconsin, such an airport would normally have a primary runway length from 8,800 to 9,800 feet. Medium-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of between 500 and 1,500 miles. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of from 7,800 feet to 8,800 feet. Short-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of less than 500 miles. Within Southeastern Wisconsin, such airports would normally have a minimum primary runway length from 6,800 to 7,800 feet. Throughout the entire State of Wisconsin, air carrier airports typically have primary runways that vary in length from 6,500 feet to 9,700 feet.

The three remaining airport role classifications are self-explanatory. Heliports are designated areas of land or water or a structures to be used for the landing and takeoff of helicopters and are separate from conventional airports. Seaplane bases are designated areas of water to be used for the landing and takeoff of appropriately equipped aircraft. STOLports are airports specifically designed for short take-off-and-landing aircraft and are also separate from conventional airport facilities.

There are some important differences between the former classification system, which used the BU-I, BU-II, GU-I, GU-II, and T designations, and the current airport role classifications that are used in this reevaluation of the second-generation regional airport system plan, even though some of the classification recommendations are similar. In general, the current Basic Utility role includes the airports formerly classified as either BU-I or BU-II. The current General Utility role includes the airports formerly classified as GU-I. The current Transport-Corporate role includes the airports formerly classified as GU-II. The current Air Carrier role includes the airports formerly classified as T. A comparison of these two airport classification systems is provided in Table A-2. The most important item to note under the new airport classification scheme is that the Transport-Corporate airport category refers to general aviation airports capable of handling such corporate and business jets as Learjets and Cessna Citations, but not such large air carrier-sized aircraft as McDonnell Douglas DC-9s and Boeing 727s. Such air carrier aircraft require the largest airports, classified as Air Carrier airports.

Table A-1

AIRPORT ROLE CLASSIFICATIONS

Role	Name
BU	Basic Utility
GU	General Utility
TR	Transport
L	Long-Haul Air Carrier
M	Medium-Haul Air Carrier
S	Short-Haul Air Carrier
HE	Heliport
SP	Seaplane Base
ST	STOLport (Short-takeoff-and-landing airport)

Source: Federal Aviation Administration, and SEWRPC.

Table A-2

COMPARISON OF OLD AND NEW AIRPORT ROLE CLASSIFICATION NOMENCLATURE

Old Airport Classification Name[a]	New Airport Classification Name[b]	Description
Basic Utility-Stage I	Basic Utility	Intended to serve all small single-engine piston aircraft and many of the smaller twin-engine piston aircraft with a maximum gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are used for a wide variety of activities, including recreational and sport flying, training, agricultural purposes, and some business and charter flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 2,800 to 3,900 feet.
Basic Utility-Stage II		
General Utility-Stage I	General Utility	Intended to serve virtually all small general aviation single-and twin-engine aircraft, both piston and turboprop, with a maximum takeoff weight of 12,500 pounds or less. The larger aircraft that this type of airport is intended to serve typically seat from six to 14 people and are widely used for business, corporate, and commercial flying. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 3,900 to 4,800 feet.
General Utility-Stage II	Transport-Corporate	Intended to serve business jets and transport aircraft as well as virtually all small general aviation aircraft. This type of airport may have facilities designed to accommodate aircraft used by regional and commuter airlines and by many air cargo operators. Within Southeastern Wisconsin, such an airport would normally have a primary runway length of 4,800 to 6,800 feet.
Transport	Air Carrier	Intended to serve all aircraft up to, and including, large jet airliners and military transports. Long-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of over 1,500 miles. Medium-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of between 500 and 1,500 miles. Short-haul air carrier airports are intended to serve scheduled nonstop airline markets and routes of less than 500 miles. Within Southeastern Wisconsin, long-haul air carrier airports would normally have a primary runway length of 8,800 to 9,800 feet, medium-haul air carrier airports would normally have a primary runway length of 7,800 to 8,800 feet, and short-haul air carrier airports would normally have a primary runway length of 6,800 to 7,800 feet.
Heliport	Heliport	Intended to serve all types of helicopters. May be located on land or water or on a structure.
Seaplane Base	Seaplane Base	Intended to accommodate appropriately equipped aircraft on designated areas of water.
STOLport	STOLport	Special airports that are specifically designed to accommodate the operation of short-takeoff-and-landing aircraft.

[a] *Used in second-generation regional and State airport system plans.*

[b] *Used in reevaluation of second-generation regional airport system plan.*

Source: Federal Aviation Administration and SEWRPC.

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Appendix B

MODEL RESOLUTION FOR ADOPTION OF THE THIRD-GENERATION REGIONAL AIRPORT SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN

WHEREAS, the Southeastern Wisconsin Regional Planning Commission, which was duly created by the Governor of the State of Wisconsin in accordance with Section 66.945(2) of the Wisconsin Statutes on the 8th day of August 1960 upon petition by the Counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha, has the function and duty of making and adopting a master plan for the physical development of the Region; and

WHEREAS, the Southeastern Wisconsin Regional Planning Commission completed and adopted a first-generation regional airport system plan at its meeting held on the 4th day of March 1976; and completed and adopted a second-generation regional airport system plan at its meeting held on the 15th day of June 1987; and

WHEREAS, the Southeastern Wisconsin Regional Planning Commission has updated and revised the second-generation regional airport system plan for Southeastern Wisconsin, having:

1. Collected, compiled, processed, and analyzed various types of demographic, economic, land use, natural resource base, and airport and aircraft data and materials pertaining to the development of the Region.

2. Prepared objectives, principles, and standards for population, employment, and aviation activity demand.

3. Forecast regional growth and change as related to population, employment, and aviation activity demand.

4. Developed, compared, and evaluated alternative airport system improvements for the Region.

5. Selected and adopted on the 4th day of December, 1996, a third-generation regional airport system plan for the year 2010; and

WHEREAS, the aforementioned inventories, analyses, objectives, principles, forecasts, alternatives, and adopted plan are set forth in a report entitled, SEWRPC Planning Report No. 38 (2nd Edition), A Regional Airport System Plan for Southeastern Wisconsin: 2010, published in November 1996; and

WHEREAS, the Commission has transmitted certified copies of its resolution adopting such regional airport system plan, together with the aforementioned SEWRPC Planning Report No. 38 (2nd Edition) to the local units of government; and

WHEREAS, the (name of local governing body) has supported, participated in the financing of, and generally concurred in the regional planning programs undertaken by the Southeastern Wisconsin Regional Planning Commission and believes that the third-generation regional airport system plan prepared by the Commission is a sound and valuable guide to the development of not only the Region, but also the community, and the adoption of such plan by the (name of local governing body) will assure a common understanding by the several governmental levels and agencies and private concerns involved and enable these levels and agencies of government and private concerns to program the necessary areawide and local plan implementation work; and

WHEREAS, the (name of local governing body) did on the ____ day of _____, 19___, approve a resolution adopting the second-generation regional airport system plan.

NOW, THEREFORE, BE IT HEREBY RESOLVED that, pursuant to Section 66.945(12) of the Wisconsin Statutes, the (name of governing body) on the ___ day of _____, 19___, hereby adopts the third-generation regional airport system plan previously adopted by the Southeastern Wisconsin Regional Planning Commission as set forth in SEWRPC Planning Report No. 38 (2nd Edition) as a guide for regional and community development.

BE IT FURTHER HEREBY RESOLVED that the _____ Clerk transmit a certified copy of this resolution to the Southeastern Wisconsin Regional Planning Commission.

_____

(President, Mayor, or Chairman
Of the Local Governing Body)

Attestation:

_____

(Clerk of Local Governing Body)