







Massachusetts

massDOT
Massachusetts Department of Transportation
Aeronautics Division

Massachusetts Statewide Airport System Plan

Technical Report

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CHAPTER ONE:

AIRPORT SYSTEM VISION, GOALS AND PERFORMANCE MEASURES

INTRODUCTION

This chapter represents the first in a series of technical chapters that document the Massachusetts Statewide Airport System Plan (MSASP). Chapter One provides an overview of the study, the potential industry and local issues facing the system, and establishes the study vision, goals, and performance measures.

STUDY OVERVIEW

Airports are an essential element of Massachusetts' intermodal transportation system, and the Massachusetts Department of Transportation (MassDOT) Aeronautics Division (formerly the Massachusetts Aeronautics Commission or MAC) is responsible for being an effective steward for a statewide airport system that encompasses 37 public use airports (seven of which are currently classified by the Federal Aviation Administration (FAA) as commercial service airports, and three as reliever airports), in addition to a wide variety of private use landing areas, seaplane bases and heliports. Overall, MassDOT Aeronautics' goal is to help facilitate the state's vision of providing a fully integrated, safe, efficient, and seamless transportation link between the people and products of Massachusetts with national and international destinations through an efficient airport system that will help build upon economic development success and improve the quality of life in the Commonwealth.

The Commonwealth of Massachusetts (through MAC and now MassDOT Aeronautics) has long recognized the importance of planning as a proactive approach to ensuring that aviation continues its role in the statewide transportation system. As such, MassDOT Aeronautics has undertaken this Massachusetts Statewide Airport System Plan in order to provide an analysis of the statewide airport system that will produce an extensive assessment of the condition of the current system, as well as a plan for meeting its current and future needs. Designed and conducted appropriately, the MSASP will support MassDOT Aeronautics by providing a tool that will help facilitate the continued successful development of its aviation system, with an emphasis on planning for the airport system as a whole.

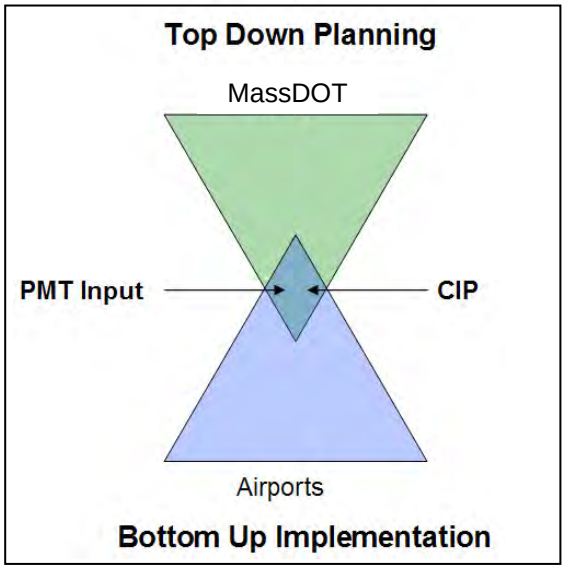
Additionally, the MSASP is designed to provide MassDOT Aeronautics with policies and guidelines to facilitate the system's long term development. An effective system plan will also show how investments in airports provide returns, will increase accountability in funding decisions, and will provide tools for decision making. Additionally, this plan will prove to be a valuable tool for MassDOT Aeronautics in its constant pursuit of enhancing the level of safety at all of the airports within the Commonwealth. This plan will also help MassDOT Aeronautics determine how the Massachusetts airport system should be developed to respond to future challenges and to meet changes in demand in order to promote system sustainability. (Note that in order for this plan to remain an effective and appropriate tool for the Commonwealth,

it will be important that it is updated at regular intervals.) The MSASP will provide the baseline for future updates and allow MassDOT Aeronautics to track changes at commercial service and general aviation (GA) airports in future years.

As stated above, MassDOT Aeronautics has identified 37 airports for inclusion in the MSASP. This total does not include either Laurence G. Hanscom Field Airport (Bedford) nor General Edward Lawrence Logan International Airport (Boston) since neither will be directly addressed within the MSASP beyond that of basic inventory and recognition of their existing role and influence within the Massachusetts airport system. Therefore, no evaluations or ultimate recommendations of these airports will be made within this MSASP, although their operational impacts on the other identified airports within the system will be generally identified and quantified.

It is important to note that the MSASP is not an explicit project programming document, and inclusion of any projects in this plan does not constitute a commitment of either state or federal funding. More appropriately, the MSASP is a strategic look or "top-down" planning study whose recommendations must still be implemented from the airport project level (otherwise referred to as "bottom-up") typically through such initiatives as master planning, environmental analyses, and financial evaluations. While top-down and bottom-up planning operate as fundamentally different approaches, they can and should operate in concert with each other in that top-down planning provides vision, direction and purpose, while bottom-up planning provides focus and practical implementation implications. As shown in Figure 1-1, this approach for the MSASP, when conducted with effective input from the Project Management Team (PMT) and appropriate capital improvement planning (CIP), will result in a cohesive and comprehensive planning model for Massachusetts.

Figure 1-1: Planning Approach



Source: Wilbur Smith Associates
Prepared: March 2010

Again, implementation of specific airport improvement projects identified in this study ultimately remains the responsibility of individual airport owners. Some actions identified by the MSASP could require the development of additional airport-specific planning efforts (as identified above) prior to the actual development occurring. Information contained in this document should be used by airports in Massachusetts as they evaluate and determine their individual development needs.

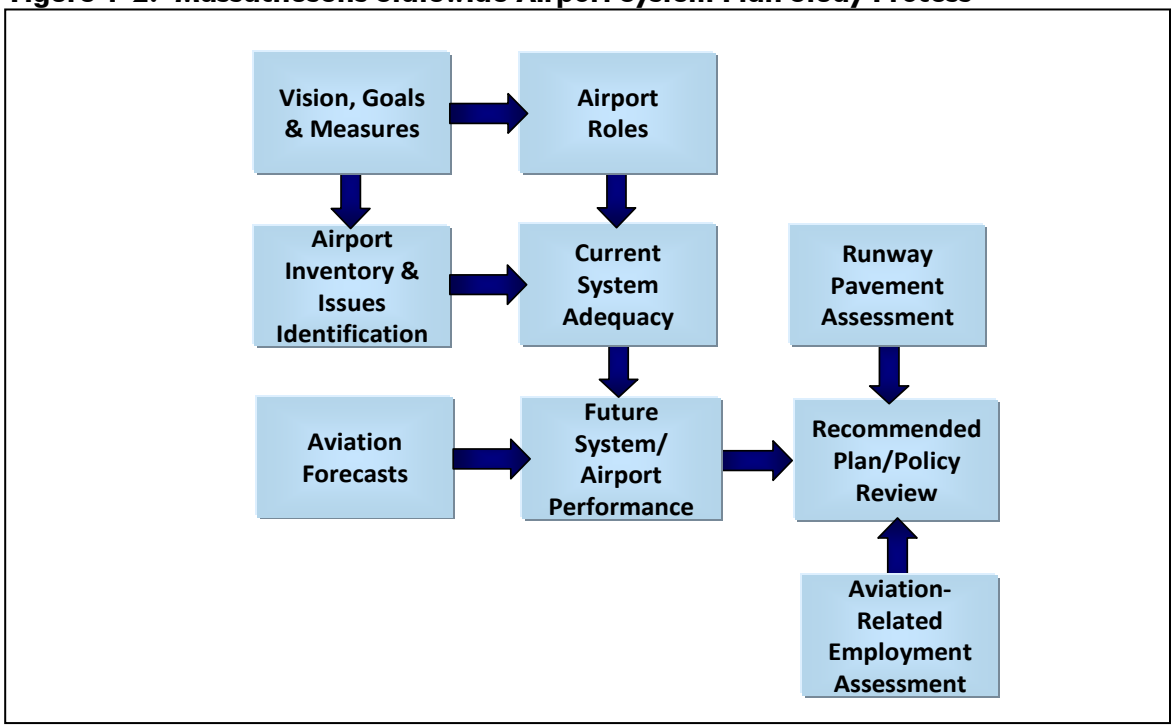
STUDY APPROACH & PROCESS

The Massachusetts Statewide Airport System Plan follows a strategic approach for providing a blueprint to insure that Massachusetts' future system of airports meets the Commonwealth's existing and future air transportation and economic needs in a sustainable manner. The approach that will be used to conduct the MSASP will reflect the following characteristics:

- Utilize proven methods consistent with the FAA's Advisory Circular on System Planning
- Be visionary in establishing future goals for the system
- Leverage critical insights, experience and goals from key project stakeholders that can be effectively accessed through use of a Project Management Team (PMT)
- Develop a process that is consistent with other established Massachusetts statewide plans and initiatives related to other transportation modes
- Establish performance measures for system evaluation
- Consider the implications of new technologies on the airport system
- Benchmark the adequacy of the current airport system
- Analyze potential changes to the FAA's National Plan of Integrated Airport Systems (NPIAS)
- Assess needs related to economic development, air service, air cargo, and multimodal accessibility
- Determine the financial requirements of the system and prioritize future system development
- Provide an implementation plan to ensure adoption and action as a result of the plan
- Create sustainability in the planning process

There are 10 primary tasks that comprise the development of the MSASP, and these are graphically depicted in **Figure 1-2.** Additionally, these tasks are generally described below, as well as within various relevant chapters of the MSASP.

Figure 1-2: Massachusetts Statewide Airport System Plan Study Process



Source: Wilbur Smith Associates
Prepared: March 2010

1. System Goals, Performance Measures & Identification of Issues: The first task outlines the purpose of and sets the stage for the entire MSASP. The task establishes a system vision, goals, and performance measures. For example, maintaining airport safety is a fundamental goal of FAA and as such, is typically integrated into a system plan's vision and goals. In order to analyze the overall airport system's needs, a system vision and system goals (like that related to airport safety) are translated into goal categories. Performance measures specific to each goal category will provide the foundation for a "report card" that will be used to determine how well the Massachusetts airport system is performing. Identification of state, regional, and local issues that have the potential to impact the future airport system will also be presented here. This task is reflected below in this chapter (*Chapter One*).
2. Airport Inventory: One of the first steps in developing Massachusetts's plan for its airport system is the collection of current facility and activity data for all system airports. Additional airport data regarding airport land use, environmental constraints, and airport economic data will also be collected and compiled for use in this study. This task is reflected in Chapter Two, *Inventory*.
3. Airport Roles: As part of the MSASP, an extensive analysis is undertaken to assign all system airports to functional roles. Established through coordination with MassDOT Aeronautics and the PMT, these roles are valuable in determining the level of recommended development needed since not all airports in the Commonwealth should be treated the same. This task is reflected in Chapter Three.
4. Aviation Demand Forecasts: It is important to have a general understanding of which airports in the airport system are likely to experience the most notable growth for the 5, 10, and 20-year forecast milestones. This task provides projections through 2030

of key commercial and general aviation demand indicators. This task is reflected in Chapter Four, *Aviation Demand Forecast*, and in Appendix B.

5. System Adequacy: Goal categories and measures developed in Task One form the framework for an updated report card for the Massachusetts system of airports. This report card identifies adequacies and deficiencies in the system, as well as possible duplications. This task is the cornerstone of the system plan. Results from this analysis are the primary *input for developing* recommendations for the airport system. This task is reflected in Chapter Five, *Existing and Future Adequacy Analysis*.
6. Future System Performance: As part of this task, targets for future system performance are set. Actions needed to raise the bar for the overall performance of the Massachusetts airport system are the primary output of this task. This task considers if there is a need for improved facilities to supplement the existing system and provides information on how Massachusetts' airport system can be protected. This task is reflected in Chapter Five, *Existing and Future Adequacy Analysis*. An analysis of non-NPIAS airports' potential inclusion in the NPIAS is also included in Appendix C, as well as an airport facility and services analysis that is included in Appendix D.
7. Future Airport Performance: Results from the system analysis may reveal the need for changes in airport roles. This task identifies needed changes and analyzes which facilities and service improvements are desirable for all airports, based on their recommended system role. Cost estimates for improving the system to meet established targets are also identified in this task. This task is reflected in Chapter Six, *Financial Needs and Recommendations*.
8. Recommended Plan: This task of the Plan provides actions needed to implement study recommendations to enhance the system. This task also recommends appropriate MassDOT Aeronautics funding levels and takes the best return on investment into consideration. The task will also review policies and statutes that currently govern MassDOT Aeronautics and impact aviation in the state. Suggestions for changes to these items are developed here as well in order to best support the future needs of the airport system. This task is reflected in Chapter Six, *Financial Needs and Recommendations*.
9. Comparative Assessment of Runway Pavements: A supplemental broad analysis of the condition of runway pavements will also be completed to assist MassDOT Aeronautics staff to prioritize and budget for future runway reconstruction projects beyond the five year state CIP. This task is reflected in Appendix A.
10. Aviation Related Employment Report: As a supplemental task to the system plan, the number of jobs that can be attributed to aviation in Massachusetts will be developed to provide MassDOT Aeronautics with information to address the importance of aviation to the state's economy. The number of on-airport jobs will be collected as part of the inventory effort and the non-aviation dependent employment will be collected through a non-aviation business survey to 2,000 businesses in the Commonwealth. This task is reflected in Appendix E.

Project Management Team

A Project Management Team (PMT) was assembled by MassDOT Aeronautics to provide input and direction for the study. The PMT is comprised of volunteer members with a diverse base of airport/aviation and statewide knowledge and responsibilities. The PMT includes representatives from the following organizations:

- Air Transport Association (ATA)
- Aircraft Owners and Pilots Association (AOPA)
- Federal Aviation Administration (FAA)
- Former Massachusetts Aeronautics Commission
- Massachusetts Airport Management Association (MAMA)
- Massachusetts Department of Transportation (MassDOT) Aeronautics Division
- Massachusetts Office of Transportation Planning (OTP)
- Massachusetts Port Authority (Massport)
- Massachusetts Office of Business Development (MOBD)
- National Business Aviation Association (NBAA)

The PMT provides MassDOT Aeronautics with outside input into the system planning process and provides the Consultant Team with first-hand knowledge of the key factors impacting aviation demand and needs throughout the Commonwealth. Specifically, the PMT's role within this study process is encompassed within the following:

- The purpose of the PMT is to appropriately represent their constituents by serving as advisors to MassDOT Aeronautics and the Consultant Team in helping to ensure that the MSASP is developed in such a way as to address key issues facing the statewide airport system.
- PMT members are responsible for reviewing and commenting on study assumptions (such as goals, performance measures, benchmarks roles, etc.) and drafts of various study work products.
- PMT members are expected to act as liaisons for airports, agencies and other constituencies to the MSASP planning process with the intent that such coordination and communication will help ensure a successful project.

In addition to being a technical resource, the PMT also supports MassDOT Aeronautics with management oversight to ensure that the project is executed within the approved work scope and remains on schedule. The PMT is also an effective means for coordinating and managing the public outreach process. Up to six PMT meetings will be held at key junctures of the study to help guide the development of the system plan.

AVIATION ISSUES

Issues that affect the airport system range in scope from national to local issues, with the impacts affecting airports in multiple ways. It is critical to identify and fully understand the breadth and implications of these issues prior to formally initiating the system planning effort since these issues must be weighed throughout the planning effort. Formal integration of these issues into the structure of the MSASP starts with the system vision discussed later in this chapter.

National Issues

Many issues currently being faced by Massachusetts directly reflect those being experienced on the national level by other states and agencies. These include land use compatibility, airport capacity, and funding for airport projects. Additionally, aviation industry issues, raised at a

national level by the FAA, national interest groups such as the Airport Owners and Pilots Association (AOPA) and National Business Aviation Association (NBAA), and airport groups such as the American Association of Airport Executives (AAAE) and Airports Council International (ACI) include aviation fuel issues, airport security, insurance, credit issues, loss of airports, fees, new technology, and maintaining airport pavements. A brief description of each of these issues follows.

Safety

With respect to national aviation industry issues, overall airport safety plays an increasingly critical role. The core focus of the FAA is its mission to provide the safest, most efficient aerospace system in the world, and it continually strives to improve the safety and efficiency of flight in this country. Under the broad umbrella of safety and efficiency, the FAA has several major roles:

- Regulating civil aviation to promote safety
- Encouraging and developing civil aeronautics, including new aviation technology
- Developing and operating a system of air traffic control and navigation for both civil and military aircraft
- Researching and developing the National Airspace System and civil aeronautics
- Developing and carrying out programs to control aircraft noise and other environmental effects of civil aviation
- Regulating U.S. commercial space transportation

Some of the notable areas of focus related to safety have more recently been related to compliance with runway safety area design requirements, the reduction of runway incursions, and the establishment and implementation of NextGen technologies.

Land Use

Consistent with much of the nation's general aviation airport system, there are formidable land use challenges facing the development of Massachusetts' airport system. Coordination between airport planning and general planning, cross-jurisdictional concerns, and the lack of a state or federal policy to protect airports are some of the most significant barriers that typically exist in the promulgation of compatible land use for airports.

Capacity

Capacity is often a primary consideration at general aviation airports. While airfield capacity is often not a primary consideration for most airports, issues related to terminal/hangar capacity, airspace capacity, and ground access capacity are frequently experienced at airports of all sizes and operational levels. It should also be noted that capacity issues also extend to system planning levels in that it is not just overall capacity that is of importance, but also whether that capacity is properly located within the system.

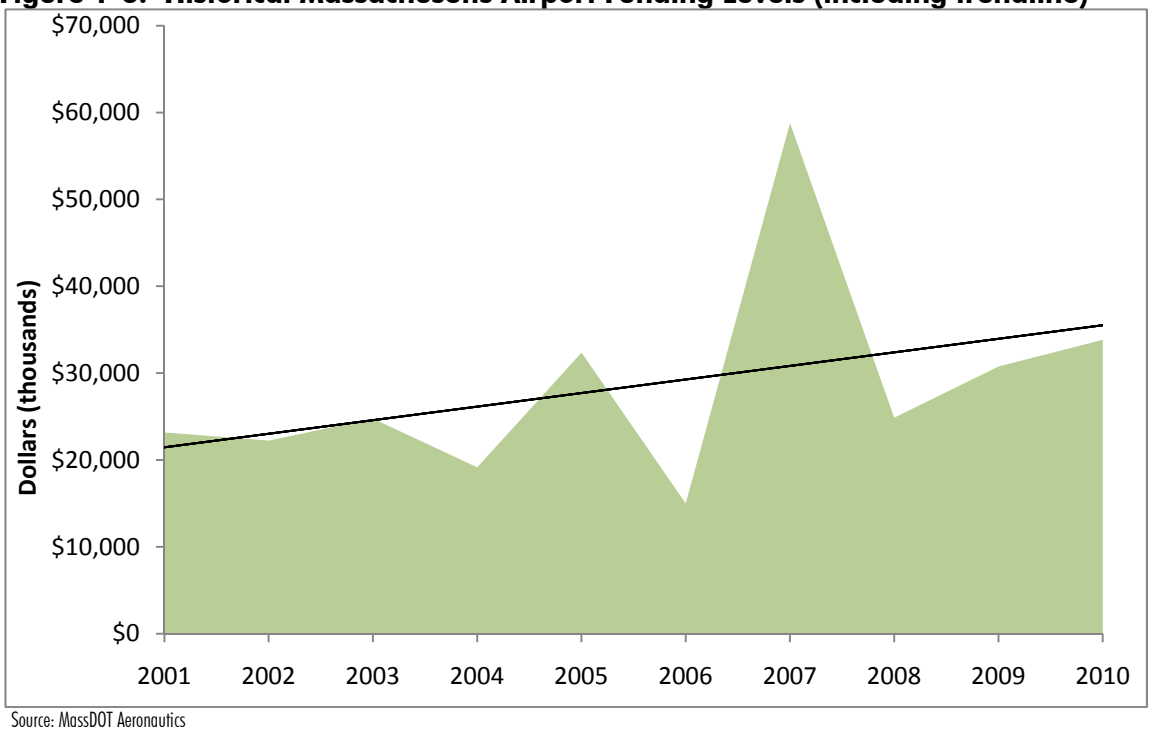
Funding Needs

Funding for airport projects comes from variety of sources depending upon the airport. Some airports are eligible for federal Airport Improvement Program (AIP) funding, state airport

funding (Airport Safety and Maintenance Program-ASMP) and local monies. The federal AIP is a critical element of Massachusetts' airport funding. MassDOT Aeronautics Division works closely with the FAA in leveraging federal dollars on eligible airport infrastructure and equipment projects. Additionally, the ASMP program is intended to provide state funding for ineligible safety and maintenance projects under the AIP program at the public-use airports in Massachusetts.

The current reauthorization of the legislation to fund the AIP expired in 2007 and significant changes are proposed for the funding mechanism and distribution to the airports. Figure 1-3 below reflects the historical funding levels made available from the FAA, MassDOT Aeronautics, and the airport sponsors. It should also be noted that the capital infrastructure needs at eligible airports throughout Massachusetts annually exceed the funding levels provided.

Figure 1-3: Historical Massachusetts Airport Funding Levels (including trendline)



Source: MassDOT Aeronautics
Prepared: February 2010

Aviation Fuel

The price of aviation fuel significantly impacts the aviation industry as a whole, including the general aviation community. While the impacts of increased fuel costs on commercial aviation have been well documented, higher fuel prices have also directly resulted in lowered activity levels, especially by discretionary flyers that are flying for personal and non-business reasons. As Avgas and Jet Fuel costs rose dramatically over the past three years, airports throughout New England saw a pronounced decline in traffic and fuel sales, which had an marked impact on local fixed base operators (FBOs), particularly smaller ones.

Additionally, the future availability of 100LL avgas is also in question, raising potentially significant concerns for the majority of based aircraft and GA operations in New England, which are predominantly piston-engined that require Avgas. There are multiple industry pressures to stop production of 100LL, including environmental concerns, as well as market concerns in that the volume of 100LL sold is relatively small and an important fuel lead additive will likely not be produced by the end of the decade. As of 2010, no viable option to 100LL that will work in all piston-engine aircraft has been identified.

Security Regulations

Increased security regulations targeted at GA aircraft, pilots, or airports, could impact traffic levels. The Transportation Security Administration (TSA) has at various times proposed new security procedures for large GA aircraft which could have a significant impact on that segment of the market. Note that TSA withdrew its original proposals in response to comments from the GA community that considered the proposals to be ineffective and impractical. While new national security regulations remain under consideration, it is important to recognize that there are security measures currently established for GA activities, including within Massachusetts. Specifically, in response to 9/11, the Massachusetts Aeronautics Commission (now MassDOT Aeronautics) issued an agency directive in November 2011 that established minimum airport security standards for all public-use airports in the Commonwealth, including GA.

Insurance Requirements

Insurance requirements are significant hurdles to overcome for both employers who see the advantage of letting their employees fly GA airplanes for business, and also for employees who are GA pilots because they cannot obtain sufficient coverage through their own personal insurance policies. Many licensed GA pilots work in non-flying jobs, and also travel for business. Particularly for travel throughout New England, they would find the use of GA aircraft extremely beneficial in terms of reducing travel times. However, employers frequently do not allow employees to fly GA aircraft on business for one primary reason: a fundamental lack of understanding of GA by the commercial insurance and workers compensation carriers that classify GA activities as "hazardous."

Credit

The lack of credit availability is a significant concern facing potential buyers and users of GA aircraft since most aircraft purchases are financed to some degree. As such, until the national and global economic conditions change and the pressures on the credit markets are lessened, tight credit restrictions will continue to dampen GA aircraft manufacturing and purchases.

Loss of Airports

Progressive development occurring near airports has encroached upon many airports' ability to expand and operate efficiently. Historically, airports were often developed in community areas of low importance, value, and population density. However, many recent instances have shown that the general rising value of land within communities has resulted in the introduction and expansion of incompatible non-aviation uses on and around airports. Such incompatible

land development often adversely impacts the viability of neighboring airports, with the ultimate impact resulting in the closure of the airport itself. While the loss of airports tends to be most critical in major metropolitan areas, it is also occurs throughout the country where sponsors cannot afford to maintain airports.

Moreover, a related challenge facing general aviation airports (particularly those privately owned, public use airports) is that the perceived "value" of airport land can be lower than the value that the land may have for other uses, particularly within populated areas. However, it must be recognized that this perception is often the result of a fundamental lack of understanding regarding the true "value" of airport land in that airports bring both real and potential economic impact to a host community and state. Unfortunately, this lack of understanding regarding the value of airport land is often not appreciated until an airport has been closed. To combat this, states like Massachusetts are increasingly pursuing public education initiatives (like airport economic impact studies) in an effort to promote the true value of airports.

Fees

Funding for the FAA's AIP has been generated primarily from a tax imposed on passengers flying on commercial airlines. With the lapsing of the current funding source, a new system of user fees was proposed by federal legislators to fund the future development of US airports. A component of the proposed funding system is a user fee for general aviation aircraft. Presently, general aviation pays fees via a fuel tax but pays no distinct or separate fee for the use of air traffic control services. However, no final decision has been made regarding future funding mechanisms for the aviation system. The existing funding mechanisms have been extended by a series of congressional continuing resolutions.

New Technology

Next generational technologies have initiated substantial changes within the aviation community. Conventionally known as "NextGen," next generation technology within the industry have focused predominantly on development of new aircraft, including very light jets (VLJ), and on the Next Generation Air Transportation System, the name given to a new National Airspace System due for implementation across the United States in stages between 2012 and 2025, which includes the development of satellite-based navigation.

New aircraft technologies hold promise for increased levels of aircraft activities and efficiencies. Specifically, VLJ technology is based on the use of new fuel efficient engines and lower cost manufacturing processes to lower VLJ operating and acquisition costs. It is thought that these lower-cost jet aircraft may provide an opportunity for more individuals and corporations, which have otherwise relied on commercial service aircraft or typical general aviation business jets, to own and operate their own aircraft at a lower cost. The increased utilization of VLJ aircraft creates an opportunity for growth at GA airports; however, much of the production of VLJ aircraft has halted due to current economic conditions. Conceptually, these aircraft can operate at smaller airports throughout the US, requiring runway lengths as short as 2,500 feet. In the future, if utilization of these aircraft increases, smaller airports may need to provide additional services and instrument approaches. For Massachusetts, this

effectively translates into development opportunities within the business/corporate aviation markets.

As defined by the FAA, NextGen represents the ongoing national airspace system redesign. To implement this program, the FAA will undertake a wide-ranging transformation of the entire United States air transportation system aimed at reducing gridlock, both in the sky and at the airports. This national program consists of five primary elements: Automatic dependent surveillance-broadcast, System Wide Information Management, Next Generation Data Communications, Next Generation Network Enabled Weather, and NAS Voice Switch. The FAA primary goal is to provide new capabilities that make air transportation safer and more reliable, improve the capacity of the National Airspace System (NAS) and reduce aviation's impact on the environment.

As part of this effort, the implementation of global positioning systems (GPS) in the late 1990s and development of wide area augmentation system and local area augmentation system (WAAS and LAAS) technology will allow for precision approach capabilities, with near instrument landing system (ILS) descent and visibility minimums. These new instrument approaches are referred to as Approach Procedures with Vertical Guidance (APV) and are derived from the WAAS technology. Localizer Performance with Vertical Guidance (LPV) approaches rely on space-based satellite signals rather than land-based facilities, precluding terrain interference. APV/LPV approaches currently provide approach descent minimums to 250 feet above the runway elevation, with lower descent minimums expected to be published in the near future. GPS satellite data in concert with a ground-based transmitter can provide the three-dimensional guidance for a GPS near-precision approach. This can lead to more Massachusetts airports having better approach capabilities, assuming that the airports can meet appropriate FAA safety and design criteria. Additionally, the satellite based GPS systems are far more cost effective than ground based systems and require significantly less maintenance.

Maintaining Airport Pavements

Significant investments have been made by the FAA, individual states, and airport sponsors in airport pavement, one of the most important components of any airport. The commitment to airport pavement is evidenced by the FAA's current 95% funding contribution to eligible airports for qualifying pavements, in addition to many state's financial support for other pavement maintenance programs.

It is important to note that maintenance programs play a critical role in the life cycle of airport pavement, for while pavements are developed for long-term use, their life expectancy can only be maximized through timely and appropriate maintenance. Similar to other airport needs, airport pavements require constant monitoring and evaluation to ensure the safety of the airport users. While many sponsors monitor and evaluate their pavements, the cost of even routine maintenance must be justified in the sponsor's budget, whether it is a city-owned, county-owned, or privately owned facility. Because of this and the increasing cost of pavement projects, without diligence and appropriate funding support, airport pavements can become susceptible to falling into disrepair and beyond the curve of "preventative maintenance." Once beyond the point of maintenance, pavement typically requires rehabilitation or reconstruction, a costly project for any airport sponsor.

Reflective of the importance of airport pavement maintenance, MassDOT Aeronautics (and MAC) has historically funded additional airport work for projects deemed ineligible for FAA funding such as pavement repair and maintenance work. Under the Airport Safety & Maintenance Program (ASMP), MassDOT Aeronautics has been able to help provide significant support to airports within the Commonwealth to preserve their pavement life spans.

Environmental Concerns

Airports throughout the country face increasing concerns related to environmental issues and considerations. Specific environmental elements such as air, wetlands, water quality, rare species management, noise impacts, and environmental sustainability, increasingly place airports under pressure to meet new and changing environmental regulatory requirements. Addressing these regulatory issues has significant effects at certain airports for maintenance and future planned projects which affect costs, design constraints, and ultimate feasibility. Whether they are public or privately owned, airports are subject to local, state, and federal environmental regulations. Beginning with federal enabling legislation in 1969 (National Environmental Policy Act or NEPA), all levels of government have assumed some level of responsibility for balancing economic development with protecting the environment. It is important to note that the jurisdiction of government agencies regarding environmental review and permitting is not dependent on funding sources.

Additionally, it should be noted that the aviation industry has consistently responded to environmental concerns and demands for increased regulations and restrictions. Whether it is through aircraft manufacturers' employment of new technologies for engine noise mitigation, emissions reductions, and use of alternative fuels, or through the employment of new policies and operational standards at airports themselves, the aviation industry has shown an understanding and willingness to address reasonable environmental considerations.

Sustainability

The concept of sustainability has historically been used in reference to environmental concerns but has, more recently, taken on a larger definition in relation to airport development and maintenance. Sustainability in terms of airports has been defined by the concept of what is in place that is sustainable and worth sustaining and how we can better develop airports that are sustainable long-term and more cost-effective and balanced in terms of actual cost and environmental impact. This is challenging in an environment of cost-cutting and increased costs for airport improvements, as the process of sustainability typically requires spending more up-front on projects to create longer sustaining infrastructure. While many airport sponsors can justify the long-term cost savings that may be realized, the higher up-front costs mean that fewer projects will be funded, leading to more delay in airport development.

State Issues

During the project design phase of the MSASP, a state and local industry outreach effort was undertaken to identify those issues that were specifically related to Massachusetts. Input solicited from MassDOT Aeronautics, airport managers and other interested parties was ultimately utilized within the actual planning and design of this project so as to ensure that

these issues were addressed, as appropriate. The following points of considerations are either summarizations or direct quotes taken from that input:

- *"A secure, dependable source of financing on the state level would allow long term planning for projects and programs."*
- Environmental considerations, including vegetation management policies and programs around airports are a primary concern. As with any state, Massachusetts must face the challenges of implementing required safety improvements while protecting the state's valuable environmental resources.
  - *"Plan that systematically balances airport safety (e.g. RSA, vegetation management, etc.) with environmental challenges and permitting. Airports should not have to spend years in multiple layers of environmental permitting to carry out safety 'maintenance' projects"*
  - *"System for balancing MEPA, wildlife management and the avoidance of creating wildlife refuges (especially for birds) around airports"*
- Public-use, privately-owned airports within the state provide important capacity resources, especially for aircraft storage, and access to remote locations; however, there is no financial support mechanisms made available to help support these important facilities.
  - *"This study should clearly define those airports that should be preserved and improved, then establish the same funding programs for all Public Use Airports, without regard for ownership type."*
- *"This study also provides an opportunity to support airport owners (of all types) with information regarding the role their airport plays in contributing to the social and economic wellbeing of the Commonwealth of Massachusetts."*
- *"A key issue that is resisted by most real estate interests is planning and protecting the land area around airports. When residential development encroaches on airport land and then becomes an issue for noise and activity. State rules requiring deed notification of the airport's presence and enforcement are essential."*
- *"Accounting for business interests in aviation in the state is often overlooked. Corporate flight departments, parts and systems suppliers, airline employment, insurance interests, FAA, TSA and [MassDOT Aeronautics] employees, consultants, airline maintenance facilities, fuel and oil sales as well as the capital involved in the transportation and storage facilities that support them."*
- *"It is crucial that we project the economic importance and the true value an airport brings to the community and its environment. Having a hard number is always more effective than the concept. Economic impact cannot be stressed enough. To gain credence with local officials they must understand the importance of the wide range of benefits having an airport provides business travel, tourism and emergency relief."*
- *"Plan needs to integrate GPS and Next Gen technology into state airport plan. What should be the state's role in expanding instrument approach procedures throughout the state."*
- *"Examination of current municipal operation of airports and consideration of alternative management options for state supported airports. Are municipalities and airport commissions the best operators of our airports?"*
- *"Need for a modern IFR capable heliport serving downtown Boston. Determine whether a state system of heliports is necessary and practicable."*

- *"Desirability/practicability of developing an intra-state commercial service network – linking the state via air."*

SYSTEM VISION, GOALS, & PERFORMANCE MEASURES

The MSASP is being conducted in a series of separate, but related, technical steps. The first step in the analysis of the airport system's needs is to establish a system vision and, in support of that vision, specific system goals, which are then translated into goal categories. These system goal categories are subsequently used to evaluate the adequacy of Massachusetts' airport system itself. To facilitate the evaluation process, performance measures specific to each goal category are employed to provide the foundation for a "report card" that will ultimately be used in the MSASP to determine how well the Massachusetts airport system is performing.

The remainder of this chapter is devoted to describing the plan vision, goal categories, and performance measures for the MSASP.

System Plan Vision

Through coordination efforts internal to MassDOT Aeronautics in conjunction with Consultant Team efforts, the following vision was established for the Massachusetts Statewide Airport System Plan:

> *Provide an airport system that accommodates demand, supports economic and transportation needs, and maximizes funding resources while being conscious of environmental issues.*

This vision requires that the process used to develop the MSASP include input from a variety of sources. The process brings together representatives of airports and other public agencies to work with MassDOT Aeronautics and the Consultant Team to ensure that a comprehensive evaluation of the airport system is conducted. States, as well as individual communities within those states, continue to recognize the importance of an airport system to their statewide and local economic and transportation infrastructures, and to that end, development of a MSASP that can be supported on all levels is the primary vision.

System Plan Goals & Goal Categories

While the purpose of a system vision is to provide focus and direction, it does not, in and of itself, detail how to achieve that vision. In order to fulfill the overall system vision established above for the MSASP, a series of contributing airport system goals were established that could provide the markers for tracking progress toward that vision. Through coordination efforts internal to MassDOT Aeronautics in conjunction with Consultant Team and PMT efforts, the following system goals were established for the Massachusetts airport system:

- The Commonwealth of Massachusetts should be served by a system of airports that are safe, secure, and meet applicable FAA design standards that will satisfy the current and future needs of aviation.

- The Commonwealth of Massachusetts should be served by a system of airports that complies with all federal, state, and local environmental regulatory requirements.
- The Commonwealth of Massachusetts should identify the economic impact of the Massachusetts' system airports and the economic benefit of incremental investment in the aviation system.
- The Commonwealth of Massachusetts should be served by an efficient airport system with sufficient facilities and services to maintain the airport and address the current/future needs of the aviation community.
- The Commonwealth of Massachusetts should be served by a system of airports that promote and support aviation educational programs and community outreach programs.
- The Commonwealth of Massachusetts should be served by a system of airports that support integration with other modes of transportation.

Subsequently, the overall purpose and meaning of these six goals for the airport system were distilled into the following goal categories:

- Standards
- Environmental Compliance & Stewardship
- Economic
- Preservation
- Public Outreach
- Transportation Integration & Accessibility

Note that the primary purpose for translating the system goals into these goal categories is for ease of recognition and understanding, as well as for ease in establishing appropriate performance measures for each category.

System Plan Performance Measures

In developing a "report card" for airport performance, the Massachusetts airport system will be evaluated or graded on the six goal categories identified above. Performance measures for each of the goal categories are the "tests" that are applied to determine how well the system is currently performing with respect to each category. Through coordination efforts internal to MassDOT Aeronautics in conjunction with Consultant Team and PMT efforts, appropriate performance measures were established for the individual goal categories.

Figure 1-4 provides a summary of those goal categories and their associated performance measures that will be used in the MSASP. Again, most of the measures were identified by MassDOT Aeronautics and the PMT for their relevance and importance to the Massachusetts airport system. It is important to note that several of the performance measures used to evaluate the Massachusetts aviation system are action-oriented, while others are more informational in nature. Many of the measures are also performance based and have the ability to be tracked in the future. The information presented in Figure 1-4 is integral to the remainder of this study.

Figure 1-4: Goal Categories and Performance Measures

Goal Category: STANDARDS
1. Percent of system airports meeting applicable FAA design standards for Runway Safety Areas (RSAs). 2. Percent of system airports with a runway pavement classification of "good." 3. Percent of system airports with access controls to the airport operating areas. 4. Percent of system airports with an updated survey of aeronautical obstructions. 5. Percent of system airports with an airport perimeter road. 6. Percent of system airports with controlling interest (property ownership/easements) over the FAA design standard Runway Protection Zones (RPZs) for each runway end. 7. Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways. 8. Percent of system airports with a General Aviation Airport Security Plan. 9. Percent of system airports that have an Airport Emergency Plan. 10. Percent of system airports with Airport Minimum Standards, and Airport Rules and Regulations documents for their facility.
Goal Category: ENVIRONMENTAL COMPLIANCE & STEWARDSHIP
1. Percent of system airports that comply with the EPA's current requirements for Spill Prevention, Control, and Countermeasure (SPCC). 2. Percent of system airports that comply with the EPA's current requirements for Stormwater Pollution Prevention Plans (SWPPP). 3. Percent of applicable system airports with a Vegetation Management Plan (VMP). 4. Percent of applicable system airports with updated yearly operating plans associated with their existing VMPs. 5. Percent of system airports with a Wildlife Management Plan. 6. Percent of system airports with a Comprehensive Solid Waste Management Plan. 7. Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls to help ensure that land uses within the airport environs are compatible with airport operations and development. 8. Percent of system airports with alternative fuel vehicles or other alternative fuel equipment. 9. Percent of system airports with recycling programs. 10. Percent of system airports with airport noise contours.
Goal Category: ECONOMIC
1. Percent of the direct economic impacts of individual airports in terms of airport related jobs and dollars. 2. Percent of total employment/businesses within 30 minutes of a system airport. 3. Percent of population and area within 30 minutes of a system airport meeting traditional business user needs (supports business aviation/Part 135). 4. Percent of system airports with expansion / development potential. 5. Percent of system airports with established/developable industrial park abutting/nearby airport. 6. Number of key tourism indicators (i.e. hotel rooms) within 30 minutes of system airports.

Figure 1-4: Goal Categories and Performance Measures (continued)

Goal Category: PRESERVATION
1. Percent of airports meeting minimum facility and service objectives. 2. Percent of system airports with displaced thresholds. 3. Percent of system airports with a waiting list for T-hangars or community hangars. 4. Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990. 5. Percent of existing capital projects funding versus the future capital projects costs for system airports. 6. Percent of system airports with an airport restaurant. 7. Percent of system airports that offer based flight training. 8. Percent of system airports that offer aircraft maintenance services. 9. Percent of system airports that offer aircraft charter services. 10. Percent of system airports that have a Winter Operations Plan. 11. Number of system airports that have closed since 1980 (public-owned and privately-owned, public-use airports). 12. Percent of system airports that are recognized in local comprehensive plans.
Goal Category: PUBLIC OUTREACH
1. Percent of system airports that have established public outreach programs that include active coordination efforts with the local community, as well as local, state, regional and federal governmental representatives. 2. Percent of system airports that have an educational outreach program that illustrate aviation career opportunities to students. 3. Percent of system airports that host annual air shows or fly-ins. 4. Percent of system airports that are members of their local chambers of commerce. 5. Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor.
Goal Category: TRANSPORTATION INTEGRATION AND ACCESSIBILITY
1. Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports (i.e. bus). 2. Percent of total population within 30 minutes of a publicly owned system airport & of a public/privately-owned system airport. 3. Percent of system airports accessed by roads within the National Highway System. 4. Percent of system airports that are adequately accessible in terms of signage and access road quality. 5. Percent of system airports that are acknowledged in local/regional transportation plans.

SUMMARY

The groundwork established in this phase of the MSASP is used to guide the remainder of the system plan, providing a foundation for subsequent analysis. Specifically, the goal categories and associated performance measures presented in this chapter are used to

1. guide the collection of data and information at system airports during the inventory phase of the study,
2. determine how well Massachusetts's system of public use airports is currently performing, and
3. identify where Massachusetts airport system is currently adequate, as well as where it is presently deficient, or where overlaps may be present.

CHAPTER TWO:

INVENTORY

INTRODUCTION

The purpose of the inventory effort is to identify current conditions and important characteristics of individual airports within the system of general aviation (GA) airports in the Commonwealth of Massachusetts. The inventory process and the data collected provide the information necessary to understand existing system conditions as well as provide information for subsequent evaluations and analysis. Inventory data also serves as the basis for providing recommendations throughout the study process and results in a valuable resource of updated data relative to the general aviation airport system for the MassDOT Aeronautics Division.

This chapter presents the findings of the Massachusetts Statewide Airport System Plan (MSASP) inventory effort.

INVENTORY PROCESS

Thirty seven (37) general aviation Massachusetts airports were selected for inclusion in the MSASP study. Data within this chapter was collected through a comprehensive Airport Inventory and Data Survey that was distributed to, and completed by, each of the subject airports by means of on-site visits, interviews, and/or mailings. The Airport Inventory and Data Survey was an 18-page questionnaire with sections pertaining to various facets of airport facilities, activities, operations, and historical data. Providing the airport data and contributing to the inventory effort were airport managers and airport personnel, Fixed Base Operator (FBO) representatives, Massachusetts Airport Management Association (MAMA) members, and MassDOT Aeronautics staff. Information gathered from the survey was verified and supplemented through the on-site interviews. Due to the wide range of potential data sources available for use, a data source protocol was developed that identified primary, secondary, and tertiary means of collecting data for each element. These sources included the following:

- On-site Airport Interviews/Observations
- Federal Aviation Administration (FAA) Form 5010, Airport Master Record
- Airport Master Plans
- Airport Layout Plans
- MassDOT Aeronautics airport records
- FAA Airport Facilities Directory (AFD)
- FAA Published Instrument Approach Plates

Using this protocol, airport surveys were pre-populated with data to assist in completing the forms, and then emailed to a representative from each of the 37 study airports. Airport representatives were given a minimum of two weeks to complete the survey. Follow-up on-site airport visits were then scheduled to conduct a general photo inventory, answer any questions related to the survey, and to assist the airport representative in the collection and recording of

any supplemental data (Master Plans, ALPs, CIPs, Rates & Charges, etc.) to in order to facilitate the process.

Data collected from the surveys and airport site visits was reviewed and entered into a master database for use as reference throughout the study. Figures detailing airport data for each facility can be found throughout this chapter and are prefaced by a summary of the inventory findings for each specific set of airport data. Data sets include the following:

- Airport Runway data
- Airport Lighting and Navigation Aid (NAVAID) data
- Aircraft Parking and Hangar data
- Landside Facility data
- Airport Maintenance and Snow Removal Equipment data
- Airport Security data
- Airport Fueling data
- Based Aircraft and Operations data
- Airport Services data
- Aircraft Operation Activity data
- Airport Plans, Policies, and Environmental Stewardship data
- Airport Outreach data
- Land Use Compatibility data
- Airport Economic data
- Airport Runway Pavement Condition data

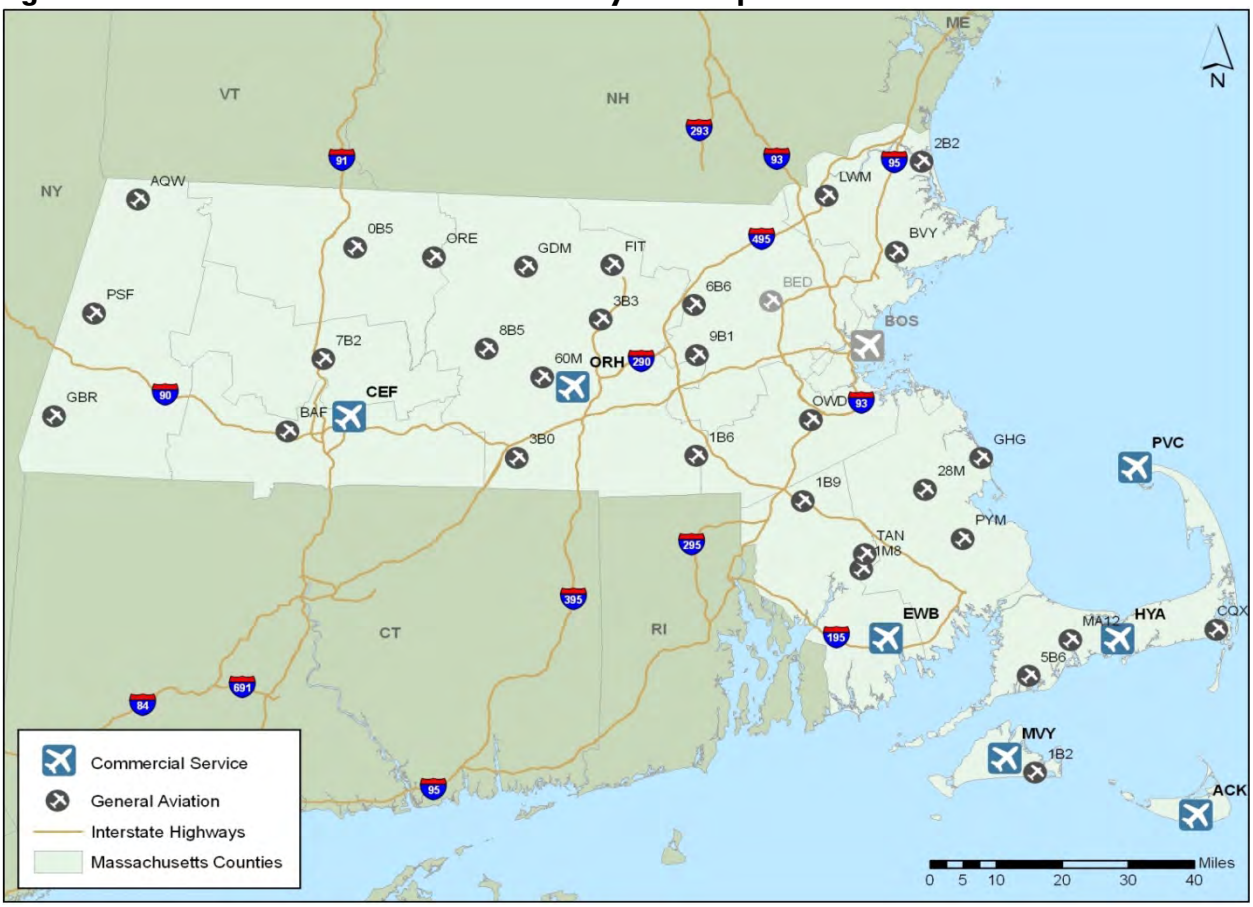
Note that multiple attempts were made by the project team to obtain airport information for the above data sets that was not sufficiently completed through the survey itself or through the subsequent on-site visit. Follow-up means of obtaining missing data elements included telephone calls and emails, and, in some cases, direct assistance from MAMA and MassDOT Aeronautics.

The figures relating to the collected data can be found in tabular format at the conclusion of this chapter. Incomplete data for a particular airport is denoted as "N/A" (not available). Additionally, various data sets within the airport survey included questions and/or subsequent questions that did not apply to every system airport. In such instances, data cells within the tables are marked by a "-".

EXISTING GENERAL AVIATION SYSTEM

According to the FAA 5010 Database, the current Massachusetts air transportation system consists of 241 airports and other aviation facilities. Of this number, 39 airports are listed as public-use airports while all other facilities are listed as private-use. The MSASP is limited to public-use airports only. Out of the 39 public-use airports in Massachusetts, 37 have been selected for inclusion into the MSASP based on a variety of factors including eligibility for federal funding, ownership, and activity levels. Figure 2-1 depicts the MSASP system of GA airports including Boston's Logan International Airport (BOS) and L.G. Hanscom Field (BED) which were not selected for inclusion into this plan. Of the 37 general aviation study airports, 26 are publicly-owned, while 11 are privately-owned. A complete listing of the airports and their ownership is provided in Figure 2-2.

Figure 2-1: Massachusetts General Aviation System Airports



Source: Wilbur Smith Associates
Prepared: March 2010

Figure 2-2: Public Use Airport System Identification and Ownership Status

Airport ID	Associated City	Airport Name	Ownership
8B5	Barre/Barre Plains	Tanner-Hiller Airport	Private
1M8	Berkley	Myricks Airport	Private
BVY	Beverly	Beverly Municipal Airport	Public
CQX	Chatham	Chatham Municipal Airport	Public
1B2	Edgartown	Katama Airpark	Public
5B6	Falmouth	Falmouth Airpark	Private
FIT	Fitchburg	Fitchburg Municipal Airport	Public
GDM	Gardner	Gardner Municipal Airport	Public
GBR	Great Barrington	Walter J. Koladza Airport	Private
28M	Hanson	Cranland Airport	Private
1B6	Hopedale	Hopedale Industrial Park Airport	Private
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	Public
LWM	Lawrence	Lawrence Municipal Airport	Public
1B9	Mansfield	Mansfield Municipal Airport	Public
9B1	Marlborough	Marlboro Airport	Private
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	Public
2B1	Marstons Mills	Cape Cod Airport	Public
0B5	Montague	Turners Falls Airport	Public
ACK	Nantucket	Nantucket Memorial Airport	Public
EWB	New Bedford	New Bedford Regional Airport	Public
2B2	Newburyport	Plum Island Airport	Private
AQW	North Adams	Harriman-and-West Airport	Public
7B2	Northampton	Northampton Airport	Private
OWD	Norwood	Norwood Memorial Airport	Public
ORE	Orange	Orange Municipal Airport	Public
PSF	Pittsfield	Pittsfield Municipal Airport	Public
PYM	Plymouth	Plymouth Municipal Airport	Public
PVC	Provincetown	Provincetown Municipal Airport	Public
3B0	Southbridge	Southbridge Municipal Airport	Public
60M	Spencer	Spencer Airport	Private
3B3	Sterling	Sterling Airport	Public
6B6	Stow	Minute Man Air Field	Private
TAN	Taunton	Taunton Municipal Airport - King Field	Public
MVY	Vineyard Haven	Martha's Vineyard Airport	Public
BAF	Westfield/Springfield	Barnes Municipal Airport	Public
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	Public
ORH	Worcester	Worcester Regional Airport	Public

Source: Airport Inventory and Data Survey
Prepared: June 2010

AIRSIDE FACILITIES DATA

This section summarizes the inventory of airside facilities for the system airports. This includes airport information as it pertains to the following elements:

- Runway Information
- Visual and Navigational Aids
- Aircraft Hangar Information
- Aircraft Tie Down Information.

Runways

Of the 37 MSASP airports, 19 have multiple runways. Three of the 37 have more than two runways; however, two of the facilities with multiple runways provide only turf landing surfaces (Katama Airpark and Cape Cod Airport). Nantucket Memorial Airport is the only facility with more than two runways with all having asphalt landing surfaces. System airports with two or more runways include the following:

- Beverly Municipal Airport
- Katama Airpark
- Fitchburg Municipal Airport
- Barnstable Municipal Airport
- Lawrence Municipal Airport
- Mansfield Municipal Airport
- Cape Cod Airport
- Nantucket Memorial Airport
- New Bedford Regional Airport
- Norwood Municipal Airport
- Orange Municipal Airport
- Pittsfield Municipal Airport
- Plymouth Municipal Airport
- Westover Air Reserve/Metropolitan Airport
- Minute Man Airfield
- Taunton Municipal Airport
- Martha's Vineyard Airport
- Barnes Municipal Airport
- Worcester Regional Airport

Runway Length

Runway length is one of the most critical factors when determining the aircraft operating parameters of an airport. When considering the runway length at an airport, 5,000 feet is a distinguishing characteristic in terms of airport planning and aircraft operations, especially at airports having only a single runway. Furthermore, airports with a greater than 5,000 foot runway provide a significant value to business/corporate activity, as most corporate type aircraft can operate in and out of airports having at least a 5,000-foot runway. Of all the system airports, 11 have a runway that is at least 5,000 feet long. Five of the eleven have a runway that is 5,500 feet or greater in length. System airports with a 5,000-foot or greater runway lengths include:

- Beverly Municipal Airport
- Barnstable Municipal Airport
- Lawrence Municipal Airport
- Nantucket Memorial Airport
- New Bedford Regional Airport
- Orange Municipal Airport
- Pittsfield Municipal Airport
- Westover Air Reserve/Metropolitan Airport
- Martha's Vineyard Airport
- Barnes Municipal Airport
- Worcester Municipal Airport

Of those airports listed, Nantucket Memorial, Westover Air Reserve/Metropolitan, Martha's Vineyard, Barnes, and Worcester Regional have a runway with a length of 5,500 feet or greater. Additionally, FAA criteria indicate that for a runway to be eligible for a new instrument approach, runway length must be at least 3,200 feet. Of the MSASP airports, 21 of the 37 meet that runway length standard.

Runway Surface Types

Of the MSASP system airports, 34 of the 37 airports provide asphalt runway surfaces. Berkley Myricks Airport, Katama Airpark and Cape Cod Airport are the only airports in the system served exclusively by turf runways. Data relative to the condition of the asphalt runway surfaces can be found in Appendix A of this report.

Inventory data relative to runway data for the system airports can be found in tabular format in **Figure 2-3** on page 2-21.

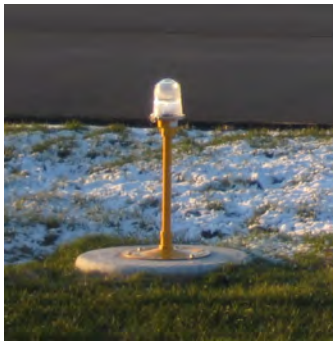
Visual and Navigational Aids *(NAVAIDS)*

Visual aids and NAVAIDS are used throughout the airport system to provide terminal and enroute navigational information to pilots. Visual aids, which consist of lighting and marking aids, are used to provide pilots information based on the aircraft's horizontal and vertical position and guide a pilot's position both in the air and on the ground. Navigational aids vary considerably in terms of their accuracy, reliability, coverage, and capabilities. Visual and NAVAID data collected during the inventory process includes:

- Runway and Taxiway Lighting
- Runway End Identifier Light (REIL) systems
- Airport Windsocks and Airport Beacons
- Automated Weather Reporting Equipment
- Visual Approach Slope Indicators (VASI) and Precision Approach Slope Indicators (PAPI)
- Approach Lighting Systems
- Instrument Approach Capabilities

Runway and Taxiway Lighting

Runway edge lights consist of a single row of two-directional lights bordering each side of the runway and are classified according to three intensity levels: High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), and Low Intensity Runway Lights (LIRL). Runway Edge Lights are white, except on instrument runways where yellow replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings. The lights marking the ends of the runway emit red light toward the runway to indicate the end of runway to a departing aircraft and emit green outward from the runway end to indicate the threshold to landing aircraft.



Runway Light (Chatham Municipal Airport)



Runway end edge lighting

Taxiway lighting consists of blue edge lights and may also consist of green centerline lights.

Of the 37 system airports, 30 have runway edge lighting on their primary runway. Seventeen of those 30 airports also provide taxiway lighting for the taxiway(s) that serve the primary runway. One of the system airports (Orange Municipal Airport) provides taxiway edge reflectors for navigational purposes.

Runway End Identifier Lights (REILS)

Runway end identifier lights (REIL) consist of high intensity white strobe lights placed on each side of the runway end to enable rapid and positive identification of the runway threshold. REILs are typically installed on runways where an approach lighting system is not available.

Of all system airports, 18 of the 37 provide REILS on at least one end of their primary runway.



Runway End Identifier Light (REIL)

Airport Beacons and Airport Windsocks



Airport Beacon (Taunton Municipal Airport)

Airport beacons are used to guide pilots to lighted airports with a sequence of yellow, green, and/or white lights. A beacon is normally operated from dusk until dawn and can be pilot-operated or active during night hours through the use of a photocell. If the beacon is on during other hours, it typically indicates that the airport is operating under instrument flight rules.

An airport windsock consists of a conical textile tube that is designed to indicate wind direction and relative wind speed. Wind socks aid pilots in determining the appropriate runway for takeoff and landing. Additionally, windsocks can be lighted at night to assist pilots during nighttime operations.

Of the 37 system airports, 28 have an airport beacon and all system airports have a windsock, of which 24 are lighted.

Automated Weather Reporting Capabilities

On-site weather stations at airports are invaluable to pilots and are designed to serve aviation and meteorological functions for safe and efficient aircraft operations. Airports having instrument approach capabilities are required to provide on-site weather reporting stations that enable the pilot to choose the instrument approach that results in the lowest possible approach minimums.

The most common automated weather service systems are called Automated Weather Observing Systems (AWOS) or Automated Surface Observation Systems (ASOS). These systems typically provide basic weather data such as temperature, sea level pressure (altimeter setting), dew point, wind direction, and precipitation accumulation. Among the oldest type of weather reporting equipment available at airports today, an AWOS generally reports at 20-minute intervals and does not report rapidly changing weather conditions.



AWOS System (Marshfield Municipal Airport)

Owned by the FAA and maintained by the National Weather Service (NWS), ASOS units report the same basic weather data as the AWOS, but generally at hourly intervals. They also have the capability to report more advanced weather information at airports, such as icing and lightning.

Over half of the system airports (19 of 37) have weather reporting capabilities, with 15 having an ASOS, and three having an AWOS. Additionally, Westover Air Reserve Base has an Airport Weather Advisor (AWA) system know as an FMQ19, which is a meteorological reporting station that is used at a number of military facilities throughout the nation.

Visual Approach Slope Indicators (VASI) and Precision Approach Path Indicators (PAPI)

The VASI is a system of lights so arranged to provide visual descent guidance information during the approach to a runway. VASI installations consist of a set of lights arranged in bars referred to as near and far bars. The basic principle of the VASI is that of color differentiation between red and white. The light units are arranged so that the pilot using the VASIs during an approach will see a combination of right and white lights. When approaching the runway at the proper angle, the first set of lights appears white and the second set appears red. When both sets appear white, the approach is too high, and when both appear red the approach is too low.

Similar to a VASI, the Precision Approach Path Indicator (PAPI) is a visual-approach slope aid system that gives a more precise indication to the pilot of the approach path of the aircraft. The system may consist of two or four lights and is usually placed on the left hand side of the approach runway. The lighting indications still consist of a series of white and/or red lights to indicate the pilot's position. A greater number of red lights visible to the pilot, compared to the number of white lights, indicate that the aircraft is flying below glide-slope, and vice versa. When flying the correct glide-slope, a pilot obtains the same number of red and white lights.



PAPI Navigational System

Within the system, 22 of the 37 airports have either a VASI or PAPI that serves at least one end of the airports' primary runway. Of the 20 airports with multiple runways in the system, nine have either a VASI or PAPI that also serves the secondary runway.

Approach Lighting Systems (ALS)

Approach Lighting Systems are a configuration of high-intensity or medium-intensity sequenced signal lights designed to guide the pilot from the approach zone to the runway threshold. An ALS mostly serves runways with an associated instrument approach procedure, and allows the pilot to identify the runway environment and align the aircraft for landing when flying the approach. Approach lights also provide additional visual guidance for nighttime approaches under Visual Flight Rules (VFR).



MALSF Approach Lighting System (Provincetown Municipal Airport)

Various ALS configurations are used at 12 of the 37 MSASP system airports. They include the following:

- MALSR - Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights
- MALSF - Medium-intensity Approach Lighting System with Sequenced Flashing lights
- SALS - Simple Approach Lighting System
- SSALR - Simplified Short Approach Lighting System with Runway Alignment Indicator Lights
- ALSF-1 - Approach Lighting System with Sequenced Flashing Lights configuration

Instrument Approach Capabilities

Airport safety and capacity are greatly enhanced at airports where instrument approach procedures (IAPs) are available during times of inclement weather; otherwise known to pilots as instrument meteorological conditions (IMC). As the sky ceiling and visibility around an airport decreases, electronic guidance provided by specialized equipment to aircraft (also equipped with specialized equipment) allows pilots to safely operate and land in weather where visibility is restricted. Airports without instrument approach capabilities are considered VFR Only airports, while airports with published instrument approach procedures are known as Instrument Flight Rules (IFR) airports. Consequently, the availability of instrument approach capabilities at an airport allows continued use of the airport by properly equipped aircraft, and pilots who are qualified to fly instrument approach procedures since they can still operate in and out of IFR airports during inclement weather, while aircraft which can only fly during visual meteorological conditions (VMC) cannot.

The instrument approach capabilities of an airport are typically broken into three categories; precision, non-precision, and visual. Precision instrument approach procedures provide accurate electronic horizontal (or lateral), and vertical guidance to aircraft. Non-precision instrument approach procedures provide less refined electronic guidance to aircraft, limited to lateral guidance only. The type and accuracy of an instrument approach is highly dependent upon any airspace obstructions within the runway approach zone.

While other precision approach systems are used throughout the country, the most common type of precision approach in use today is the Instrument Landing System (ILS). Non-precision approach capabilities have been greatly increased by the evolution of satellite technology, specifically Global Positioning System (GPS). The FAA has recently developed new approach procedures known as Localizer, or Lateral, Performance with Vertical Guidance (LPV) approaches. This new capability utilizes the Wide Area Augmentation System (WAAS). While not considered a precision approach, LPV provides vertical guidance to aircraft to "near precision" accuracy.

Of the 37 Massachusetts system airports, 15 offer instrument approaches, ten of which provide non-precision instrument approaches only and five of which provide a precision instrument approach. Martha's Vineyard Airport is currently the only airport that provides an LPV approach; however, multiple airports within the system are in the process of obtaining LPV approach capabilities. These airports include: Mansfield Municipal, Taunton Municipal, Nantucket Memorial, Westfield-Barnes Municipal, Beverly Municipal, Lawrence Municipal, Pittsfield Municipal, and Provincetown Municipal Airports.

Inventory data relative to Visual and Navigational Aid data for the system airports can be found in tabular format in **Figure 2-4** on page 2-22.

Aircraft Hangars (T Hangars, Conventional Hangars, Portable Hangars)

Weather conditions, security, investment incentives, and the general preference of aircraft owners make the availability of aircraft hangar storage at an airport more attractive to both based and transient airport users.



Aircraft Hangar (Gardner Municipal Airport)

The MSASP inventory process revealed that 21 of the 37 system airports currently have hangar waiting lists. From a short list of one person at Fitchburg Municipal Airport to an extensive list of 25 at Walter J. Koladza Airport in Great Barrington, and a list of 27 at Barnstable Municipal Airport, it is clear that the demand for hangars exists at several system airports. This fact is very important since revenue from hangar leases represents an important source of income for general aviation airports.



Portable Hangar (Sterling Airport)

All of the system airports have at least one conventional hangar, and 26 of the 37 airports indicated that their conventional hangar(s) are currently filled to 100 percent capacity. Of the 11 remaining airports, four have their conventional hangars filled to 75 percent capacity or more. Also note that 11 of the 37 system airports reported having portable or "other" type hangars.

Inventory data relative to aircraft hangars can be found in **Figure 2-5** on page 2-23.

Aircraft Parking Aprons

Aircraft parking data was collected from 32 of the 37 system airports. This data revealed that system airports as a whole provide nearly 1,500 paved aircraft tie-downs and nearly 500 grass tie-downs. The inventory effort also revealed that there is no waiting list for aircraft tie-downs at any of the system airports. Inventory data relative to aircraft parking aprons are in tabular format in **Figure 2-6** on page 2-24.



Aircraft Parking Apron (Mansfield Municipal Airport)

LANDSIDE FACILITIES AND AIRPORT SERVICES DATA

This section summarizes the inventory effort as it relates to landside facilities and services provided at system airports. This includes airport information as it pertains to the following elements:

- Terminal Facilities
- Aircraft Fueling Services
- Aircraft Rescue Fire Fighting, Snow Removal Equipment and/or Maintenance Buildings
- Airport Security
- Miscellaneous Airport Services and Accommodations

Terminal Facilities

Support facilities at general aviation airports often include a terminal building as a basic amenity provided to based and transient aircraft operators and passengers. Terminal facilities typically serve as a base of operations for an airport fixed based operator (FBO), airport administration, an aircraft flight school, or various other service providers at the airport. Additionally, GA airport terminals often provide a suitable location for a flight planning area, a pilot lounge, airport restrooms, vending machines, a conference room, or an area to purchase pilot supplies, among others.



Terminal Building (Marshfield Municipal Airport)



Terminal Building (Nantucket Memorial Airport)

Of the 37 general aviation system airports, 29 currently have a terminal facility. Typically, the size of the terminal facility is directly related to the amount of activity and the level of service the airport offers. The Massachusetts system of airports includes various levels of terminal facilities, ranging from a small GA terminal building of roughly 400-square feet of space at Myricks Airport to a larger scale GA terminal facility such as the 30,000-square foot facility at Nantucket Memorial and even a 60,000-square foot terminal facility at Worcester Regional Airport.

A complete inventory of terminal facilities for all system airports and the basic amenities they provide can be found in Figure 2.7 on page 2-25.

Aircraft Fueling Services

Fuel services are provided at most GA facilities and in many cases provide the most important source of revenue for the airports and FBOs that operate airport fuel farms. Primary fuel for aviation activities includes 100LL (Avgas) and Jet A. The majority of piston engine aircraft in the general aviation fleet use Avgas while the larger turbo-prop and jet aircraft exclusively use Jet A. Some specially certified aircraft can also use automotive gas (Mogas), but these are rare.



Fuel Farm (Chatham Municipal Airport)

Currently, all 37 system airports have the capacity to contain aviation fuel and (with the exception of Tanner-Hiller Airport) all system airports have the capability to dispense fuel. Of these, 16 provide both Avgas and Jet A. The remaining 20 general aviation airports offering fuel services provide Avgas only.

Figure 2.8 on page 2-27 depicts data relative to fuel services for all system airports.

Aircraft Rescue Fire Fighting (ARFF), Snow Removal Equipment (SRE) and/or Maintenance Buildings

Airport support facilities can vary greatly depending on the level of airport activities, airport operational expectations (particularly with respect to weather in Massachusetts) and regulatory requirements.

Aircraft Rescue Fire Fighting (ARFF)

Aircraft Rescue Fire Fighting facilities are ***not*** required at all GA airports; however, GA airports that also provide commercial aircraft operations and operate under a Part 139 certificate, must provide ARFF services. Six of the 37 MSASP system airports are currently Part 139 certificated due to commercial air services, and as such are required to provide ARFF services. Additionally, both Provincetown and New Bedford Regional Airport's, which both offer scheduled commercial passenger service using the Cessna 402 aircraft, also provide limited ARFF capabilities. The system airports that provide Aircraft Rescue Fire Fighting services and have a dedicated ARFF building include:



ARFF Facility (Barnes Municipal Airport)

- Barnstable Municipal Airport
- Nantucket Memorial Airport
- Westover Air Reserve Base/Metropolitan Airport
- Martha's Vineyard Airport

- Barnes Municipal Airport
- Worcester Regional Airport
- Provincetown Municipal

The level of ARFF services provided at these airports are based on the types of commercial aviation activities that take place at the airport (scheduled or unscheduled passenger service) and the size of the aircraft providing such services (determined by the seat capacity of the aircraft). These variables place an airport in a specific class (I-IV), which determines the level of ARFF services the airport is required to provide as per FAA regulations. Additionally, all system airports that provide ARFF services also have mutual aid agreements with their local town/city fire departments whereby, during an aircraft incident or accident requiring an ARFF response, the services of the town/city may be used to supplement the capabilities of the airport's ARFF services.

Snow Removal Equipment (SRE) and/or Maintenance buildings



Snow Removal Equipment Building (Barnstable Municipal Airport)

Snow removal and maintenance equipment are expensive investments for GA airports, particularly those which are publically-owned and have received federal or state funding to purchase such equipment for airport use. Consequently, in order to avoid storing this equipment outside, with prolonged exposure to the elements, it is highly desirable for airport operators to have the ability to store SRE and maintenance equipment in a dedicated building designed for such a purpose. Of the 37 system airports, 18 have a SRE building, and 18 of the 37 system airports have a maintenance building. Provincetown Municipal's ARFF building is a joint use facility that is also used to store SRE.

Data related to the availability of these buildings at all system airports can be found in **Figure 2.9** on page 2-28.

Airport Security



Security Fencing (Martha's Vineyard Airport)

Historically, the FAA has not held general aviation airports to the same security standards required of commercial service airports. Prior to the events of September 11, 2001 (9/11), the FAA had no real need to hold GA airports to such strict security standards. However, the rising concern for airport security following 9/11 brought about the identification of vulnerabilities that exist in airports that primarily serve general

aviation. As a result, airport security enhancements at GA airports such as, GA Security Plans, access control systems, ID badging systems, card readers, and CCTV became a priority for some general aviation airports. Consequently, the inventory effort for this MSASP sought to identify the existing security posture of the GA system.



TSA Security Checkpoint (Provincetown Municipal Airport))

All of the 37 system airports have some form of a General Aviation Security Plan. Five of the system airports hold operating certificates issued under Part 139 of the code of federal regulations (CFR) and agree to certain operational, safety, and security standards and are subject to stricter TSA 1542 requirements (security requirements at airports serving scheduled commercial operations). Although not Part 139 certificated, also subject to TSA security requirements is Provincetown Municipal Airport due to its passenger service to Logan International Airport. Additionally, 23 of the 37 system airports have control measures in place for accessing the Air Operations Area, which is defined as "any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft".

Detailed information relating to airport security at system airports can be found in **Figure 2-10** on page 2-29.

Miscellaneous Airport Services and Accommodations



Nantucket Memorial Airport

The types and the level of services that a general aviation airport offers is dependent upon market demand forces that translate to the types of aircraft and customers the airport serves. Thus, the services offered at GA facilities throughout the nation vary greatly. From the smallest GA airport serving single engine aircraft, offering fuel services and perhaps a freelance flight instructor, to large scale GA facilities that serve multimillion dollar corporate aircraft, offering aircraft oxygen and catering services, the range of services offered for general aviation is very broad. Additionally, airports with a dedicated terminal building or FBO generally offer more services than those without.

With regard to airport services and accommodations, the inventory effort sought to capture the number of FBOs at the system airports, as well as to identify the entire range of airport services offered in the GA system. These services included the following:

- On-Site Car Rental
- Courtesy Car
- Crew Car
- On-Airport Transportation Services
- Flight Instruction
- Full Time Flight School
- Aircraft Maintenance Services
- Airframe and Power Plant Repairs
- Avionics Repairs
- FAA Part 145 Repair Station
- Aircraft Sales
- Snow Removal Operations
- Aircraft Deicing
- Aircraft Oxygen
- Catering Services
- Aircraft Lavatory Disposal Services

The inventory revealed that 32 of the 37 system airports have at least one FBO, and 27 of the 37 system airports offer flight instruction with 22 of those having a full time flight school on the airport. Figure 2-11 on page 2-31 identifies the range of services at each of the system airports.

BASED AIRCRAFT, OPERATIONS, AND AIRCRAFT ACTIVITIES

Existing and historical data for based aircraft and operations were collected for system airports through various sources. Based aircraft data was primarily collected directly from the airport and/or was supplemented with archived data for each airport provided by MassDOT Aeronautics.

Out of all system airports, nine facilities had over 100 based aircraft in 2009, with Lawrence Municipal having the most based aircraft at 230. Norwood Memorial had the second most based aircraft with 203. There were seven airports with less than 15 based aircraft. Katama Airpark had the least with four based aircraft, and Tanner-Hiller had the second least with, five.

An Airport Operation is defined as either a take-off or a landing. Ten of the 37 system airports have air traffic control towers that keep and report accurate airport operations data, while the remaining 27 airports are "uncontrolled" meaning they have no air traffic control tower. Estimating airport operations data at non-towered airports can be difficult and in many cases is an educated guess, at best. Aircraft operations data was provided through the Airport Inventory and Data Survey and in many cases for the non-towered airports the FAA 5010 (Airport Master Record) database was the source of the most recent operations data. Historical operations data at the non-towered airports were mostly unavailable.

Overall, the based aircraft and operations data collected is indicative of an airport system whose airports vary in size and function and a system that supports a wide variety of aviation activity.

Figure 2-12 on page 2-33 presents the findings of the based aircraft data for 2009 and operations data from 2008, the last full year of operations data that was available (at the time data collection took place) for all system airports.

Aircraft Operations Activity Types

As mentioned throughout this chapter, the types of aircraft activity types and frequency of operations determine the size and function of GA facilities. For this reason, the inventory also looked to capture the various types and frequency of aircraft operations at all system airports, and whether or not the activity type is based at the airport. Operations included the following:

- Air Carrier
- Air Taxi
- Aircraft Charter
- Air Cargo
- Emergency Medical
- Angel Flight
- Agricultural (crop dusting)
- Law Enforcement
- Power Line or Pipe Line Control
- Skydiving
- Flight Training

Additionally, other types of aircraft activities noted at one or more of the system airports included: glider operations, aerial photography, banner towing, hot air balloon operations, blimp operations, and fish spotting operations. Inventory data pertaining to the activity types and frequency of operations for all system airports can be found in Figure 2-13 on page 2-35.

AIRPORT PLANS, ENVIRONMENTAL STEWARDSHIP, & ENVIRONMENTAL PLANS

In both public and private airport environments, there is a need for some level of regulation and oversight to ensure that airport operational safety and efficiency are maintained. This is often accomplished through defined airport standards, procedures, performance criteria, and recommended guidelines found within specific airport plans adopted by an airport. Many of these plans come as a result of federally funded projects such as Airport Master Plans and Airport Layout Plans; however, many of the other various airport plans used to maintain operational safety and efficiency at general aviation airports are adopted by publicly and privately-owned airports alike. Such plans include but are not limited to: Airport Emergency Plans, Snow and Ice Control Plans, Wildlife Management Plans, and established Noise Abatement Procedures.

The inventory effort sought to capture the level and types of existing airport plans, studies, and policies at all of the 37 system airports, as well as the dates these plans were adopted. Additionally, in an effort to identify the environmental stewardship posture at all the system airports, the airport inventory survey also asked questions pertaining to specific environmental related plans and initiatives, including:

- Environmental Assessment (EA)/Environmental Impact Statement (EIS)
- Vegetation Management Plan (VMP)
- Grassland Management
- Comprehensive Solid Waste Management
- Natural Heritage & Endangered Species Program
- Wetland Delineation
- Spill Prevention, Spill Control, Spill Countermeasures (SPCC)
- Stormwater Pollution Prevention Plan (SWPPP)
- Alternative Fuel Vehicles

- Recycling Programs

Information pertaining to airport plans and environmental stewardship can be found in tabular format in Figures 2-14 and 2-15 on pages 2-36 and 2-37.

AIRPORT/AVIATION OUTREACH PROGRAMS

Airport and aviation outreach programs allow airports to maintain close coordination with members of aviation organizations, airport stakeholders, and local communities while creating a sustainable aviation system that fosters growth and viability.

The inventory effort sought to capture the level of public, legislative, and/or educational outreach taking place at all of the system airports. With regard to outreach programs, the inventory survey asked questions such as:

- Is the airport a member of the local chamber of commerce?
- Does the Airport host an air show or fly-in?
- Does the airport have a program that educates the community's understanding of the value the airport brings to the community?
- Does the airport have an educational outreach program that illustrates aviation career opportunities to students?

Figure 2-16 on page 2-39 identifies the level of outreach programs currently in place at all system airports.

LAND USE COMPATIBILITY AND AIRPORT DEVELOPMENT POTENTIAL

Land Use Compatibility

Regulations established by the FAA define what constitutes an obstruction to navigable airspace in the vicinity of airports. In doing so, they use the concept of "imaginary surfaces", developed in relation to a given airport and to each runway at that airport. Any object that penetrates these surfaces is known as an "obstruction" and presents a potential hazard to air navigation. Therefore, incompatible land uses near an airport can result in safety concerns for pilots as well as the public on the ground in the airport vicinity. Airports were asked of any known land use zoning controls adopted by surrounding municipalities in order to make land use in the airport environs compatible with airport operations and development.

It should be noted that Massachusetts General Law (M.G.L) addresses the construction of structures in the vicinity of airports, and airport approach regulations by cities or towns, in Chapter 90.35A and 90.40A respectively. These laws state that for the safety, welfare and protections of persons and property in the air and ground, the navigable airspace overlying approaches to air traffic patterns be maintained in a reasonably unobstructed condition for the safe flight of aircraft. Additionally, 90.40A states that any city, except Boston may by ordinance or by-law adopt, and administer and enforce, approach regulations relative to the approaches to publically owned airports and may restrict the height to which trees or structures may be erected or allowed to grow.

Additionally, the Massachusetts State Board of Building Regulations and Standards states that, in addition to abiding by M.G.L., the proposed construction or alterations of buildings in an area subject to airport approach regulations require the filing of a Notice of Proposed Construction or Alteration Form (FAA 7460) with the FAA and must provide a copy to the state as well.

However, it was observed during the inventory review and follow-up airport site visits that many interviewees were unfamiliar with the degree to which local zoning language was designed to consider the airport environment. In fact, 16 of the 37 system airports responded "Unknown" when asked if appropriate zoning controls are in place by surrounding municipalities. As a result, the information collected in the inventory will serve as a foundation for further investigation and research.

Future Airport Development Potential

Airports were asked to rank their expansion potential on a scale of 1 to 10 and to cite existing factors that would inhibit the future growth of their airport. These factors included manmade factors, environmental factors, community relations, and financial shortfalls.

Of the 36 system airports that responded to this question, 32 indicated that their airports had future development potential. However, 24 of these airports cited financial shortfalls as a factor that would limit the potential for future development, while 22 cited environmental factors as a limitation.

Figure 2-17 on page 2-40 identifies the development potential for all system airports as well as the existing factors they believe would limit future airport development at their facility.

Airport Economic Data

As part of the MSASP, limited economic factors at the specific airports were considered in order to provide information to support future decision-making by MassDOT Aeronautics. Specifically, information from businesses that rely on aviation was obtained to provide the current status of aviation's employment impact on the statewide economy. This was accomplished through two primary means: on-site airport survey efforts that collected listings of airport tenants and aviation-related employment totals; and through a statewide survey of non-aviation businesses that are typically located off-airport and depend on area airports to ship final goods and/or receive manufacturing imports, receive critical spare parts, or for the transport of their personnel.

The results of the airport-related employment and non-aviation dependent employment analysis will provide MassDOT Aeronautics with information to address the importance of aviation to the state's economy, and are presented within the MSASP appendices.

Pavement Condition Inventory

Airport pavement is the basis of any airport system and the MSASP was designed to consider this fact. Specifically, this study will broadly assess the current conditions of runway pavements at the 37 public-use airports within the Commonwealth in order to serve as a means to

comparatively prioritize and budget order-of-magnitude costs for future reconstruction needs for runways at the study airports beyond the MassDOT Aeronautics current five-year Capital Improvement Plan. The data collection effort for the pavement condition inventory was integrated directly into the inventory effort and was comprised of survey efforts, records searches, and on-site visits.

The results of this analysis will be used by MassDOT Aeronautics staff to better understand the general level of investment needed for future out-year runway reconstruction projects, which generally represent a higher cost than most other airport infrastructure improvements. They are presented within the MSASP appendices.

SUMMARY

In summary, the data collected throughout the inventory effort serves as a foundation for subsequent system plan elements including aviation activity forecasts, airport role analysis, facilities and service objectives and a high-level employment review of the system airports.

Supplementing the airport data collected through each individual airport survey is data obtained through a pilot survey that was hosted online, as well as a business survey that was distributed through the postal service to a specific cross section of businesses throughout the Commonwealth of Massachusetts. Additional information such as Capital Improvement Plans, Airport Layout Plans, Airport Master Plans, and a schedule of rates and charges was obtained from various system airports and will be used throughout this study.

The resulting master database will be provided to MassDOT Aeronautics at the completion of this study and is intended to serve as a valuable resource to identify existing efficiencies and/or shortfalls that were not included for analysis within this report.

While the Massachusetts airport system continues to evolve, data collected in this study will also serve as a baseline for expanded analysis and future system updates. As such, the MSASP is expected to be an integral resource for MassDOT Aeronautics and state and local officials responsible for future funding decisions as they relate to the airport system and specific facilities in particular.

Figure 2-3: Airport Runway and Lighting Data

Airport City	Number of Runways	Max RWY Length	Surface Type	RWY Lighting	TWY Lighting
Barre/Barre Plains	1	3,027'	Asphalt	-	-
Berkley	1	2,000'	Turf	-	-
Beverly	2	5,001'	Asphalt	MIRL	MED
Chatham	1	3,001'	Asphalt	MIRL	-
Edgartown	3	3,700'	Turf	-	-
Falmouth	1	2,298'	Asphalt	LIRL	-
Fitchburg	2	4,510'	Asphalt	MIRL	-
Gardner	1	2,999'	Asphalt	MIRL	MED
Great Barrington	1	2,579'	Asphalt	LIRL	-
Hanson	1	1,860'	Asphalt	-	-
Hopedale	1	3,172'	Asphalt	LIRL	-
Hyannis	2	5,425'	Asphalt	HIRL	MED
Lawrence	2	5,001'	Asphalt	HIRL	MED
Mansfield	2	3,500'	Asphalt	MIRL	MED
Marlborough	1	1,659'	Asphalt	-	-
Marshfield	1	3,001'	Asphalt	MIRL	MED
Marstons Mills	3	2,035'	Turf	-	-
Montague	1	3,200'	Asphalt	MIRL	-
Nantucket	3	6,303'	Asphalt	HIRL	MED
New Bedford	2	5,000'	Asphalt	HIRL	MED
Newburyport	1	2,105'	Asphalt	-	-
North Adams	1	4,300'	Asphalt	MIRL	-
Northampton	1	3,365'	Asphalt	MIRL	-
Norwood	2	4,008'	Asphalt	MIRL	MED
Orange	2	5,000'	Asphalt	MIRL	REFL
Pittsfield	2	5,001'	Asphalt	MIRL	MED
Plymouth	2	4,349'	Asphalt	MIRL	MED
Provincetown	1	3,500'	Asphalt	HIRL	-
Southbridge	2	3,501'	Asphalt	MIRL	MED
Spencer	1	1,949'	Asphalt	LIRL	-
Springfield/Chicopee	2	11,597'	Asphalt	HIRL	HIGH
Sterling	1	3,086'	Asphalt	LIRL	-
Stow	2	2,770'	Asphalt	LIRL	-
Taunton	2	3,500'	Asphalt	MIRL	MED
Vineyard Haven	2	5,504'	Asphalt	HIRL	MED
Westfield /Springfield	2	9,000'	Asphalt	HIRL	MED
Worcester	2	7,000'	Asphalt	HIRL	MED

Source: Airport Inventory and Data Survey
Prepared: June 2010

Figure 2-4: Visual and Navigational Aid Data

Airport City	REILS	Windsock	Rotating Beacon	Weather Reporting	Approach Slope Indicator(s)	Approach Lighting System
Barre/Barre Plains	No	Yes	No	-	-	-
Berkley	No	Yes	No	-	-	-
Beverly	Yes	Yes- Lighted	Yes	ASOS	PAPI RY 16	MALSR RY 16
Chatham	Yes	Yes- Lighted	Yes	ASOS	PAPI 6/24	-
Edgartown	No	Yes	No	-	-	-
Falmouth	No	Yes	Yes	-	-	-
Fitchburg	Yes	Yes- Lighted	Yes	ASOS	VASI RY 14	-
Gardner	Yes	Yes	Yes	-	PAPI	-
Great Barrington	Yes	Yes- Lighted	Yes	-	-	-
Hanson	No	Yes	No	-	-	-
Hopedale	No	Yes- Lighted	Yes	-	-	-
Hyannis	Yes	Yes- Lighted	Yes	ASOS	PAPI RY 06	MALSR RY 24
Lawrence	Yes	Yes- Lighted	Yes	ASOS	PAPI RY 05 VASI RY 23	-
Mansfield	No	Yes- Lighted	Yes	-	-	-
Marlborough	No	Yes	No	-	-	-
Marshfield	Yes	Yes- Lighted	Yes	AWOS	PAPI RY 06	-
Marstons Mills	No	Yes	No	-	-	-
Montague	Yes	Yes- Lighted	Yes	-	Summer 2010	-
Nantucket	No	Yes- Lighted	Yes	ASOS/SAWS/ ATIS	VASI RY 06 PAPI RY 24	MALSF RY 06 SSALR RY 24
New Bedford	Yes	Yes- Lighted	Yes	ASOS	VASI RY 23	MALSR RY 05 & RY 23
Newburyport	No	Yes	No	-	-	-
North Adams	No	Yes- Lighted	No	AWOS	-	-
Northampton	No	Yes- Lighted	Yes	-	VASI RY 14	-
Norwood	No	Yes- Lighted	Yes	ASOS	PAPI RY 17 PAPI RY 35	MALSF
Orange	No	Yes- Lighted	Yes	ASOS	-	-
Pittsfield	No	Yes- Lighted	Yes	ASOS	VASI RY 26	MALSR RY 26
Plymouth	Yes	Yes	Yes	ASOS	PAPI RY 06 & RY 24	MALSF
Provincetown	Yes	Yes- Lighted	Yes	AWOS-3	PAPI RY 07 & RY 25	MALSF RY 07
Southbridge	Yes	Yes	Yes	-	PAPI RY 02 & RY 20	-
Spencer	No	Yes	No	-	-	-
Springfield/Chicopee	No	Yes- Lighted	Yes	FMQ19	PAPI RY 05 & RY 23	ALSF 1
Sterling	No	Yes	Yes	-	-	-
Stow	Yes	Yes- Lighted	Yes	-	PAPI RY 21 VASI RY 03	-
Taunton	Yes	Yes- Lighted	Yes	ASOS	VASI RY 30	-
Vineyard Haven	Yes	Yes- Lighted	Yes	ASOS/AWOS	VASI RY 6	ILS RY 24
Westfield /Springfield	Yes	Yes- Lighted	Yes	ASOS	PAPI RY 02 & RY 20	MALSR RY 20
Worcester	Yes	Yes- Lighted	Yes	ASOS	PAPI RY 29 & RY 33	-

Source: Airport Inventory and Data Survey
Prepared: June 2010

Figure 2-5: Airport Hangar Data

Airport City	T Hangars		Conventional Hangars		Portables/ Other		Transient Hangar		Sum Total	Waiting List
	Num	% Occupied	Num	% Occupied	Num	% Occupied	Num	% Occupied		
Barre/Barre Plains	-	-	4	100	1	50	-	-	5	No
Berkley	1	100	2	N/A	-	-	-	-	3	No
Beverly	22	100	7	100	-	-	-	-	29	No
Chatham	32	100	2	100	-	-	-	-	34	Yes
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	24	100	1	-	-	-	-	-	24	No
Fitchburg	57	100	9	100	-	-	-	-	66	Yes
Gardner	1	100	8	100	-	-	-	-	9	No
Great Barrington	-	-	3	100	-	-	-	-	3	Yes
Hanson	2	100	7	N/A	1	N/A	-	-	10	No
Hopedale	-	-	3	100	-	-	-	-	3	No
Hyannis	6	100	13	100	-	-	3	N/A	22	Yes
Lawrence	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mansfield	38	100	3	100	-	-	-	-	41	Yes
Marlborough	13	100	4	100	-	-	-	-	17	Yes
Marshfield	3	100	2	100	3	100	-	-	8	Yes
Marstons Mills	-	-	1	100	-	-	-	-	1	Yes
Montague	-	-	8	100	-	-	-	-	-	No
Nantucket	12	80	5	80	2	100	-	-	19	Yes
New Bedford	14	100	6	100	1	100	-	-	21	Yes
Newburyport	-	-	1	100	-	-	-	-	1	No
North Adams	5	100	5	100	-	-	-	-	10	No
Northampton	38	100	8	100	-	-	-	-	46	Yes
Norwood	1	100	11	100	-	-	-	-	12	Yes
Orange	-	-	30	100	-	-	-	-	30	Yes
Pittsfield	2	100	7	100	-	-	-	-	9	Yes
Plymouth	98	98	22	85	19	100	-	-	139	Yes
Provincetown	-	-	1	75	-	-	-	-	1	Yes
Southbridge	12	100	4	20	-	-	-	-	16	No
Spencer	5	100	3	100	-	-	1	N/A	9	Yes
Springfield/ Chicopee	2	100	5	N/A	8	N/A	-	-	15	No
Sterling	10	100	1	100	1	100	-	-	12	Yes
Stow	20	100	2	100	4	100	-	-	26	Yes
Taunton	76	100	6	100	3	100	-	-	85	No
Vineyard Haven	76	80	1	N/A	-	-	3	N/A	80	No
Westfield / Springfield	42	100	6	100	-	-	3	N/A	51	Yes
Worcester	20	90	2	100	1	N/A	-	-	23	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-6: Airport Tie Downs Data

Airport City	Based Tie Downs		Transient Tie Downs		Total Tie Downs		Sum Total
	Paved	Grass	Paved	Grass	Paved	Grass	
Barre/Barre Plains	-	5	3	-	3	5	8
Berkley	-	15	-	5	-	20	20
Beverly	113	-	5	-	118	-	118
Chatham	12	12	20	22	32	34	66
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	2	-	3	19	5	19	24
Fitchburg	75	-	6	-	81	-	81
Gardner	10	-	10	-	20	-	20
Great Barrington	-	20	-	10	-	30	30
Hanson	-	5	-	3	-	8	8
Hopedale	16	-	4	-	20	-	20
Hyannis	30	-	40	-	70	-	70
Lawrence	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mansfield	90	-	6	-	96	-	96
Marlborough	20	-	-	11	20	11	31
Marshfield	21	-	9	-	30	-	30
Marstons Mills	-	20	-	20	-	40	40
Montague	-	-	8	-	8	-	8
Nantucket	17	53	35	-	52	53	105
New Bedford	90	-	12	-	102	-	102
Newburyport	-	29	-	6	-	35	35
North Adams	10	6	14	-	24	6	30
Northampton	8	12	5	3	13	15	28
Norwood	134	-	13	-	147	-	147
Orange	28	23	-	-	28	23	51
Pittsfield	22	-	5	-	27	-	27
Plymouth	120	-	40	-	160	-	16
Provincetown	5	-	27	40	32	40	72
Southbridge	-	-	60	-	60	-	60
Spencer	-	20	-	2	-	22	22
Springfield/Chicopee	8	-	-	-	-	-	8
Sterling	24	8	-	3	24	11	35
Stow	54	22	6	2	60	24	84
Taunton	76	-	4	-	80	-	80
Vineyard Haven	31	-	33	30	64	30	94
Westfield /Springfield	42	30	8	-	50	30	80
Worcester	24	-	6	-	30	-	30

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-7: Airport Terminal Data

Airport City	*Terminal Building*	*Terminal Building Owner*	*Date Constructed*	*Restaurant*	*Vending Machines*	*Pilot Lounge*	*Conference Room*	*Flight Planning Area*
Barre/Barre Plains	No	-	-	No	No	No	No	No
Berkley	Yes	Airport	1940	No	No	No	No	No
Beverly	No	-	-	Yes	No	Yes	No	No
Chatham	Yes	Town of Chatham	1945/1985	Yes	Yes	Yes	Yes	Yes
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	Yes	Falmouth Airpark Homeowners Association	Pre 1982	No	Yes	Yes	No	No
Fitchburg	Yes	City of Fitchburg	1952 (Rehab 1960)	Yes	Yes	Yes	No	Yes
Gardner	Yes	Airport	1920	No	No	Yes	Yes	No
Great Barrington	Yes	Berkshire Aviation	1950	No	Yes	Yes	Yes	Yes
Hanson	No	-	-	No	No	No	No	No
Hopedale	No	-	-	No	No	No	No	No
Hyannis	Yes	Town of Barnstable	1950	Yes	Yes	No	Yes	No
Lawrence	Yes	City of Lawrence	1957	Yes	No	No	Yes	No
Mansfield	Yes	Town of Mansfield	1930	No	Yes	Yes	Yes	Yes
Marlborough	Yes	Airport	1929	No	Yes	Yes	Yes	No
Marshfield	Yes	Town of Marshfield	2001	No	Yes	Yes	Yes	Yes
Marstons Mills	No	-	-	No	No	No	No	No
Montague	Yes	Turners Falls Airport	1996	No	No	Yes	Yes	No
Nantucket	Yes	Town of Nantucket	07/2009	Yes	Yes	No	Yes	No
New Bedford	Yes	New Bedford Regional Airport	1952	Yes	Yes	Yes	Yes	Yes
Newburyport	Yes	SPNEA	1926	No	Yes	Yes	Yes	Yes
North Adams	No	-	-	No	Yes	Yes	No	No
Northampton	Yes	Seven Bravo Two, LLC	10/2005	No	Yes	Yes	Yes	Yes
Norwood	Yes	Flight Level Norwood, LLC (FBO)	1990 (Rehabed)	Yes	Yes	Yes	Yes	Yes
Orange	Yes	Town of Orange	1957	Yes	No	Yes	Yes	Yes
Pittsfield	Yes	City of Pittsfield	1968	No	Yes	Yes	Yes	Yes
Plymouth	Yes	Town of Plymouth	1971	Yes	Yes	Yes	Yes	Yes
Provincetown	Yes	Town of Provincetown	1998	No	Yes	No	Yes	Yes
Southbridge	Yes	Town of Southbridge	1948 (Rehabed in 1985)	Yes	Yes	Yes	Yes	Yes
Spencer	No	-	-	No	Yes	Yes	No	Yes
Springfield/Chicopee	Yes	Military	1950, 1987, 2009	No	Yes	Yes	Yes	Yes
Sterling	Yes	Realty Trust Co.	1950 (Rehabed in 1965)	No	Yes	Yes	Yes	Yes
Stow	Yes	Minute Man Airfield, Inc.	1969 (Rehabed in 2000)	Yes	No	Yes	Yes	Yes
Taunton	Yes	Airport Commission	1982 (Rehabed)	No	No	No	No	No
Vineyard Haven	Yes	Airport	1999	Yes	Yes	Yes	Yes	Yes
Westfield /Springfield	Yes	City of Westfield	2007	Yes	Yes	Yes	Yes	Yes
Worcester	Yes	City of Worcester	1994	No	Yes	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

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Figure 2-8: Airport Fueling Capabilities

Airport City	Avgas	Capacity (gallons)	Jet A	Capacity (gallons)	Fuel Farm Operator	Self Fueling	24 Hour Availability	Hours Available	Underground Storage
Barre/Barre Plains	Yes	8,000	No	-	Airport	No	No	0800-Sunset	Yes
Berkley	Yes	2,000	No	-	Airport	No	No	Daylight	Yes
Beverly	Yes	8,000	Yes	20,000	FBO(s)	Yes	No	0600-1900	Yes
Chatham	Yes	10,000	No	-	FBO(s)	No	No	0830-Sunset	No
Edgartown	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	Yes	8,000	No	-	Airport	Yes	Yes	-	Yes
Fitchburg	Yes	10,000	Yes	10,000	Airport	No	Yes	On Call	No
Gardner	Yes	6,000	No	-	Airport/FBO	No	No	Irregular	No
Great Barrington	Yes	20,000	No	-	Airport	Yes	No	0800- Dark	Yes
Hanson	Yes	9,600	No	-	Airport	No	No	Not for Public	Yes
Hopedale	Yes	4,000	No	-	Airport	No	No	Daylight	No
Hyannis	Yes	30,000	Yes	20,000	Avgas (FBO) Jet (Apt)	No	Jet A-Yes/Avgas-No	0600-1800	Yes
Lawrence	Yes	39,400	Yes	15,000	FBO	No	Yes	On Call	Yes
Mansfield	Yes	8,000	No	-	FBO	No	No	FBO Hrs	No
Marlborough	Yes	10,000	No	-	Airport	No	YES	-	Yes
Marshfield	Yes	12,000	Yes	5,000 (Truck)	FBO	No	No	0800-Sunset	Yes
Marstons Mills	Yes	10,000	No	-	Airport	No	No	Airport Hours	Yes
Montague	Yes	5,000	No	-	Through the Fence	No	No	0900-1600	No
Nantucket	Yes	60,000	Yes	100,000	Airport	No	Yes	-	Yes
New Bedford	Yes	47,000	Yes	37,000	FBO	No	Yes	On Call	Yes
Newburyport	Yes	1,800	No	-	Airport	No	No	0800-1700	No
North Adams	Yes	10,000	Yes	10,000	FBO	Yes/Avgas	Yes/Avgas	Jet A 0800-1700	Yes/Jet A
Northampton	Yes	10,000	No	-	Airport	Yes	Yes	-	Yes
Norwood	Yes	24,000	Yes	24,000	FBO(s)	No	Yes	-	Yes
Orange	Yes	10,000	Yes	4,000	Airport	No	Yes	-	No
Pittsfield	Yes	10,000	Yes	12,500	FBO	No	Yes	On Call	Yes
Plymouth	Yes	24,000	Yes	12,500	Airport	YES	No	0600-2200	Yes
Provincetown	Yes	10,000	No	-	FBO	No	No	0800-1800	Yes
Southbridge	Yes	10,000	No	-	Airport	No	No	0800- Dusk	Yes
Spencer	Yes	5,000	No	-	Airport	No	No	Daylight	No
Springfield/Chicopee	Yes	11,000	Yes	25,000	Airport	No	No	0700-2300	No
Sterling	Yes	10,000	No	-	FBO	No	No	0800-1800	Yes
Stow	Yes	12,000	No	-	FBO	No	No	0800-1600	Yes
Taunton	Yes	10,000	No	-	Airport	Yes	No	0800-1700	Yes
Vineyard Haven	Yes	20,000	Yes	40,000	Airport	No	Yes	-	No
Westfield /Springfield	Yes	15,000	Yes	40,000	FBO(s)	No	Yes (with 24 hour notice)	0700-2200	Yes
Worcester	Yes	10,000	Yes	40,000	FBO	No	No	FBO Hours	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-9: Airport Buildings

Airport City	*Snow Removal Equipment Building*	*Maintenance Building*	*ARFF Building*
Barre/Barre Plains	No	No	No
Berkley	No	No	No
Beverly	Yes	Yes	No
Chatham	No	No	No
Edgartown	N/A	N/A	No
Falmouth	No	Yes	No
Fitchburg	Yes	Yes	No
Gardner	No	No	No
Great Barrington	No	No	No
Hanson	No	No	No
Hopedale	No	No	No
Hyannis	Yes	No	Yes
Lawrence	Yes	Yes	No
Mansfield	Yes	Yes	No
Marlborough	No	No	No
Marshfield	Yes	Yes	No
Marstons Mills	No	Yes	No
Montague	Yes	No	No
Nantucket	Yes	Yes	Yes
New Bedford	Yes	Yes	No
Newburyport	No	Yes	No
North Adams	Yes	No	No
Northampton	No	No	No
Norwood	Yes	Yes	No
Orange	No	No	No
Pittsfield	Yes	Yes	No
Plymouth	No	Yes	No
Provincetown	Yes	Yes	Yes
Southbridge	Yes	Yes	No
Spencer	No	No	No
Springfield/Chicopee	No	No	Yes
Sterling	No	No	No
Stow	No	No	No
Taunton	Yes	No	No
Vineyard Haven	Yes	Yes	Yes
Westfield /Springfield	Yes	Yes	Yes
Worcester	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-10: Airport Security Data

Airport City	Airport Subject to TSA 1542	GA Security Plan	Access Control to AOA	ID/Card Readers	CCTV
Barre/Barre Plains	No	Yes	No	No	Yes
Berkley	No	Yes	No	No	No
Beverly	No	Yes	Yes	No	No
Chatham	No	Yes	Yes	No	No
Edgartown	N/A	Yes	N/A	N/A	N/A
Falmouth	No	Yes	Yes	No	No
Fitchburg	No	Yes	Yes	Yes	No
Gardner	No	Yes	No	No	No
Great Barrington	No	Yes	No	No	Yes
Hanson	No	Yes	No	No	No
Hopedale	No	Yes	No	No	No
Hyannis	Yes	Yes	Yes	Yes	Yes
Lawrence	No	Yes	Yes	No	Yes
Mansfield	No	Yes	Yes	Yes	Yes
Marlborough	No	Yes	Yes	No	No
Marshfield	No	Yes	Yes	Yes	Yes
Marstons Mills	No	Yes	No	No	No
Montague	No	Yes	Yes	Yes	No
Nantucket	Yes	Yes	Yes	Yes	Yes
New Bedford	No	Yes	Yes	Yes	Yes
Newburyport	No	Yes	No	No	No
North Adams	No	Yes	Yes	Yes	No
Northampton	No	Yes	No	No	No
Norwood	No	Yes	Yes	Yes	Yes
Orange	No	Yes	Yes	Yes	No
Pittsfield	No	Yes	Yes	Yes	Yes
Plymouth	No	Yes	Yes	Yes	No
Provincetown	Yes	Yes	Yes	Yes	Yes
Southbridge	No	Yes	Yes	Yes	No
Spencer	No	Yes	No	No	No
Springfield/Chicopee	Yes	Yes	Yes	Yes	Yes
Sterling	No	Yes	No	No	No
Stow	No	Yes	No	No	Yes
Taunton	No	Yes	Yes	Yes	No
Vineyard Haven	Yes	Yes	Yes	Yes	N/A
Westfield /Springfield	No	Yes	Yes	Yes	Yes
Worcester	Yes	Yes	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

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Figure 2-11: Airport Services and Accommodations

Airport City	On site Car Rental	Courtesy Car	Crew Car	On Airport Bus	On Airport Light Rail	On Airport Taxi	Flight Instruction	Full Time Flight School	A/C Mx Services	Airframe Repairs	Powerplant Repairs	Avionics Repairs	FAA Part 145 Repair Station	A/C Sales	Snow Removal Ops	A/C Deicing	A/C Oxygen	Catering Services	A/C Lavatory Disposal
Barre/Barre Plains	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
Berkley	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Beverly	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Chatham	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
Fitchburg	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Gardner	No	No	No	No	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Great Barrington	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No
Hanson	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Hopedale	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
Hyannis	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Lawrence	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Mansfield	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	No
Marlborough	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Marshfield	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
Marstons Mills	No	No	No	No	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Montague	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No
Nantucket	Yes	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
New Bedford	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No
Newburyport	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
North Adams	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Northampton	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Norwood	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No
Orange	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
Pittsfield	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Plymouth	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Provincetown	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No
Southbridge	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
Spencer	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Springfield/Chicopee	Yes	No	Yes	Yes	No	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Sterling	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
Stow	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No
Taunton	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Vineyard Haven	Yes	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
Westfield /Springfield	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worcester	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

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Figure 2-12: Based Aircraft and Operations Data

Airport City	*2009 Based Aircraft Data*							*2008 Operations Data**
	Single Engine	Multi-Engine	Jet	Helo	Glider	Ultra-Light	Total	
Barre/Barre Plains	3	0	0	0	0	2	5	560
Berkley	10	0	0	0	0	0	10	1,000
Beverly	109	17	2	6	0	0	134	68,896
Chatham	32	1	0	1	0	0	34	25,530
Edgartown	4	0	0	0	0	0	4	7,200
Falmouth	45	4	0	1	0	0	50	1,718
Fitchburg	134	3	2	4	0	0	143	63,025
Gardner	19	4	0	0	0	0	23	5,315
Great Barrington	44	5	0	0	0	0	49	29,810
Hanson	17	0	1	0	0	0	18	5,600
Hopedale	12	1	0	0	0	0	13	27,900
Hyannis	51	11	3	0	0	0	65	119,091
Lawrence	196	22	3	9	0	0	230	53,720
Mansfield	132	4	0	1	0	0	137	57,500
Marlborough	34	0	0	1	0	0	35	24,000
Marshfield	50	5	1	1	0	0	57	18,075
Marstons Mills	13	1	0	0	0	0	14	1,200
Montague	33	0	0	0	0	0	33	17,600
Nantucket	24	13	0	0	0	0	37	150,200
New Bedford	119	17	4	0	0	0	140	57,496
Newburyport	11	0	0	0	0	0	11	2,825
North Adams	19	3	1	0	0	0	23	45,780
Northampton	64	4	0	1	0	1	70	26,600
Norwood	164	15	11	13	0	0	203	65,036
Orange	43	3	0	0	0	0	46	50,014
Pittsfield	29	8	7	0	0	0	44	50,700
Plymouth	103	22	11	8	0	1	145	65,500
Provincetown	8	1	0	0	0	1	10	75,444
Southbridge	33	1	0	1	0	0	35	51,800
Spencer	25	0	0	0	0	0	25	10,125
Springfield/Chicopee	23	3	2	0	3	0	31	47,228
Sterling	38	0	0	1	45	0	84	49,260
Stow	58	0	0	4	0	0	62	48,095
Taunton	115	0	0	4	0	0	119	31,390
Vineyard Haven	77	17	0	0	0	0	94	45,291
Westfield /Springfield	100	12	9	1	0	0	122	59,179
Worcester	74	5	0	0	0	0	79	47,202
Totals	2065	202	57	57	48	5	2425	1,506,905

Source: Airport Inventory and Data Survey
Prepared: June 2010
* Last complete year of data

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Figure 2-13: Airport Operations Activity Types

Airport City	Aircraft Operations Activity Types & Frequency of Operation																					
	Air Carrier	Based	Air Taxi	Based	Charter	Based	Air Cargo	Based	Med A/C Ops	Based	Angel Flight	Based	Ag Ops	Based	Law Enforcement	Based	Power/ Pipe Line	Based	Skydiving	Based	Flight Training	Based	Other	Based
Barre/Barre Plains	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Seasonal	No	Never	-	Never	-	Weekly	No	Gliders/Sport A/C	Yes
Berkley	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Monthly	-	-	-
Beverly	Never	-	Seasonal	No	Weekly	No	Never	-	Monthly	No	Never	-	Never	-	Never	-	Seasonal	No	Never	-	Daily	Yes	Banner Towing	No
Chatham	Never	-	Seasonal	No	Weekly	No	Never	-	Monthly	No	Monthly	No	Never	-	Weekly	No	Seasonal	No	Seasonal	Yes	Daily	Yes	-	-
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	Never	-	Never	-	Never	-	Never	-	Never	-	Weekly	Yes	Never	-	Never	-	Never	-	Never	-	Never	-	-	-
Fitchburg	Never	-	Never	-	Daily	Yes	Never	-	Monthly	No	Monthly	No	Never	-	Weekly	-	Weekly	No	Never	-	Daily	Yes	-	-
Gardner	Never	-	Seasonal	No	Seasonal	No	Never	-	Never	-	Never	-	Never	-	Seasonal	No	Weekly	No	Never	-	Weekly	No	-	-
Great Barrington	Never	-	Daily	Yes	Daily	Yes	Never	-	Weekly	No	Monthly	No	Never	-	Monthly	No	Never	-	Never	-	Daily	Yes	Banner Towing/Monthly	No
Hanson	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	Never	-	EAA 279/Daily	Yes
Hopedale	Never	-	Never	-	Never	-	Never	-	Seasonal	No	Seasonal	No	Never	-	Seasonal	No	Seasonal	No	Never	-	Never	-	-	-
Hyannis	Seasonal	No	Daily	Yes	Daily	Yes	Daily	Yes	Weekly	No	Weekly	No	Never	-	Daily	No	Never	-	Never	-	Daily	Yes	-	-
Lawrence	Never	-	Never	-	Monthly	Yes	Seasonal	-	Monthly	No	Weekly	Yes	Never	-	Daily	Yes	Monthly	No	Never	-	Daily	Yes	Banner Towing/Seasonal	No
Mansfield	Never	-	Monthly	No	Weekly	No	Never	-	Seasonal	No	Weekly	No	Seasonal	No	Seasonal	No	Seasonal	No	Never	-	Daily	Yes	Banner/Blimps Seasonal	No
Marlborough	Never	-	Never	-	Monthly	No	Monthly	No	Monthly	No	Never	-	Never	-	Monthly	No	Monthly	No	Never	-	Daily	Yes	Banner/Seasonal	No
Marshfield	Never	-	Daily	Yes	Daily	Yes	Seasonal	No	Monthly	No	Monthly	Yes	Never	-	Weekly	No	Monthly	No	Never	-	Daily	Yes	Fish spotting/ survey/ photography	Yes
Marstons Mills	Never	-	Never	-	Never	-	Never	-	Seasonal	No	Never	-	Never	-	Never	-	Never	-	Seasonal	Yes	Seasonal	Yes	-	-
Montague	Never	-	Weekly	No	Weekly	No	Monthly	No	Monthly	No	Weekly	No	Never	-	Monthly	No	Seasonal	No	Never	-	Weekly	Yes	-	-
Nantucket	Daily	Yes	Daily	Yes	Daily	Yes	Daily	Yes	Daily	No	Daily	No	Never	-	Daily	No	Never	-	Never	-	Seasonal	Yes	-	-
New Bedford	Daily	No	Daily	Yes	Daily	No	Daily	Yes	Weekly	No	Weekly	Yes	Seasonal	No	Weekly	No	Seasonal	No	Never	-	Daily	Yes	-	-
Newburyport	Never	-	Never	-	Never	-	Never	-	Monthly	No	Never	-	Seasonal	No	Monthly	No	Never	-	Seasonal	No	Seasonal	Yes	Banner /Glider Towing	Yes
North Adams	Never	-	Monthly	No	Weekly	Yes	Never	-	Monthly	No	Monthly	No	Seasonal	No	Seasonal	No	Seasonal	No	Never	-	Daily	Yes	Gliders	Yes
Northampton	Never	-	Never	-	Daily	No	Never	-	Never	-	Weekly	No	Never	-	Daily	No	Weekly	No	Never	-	Daily	Yes	-	-
Norwood	Never	-	Never	-	Daily	Yes	Never	-	Daily	Yes	Monthly	No	Seasonal	No	Monthly	No	Monthly	Yes	Never	-	Daily	Yes	-	-
Orange	Never	-	Never	-	Monthly	Yes	Monthly	No	Monthly	No	Seasonal	No	Never	-	Seasonal	No	Seasonal	No	Seasonal	Yes	Weekly	Yes	-	-
Pittsfield	Never	-	Daily	Yes	Daily	Yes	Never	-	Weekly	No	Monthly	Yes	Never	-	Seasonal	No	Seasonal	No	Never	-	Daily	Yes	-	-
Plymouth	Never	-	Daily	Yes	Daily	Yes	Seasonal	No	Daily	Yes	Weekly	Yes	Daily	Yes	Daily	Yes	Seasonal	No	Never	-	Daily	Yes	-	-
Provincetown	Daily	Yes	Seasonal	No	Seasonal	No	Never	-	Monthly	No	Monthly	No	Never	-	Never	-	Never	-	Never	-	Daily	Yes	Ultra light Ops/Weekly	Yes
Southbridge	Never	-	Never	-	Weekly	No	Never	-	Never	-	Never	-	Never	-	Monthly	No	Never	-	Never	-	Daily	Yes	-	-
Spencer	Never	-	Never	-	Seasonal	No	Never	-	Monthly	No	Monthly	No	Never	-	Seasonal	No	Never	-	Never	-	Daily	Yes	-	-
Springfield/Chicopee	Monthly	No	Daily	Yes	Never	-	Seasonal	No	Weekly	No	Weekly	-	Never	-	Daily	Yes	Seasonal	No	Never	-	Monthly	No	MIL FLT Trng	No
Sterling	Never	-	Monthly	No	Never	-	Never	-	Seasonal	No	Seasonal	No	Never	-	Monthly	No	Seasonal	No	Never	-	Daily	Yes	Glider/Weekly	Yes
Stow	Never	-	Never	-	Monthly	No	Never	-	Monthly	No	Weekly	Yes	Seasonal	No	Monthly	No	Never	-	Seasonal	No	Daily	Yes	Balloons/Weekly	No
Taunton	Never	-	Seasonal	No	Never	-	Never	-	Never	-	Never	-	Seasonal	No	Never	-	Never	-	Never	-	Daily	Yes	-	-
Vineyard Haven	Daily	Yes	Daily	Yes	Daily	Yes	Daily	No	Daily	No	Daily	Yes	Never	-	Seasonal	No	Never	-	Never	-	Daily	Yes	-	-
Westfield /Springfield	Never	-	Never	-	Daily	Yes	Never	No	No	No	Never	-	Never	-	Never	-	Never	-	Never	-	Daily	Yes	-	-
Worcester	Weekly	No	Daily	Yes	Seasonal	No	Seasonal	No	Daily	Yes	Monthly	No	Never	-	Weekly	No	Seasonal	No	Never	-	Daily	Yes	Mapping/Seasonal	No

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-14: Airport Plans & Studies

Airport City	*Airport Plans/Studies*														
	Airport Master Plan	Airport Layout Plan	Capital Improvement Plan	Business Plan	Economic Plan	Minimum Standards	Rules & Regulations	Obstruction Analysis	Noise Study	Noise Contours	Noise Abatement Procedures	Wildlife Management Plan	Emergency Plan	Winter Ops Plan	Pavement Mgmt Plan
Barre/Barre Plains	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
Berkley	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Beverly	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
Chatham	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	Yes	No
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No
Fitchburg	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No
Gardner	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No
Great Barrington	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No
Hanson	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
Hopedale	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Hyannis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lawrence	Yes	Yes	Yes	No	No	Yes	Yes	N/A	No	Yes	Yes	No	Yes	Yes	No
Mansfield	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Marlborough	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Marshfield	Yes	Yes	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes	No	No
Marstons Mills	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
Montague	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nantucket	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
New Bedford	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Newburyport	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	No
North Adams	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes
Northampton	No	Yes	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No
Norwood	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Orange	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pittsfield	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
Plymouth	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Provincetown	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No
Southbridge	Yes	Yes	N/A	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No
Spencer	No	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No
Springfield/Chicopee	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sterling	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Stow	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Taunton	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Vineyard Haven	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Westfield /Springfield	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Worcester	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-15: Airport Environmental Plans & Environmental Stewardship

Airport City	*Environmental Plans/Studies & Environmental Stewardship*										
	EA or EIS	Vegetation Mgmt Plan	VMP Yearly Operational Plan	NHESP Conservation Plan	Grassland Mgmt Plan	Comp. Solid Waste Mgmt Plan	Wetland Delineation	EPA SPCC Compliant *	EPA SWPPP Compliant *	Alternative Fueled Equipment	Recycling Program
Barre/Barre Plains	No	No	No	No	Yes	No	No	N/A	N/A	No	No
Berkley	No	No	No	Yes	No	No	Yes	Yes	N/A	No	No
Beverly	Yes	Yes	Yes	No	No	No	Yes	Yes	N/A	No	No
Chatham	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	No	No	No	No	No	No	No	Yes	N/A	No	No
Fitchburg	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No
Gardner	Yes	No	No	No	No	No	Yes	Yes	Yes	No	Yes
Great Barrington	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes
Hanson	No	No	No	No	No	No	No	N/A	N/A	No	No
Hopedale	No	No	No	No	No	No	No	N/A	N/A	No	No
Hyannis	Yes	No	No	No	No	No	Yes	Yes	Yes	No	No
Lawrence	Yes	Yes	Yes	No	No	No	Yes	N/A	Yes	Yes	Yes
Mansfield	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Marlborough	No	No	No	No	No	No	Yes	N/A	N/A	Yes	Yes
Marshfield	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No
Marstons Mills	No	No	No	No	No	No	No	Yes	N/A	No	No
Montague	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
Nantucket	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes
New Bedford	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Newburyport	No	No	No	No	No	No	No	N/A	N/A	No	No
North Adams	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No
Northampton	Yes	No	No	No	No	No	No	N/A	N/A	No	No
Norwood	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Orange	No	Yes	Yes	No	Yes	No	Yes	N/A	N/A	No	Yes
Pittsfield	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Plymouth	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Provincetown	Yes	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes
Southbridge	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No
Spencer	No	No	No	No	No	No	No	N/A	N/A	Yes	Yes
Springfield/Chicopee	Yes	No	No	No	Yes	No	Yes	N/A	N/A	No	Yes
Sterling	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Stow	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Taunton	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No
Vineyard Haven	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
Westfield /Springfield	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Worcester	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available,
* - Data Obtained from Airport Management and Not Validated by MassDOT or Consultant

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Figure 2-16: Airport Outreach Data

Airport City	*Airport Outreach Efforts*							
	Community Aviation Outreach	Education Outreach	Local Legislative Outreach	Frequency	State Legislative Outreach	Frequency	Federal Legislative Outreach	Frequency
Barre/Barre Plains	No	No	Yes	Annually	No	-	No	-
Berkley	No	No	No	-	No	-	No	-
Beverly	Yes	No	No	-	No	-	No	-
Chatham	No	No	No	-	No	-	No	-
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	No	No	No	-	No	-	No	-
Fitchburg	Yes	Yes	No	-	Yes	Monthly	Yes	Annually
Gardner	No	No	Yes	Quarterly	Yes	Annually	No	-
Great Barrington	No	No	No	-	No	-	No	-
Hanson	No	No	No	-	No	-	No	-
Hopedale	No	No	No	-	No	-	No	-
Hyannis	Yes	No	Yes	Monthly	Yes	Monthly	Yes	Quarterly
Lawrence	No	No	No	-	No	-	No	-
Mansfield	Yes	Yes	Yes	Weekly	Yes	Monthly	Yes	Annually
Marlborough	Yes	Yes	Yes	Weekly	Yes	Quarterly	Yes	Quarterly
Marshfield	No	No	Yes	Weekly	Yes	Quarterly	No	-
Marstons Mills	No	No	No	-	No	-	No	-
Montague	Yes	Yes	Yes	Quarterly	Yes	Quarterly	Yes	Quarterly
Nantucket	Yes	Yes	Yes	Monthly	Yes	Monthly	Yes	Bi-Monthly
New Bedford	Yes	Yes	Yes	Weekly	Yes	Monthly	Yes	Quarterly
Newburyport	No	Yes	No	-	No	-	No	-
North Adams	No	No	Yes	Weekly	Yes	Annually	Yes	Annually
Northampton	Yes	Yes	No	-	No	-	No	-
Norwood	Yes	Yes	Yes	Weekly	Yes	Monthly	Yes	Monthly
Orange	Yes	No	No	-	No	-	No	-
Pittsfield	No	Yes	Yes	Monthly	Yes	Monthly	Yes	Bi-Annually
Plymouth	Yes	Yes	Yes	Weekly	Yes	Bi-Annually	Yes	Bi-Annually
Provincetown	No	No	No	-	No	-	No	-
Southbridge	No	No	No	-	No	-	No	-
Spencer	No	No	Yes	Quarterly	Yes	Quarterly	No	-
Springfield/Chicopee	No	Yes	Yes	Quarterly	Yes	Quarterly	Yes	Quarterly
Sterling	No	No	No	-	No	-	No	-
Stow	Yes	Yes	Yes	Quarterly	Yes	Monthly	No	-
Taunton	Yes	No	No	-	No	-	No	-
Vineyard Haven	No	Yes	Yes	Monthly	Yes	Monthly	Yes	Monthly
Westfield /Springfield	Yes	Yes	Yes	Weekly	Yes	Monthly	Yes	Monthly
Worcester	No	Yes	Yes	Weekly	Yes	Weekly	Yes	Weekly

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

Figure 2-17: Airport Expansion Potential

Airport City	Airport Expansion Potential & Limiting Factors					
	Airport's Expansion Potential (1-10)	Manmade Factors	Environmental Factors	Community Relations	Financial Shortfalls	Property Available for Future Development
Barre/Barre Plains	10	No	Yes	No	Yes	Yes
Berkley	1	Yes	Yes	No	Yes	No
Beverly	3	No	Yes	No	Yes	Yes
Chatham	3	No	Yes	Yes	No	Yes
Edgartown	N/A	N/A	N/A	N/A	N/A	N/A
Falmouth	1	Yes	No	No	Yes	Yes
Fitchburg	9	No	Yes	Yes	No	Yes
Gardner	6	Yes	Yes	Yes	Yes	Yes
Great Barrington	5	Yes	Yes	No	Yes	Yes
Hanson	3	No	No	No	Yes	Yes
Hopedale	1	Yes	No	No	Yes	No
Hyannis	8	Yes	Yes	Yes	Yes	Yes
Lawrence	1	Yes	Yes	Yes	Yes	Yes
Mansfield	2	Yes	No	No	No	Yes
Marlborough	1	Yes	No	Yes	Yes	Yes
Marshfield	3	No	Yes	No	No	Yes
Marstons Mills	5	No	No	No	Yes	Yes
Montague	7	Yes	No	Yes	Yes	Yes
Nantucket	9	No	Yes	Yes	Yes	Yes
New Bedford	3	Yes	Yes	No	Yes	Yes
Newburyport	1	Yes	No	No	Yes	Yes
North Adams	4	Yes	Yes	Yes	No	Yes
Northampton	8	Yes	Yes	No	Yes	Yes
Norwood	5	No	Yes	Yes	Yes	Yes
Orange	10	No	Yes	No	Yes	Yes
Pittsfield	7	Yes	Yes	Yes	Yes	Yes
Plymouth	8	Yes	Yes	Yes	No	Yes
Provincetown	2	No	Yes	Yes	Yes	No
Southbridge	6	Yes	Yes	Yes	Yes	Yes
Spencer	1	Yes	No	No	Yes	No
Springfield/Chicopee	10	No	No	No	No	Yes
Sterling	10	Yes	No	Yes	Yes	Yes
Stow	8	No	Yes	No	No	Yes
Taunton	4	No	No	Yes	No	Yes
Vineyard Haven	5	Yes	Yes	Yes	No	Yes
Westfield /Springfield	7	No	Yes	No	Yes	Yes
Worcester	10	Yes	Yes	Yes	Yes	Yes

Source: Airport Inventory and Data Survey
Prepared: June 2010
N/A – Data Not Available

CHAPTER THREE:

CURRENT AIRPORT ROLES AND FACILITY/SERVICE OBJECTIVES

INTRODUCTION

Airports within any transportation system contribute to meeting air transportation and economic needs in different ways and at varying levels. Effectively, each airport within a system contributes in some way by filling different roles. Insofar as airports in an aviation system play those varying roles, their needs for facilities and services will also naturally vary. As such, it is important to determine how each airport within an aviation system is currently contributing to that system. Identifying current roles or functional levels for all system airports is a cornerstone of system planning, since only through determining how system airports are currently functioning can adequacies, deficiencies, and overlaps be identified within that system.

For the Massachusetts Statewide Airport System Plan (MSASP), assigning current roles to airports within the system provides a baseline for evaluating the existing airport system as a whole. Once the current roles are established, the previously developed goal categories, along with their specific performance measures, are used to evaluate the overall system. This evaluation ultimately provides an indication of where the airport system is adequate to meet near- and long-term aviation needs, identifies specific airport or system deficiencies, and helps to determine if there are surpluses or duplications within the system. The results of this evaluation provide the foundation for subsequent recommendations for the airport system, as well as for individual study airports.

This chapter identifies, defines, and establishes airport roles for the Massachusetts airport system. In addition, appropriate facilities and services that should ideally be provided to meet the needs for those particular roles are identified.

AIRPORT ROLES

Airport roles are defined differently from a national, state, and local perspective. Prior to determining current roles for the Massachusetts Statewide Airport System Plan (MSASP) or analyzing the future system's needs, it is essential to review the historic role classifications. Massachusetts has historically utilized the Federal Aviation Administration's (FAA) airport role classification system, having never established a system dedicated to the Commonwealth. As part of the MSASP, an examination of the FAA roles classifications, as well as other states' classification systems was conducted to provide input in designing a Massachusetts-specific approach to airport roles.

FAA's National Airport Classifications & Previous State Airport Classification

The National Plan of Integrated Airport Systems (NPIAS) is essentially a nationwide airport system plan used by the FAA to identify aviation facilities of significance to the national air

transportation network. It is maintained on a continuing basis, and every two years an update is reported to Congress. The NPIAS includes a plan for the type and cost of eligible airport development that the Secretary of Transportation, "…considers necessary to provide a safe, efficient, and integrated system of public use airports adequate to anticipate and meet the needs of civil aeronautics, to meet the national defense requirements of the Secretary of Defense, and to meet identified needs of United States Postal Service." Therefore, for airports to receive federal Airport Improvement Program (AIP) funding, they must be included in the NPIAS. AIP funding is derived from the Aviation Trust Fund; the source for this trust fund is a dedicated stream that is derived from taxes on the aviation fuel and commercial airline tickets. While there are a variety of criteria that are considered for an airport to be included in the NPIAS, generally speaking, to be in the NPIAS, an airport must:

- Be more than 30 miles from the closest NPIAS airport
- Have at least 10 based aircraft
- Have a willing public sponsor

Recommendations from this MSASP will be coordinated with both the NPIAS as well as individual airport master plans.

The NPIAS defines an airport's role by its "service level," which reflects the type of service that a given airport provides to the nation, state, and local community. It is important to note that service levels also reflect the funding categories established by Congress to assist in airport development through the Airport Improvement Program (AIP).

Specifically, the service levels used by the NPIAS include the following:

- Primary Service (PR) - Primary Service airports are public use airports receiving scheduled airline passenger service, enplaning 10,000 or more passengers per year.
- Commercial Service (CM) - Commercial Service airports are public use airports which receive scheduled airline passenger service and which enplane 2,500 or more passengers annually.
- Reliever (RL) - Reliever airports are general aviation or commercial service airports which serve to relieve congestion for a Primary Service airport by providing general aviation and non-airline commercial operators with alternative access to the community.
- General Aviation (GA) - General Aviation airports are either publicly or privately owned public use airports that primarily serve general aviation users.

The 2009-2013 NPIAS listing for Massachusetts includes 26 of the 37 airports in the MSASP. The service level classification of these 26 airports includes six Primary Service, three Reliever, and 17 General Aviation airports. **Figure 3-1** presents the service level for those airports identified within the NPIAS, as well as the non-NPIAS airports included in the MSASP. It is important to note that while shown in Figure 3-1 and included in the NPIAS, Logan International Airport (Boston) and Laurence G. Hanscom Field (Bedford) are not included in this update to the MSASP. It should also be noted that of the 27 Massachusetts airports listed in the NPIAS, three airports (Great Barrington/Walter J. Koladza Airport, Northampton Airport, and Stow/Minute Man Air Field) are actually privately-owned. This is a very important

distinction in that while inclusion in the NPIAS typically enables airport to receive federal AIP funding, the fact that these three airports are privately-owned makes them ineligible for such federal funding. This important distinction will be considered throughout the MSASP.

Figure 3-1: FAA NPIAS Role

Airport ID	*Associated City*	*Airport Name*	*FAA Role*
8B5	Barre/Barre Plains	Tanner-Hiller Airport[1]	----
BED	Bedford	Laurence G. Hanscom Field[2]	Primary Service
1M8	Berkley	Myricks Airport[1]	----
BVY	Beverly	Beverly Municipal Airport	Reliever
BOS	Boston	Logan International Airport[2]	Primary Service
CQX	Chatham	Chatham Municipal Airport	General Aviation
1B2	Edgartown	Katama Airpark	----
5B6	Falmouth Airpark	Falmouth Airpark[1]	----
FIT	Fitchburg	Fitchburg Municipal Airport	General Aviation
GDM	Gardner	Gardner Municipal Airport	General Aviation
GBR	Great Barrington	Walter J. Koladza Airport[1]	General Aviation[3]
28M	Hanson	Cranland Airport[1]	----
1B6	Hopedale	Hopedale Industrial Park Airport[1]	----
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	Primary Service
LWM	Lawrence	Lawrence Municipal Airport	Reliever
1B9	Mansfield	Mansfield Municipal Airport	General Aviation
9B1	Marlborough	Marlboro Airport[1]	----
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	General Aviation
2B1	Marstons Mills	Cape Cod Airport	----
0B5	Montague	Turners Falls Airport	General Aviation
ACK	Nantucket	Nantucket Memorial Airport	Primary Service
EWB	New Bedford	New Bedford Regional Airport	Primary Service
2B2	Newburyport	Plum Island Airport[1]	----
AQW	North Adams	Harriman-and-West Airport	General Aviation
7B2	Northampton	Northampton Airport[1]	General Aviation[3]
OWD	Norwood	Norwood Memorial Airport	Reliever
ORE	Orange	Orange Municipal Airport	General Aviation
PSF	Pittsfield	Pittsfield Municipal Airport	General Aviation
PYM	Plymouth	Plymouth Municipal Airport	General Aviation
PVC	Provincetown	Provincetown Municipal Airport	Primary Service
3B0	Southbridge	Southbridge Municipal Airport	General Aviation
60M	Spencer	Spencer Airport[1]	----
3B3	Sterling	Sterling Airport[1]	----
6B6	Stow	Minute Man Air Field[1]	General Aviation[3]
TAN	Taunton	Taunton Municipal Airport - King Field	General Aviation
MVY	Vineyard Haven	Martha's Vineyard Airport	Primary Service
BAF	Westfield/Springfield	Barnes Municipal Airport	General Aviation
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	Primary Service
ORH	Worcester	Worcester Regional Airport	Primary Service

Note: ---- Indicates that the general aviation airport is not included in the NPIAS.
[1]Privately-owned, public-use airport
[2]Airports not included in the 2010 Massachusetts Statewide Airport System Plan.
[3] Included in the NPIAS, but are ineligible for federal AIP funding due to private ownership.
Source: FAA
Prepared: March 2010

Note that while these service levels are useful to the FAA in making funding decisions, they do not adequately describe the function or role of the airports within the Massachusetts airport system; this is particularly true with respect to the General Aviation category. Stated simply, the

17 Massachusetts airports within the NPIAS General Aviation category do not serve the same function or role within the state system, nor should they be designed to do so. Unfortunately, the NPIAS service level for General Aviation airports does not provide any ability to further define an airport or discriminate as to its function within a system. Additionally, this category does not and cannot account for the 11 non-NPIAS general aviation airports included in the MSASP that also require analysis as to their function or role in the Commonwealth's system.

As reflected within the Massachusetts aviation system, general aviation airports typically have varying levels of activities, facilities, and services in order to meet a highly diverse set of needs. For example, some general aviation airports are used extensively by large business-class aircraft, while others are used primarily by small aircraft for recreational purposes, while still others are used for emergency medical air transport. However, the FAA's NPIAS service levels do not relate to the manner in which general aviation airports function within a state system. The NPIAS service level classification provides little guidance on the types of facilities that should be developed and/or maintained to meet other functions. Both federal and state funding for airport improvements is extremely limited; therefore, it is essential that airports in Massachusetts be developed to the extent necessary to perform their identified roles, and that state funding is applied to help support these roles.

Review of Other State Classifications

A review of several statewide airport system plans was conducted to provide background on other airport role or classification systems that are being utilized both regionally and nationally. The state system plans reviewed include the following:

- Arizona State Airports System Plan (2008)
- Arkansas State Airport System Plan Update (2006)
- Colorado Aviation System Plan Update (2006)
- Idaho Airport System Plan (2008)
- Iowa Aviation System Plan (2005)
- Maryland State Aviation System Plan (2008)
- Minnesota Aviation System Plan Update (2006)
- Missouri State Airport System Plan (2006)
- New Hampshire State Airport System Plan (2003)
- Rhode Island Airport System Plan (2003)
- Utah Continuous Airport System Plan (2007)
- Vermont Airport System and Policy Plan (2007)
- Wisconsin Airport Classification Review and Update (2008)

These system plans were included due to their recent completion date, variety of role nomenclature and the process they utilized to derive the airport roles. All airport systems share commonalities among them while at the same time each system, whether state or regional, typically considers specific factors that drive aviation demand and the level of facilities needed to serve the individual system. As discussed previously, the FAA role classification of general aviation airports is relatively simplistic. When systems are further defined by states, the roles are typically more clearly defined with nomenclature that is specific to each state and easy to comprehend by both the aviation and non-aviation public.

The review identified a similarity of role classifications, nomenclature, and quantity adopted by states in recent airport system plans. An overview of the general themes identified in the review of other state system documentation includes the following:

- Not all systems use the same number of roles or the same nomenclature.
- Some systems, such as the Minnesota system, have roles directly tied to legislative law.
- Others, such as the Iowa system, are more flexible in nature and not tied to statutes.

The themes derived from this review, as well as the factors influencing the development needs of Massachusetts system, were considered in the process of defining airport roles for the Commonwealth.

FACTORS INFLUENCING AIRPORT ROLES

How each airport contributes within any given aviation system, or what role it plays in that system is dependent upon a variety of factors. For Massachusetts, four primary role factors were identified and considered to determine the role that each airport currently plays within the system. These factors are consistent with those identified by the FAA for determining relative demand for each airport in a given system and include:

- Availability of Commercial Service – The availability of some form of commercial passenger service, either regularly scheduled or scheduled charter, is considered to be an important factor in defining an airport's role. For purposes of the MSASP, this factor alone was considered to be of such significance that it was utilized to define a separate role category for those airports having such services. Note that the availability of commercial service was determined based on data collected during the inventory effort for the MSASP.
- Based Aircraft – Higher numbers of based aircraft reflect the role the airport is playing in meeting the air transportation and economic needs of the market area it serves. The total number of permanently based aircraft data for each airport was gathered from the MSASP Airport Inventory & Data Survey 2009.
- Facilities – The quality of airside facilities provided by an airport typically increases the usage of that facility and its corresponding role within that system. Airports were evaluated based on the length of their primary runway and its surface type. Data was gathered from the MSASP Airport Inventory & Data Survey 2009.
- Services – Services provided at system airports are key contributing factors to attracting both local and transient aviation demand. Specific services that have a significant impact on an airport's role within a particular system include the presence and type of fuel available. Fuel type and availability were identified in the MSASP Airport Inventory & Data Survey 2009 that was conducted as part of the inventory process.

Additionally, the number of airport role categories and the nomenclature or naming convention was established for the Massachusetts airport system. It was determined that four categories of airport roles would be used to define the different service levels associated with

Massachusetts airports. A general description of the types of activity and aircraft accommodated by airports in each of these four categories follows:

- Commercial Service/Scheduled Charter Airports accommodate commercial passenger service (including scheduled charter) in addition to air cargo and a complete range of business aviation activities. They accommodate commercial aircraft commensurate to the level of service employed and permitted, as well as all types of general aviation aircraft including corporate jet and multi-engine activity.
- Corporate/Business Airports serve a primary role in regional economic activities, connecting to state and national economies. They accommodate a full range of regional and local business activities, as well as most types of general aviation aircraft including corporate jet and multi-engine activity.
- Community/Business Airports serve a primary role in local economies, focused on supporting a variety of general aviation activities such as business, emergency service, recreational, and personal flying. They accommodate smaller general aviation aircraft including some multi-engine, but mostly single-engine aircraft.
- Essential/Business Airports serve a supporting role in local communities and economies. They facilitate essential local business activities and emergency service access, as well as serving recreational and personal flying activities. They primarily accommodate small general aviation single-engine aircraft.

Using the role factors described previously, the 37 system airports in Massachusetts were reviewed and assigned to one of the four role categories. The results of this process are discussed in the following sections.

ROLE FACTOR ANALYSIS

In order to determine which system airports currently serve in what role capacity, thresholds were developed to define each of the four airport roles. These thresholds were viewed not only as a means by which to classify the airports, but also as a device for use by airports to better understand how their roles could change over time as their conditions evolve. The thresholds established for each of the four role categories are shown in Figure 3-2.

Figure 3-2: Role Factor Thresholds

Airport Role	*Role* Factor Thresholds
Commercial Service/Scheduled Charter	1. Commercial Service *and/or* 2. Scheduled Air Charter Service
Corporate/Business	1. Paved Primary Runway, *and* 2. Jet A fuel *and* 3. 4,000' Primary Runway or 40 Based Aircraft
Community/Business	1. Paved Primary Runway *and* 2. Avgas *and* 3. 3,000' Primary Runway or 30 Based Aircraft
Essential/Business	All Other Airports

Source: Wilbur Smith Associates
Prepared: March 2010

The data for each of the factors used in evaluating their ability to meet the thresholds was then examined to assign airports to the four categories. Figures 3-3 through 3-6 show the raw data for each of the airports for each of the role factors.

Figure 3-3: Role Factor – Based Aircraft

Airport ID	*Associated City*	*Airport Name*	*Total Based Aircraft*
8B5	Barre/Barre Plains	Tanner-Hiller Airport	5
1M8	Berkley	Myricks Airport	10
BVY	Beverly	Beverly Municipal Airport	134
CQX	Chatham	Chatham Municipal Airport	34
1B2	Edgartown	Katama Airpark	4
5B6	Falmouth Airpark	Falmouth Airpark	50
FIT	Fitchburg	Fitchburg Municipal Airport	143
GDM	Gardner	Gardner Municipal Airport	23
GBR	Great Barrington	Walter J. Koladza Airport	49
28M	Hanson	Cranland Airport	18
1B6	Hopedale	Hopedale Industrial Park Airport	13
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	65
LWM	Lawrence	Lawrence Municipal Airport	230
1B9	Mansfield	Mansfield Municipal Airport	137
9B1	Marlborough	Marlboro Airport	35
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	57
2B1	Marstons Mills	Cape Cod Airport	14
0B5	Montague	Turners Falls Airport	33
ACK	Nantucket	Nantucket Memorial Airport	37
EWB	New Bedford	New Bedford Regional Airport	140
2B2	Newburyport	Plum Island Airport	11
AQW	North Adams	Harriman-and-West Airport	23
7B2	Northampton	Northampton Airport	70
OWD	Norwood	Norwood Memorial Airport	203
ORE	Orange	Orange Municipal Airport	46
PSF	Pittsfield	Pittsfield Municipal Airport	44
PYM	Plymouth	Plymouth Municipal Airport	145
PVC	Provincetown	Provincetown Municipal Airport	10
3B0	Southbridge	Southbridge Municipal Airport	35
60M	Spencer	Spencer Airport	25
3B3	Sterling	Sterling Airport	84
6B6	Stow	Minute Man Air Field	62
TAN	Taunton	Taunton Municipal Airport - King Field	119
MVY	Vineyard Haven	Martha's Vineyard Airport	94
BAF	Westfield/Springfield	Barnes Municipal Airport	122
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	31
ORH	Worcester	Worcester Regional Airport	79

Source: The Louis Berger Group (2009 Data)
Prepared: March 2010

Figure 3-4: Role Factor – Primary Runway Length

Airport ID	Associated City	Airport Name	Primary Runway Length
8B5	Barre/Barre Plains	Tanner-Hiller Airport	3,027 feet
1M8	Berkley	Myricks Airport	2,000 feet
BVY	Beverly	Beverly Municipal Airport	5,001 feet
CQX	Chatham	Chatham Municipal Airport	3,001 feet
1B2	Edgartown	Katama Airpark	3,700 feet
5B6	Falmouth Airpark	Falmouth Airpark	2,298 feet
FIT	Fitchburg	Fitchburg Municipal Airport	4,510 feet
GDM	Gardner	Gardner Municipal Airport	2,999 feet
GBR	Great Barrington	Walter J. Koladza Airport	2,579 feet
28M	Hanson	Cranland Airport	1,860 feet
1B6	Hopedale	Hopedale Industrial Park Airport	3,172 feet
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	5,425 feet
LWM	Lawrence	Lawrence Municipal Airport	5,001 feet
1B9	Mansfield	Mansfield Municipal Airport	3,500 feet
9B1	Marlborough	Marlboro Airport	1,659 feet
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	3,001 feet
2B1	Marstons Mills	Cape Cod Airport	2,035 feet
0B5	Montague	Turners Falls Airport	3,200 feet
ACK	Nantucket	Nantucket Memorial Airport	6,303 feet
EWB	New Bedford	New Bedford Regional Airport	5,000 feet
2B2	Newburyport	Plum Island Airport	2,105 feet
AQW	North Adams	Harriman-and-West Airport	4,300 feet
7B2	Northampton	Northampton Airport	3,365 feet
OWD	Norwood	Norwood Memorial Airport	4,008 feet
ORE	Orange	Orange Municipal Airport	5,000 feet
PSF	Pittsfield	Pittsfield Municipal Airport	5,001 feet
PYM	Plymouth	Plymouth Municipal Airport	4,349 feet
PVC	Provincetown	Provincetown Municipal Airport	3,500 feet
3B0	Southbridge	Southbridge Municipal Airport	3,501 feet
60M	Spencer	Spencer Airport	1,949 feet
3B3	Sterling	Sterling Airport	3,086 feet
6B6	Stow	Minute Man Air Field	2,770 feet
TAN	Taunton	Taunton Municipal Airport - King Field	3,500 feet
MVY	Vineyard Haven	Martha's Vineyard Airport	5,504 feet
BAF	Westfield/Springfield	Barnes Municipal Airport	9,000 feet
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	11,597 feet
ORH	Worcester	Worcester Regional Airport	7,000 feet

Source: The Louis Berger Group
Prepared: March 2010

Figure 3-5: Role Factor – Primary Runway Surface

Airport ID	*Associated City*	*Airport Name*	*Primary Runway Surface*
8B5	Barre/Barre Plains	Tanner-Hiller Airport	Paved
1M8	Berkley	Myricks Airport	Turf
BVY	Beverly	Beverly Municipal Airport	Paved
CQX	Chatham	Chatham Municipal Airport	Paved
1B2	Edgartown	Katama Airpark	Turf
5B6	Falmouth Airpark	Falmouth Airpark	Paved
FIT	Fitchburg	Fitchburg Municipal Airport	Paved
GDM	Gardner	Gardner Municipal Airport	Paved
GBR	Great Barrington	Walter J. Koladza Airport	Paved
28M	Hanson	Cranland Airport	Paved
1B6	Hopedale	Hopedale Industrial Park Airport	Paved
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	Paved
LWM	Lawrence	Lawrence Municipal Airport	Paved
1B9	Mansfield	Mansfield Municipal Airport	Paved
9B1	Marlborough	Marlboro Airport	Paved
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	Paved
2B1	Marstons Mills	Cape Cod Airport	Turf
0B5	Montague	Turners Falls Airport	Paved
ACK	Nantucket	Nantucket Memorial Airport	Paved
EWB	New Bedford	New Bedford Regional Airport	Paved
2B2	Newburyport	Plum Island Airport	Paved
AQW	North Adams	Harriman-and-West Airport	Paved
7B2	Northampton	Northampton Airport	Paved
OWD	Norwood	Norwood Memorial Airport	Paved
ORE	Orange	Orange Municipal Airport	Paved
PSF	Pittsfield	Pittsfield Municipal Airport	Paved
PYM	Plymouth	Plymouth Municipal Airport	Paved
PVC	Provincetown	Provincetown Municipal Airport	Paved
3B0	Southbridge	Southbridge Municipal Airport	Paved
60M	Spencer	Spencer Airport	Paved
3B3	Sterling	Sterling Airport	Paved
6B6	Stow	Minute Man Air Field	Paved
TAN	Taunton	Taunton Municipal Airport - King Field	Paved
MVY	Vineyard Haven	Martha's Vineyard Airport	Paved
BAF	Westfield/Springfield	Barnes Municipal Airport	Paved
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	Paved
ORH	Worcester	Worcester Regional Airport	Paved

Source: The Louis Berger Group
Prepared: March 2010

Figure 3-6: Role Factor – Fuel

Airport ID	*Associated City*	*Airport Name*	*Fuel Type*
8B5	Barre/Barre Plains	Tanner-Hiller Airport	Avgas*
1M8	Berkley	Myricks Airport	Avgas
BVY	Beverly	Beverly Municipal Airport	Jet-A
CQX	Chatham	Chatham Municipal Airport	Avgas
1B2	Edgartown	Katama Airpark	Avgas
5B6	Falmouth Airpark	Falmouth Airpark	Avgas
FIT	Fitchburg	Fitchburg Municipal Airport	Jet-A
GDM	Gardner	Gardner Municipal Airport	Avgas
GBR	Great Barrington	Walter J. Koladza Airport	Avgas
28M	Hanson	Cranland Airport	Avgas
1B6	Hopedale	Hopedale Industrial Park Airport	Avgas*
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	Jet-A
LWM	Lawrence	Lawrence Municipal Airport	Jet-A
1B9	Mansfield	Mansfield Municipal Airport	Avgas
9B1	Marlborough	Marlboro Airport	Avgas
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	Jet-A
2B1	Marstons Mills	Cape Cod Airport	Avgas
0B5	Montague	Turners Falls Airport	Avgas
ACK	Nantucket	Nantucket Memorial Airport	Jet-A
EWB	New Bedford	New Bedford Regional Airport	Jet-A
2B2	Newburyport	Plum Island Airport	Avgas
AQW	North Adams	Harriman-and-West Airport	Jet-A
7B2	Northampton	Northampton Airport	Avgas
OWD	Norwood	Norwood Memorial Airport	Jet-A
ORE	Orange	Orange Municipal Airport	Jet-A
PSF	Pittsfield	Pittsfield Municipal Airport	Jet-A
PYM	Plymouth	Plymouth Municipal Airport	Jet-A
PVC	Provincetown	Provincetown Municipal Airport	Avgas
3B0	Southbridge	Southbridge Municipal Airport	Avgas
60M	Spencer	Spencer Airport	Avgas
3B3	Sterling	Sterling Airport	Avgas
6B6	Stow	Minute Man Air Field	Avgas
TAN	Taunton	Taunton Municipal Airport - King Field	Avgas
MVY	Vineyard Haven	Martha's Vineyard Airport	Jet-A
BAF	Westfield/Springfield	Barnes Municipal Airport	Jet-A
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	Jet-A
ORH	Worcester	Worcester Regional Airport	Jet-A

* Airport has fueling capabilities that are not currently utilized.
Source: The Louis Berger Group
Prepared: March 2010

Based on an analysis of the data and the thresholds for each airport, current role classifications were developed for each of the 37 airports. Figure 3-7 depicts the current airport role/level assignment for all system airports alphabetically by airport. Figure 3-8 lists these same role assignments by role assignment. Figure 3-9 presents this information graphically for Massachusetts' aviation system.

It is important to note that this role analysis should be considered to be a "snapshot in time" of present conditions and is only a starting point in Massachusetts' system planning process. Based on analyses that are conducted in subsequent steps, some airports may be identified to serve a different airport role in the future for the system to function at its highest level.

Figure 3-7: Current Role Assignments by Airport

Airport ID	Associated City	Airport Name	Current Role
8B5	Barre/Barre Plains	Tanner-Hiller Airport	Essential/Business
1M8	Berkley	Myricks Airport	Essential/Business
BVY	Beverly	Beverly Municipal Airport	Corporate/Business
CQX	Chatham	Chatham Municipal Airport	Community/Business
1B2	Edgartown	Katama Airpark	Essential/Business
5B6	Falmouth Airpark	Falmouth Airpark	Community/Business
FIT	Fitchburg	Fitchburg Municipal Airport	Corporate/Business
GDM	Gardner	Gardner Municipal Airport	Essential/Business
GBR	Great Barrington	Walter J. Koladza Airport	Community/Business
28M	Hanson	Cranland Airport	Essential/Business
1B6	Hopedale	Hopedale Industrial Park Airport	Essential/Business
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field	Commercial Service / Scheduled Charter
LWM	Lawrence	Lawrence Municipal Airport	Corporate/Business
1B9	Mansfield	Mansfield Municipal Airport	Community/Business
9B1	Marlborough	Marlboro Airport	Community/Business
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field	Corporate/Business
2B1	Marstons Mills	Cape Cod Airport	Essential/Business
0B5	Montague	Turners Falls Airport	Community/Business
ACK	Nantucket	Nantucket Memorial Airport	Commercial Service / Scheduled Charter
EWB	New Bedford	New Bedford Regional Airport	Commercial Service / Scheduled Charter
2B2	Newburyport	Plum Island Airport	Essential/Business
AQW	North Adams	Harriman-and-West Airport	Corporate/Business
7B2	Northampton	Northampton Airport	Community/Business
OWD	Norwood	Norwood Memorial Airport	Corporate/Business
ORE	Orange	Orange Municipal Airport	Corporate/Business
PSF	Pittsfield	Pittsfield Municipal Airport	Corporate/Business
PYM	Plymouth	Plymouth Municipal Airport	Corporate/Business
PVC	Provincetown	Provincetown Municipal Airport	Commercial Service / Scheduled Charter
3B0	Southbridge	Southbridge Municipal Airport	Community/Business
60M	Spencer	Spencer Airport	Community/Business
3B3	Sterling	Sterling Airport	Community/Business
6B6	Stow	Minute Man Air Field	Community/Business
TAN	Taunton	Taunton Municipal Airport - King Field	Community/Business
MVY	Vineyard Haven	Martha's Vineyard Airport	Commercial Service / Scheduled Charter
BAF	Westfield/Springfield	Barnes Municipal Airport	Corporate/Business
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport	Commercial Service / Scheduled Charter
ORH	Worcester	Worcester Regional Airport	Commercial Service / Scheduled Charter

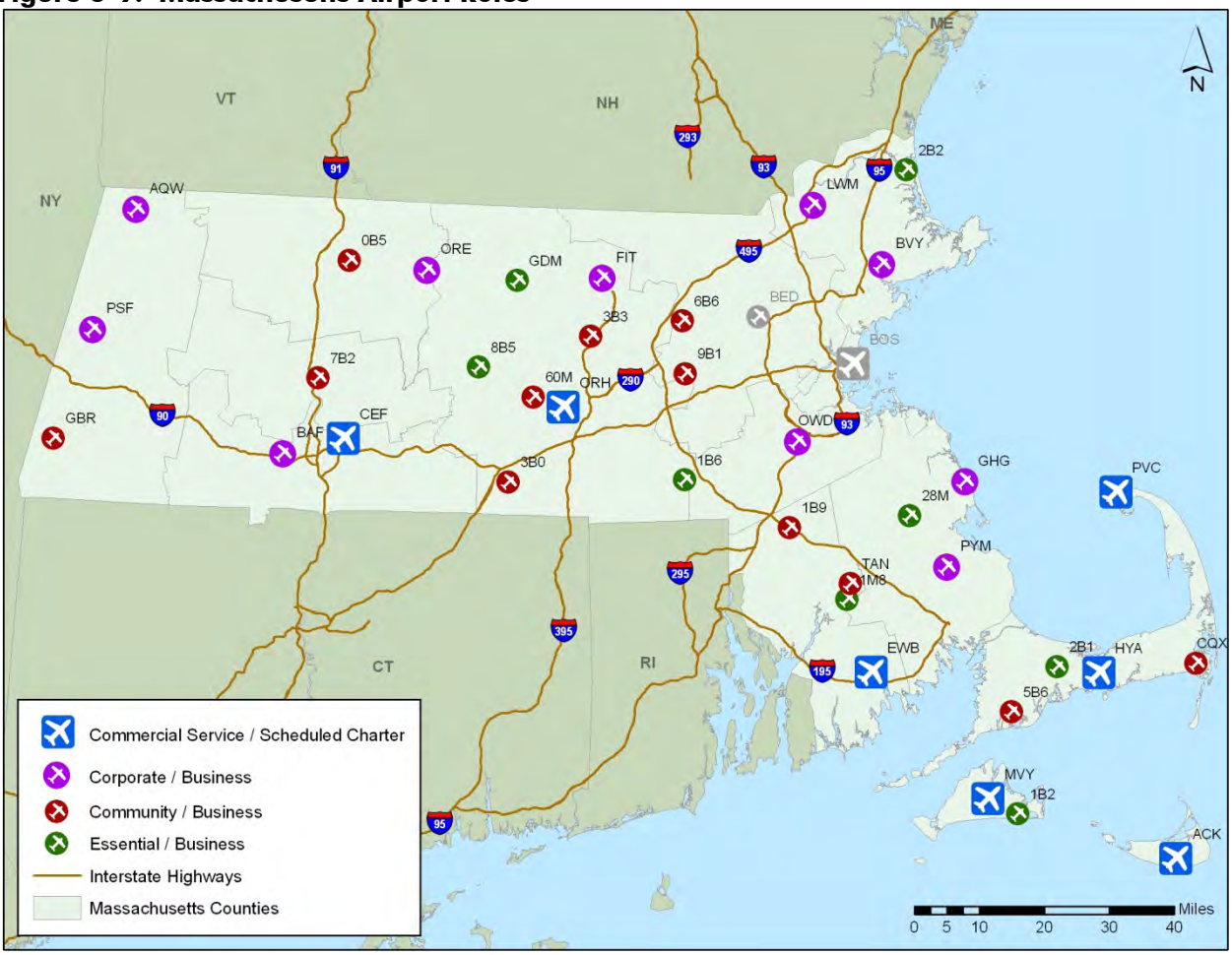
Source: Wilbur Smith Associates
Prepared: March 2010

Figure 3-8: Current Role Assignments by Role

Airport ID	*Associated City*	*Airport Name*
Commercial Service/Scheduled Charter		
HYA	Hyannis	Barnstable Municipal Airport-Boardman/Polando Field
ACK	Nantucket	Nantucket Memorial Airport
EWB	New Bedford	New Bedford Regional Airport
PVC	Provincetown	Provincetown Municipal Airport
MVY	Vineyard Haven	Martha's Vineyard Airport
CEF	Chicopee/Springfield	Westover Air Reserve Base/Metropolitan Airport
ORH	Worcester	Worcester Regional Airport
Corporate/Business		
BVY	Beverly	Beverly Municipal Airport
FIT	Fitchburg	Fitchburg Municipal Airport
LWM	Lawrence	Lawrence Municipal Airport
GHG	Marshfield	Marshfield Municipal Airport - George Harlow Field
AQW	North Adams	Harriman-and-West Airport
OWD	Norwood	Norwood Memorial Airport
ORE	Orange	Orange Municipal Airport
PSF	Pittsfield	Pittsfield Municipal Airport
PYM	Plymouth	Plymouth Municipal Airport
BAF	Westfield/Springfield	Barnes Municipal Airport
Community/Business		
CQX	Chatham	Chatham Municipal Airport
5B6	Falmouth Airpark	Falmouth Airpark
GBR	Great Barrington	Walter J. Koladza Airport
1B9	Mansfield	Mansfield Municipal Airport
9B1	Marlborough	Marlboro Airport
0B5	*Montague*	*Turners Falls Airport*
7B2	Northampton	Northampton Airport
3B0	Southbridge	Southbridge Municipal Airport
60M	Spencer	Spencer Airport
3B3	*Sterling*	*Sterling Airport*
6B6	Stow	Minute Man Air Field
TAN	Taunton	Taunton Municipal Airport - King Field
Essential/Business		
8B5	Barre/Barre Plains	Tanner-Hiller Airport
1M8	Berkley	Myricks Airport
1B2	Edgartown	Katama Airpark
GDM	Gardner	Gardner Municipal Airport
28M	Hanson	Cranland Airport
1B6	Hopedale	Hopedale Industrial Park Airport
2B1	Marstons Mills	Cape Cod Airport
2B2	Newburyport	Plum Island Airport

Source: Wilbur Smith Associates
Prepared: March 2010

Figure 3-9: Massachusetts Airport Roles



Source: Wilbur Smith Associates
Prepared: March 2010

FACILITY AND SERVICE OBJECTIVES

With system airports assigned to a role, it is desirable to identify facilities and services that should be available at airports assigned to one of the four roles. Facility and service objectives delineated in this section are just that, objectives; they are not standards or requirements. It is possible that airports included in, or recommended for, a role may be unable to achieve certain facility and service objectives. An airport's inability to meet all facility and service objectives for its role does not necessarily preclude that airport from filling its recommended role within the system, but may impact its future functionality within the system.

The objectives present the minimum level of development that the airport should have to meet its recommended system role. It is possible that some airports may have facilities or services that are in excess of those attached to its role or category. Reduction or removal of facilities and services that exceed the defined objectives was not considered in this analysis.

The following presents the facilities and services associated with an airport system that is developed to serve the activity identified within each role. Prior to presentation of the specific facility and service objectives for each role, definition of the FAA's Airport Reference Code

(ARC) system is important to understanding how the FAA relates airport development standards to airport functions based on the type of aircraft that operate at the airports.

FAA's Airport Reference Code (ARC) System

In the ARC system, the FAA relates airport design criteria to the operational and physical characteristics of the most demanding aircraft, or design aircraft, intended to regularly operate at an airport. The ARC has two components related to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to the design aircraft's published approach speed. The second component, depicted by a Roman numeral, is the airplane design group and relates to the design aircraft's published wingspan. Generally, the size and characteristics of an airport's runway and other facilities are related to aircraft approach speed, airplane wingspan, and designated or planned instrument approach visibility minimums. Figure 3-10 provides a list of common airplanes with their approach category and design group as specified by FAA standards.

Figure 3-10: Common GA Aircraft with FAA Approach & Design Categories

AIRCRAFT WINGSPAN (Airplane Design Group)

AIRCRAFT APPROACH SPEED (Aircraft Approach Category)

	I Less than 49'	II 49' to 79'	III 80' to 118'	IV 119' to 170'	V 171' to 214'
A Less than 91 kts	 Beech Bonanza Cessna 150 **Cessna 177** Eclipse 500	 Beech E18S D4C-6 Twin Otter **Pilatus PC-6** Raytheon E-18	 **De Havilland Dash 8** DHC-7 Douglas DC-3		
B Weigh less than 12,500 lbs. 91 to 120 kts	 Cessna 402 Cessna Citation I **Piper 31-310 Navajo** Rockwell International 690A	 Beech King Air **Cessna-441 Conquest** Rockwell 840			
B Weigh greater than 12,500 lbs. 91 to 120 kts	 Dassault Falcon 10 Gates Learjet 28/29 Mitsubishi MU 300 **Rockwell Sabre 60**	 Cessna Citation **Dassault Falcon** 200, **900** Grumman Gulfstream I Saab SF 340	 **ATR 42**, 72 Bombardier Q400 BAe 146-200 Beechcraft 1900		
C & D 121 to 166 kts	 Bombardier 60 **Gates Learjet 25**, 35A, 55 Rockwell Sabre 75A	 **Canadair CL-600** Cessna Citation X Gulfstream II, III, IV Rockwell Sabre 80	 Boeing 737-100,200,300,400 **Bombardier Global Express** DC-9 Gulfstream V	 **Boeing 757** Boeing 767-100, 200	 Airbus A340-200 **Boeing 747 Series** Boeing 777-200, 300

*__Bold__ font depicts aircraft shown

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Facility and Service Objectives by Airport Role

Figures 3-11 thru 3-14 identify facility and service objectives for each of the four airport role categories defined previously. A subsequent chapter of this report compares current facilities and services at system airports to the objectives presented in the following tables. Through that comparison, enhancements for system airports will subsequently be developed. (Note that full descriptions of any acronyms can be found in the glossary.)

Figure 3-11: Facility and Service Objectives – Commercial Service/Scheduled Charter

Airport Criteria	*Minimum Objective*
Airside Facilities	
Primary Runway Length	5,500' or greater
Primary Runway Width	To Meet ARC Criteria
Taxiway	Full Parallel
Approach	Precision or LPV
Lighting	MIRL and MITL; HIRL preferred
Visual Aids	Rotating Beacon; Wind Indicator
NAVAIDS	ALS; REILS; VGSI (PAPI/VASI)
Weather	ATCT, ASOS, or AWOS
Landside Facilities	
Hangar Spaces – Based Aircraft	75% of Based Fleet
Hangar Spaces – Transient Aircraft	25% of Overnight Aircraft
Apron Spaces	25% of Based Fleet + 50% of Transient
Terminal/Administration Building	Terminal/Administration Building
Auto Parking Spaces	Airport Reports Sufficient Parking
Services	
Fixed Base Operator (FBO)	Full Service
Fuel	Jet A and Avgas (100LL)
Terminal/Pilot	Phone; Restrooms; Flight Planning/Lounge
Ground Transportation Services	On-Site Rental Car
Security	Current TSA or GA Security Plan
Others	Snow Removal and De-Icing is desirable

Source: Wilbur Smith Associates
Prepared: March 2010

Figure 3-12: Facility and Service Objectives – Corporate/Business

Airport Criteria	*Minimum Objective*
Airside Facilities	
Primary Runway Length	5,000' or greater
Primary Runway Width	To Meet ARC Criteria
Taxiway	Full Parallel
Approach	Non-Precision or LPV
Lighting	MIRL and Reflectors (MITL is desirable)
Visual Aids	Rotating Beacon; Wind Indicator
NAVAIDS	REILS;VGSI (PAPI/VASI); ALS as needed
Weather	ASOS or AWOS
Landside Facilities	
Hangar Spaces – Based Aircraft	50% of Based Fleet
Hangar Spaces – Transient Aircraft	25% of Overnight Aircraft
Apron Spaces	50% of Based Fleet + 50% of Transient
Terminal/Administration Building	Terminal/Administration Building
Auto Parking Spaces	Airport Reports Sufficient Parking
Services	
Fixed Base Operator (FBO)	Full Service or Limited Service
Fuel	Avgas (100LL); Jet A as needed
Terminal/Pilot	Phone; Restrooms; Flight Planning/Lounge
Ground Transportation Services	On-Site Courtesy Car
Security	Current GA Security Plan
Others	Snow Removal and De-Icing is desirable

Source: Wilbur Smith Associates
Prepared: March 2010

Figure 3-13: Facility and Service Objectives – Community/Business

Airport Criteria	*Minimum Objective*
Airside Facilities	
Primary Runway Length	3,200' or greater
Primary Runway Width	To Meet ARC Criteria
Taxiway	Partial parallel and/or Turnarounds
Approach	Non-Precision
Lighting	MIRL and Taxiway Reflectors
Visual Aids	Rotating Beacon; Wind Indicator
NAVAIDS	REILS;VGSI (PAPI/VASI)
Weather	ASOS or AWOS as needed
Landside Facilities	
Hangar Spaces – Based Aircraft	50% of Based Fleet
Hangar Spaces – Transient Aircraft	Not an Objective
Apron Spaces	50% of Based Fleet + 50% of Transient
Terminal/Administration Building	Terminal/Administration Building
Auto Parking Spaces	Airport Reports Sufficient Parking
Services	
Fixed Base Operator (FBO)	Limited Service
Fuel	Avgas (100LL) as needed
Terminal/Pilot	Phone; Restrooms
Ground Transportation Services	On-Site Courtesy Car
Security	Current GA Security Plan
Others	Snow Removal and De-Icing is desirable

Source: Wilbur Smith Associates
Prepared: March 2010

Figure 3-14: Facility and Service Objectives – Essential/Business

Airport Criteria	*Minimum Objective*
Airside Facilities	
Primary Runway Length	Preserve Existing
Primary Runway Width	To Meet ARC Criteria
Taxiway	None
Approach	Visual
Lighting	Preserve Existing
Visual Aids	Wind Indicator
NAVAIDS	Preserve Existing
Weather	Preserve Existing
Landside Facilities	
Hangar Spaces – Based Aircraft	Preserve Existing
Hangar Spaces – Transient Aircraft	Preserve Existing
Apron Spaces	No Specific Requirement
Terminal/Administration Building	Preserve Existing
Auto Parking Spaces	No Specific Requirement
Services	
Fixed Base Operator (FBO)	Preserve Existing
Fuel	No Requirement
Terminal/Pilot	Phone
Ground Transportation Services	Preserve Existing
Security	Current GA Security Plan
Others	Preserve Existing

Source: Wilbur Smith Associates
Prepared: March 2010

SUMMARY

This chapter has presented the airport role classification system that will be used in subsequent analyses to evaluate the adequacy of the Massachusetts airport system. With the current airport roles and the facility and service minimum objectives identified, the ability of the system to meet the goals and objectives now and in the future will be analyzed in the next step of the MSASP.

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CHAPTER FOUR:

AVIATION DEMAND FORECAST

INTRODUCTION

Projecting aviation demand at both the local and state levels is a key element in the development of a state airport system plan. The demand projections provide insight into how aviation activity is anticipated to change over time. The changes in activity are used to determine if facility and service improvements are needed to serve the projected demand. Future aviation demand forecasts may also suggest other needs related to airport roles. Details of aviation demand projections for this study's 37 public use airports comprising the Massachusetts statewide airport system are presented in this chapter.

Both commercial and general aviation positively affect the U.S. economy. For purposes of the Massachusetts Statewide Airport System Plan (MSASP), the focus on the aviation forecasts is on general aviation activities. General Aviation (GA) is defined as all aviation activity other than commercial airline and military operations. It encompasses a wide variety of aviation activities including private/recreational flying, flight instruction, business jet operations, emergency medical/air ambulance services, aerial vegetation management, photography, and surveying. GA operations are conducted through the use of a diverse group of aircraft ranging from gliders and single- and multi-engine piston driven aircraft, to high-performance, long-range business jet aircraft.

General aviation is an important transportation resource in the United States and the demand for business jet aircraft and services has grown in recent years. Safety and security concerns for corporate executive staff and flight delays at some U.S. airports have made on demand, corporate, and fractional ownership charter flights more prudent than traveling on scheduled air carriers for a certain segment of the population.

While business aviation continues to grow, the smaller/recreational use activities have been negatively affected by the recent economic recession. Over the past 10 years, bankruptcies and high fuel prices have resulted in 2009 being one of the more difficult years since the previous economic downturns of 1991 and 2001. These factors have also contributed to the lack of any significant growth in the personal/recreational aviation activities at many airports. This chapter presents the aviation demand forecast in the following sections:

- Historical Airport Data and Activity Measures
- Forecasting Methodology
- Airport Activity Forecasts
- Summary of Forecasted System Activity

HISTORICAL AIRPORT DATA AND ACTIVITY MEASURES

During the process of forecasting aeronautical activity at an airport, or in this case a system of airports, understanding the demand for aviation-related services is extremely important. Two key components in conducting this evaluation are drawing relationships between the number of based aircraft and the number of aircraft operations. For this system planning effort, an airport inventory for each airport was conducted. During this process, significant data was collected, including based aircraft and annual aircraft operations. Although the inventory was conducted in late 2009, data for aircraft operations and enplanements was taken from 2008 as this was the last year for which an entire year's worth of data was available. Based aircraft data was collected and reported for 2009.

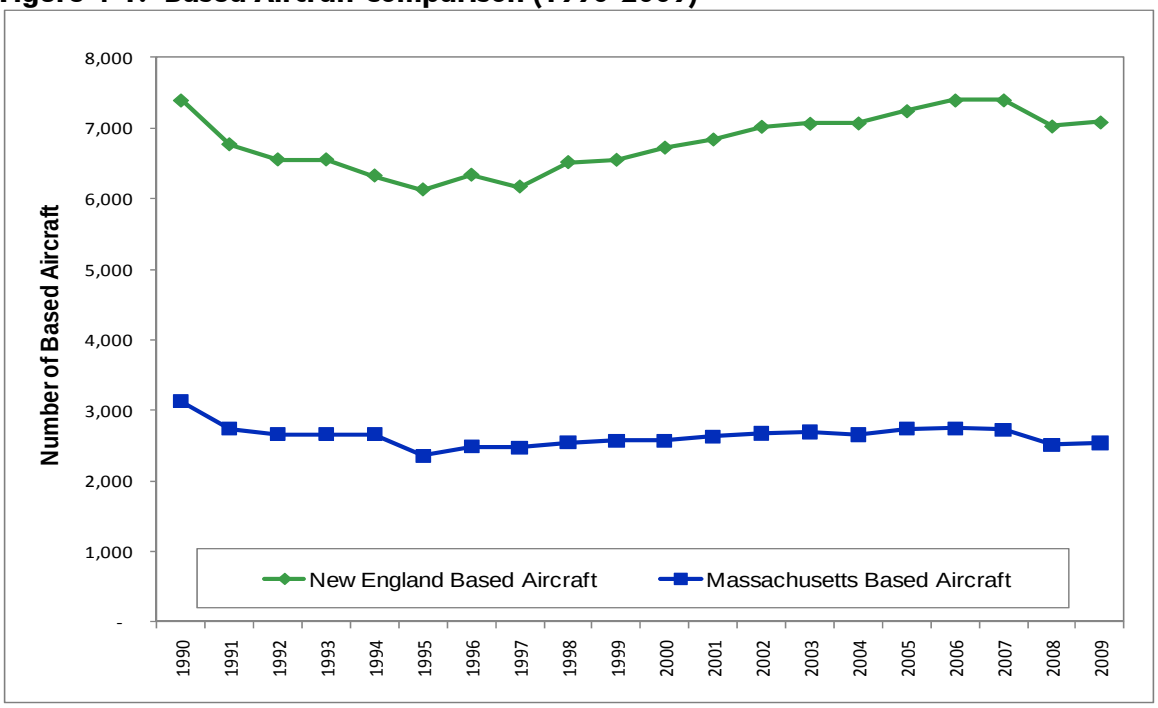
Historical Based Aircraft

The Federal Aviation Administration (FAA) defines a based aircraft as one that is operational and airworthy and which is typically operated from the airport for the majority of the year. In the Massachusetts state airport system there are currently 2,425 based aircraft at 37 study airports which represents approximately 87 percent of all based aircraft in the Commonwealth of Massachusetts (the remaining are based at Laurence G. Hanscom Field Airport). Evaluating historical based aircraft back to 1999, the number of aircraft increases from 2,007 in 1999 to a peak of 2,457 in 2003. Beginning in 2004, statewide based aircraft began to decline and reached 2,425 in 2009.

Over the last 20 years, the Commonwealth has maintained an average of 39 percent (ranging from 36 to 42 percent) of all based aircraft in New England. Evaluation of the based aircraft data reveals that from 1990 to 1997 the number of aircraft based in New England and Massachusetts decreased. New England continued to see growth until 2008 while Massachusetts experienced decreases in 2004 and 2007. In 2008, both systems saw the greatest annual decrease in based aircraft in the study period with New England losing five percent and Massachusetts losing almost eight percent of its total based aircraft. Both have since experienced resurgence in based aircraft numbers for 2009.

Figure 4-1 illustrates the relationship between the based aircraft in New England and the number of based aircraft in the Commonwealth of Massachusetts. The figure displays the historical based aircraft data for the last 20 years. The similarities in the based numbers on a regional and state level indicate there is a general correlation of aviation activity within the region and activity within the Massachusetts system of airports.

Figure 4-1: Based Aircraft Comparison (1990-2009)



Source: FAA Terminal Area Forecast (TAF) database

Historical Aircraft Operations

The FAA categorizes an aircraft operation, a takeoff or a landing, into varied groups. These categories include commercial operations (air carrier, air taxi and commuter), general aviation, and military activity. For the purpose of this study general aviation operations are used which identify aircraft takeoffs and landings not classified as commercial or military. Note that aircraft operations activity levels at airports are an estimate, unless there is an air traffic control tower. Activity at airports with air traffic control towers are systematically recorded and reported. For airports without control towers, the inventory effort of this study asked the airports to provide estimates of annual aircraft operations.

As with all of the data collected for the forecast, the operations data for the system airports were collected in compliance with the protocol set forth by the MassDOT Aeronautics Team. As noted, most annual aircraft operations reported by the airports are estimates of activity. Due to the variations in the estimates, a protocol reference was established in order to report the operations estimates viewed to be most accurate. The protocol reference for annual aircraft operations utilized the following sequence of sources:

- MassDOT Aeronautics Aviation Information Management System (AIMS)
- FAA Air Traffic Activity Data System (ATADS)
- FAA Terminal Area Forecast (TAF)
- Airport inventory data collection forms

Of the 37 airports, aircraft operations data was readily available for 28 airports through various sources such as airport management records, the TAF, or the ATADS system. Every effort was made to collect the data from the remaining nine airports.
Due to the lack of data from the preferred sources for these airports following the study protocol, the most recent FAA Form 5010 master record data was collected and used for these nine airports that include:

- Barre/Barre Plains – Tanner Hiller
- Edgartown – Katama Airpark
- Falmouth – Falmouth Airpark
- Hanson – Cranland Airport
- Hopedale – Hopedale Industrial Airpark
- Marstons Mills – Cape Cod Airport
- Newburyport – Plum Island Airport
- Spencer – Spencer Airport
- Sterling – Sterling Airport

There are 10 system airports served by air traffic control towers and include the following:

- Beverly – Beverly Municipal Airport
- Hyannis – Barnstable Municipal-Boardman Polando Field
- Lawrence – Lawrence Municipal Airport
- Nantucket – Nantucket Memorial Airport
- New Bedford – New Bedford Regional Airport
- Norwood – Norwood Memorial Airport
- Springfield/Chicopee - Westover Air Reserve Base/Metropolitan
- Vineyard Haven – Martha's Vineyard
- Westfield/Springfield – Barnes Municipal Airport
- Worcester – Worcester Regional Airport

There are many challenges associated with aircraft operations data at general aviation airports with no air traffic control tower. Oftentimes, this data is developed based on a best guess of airport management. Historically, this has led to various data sources reporting aircraft operations numbers that differ. Every attempt was made during this effort to utilize aircraft operations data from the data source protocol developed for this study. Appendix B utilizes a color-coded theme that identifies the sources of the data used for each airport.

The operations data obtained in this study effort are primarily used to derive historical operations per based aircraft ratios that are utilized to forecast future aircraft operations activity. To develop this ratio, the based aircraft is divided into the total general aviation operations. See forecasting methodology for more information.

Historical Enplanements

An enplanement is measured as a passenger boarding a commercial service/charter flight. While this study is focused on general aviation, there are eight study airports that are primarily GA airports, but also have commercial service/charter activity. These eight include:

- Hyannis - Barnstable Municipal-Boardman Polando Field
- Nantucket - Nantucket Memorial Airport
- New Bedford - New Bedford Regional Airport
- Provincetown - Provincetown Municipal Airport
- Springfield/Chicopee - Westover Air Reserve Base/Metropolitan
- Vineyard Haven - Martha's Vineyard
- Westfield/Springfield - Barnes Municipal Airport
- Worcester - Worcester Regional Airport

The enplanement activity at these airports varies considerably based on the type of service being offered and seasonal fluctuations. Some of these airports have also experienced intermittent commercial activity.

The results of the activity measures inventoried are displayed in **Figure 4-2**, which shows the number of based aircraft, aircraft operations, and enplanements for each system airport.

Figure 4-2: Summary of Based Aircraft, Aircraft Operations, and Enplanements

Airport City	Airport Name	3- Letter Identifier	ATCT	Based Aircraft	Aircraft Operations[1]	Enplanements[2]
Barre/Barre Plains	Tanner-Hiller	8B5	No	5	560	0
Berkley	Myricks Airport	1M8	No	10	1,000	0
Beverly	Beverly Municipal Airport	BVY	Yes	134	68,896	0
Chatham	Chatham Municipal	CQX	No	34	25,530	0
Edgartown	Katama Airpark	1B2	No	4	7,200	0
Falmouth	Falmouth Airpark	5B6	No	50	1,718	0
Fitchburg	Fitchburg Municipal Airport	FIT	No	143	63,025	0
Gardner	Gardner Municipal	GDM	No	23	5,315	0
Great Barrington	Walter J. Koladza Airport	GBR	No	49	29,810	0
Hanson	Cranland Airport	28M	No	18	5,600	0
Hopedale	Hopedale Industrial Park	1B6	No	13	27,900	0
Hyannis	Barnstable Municipal-Boardman Polando Field	HYA	Yes	65	119,091	191,837
Lawrence	Lawrence Municipal Airport	LWM	Yes	230	53,720	4
Mansfield	Mansfield Municipal Airport	1B9	No	137	57,500	3
Marlborough	Marlboro Airport	9B1	No	35	24,000	0
Marshfield	Marshfield Municipal Air-port- George Harlow Field	GHG	No	57	18,075	0
Marstons Mills	Cape Cod Airport	2B1	No	14	1,200	0
Montague	Turners Falls	0B5	No	33	17,600	0
Nantucket	Nantucket Memorial Airport	ACK	Yes	37	150,200	257,755
New Bedford	New Bedford Regional Air-port	EWB	Yes	140	57,496	13,990
Newburyport	Plum Island Airport	2B2	No	11	2,825	0
North Adams	Harriman and West	AQW	No	23	45,780	0
Northampton	Northampton	7B2	No	70	26,600	0
Norwood	Norwood Memorial Airport	OWD	Yes	203	65,036	0
Orange	Orange Municipal	ORE	No	46	50,014	0
Pittsfield	Pittsfield Municipal Airport	PSF	No	44	50,700	0
Plymouth	Plymouth Municipal Airport	PYM	No	136	65,500	0
Provincetown	Provincetown Municipal Airport	PVC	No	10	75,444	11,468
Southbridge	Southbridge Municipal Air-port	3B0	No	35	51,800	0
Spencer	Spencer Airport	60M	No	25	10,125	0
Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	CEF	Yes	31	47,228	15,437
Sterling	Sterling Airport	3B3	No	84	49,260	0
Stow	Minute Man Airfield	6B6	No	62	48,095	0
Taunton	Taunton Municipal Airport	TAN	No	119	31,390	0
Vineyard Haven	Martha's Vineyard	MVY	Yes	94	45,291	40,892
Westfield /Springfield	Barnes Municipal Airport	BAF	Yes	122	59,179	301
Worcester	Worcester Regional Airport	ORH	Yes	79	47,202	685
			System Totals:	2,425	1,506,905	532,372

Source: MSASP data collection and inventory effort (see Appendix B for various data source details.)

[1] 2008 is the last full year operations data was available for all airports

[2] 2008 is the last full year enplanement data was available for airports tracking enplanements

The historical data collected for this study shows a decline in based aircraft and operations data at many of the airports inventoried. As also noted previously, enplanement activity at the study airports has varied due to changes in air service and seasonal fluctuations. It is expected however, that even with the recent recession the aviation industry is positioned to continue to experience slow steady growth over the long term.

FORECASTING METHODOLOGY

Choosing the appropriate methodology is an important component to developing forecasts which allow for appropriate planning for future system needs. The general approach often used to develop forecasts requires the identification of specific historical relationships between regional, state, and individual airport forecasts as well as specific operational and based aircraft data. Historical data at smaller airports without air traffic control towers is generally less reliable than airports with control towers. Consequently, it is more of a challenge to produce accurate quantitative forecasts.

Demand projections for general aviation aircraft operations, based aircraft, and commercial service enplanements for this effort were primarily developed through an analysis of historical trends at the system airports, as well as examining historic trends throughout New England. This historical trending analysis, combined with growth rates from the FAA Aerospace Forecast for Fiscal Years 2010-2030, were the chosen methodology for this forecast effort. Utilizing this information for a system plan forecast is an industry accepted practice and an appropriate level of effort for this system plan. Other methodologies commonly used to forecast aviation activity (e.g., regression analysis) were not employed. These more rigorous methodologies are usually reserved for more in depth forecasts at the master planning level.

In addition, this system planning effort reviewed forecast data from study airports whose airport master plans were completed within the last five years. At airports where the airport master plan was older than five years, the above methodology was employed. The following airports provided forecast information (preferred forecast) from their master plans and the extrapolated Average Annual Forecasted Growth Rates (AAFGR) derived are presented below:

- Beverly – Beverly Municipal Airport; completed in 2009
  - Based aircraft 0.1 percent
  - Operations 0.8 percent
- Fitchburg – Fitchburg Municipal Airport; completed in 2008
  - Based aircraft 0.6 percent
  - Operations 0.6 percent
- Hyannis – Barnstable Municipal-Boardman Polando Field; completed in 2008
  - Based aircraft 1.4 percent
  - Operations forecast was for GA operations and not applicable to all operations
  - Enplanement forecast was not provided
- Marshfield – Marshfield Municipal Airport-George Harlow Field; completed in 2006
  - Based aircraft 0.8 percent
  - Operations 0.8 percent

- Nantucket – Nantucket Memorial Airport; completed in 2010
  - Based aircraft 4.0 percent
  - Operations 1.8 percent
  - Enplanements 0.8 percent
- Norwood – Norwood Memorial Airport; completed in 2007
  - Based aircraft 0.7 percent
  - Operations 1.5 percent
- Provincetown – Provincetown Municipal Airport; completed in 2005
  - Based aircraft 0.8 percent
  - Operations 0.5 percent
  - Enplanements 0.7 percent
- Westfield/Springfield - Barnes Municipal Airport; completed in 2004
  - Based aircraft 1.6 percent
  - Operations 1.3 percent
- Worcester – Worcester Regional Airport; completed in 2008
  - A based aircraft forecast was not provided
  - Operations 2.4 percent
  - Enplanements 6.7 percent

The AAFGR for these airports will be applied to the baseline data from this study for based aircraft, aircraft operations, and enplanements.

It is important to emphasize that aviation forecasting is not an "exact science", so experienced judgment and practical considerations ultimately influence the level of detail and effort required to establish a reasonable aviation forecast and the development of decisions that result from them.

This forecasting effort is presented in standard 5, 10, and 20-year increments. Historically, the general aviation industry has been highly cyclical, exhibiting strong growth during economic expansions and negative growth during economic recessions.

AIRPORT ACTIVITY FORECASTS

Forecasts of aviation activity are developed to enable airport operators and other entities involved in the development of aviation facilities to properly plan for the distribution of limited financial resources to enable the highest return on investment. Whether that funding is intended for a single airport or across a system of airports, the forecasts lay the foundation to identify the required facilities to meet future demand.

One of the most significant current challenges in the aviation industry, more specifically general aviation, is the recent economic recession. The lack of capital for the purchase of aircraft as well as the increase in general operating costs makes general aviation a less inviting endeavor than in previous years. In addition to the recreational aviation activities, many corporate operations have experienced the crunch of the economy over the past several years with cutbacks to, or elimination of corporate flight departments. These types of fiscal constraints and decreased aviation activity can have a devastating impact on revenue and budgets of small to medium sized general aviation airports.

Based Aircraft Forecast

To forecast the number of based aircraft at each airport for the forecast periods of 5, 10, and 20 years, each airport was inventoried for current and historical based aircraft. Based aircraft data was collected for the previous 10 years (2000-2009). Analysis of this information provided a yearly growth percentage for each airport from which a historical average annual growth (HAAG) trend was derived.

It should be noted that the based aircraft forecast methodology for this study was chosen to fit within the constraints of the project. The based aircraft situation in Massachusetts, and throughout New England, is complex and dynamic and includes many variables. Notably, aircraft owners in the region have the ability to be flexible with regard to their choice of where to base their aircraft due to the proximity of airports without regard to geo-political boundaries. This means that an owner who is a resident of Massachusetts can easily base an aircraft outside of Massachusetts. Variables such as these were not considered when conducting this forecasting effort.

The HAAG data was analyzed and anomalies were evaluated and compared to ATADS and MassDOT Aeronautics data if available to determine the validity of the findings. Once the data was validated the airports were separated into two historical performance categories. These categories are based on the airport historically experiencing positive or negative average annual growth in the last 10 years.

- HAAG Category 1 – Negative Average Annual Growth
- HAAG Category 2 – Positive Average Annual Growth

The *FAA Aerospace Forecast Fiscal Years 2010-2030* were reviewed for this forecast effort. The FAA forecasts the fleet of "active aircraft", one that flies at least one hour during the year, not total aircraft. They utilize a methodology that takes into account numerous industry factors as well as economic conditions. The following summarizes their most recent average growth rates for general aviation that are applicable for this effort:

- Active General Aviation Fleet – 0.9 percent
- Turbine-powered Fleet – 3.0 percent
- Turbine-jet Fleet – 4.2 percent
- Piston-powered Fleet – 0.2 percent

The growth rates for aircraft based in New England and all study airports within the Commonwealth of Massachusetts from 2000-2009 were evaluated along with a review of the FAA forecasts, and growth rates were derived. Reviewing airport trends and forecasted growth rates from the FAA, the FAA rates were applied to the 2009 based aircraft numbers and projected out to 2030. A fleet mix breakdown was not utilized for this effort; therefore, the following Future Annual Growth rates were applied to each of the two categories of historical performance noted above and meant to represent the average for each airport:

- Future Annual Growth Category 1 – 0.2 percent
- Future Annual Growth Category 2 – 0.9 percent

Figure 4-3, represents all 37 study airports listed with the number of based aircraft at each airport in 2009 and projected based aircraft in each forecast period. Airports that utilized airport master plan forecasted growth rates are noted with an asterisk. Appendix B shows the HAAG for each airport that determined whether an airport was determined to be a Category 1 or 2. This percentage was then applied to the base year based aircraft to derive the forecasted based aircraft. Airports that utilized airport master plan growth rates are also noted in the Appendix data.

Figure 4-3: Based Aircraft Forecast

Airport City	*Airport Name*	*2009*	*2015*	*2020*	*2030*
Barre/Barre Plains	Tanner-Hiller	5	5	5	5
Berkley	Myricks Airport	10	10	10	10
Beverly*	Beverly Municipal Airport	134	135	135	137
Chatham	Chatham Municipal	34	34	35	35
Edgartown	Katama Airpark	4	4	4	5
Falmouth	Falmouth Airpark	50	53	55	60
Fitchburg*	Fitchburg Municipal Airport	143	144	144	145
Gardner	Gardner Municipal	23	23	24	24
Great Barrington	Walter J. Koladza Airport	49	52	54	59
Hanson	Cranland Airport	18	18	18	19
Hopedale	Hopedale Industrial Park	13	13	13	14
Hyannis*	Barnstable Municipal-Boardman Polando Field	65	71	76	87
Lawrence	Lawrence Municipal Airport	230	243	254	278
Mansfield	Mansfield Municipal Airport	137	145	151	165
Marlborough	Marlboro Airport	35	37	39	42
Marshfield*	Marshfield Municipal Airport- George Harlow Field	57	60	62	67
Marstons Mills	Cape Cod Airport	14	14	14	15
Montague	Turners Falls	33	33	34	34
Nantucket*	Nantucket Memorial Airport	37	47	57	84
New Bedford	New Bedford Regional Airport	140	148	155	169
Newburyport	Plum Island Airport	11	11	11	11
North Adams	Harriman and West	23	24	25	28
Northampton	Northampton	70	74	77	84
Norwood*	Norwood Memorial Airport	203	212	219	235
Orange	Orange Municipal	46	49	51	56
Pittsfield	Pittsfield Municipal Airport	44	46	49	53
Plymouth	Plymouth Municipal Airport	136	138	139	142
Provincetown*	Provincetown Municipal Airport	10	10	11	12
Southbridge	Southbridge Municipal Airport	35	37	39	42
Spencer	Spencer Airport	25	26	28	30
Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	31	31	32	32
Sterling	Sterling Airport	84	89	93	101
Stow	Minute Man Airfield	62	65	68	75
Taunton	Taunton Municipal Airport	119	126	131	144
Vineyard Haven	Martha's Vineyard	94	99	104	113
Westfield /Springfield*	Barnes Municipal Airport	122	134	145	170
Worcester	Worcester Regional Airport	79	83	87	95
	System Totals:	2,425	2,543	2,648	2,880

Source: FAA, Airport Master Plans, and The Louis Berger Group Calculations (See Appendix B)
* Airport master plan forecasted growth rate utilized

As portrayed, total based aircraft are projected to grow from 2,425 to 2,880 over the 20-year forecast period. This is an average annual growth rate of 0.9 percent for the airport system.

Annual Aircraft Operations Forecast

In an effort to project future operations for these airports, a systematic method was used to calculate future aircraft operations through drawing a correlation between based aircraft and aircraft operations. The process divides the number of operations by the number of based aircraft which results in the Operations per Based Aircraft (OPBA). The OPBA is then multiplied by the projected number of based aircraft resulting in the projected operations for each forecast milestone.

During the inventory process of this planning effort, some airports reported data that differed substantially from previously reported data, or the data was completely missing primarily due to changes in management or ownership. In these cases, MassDOT Aeronautics data was used. There were also some airports that reported seasonal fluctuations in the based aircraft/operations during peak tourist seasons at some of the coastal airports which caused a slight increase in the number of based aircraft for a brief period, but the impact on the total system in terms of the number of increased annual operations is negligible.

The OPBA method is generally used in instances where the historical operations data is questionable or in some cases nonexistent. While this methodology for determination of future activity is not always the most accurate, it does provide a sound basis for estimating future activity at the airport where no other methodology can be employed due to a lack of reliable data. Expert judgment was used to evaluate the data and provide more likely estimates with respect to gaps or other anomalies. Adjustments were performed in a manner taking into account operational characteristics of the airport, its historical operations, and other pertinent information. As discussed earlier in this chapter, some airports were unable to provide operations data, and in these cases the most recent FAA Form 5010 numbers were used to assist in calculating the aircraft operations forecast.

In order to determine the projected aircraft operations forecast for the airports, the based aircraft projections were multiplied by the average historical OPBA for the past 10 years to derive the forecast for that particular year. As mentioned previously, there are 10 system airports with air traffic control towers. As a result, aircraft operations data from these airports is recorded daily and provides a higher level of accuracy in the data that ultimately results in a higher level of confidence in the OPBA derived for those airports.

For airports that utilize airport master plan growth rates for this study, OPBA was not derived.

The average OPBA for each of the study airports utilized for the operations forecast is presented in Figure 4-4.

Figure 4-4: Average OPBA

Airport City	Airport Name	3- Letter Identifier	Average OPBA
Barre/Barre Plains	Tanner-Hiller	8B5	112
Berkley	Myricks Airport	1M8	100
Beverly* ^	Beverly Municipal Airport	BVY	-
Chatham	Chatham Municipal	CQX	756
Edgartown	Katama Airpark	1B2	1,800
Falmouth	Falmouth Airpark	5B6	35
Fitchburg*	Fitchburg Municipal Airport	FIT	-
Gardner	Gardner Municipal	GDM	235
Great Barrington	Walter J. Koladza Airport	GBR	670
Hanson	Cranland Airport	28M	311
Hopedale	Hopedale Industrial Park	1B6	2,146
Hyannis ^	Barnstable Municipal-Boardman Polando Field	HYA	1,873
Lawrence ^	Lawrence Municipal Airport	LWM	317
Mansfield	Mansfield Municipal Airport	1B9	531
Marlborough	Marlboro Airport	9B1	685
Marshfield*	Marshfield Municipal Airport- George Harlow Field	GHG	-
Marstons Mills	Cape Cod Airport	2B1	86
Montague	Turners Falls	0B5	526
Nantucket* ^	Nantucket Memorial Airport	ACK	-
New Bedford ^	New Bedford Regional Airport	EWB	577
Newburyport	Plum Island Airport	2B2	257
North Adams	Harriman and West	AQW	2,005
Northampton	Northampton	7B2	608
Norwood* ^	Norwood Memorial Airport	OWD	-
Orange	Orange Municipal	ORE	1,080
Pittsfield	Pittsfield Municipal Airport	PSF	1,126
Plymouth	Plymouth Municipal Airport	PYM	465
Provincetown*	Provincetown Municipal Airport	PVC	-
Southbridge	Southbridge Municipal Airport	3B0	1,563
Spencer	Spencer Airport	60M	405
Springfield/Chicopee ^	Westover Air Reserve Base/Metropolitan	CEF	1,654
Sterling	Sterling Airport	3B3	586
Stow	Minute Man Airfield	6B6	728
Taunton	Taunton Municipal Airport	TAN	264
Vineyard Haven ^	Martha's Vineyard	MVY	570
Westfield /Springfield* ^	Barnes Municipal Airport	BAF	-
Worcester* ^	Worcester Regional Airport	ORH	-

Source: The Louis Berger Group Calculations (See Appendix B)

* Airport master plan available, no OPBA derived.

^ Airport has an air traffic control tower.

Figure 4-5 shows the operations forecast for the study airports for 2015, 2020, and 2030. These numbers were developed using the historical average OPBA for each airport multiplied by the number of projected based aircraft resulting in the aircraft operations projection.

Figure 4-5: Annual Aircraft Operations Forecast

Airport City	Airport Name	2008[1]	2015	2020	2030
Barre/Barre Plains	Tanner-Hiller	560	567	572	584
Berkley	Myricks Airport	1,000	1,012	1,022	1,043
Beverly* ^	Beverly Municipal Airport	68,896	72,270	75,207	81,445
Chatham	Chatham Municipal	25,530	26,013	26,274	26,804
Edgartown	Katama Airpark	7,200	7,598	7,946	8,691
Falmouth	Falmouth Airpark	1,718	1,850	1,935	2,116
Fitchburg*	Fitchburg Municipal Airport	63,025	65,328	67,312	71,461
Gardner	Gardner Municipal	5,315	5,469	5,524	5,635
Great Barrington	Walter J. Koladza Airport	29,810	34,623	36,209	39,603
Hanson	Cranland Airport	5,600	5,668	5,724	5,840
Hopedale	Hopedale Industrial Park	27,900	28,236	28,520	29,096
Hyannis ^	Barnstable Municipal-Boardman Polando Field	119,091	132,312	141,836	162,992
Lawrence ^	Lawrence Municipal Airport	53,720	76,975	80,502	88,048
Mansfield	Mansfield Municipal Airport	57,500	76,785	80,303	87,830
Marlborough	Marlboro Airport	24,000	25,314	26,474	28,956
Marshfield*	Marshfield Municipal Airport-George Harlow Field	18,075	18,960	19,731	21,367
Marstons Mills	Cape Cod Airport	1,200	1,214	1,227	1,251
Montague	Turners Falls	17,600	17,563	17,739	18,097
Nantucket* ^	Nantucket Memorial Airport	150,200	167,169	182,766	218,461
New Bedford ^	New Bedford Regional Airport	57,496	85,266	89,173	97,532
Newburyport	Plum Island Airport	2,825	2,859	2,888	2,946
North Adams	Harriman and West	45,780	48,662	50,892	55,662
Northampton	Northampton	26,600	44,911	46,969	51,371
Norwood* ^	Norwood Memorial Airport	65,036	71,113	76,609	88,908
Orange	Orange Municipal	50,014	52,414	54,815	59,953
Pittsfield	Pittsfield Municipal Airport	50,700	52,283	54,679	59,804
Plymouth	Plymouth Municipal Airport	65,500	63,937	64,579	65,882
Provincetown*	Provincetown Municipal Airport	75,444	77,736	79,699	83,775
Southbridge	Southbridge Municipal Airport	51,800	57,740	60,385	66,045
Spencer	Spencer Airport	10,125	10,684	11,174	12,221
Springfield/Chicopee ^	Westover Air Reserve Base/Metropolitan	47,228	51,904	52,425	53,483
Sterling	Sterling Airport	49,260	51,981	54,362	59,458
Stow	Minute Man Airfield	48,095	47,624	49,806	54,474
Taunton	Taunton Municipal Airport	31,390	33,124	34,641	37,888
Vineyard Haven ^	Martha's Vineyard	45,291	56,507	59,096	64,635
Westfield /Springfield* ^	Barnes Municipal Airport	59,179	63,948	68,214	77,619
Worcester* ^	Worcester Regional Airport	47,202	54,420	61,272	77,671
	System Totals:	1,506,905	1,689,029	1,775,354	1,965,206

Source: The Louis Berger Group Calculations (See Appendix B)
[1] 2008 is the last full year operations data was available for all airports.
* Master plan forecasted growth rate utilized.
^ Airport has an air traffic control tower.

As portrayed, annual aircraft operations are projected to grow from 1,506,905 to 1,965,206 over the 20-year forecast period. This is an average annual growth rate of 1.4 percent for the airport system.

GA Airport Enplanements Forecast

Of the 37 system airports studied for this effort, eight of the airports with commercial passenger service reported enplanements. This forecast relies solely on the FAA's TAF database or the airports master plan. The TAF data is used by the FAA, planners and airports to project anticipated activity including activities such as enplanements at airport that provide commercial service. Given the inventory portion of this effort was conducted in 2009, enplanement numbers were not available for the entire calendar year, therefore the numbers for 2008 were used as a baseline for the enplanement data.

Figure 4-6 shows the current enplanements for the year 2008, and projected enplanements for 2015, 2020, and 2030. The Worcester Regional Airport enplanement forecast is the projected growth rate (medium-growth scenario) in enplanements from the airport's master plan extrapolated over this study's 20-year planning period. While it is a significant jump from the 2008 level of activity, the Airport has previously seen enplanements in excess of 100,000.

Figure 4-6: GA Airport Enplanement Forecast

Airport City	*Airport Name*	*2008* [1]	*2015*	*2020*	*2030*
Hyannis	Barnstable Municipal-Boardman Polando Field	191,837	215,863	234,846	277,967
*Nantucket	Nantucket Memorial Airport	257,755	272,540	283,618	307,142
New Bedford	New Bedford Regional Airport	13,990	14,850	16,801	21,508
*Provincetown	Provincetown Municipal Airport	11,468	12,042	12,469	13,370
Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	15,437	1,336	1,336	1,336
Vineyard Haven	Martha's Vineyard	40,892	44,189	45,306	47,622
Westfield /Springfield	Barnes Municipal Airport	301	387	387	387
*Worcester	Worcester Regional Airport	685	107,686	144,262	270,800
	System Totals:	532,365	668,894	739,025	940,132

Source: FAA TAF, Airport Master Plans and The Louis Berger Group Calculations (See Appendix B)
[1] 2008 is the last full year operations data was available for all airports
* Airport master plan forecasted growth rate utilized.

As portrayed, enplanements at study airports are projected to grow from 532,365 to 940,132 over the 20-year forecast period. This is an average annual growth rate of 3.6 percent for the airport system.

SUMMARY OF FORECASTED SYSTEM ACTIVITY

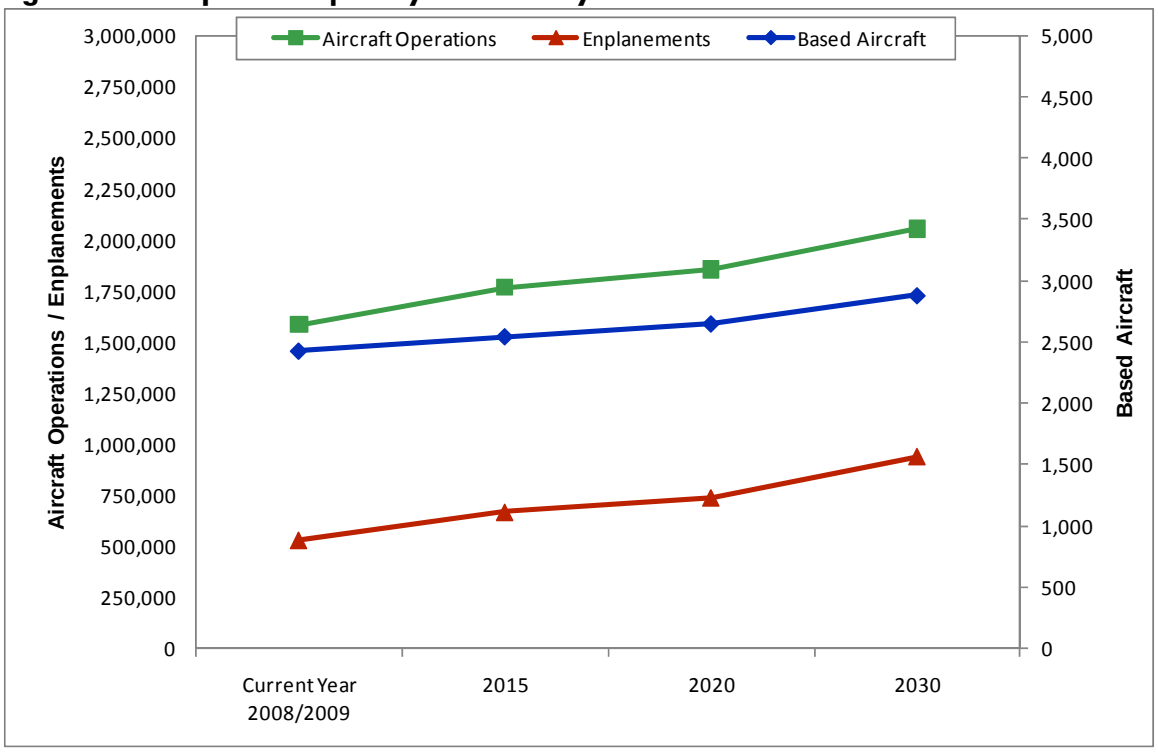
As a result of applying the various methodologies identified in this chapter, the Massachusetts system of airports is poised to grow modestly over the forecasted period. A summary of the three activity measures forecasted for this system plan study include based aircraft, aircraft operations, and enplanements and is presented in Figure 4-7 and Figure 4-8 below.

Figure 4-7: Summary of Forecasted Airport System Activity

Activity	*Current Year[1] 2008/2009*	*2015*	*2020*	*2030*	*Average Annual Growth*
Based Aircraft	2,425	2,543	2,648	2,880	0.9%
Aircraft Operations	1,506,905	1,689,029	1,775,354	1,965,206	1.4%
Enplanements	532,365	668,894	739,025	940,132	3.6%

Source: Study data, Airport master plans, The Louis Berger Group calculations, and FAA TAF (See Appendix B)
[1] Current Year for Aircraft Operations and Enplanements is 2008; Current year data for Base Aircraft is 2009.

Figure 4-8: Projected Airport System Activity



Source: The Louis Berger Group

As discussed earlier, forecasting is not an "exact science", therefore, outside influences, the economy, or industry changes can impact the Commonwealth's system of airports. Some of these include:

- Flight Training – The recent closure of Daniel Webster's flight training program in Nashua, New Hampshire could positively impact the flight training program at Bridgewater State College in Massachusetts, New Bedford Regional Airport, and surrounding facilities.

- Management – The Massachusetts Port Authority recently took over the ownership of Worcester Regional Airport. The additional support and resources of Massport for this facility could positively change the makeup of activity for this facility.

- Corporate Activity – While the recent economic downturn has decreased corporate flight activity, typical turbine powered corporate aircraft are forecasted by the FAA to grow in excess of three percent per year over the next 20 years.

- Legislative – Changes to existing legislation and tax laws, environmental regulations, and policies for airports on the federal, state and local level can have an effect on the ability of airports to meet the demands of their facility. Any changes can favorably or unfavorably affect airports to foster programs (capital or economic) for their airport.

CHAPTER FIVE:

EXISTING AND FUTURE SYSTEM ADEQUACY ANALYSIS

INTRODUCTION

Previous chapters of the 2010 Massachusetts Statewide Airport System Plan (MSASP) have outlined the study's process, established system goals and performance measures, summarized existing facilities and activities, determined roles for the Massachusetts system airports, and provided forecasts of anticipated future activity. The remaining tasks in the MSASP address the existing and future airport system's needs and recommendations.

As noted in previous analyses, the specific roles that each of the Commonwealth's airports play are an important factor in evaluating the performance of the overall airport system. Using these roles, as well as the associated facility and service objectives established for a given airport to function at the identified role level, the performance of the existing airport system can be evaluated through each measure identified for the MSASP. This process of measuring performance is conducted on an airport-by-airport basis, by airport role, and for the system as a whole. This process allows for the identification of specific airport improvements or enhancements, as well as recognition of specific groups of airports or system-wide performance issues that could be addressed through the system planning process.

The analysis initially examines the existing system's overall performance. Based on the evaluation of the existing system and the consideration of future system needs, targets for each of the performance measures are determined. These targets are utilized in the final chapters of the MSASP to develop system recommendations and cost estimates to implement the projects identified in the analysis. Note that the impacts of outside influences on the future system are also considered in the development of targets and recommendations.

Chapter Five itself is structured to first identify and describe the range of "outside influences" that have the potential to impact the current and future performance of the Commonwealth's airport system. This is followed by a high-level, National Plan of Integrated Airport Systems (NPIAS) analysis of the airport system to review of the status of those MSASP airports currently included in the NPIAS, as well as other airports' potential inclusion eligibility. Following these sections, the remaining chapter presents an evaluation of the existing airport system's performance with respect to the six general system goal categories previously identified for the MSASP. Introduced and discussed in Chapter One, the six goal categories established to analyze the system include the following:

- Standards – provide a system of airports that is safe, secure and meets applicable Federal Aviation Administration (FAA) design standards that will satisfy the current and future needs of aviation.
- Environmental Compliance and Stewardship – provide a system of airports that complies with all federal, state, and local environmental regulatory requirements.

- Economic – identify the economic impact of the Massachusetts system of airports and the economic benefit of incremental investment in the aviation system.
- Preservation – provide a system of airports that serves the Commonwealth with sufficient facilities and services to maintain the airport system and address the current/future needs of the aviation community.
- Public Outreach – provide a system of airports that promotes and supports aviation educational programs and community outreach programs.
- Transportation Integration and Accessibility – provide a system of airports that is easily accessible from both the ground and the air, and supports integration with other modes of transportation.

Within each of these six goal categories, specific performance measures are used as "tests" that are applied to determine how well the system is currently performing with respect to a particular measure. These tests are then compiled and summarized to create a "report card" of the existing system performance that, like any report card, will assist in determining where improvements or enhancements to performance are required.

It is important to note that with any analysis, data is gathered during a certain point in time, but that during the progression of the analysis, changes can and do occur. For purposes of the MSASP, data were primarily gathered from August 2009 through March 2010, with limited updates to data provided through May 2010. Any changes that affect data used for the subsequent analysis are noted, as available.

Many performance measures within the six goal categories also required geographic analysis through the use of mapping. ArcGIS 9, a Geographic Information System (GIS), was used to determine the ground coverage of airports and their proximity to existing and future users. GIS uses multiple map and data systems to develop automobile drive times to and from airports based on the types of roads, posted speed limits, and average traffic patterns. By applying specific driving times to Massachusetts' system airports using GIS (for the MSASP, a 30 minute drive time was used since that is also the standard used by the FAA in its evaluation of airports eligibility related to inclusion in the National Plan of Integrated Airport Systems), coverage or "market areas" for each airport in the Massachusetts airport system were developed. When the 30-minute drive times for each airport are calculated and applied to mapping that includes other data such as population, the ability of Massachusetts' airport system to effectively serve the Commonwealth and its population can be determined. Note that population coverage for each airport was based on 2007 population at the Census block group level. Population and area coverage of each airport's 30-minute areas were thus based on the block groups which fell into these areas.

OUTSIDE INFLUENCES

The demand for airports and aviation services is influenced by many aviation and non-aviation related factors. Because of the long-term planning timeframe, it is impossible for the MSASP to project all possible factors that could have the potential to impact system coverage over the planning period. However, the factors identified through discussions with various project stakeholders and through the PMT that have the greatest likelihood of impacting system coverage in Massachusetts include the following:

- Population Growth
- Employment Growth
- Economic Development Initiatives
- Higher Education Influence
- High-Technology and Aerospace Industry Growth
- Tourism
- Major Surface Transportation Improvements
- Legislative Initiatives

The purpose of this section of the chapter is to provide a "big picture overview" of what factors might alter the overall demands placed upon the Massachusetts airport system and any resulting associated needs for the system. This information should help the Commonwealth and local aviation community acknowledge the potential impacts of these influences, thereby allowing them to be better prepared to respond to changes that may occur. Recognizing these factors today will enable MassDOT Aeronautics to remain diligent in its monitoring of the aviation system. With funding constraints making it more challenging to maintain and improve the overall airport system for peak performance, it is even more critical that MassDOT Aeronautics be able to be responsive to external factors that could impact the system by shifting priorities and/or redirecting funding to keep the airport system at its best possible performance level.

Unfortunately, with the current downturn being experienced in the national and world economies, there are fewer major employers moving into Massachusetts today and fewer small business upstarts. However, the Commonwealth has been aggressively pursuing opportunities to promote and invest in economic development so as to keep Massachusetts at its highest potential as a diverse and progressive industry supported by a healthy transportation infrastructure. As such, this downturn should be viewed as a prime opportunity to take inventory of economic/demographic trends and evaluate how future projections and current activities will impact aviation.

Population Growth

Extensive population growth can potentially place a significant level of demand on an airport system. Growth in population has traditionally been a reliable indicator for increased demand for all elements of aviation services; consequently, population growth is always an important factor to review in the consideration of a future airport system's needs.

With respect to population, Massachusetts has the 15th largest population in the country, although it is only the 44th largest state by area. It has experienced relatively flat growth

throughout the last decade, with an average annual growth rate of 0.4 percent from 2000 to 2009. Massachusetts' two most populated counties are Worcester and Middlesex counties, which are the first and third largest counties in terms of area, respectively.

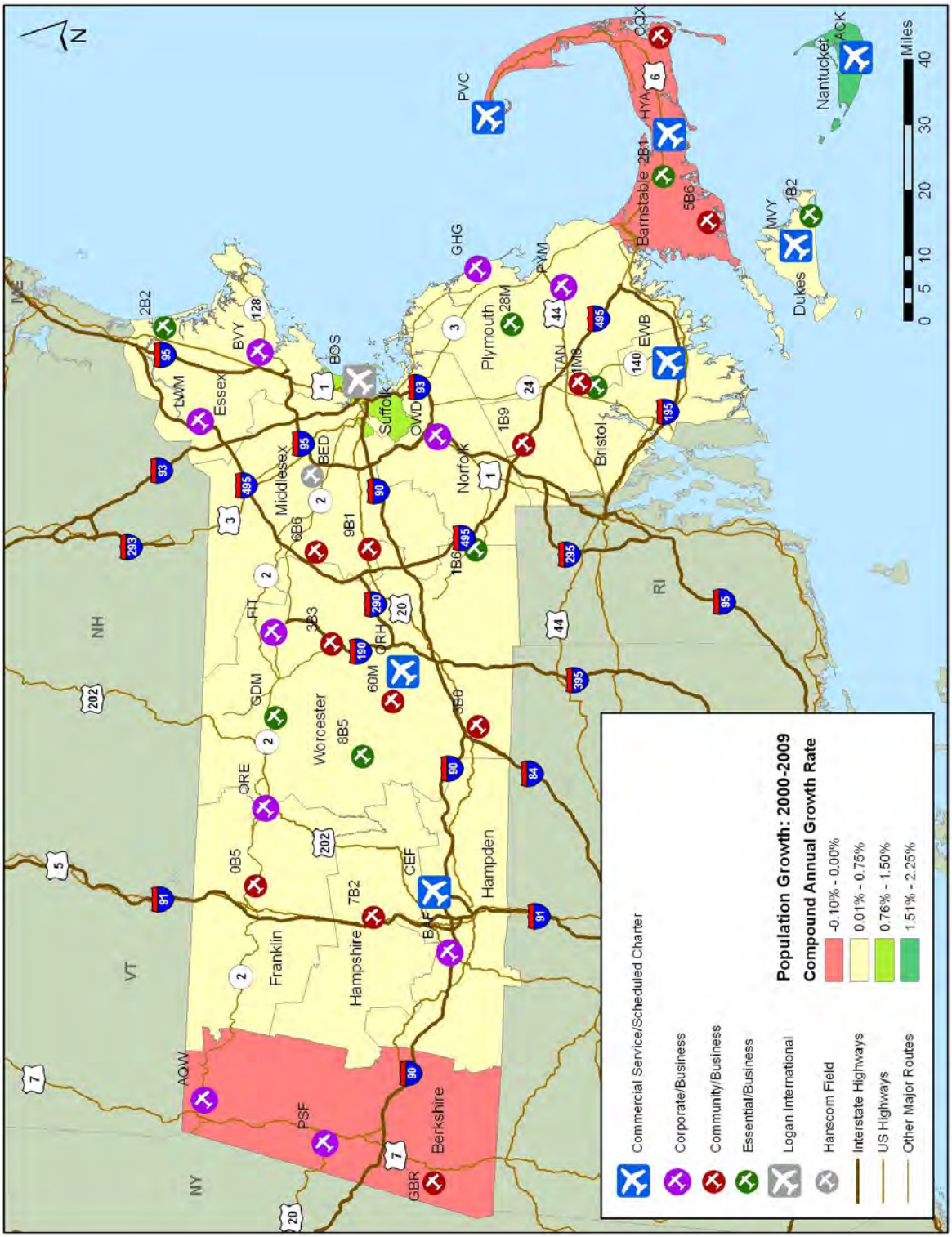
In terms of total population change between 2000 and 2009, Massachusetts experienced an overall growth of 3.62 percent (or approximately 230,500 people), ranking it 37th out of the 50 states. By comparison, the national average during this time period was 9.1 percent. Figure 5-1 lists population growth rates for all 14 Massachusetts counties between 2000 and 2009. The five fastest growing counties over the past ten years include Nantucket, Suffolk, Worcester, Dukes, and Plymouth. Berkshire and Barnstable were the only counties in the state to lose population during this period. Figure 5-2 graphically illustrates county population trends between 2000 and 2009.

Figure 5-1: Massachusetts County Population Trends, 2000-2009

County	2000	2009	Average Annual Growth Rate	Total Change: 2000-2009
Barnstable	223,245	221,151	-0.10%	-0.94%
Berkshire	134,787	129,288	-0.46%	-4.08%
Bristol	536,008	547,433	0.23%	2.13%
Dukes	15,072	15,974	0.65%	5.98%
Essex	725,379	742,582	0.26%	2.37%
Franklin	71,499	71,778	0.04%	0.39%
Hampden	456,573	471,081	0.35%	3.18%
Hampshire	152,381	156,044	0.26%	2.40%
Middlesex	1,468,934	1,505,006	0.27%	2.46%
Nantucket	9,574	11,322	1.88%	18.26%
Norfolk	651,227	666,303	0.25%	2.32%
Plymouth	474,414	498,344	0.55%	5.04%
Suffolk	691,238	753,580	0.96%	9.02%
Worcester	752,684	803,701	0.73%	6.78%
Massachusetts Total	**6,363,015**	**6,593,587**	**0.40%**	**3.62%**

Source: US Census Bureau Population Finder, Wilbur Smith Associates
Prepared: June 2010

Figure 5-2: Massachusetts County Population Trends, 2000-2009



Source: US Census Bureau Population Finder, Wilbur Smith Associates
Prepared: June 2010

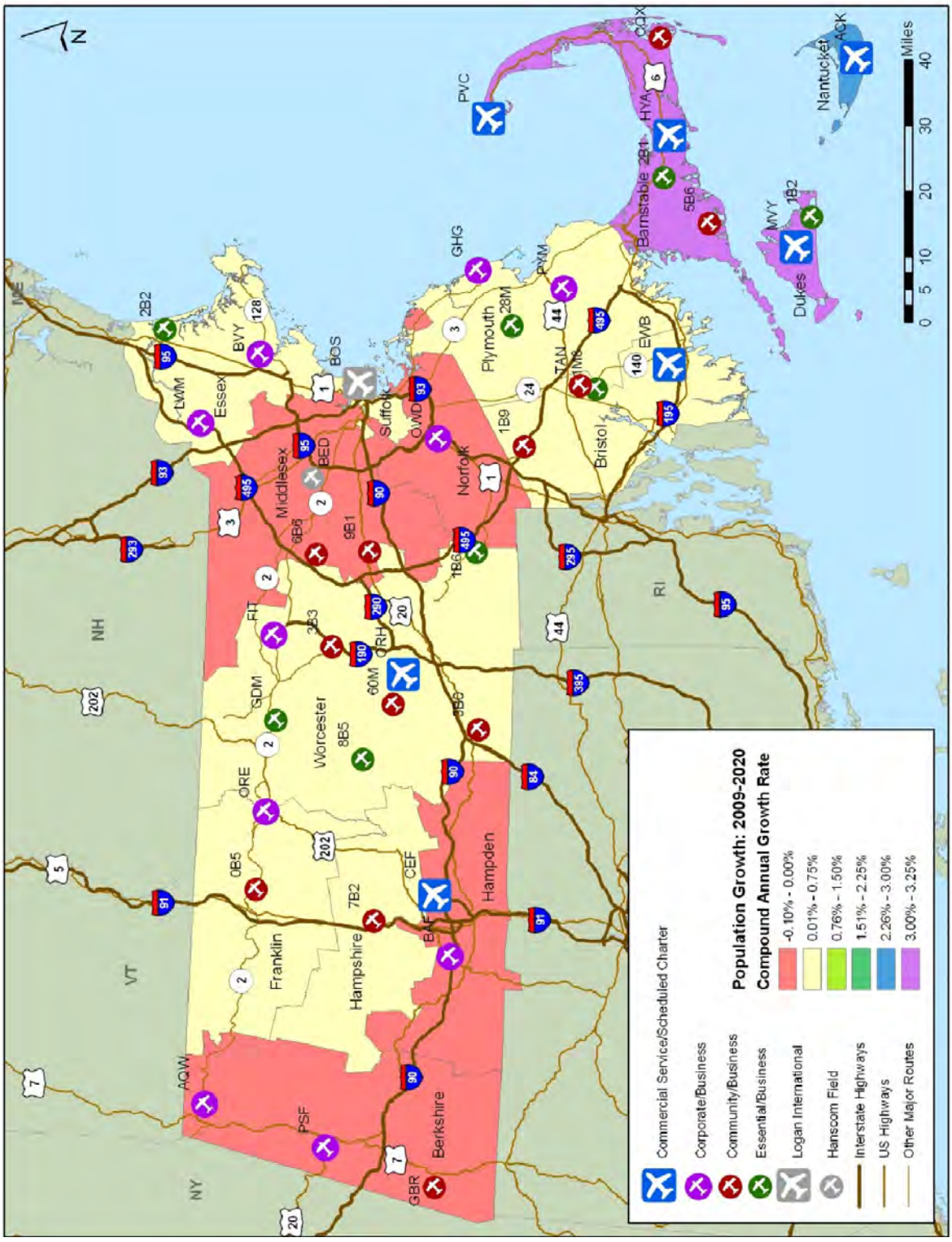
Despite the recent economic downturn, the population growth of Massachusetts is projected to continue to grow at a modest, albeit slower average annual rate of 0.26 percent through 2020. The Cape Cod, Martha's Vineyard, and Nantucket region is projected to experience the fastest growth, with Dukes, Barnstable, and Nantucket counties all anticipated to experience an average grow rate of at least 2.5 percent annually. Figure 5-3 lists population growth projections for all Massachusetts counties from 2009 to 2020. Note that four counties are projected to lose population over that period, including Berkshire, Hampden, Middlesex, and Norfolk counties. As graphically illustrated by Figure 5-4, the fastest growth on an average annual percentage basis is projected to occur in the Cape and Islands region of Massachusetts.

Figure 5-3: Massachusetts County Population Forecasts, 2009-2020

County	2009	2020	Average Annual Growth Rate	Total Forecasted Change: 2009-2020
Barnstable	221,151	299,035	3.06%	35.22%
Berkshire	129,288	118,452	-0.87%	-8.38%
Bristol	547,433	576,868	0.53%	5.38%
Dukes	15,974	21,822	3.17%	36.61%
Essex	742,582	787,032	0.58%	5.99%
Franklin	71,778	73,806	0.28%	2.83%
Hampden	471,081	453,115	-0.39%	-3.81%
Hampshire	156,044	163,233	0.45%	4.61%
Middlesex	1,505,006	1,469,494	-0.24%	-2.36%
Nantucket	11,322	14,426	2.45%	27.42%
Norfolk	666,303	652,440	-0.21%	-2.08%
Plymouth	498,344	517,644	0.38%	3.87%
Suffolk	753,580	776,811	0.30%	3.08%
Worcester	803,701	843,534	0.48%	4.96%
Massachusetts Total	**6,593,587**	**6,769,732**	**0.26%**	**2.67%**

Source: UMass Amherst, Wilbur Smith Associates
Prepared: June 2010

Figure 5-4: Massachusetts County Population Forecasts, 2009-2020



Source: UMass Amherst, Wilbur Smith Associates
Prepared: June 2010

Employment Growth

New or expanding employment centers also typically impact the overall levels of aviation demand. While employment growth and projections generally track population growth and projections, the recent economic downturn has resulted in a marked drop in employment without a corresponding drop in population. Nevertheless, Massachusetts has been working to attract new and more diversified industries for many years, so it is anticipated that the eventual economic recovery within the Commonwealth will benefit from these efforts.

Job growth and hiring expectations within the Commonwealth are very gradually improving as the economy begins to recover from the recent recession. In July 2010, the Massachusetts Department of Workforce Development published a report on Business Hiring Expectations based on a job vacancy survey of 10,000 employers. Tabulating responses on how the job market will change over the next six months, the report indicates that a net hiring increase of 14 percent is projected for the second half of 2010, up from seven percent in 2009. Transportation and Warehousing leads all industries with a net hiring projection of 25 percent (up from 6 percent in 2009), while Professional and Technical Services is second with a net hiring projection of 21 percent (up from 8 percent in 2009).

Prior to the economic recession of 2008/2009, employment trends in Massachusetts began to show signs of decline. A May 2010 Labor Market Information (LMI) Profile for Massachusetts revealed that between the third quarters of 2007 and 2008, employment in Massachusetts decreased by over 6,000 jobs or -0.2 percent. Between the third quarters of 2008 and 2009, four of the five largest industry sectors, which comprise one-half of all jobs in the Commonwealth, had job loss rates approximately equivalent to the overall statewide average decline of -0.2 percent. Healthcare and Social Assistance dropped nearly 1,400 jobs (-0.3 percent); Professional, Scientific, and Technical Services lost over 1,500 jobs (-0.6 percent); Retail Trade lost over 900 jobs (-.03 percent); and Manufacturing lost nearly 300 jobs (-0.1 percent). Additionally, major losses were experienced in the Accommodation and Food Services sector, which shed over 14,000 jobs (-5.2 percent). Significant job losses also occurred in Construction (8,200 jobs, -5.8 percent), Financial Activities (2,000 jobs, -0.9 percent), and Wholesale Trade (500 jobs, -0.4 percent). Sectors that experienced growth between 2008 and 2009 included Government and Educational Services, gaining 35,600 jobs (15.9 percent) and 3,700 jobs (3.0 percent), respectively.

The LMI Profile projects that Professional, Technical and Business Services and Health and Educational Services will be the two fastest growing industry sectors, adding 85,400 (18.1 percent) and 102,000 jobs (16.8) respectively, representing 86 percent of all new net jobs by 2016. Health Care alone will account for approximately 64,000 new jobs during this period. Eight industries are expected to increase by more than 10,000 jobs, including Private Hospitals, Management and Technical Consulting, Computer Systems Design, Food Services and Drinking Places, Individual and Family Services, Residential Care Facilities, Offices of Health Practitioners, as well as Colleges and Universities. However, it is important to note that most of these job openings are anticipated to be the result of replacement demand due to retirement, labor force withdrawal, and occupational changes.

The industry growth projections maintain that Professional, Technical and Business Services will experience the fastest growth. As an indicator of this, a review of the 13 companies

currently headquartered in Massachusetts that made the most recent Fortune 500 list announced in May 2010 (up from 12 companies that made the list in 2009), supports the importance of this particular industry sector to Massachusetts. Specifically, according to Fortune Magazine, the 13 Massachusetts companies on the Fortune 500 list include:

- Liberty Mutual Insurance Group (over $31 billion in annual revenue, #71)
- Massachusetts Mutual Life Insurance (over $25 billion in annual revenue, #93)
- Raytheon (nearly $25 billion in annual revenue, #95)
- Staples (over $24 billion in annual revenue, #101)
- TJX (over $20 billion in annual revenue, #119)
- EMC (over $14 billion in annual revenue, #166)
- BJ's Wholesale Club (over $10 billion in annual revenue, #232)
- Thermo Fisher Scientific (over $10 billion in annual revenue, #234)
- State Street Corp. (over $9.3 billion in annual revenue, #249)
- Boston Scientific (over $8.1 billion in annual revenue, #279)
- Global Partners (over $5.8 billion in annual revenue, #368)
- Genzyme (over $4.5 billion in annual revenue, #458)
- Biogen Idec (nearly $4.4 billion in annual revenue, #471)

With respect to aviation, this indicator is particularly important since those employed within this business sector have a higher propensity to utilize aviation (as established through industry research experience). As such, it can be reasonably assumed that as this sector continues to grow within Massachusetts, the demand for commercial aviation and general aviation within the Commonwealth will grow concurrently.

Economic Development Initiatives

The Commonwealth of Massachusetts has implemented several focused development initiatives to facilitate economic growth in various important sectors of the economy. Several initiatives have been identified as having the potential to impact aviation demand in Massachusetts, which are discussed below.

Growth District Initiative

The Growth District Initiative is a plan sponsored by the Executive Office of Housing and Economic Development (EOHED) as a focused means of expediting commercial and residential development within the Commonwealth. The initiative involves planning ahead to identify one or more areas within a community as appropriate locations for significant new growth, whether commercial, residential or mixed-use. Within those identified growth districts, EOHED will work with the community and property owners to make the district development ready by streamlining the state permitting, local permitting, site preparation, infrastructure improvements, and marketing processes. Growth Districts have been identified in the following cities:

- Worcester
- Haverhill
- Chicopee
- Devens
- Weymouth
- Pittsfield
- Revere
- Springfield Lowell
- Burlington
- Plymouth
- Lynn
- Lawrence
- Fall River
- Rivers Edge
- Holyoke

- Attleboro
- New Bedford
- Foxborough
- Somerville

The Growth Districts Initiative enables each of these cities to become highly attractive centers for new development, as experienced at Devens, located in the towns of Ayer and Shirley. Specifically, Devens is an unincorporated village under the direction of MassDevelopment, a quasi-public, economic development and real estate agency tasked with stimulating economic investment across Massachusetts. Its charge is to redevelop the former U.S. Army base by creating a sustainable and diverse residential and business community that offers unique opportunities for recreation to area residents, as well as stimulating economic activity and job creation in the area. MassDevelopment currently provides municipal services, education, environmental protection and the infrastructure improvements to convert the former military installation into a planned community. Efforts have recently resulted in Devens winning a competition to locate a Bristol-Myers Squibb pharmaceutical factory in the area.

With respect to aviation, Devens is an excellent example of how these types of development initiatives have a great potential to impact aviation in Massachusetts in that increased development and industrial activities typically results in increasing corporate aircraft usage and passenger transportation demand levels.

Massachusetts Life Sciences Initiative

The Massachusetts Life Sciences Initiative is a 10-year, $1 billion investment package to enhance and strengthen the Commonwealth's internationally recognized leadership in the life sciences fields. Initiated in 2008, the effort will bring together industry, research hospitals, and colleges/universities to spur new research, strengthen investments, produce new therapies, and create new jobs. Massachusetts already has a significant cluster of life science activity, with many biopharmaceutical and medical science companies, over 60 academic institutions offering advanced degrees in life sciences, and five of the top eight National Institutes of Health (NIH)-funded hospitals in the country.

From June 2008 to June 2010, the Massachusetts Life Sciences Center (MLSC) has invested $188 million, with $704 million in matching investments attracted. An additional $25 million in tax incentives per year will be offered, the first round of which was awarded to 26 companies in December 2009. These companies have committed to creating more than 800 new jobs during calendar year 2009. As listed on the MLSC website, some recent infrastructure investments include the following:

- Town of Framingham - $12.9 million grant to allow Genzyme to build new facility creating 300 permanent manufacturing jobs and 165 construction jobs.
- Marine Biological Laboratory - $10 million grant for renovation of Loeb Lab, creating 200 construction jobs and up to 50 permanent jobs. Additional $15 million grant from the Howard Hughes Medical Institute.
- Tufts University – Cummings School - $9.5 million grant to support construction and equipping of the New England Regional Biosafety Laboratory in Grafton, which is projected to create 56 construction jobs and 29 full time positions.

- University of Massachusetts – Albert Sherman Center - $90 million multi-year grant for new 500,000-square foot research facility, projected to create 1,600 permanent jobs and 6,000 construction jobs.
- Gateway Park - $6.6 million grant to support the construction of the WPI Bio-manufacturing Education and Training Center, projected to create 120 construction jobs and 140 permanent jobs.
- Mount Wachusett Community College - awarded three year $1.3 million grant from US Department of Labor for biotechnology/bio-manufacturing degree and worker-training programs.

Since the enactment of the Life Sciences Initiative, five life sciences companies have relocated to Massachusetts including Raindance Technologies, Biocell Center, Systagenix, CYTOO Cell Architects, and NeoStem Inc. It is important to recognize significant changes in an industry such as life sciences and the potential impacts to aviation demand as these projects come to fruition and are developed to their long-term ability.

Destination Resort Casinos

In 2008, Governor Deval Patrick proposed authorizing up to three destination resort casinos to spur economic growth as well as create jobs and tax revenue for the Commonwealth. According to Spectrum Gaming Group, an independent gaming industry consultancy, as Massachusetts residents spend approximately $1.1 billion annually on gaming in Connecticut and Rhode Island, Massachusetts casinos could potentially recapture approximately $500 to $700 million annually. Complementing this recapture, Massachusetts would see the importation of new gaming revenues from neighboring states. In addition, casinos can complement existing attractions, add perceived value to tourists and business travelers who are considering Massachusetts as a destination, and help attract incremental capital investment for the tourism industry.

The potential economic impact of three new casinos, as outlined in a comprehensive gaming analysis prepared by Spectrum, is estimated between $1.23 billion and $1.78 billion in annual revenue for the first stabilized year. Employment impacts are estimated at over 4,300 direct jobs, and 20,000 total jobs throughout the Massachusetts. Conventions and meetings at casinos would generate $7.2 million in annual spending at other area businesses, and would create annual demand for more than 26,000 room-nights at other lodging facilities. Depending on the location of each casino, this initiative has great potential to increase the use of airports within a relatively short distance of the casinos. It is generally assumed that there will be one casino in the western half of the Commonwealth, one located in Boston, and another in the southeastern region. However, without knowing exact locations of the three casinos, it is difficult to project specific impacts to airports. It is also important to note that legislation enabling this sort of gaming initiative within the Commonwealth is still actively being debated and has yet to be enacted.

Gateway Cities

Massachusetts Gateway Cities are a group of former industrial cities that have been identified by the Massachusetts Institute for a New Commonwealth to be included in a statewide

revitalization effort. As part of the initiative, tax incentives are available for any project in a "Gateway City" that creates more than 100 jobs. Identified cities include the following:

- Brockton
- Fall River
- Fitchburg
- Haverhill
- Holyoke
- Lawrence
- Lowell
- New Bedford
- Pittsfield
- Springfield
- Worcester

Recent investments in Gateway Cities include the following projects (as described on the respective city's website):

- Fall River BioPark - A 300-acre site zoned for bio-tech/life science industries abutting the Route 24 interchange project. Within the BioPark, $17 million was awarded to the city for a bio-processing center to be built for UMass-Dartmouth. Mashpee Wamponoag Tribe is also interested in building a casino on the site.
- Springfield - Seahorse Bioscience facility expansion (14,000 to 25,000 square feet).
- Holyoke - Cisco Smart+Connected community neighborhood pilot program intended to demonstrate the benefits of advanced electronic connectivity between city services and utilities (i.e. between security, education, health care, transportation, government, and real estate). A $100 million high performance computing center will also be built.
- New Bedford - Potential staging port/construction base for the Cape Wind project, expected to create 600 to 1,000 temporary and 150 permanent jobs.
- Pittsfield - William Stanley Business Park is under evaluation to be the site of a $10 million solar array (the largest of its kind in New England).
- Worcester - CitySquare commercial real estate project, which will be the largest development project in the Commonwealth outside Boston, creating more than 2.2 million square feet of mixed commercial/residential space. A large insurance company, Unum, has already committed to relocate offices (700 employees) to CitySquare. Additionally, the Massachusetts College of Pharmacy and Health Sciences opened a new academic center in downtown Worcester, doubling the size of the Pharmacy School in Worcester (750 Doctor of Pharmacy Students).

As a result of these projects, the airports located in or near these communities could reasonably be utilized to serve the subsequent increase in demand, whether through corporate jet activity or commercial passenger service.

Hollywood East

In 2005, Massachusetts legislation was signed to create a film production tax incentive. It was expanded upon in 2007 to include a 25 percent tax credit for payroll and production costs of at least $50,000 (no limit) for motion pictures filmed within Massachusetts. Since 2006 at least 38 major motion pictures have been filmed in Massachusetts, including "The Departed," "The Proposal," "Bride Wars," "Shutter Island," "Paul Blart: Mall Cop," "The Invention of Lying," "Surrogates," and "The Women" to name a few. Production spending increased from

$71 million in 2006 to $400 million in 2009, with an estimated $1 billion in economic activity generated in Massachusetts by the film industry in 2008. Employment within the industry has risen 33 percent from 4,530 jobs in 2005 to 6,048 jobs in 2009.

As a result of the film production tax credit and the subsequent influx of movie projects to Massachusetts, two separate production studios have been planned to function as permanent infrastructure supporting film production. Plymouth Rock Studios in Plymouth is a proposed $500 million project expected to create 2,000 jobs. SouthField Studio is a similar project proposed for the site of the former South Weymouth Naval Air Station. It is part of a larger planned community with housing, offices, shopping, and a golf course in addition to the film studio. Part of the project proposes an east-west connector parkway, connecting SouthField to Route 3 and Route 18. However, it should also be noted that both of these proposed initiatives are currently on hold due to recent economic conditions and the resulting restricted credit markets.

There is little doubt that the recent growth in Massachusetts' film production activity, dubbed "Hollywood East," generates a significant amount of economic activity throughout the Commonwealth. What is also important to consider is the potential impact the film industry has on aviation. Film related activities such as high-profile personnel transport, aerial filming, and equipment/set transport can all have a significant impact on aviation services and requirements.

Higher Education Influence

Massachusetts has long been known as a primary center for higher education, being home to Harvard University, the Massachusetts Institute of Technology (MIT), the University of Massachusetts, Boston College, and 76 other degree-granting public and private colleges and universities in the Commonwealth. Of these schools, seven currently have an aerospace/aeronautics department or degree program, including the following:

- Boston University - Mechanical Engineering with Aerospace concentration (nearest airport: Boston Logan International)
- Bridgewater State University - Aviation Sciences (nearest airport: Taunton Municipal; partnership with New Bedford Regional)
- Harvard University - Aerospace Engineering (nearest airport: Boston Logan International)
- MIT - Department of Aeronautics and Astronautics (nearest airport: Boston Logan International)
- Northeastern University - Department of Mechanical and Industrial Engineering (nearest airport: Boston Logan International)
- Worcester Polytechnic Institute - Aerospace Engineering (nearest airport: Worcester Regional)
- UMass Lowell - Mechanical Engineering with Aerospace concentration (nearest airport: Lawrence Municipal)

These programs create opportunities for the establishment of new pilots, engineers, and technicians entering the field of aerospace, subsequently creating more aviation demand, particularly through that of flight training. The aviation landscape in Massachusetts is further

influenced by these programs through the research opportunities that generate inventions, technologies, and solutions to the aerospace community. It is also important to note that the recent discontinuation of a major regional aviation program at Daniel Webster College (located across the state border in Nashua, New Hampshire) will surely have a positive impact on similar Massachusetts-based education programs. In particular, Bridgewater State University's Aviation Science program, whose curriculum provides the flight training necessary to operate in the high-density environment of modern airspace, has already anticipated increased demand by making investments in its program. Specifically, Bridgewater has formed a partnership with New Bedford Regional Airport to establish a flight academy to provide flight training for students enrolled in its aviation program.

It is also important to recognize the direct link between higher education and corporate aviation. Similar to the previously noted connection between Fortune 500 corporate headquarters and corporate aviation, higher education (and in particular, private colleges and universities) has proven to be a driver of general aviation activity. Massachusetts is home to 36 public/community colleges and universities in addition to approximately 56 private colleges and universities. Whether it is driven directly by school administrative requirements, university research and development programs, or simply transportation for students and their families, corporate aviation activities are directly generated at airports in close proximity to a college or university.

High-Technology and Aerospace Industry

High-technology growth is addressed separate from employment growth within this section since certain high-tech industries have a more significant impact and/or relationship with aviation. Mass Aerospace Council is an organization dedicated to promoting and fostering the growth of aerospace companies in Massachusetts. According to an article published by the Council, there are over 1,200 aerospace companies in the Commonwealth, including Raytheon, General Electric Aircraft Engines, BAE Systems, General Dynamics, Draper Labs, Boeing, Lockheed Martin, Aurora Flight Sciences, Spincraft, Avidyne, Terrafugia, FloDesign, Ametek, and Honeywell.

A recent example of an aerospace startup company in Massachusetts that has received significant media attention is Terrafugia. Based in Woburn and founded by MIT graduates, Terrafuga is working to develop, manufacture and bring to marker the Transition, a unique aircraft that combines the convenience of being able to fold its wings with the ability to drive on any surface road in a modern personal airplane platform. It is anticipated that this unique functionality will effectively addresses many of the issues currently faced by private and sport pilots. To date, Terrafugia has successfully produced a "proof of concept" prototype.

Additionally, the overall aerospace industry generates aviation demand in Massachusetts through a number of ways, including commercial passenger service, corporate jet activity, and testing/experimenting of new technologies. In the case of Terrafugia, their development in creating a new type of aircraft class has the potential to change the way airports are used and accessed. If the "Transitioning Roadable Aircraft" premise is proven to be viable, airports may experience a new level of demand requiring infrastructure adjustment investments and/or airport role changes.

Tourism in Massachusetts

According to the World Tourism Council, tourism is now the world's largest industry, responsible for estimated employment of nearly 220 million people worldwide and over 9% of worldwide capital investment. Tourism is also likely the most recognizable aviation demand factor, in large part due to the inherent co-dependency of aviation and tourism, the most apparent link to the general public. Specifically, tourism depends on aviation to transport visitors, while air transportation depends on tourism to generate demand for its services. Any growth in the tourism industry naturally impacts air transportation; therefore, it is critical to closely monitor the changes occurring to tourist attractions.

For Massachusetts, tourism has become one of the largest contributors to the Commonwealth's economy according to the Massachusetts Office of Travel and Tourism. Extending from the heavily forested Berkshire Mountains in the west to the beaches and bluffs of Cape Cod and the Islands to the east, Massachusetts encompasses a wide variety of tourism destinations, ranging from hiking, skiing, white water rafting in the Berkshires to strolling the downtown streets and ethnic enclaves of Boston to whale-watching in Gloucester or Provincetown. As the epicenter of several major chapters of Colonial and Revolutionary War history, Massachusetts is also home to Plymouth Rock; the sites of the 1692 Salem witch trials; Walden Woods, where Henry David Thoreau developed his ideas about living close to nature; and the paths where the first shots of the Revolutionary War were fired in Lexington and Concord. Additionally, the Bay State offers a wealth of art, music, and other cultural activities, making it one of the most vibrant and diverse tourism destinations in the country.

In fact, the Massachusetts Office of Travel and Tourism reported that tourism is currently one of the largest contributors to the Commonwealth's economy and continues to trend toward an increasing importance to the economy. Boston, Cape Cod and the Islands are the leading tourist destinations, while other popular destinations include Salem, Plymouth, and the Berkshires. It is estimated that travel spending by tourists in Massachusetts directly generated nearly $2.4 billion in tax revenue for federal, state, and local governments in 2008, up 1.7 percent from 2007. Note that increases or decreases in tourism activities often directly mirror aviation demand within Massachusetts.

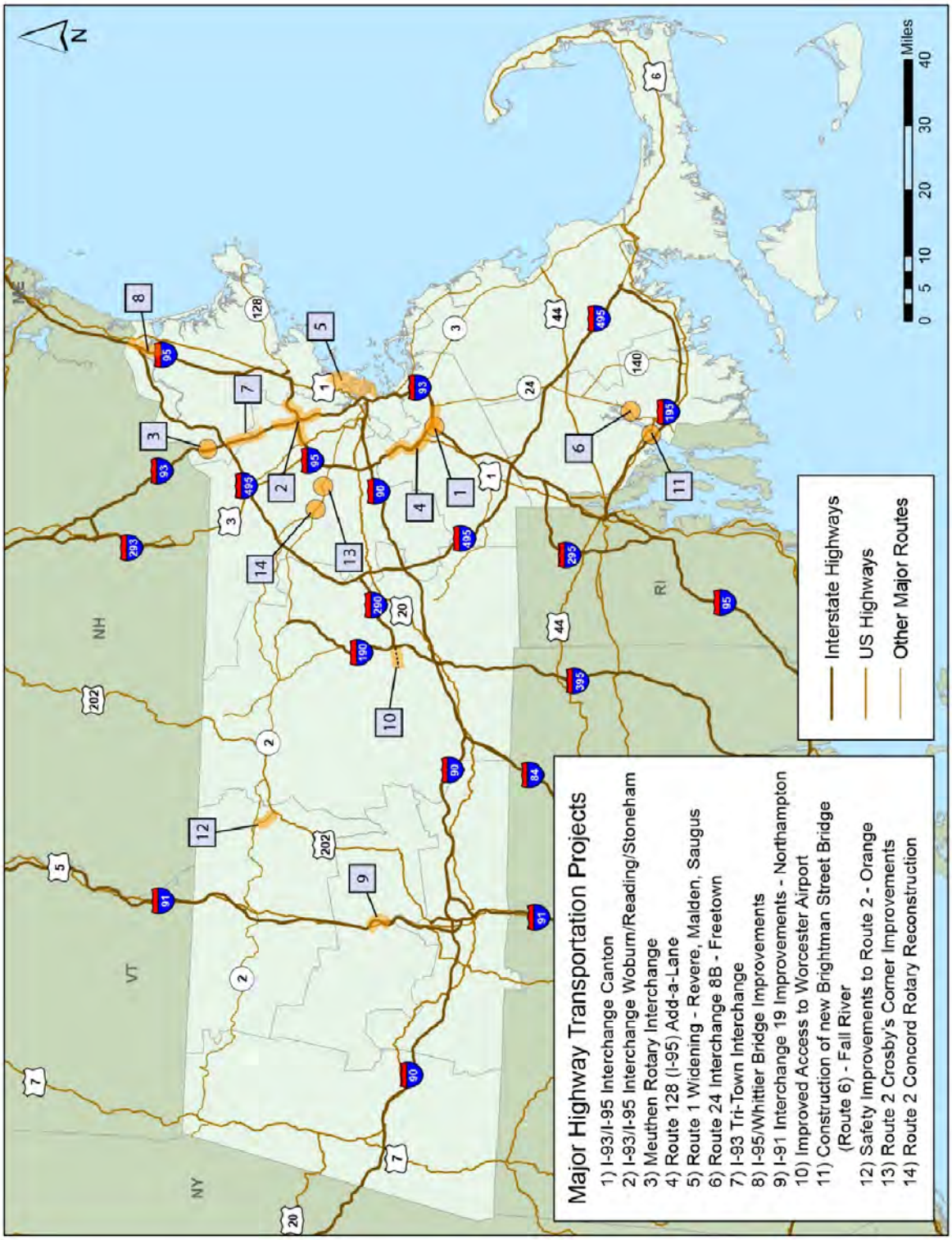
While Massachusetts had approximately 17.4 million domestic visitors in 2008, a decrease from the 19.3 million identified in 2007, international visitors increased from 1.8 to 1.9 million over the same period. Total domestic and international traveler spending in Massachusetts, both direct and indirect, reached $24.7 billion in 2008, up 2.4 percent from 2007. Total payroll income generated by travel spending was nearly $7 billion in 2008, up 1.7 percent from 2007. Domestic and international traveler expenditures generated a total of over 200,000 thousand jobs in the Commonwealth during 2008, a 0.6 percent increase from 2007. Helped by a weakened US dollar, international travelers to Massachusetts increased greatly in 2008. These travelers spent over $2 billion in the state, a growth of 13.3 percent from 2007.

Major Surface Transportation Improvements

Major surface transportation improvements can have an impact on aviation as these improvements can change how residents and visitors travel within the state, and in particular, to and from airports. These improvements can also influence future population and employment growth as new opportunities emerge to reach locations that previously were less accessible. Through information provided by the MassDOT Highway Division, there are numerous active roadway improvement projects occurring around the Commonwealth, with multiple improvements planned for the future. Due to the proximity to the largest concentration of population within Massachusetts, the majority of improvements are in or around greater Boston. **Figure 5-5** shows the location of major highway improvement projects identified to have a potential impact on aviation. These major highway improvement projects are listed in the following:

- **I-93 / I-95 Canton Interchange Reconfiguration**: Intended to reduce truck rollovers and eliminate weaving maneuvers that intensify congestion.
- **Methuen Rotary Interchange Reconfiguration**: Intended to relieve congestion and improve safety.
- **Route 128 Add-A-Lane**: Widening of the highway between Route 9 in Wellesley and Route 24 in Randolph to incorporate a fourth travel lane within the median area and a 10-foot shoulder in each direction. It is intended to relieve traffic congestion along the corridor and reduce diversion of traffic to parallel routes.
- **Route 1 Transportation Improvement Project**: 2.4 mile project through Revere, Malden and Saugus intended to relieve congestion, improve access, and improve safety.
- **Route 24 Interchange 8B in Freetown**: Create a new interchange in Freetown between existing exits 8 and 9 intended to reduce congestion and provide access to the new Fall River Executive Park.
- **I-93 Tri-Town Interchange Project**: Intended to relieve congestion on I-93 by constructing a new interchange between interchanges 41 and 42 while adding one travel lane in each direction.
- **Whittier Bridge / I-95 Improvement Project**: Intended to bring bridge up to current safety standards while accommodating I-95 traffic flow by adding a high speed shoulder and breakdown lane in each direction.
- **I-91 Interchange 19 Improvements – Northhampton**: Construct a new on/off-ramp to/from Damon Road and design new signalized intersection at Damon Road. I-91's north and southbound bridges will also be widened over Route 9 and the Rail Trail.
- **Improved Access to Worcester Airport**: New access roadway intended to reduce travel time from Worcester to the airport is included as part of the Worcester Regional Mobility Study, which is still in the conceptual stages.
- **Construction of the New Brightman Street Bridge (Route 6) – Fall River**: Construction of a new bascule four-lane bridge to carry US Route 6 across the Taunton River, replacing the smaller, existing two-lane bridge.
- **Safety Improvements to Route 2 – Town of Orange**: Five miles of improvements along Route 2, including shoulder widening, extending existing climbing lanes, and improving acceleration/deceleration lanes. The project also includes widening of the bridge over Route 122.

Figure 5-5: Major Highway Improvement Projects



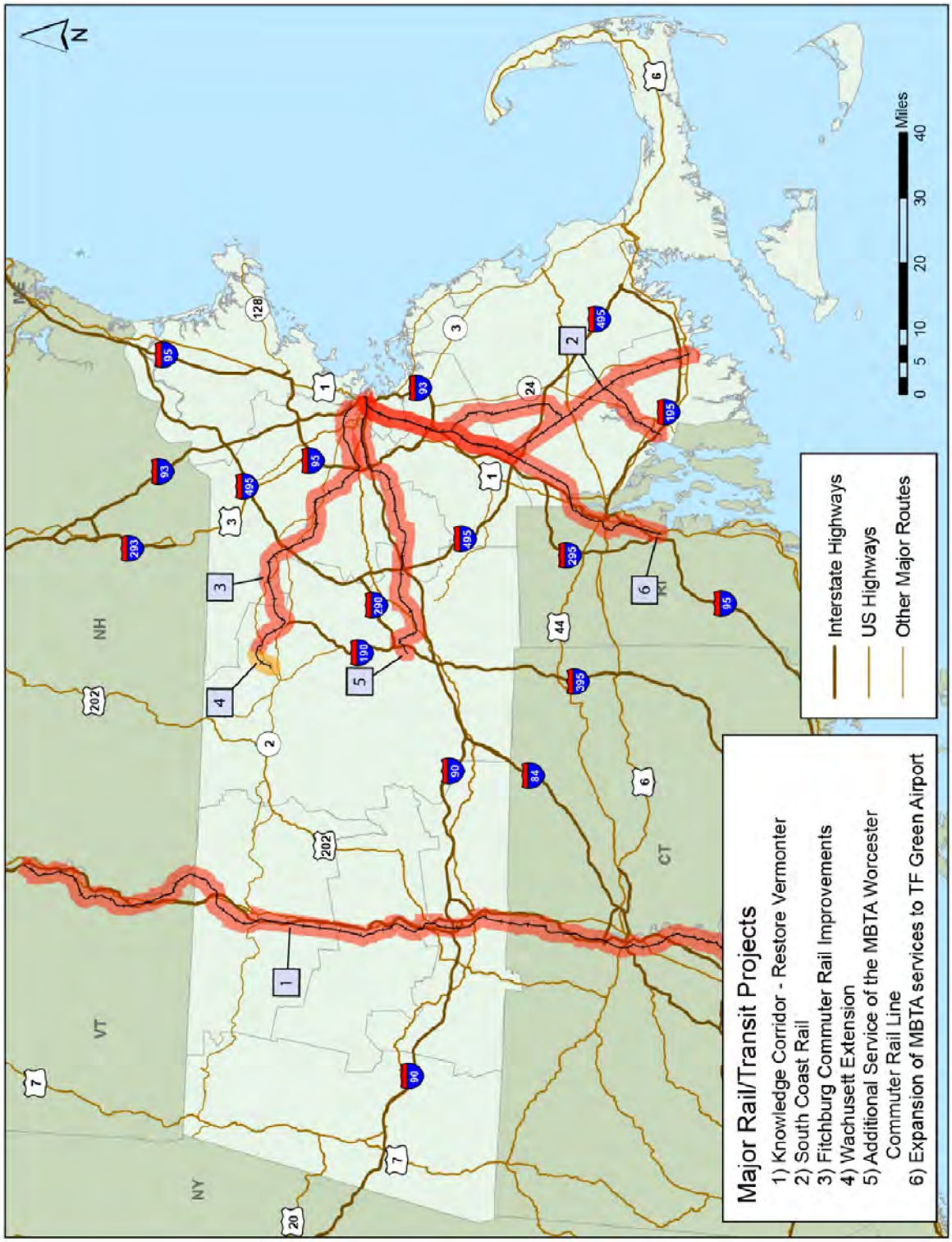
Sources: MassDOT Highway Department, Wilbur Smith Associates
Prepared: June 2010

- Route 2 Crosby's Corner Improvements – Concord, Lincoln: Safety improvements at the intersection of Route 2, Cambridge Turnpike and Route 2A/the Concord Turnpike. The project will also construct neighborhood service roads to parallel Route 2 and a bridge to carry Route 2 over these roads.
- Route 2 Concord Rotary Reconstruction: Replace the existing traffic rotary and create a typical overpass to enable it operate more efficient and safely.

In addition to road/highway projects, major changes in mass transit systems can also impact the demand for aviation. As listed by the Massachusetts Department of Transportation Transit Division, the locations of all major rail/transit projects identified in Massachusetts are shown in Figure 5-6. These major improvement projects are listing in the following:

- Knowledge Corridor – Restore Vermonter Project: The project will restore Amtrak's intercity passenger train service to its original route by relocating the Vermonter from the New England Central Railroad back to its former route on the Pan Am Southern Railroad. The Pan Am Southern route provides a shorter and more direct route for the Vermonter between Springfield and East Northfield, and improves access to densely populated areas along the Connecticut River. This route also includes station stops at the former Amtrak station at Northampton and the new intermodal station at Greenfield.
- South Coast Rail: The project will implement passenger rail transportation from South Station in Boston to both Fall River and New Bedford along an existing north-south freight rail corridor. It is intended to improve accessibility and promote economic development along the corridor.
- Fitchburg Commuter Rail Improvements: The project will modernize an existing commuter rail line to provide greatly improved service and reliability to riders and commuters in a 50-mile long corridor extending from Fitchburg to Boston.
- Fitchburg Commuter Rail Extension – Wachusett Station: The project will construct a commuter rail station, layover facility, and track improvements in the Montachusett region located west of Fitchburg in Wachusett.
- Additional Service on the MBTA Worcester Commuter Rail Line: CSX, MassDOT and the MBTA have reached an agreement to add 20 new weekday commuter rail trips to Worcester intended to accommodate heavy demand.
- Expansion of MBTA service to T.F. Green Airport: The project will be a 20-mile extension of commuter rail service from Boston to Warwick (T.F. Green Airport), south of Providence, operated by the Massachusetts Bay Transportation Authority.

Figure 5-6: Major Rail/Transit Projects



Sources: MassDOT Highway Department, Wilbur Smith Associates
Prepared: June 2010

Legislative Initiatives

Massachusetts has one of the nation's longest and most active relationships with the aviation industry. From the first tethered flight of a person in America in 1757, to the formation of the country's first aeronautical club (Aero Club of New England) in 1902, to continued development of today's robust aviation industry in the state, Massachusetts has always sought to not only preserve, but enhance the unique status aviation has in the Commonwealth. This is evidenced by the active role the Massachusetts Legislature has historically played in fostering an environment where aviation can thrive in a safe and efficient manner. The Commonwealth was one of the first to establish airspace protection legislation for airports; among the first to establish airport vegetation management plans; as well as one of the first to proactively respond with enhanced security requirements following the terrorist attacks on 9/11. While legislative initiatives can encompass a wide variety of issues, two of the most important remain security and funding.

In response to 9/11, the aviation industry pursued emergency expansions of security initiatives and protocol within both the commercial and general aviation industry sectors. In the immediate wake of the terrorist attacks, government regulators and airport professionals alike assessed the vulnerability of airport security across the country. Sensitive to the fact that aircraft were used as weapons, the Massachusetts Aeronautics Commission (now MassDOT Aeronautics) issued Agency Directive AD-001a in November 2001, *Airport Security,* which established minimum airport security standards for all public-use airports in the Commonwealth. Given the urgency of the situation, many of the requirements of this directive were imposing and difficult to meet, particularly for smaller general aviation airports. While this document is still in effect, it is currently in the process of being updated. It should also be noted that MassDOT Aeronautics has been proactive in assisting airports with other security measures, including a statewide identification/badging program.

In terms of capital funding, Massachusetts relies heavily on matching grants from the federal government through the FAA's Airport Improvement Program (AIP), as do all states. Additionally, recognizing that not all airport sponsors are eligible for federal funding, MassDOT Aeronautics initiated a grants-in-aid program known as the Airport Safety and Maintenance Program (ASMP), which can provide state grants for projects and to airports not covered under federal programs. With funding authority provided under Mass General Law (MGL Chapter 90), the ASMP serves to leverage funds for safety, maintenance, and security projects typically funded with a state share of 80 percent and a local airport share of 20 percent with no federal participation. Note that state grants for projects under the ASMP are only given to public use airports included in the Massachusetts Statewide Airport System Plan (MSASP). Further, to be eligible for a grant, the project must be included in the MassDOT Aeronautics statewide Capital Improvement Plan (CIP). These projects are often programmed for routine maintenance which addresses deficiencies noted in state airport inspections (such as pavement condition, security issues and vegetation overgrowth). Airport planning and new construction and equipment grants are also eligible under the ASMP.

The ASMP is particularly important since each airport in the Commonwealth's airport system contributes measurable economic impacts in the form of revenue, earnings and employment, but due to higher competing priorities such as runway safety and airfield infrastructure, there is often limited discretionary funding available through the federal AIP for projects ranking lower

in the national priority scale that provide an economic benefit to the statewide airport system. Airport hangars and terminals primarily fall into such a category with large non-federal project shares. It deserves noting that none of these projects could be accomplished without significant state assistance because of the limited federal monies available under the AIP for projects with large discretionary spending. In these instances, the Commonwealth uses anticipated ASMP monies (as prescribed in state bond language) to supplement the larger non-standard federal share of these worthy economic development projects.

Finally, it must also be recognized that the recent economic downturn realized through the recession of 2008/2009 has placed significant financial pressures on all elements of the aviation industry, including those funding elements that originate in Washington D.C. and the Massachusetts State House. In short, funding availability for capital projects is currently limited and that funding which is available (particularly on the state level) has multiple interests competing for it. As such, capital projects for airports must be able to show need, value, viability and return-on-investment to secure appropriate funding. This is a principal challenge for MassDOT Aeronautics and a primary reason for conducting this MSASP – maintaining the historical vibrancy and strength of the Massachusetts aviation industry and airport system in the face of economic uncertainties.

Conclusions

While key aviation demand factors such as population, employment, and tourism trends may intermittently stagnate due to prevailing economic conditions, the current recession offers an opportunity for MassDOT Aeronautics to closely examine, and benchmark the airport system before the economy improves significantly. MassDOT Aeronautics and the Commonwealth's airport system are currently facing and will continue to be subjected to numerous outside influences that have the potential to impact future aviation needs and demand levels. By recognizing and diligently monitoring these potential outside influences and any associated resulting changes, the Commonwealth will be able to respond effectively to those potential impacts associated with the airport system. Specifically, the implications of these impacts could mean that there are airport needs that exceed those outlined within the MSASP – this may be particularly true with respect to the future needs of the greater Boston area airports, as well as for those that may be directly impacted by individual economic development initiatives in the future.

NPIAS ANALYSIS

The National Plan of Integrated Airport Systems (NPIAS) is the FAA's national airport system plan, which includes approximately 3,500 existing and proposed public-use airports in the United States that have significance for the national air transportation system. Inclusion in the NPIAS is critical for public-use airports for a variety of reasons including that it is a prerequisite for being eligible to receive airport development and maintenance funding from the FAA through the Airport Improvement Program (AIP). Specifically, AIP provides funding grants to public agencies, and in some limited cases to private owners and entities, for the planning and development of public-use airports included in the NPIAS. Typically, AIP funding, which can provide up to 95 percent of the cost of an eligible project, is a vital component of any public-use airport's development funding program.

Within the Commonwealth of Massachusetts, 26 of the 37 airports included in the MSASP are identified within the NPIAS. However, it is important to note that three of those airports included are not eligible to receive AIP funding since they are privately owned facilities. **Figure 5-7** lists airports in the MSASP system, their current NPIAS status, and their current AIP-eligibility. The NPIAS airports that are not AIP-eligible are Walter J. Koladza, Northampton, and Minute Man Airfield. Also note that future targets for performance measures discussed in the following sections are often contingent upon an airport's AIP eligibility.

Figure 5-7: NPIAS and AIP-Eligible Status of Massachusetts System Airports

3- Letter Identifier	*Associated City*	*Airport Name*	*Airport Ownership*	*NPIAS*	*AIP-Eligible*
Commercial Service/Scheduled Charter					
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Public	Yes	Yes
ACK	Nantucket	Nantucket Memorial Airport	Public	Yes	Yes
EWB	New Bedford	New Bedford Regional Airport	Public	Yes	Yes
PVC	Provincetown	Provincetown Municipal Airport	Public	Yes	Yes
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	Public	Yes	Yes
MVY	Vineyard Haven	Martha's Vineyard	Public	Yes	Yes
ORH	Worcester	Worcester Regional Airport	Public	Yes	Yes
Corporate/Business					
BVY	Beverly	Beverly Municipal Airport	Public	Yes	Yes
FIT	Fitchburg	Fitchburg Municipal Airport	Public	Yes	Yes
LWM	Lawrence	Lawrence Municipal Airport	Public	Yes	Yes
GHG	Marshfield	Marshfield Municipal Airport- George Harlow Field	Public	Yes	Yes
AQW	North Adams	Harriman and West	Public	Yes	Yes
OWD	Norwood	Norwood Memorial Airport	Public	Yes	Yes
ORE	Orange	Orange Municipal	Public	Yes	Yes
PSF	Pittsfield	Pittsfield Municipal Airport	Public	Yes	Yes
PYM	Plymouth	Plymouth Municipal Airport	Public	Yes	Yes
BAF	Westfield /Springfield	Barnes Municipal Airport	Public	Yes	Yes
Community/Business					
CQX	Chatham	Chatham Municipal	Public	Yes	Yes
5B6	Falmouth	Falmouth Airpark	Private	No	No
GBR	Great Barrington	Walter J. Koladza Airport	Private	Yes	No
1B9	Mansfield	Mansfield Municipal Airport	Public	Yes	Yes
9B1	Marlborough	Marlboro Airport	Private	No	No
0B5	Montague	Turners Falls	Public	Yes	Yes
7B2	Northampton	Northampton	Private	Yes	No
3B0	Southbridge	Southbridge Municipal Airport	Public	Yes	Yes
60M	Spencer	Spencer Airport	Private	No	No
3B3	Sterling	Sterling Airport	Private	No	No
6B6	Stow	Minute Man Airfield	Private	Yes	No
TAN	Taunton	Taunton Municipal Airport	Public	Yes	Yes
Essential/Business					
8B5	Barre/Barre Plains	Tanner-Hiller	Private	No	No
1M8	Berkley	Myricks Airport	Private	No	No
1B2	Edgartown	Katama Airpark	Public	No	No
GDM	Gardner	Gardner Municipal	Public	Yes	Yes
28M	Hanson	Cranland Airport	Private	No	No
1B6	Hopedale	Hopedale Industrial Park	Private	No	No
2B1	Marstons Mills	Cape Cod Airport	Public	No	No

2B2	Newburyport	Plum Island Airport	Private	No	No

Source: Federal Aviation Administration
Prepared: July 2010

As stated above, 11 airports included in the MSASP are not currently listed within the NPIAS. Those airports not included are listed below in Figure 5-8.

Figure 5-8: Non-NPIAS Airports in the Massachusetts System

3- Letter Identifier	*Associated City*	*Airport Name*	*Ownership*
Community/Business			
5B6	Falmouth	Falmouth Airpark	Private
9B1	Marlborough	Marlboro Airport	Private
60M	Spencer	Spencer Airport	Private
3B3	Sterling	Sterling Airport	Private
Essential/Business			
8B5	Barre/Barre Plains	Tanner-Hiller	Private
1M8	Berkley	Myricks Airport	Private
1B2	Edgartown	Katama Airpark	Public
28M	Hanson	Cranland Airport	Private
1B6	Hopedale	Hopedale Industrial Park	Private
2B1	Marstons Mills	Cape Cod Airport	Public
2B2	Newburyport	Plum Island Airport	Private

Source: Federal Aviation Administration
Prepared: July 2010

A detailed analysis was conducted to determine the eligibility of each of these 11 airports to be included in the NPIAS in the future. The FAA considers the following criteria when reviewing the eligibility of an airport for possible inclusion in the NPIAS:

- Airports formerly in the NPIAS
- Airport's location in relation to the nearest NPIAS airport
- Reliever airports
- Airports receiving U.S. mail service
- Airports with a national defense role

Additionally, an existing or proposed airport not meeting the criteria above may be included in the NPIAS if it meets all of the following:

- It is included in a state aviation system plan
- It serves a community more than 30 minutes from the nearest NPIAS airport
- It is forecasted to have 10 or more based aircraft within the short-term planning period (5 years)
- There is an eligible public sponsor willing to undertake the ownership and development of the airport

Airports that do not meet any of the previously discussed entry criteria may be still considered for inclusion in the NPIAS on the basis of a special justification. This justification must show that there is a significant national interest in the airport. Such special justifications include:

- A determination that the benefits of the airport will exceed its development costs
- Written documentation describing isolation
- Airports serving the needs of Native American communities
- Airports needed to support recreation areas
- Airports needed to develop or protect important national resources

After analysis, it was determined that seven of the 11 non-NPIAS airports included in the MSASP have the potential to meet criteria set out by the FAA when determining NPIAS eligibility. The key factor for any of these airports that would have to be resolved in order for them to be included in the NPIAS would be their ownership/sponsorship in that all are privately owned. It is also very important to note that this analysis neither recommends nor advocates that these privately owned airports transition to a public ownership for the purposes of being listed in the NPIAS. This analysis only identifies the potential for that, as well as the possible limitations. (A full analysis of each of these airports is located in Appendix C.) Figure 5-9 lists these airports.

Figure 5-9: Non-NPIAS Airports Meeting Criteria for Inclusion in the NPIAS

3- Letter Identifier	*Associated City*	*Airport Name*	*Meets NPIAS Criteria*
Community/Business			
5B6	Falmouth	Falmouth Airpark	Yes*
9B1	Marlborough	Marlboro Airport	Yes*
60M	Spencer	Spencer Airport	Yes*
3B3	Sterling	Sterling Airport	Yes*
Essential/Business			
28M	Hanson	Cranland Airport	Yes*
1B6	Hopedale	Hopedale Industrial Park	Yes*
2B2	Newburyport	Plum Island Airport	Yes*

Source: Federal Aviation Administration
Prepared: July 2010
* Since airport is privately owned, airport would have to transition to a public ownership option in order for it to be included in the NPIAS. However, no such agreements or understandings have been established for this airport.

GOAL CATEGORIES ANALYSIS

As stated in the chapter introduction, an evaluation of the existing Massachusetts airport system's performance with respect to the six general system goal categories identified for the MSASP is presented in the following sections. Introduced and discussed in Chapter One, the six goal categories established to analyze the system include the following:

- Standards
- Environmental Compliance and Stewardship
- Economic
- Preservation
- Public Outreach
- Transportation Integration and Accessibility

Goal Category: Standards

One of the most important characteristics of a good airport system is that system's ability to meet applicable airport design and safety standards. For the most part, design and safety standards are primarily established by the FAA through a wide variety of advisory circulars, orders, and other directives. While these standards are actually directly applicable to only those airports included in the NPIAS, the FAA's safety and design standards are generally accepted as the industry norm since they are primarily based on extensive industry research and analysis that is reasonably applicable to all airports.

With respect to system planning, it can be generally stated that the degree to which airports within any system comply with these safety and design standards helps to promote a system of safe and efficient airports. While an individual airport's ability to meet specific standards is primarily a master planning issue, it is important for the MSASP to provide at least a general overview of the airport system's ability to conform to identified standards. The following performance measures are used to evaluate the Massachusetts airport system in the Standards goal category:

- Percent of system airports reporting meeting applicable FAA standards for Runway Safety Area (RSA) on their runways
- Percent of system airports with a runway pavement classification of "good"
- Percent of system airports with access controls to the airport operating areas
- Percent of system airports with a survey of aeronautical obstructions
- Percent of system airports with an airport perimeter road
- Percent of system airports with controlling interest over Runway Protection Zones (RPZs) for each runway end
- Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways
- Percent of system airports with a security plan
- Percent of system airports that have an airport emergency plan
- Percent of system airports with airport minimum standards, and airport rules and regulations

The results of system evaluation as it pertains to the Standards goal category are discussed in the following sections.

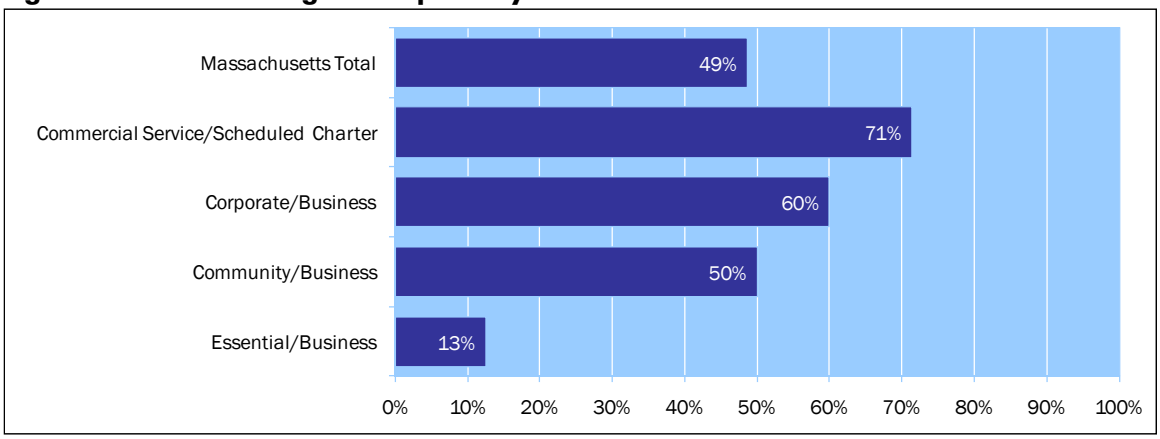
Percent of system airports reporting meeting applicable FAA standards for Runway Safety Area (RSA) on their runways

The fundamental purpose of an RSA is to promote and increase airport safety. Specifically, an RSA is a designated area off each runway end that, in accordance with FAA standards, should be free and clear of any obstructions, graded appropriately, and capable of sustaining the weight of an aircraft should an "undershoot" or an "overshoot" of the runway be experienced. The dimensions of the RSA vary based on applicable FAA design standards that consider the characteristics of the most demanding aircraft that consistently operate at the airport and are determined by each airport's Airport Reference Code (ARC). As with all FAA planning standards and guidelines, only those airports that are listed in the NPIAS and are eligible for federal funding are required to meet FAA standards, however, as previously noted, the

guidance provided by FAA is considered to be the industry standard for all airports to promote safety. During the survey effort, airport management provided RSA standard information for each runway. For runways that did not meet current RSA criteria, airport management also provided details of the runway end and RSA issues. Note that a runway with only one end meeting RSA standards was not considered to be compliant.

As shown in Figure 5-10, 49 percent of the Massachusetts system airports currently meet RSA standards on all of their runway ends. By role, 71 percent of Commercial Service/Scheduled Charter, 60 percent of Corporate/Business, 50 percent of Community/Business, and 13 percent of Essential/Business airports meet FAA-defined RSA safety area standards based on their identified ARC.

Figure 5-10: Percentage of Airports by Role that Meet FAA RSA Standards



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Since the goal of MassDOT Aeronautics has always been to have all airports within the state meet the RSA standard, it is a reasonable target for the MSASP that all AIP-eligible airports within the system meet FAA RSA standards. Currently, seven AIP-eligible Massachusetts system airports do not meet RSA standards on all of their runways. Figure 5-11 lists these airports and provides any additional information provided by the airports related to their not meeting that standard. The target performance for this measure is for 100 percent of all AIP-eligible airports to meet RSA standards on all of their runways. Additionally, it is recommended that all non-AIP airports that currently meet the RSA standards (only Spencer) should continue to do so, while those that do not meet the standards should strive to meet them. (Note that if AIP-eligible airports and any non-AIP-eligible airports that already meet this performance measure are combined, the resulting compliance percentage with respect to the entire system is 65 percent.)

The future target for this performance measure is for the six AIP-eligible airports listed below to meet RSA standards on all of the listed runways, with priority being given to primary runways. Note that the FAA has made a dedicated national effort and contributed considerable funding to its objective of making RSAs compliant with its design standards, and the airports listed below should be evaluated in greater detail to determine the best steps to address any outstanding RSA issues.

Figure 5-11: Airports Recommended to Meet FAA RSA Standards on All Runways

Airport Code	Associated City	Airport Name	AIP-Eligible	Primary Runway Compliance	Reason	Secondary Runway Compliance	Reason
Commercial Service/Scheduled Charter							
EWB	New Bedford	New Bedford Regional Airport	Yes	No	Wetlands/ Terrain	No	Currently being addressed
MVY	Vineyard Haven	Martha's Vineyard Airport	Yes	No	RW 06 end: under construction	Yes	
Corporate/Business							
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	No	Rivers at both runway ends	No	Terrain
LWM	Lawrence	Lawrence Municipal Airport	Yes	No	Grading drops off	No	RW 14 end: outside airport property
OWD	Norwood	Norwood Memorial Airport	Yes	Yes	*NA*	No	Wetlands
PSF	Pittsfield	Pittsfield Municipal Airport	Yes	No	Wetlands/ Terrain	No	Terrain

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

In terms of future projects to address RSA deficiencies, coordination with the FAA New England Region will be required. According to the FAA National RSA Program guidance, the Regional Airports Division Manager makes a determination on whether an airport meets current standards for RSA compliance. The determination should be based on the best and current information available at an airport. After reviewing the data, the Regional Airports Division Manager will make one of the following determinations:

- The existing RSA meets standards as defined in AC 150/5300-13, *Airport Design*
- The existing RSA does not meet standards, but it is practicable to improve the RSA to meet current standards
- The existing RSA can be improved, but the RSA will note meet current standards
- The existing RSA does not meet current standards, and it is not practicable to improve the RSA to meet current standards

Depending on the type of airport, an RSA inventory and determination may be a time sensitive issue and require immediate action; otherwise such actions are typically addressed during a master planning process. Documentation must also be provided in making a determination and evaluating alternative solutions. As part of evaluating RSA alternatives, the following proposed actions should be considered:

- Relocating, shifting or realignment of runway
- Reducing runway length to only meet the dimensions of the existing or projected design aircraft
- Combining runway relocation, shifting, grading, realignment, or reduction
- Publishing declared distances
- Developing an Engineered Materials Arresting System (EMAS)

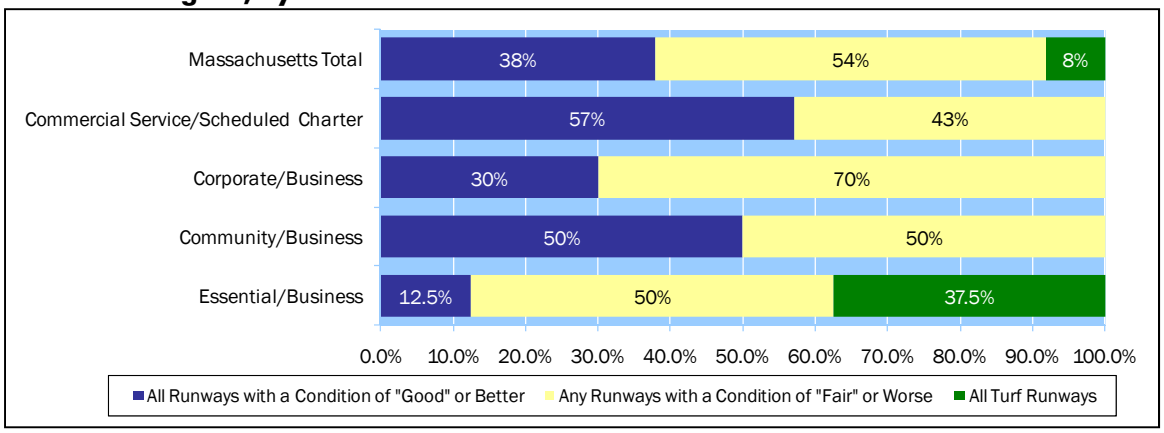
In considering these alternatives, it is critical to examine environmental conditions in conjunction with a cost/benefit analysis. It should be noted that as the FAA national effort regarding RSA compliance has progressed, the more easily reconciled RSA issues at airports have been largely addressed, leaving many of the more challenging airport RSA issues still to be resolved. As such and since every airport has unique geographical and other characteristics, there is no one solution for RSA compliance and therefore the recommendations for each airport will require a much more in-depth analysis than what is provided in this study.

Percent of system airports with a runway pavement classification of "good"

The development and maintenance of paved surfaces at all system airports requires significant and continual investment. MassDOT has determined that maintaining runway pavements to a defined standard helps to minimize major costly runway reconstruction projects over the long term. During the MSASP survey effort, airport managers were asked to assess the pavement condition of all of their runways. In total, the 37 Massachusetts system airports in the MSASP include a total of 62 runways and 2 helipads, of which, 51 runways are paved. Note that unpaved runways (in Massachusetts, unpaved runways are turf) are not evaluated in this analysis. Three system airports, Katama Airpark, Berkley Myricks and Cape Cod Airport, have a primary runway that is turf, while several other airports have unpaved secondary runways.

Figure 5-12 reveals the aggregate results for general pavement condition on all runways at Massachusetts system airports. Throughout the airport system, 38 percent of the system's 37 airports have a reported condition of at least "good" on all of their paved runways. By role, this includes 57 percent of Commercial Service/Scheduled Charter, 30 percent of Corporate/Business, 50 percent of Community/Business, and 12.5 percent of Essential/Business.

Figure 5-12: Percentage of Airports by Role with All Runway Pavement Conditions of "Good" or Higher, by Role

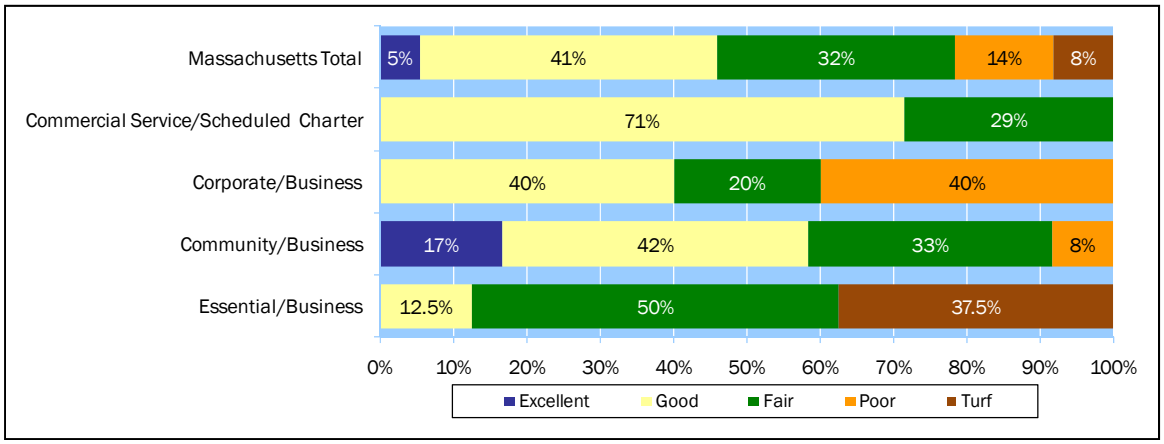


Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-13 shows results for just the primary runways at the system airports. Seventeen out of the 37 Massachusetts system airports reported having a primary runway with a pavement condition of at least "good," with two rated as "excellent." An additional 17 were reported as either "fair" or "poor" and three other turf primary runways. It should also be noted that at the

time of this study, one airport (Harriman and West) was in process of having its primary runway pavement upgraded to excellent. By role, 71 percent of Commercial Service/Scheduled Charter, 40 percent of Corporate/Business, 59 percent of Community/Business, and 12.5 percent of Essential/Business reported having a primary runway with a condition of at least "good."

Figure 5-13: Primary Runway Pavement Conditions at Massachusetts Airports, by Role



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

For this performance measure, the future target was set such that 100 percent of primary runways should have a pavement condition of at least "good," and all other runways are to be maintained in a "fair" condition or better. Figure 5-14 shows runways at Massachusetts airports that do not currently meet these targets, as reported by airport management. Projects such as crack sealing or repaving are recommended to improve the pavement conditions at these airports, but due to possible cost constraints primary runways should be given the highest priority. Further planning and engineering will be necessary to analyze the individual airport's ability to improve runway pavement conditions.

It is important to note that the pavement conditions listed in the following figure were provided directly by that airports themselves and do not reflect any independent assessment. Since determination of pavement conditions can be somewhat subjective, a general pavement assessment and maintenance analysis was also conducted as part of the MSASP. While this effort was performed at a higher level than an in-depth pavement analysis, it does provide much more refined level of analysis for assessing current pavement conditions and recommended future pavement maintenance actions. However, with respect to the following figure, only the pavement conditions reported by the airports were considered. The results of the MSASP pavement assessment are included in Appendix A as a reference and resource for MassDOT Aeronautics.

Figure 5-14: Airports Recommended to Upgrade Runway Pavement Condition

Airport Code	Associated City	Airport Name	AIP-Eligible	Primary Runway	Primary Runway Condition	Secondary Runway	Secondary Runway Condition
Commercial Service/Scheduled Charter							
EWB	New Bedford	New Bedford Regional Airport	Yes	05/23	Fair	14/32	Fair
ORH	Worcester	Worcester Regional Airport	Yes	11/29	Fair	15/33	Good
Corporate/Business							
BVY	Beverly	Beverly Municipal Airport	Yes	16/34	Fair	09/27	Excellent
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	02/20	Poor	14/32	Poor
GHG	Marshfield	Marshfield Municipal Airport	Yes	06/24	Poor	-	-
AQW	North Adams	Harriman and West	Yes	11/29	Poor	-	-
PSF	Pittsfield	Pittsfield Municipal Airport	Yes	08/26	Fair	14/32	Fair
BAF	Westfield/Springfield	Barnes Municipal Airport	Yes	02/20	Poor	15/33	Poor
Community/Business							
5B6	Falmouth	Falmouth Airpark	No	07/25	Fair	-	-
GBR	Great Barrington	Walter J. Koladza Airport	No	11/29	Fair	-	-
9B1	Marlborough	Marlboro Airport	No	14/32	Fair	-	-
60M	Spencer	Spencer Airport	No	01/19	Poor	-	-
6B6	Stow	Minute Man Airfield	No	03/21	Fair	12/30	Turf
Essential/Business							
8B5	Barre/Barre Plains	Tanner-Hiller	No	06/24	Fair	-	-
28M	Hanson	Cranland Airport	No	18/36	Fair	-	-
1B6	Hopedale	Hopedale Industrial Park	No	18/36	Fair	-	-
2B2	Newburyport	Plum Island Airport	No	10/28	Fair	14/32	Turf

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Percent of system airports with access controls to the airport operating areas

As response to the terrorist attacks on September 11, 2001, the aviation industry pursued vast expansions of security initiatives and protocol within both the commercial and general aviation industry sectors. In November 2001, the Massachusetts Aeronautics Commission (now MassDOT Aeronautics) issued Agency Directive AD-001a, *Airport Security* that established minimum airport security standards for public-use airports in the Commonwealth. As part of the directive, airports were classified into three categories depending on their size as related to potential risk posed by the airport. Class 1 airports are those with airline passenger service, Class 2 airports are municipally-owned airports without passenger service, and Class 3 includes private airports. The security standards referenced specific guidance on different security concerns by classification. Specifically, all classes of airports were provided the following guidance related to access controls to the airport operating areas (AOAs):

> *2.c.iv "Install access control devices (e.g. card readers, mechanical pin latch mechanisms, etc.) on fence gates leading into the AOA, where appropriate." (Class 3 airports were exempt from this requirement but Class 2 airports were noted to comply as funding permitted)*

> *2.c.v "Install video surveillance & detection equipment. The Commission recommends installing video cameras to monitor access gates leading into the AOA, where appropriate. Class 1 airports should also consider installing video cameras to*

monitor areas in the terminal building, where appropriate. (Class 2 and 3 airports were exempt from this requirement however Class 2 airports were encouraged to comply)

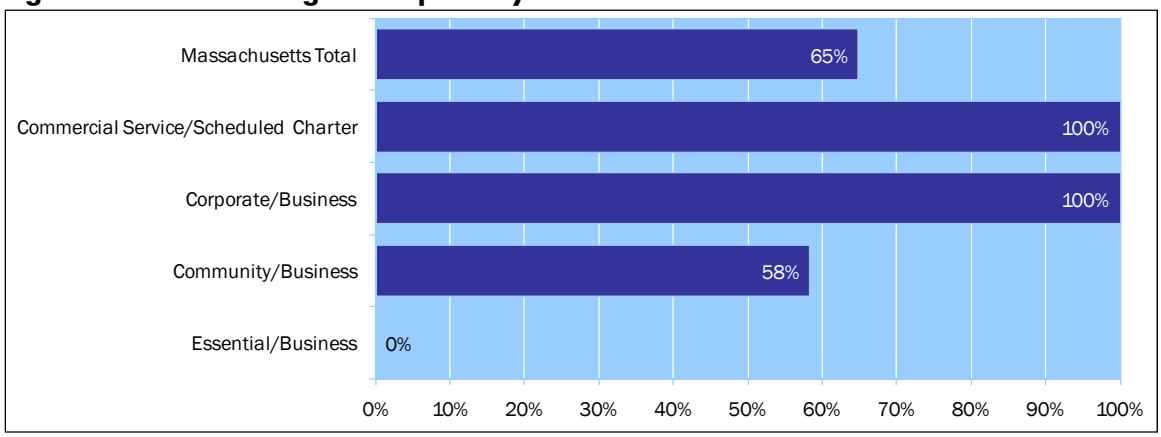
This directive remains in effect today but is currently being revisited based on updated security data, research, technologies and protocols.

In addition to the 2001 MAC directive, in 2004 the Transportation Security Administration (TSA) released security guidelines for general aviation airports, including a guideline to limit access to airport operating areas (AOA). During the airport survey effort, managers were asked to report if their airport employed access controls to their AOAs, and the types of controls in place.

Figure 5-15 summarizes the results of this performance measure. In total, 65 percent of Massachusetts system airports reported utilizing some form of access controls to their AOAs. By role, 100 percent of Commercial Service/Scheduled Charter and Corporate/Business reported using access controls, while 58 percent of Community/Business reported using controls. No Essential/Business airports have access controls.

Several different types of airport access controls are used at commercial service and general aviation airports. Airport managers were asked to report if their airports utilize ID and card reader access systems, closed circuit TV systems, or maintain a presence of law enforcement on site. Seventeen Massachusetts system airports reported using ID and card reader systems; 15 reported having a closed circuit TV security system; and eight reported a permanent law enforcement officer or officers present.

Figure 5-15: Percentage of Airports by Role with Access Controls to their AOA



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

For this performance measure, a target was set that all airports in the Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business roles should have access controls to their AOAs, as well as those AIP-eligible airports in the Essential/Business role (only Gardner Municipal). It should be noted that the five airports currently without access controls in the Community/Business category are privately owned (Class 3) and therefore not required to meet the Commonwealth's current airport security directive.. If Gardner Municipal were to upgrade it access control, the system performance would increase to 68%, while if all of these airports were to meet this target (although not required due to their Class 3 status),

the performance would increase to 81 percent of the system total. Figure 5-16 details airports that could install or upgrade access controls to their airport operating areas.

Figure 5-16: Airports Recommended to Install Access Controls to their Airport Operating Areas

Airport Code	Associated City	Airport Name	AIP-Eligible	Agency Directive Airport Class	Access Controls to AOA
Community/Business					
GBR	Great Barrington	Walter J. Koladza Airport	No	3*	No
7B2	Northampton	Northampton	No	3*	No
60M	Spencer	Spencer Airport	No	3*	No
3B3	Sterling	Sterling Airport	No	3*	No
6B6	Stow	Minute Man Airfield	No	3*	No
Essential/Business					
GDM	Gardner	Gardner Municipal	Yes	2	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010
* As a privately owned airport (Class 3), this airport is not required to meet Agency Directive AD-001a, *Airport Security*.

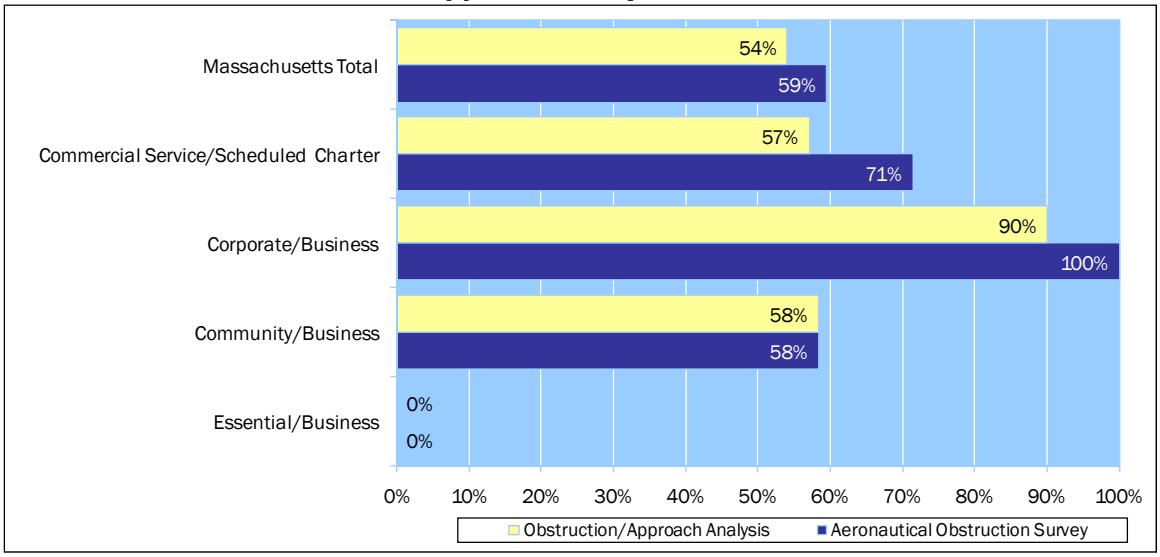
Percent of system airports with a survey of aeronautical obstructions

Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, provides guidelines for airspace protection on and around airports. The regulations define imaginary airspace surfaces around runways that should be maintained to be clear of obstructions, including approach surfaces that slope upward and outward from runway ends. The required slope of an approach surface is dictated by the design aircraft and the instrument approach established for the runway. Approach slopes (horizontal:vertical) defined by FAR Part 77 include 20:1, 34:1 and 50:1. Generally, airports with an instrument approach require a 34:1 or 50:1 clear approach slope, while all other airports require a minimum 20:1 clear approach slope.

Airspace protection is especially critical within the runway approach areas since takeoffs and landings represent the flight segments with the highest accident risk. Clear airspace protects the pilot as well as the people and property on the ground. Furthermore, obstructions that are hazardous to air navigation represent a significant liability to an airport when not removed, lighted, mitigated by displaced thresholds, or otherwise appropriately addressed While manmade and terrain obstructions cannot always be removed, vegetative obstructions in the runway approaches (particularly trees) can usually be resolved if the airport has and adheres to a vegetation management plan (VMP).

Airport managers were asked to report if their airport had conducted surveys of aeronautical obstructions, such as obstruction approach analyses or a vegetation management plan (discussed below in the Environmental Compliance and Stewardship section). Figure 5-17 summarizes the results by role for the existing airport system. In total, 54 percent of Massachusetts system airports report having an obstruction/approach analysis conducted, while 59 percent have had an aeronautical obstruction survey completed.

Figure 5-17: Percentage of Airports by Role with a Survey of Aeronautical Obstructions or an Obstruction/Approach Analysis



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

A future target was set for this performance measure that 100 percent of airports in the Massachusetts system should have completed either a survey of aeronautical obstructions or an obstruction/approach analysis. Figure 5-18 lists the 14 airports that currently have had neither according to data obtained from the airports during the inventory survey effort.

Figure 5-18: Airports Recommended to Develop a Survey of Aeronautical Obstructions or an Obstruction/Approach Analysis

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*
Commercial Service/Scheduled Charter			
PVC	Provincetown	Provincetown Municipal Airport	Yes
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan*	Yes
Community/Business			
5B6	Falmouth	Falmouth Airpark	No
9B1	Marlborough	Marlboro Airport	No
7B2	Northampton	Northampton	No
60M	Spencer	Spencer Airport	No
Essential/Business			
8B5	Barre/Barre Plains	Tanner-Hiller	No
1M8	Berkley	Myricks Airport	No
1B2	Edgartown	Katama Airpark	No
GDM	Gardner	Gardner Municipal	Yes
28M	Hanson	Cranland Airport	No
1B6	Hopedale	Hopedale Industrial Park	No
2B1	Marstons Mills	Cape Cod Airport	No
2B2	Newburyport	Plum Island Airport	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010
* The runways and approach areas at CEF are operated and maintained by the military. As such, the United States Department of Defense is responsible for the clearance and maintenance of the approach areas at CEF.

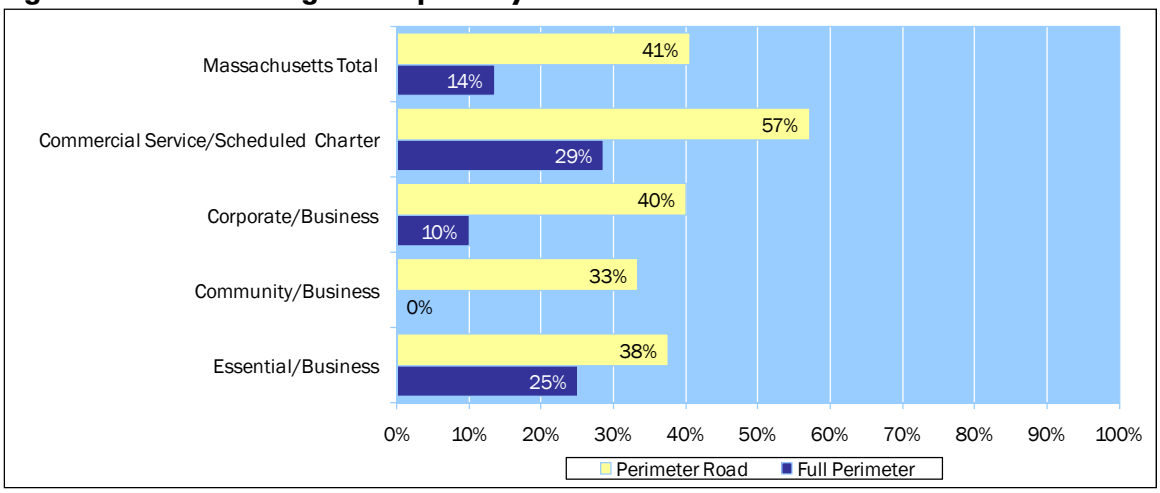
It should be noted that the majority of the airports without an aeronautical obstruction survey or obstruction/approach analysis are not eligible for federal AIP funding.

Percent of system airports with an airport perimeter road

The existence of an airport perimeter road enhances both the accessibility and security of both commercial service and general aviation airports. It ensures full airfield accessibility for general aviation users, while also providing easy access to all parts of an airport for purposes of security, maintenance and emergency response. During the survey effort, Massachusetts system airport managers were asked to report on the existence of perimeter roads at their airports and whether those roads provide partial or full access (complete access around the perimeter of the airport).

As depicted in Figure 5-19, 41 percent of system airports have at least a partial perimeter road, with 14 percent having a full perimeter road. By role, 57 percent of Commercial Service/Scheduled Charter, 40 percent of Corporate/Business, 33 percent of Community/Business, and 38 percent of Essential/Business airport have at least a partial perimeter road.

Figure 5-19: Percentage of Airports by Role with a Full or Partial Perimeter Road



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Although a full perimeter road is preferred for each airport in the system, for the purposes of the MSASP, the target is that each airport should have a partial perimeter road at a minimum. As stated above, only 41 percent of Massachusetts' system airports have at least a partial perimeter road. Figure 5-20 details the airports in all four role categories that are recommended to establish at least a partial perimeter road to meet this performance measure.

Figure 5-20: Airports Recommended to Develop a Perimeter Road

Airport Code	Associated City	Airport Name	AIP-Eligible
Commercial Service/Scheduled Charter			
PVC	Provincetown	Provincetown Municipal Airport	Yes
MVY	Vineyard Haven	Martha's Vineyard	Yes
ORH	Worcester	Worcester Regional Airport	Yes
Corporate/Business			
BVY	Beverly	Beverly Municipal Airport	Yes
LWM	Lawrence	Lawrence Municipal Airport	Yes
GHG	Marshfield	Marshfield Municipal Airport-George Harlow Field	Yes
AQW	North Adams	Harriman and West	Yes
OWD	Norwood	Norwood Memorial Airport	Yes
PSF	Pittsfield	Pittsfield Municipal Airport	Yes
Community/Business			
CQX	Chatham	Chatham Municipal	Yes
GBR	Great Barrington	Walter J. Koladza Airport	No
9B1	Marlborough	Marlboro Airport	No
0B5	Montague	Turners Falls	Yes
7B2	Northampton	Northampton	No
60M	Spencer	Spencer Airport	No
3B3	Sterling	Sterling Airport	No
6B6	Stow	Minute Man Airfield	No
Essential/Business			
8B5	Barre/Barre Plains	Tanner-Hiller	No
1M8	Berkley	Myricks Airport	No
1B6	Hopedale	Hopedale Industrial Park	No
2B1	Marstons Mills	Cape Cod Airport	No
2B2	Newburyport	Plum Island Airport	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

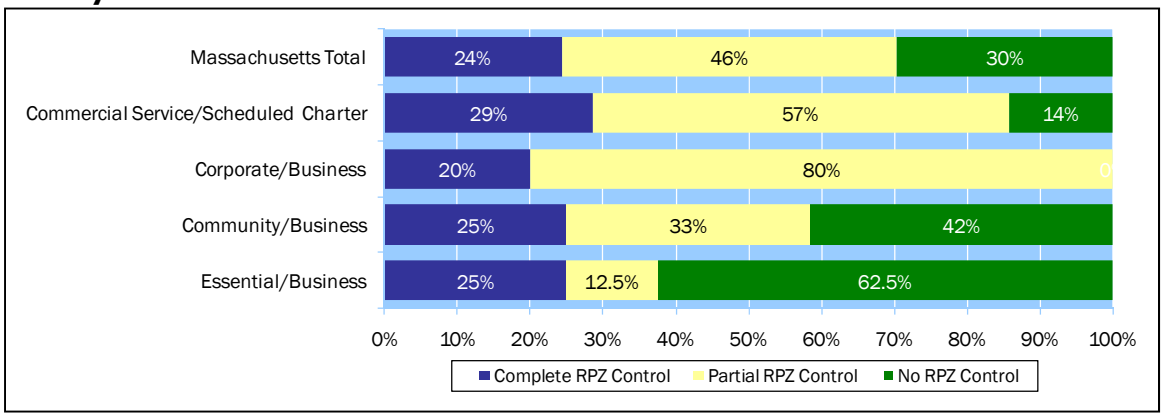
Percent of system airports with controlling interest over Runway Protection Zones (RPZs) for each runway end

The FAA defines an RPZ as a trapezoidal area centered on the extended runway centerline immediately off the runway ends that have the function of enhancing the protection of people and property on the ground. Controlling the RPZ areas, which oftentimes will lie off airport property, is critical to ensuring that incompatible land development does not take place in the immediate areas of the runway approaches. Airport managers were asked if they controlled their airport RPZs through either fee simple (ownership) or by means of an avigation easement. Having either of these control mechanisms at all runway ends fulfills this performance measure.

Figure 5-21 presents system airports by role categories that have complete or partial control of the RPZs on both ends of all runway ends as identified by the airports. If an airport controls 100 percent of the RPZ through either fee simple or easement, it is considered complete control. For an airport to meet this performance measure, it must have controlling interest in the RPZs on all runway ends (a total of 124 runway ends exist in the system). System-wide, 24 percent of airports have complete RPZ control either through fee simple ownership or easements. Twenty-nine percent of Commercial Service/Scheduled Charter airports have

complete control of their primary RPZs. Twenty percent of Corporate/Business, and 25 percent each of the Community/Business and Essential/Business roles have complete control over their RPZs.

Figure 5-21: Percentage of Airports by Role with Controlling Interest Over Their Runway Protection Zones



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target set for this performance measure is for all AIP-eligible airports to have controlling interest over all of their RPZs. In total, 17 AIP-eligible airports in the Massachusetts system lack complete control of all of their RPZs (Figure 5-22). All but two of these have at least partial control, but are recommended to acquire complete control to meet this performance measure. Based on this target, a system-wide goal of 70 percent was established related to this performance measure.

Figure 5-22: Airports Recommended to Gain Complete Controlling Interest Over Their Runway Protection Zones

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*	*RPZ Control*
Commercial Service/Scheduled Charter				
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Yes	Partial
EWB	New Bedford	New Bedford Regional Airport	Yes	Partial
PVC	Provincetown	Provincetown Municipal Airport	Yes	None
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	Yes	Partial
MVY	Vineyard Haven	Martha's Vineyard	Yes	Partial
Corporate/Business				
BVY	Beverly	Beverly Municipal Airport	Yes	Partial
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	Partial
LWM	Lawrence	Lawrence Municipal Airport	Yes	Partial
AQW	North Adams	Harriman and West	Yes	Partial
OWD	Norwood	Norwood Memorial Airport	Yes	Partial
ORE	Orange	Orange Municipal	Yes	Partial
PYM	Plymouth	Plymouth Municipal Airport	Yes	Partial
BAF	Westfield/Springfield	Barnes Municipal Airport	Yes	Partial
Community/Business				
CQX	Chatham	Chatham Municipal	Yes	Partial
1B9	Mansfield	Mansfield Municipal Airport	Yes	None

TAN	Taunton	Taunton Municipal Airport	Yes	Partial
Essential/Business				
GDM	Gardner	Gardner Municipal	Yes	Partial

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways

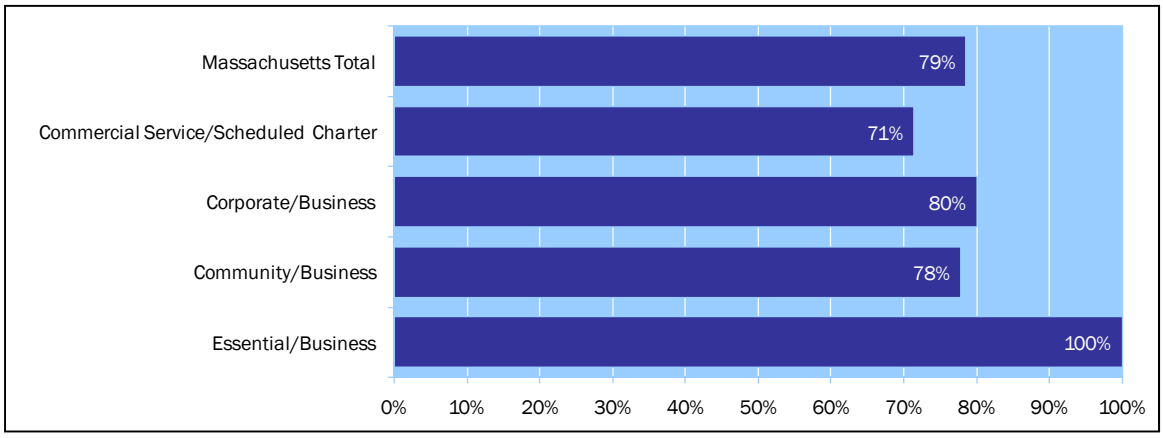
Airports in the NPIAS are recommended by the FAA to meet all applicable airport design and development standards. Through FAA AC 150/5300-13, *Airport Design*, the FAA provides specific airport design standards for airports, largely based on the most demanding aircraft that regularly operates at an airport (500 annual operations), also known as the airport's critical or design aircraft. Once an airport's critical aircraft is established during the development of an airport master plan or airport layout plan (ALP), applicable design standards from the advisory circular are identified. Specifically, each airport's design standards are related to the approach speed and wingspan of its critical aircraft (these two parameters are used to determine each airport's reference code (ARC)), as well as the instrument approach minimums for an applicable runway.

With respect to this performance measure, the FAA provides distance standards for appropriate runway centerline to parallel taxiway/taxilane centerline separation. This distance is such to satisfy the requirement that no part of an aircraft (tail tip, wing tip) on taxiway/taxilane centerline is within the runway safety area or penetrates the obstacle free zone. This is a particularly important standard since it speaks to the fundamental structure and alignment of an airport's airfield components. Additionally, while changes in the separation requirement for a given airport may reflect a change in that airport's design aircraft, it can also reflect a potentially significant infrastructure cost consideration.

As previously noted, airports that are not currently in the NPIAS and do not receive federal AIP grants are not required to meet FAA standards, but they are still encouraged to do so as these standards have been developed to ensure safe operations at airports in general.

All MSASP system airports are analyzed to determine if they meet the standards for runway/taxiway separation. Figure 5-23 summarizes the MSASP airports by role category that meet runway/taxiway separation criteria for their current ARC. These compliance percentages include only the 30 system airports which have at least a partial parallel taxiway. Of these, 79 percent of the airports have adequate runway to taxiway separation. By role, this includes 71 percent of Commercial Service/Scheduled Charter, 80 percent of Corporate/Business, 78 percent of Community/Business, and 100 percent of Essential/Business.

Figure 5-23: Percentage of Airports by Role that Meet Runway/Taxiway Separation Criteria for their Current ARC



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target for this performance measure is for all AIP-eligible airports with a full parallel taxiway to meet separation standards for their ARC. Figure 5-24 details the AIP-eligible airports that have full parallel taxiways currently not meeting FAA separation standards for their ARC. Further study will be required to analyze the feasibility of each of these six airports meeting those separation requirements for their parallel taxiways. Multiple factors within the developed area, including potential environmental considerations, lack of available property, as well as potential financial practicability implications, could hinder each airport's ability to meet these criteria.

Figure 5-24: Airports Recommended to Meet Runway/Taxiway Separation Criteria for their Current ARC

Airport Code	*Associated City*	*Airport Name*	*ARC*	*Required Separation*	*Current Separation*
Commercial Service/Scheduled Charter					
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	C-II	400	300
MVY	Vineyard Haven	Martha's Vineyard	C-III	400	360-400**
Corporate/Business					
GHG	Marshfield	Marshfield Municipal Airport-George Harlow Field	B-II	300	250*
PSF	Pittsfield	Pittsfield Municipal Airport	C-II	400	300
Community/Business					
1B9	Mansfield	Mansfield Municipal Airport	B-I	250	200

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010
*Estimate based on satellite imagery
**The parallel taxiway at Martha's Vineyard shifts distance at one point. Most of the taxiway has the distance of 360 feet.

Percent of system airports with a security plan

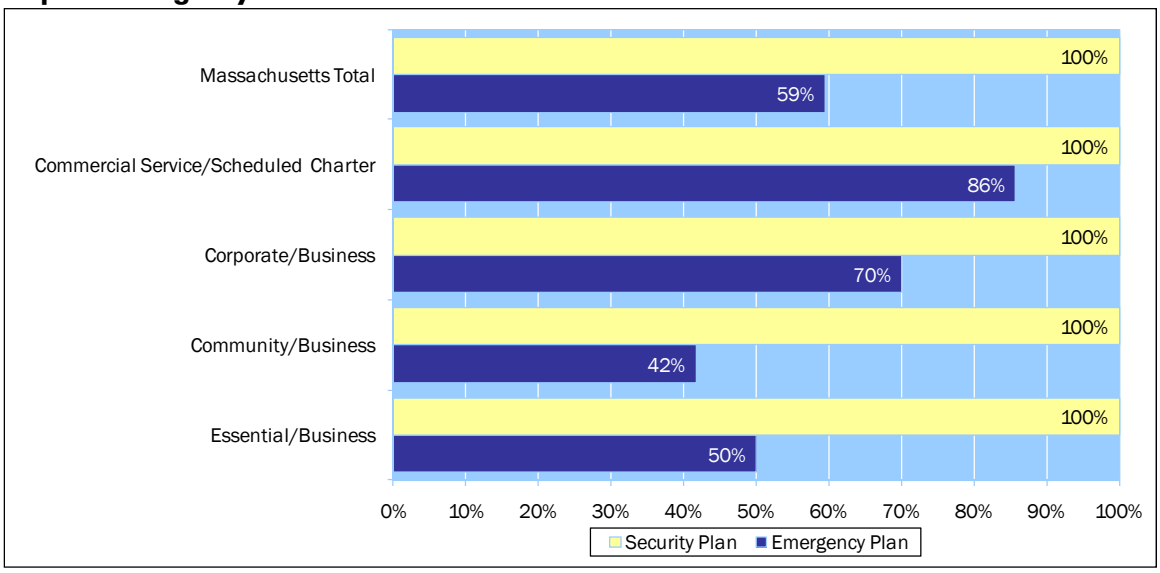
An airport security plan is a critical for ensuring and maintaining the safety and security for an airport, its surrounding community, as well as the region and state. A security plan defines and organizes communication linkages between airport managers, tenants, local law enforcement representatives, government officials and others with appropriate interests in airport security. The plan also creates a listing of suspicious activities that should be reported, and increases

awareness of security issues at individual airports. As mentioned previously, the Massachusetts Aeronautics Commission issued an agency directive for airport security in 2001. As part of that directive, the MAC required that every airport develop an airport security plan and update the plan regularly. Currently, as shown below in Figure 5-25, all airports in the Massachusetts system have a general aviation security plan in place. The target set for this performance measure is to maintain that 100 percent compliance for all system airports

Percent of system airports that have an airport emergency plan

An airport emergency plan (AEP) is developed to facilitate the efficient and appropriate response to natural or man-made emergencies occurring on or near an airport. Each plan lists potential emergencies at specific airports, and creates response scenarios for each. In addition to showing airports with security plans, Figure 5-25 also shows the percentage by role category of Massachusetts' system airports that have an established AEP. In total, 59 percent of the system has an established AEP. By role, this includes 86 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 42 percent of Community/Business, and 50 percent of Essential/Business.

Figure 5-25: Percentage of Airports by Role with Established Security Plans and Airport Emergency Plans



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target set for this performance measure is for 100 percent of system airports to have an AEP. To meet this goal, the 15 airports listed in Figure 5-26 are recommended to develop an AEP. Guidelines for emergency response plans have been outlined by the FAA in AC 150/5200-31A, *Airport Emergency Plan*, which details the process for developing and implementing an AEP. These plans help to ensure safety not only for an airport's users, but also for the surrounding community. An AEP is also intended to lower the potential impact of emergencies by addressing issues in an appropriate time period following an emergency. An AEP is intended to create quick response to emergencies by outlining responsibilities that individuals or organizations have. The plan is also airport-specific, detailing the emergencies

most likely to happen at a particular airport and what airport characteristics may affect a timely and efficient response.

Figure 5-26: Airports Recommended to Develop an Airport Emergency Plan

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*
Commercial Service/Scheduled Charter			
PVC	Provincetown	Provincetown Municipal Airport	Yes
Corporate/Business			
BVY	Beverly	Beverly Municipal Airport	Yes
AQW	North Adams	Harriman and West	Yes
PSF	Pittsfield	Pittsfield Municipal Airport	Yes
Community/Business			
CQX	Chatham	Chatham Municipal	Yes
5B6	Falmouth	Falmouth Airpark	No
GBR	Great Barrington	Walter J. Koladza Airport	No
9B1	Marlborough	Marlboro Airport	No
7B2	Northampton	Northampton	No
3B0	Southbridge	Southbridge Municipal Airport	Yes
3B3	Sterling	Sterling Airport	No
Essential/Business			
1M8	Berkley	Myricks Airport	No
28M	Hanson	Cranland Airport	No
1B6	Hopedale	Hopedale Industrial Park	No
2B1	Marstons Mills	Cape Cod Airport	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

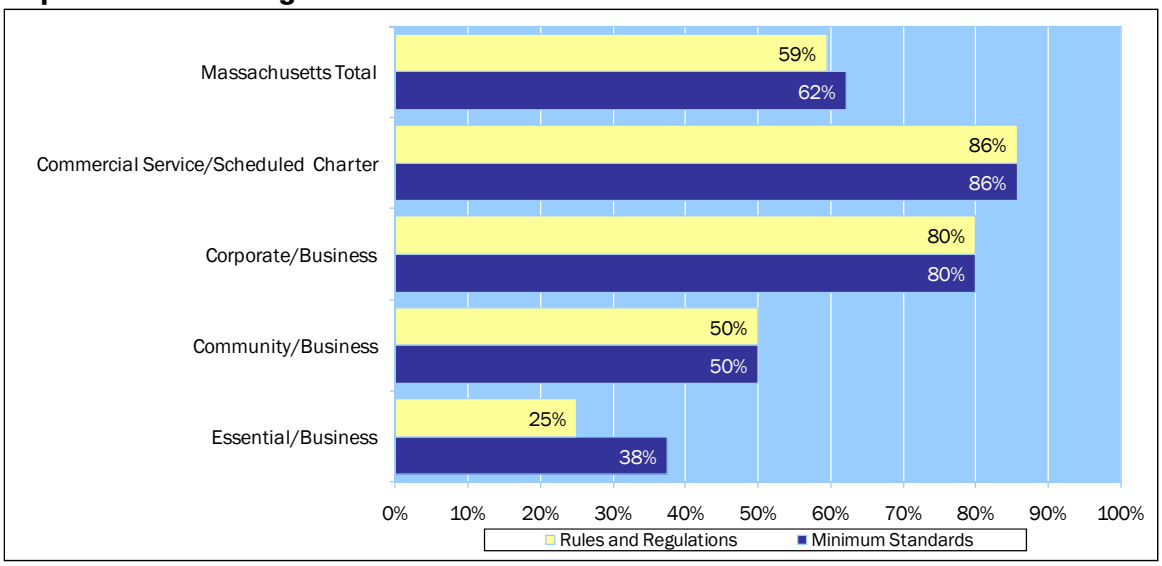
Percent of system airports with airport minimum standards, and airport rules and regulations

By definition, airport minimum standards are the "qualifications that may be established by an airport owner/operator as the minimum requirements to be met as a condition for the right to conduct an aeronautical activity on the airport." The purpose of minimum standards is "to provide a fair and reasonable opportunity, without unlawful discrimination, to all applicants to qualify, or otherwise compete, to occupy available airport land and/or improvements and engage in authorized aeronautical activities at an airport." In essence, by establishing minimum entry-level requirements (or thresholds), minimum standards maintain a level playing field. If consistently applied and enforced, they permit the airport sponsor to maintain a high level of service to the public while also offering consistent, predictable decision-making criteria to potential tenants. When appropriately associated and coordinated with airport rules and regulation documents, minimum standards documents provide clarification to help avoid confusion and misunderstanding about operating on an airport and associated business activities.

Related to airport minimum standards, airport rules and regulations documents are generally established to facilitate the safe, orderly, and efficient use of an airport for the benefit of its users and investors. Its primary purpose is to ensure that airport tenants and customers operate in a safe and orderly fashion in order to protect the public health, safety, interest, and welfare on the airport, as well as to restrict (or prevent) any activity which would interfere with

the safe and orderly use of the airport. For example, such rules and regulations may refer to based aircraft, airport noise, flying clubs and other organizations, business operations, operating rules, and/or accidents, among many others. Information on airport minimum standards and airport rules and regulations was gathered during the MSASP inventory effort, and is presented below in Figure 5-27. In total, 62 percent of the Massachusetts system has established minimum standards for aviation businesses, and 59 percent has established airport rules and regulations documentation.

Figure 5-27: Percentage of Airports by Role with Airport Minimum Standards and Airport Rules and Regulations



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

A target was set that 100 percent of AIP-eligible airports should have airport minimum standards and airport rules and regulations. AIP-eligible airports lacking one or both of these documents are shown in Figure 5-28. When combined with non-AIP-eligible airports that already meet this objective, it results in a system-wide target of 70 percent for both airport minimum standards and airport rules and regulations. Airports are also recommended to develop regular updates (every three to five years) for both documents.

Figure 5-28: Airports Recommended to Develop Airport Minimum Standards and Airport Rules and Regulations

Airport Code	*Associated City*	*Airport Name*	*Minimum Standards*	*Airport Rules and Regulations*
Commercial Service/Scheduled Charter				
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	No	No
Corporate/Business				
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	No
GHG	Marshfield	Marshfield Municipal Airport	No	Yes
BAF	Westfield/Springfield	Barnes Municipal Airport	No	No
Community/Business				
3B0	Southbridge	Southbridge Municipal Airport	Yes	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Goal Category: Environmental Compliance and Stewardship

It is important for airports in Massachusetts to be compatible with both the human and natural environment. Noise, water, and air pollution are all potential environmental considerations arising from airport operations that can have both real and perceived impacts. For airports, continuing to work toward a baseline of environmental sensitivity ultimately helps to maintain their long-term viability, and by extension, help sustain the aviation industry as a whole.

The following performance measures deal with the ability of Massachusetts' airport system to maintain environmental sensitivity stewardship:

- Percent of system airports with a Spill Prevention, Control, and Countermeasures (SPCC) plan
- Percent of system airports with a Storm Water Pollution Prevention Plan (SWPPP)
- Percent of system airports with a Vegetation Management Plan (VMP)
- Percent of system airports with updated yearly operating plans associated with their existing VMPs
- Percent of system airports with a Conservation Management Plan
- Percent of system airports with a Grassland Management Plan
- Percent of system airports with a Wildlife Hazard Management Plan (WHMP)
- Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls
- Percent of system airports with alternative fuel vehicles or other alternative fuel equipment
- Percent of system airports with recycling programs
- Percent of system airports with noise abatement programs and procedures

Percent of system airports that comply with the EPA's current Spill Prevention, Control, and Countermeasures (SPCC) rule

As a key component of its strategy to prevent oil spills from reaching the nation's waters, the United States Environmental Protection Agency (EPA) requires that certain facilities (including industrial facilities like airports) develop and implement oil spill prevention, control, and countermeasures (SPCC) plans. Specifically, a facility may be subject to the SPCC rule if it meets the following criteria:

1. If a facility has a total aboveground oil/fuel storage capacity greater than 1,320 gallons, or if a facility has a total underground oil/fuel storage capacity of greater than 42,000 gallons.
2. There must be a reasonable expectation of a discharge into or upon navigable waters of the United States or adjoining shorelines.

SPCC plans ensure that such required facilities (like airports) establish appropriate containment and other counter measures that would prevent any oil spills that could potentially reach navigable waters of the United States. Under EPA's Oil Pollution Prevention regulation, facilities must detail and implement spill prevention and control measures in their SPCC plans. Additionally, a spill contingency plan is required as part of the SPCC plan if the

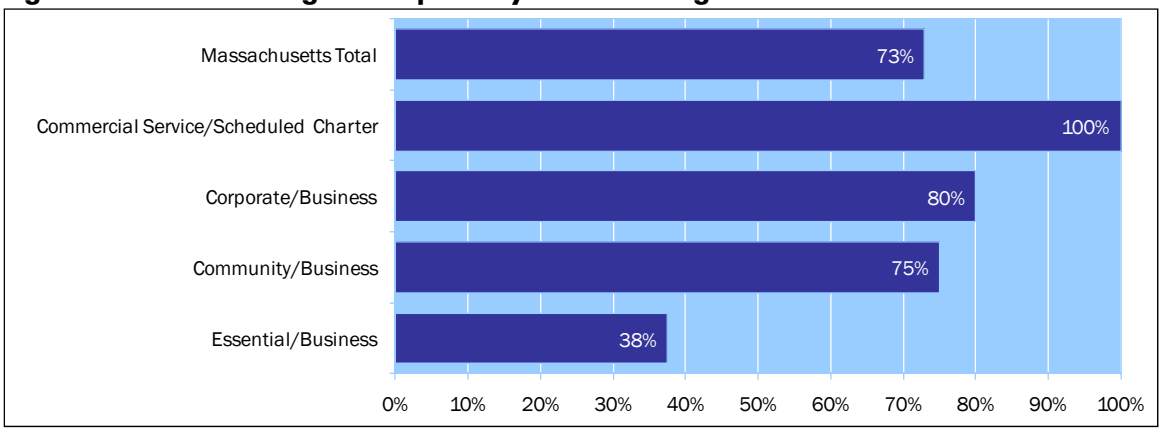
facility is unable to provide secondary containment (e.g. berms surrounding the oil/fuel storage tank).

Each SPCC plan, while unique to the facility it covers, must include certain elements to ensure that facilities comply with the spill prevention regulations. A copy of the entire SPCC plan must be maintained at the facility if the facility is normally attended for at least eight hours per day. Otherwise, it must be kept at the nearest field office of the EPA. The SPCC plan must be available to EPA for on-site review and inspection during normal working hours.

Figure 5-29 shows Massachusetts system airports by role that report having an SPCC plan. It must be clearly understood that the existence of an SPCC plan at an airport should not be interpreted as that airport's current compliance to the SPCC rule. The EPA does change SPCC compliance requirements and as such, it is incumbent upon the airport to be diligent in ensuring that its plan is kept current and consistent with those requirements. In fact, compliance with these regulations requires ongoing inspections, maintenance, reporting, and documentation by airports, a process that is as important as the report itself. However, this may not always be the case with all airports.

The role of this performance measure is to identify the number of airports that have established an SPCC plan; however, this does not ensure the currency of those plans. The existence of an SPCC plan should simply be interpreted as an acknowledgement by an airport that an SPCC plan has been previously required and that the airport is aware of its potential current and future compliance requirements. Note that MassDOT Aeronautics fully expects that all airports required to have and maintain an SPCC plan will do so. Seventy-three percent of the airport system has an SPCC Plan, including 100 percent of Commercial Service/Scheduled Charter, 80 percent of Corporate/Business, 75 percent of Community/Business, and 38 percent of Essential/Business. The target for this performance measure is that 100 percent of those airports required to hold and maintain a current SPCC plan will do so.

Figure 5-29: Percentage of Airports by Role Meeting the EPA's SPCC Standards



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports that comply with the EPA's current requirements for Storm Water Pollution Prevention Plan (SWPPP)

Stormwater runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and runways), it accumulates debris, chemicals, sediment or other pollutants (such as toxic chemicals, oil and grease, pesticides, metals, and other contaminants) that could adversely affect water quality if the runoff is discharged untreated into national waterways, effecting commercial fisheries, restrict swimming areas, and affect the navigability of the nation's waters. The primary method to control stormwater discharges is the use of best management practices. In addition, most stormwater discharges are considered point sources and require coverage under a National Pollutant Discharge Elimination System (NPDES) permit which regulates stormwater discharges from three potential sources, including construction activities and industrial activities. This permitting mechanism is designed to prevent stormwater runoff from washing harmful pollutants into local surface waters such as streams, rivers, lakes or coastal waters

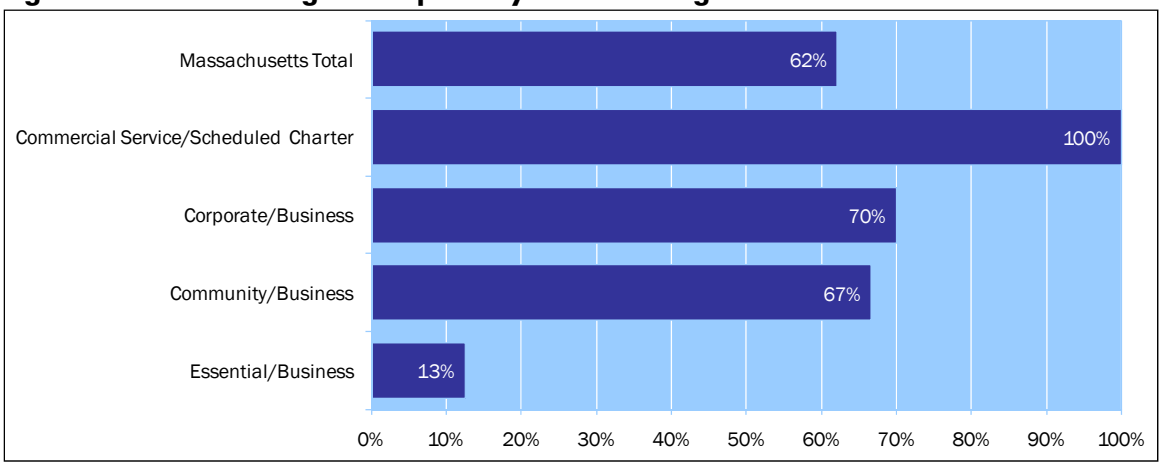
To protect water resources, the FAA requires that applicable airports comply with the federal and state environmental regulations by obtaining a National Pollutant Discharge Elimination System (NPDES) permit. Required as part of an NPDES permit, a Storm Water Pollution Prevention Plan (SWPPP) identifies controls to be used by an airport to minimize the amount of runoff pollution, sediment runoff, and erosion.

Figure 5-30 shows the percentage of airport roles that report having a SWPPP. It must be clearly understood that the existence of a SWPPP at an airport should not be interpreted as the airport's compliance to the SWPPP requirements nor of its holding a current NPDES permit. The EPA has a 5-year permit cycle that can include changes to NPDES compliance requirements and as such, it is incumbent upon each airport to be diligent in ensuring that its SWPPP is kept current and consistent with those requirements. In fact, compliance with these regulations requires ongoing inspections, maintenance, reporting, and documentation by airports, a process that is as important as the report itself. However, this may not always be the case with all airports.

The role of this performance measure is to identify the number of airports that have established a SWPPP; however, this does not ensure the currency of those plans. The existence of a SWPPP should be interpreted as an acknowledgement by an airport that a SWPPP has been previously required and that the airport is aware of its potential current and future compliance requirement. Note that MassDOT Aeronautics fully expects that all airports required to have and maintain a SWPPP will do so.

In total, 62 percent of the Massachusetts system report having a SWPPP. By role, this includes 100 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 67 percent of Community/Business, and 13 percent of Essential/Business. The target for this performance measure is that 100 percent of those airports required to hold and maintain a current SWPPP plan will do so.

Figure 5-30: Percentage of Airports by Role Meeting the EPA's SWPPP Standards



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with a Vegetation Management Plan (VMP)

All airports, from the smallest community airport to the largest commercial facility, must actively manage any vegetation (including trees and lower brush) that abut its runways, and in particular, those areas that lie off the runway ends in the approach zones. As trees and other vegetation grow taller, they can create air navigation safety hazards for pilots, as well as limiting the visibility between the aircraft, a control tower, and the airfield. FAA safety guidelines require that certain areas on and around an airport are either cleared of vegetation or at least that vegetative heights be limited, even if these occur within wetlands. To maintain these areas in a manner that not only maintains aeronautical safety, but also in an environmentally sensitive manner, a VMP can be established to ensure that vegetative growth within the aircraft approach corridors and other important areas around airports is controlled.

Environmental sensitivity is particularly important in Massachusetts, where 1,350 acres of the approximately 18,600 acres of airport property are considered to be wetland resources. The MA Wetlands Protection Act (WPA) allows for vegetation management at airports as a Limited Project Status for existing facilities only, but requires that vegetation management must be done with careful design and precautions to minimize adverse effects on the wetlands. The identification of areas that need to be cut in and near wetlands is presented in VMP which are developed for each airport. Subsequent to the revisions to the WPA regulations in January 1, 1994, vegetation management projects at many airports have been successfully completed. All phases of tree removal have been monitored, and airports have been monitored by MassDOT Aeronautics for wetland impacts annually since the original cutting. The experience in permitting and monitoring of these VMPs has provided substantial information on the best approaches, common concerns experienced at the various airports, and successful Best Management Practices.

Specifically, a VMP for an airport is a Massachusetts plan developed according to the Massachusetts Environmental Policy Act (MEPA) Generic Environmental Impact Report (GEIR) and the most recent Generic Environmental Notification Form (GENF) guidelines that is utilized by MassDOT Aeronautics as an effective mechanism by which airports maintain their clearance requirements in an appropriate and sustainable manner over the long term. Note

that while MassDOT Aeronautics has historically prioritized the development and implementation of VMPs at more environmentally sensitive airports (i.e. those with wetlands considerations), it does support but does not require the use of VMPs at all airports.

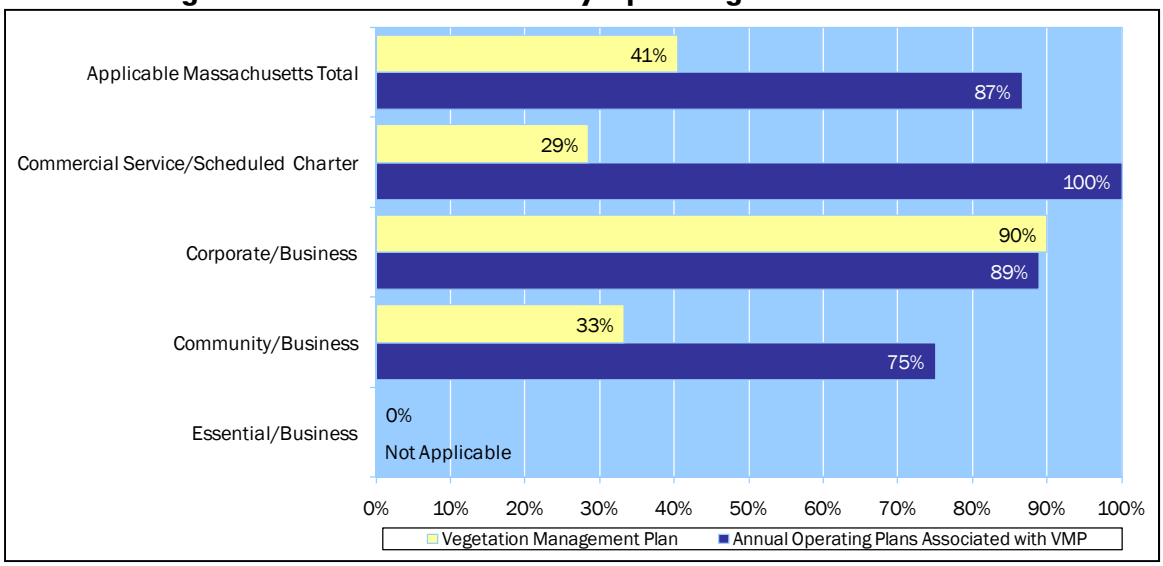
Note that guidelines were developed for VMPs at airports under the 1993 MEPA GEIR for Vegetation Removal in Wetlands at Public Use Airports (EOEA #8979), which allows airports to develop and permit VMPs without further MEPA review. Regulatory changes to the MA Wetlands Protection Act ensued as a result of the MEPA GEIR that eliminated the need for a wetlands variance and allowed permitting of tree removal in wetlands to occur in a more programmatic fashion under a VMP developed in compliance with the guidelines. A new GEIR Update and Expanded GENF for Statewide airport VMPS was submitted to MEPA, jointly with FAA and MA DEP, in August 2006. Some airports have VMPs for all or parts of the airports that were not created under these guidelines. Any more recent updates of the airport VMPs are presumed to be compliant with these guidelines and regulations.

Figure 5-31 displays the percentage by role of airports in the Massachusetts system that report having a VMP. It must be clearly understood that the existence on a VMP at an airport does not imply that the airport is free of all vegetative obstructions. The VMP is the tool by which zones are identified for clearance, but it does not ensure that such clearance has occurred. In total, 41 percent of the system has an established VMP. By role, this includes 29 percent of Commercial Service/Scheduled Charter, 90 percent of Corporate/Business, and 33 percent of Community/Business. The target for this performance measure is that 100 percent of those airports that should have a VMP established as agreed to by the airport and MassDOT Aeronautics will do so.

Percent of system airports with updated yearly operating plans associated with their existing VMPs

As stated in the previous performance measure, simply having a VMP established for an airport does not mean that the VMP has been fully implemented and/or maintained. Since costs associated with vegetative clearing, obtaining environmental permits, and acquisition of avigation easements are often significant, VMPs are typically implemented over an extended period of time. Additionally, it is MassDOT Aeronautics' goal that every airport with a VMP appropriately maintains that plan on a continuing basis to ensure that cleared areas are maintained. As such, airport managers who had VMPs for their airports were also asked to report if they had established yearly operating plans associated with their existing VMPs. Figure 5-31 below indicates that of those airports within the Massachusetts system that have an established VMP, 41 percent also report having a yearly operating plan for the maintenance of those VMPs. The target for this performance measure is that 100 percent of those airports that have a VMP also establish a yearly operating plan to ensure the maintenance of the VMP.

Figure 5-31: Percentage of Airports by Role with a Vegetation Management Plan and Percentage of these Plans with a Yearly Operating Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with a Conservation Management Plan

Many state protected endangered, threatened and species of special concern, as well as some federally listed species, have been identified as existing in habitats present within airport properties. Airports, as a consequence of encompassing large blocks of land with grassland and transitional shrubland habitats, tend to preserve habitats that are increasingly rare in Massachusetts. As a result, there are identified habitats for many state-protected species at numerous system airports. Conservation Management Plans are created during rare species permitting processes to address the needs for protecting such rare species, and therefore are only required to the extent that rare species are known to be present on the airport property and the proposed or ongoing airport activities occur within these identified habitats.
Specifically, the Massachusetts Endangered Species Act (MESA), administered through the Massachusetts Natural Heritage & Endangered Species Program (NHESP), protects those rare species and their habitats by prohibiting the "take" of any plant or animal species listed as Endangered, Threatened, or Special Concern by the Massachusetts Division of Fisheries & Wildlife (MassWildlife) for the execution of a project. A "take" is defined as:

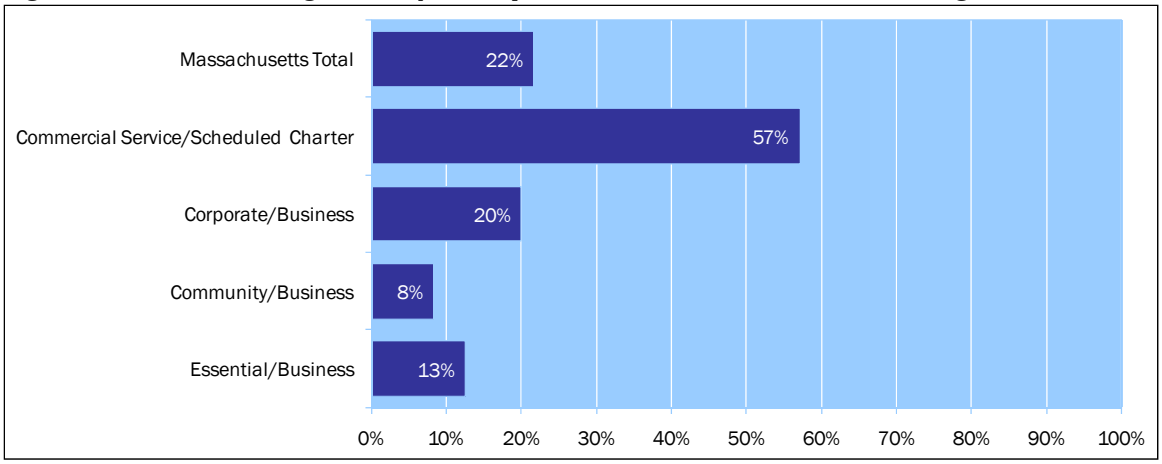
> "in references to animals to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct, and in reference to plants, means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct. Disruption of nesting, breeding, feeding or migratory activity may result from, but is not limited to, the modification, degradation or destruction of Habitat."

Permits for taking rare species for scientific, educational, conservation, or management purposes can be granted by MassWildlife through the NHESP. If during a MESA review it is determined that a project will result in a "take" of a state-listed species, the project may require

a Conservation Management Permit. Generally, these projects require public comment in order to provide an opportunity for the public to comment on an associated Conservation Management Plan prior to issuance of the permit.

For airports, it is generally considered to be prudent to have a Conservation Management Plan established for the management of any rare species that may be present in that this will enable the airport to more effectively avoid any inadvertent "takings." Note that MassDOT Aeronautics fully expects that any airport required to have Conservation Management Plan due to the presence of rare species will do so. However, it should also be noted that since the establishment of a Conservation Management Plan is only driven by the potential impact of a project to be undertaken at an airport, it can reasonably be assumed that all airports currently required to have such a plan, have them, but that this total may increase over time as new projects at airports without such a plan may trigger the requirement. Figure 5-32 shows that 22 percent of all Massachusetts system airports reported having a Conservation Management Plan, including 57 percent of Commercial Service/Scheduled Charter, 20 percent of Corporate/Business, 8 percent of Community/Business, and 13 percent of Essential/Business. The target for this performance measure is that 100 percent of those airports required to have a Conservation Management Plan should have and maintain them.

Figure 5-32: Percentage of Airports by Role with a Conservation Management Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with a Grassland Management Plan

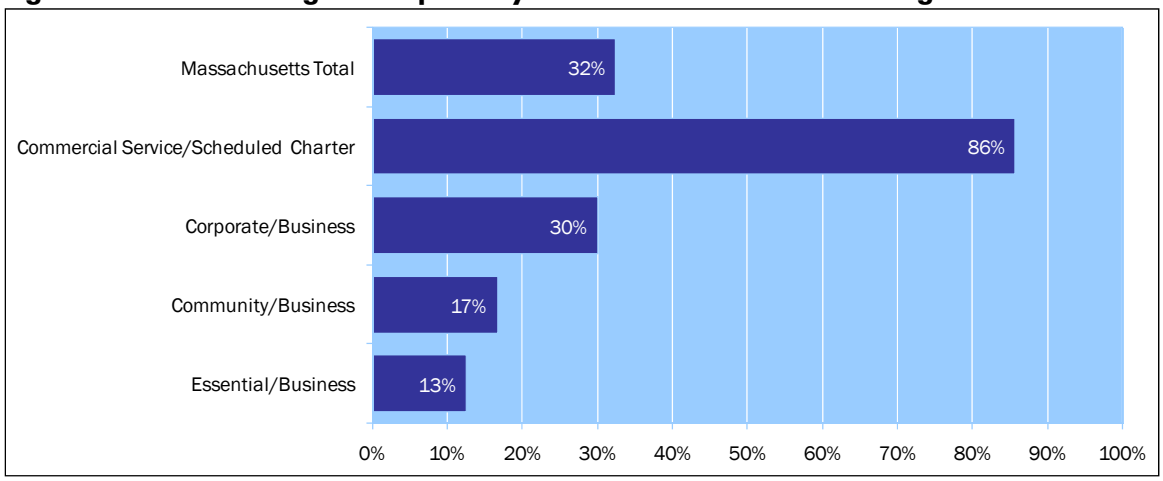
Similar to Conservation Management Plans, Grassland Management Plans protect endangered, threatened and species of special concern within the state, as well as some federally listed species. Airports, as a consequence of encompassing large blocks of land with grassland and transitional shrubland habitats, tend to preserve habitats that are increasingly rare in Massachusetts. As a result, there are identified habitats for many state-protected species at numerous system airports. Grassland Management Plans are created during rare species permitting processes to address the needs for protecting such rare species, and therefore are only required to the extent that rare species are known to be present on the airport property and the proposed or ongoing airport activities occur within these identified habitats.

As an airport grows and develops, maintaining natural grassland habitats becomes an ongoing process. In an effort to help protect identified Massachusetts-protected species and communities located on airports, the establishment of a Grassland Management Plan may be required of airport management by MassWildlife through the NHESP. A Grassland Management Plan encompasses the surveying of the airport property to identify sensitive habitat and environments, and may outline policies such as a mowing scheduling, best methods for weed removal, and other standards such as limited soil impact or prohibition of fertilizer use. It is important to note that a Grassland Management Plan is only required by Mass Natural Heritage for those airports that have the documented presence of state-listed rare and endangered species. Airports without such documented species are not required to have such a plan.

Note that MassDOT Aeronautics expects that any airport required to have a Grassland Management Plan due to the presence of rare species will do so. Since the establishment of a Grassland Management Plan requirement is driven by the documented presence of state-listed rare and endangered species on an airport, it is reasonably assumed that all those airports required to have such a plan currently have them. However, it should also be noted that this total could increase over time since there is a strong likelihood that state-listed rare and endangered species may be found and documented at some airport that is currently not aware of their presence, and as such, does not currently have a Grassland Management Plan.

During the survey effort, airport management was asked to report if their airport has established and implemented a Grassland Management Plan. As shown in Figure 5-33, 32 percent of the entire Massachusetts system has established a Grassland Management Plan. By role, this includes 86 percent of Commercial Service/Scheduled Charter, 30 percent of Corporate/Business, 17 percent of Community/Business, and 13 percent of Essential/Business airports. The target for this performance measure is that 100 percent of those airports required to have a Grassland Management Plan should have and maintain them.

Figure 5-33: Percentage of Airports by Role with a Grassland Management Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with a Wildlife Hazard Management Plan (WHMP)

Wildlife is frequently attracted to airport environments in that airports either are often located near wildlife habitats outside of urban locales, or offer open space opportunities to wildlife at airports located within urban areas. Regardless of the airport location, it is important to recognize that animals ranging from birds to deer to coyotes can and will appear within an active airport runway environment. Equally important to recognize is that wildlife within or near an airport has the potential to endanger aircraft, their occupants, as well as the animals themselves. As such, airports with such wildlife concerns are typically very active in their efforts to prevent such conflicts and can employ a wide variety of animal control strategies.

The FAA has historically required air carrier airports that have the potential to experience wildlife strikes, damaging collisions with wildlife, engine ingestion of wildlife, or wildlife of a size or in numbers capable of causing such events, to develop and implement a Wildlife Hazard Management Plan (WHMP) according to 14 CFR Part 139.337. The overall objective of the WHMP is to develop an integrated and adaptive program to effectively manage risk at an airport by reducing the probability of occurrence of wildlife/aircraft collisions, thereby enhancing the safety of aircraft operations while remaining sensitive to wildlife preservation. Specifically, an airport WHMP focuses on assessing the risks that local wildlife may present to the airport, and vice versa, as well as creating a plan to mitigate these risks. The plan can include operational requirements such as regular, daily inspections of the runways and airport environment, as well as facility changes that will minimize the likelihood of wildlife entering the runway environment.

While the primary goal of WHMPs is to provide for the safety of all airport operations, the management of wildlife has begun to take on management perspectives that seek to also protect wildlife and its habitat, as obvious from the purpose and intent of the Conservation Management Plans and Grassland Management Plans, as well as certain aspects of the Vegetation Management Plans. Therefore, a well developed WHMP will integrate wildlife management for the benefit of wildlife to the maximum extent consistent with the safety mandates and to the extent required by the regulations and guidelines relating to vegetation and rare species management.

The importance of WHMPs can be seen through recent data analyses. As evidenced in a 2009 SRA International study, the total number of aircraft bird strikes has increased from 20 percent during the period from 1990-1994 to 39 percent from 2004-2008. The majority of strike reports have been filed at Part 139 airports, with approximately six percent at general aviation airports. Although there is a higher level of reporting, it has been deduced that the number of damaging strikes has not increased mainly because many certificated airports have successfully put in place professionally-run WHMPs.

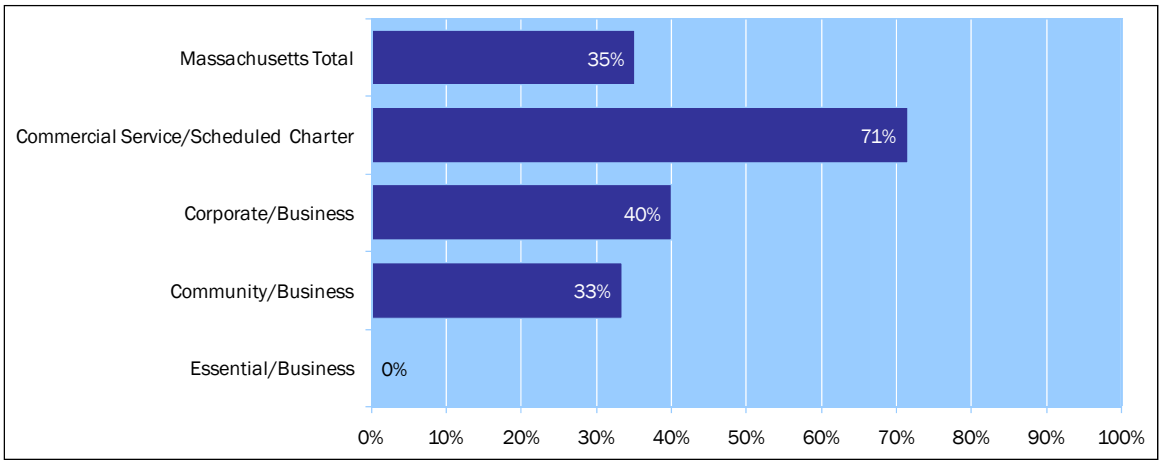
Note that historically only airports that operate under the requirements of FAR Part 139 (air carrier airports) have been required to have an established WHMP, although WHMPs have also been established at general aviation airports as a best management practices initiative. However, in 2009 the FAA initiated multiple wildlife hazard mitigation efforts in response to US Airways Flight 1549 bird strike and emergency landing in the Hudson River. Specifically, the FAA issued a certification alert to all Part 139 airports reminding them of their obligations to conduct Wildlife Hazard Assessments if they experience a "triggering event," such as an air

carrier experiencing multiple wildlife strikes or substantial damage from striking wildlife, wildlife being ingested into the engine of an air carrier, or wildlife of any size, or in any numbers, capable of causing any of those problems. Subsequently, the FAA made this requirement mandatory for all Part 139 airports, regardless of the occurrence of a triggering event.

Beyond Part 139 airports, the FAA has also developed a program to conduct Wildlife Hazard Assessments at approximately 2,000 general aviation airports within the NPIAS (note that this is an assessment and not a management plan). Initiated in 2010, this program is a phased approach that will likely take several years to complete because of the large number of assessments required. Under this program, those AIP-eligible Massachusetts general aviation airports identified within the NPIAS will have these assessments conducted. Beyond that, MassDOT Aeronautics expects that all other non-AIP-eligible airports will have a Wildlife Hazard Assessment conducted, as well.

Figure 5-34 details the reported information by role. Statewide, only 35 percent of airports included in the MSASP report having a Wildlife Hazard Management Plan. This includes 71 percent of Commercial Service/Scheduled Charter, 40 percent of Corporate/Business, and 33 percent of Community/Business. None of the Essential/Business airports currently have a Wildlife Hazard Management Plan in place.

Figure 5-34: Percentage of Airports by Role with a Wildlife Hazard Management Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls

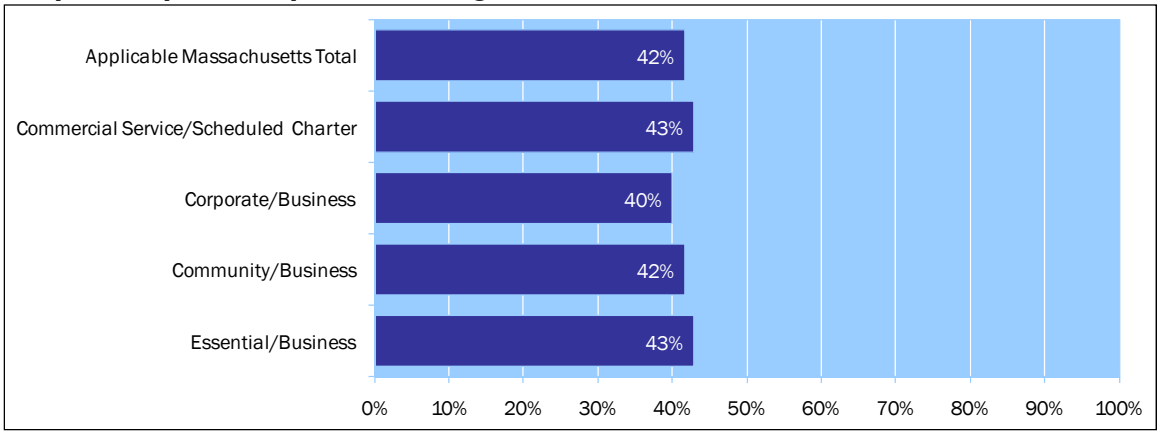
Aviation is important to the economic health of Massachusetts and the quality of life of its citizens, businesses and visitors. One of the major challenges is to balance the needs of aviation with the needs of local communities. Protection of these valuable facilities is of paramount importance to both the economic viability and the quality of life in the state. With increasing population and development, airports are coming under increasing pressure from encroaching development. In fact, the long-term viability of airports in many communities may be threatened by such encroachment from land uses or activities which are incompatible with airport operations. As such, it is incumbent upon airport sponsors to actively forge

partnerships with host communities and jurisdictions, as well as to act as an advocate for compatible land uses surrounding their airports. It is critical that airport sponsors work through these partnerships to adopt appropriate land use controls and zoning ordinances to protect the airports and the surrounding areas from potential impacts due to incompatible land uses. This is particularly important for areas in the vicinity of an airport that have the potential to be impacted by airport operations (e.g. flight patterns of aircraft operating at the airport) but which extend beyond airport property.

MassDOT Aeronautics has historically been visionary and proactive in supporting the development of appropriate controls/zoning to help ensure that land uses within the airport environs are compatible with airport operations and development. The agency anticipates maintaining and enhancing that advocacy so that all airports within the Massachusetts airport system have developed and implemented appropriate land use controls.

Figure 5-35 shows that 42 percent of the Massachusetts airport system report being hosted by a community with airport-compatible zoning and controls. However, it should also be noted that these results reflect the airport sponsors' understanding of compatible land use and should not interpreted that any such land use controls are specifically based on maintaining airport compatibility. Rather, such compatible land uses could be simply based on happenstance or on existing zoning controls that may or may not be related to the existence of the airport. The target for this performance measure is that 100 percent of system airports have airport compatible zoning and controls.

Figure 5-35: Percentage of Airports with Surrounding Municipalities that have Adopted Airport-Compatible Zoning and Controls



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with alternative fuel vehicles or other alternative fuel equipment

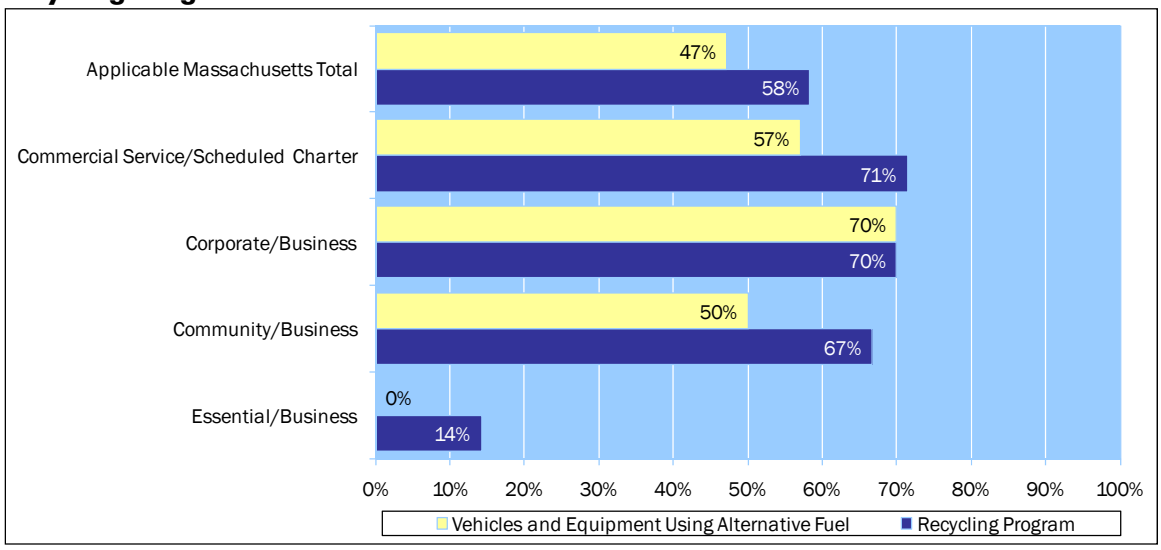
As part of a general MassDOT "GreenDOT" environmental sustainability program, MassDOT Aeronautics has worked to adopt and promote industry airport sustainability practices to help ensure the protection of the environment with respect to the state's airports. These airport sustainability practices include the conservation of natural resources, social progress that recognizes the needs of all stakeholders, and maintenance of high and stable levels of economic growth and employment. While airports within the state have begun to adopt these practices to varying degrees, it is important that each airport consider methods to protect:

1) the natural environment;
2) the quality of life for their employees and neighbors; and
3) the economic development potential of their airport.

No matter the size of the facility, each airport must make strides towards sustainability. One such approach to airport sustainability that has been in place within Massachusetts for several years is the use of alternative fuel vehicles or other alternative fuel equipment. Additionally, this approach coincides with the FAA's Voluntary Airport Low Emissions Program (VALE), a national program to reduce airport ground emissions at commercial service airports located in designated air quality nonattainment and maintenance areas. This program allows airport sponsors to use the AIP and Passenger Facility Charges (PFCs) to finance low emission vehicles, refueling and recharging stations, gate electrification, and other airport air quality improvements.

Figure 5-36 shows that 47 percent of the Massachusetts airport system report using alternative fuel vehicles or equipment at their airports. This includes 57 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, and 50 percent of Community/Business airports. None of the Essential/Business airports currently have alternative fuel vehicles or equipment. It is important to note that the employment of such vehicles at airports within the state has not been mandated, but has been encouraged through several state and federal programs, such as the VALE program.

Figure 5-36: Percentage of Airports with Alternative Fuel Vehicles/Equipment and Recycling Programs



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports with recycling programs

Similar to the alternative fuel vehicles discussed above, the development and employment of recycling programs at airports is a key indicator towards employment of the MassDOT "GreenDOT" initiative for airport sustainability. While programs can vary in breadth of scope, they often include recycling of aluminum, glass, plastics, paper, newspapers, magazines, corrugated cardboard, and fuel oils. For Massachusetts, an airport recycling program is an

important step that an airport can take to improve its environmental sustainability and MassDOT Aeronautics strongly supports that establishment of such programs at every Massachusetts airport. Figure 5-36 shows that 58 percent of the Massachusetts system reports having an established recycling program, including 71 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 67 percent of Community/Business airports, and 14 percent of Essential/Business airports. The target for this performance measure is that 100 percent of system airports have a formally established recycling program.

Percent of system airports with noise abatement programs and procedures

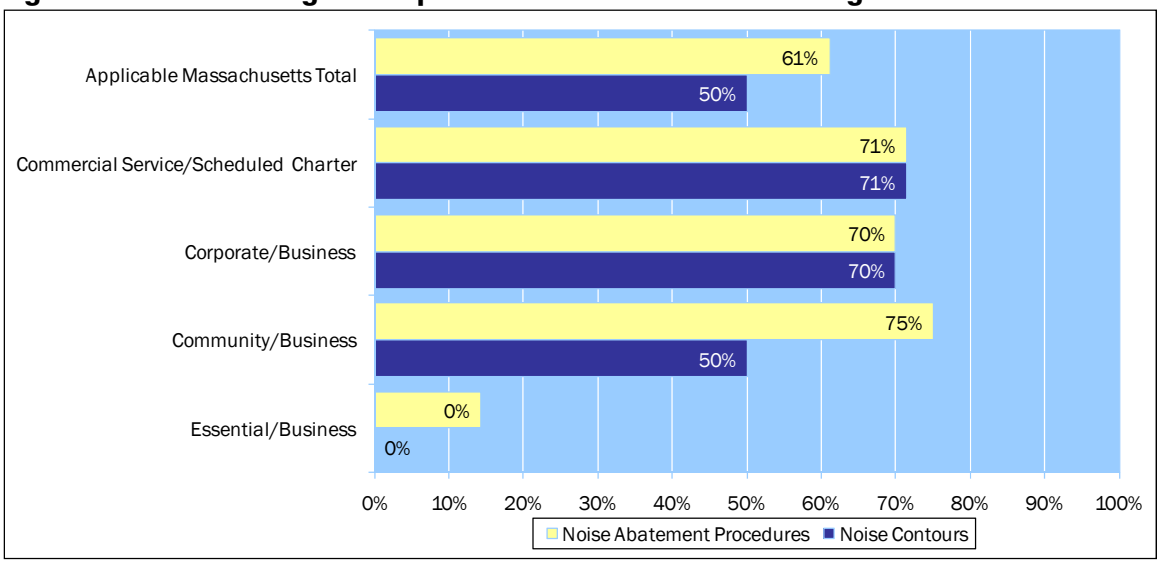
For airports, particularly those located within close proximity to commercial or residential areas, noise associated with aviation can often become an issue of contention and public debate. In response to these issues, the FAA has multiple established approaches and responses to such issues, including environmental studies and Part 150 analyses, as do many states. Two particular tools that are frequently utilized by airports through application of such studies or state initiatives are noise contours and noise abatement programs.

Airport nose contour maps not only can be an important part of the airport master planning or environmental study processes, but also can assist in identifying development around an airport that has the potential to be impacted by airport noise. Specifically, these maps show how much aircraft noise is experienced on an annual basis on and around an airport based on a specific FAA algorithm. They are produced by using a specialized computer model adopted by the FAA known as the Integrated Noise Model and show "contour" maps defining bands or contours of noise impact around an airport for the purposes of illustrating where various intensities of aircraft noise are experienced. It should be noted that noise contours are typically only generated as a result of their specific requirement through a planning initiative, such as a noise study. They are also time sensitive in that they are based on current and projected aircraft fleet mixes and operational levels.

Noise abatement programs and procedures are often established as a result of the findings of an airport noise contour-related analysis, such as an airport noise or Part 150 study. Generally defined, a noise abatement program is an initiative that oftentimes involves local neighbors and government participation to establish a program to help reduce noise impacts associated with airport operations. Such a program often includes the establishment of aircraft approach and departure flight tracks, the implementation of aircraft operational procedures, the formal tracking and reporting of aircraft flight patterns and noise impacts, the establishment of formal airport noise-related issue and response procedures, etc. One of the many benefits of such a program is that when properly conducted and maintained, a noise abatement program can positively impact noise levels and public perception of any impacts.

MassDOT Aeronautics has historically been a strong advocate of proactive airport noise abatement initiatives, having helped sponsor multiple programs, and will continue to advocate for such programs as required. Figure 5-37 shows the percentage of Massachusetts airports by role that report having established noise abatement programs and developed noise contours. In total, 61 percent of Massachusetts airports have noise abatement programs, and 50 percent have developed noise contours.

Figure 5-37: Percentage of Airports with Noise Abatement Programs and Procedures



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Goal Category: Economic

Airports play a key role in supporting and promoting economic activity in Massachusetts. Employers nationwide consider the existence and efficiency of air transportation facilities when expanding or developing in a given geographic area. This is evidenced by the fact that many top national firms use general aviation aircraft in their business to transport employees and also have customers and suppliers who visit via general aviation airports.

The presence and utility of airports is an indisputable asset to economic growth and diversification. In addition to adequate airport facilities, market areas that airports serve must possess other characteristics that make them candidates for the attraction and retention of various economic development activities.

For this MSASP goal category, the relationship between the economic activity of the region and the demand for aviation services was examined through the following performance measures:

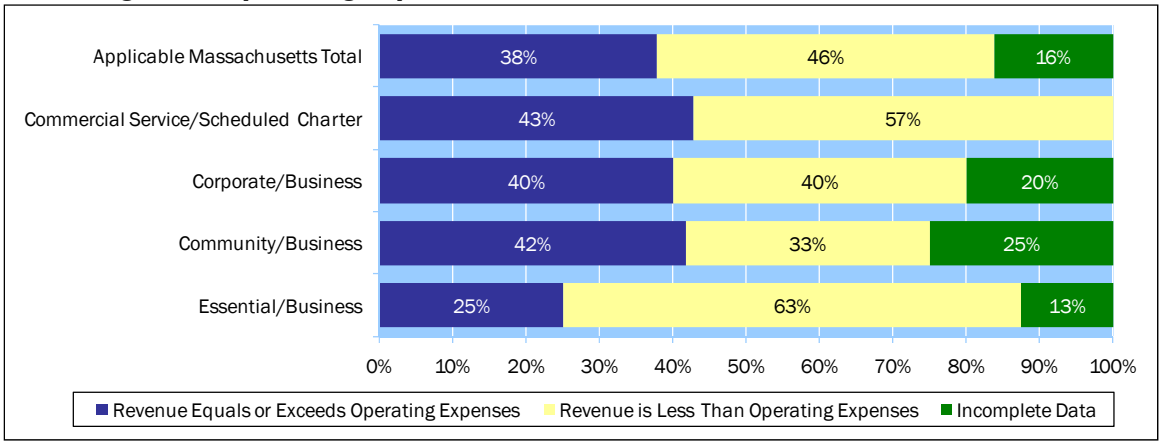
- Percent of system airports whose revenues equal or exceed their operating expenses
- Percent of total employment within 30 minutes of a system airport
- Percent of population and area within 30 minutes of a system airport meeting typical business user needs
- Percent of system airports with business development potential
- Percent of system airports with established/developable industrial park abutting/nearby airport
- Number of key tourism indicators (i.e. hotel rooms) within 30 minutes of system airports

Percent of system airports whose revenues equal or exceed their operating expenses

Whether they are publicly or privately owned, airports are typically operated as businesses. As with most businesses, airports strive to at least generate sufficient revenue to at least meet their operating expenses. This fact is particularly true during economic difficulties when public airport sponsors are more likely to realize severe budgetary constraints, and private owners are more susceptible to declines in industry operational levels. Airport revenue can be generated through a wide variety of sources, including hangar and apron fees, landing fees, land rentals, fees on services such as fuel sales, and other means depending on the facilities and services available at the airport. While the reality is that not all airports are able to operate with a positive cash flow that covers all expenses, it is the goal that nearly every airport pursues. But in relation to this fact, it must again be recognized that many public airport sponsors recognize that while their airports may not be directly profitable, the overall economic and societal benefits that they generate for the local community outweigh the annual direct costs.

During the MSASP inventory process, management was asked to report if their current revenue equaled or exceeded their current operating expenses. Figure 5-38 lists the results of this question by airport role. In total, 38 percent of system airports reported that their revenue in 2009 exceeded their operating expenses for the same period. By role, this includes 43 percent of Commercial Service/Scheduled Charter, 40 percent of Corporate/Business, 42 percent of Community/Business, and 25 percent of Essential/Business. Sixteen percent of system airports provided incomplete data for this performance measure. Detailed results by airport are shown in Figure 5-39.

Figure 5-38: Percentage of Airports by Role with 2009 Revenues Equal to or Exceeding 2009 Operating Expenses



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Note that this performance measure is informational in nature and therefore has no future target associated with it. However, as previously noted, most airports strive to have revenues that exceed expenses. Through appropriate business planning and thoughtful management processes, it is possible that the number of airports that achieve this performance measure can be increased.

Figure 5-39: Airports with 2009 Revenues Equal to or Exceeding 2009 Operating Expenses

Airport Code	Associated City	Airport Name	AIP-Eligible	2009 Operating Expenses	2009 Revenue	Revenue Equals or Exceeds Operating Expenses
Commercial Service/Scheduled Charter						
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Yes	$3,007,000	$4,146,000	Yes
ACK	Nantucket	Nantucket Memorial Airport	Yes	$10,835,003	$10,500,000	No
EWB	New Bedford	New Bedford Regional Airport	Yes	$720,000	$723,168	Yes
PVC	Provincetown	Provincetown Municipal Airport	Yes	$85,000	$40,000	No
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	Yes	$765,000	$751,000	No
MVY	Vineyard Haven	Martha's Vineyard	Yes	$2,906,455	Unknown	Yes
ORH	Worcester	Worcester Regional Airport	Yes	$7,500,000	$2,600,000	No
Corporate/Business						
BVY	Beverly	Beverly Municipal Airport	Yes	$273,305	Unknown	Yes
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	$788,000	Unknown	Unknown
LWM	Lawrence	Lawrence Municipal Airport	Yes	$471,608	$515,403	Yes
GHG	Marshfield	Marshfield Municipal Airport-George Harlow Field	Yes	Unknown	Unknown	Unknown
AQW	North Adams	Harriman and West	Yes	Unknown	Unknown	No
OWD	Norwood	Norwood Memorial Airport	Yes	$280,566	$372,456	Yes
ORE	Orange	Orange Municipal	Yes	$87,536	$87,536	Yes
PSF	Pittsfield	Pittsfield Municipal Airport	Yes	$200,000	$115,000	No
PYM	Plymouth	Plymouth Municipal Airport	Yes	$2,671,850	$2,639,322	No
BAF	Westfield/Springfield	Barnes Municipal Airport	Yes	$576,407	$572,400	No
Community/Business						
CQX	Chatham	Chatham Municipal	Yes	$18,000	$25,000	Yes
5B6	Falmouth	Falmouth Airpark	No	$225,000	$225,000	Yes
GBR	Great Barrington	Walter J. Koladza Airport	No	Unknown	Unknown	Unknown
1B9	Mansfield	Mansfield Municipal Airport	Yes	Unknown	Unknown	Unknown
9B1	Marlboro	Marlboro Airport	No	$240,000	$210,000	No
0B5	Montague	Turners Falls	Yes	$43,000	$30,000	No
7B2	Northampton	Northampton	No	$851,081	$842,180	No
3B0	Southbridge	Southbridge Municipal Airport	Yes	$40,000	$28,000	No
60M	Spencer	Spencer Airport	No	$10,000	$30,000	Yes
3B3	Sterling	Sterling Airport	No	Unknown	Unknown	Unknown
6B6	Stow	Minute Man Airfield	No	$185,000	$195,000	Yes
TAN	Taunton	Taunton Municipal Airport	Yes	$238,000	$260,404	Yes

Source: Airport Inventory and Data Survey 2010
Prepared: May 2010
Note: certain airports did not fill in information about both operating expenses and revenue, but may have answered the question about revenue exceeding or equaling operating expenses. The best answer given was used.

Figure 5-39: Airports with 2009 Revenues Equal to or Exceeding 2009 Operating Expenses

Airport Code	Associated City	Airport Name	AIP-Eligible	2009 Operating Expenses	2009 Revenue	Revenue Equals or Exceeds Operating Expenses
Essential/Business						
8B5	Barre/Barre Plains	Tanner-Hiller	No	$11,000	$5,060	No
1M8	Berkley	Myricks Airport	No	$5,000	$0	No
1B2	Edgartown	Katama Airpark	No	Unknown	Unknown	Unknown
GDM	Gardner	Gardner Municipal	Yes	$16,000	$16,000	Yes
28M	Hanson	Cranland Airport	No	$12,000	$1,200	No
1B6	Hopedale	Hopedale Industrial Park	No	Unknown	$9,000	No
2B1	Marston Mills	Cape Cod Airport	No	$20,000	$20,000	Yes
2B2	Newburyport	Plum Island Airport	No	$23,000	$0	No

Source: Airport Inventory and Data Survey 2010
Prepared: May 2010
Note: certain airports did not fill in information about both operating expenses and revenue, but may have answered the question about revenue exceeding or equaling operating expenses. The best answer given was used.

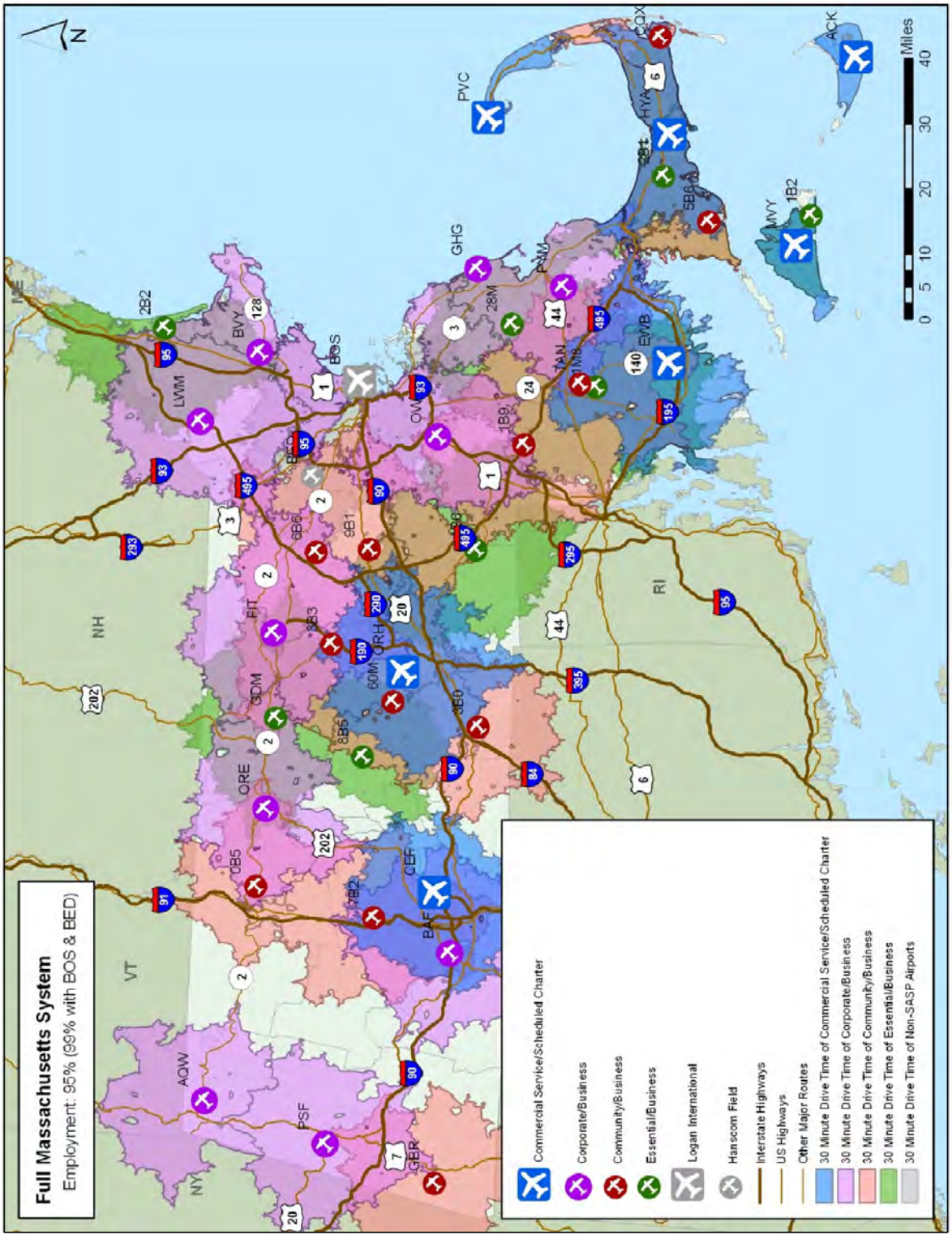
Percent of total employment within 30 minutes of a system airport

In order for the Massachusetts system of airports to properly serve businesses within the Commonwealth, airports must have a reasonable geographic proximity to those demands generated by businesses. This performance measure analyzes the percentage of total statewide employment located within 30 minutes of a system airport. As previously discussed, 30 minutes is used as a standard "service area" (also referred to as a market area) for general aviation airports since this has been established by the industry as being the approximate maximum drive time that general aviation users are generally willing to travel. This service area size is especially important for businesses that utilize general aviation aircraft since two of the key benefits of general aviation aircraft utilization is the time savings realized and the convenient access afforded to areas that are lie outside of major metropolitan markets.

For this analysis, employment is based on 2007 data from the United States Census Bureau at the Census Block Group level. Figure 5-40 depicts this data relative to the 30-minute service areas. In total, approximately 95 percent of all statewide employment is within 30 minutes of a MSASP airport. When 30-minute service areas for both General Edward Lawrence Logan International and Laurence G. Hanscom Field airports are included in addition to the MSASP airports, this coverage increases to 99 percent all of total employment being within a 30-minute drive time of a Massachusetts public-use airport.

This performance indicates that the current airport system appears to be adequately located and distributed throughout Massachusetts to appropriately serve the Commonwealth's employment centers and businesses. As such, it is concluded that no additional airport service areas (or airports) are needed to meet the current or projected levels of demand.

Figure 5-40: Percentage of Statewide Employment within a 30 Minute Drive Time of a Massachusetts System Airport



Source: Airport Inventory and Data Survey 2010, United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

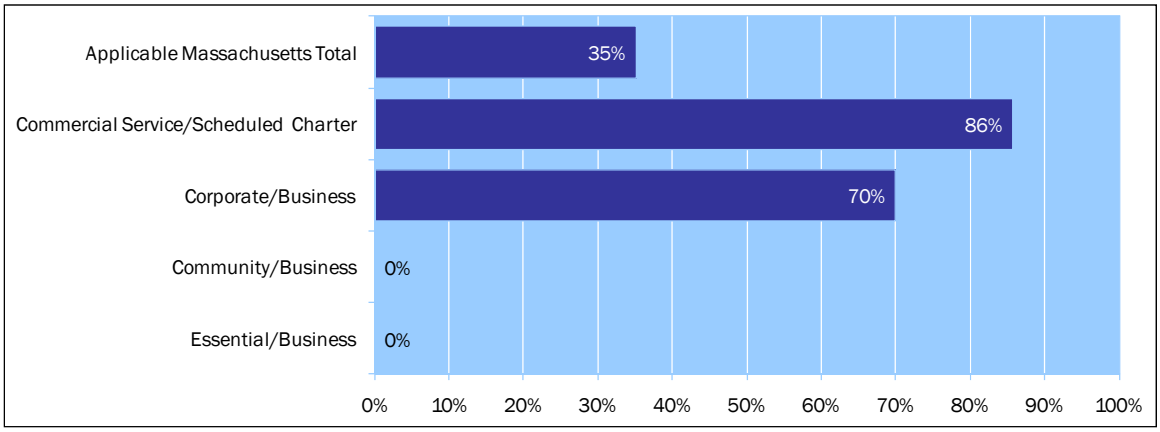
Percent of population and area within 30 minutes of a system airport meeting typical business user needs

The previous performance measure addressed the proximity of all businesses or employment in Massachusetts relative to airport locations and service areas. However, some businesses have a higher propensity to use aviation (especially general aviation) as part of their routine business activities. These types of businesses must not only have reasonable access to airports, but those airports must also meet the specific facility and service needs required by business aviation. For the purpose of this study, the following business user requirements were identified as a minimum level of facilities and services required to adequately serve business aviation needs at a system airport:

- 4,000' runway
- Instrument approach
- Jet fuel
- Terminal building
- Ground transportation

Figure 5-41 presents Massachusetts airports by role that possess each of the characteristics to meet typical business user needs. In total, 35 percent of MSASP airports meet each of these requirements. As expected, based on the criteria established for the airport roles, the majority of the airports that meet the requirements are in the Commercial Service/Scheduled Charter role category (86 percent), with the remainder in the Corporate/Business role category (70 percent).

Figure 5-41: Percentage of Airports by Role Meeting Typical Business User Needs



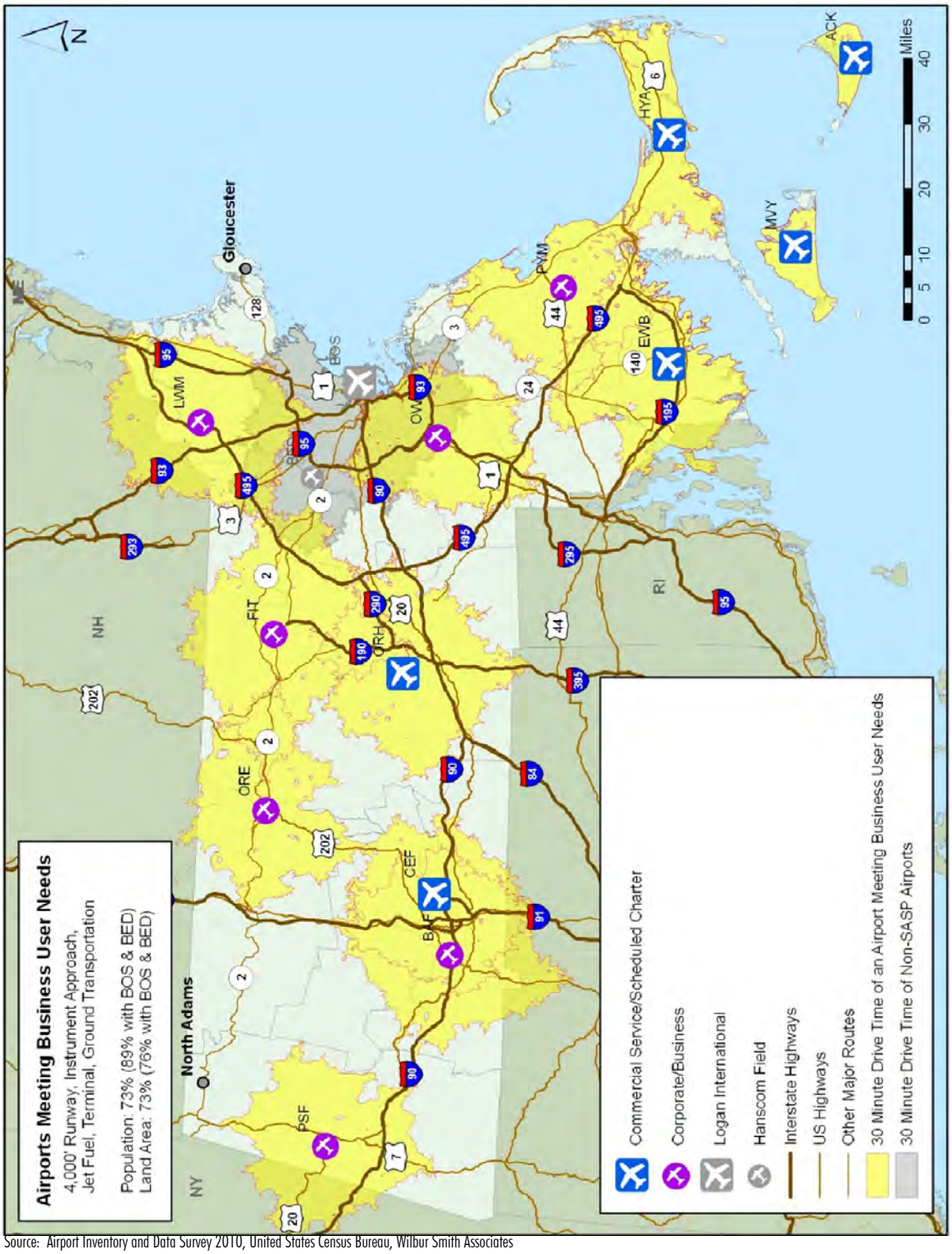
Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-42 depicts the airports that meet the specific needs of business aviation and their corresponding 30-minute drive time market areas. These areas cover 73 percent of the Commonwealth's population and 73 percent of its total land area. Inclusion of the 30-minute service areas for General Edward Lawrence Logan International and Laurence G. Hanscom Field increases this coverage to 89 percent of total population and 76 percent of total land area. However, when reviewing the figure, it is obvious that there are several "holes" in coverage, the most notable of which is located in northwestern Massachusetts along State Route 2 and includes the city of North Adams, which has a population of over 14,000. The northeastern corner of the Commonwealth (i.e. Cape Ann) also lacks coverage by airports

meeting typical business user needs. The city of Gloucester with a population of over 30,000 is located in this region. Additionally, the southwestern corner of the Commonwealth, much of the area in southern Metrowest Boston, and areas of the lower Cape are all lacking coverage from airports meeting typical business user needs.

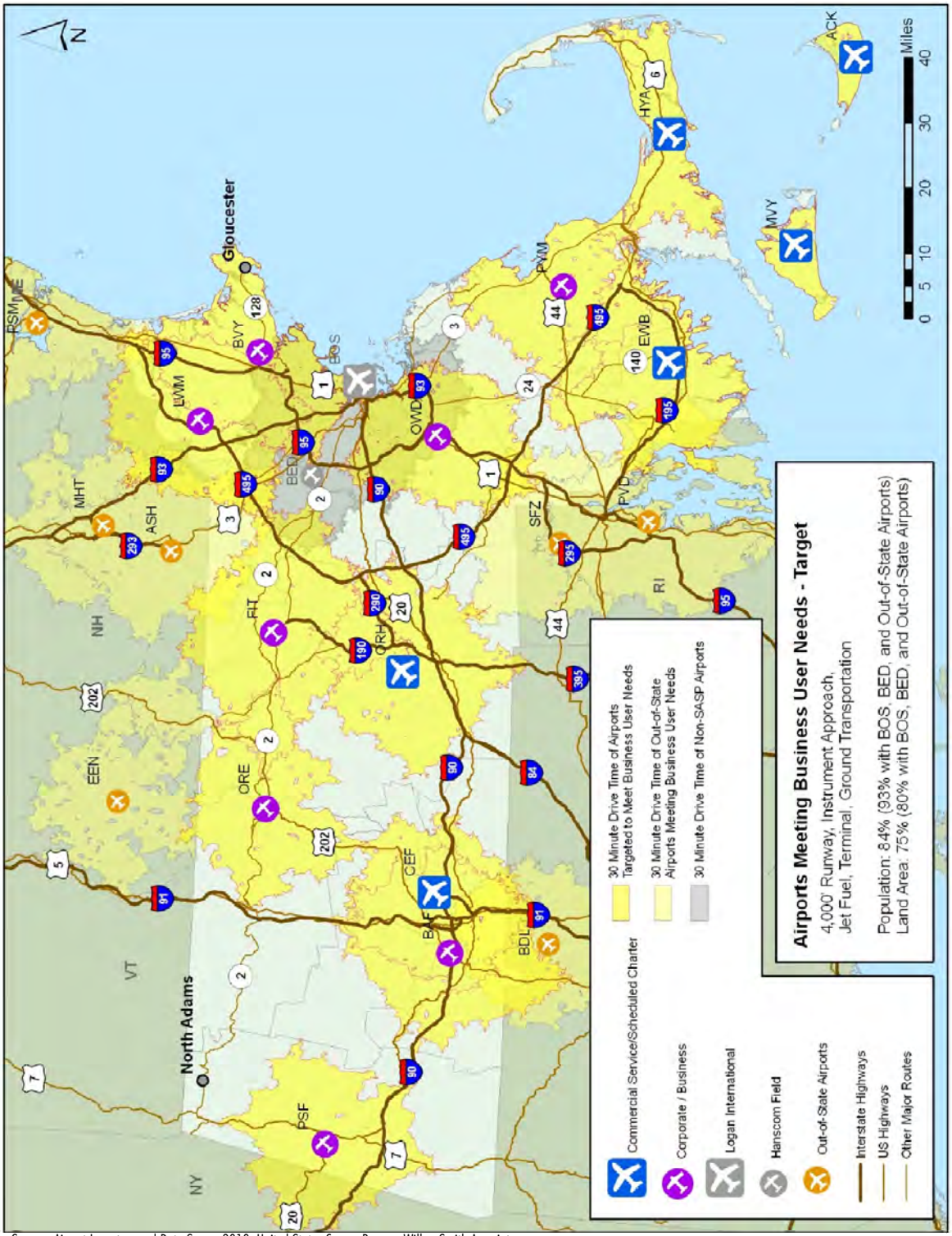
Note that as part of this study's role analysis, specific facility and service objectives were established for each airport role category. For this particular performance measure, meeting goals for the facility and service objectives (discussed in Appendix D) will improve the airport system's ability to meet typical business user needs. Specifically, if these facility and service objectives are met, Beverly Municipal Airport will also meet the business user needs criteria described above (it is currently deficient in terms of a terminal building). This would increase the compliance of the Corporate/Business role category to 80 percent and the statewide performance to 38 percent of the total system airports. Also note that several out-of-state airports that meet business user needs are within a 30-minute drive time of Massachusetts. Figure 5-43 shows how the population and geographic coverage would improve with the inclusion of Beverly Municipal and these out-of-state airports. In total, this coverage is 93 percent of the Commonwealth's population and 80 percent of its total land area.

Figure 5-42: Percentage of Statewide Population and Land Area within a 30 Minute Drive Time of a Massachusetts System Airport Meeting Typical Business User Needs



Source: Airport Inventory and Data Survey 2010, United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-43: Percentage of Statewide Population and Land Area within a 30 Minute Drive Time of Massachusetts System Airports Targeted to Meet Typical Business User Needs and Out-of-State Airports Meeting Typical Business User Needs

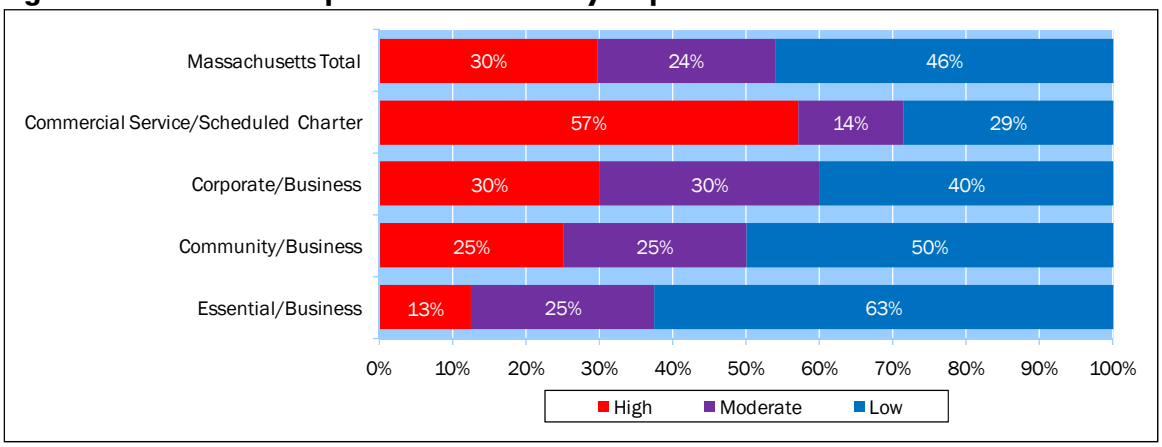


Source: Airport Inventory and Data Survey 2010, United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Percent of system airports with business development potential

The expansion potential of an airport system is important not only for the long term viability of the airports but also for the economic development of a state. During the MSASP inventory process, Massachusetts system airport managers were asked several questions about their potential for future expansion and business development on-site. The first was a general question asking them to assess the level of overall expansion potential that their airport possesses. Figure 5-44 summarizes this data by role. Statewide, 30 percent of Massachusetts system airports reported having high expansion potential, 24 percent reported moderate expansion potential, and the remaining 46 percent reported low expansion potential.

Figure 5-44: Level of Expansion Potential by Airport Role

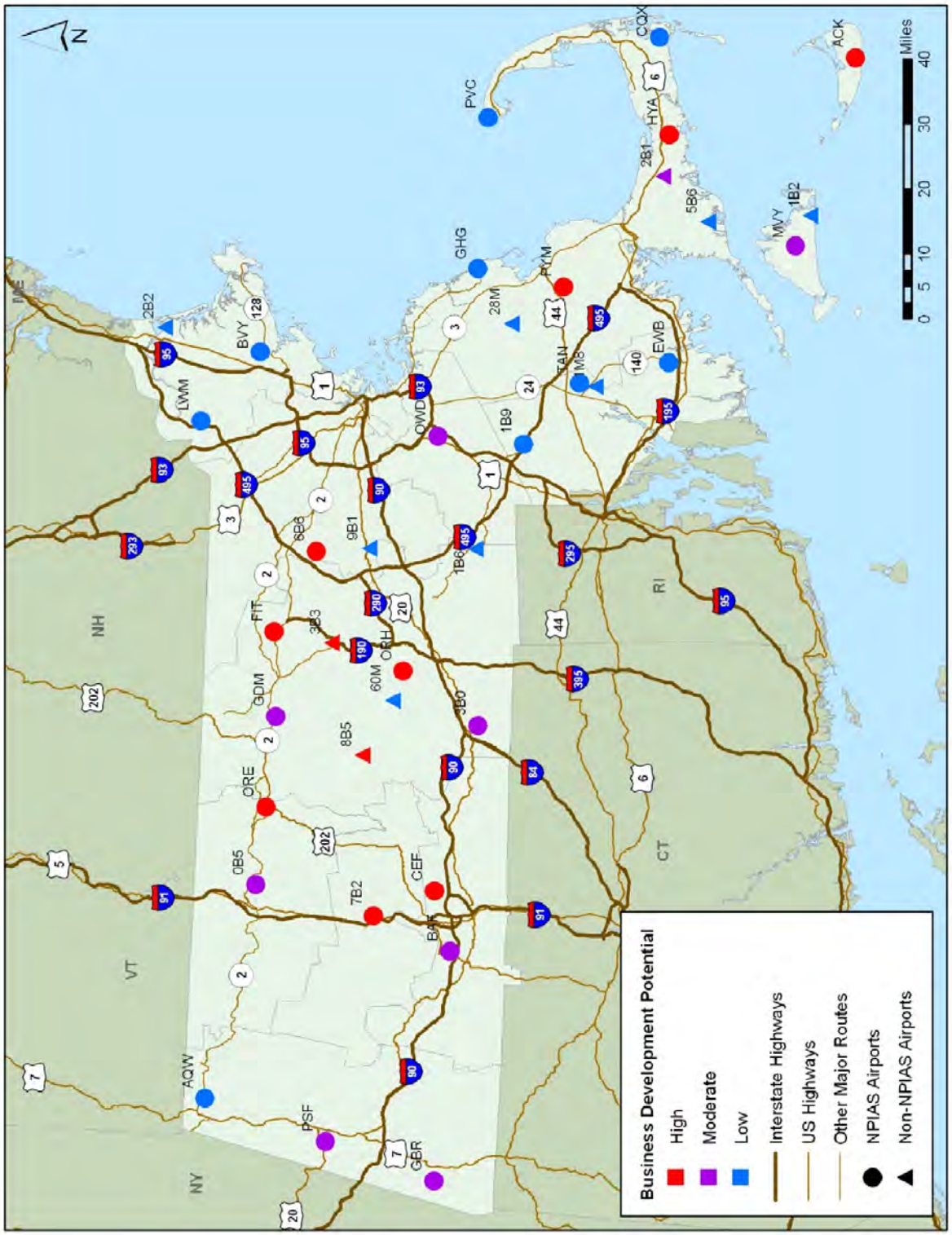


Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-45 depicts this data geographically, also showing the level of development potential reported by individual airports. The majority of airports that reported having high development potential are located in central Massachusetts, between I-91 and the I-495 loop. The few airports located in the Berkshire region of western Massachusetts all reported moderate to low expansion potential. In addition, nearly all of the airports near the Atlantic coast also reported moderate to low expansion potential. The only airports that reported a high expansion potential which also have close proximity to the coast are Barnstable Municipal, Nantucket Memorial, and Plymouth Municipal.

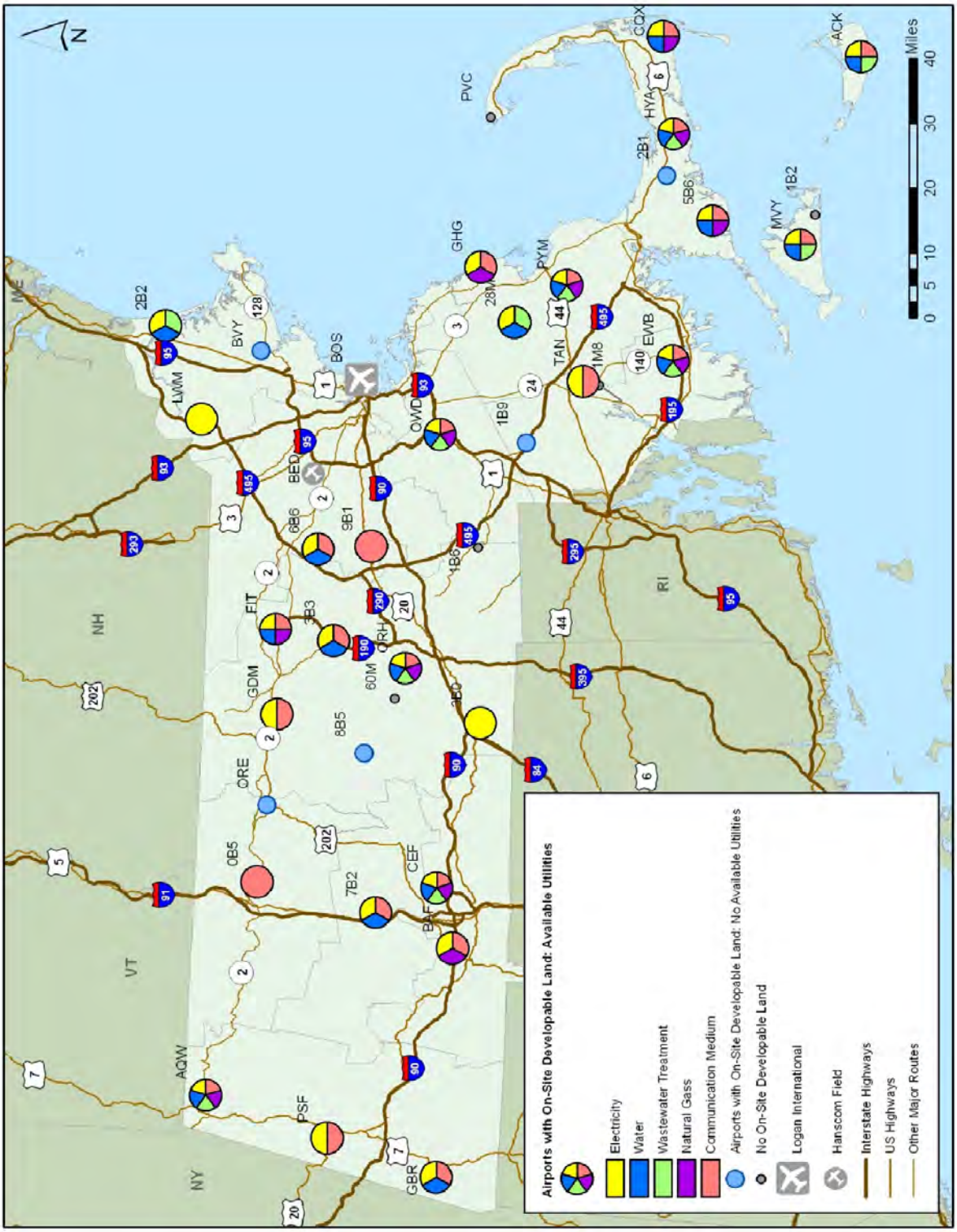
Airports were also asked if there was open land within the airport boundaries that could be developed, in addition to available utilities at these sites, such as electricity, water, wastewater treatment, natural gas, and communications (phone, cable, and internet). Figure 5-46 depicts this data geographically. In total, 86 percent of the Massachusetts system has land within airport boundaries that is available for development. For utilities at these sites, 78 percent have electricity, 56 percent have water service, 34 percent have wastewater treatment, 38 percent have natural gas, and 72 percent have some sort of communication medium already available. Airports with development-ready sites are dispersed throughout the Commonwealth, and the only gaps in distribution are where there are no MSASP airports.

Figure 5-45: Business Development Potential at Massachusetts System Airports



Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010

Figure 5-46: On-Site Developable Airport Land and Available Utilities at These Sites



Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010

In addition to these previous questions, airport management was also asked to report if manmade factors, environmental factors, community relations, or financial shortfalls could be potential restrictions on future development at their airports. Manmade factors refer to the built environment and may include buildings in future airspace, roads in an area desired for runway expansion, or other structures such as power lines or water towers. Environmental factors are any naturally existing element which may hinder development, such as trees, topography, or protected habitats such as wetlands. An airport's relationship with its host community can also directly affect the potential for expansion. A mutual understanding of an airport's benefits for a community can often greatly enhance this relationship. Finally, a shortage of airport funding, or an unsustainable financial situation at the airport, can hinder any expansion. The following details the results of the factors impacting the potential future development of Massachusetts' airports:

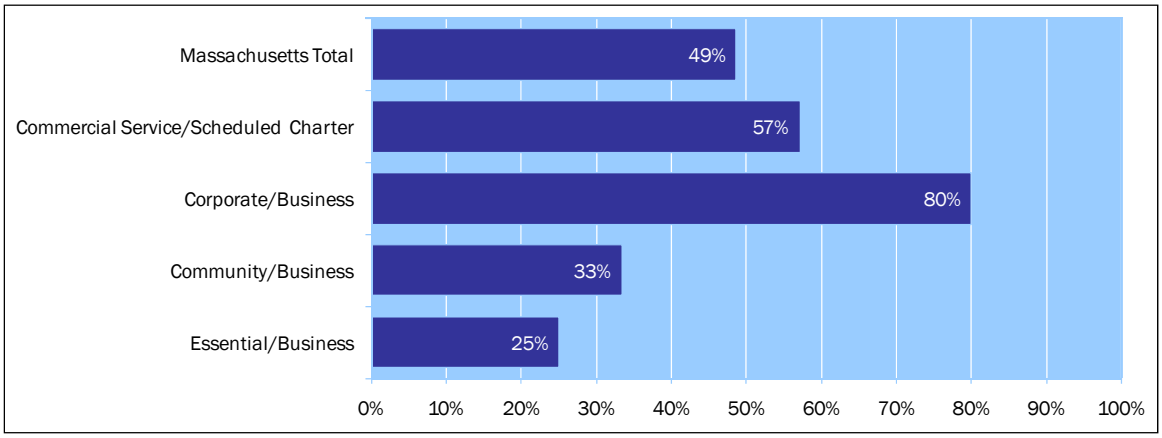
- Manmade factors: 57 percent of system airports
- Environmental factors: 65 percent of system airports
- Community relations: 49 percent of system airports
- Financial shortfalls: 70 percent of system airports

While there are multiple factors impacting the future development potential of the Commonwealth's airports, the most prominent factor identified was financial shortfalls. Given the current economic environment, this shortfall is to be expected and hopefully presents an area that can be addressed as the economy progressively recovers. Environmental factors rank second highest and have been an area of focus within Massachusetts, New England and the U.S. related to airport development. Through working with appropriate agencies and improvements in processes, it is anticipated that some of the environmental factors impacting growth can be mitigated to allow for appropriate and justified airport development in the future.

Percent of system airports with established/developable industrial park abutting/nearby airport

The economic viability of an airport is often enhanced by the existence of a nearby industrial park. Airport management was asked to report the existence of current or developable industrial parks either abutting or very near their airport location. Figure 5-47 depicts this information by role category. In total, 49 percent of system airports report having an established or developable industrial park abutting or near their property. By role, this includes 57 percent of Commercial Service/Scheduled Charter, 80 percent of Corporate/Business, 33 percent of Community/Business, and 25 percent of Essential/Business.

Figure 5-47: Percentage of Airports by Role with an Established/Developable Industrial Park



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

This is strictly an informational performance measure and has no specific target set. However, the existence of an industrial park on or very near an airport is yet another way that the long term economic viability can be strengthened. In addition, corporations within these industrial parks often use the airports for shipments or corporate flights. An airport-associated industrial park also helps to improve land use compatibility on or around the airport area.

Number of key tourism indicators (i.e. hotel rooms) within 30 minutes of system airports

Recreational tourism plays a significant role in the overall economic health of Massachusetts. Visitors come to the Commonwealth for its abundance of historical sites and cities, the beaches of Cape Cod, regional arts, culture, and food, and to experience firsthand the New England environment. The Massachusetts Office of Travel and Tourism provided an inventory of major year-round lodgings in the Commonwealth, as of April 2010. While this list does not include most bed and breakfasts or seasonal hotels, it does include larger hotel/motel facilities in the state. Of that data, seventy-five percent of these hotels and motels are located within a 30-minute driving time of at least one of the 37 system airports. When General Edward Lawrence Logan International and Laurence G. Hanscom Field are added to the 37 system airports, this coverage increases to 100 percent of the lodging locations being located near a public use airport.

Goal Category: Preservation

An important goal for the Massachusetts airport system is to maximize and preserve, where possible, the return on historic investment. This includes the preservation of an airport's infrastructure in terms of facilities, both airside and landside, and services provided to the public. For the Preservation goal category, the following performance measures were identified for monitoring facility infrastructure at study airports:

- Percent of airports meeting minimum facility and service objectives
- Percent of system airports with displaced thresholds on their primary runway
- Percent of system airports with a waiting list for T-hangars or community hangars
- Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990
- Percent of system airports with an airport restaurant
- Percent of existing capital projects funding versus the future capital projects costs for system airports
- Percent of system airports that offer based flight training
- Percent of system airports that offer aircraft maintenance services
- Percent of system airports that offer aircraft charter services
- Percent of system airports that have a winter operations plan
- Number of system airports that have closed since 1980
- Percent of system airports that are recognized in local comprehensive plans

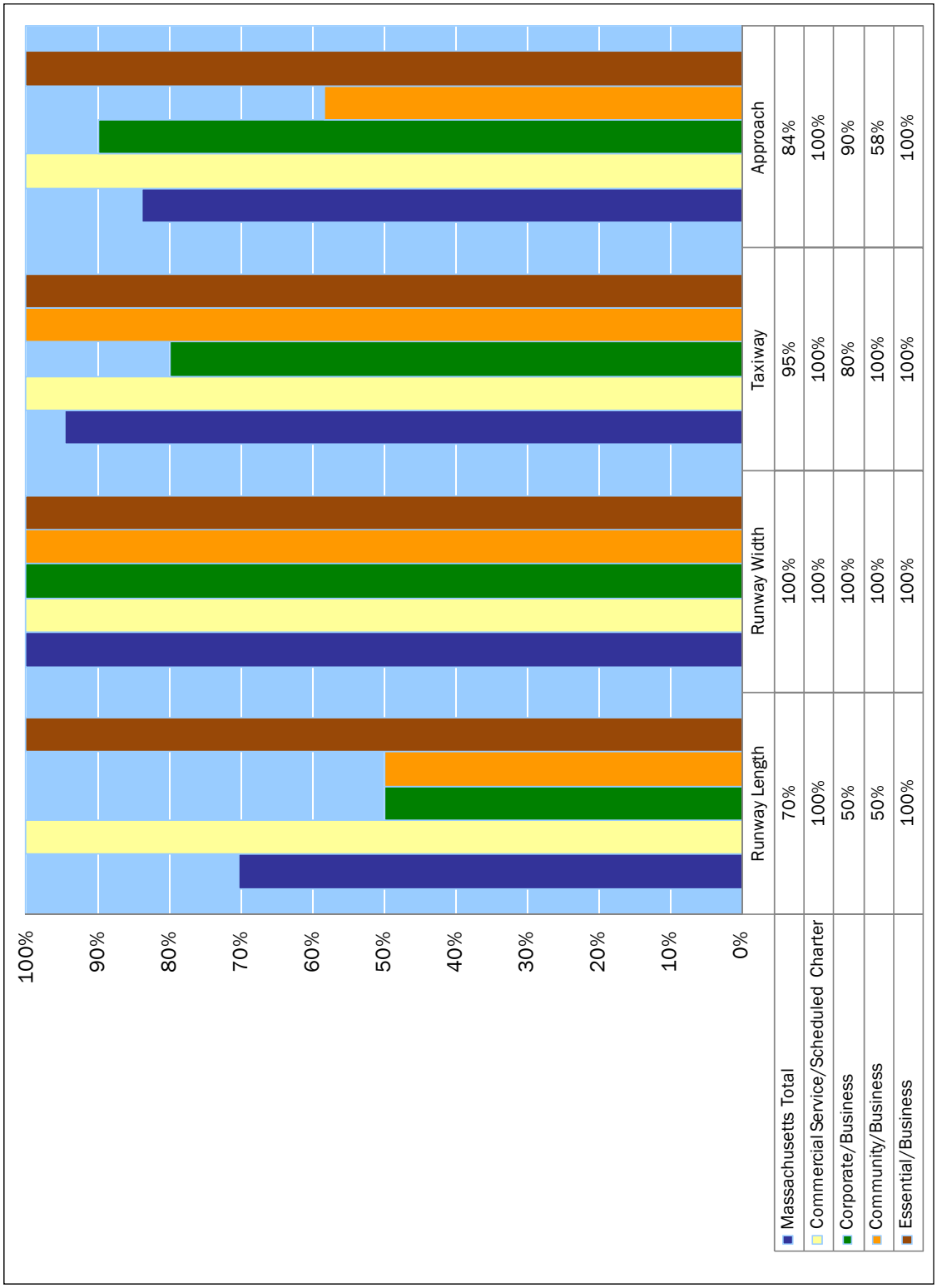
Percent of airports meeting minimum facility and service objectives

In order for the Massachusetts' airports to completely fulfill their respective roles in the system as identified in Chapter Three, the minimum facility and service objectives established for each role category should be met by those respective airports. The specific facilities and services required at each airport depend on its role with within the system, with more extensive facilities and services typically needed at airports that serve larger, more sophisticated aircraft. However, it must be understood that facility and service objectives are just that – objectives - and serve as a minimum or baseline target for airports to strive to meet in order to fully serve their role in the Massachusetts airport system. This means that, at minimum, airports within a particular role category should try to meet those facility and service objectives established for that individual category, since those objectives will aid that airport in fulfilling its system role. However, those airports should also not be limited by those objectives in that airports always have the discretion to exceed those objectives, as required.

It is important to note that the purpose of the MSASP is to provide MassDOT with a clear assessment of airport needs within the Commonwealth. Facility and service deficiencies identified in this analysis do not necessarily indicate that an airport must meet that objective during or beyond the planning period. From an FAA or state funding standpoint, projects must be included and justified in an airport-specific study in order to be eligible for FAA and state participation. Projects must be identified on an airport layout plan (ALP) and appropriate environmental analyses must be prepared prior to consideration for funding. While the MSASP analysis is considered in the overall context of FAA review, justification for airport-specific projects must be provided to gain FAA and state funding approval.

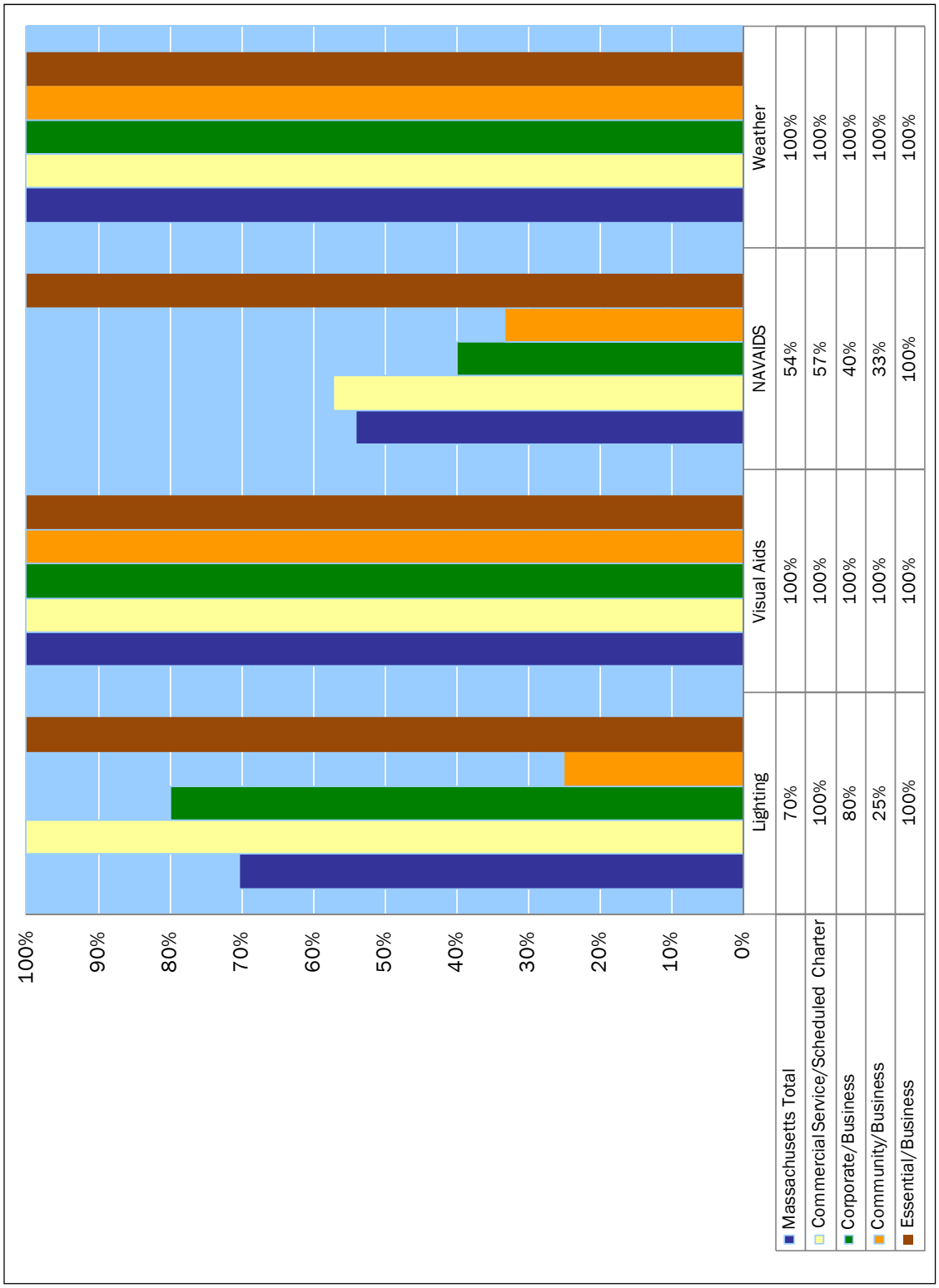
Figures 5-48 through 5-50 summarize the current compliance within each role category for facility and service objectives as well as the overall airport system's performance. In the instance where no specific objective has been established for a role category, airports are to preserve their existing facilities or services. This was often the case with the Essential/Business role category. For example, because the objective for taxiways at Essential/Business airports is to "preserve existing," the current performance is 100 percent of the role total, regardless of their taxiway type. A complete, detailed analysis has been performed and is included in Appendix D. In some cases, airports in a given role may not currently meet their objectives. In such instances, the system deficiencies in specific facility and service objectives will serve as guidelines for future airport system development if and when desire and means for compliance arises. Future targets set for each of these objectives are also presented in Appendix D. Specific projects are identified in a subsequent chapter of the MSASP for each airport as related to meeting the facility and service objectives, as appropriate.

Figure 5-48: Summary of Airside Facility Objectives at Massachusetts System Airports



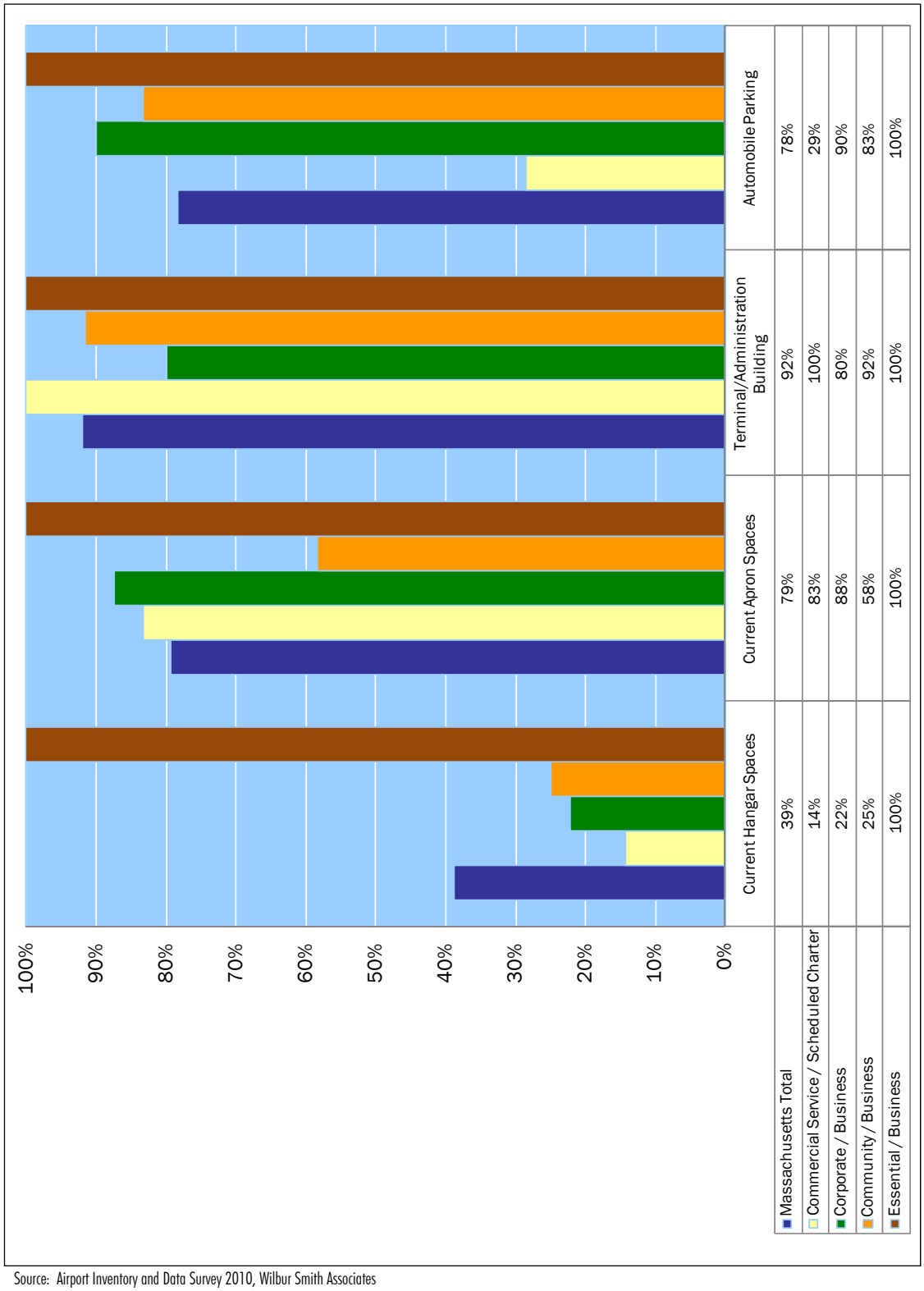
Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010
Note: Essential/Business role category goal is to simply "preserve existing." As such, their compliance is 100 percent.

Figure 5-48: Summary of Airside Facility Objectives at Massachusetts System Airports (continued)



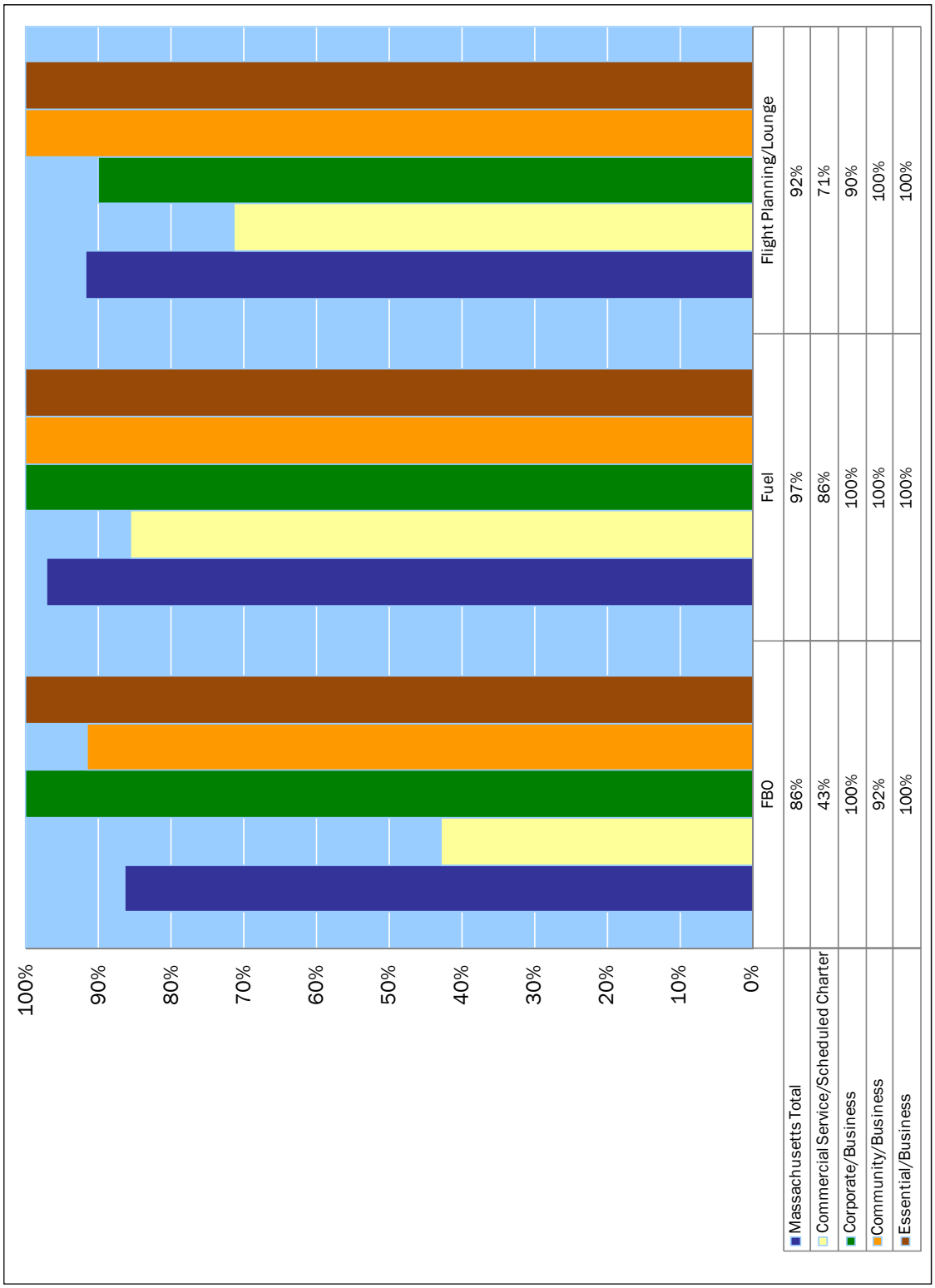
Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010
Note: Essential/Business role category goal is to simply "preserve existing." As such, their compliance is 100 percent.

Figure 5-49: Summary of Landside Facility Objectives at Massachusetts System Airports



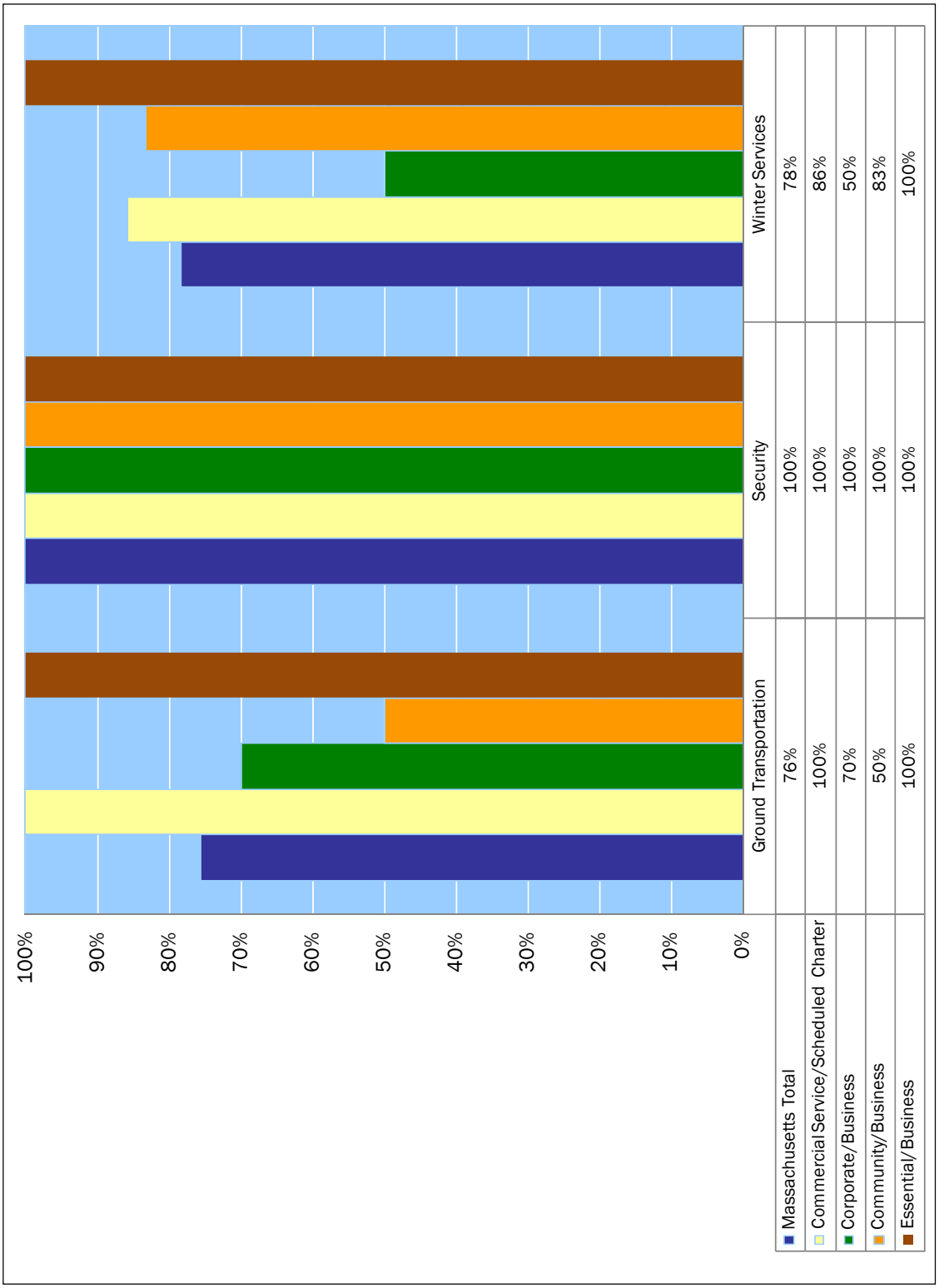
Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010
Note: Essential/Business role category goal is to simply "preserve existing." As such, their compliance is 100 percent.

Figure 5-50: Summary of Landside Services Objectives at Massachusetts System Airports



Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010
Note: Essential/Business role category goal is to simply "preserve existing." As such, their compliance is 100 percent.

Figure 5-50: Summary of Landside Services Objectives at Massachusetts System Airports (continued)

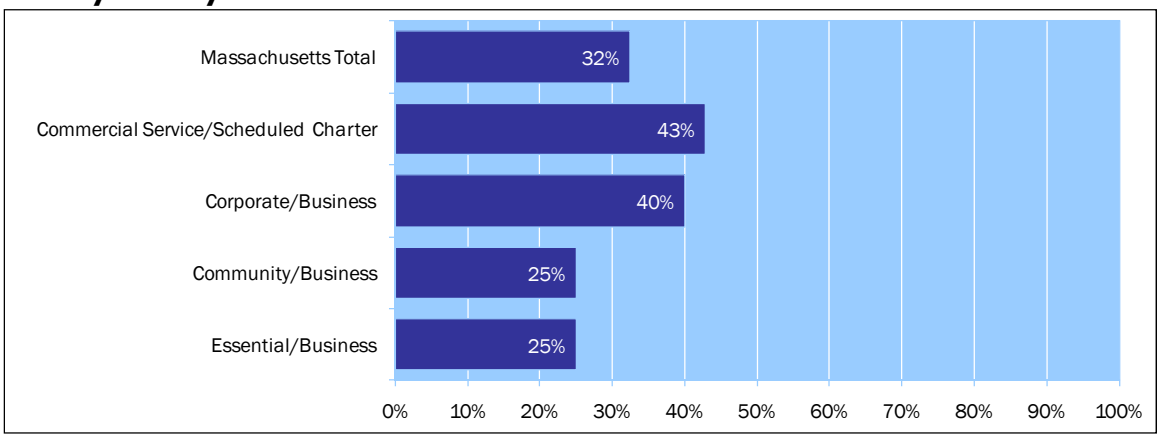


Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010
Note: Essential/Business role category goal is to simply "preserve existing." As such, their compliance is 100 percent.

Percent of system airports with displaced thresholds on their primary runway

Displaced thresholds at runway ends are often used to account for airspace obstacles near the runway ends, runway safety areas, noise restrictions at or around the airport, or to account for specific issues related to the quality and strength of the runway pavement. During the MSASP survey effort, airport managers were asked to report if they had displaced thresholds on their primary runways. Figure 5-51 shows that 32 percent of airports in the Massachusetts system have a displaced threshold on their primary runway. By role, this includes 43 percent of Commercial Service/Scheduled Charter, 40 percent of Corporate/Business, 25 percent of Community/Business, and 25 percent of Essential/Business.

Figure 5-51: Percentage of Airports by Role with Displaced Thresholds on Their Primary Runways



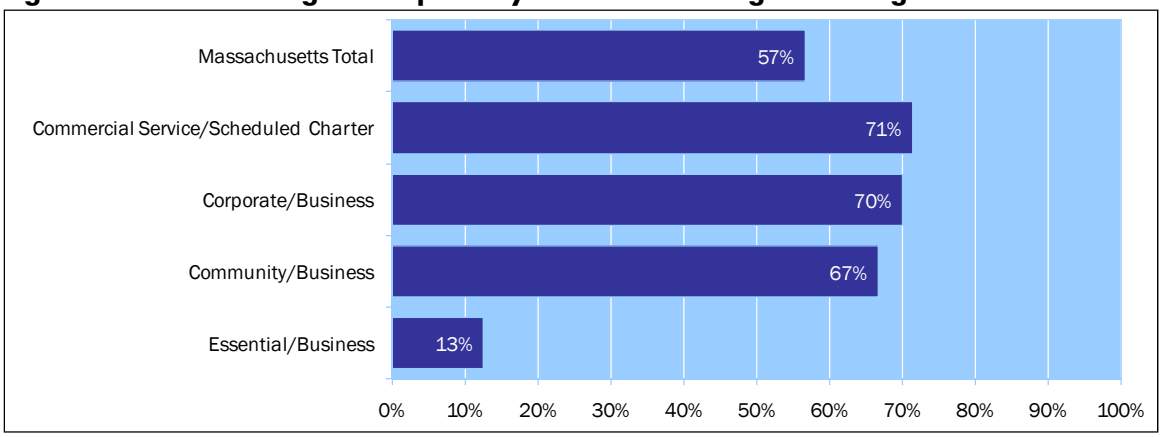
Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

While displaced thresholds do impact the landing distance available for a runway, they do still allow for takeoff on the displaced area. Unless an airport has indicated that its landing length is not sufficient, a displaced threshold does not have to be addressed. This informational performance measure has no specific target associated with it.

Percent of system airports with a waiting list for T-hangars or community hangars

During the airport inventory effort, managers at Massachusetts system airports were asked if they had a waiting list for hangar spaces for based aircraft. Hangar waiting lists are good indicators to both determine the level of demand for basing aircraft at a particular airport, and to weigh that airport's current ability to meet this demand. Figure 5-52 displays the percentage of airports that report having a waiting list for T-hangars or community hangars. System-wide 57 percent of airports have a hangar waiting list. By role, this includes 71 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 67 percent of Community/Business, and 13 percent of Essential/Business.

Figure 5-52: Percentage of Airports by Role with a Hangar Waiting List



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

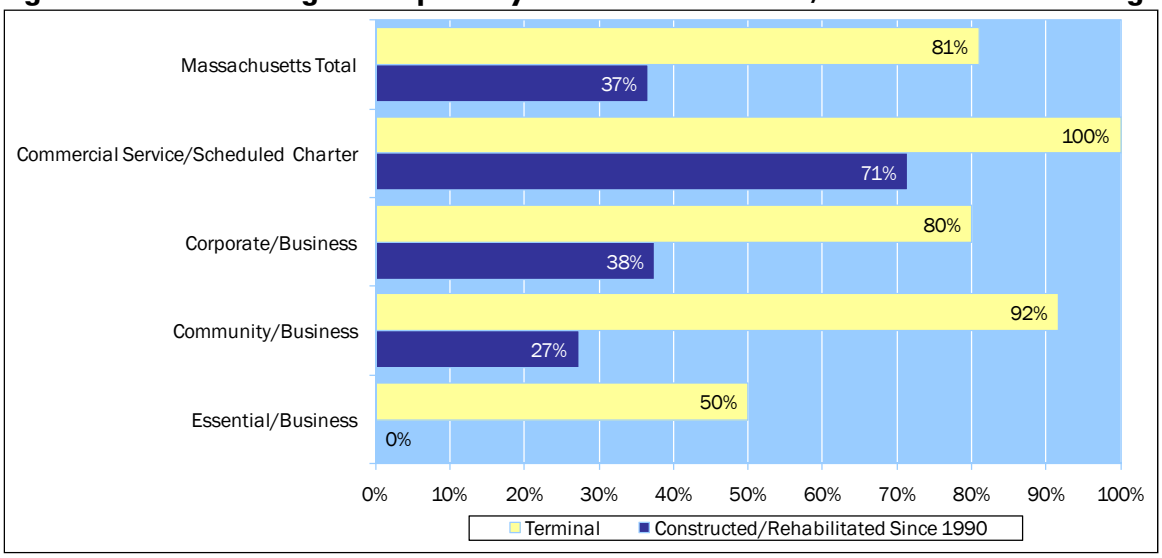
This performance measure is for informational purposes. Although no specific target has been set for the MSASP, waiting lists are one of the factors considered when determining recommendations for aircraft storage construction.

Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990

A terminal or administration building is typically seen as both an airport's "welcome center" and the gateway to the host community for arriving pilots and passengers. General aviation terminal buildings typically serve multiple roles for the airport depending on the complexity of its services and facilities. At many airports, the terminal may house the fixed base operator (FBO), a pilots' lounge, a weather information area, restrooms/showers, a restaurant, and/or an observation area. Additionally, terminal facilities can vary dramatically in their quality, upkeep and preservation. Oftentimes, airports can have terminal buildings that are over 50 years old, originating as a hangar, military facility, or some other structure. As a baseline for analysis in the MSASP, it was assumed that those terminal facilities that were either constructed or rehabilitated since 1990 would be of appropriate quality and upkeep for the Massachusetts airport system.

Figure 5-53 shows that 81 percent of the Massachusetts airport system reported having a terminal or administration building. By role, this includes 100 percent of Commercial Service/Scheduled Charter, 80 percent of Corporate/Business, 92 percent of Community/Business, and 50 percent of Essential/Business. Of the airports that have a terminal building, 37 percent of these have been constructed or rehabilitated since 1990.

Figure 5-53: Percentage of Airports by Role with a Terminal/Administration Building



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010
Note: role percentages of terminals constructed or rehabilitated since 1990 only reflect those airports that have a terminal/administration building.

The target established for this performance measure is for all airports in the Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business role categories to have a terminal/administration building that has been constructed or rehabilitated since 1990. Figure 5-54 details the airports that need to construct or rehabilitate a terminal building. The system-wide target for this performance measure totals 78 percent of all airports included in the MSASP. However, it should also be noted that federal funding for terminal buildings is only available for commercial service purposes.

Figure 5-54: Airports Identified to Construct or Rehabilitate a Terminal/ Administration Building Based Upon Facility Requirement

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*	*Terminal/ Administration Building*	*Constructed/ Rehabilitated Since 1990*
Commercial Service/Scheduled Charter					
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Yes	Yes	No*
EWB	New Bedford	New Bedford Regional Airport	Yes	Yes	No
Corporate/Business					
BVY	Beverly	Beverly Municipal Airport	Yes	No	NA
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	Yes	No
LWM	Lawrence	Lawrence Municipal Airport	Yes	Yes	No
AQW	North Adams	Harriman and West	Yes	No	NA
ORE	Orange	Orange Municipal	Yes	Yes	No
PSF	Pittsfield	Pittsfield Municipal Airport	Yes	Yes	No
PYM	Plymouth	Plymouth Municipal Airport	Yes	Yes	No
Community/Business					
CQX	Chatham	Chatham Municipal	Yes	Yes	No
5B6	Falmouth	Falmouth Airpark	No	Yes	No
GBR	Great Barrington	Walter J. Koladza Airport	No	Yes	No
1B9	Mansfield	Mansfield Municipal Airport	Yes	Yes	No
9B1	Marlborough	Marlboro Airport	No	Yes	No

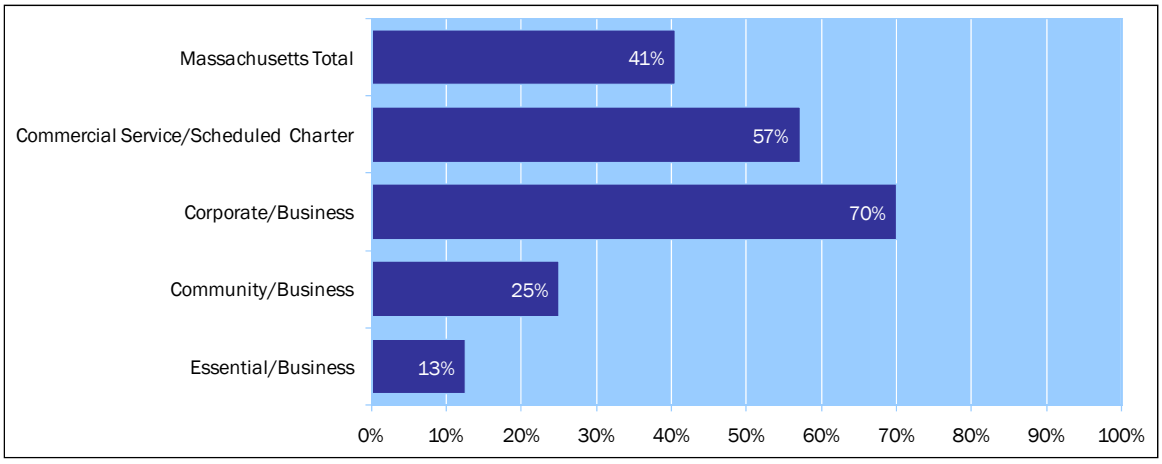
3B0	Southbridge	Southbridge Municipal Airport	Yes	Yes	No
60M	Spencer	Spencer Airport	No	No	NA
3B3	Sterling	Sterling Airport	No	Yes	No
TAN	Taunton	Taunton Municipal Airport	Yes	Yes	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010
Note: * Barnstable Municipal Airport is currently undertaking the construction of a new terminal building.

Percent of system airports with an airport restaurant

Airports were also asked to report if they had an on-site restaurant. Airport restaurants are seen as an attraction and value-added service for general aviation and commercial passengers alike. In total, 41 percent of Massachusetts system airports reported having an airport restaurant. As shown in Figure 5-55 this includes 57 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 25 percent of Community/Business, and 13 percent of Essential/Business. Figure 5-56 depicts the airports that have an airport restaurant.

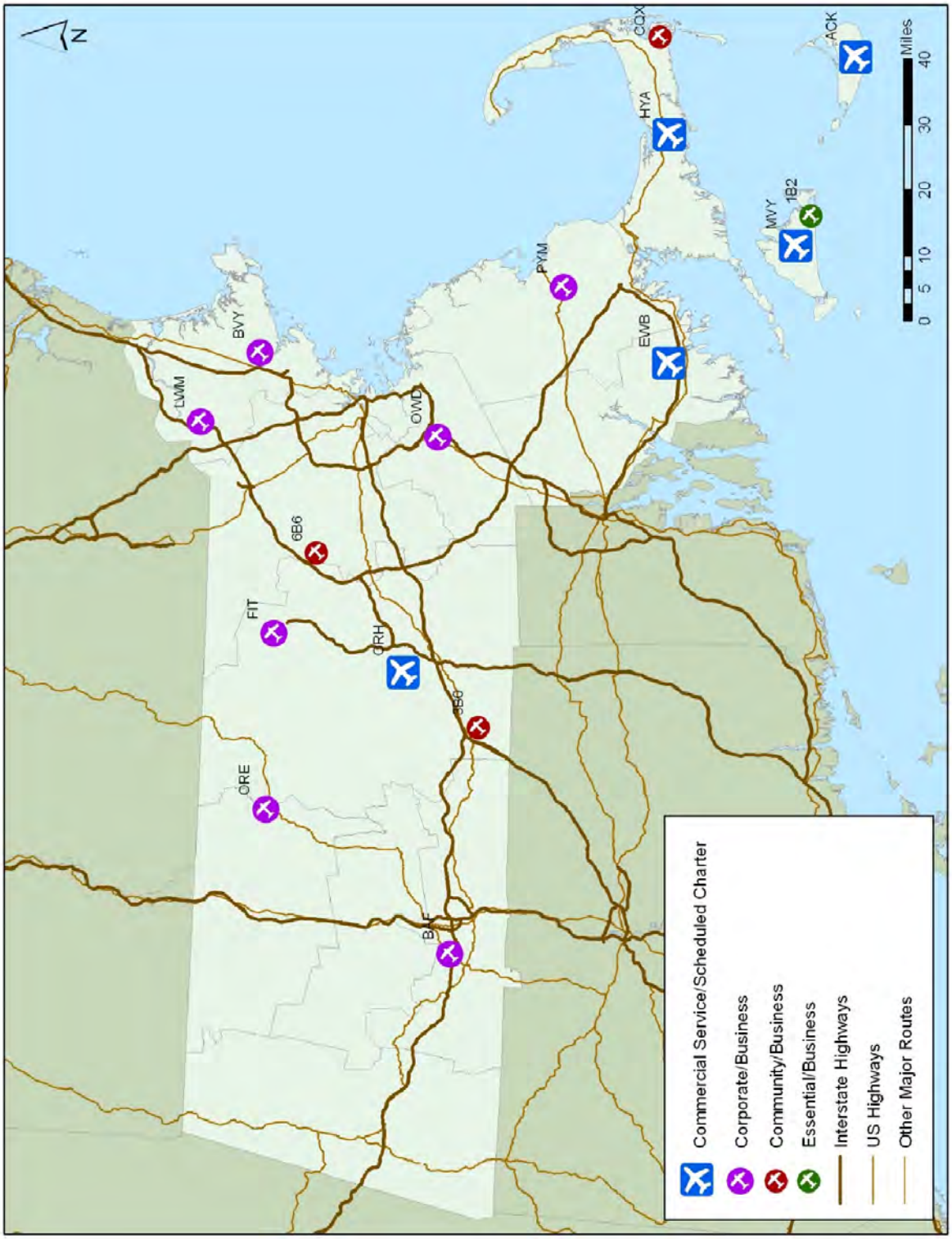
Figure 5-55: Percentage of Airports by Role with an Airport Restaurant



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Airport restaurants are not considered an objective, but merely provide the potential attraction for aviation and non-aviation residents to visit the airport. As this performance measure is for informational purposes, no specific future target has been set.

Figure 5-56: Locations of Airport Restaurants

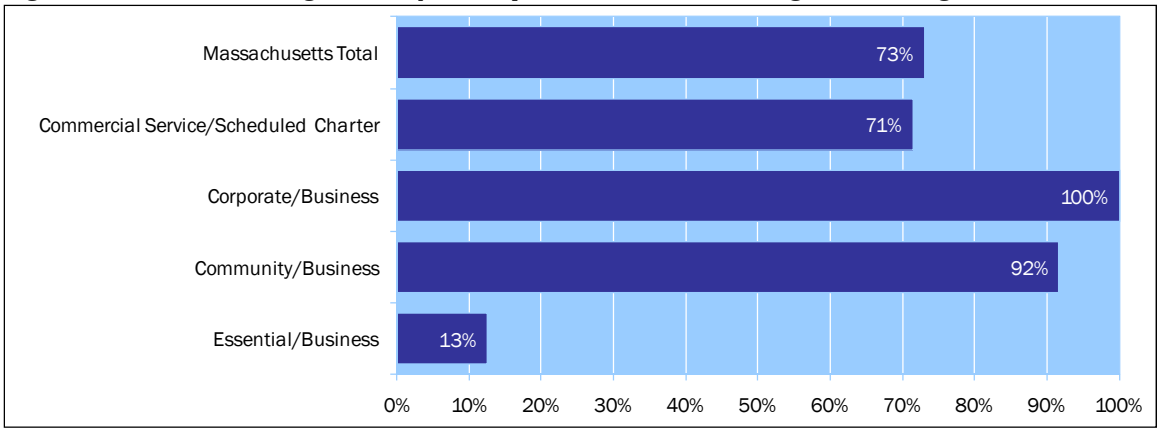


Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports that offer based flight training

Airports that provide or accommodate flight instruction help to add and develop pilots within the national aviation system. They also provide outlets for people who are interested in aviation and frequently serve as effective promoters of the aviation industry - flight instructors are always willing to discuss flight principles with those who are interested. Additionally, flight instructors often provide introductory flights (that are often free) to those attracted to aviation, which is a highly effective promotional tool for the industry. Finally, based flight training is one of many ways that an airport can ensure the existence and consistency of aviation activity and revenue. Figure 5-57 details the results by airport role of those airports that reported having based flight training. In total, 73 percent of the full Massachusetts system of airports has on-site flight training. By role, this includes 71 percent of Commercial Service/Scheduled Charter, 100 percent of Corporate/Business, 92 percent of Community/Business, and 13 percent of Essential/Business.

Figure 5-57: Percentage of Airports by Role with Based Flight Training



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

MassDOT Aeronautics actively supports the growth and diversification of its airport system, and flight training is an important component of that growth and diversification. MassDOT Aeronautics encourages additional flight training be developed around the state to meet demand for such services and help sustain the aviation industry as a whole. This performance measure is again informational in nature and has no specific future target associated with it.

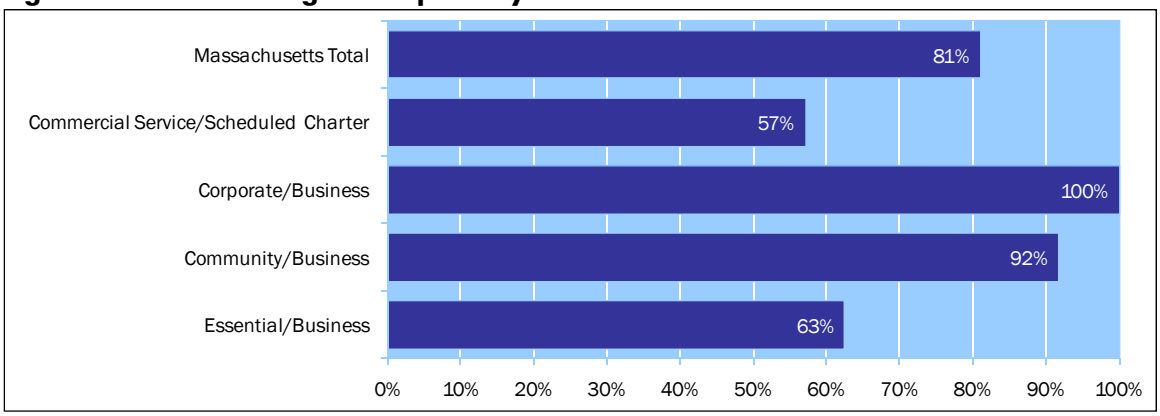
Percent of system airports that offer aircraft maintenance services

During the MSASP inventory effort, airport managers were asked to indicate the availability of three types of aviation maintenance and repair at their airports: airframe, powerplant, and avionics. Additionally, they were asked if they had an FAA Part 145 Repair Station. For the purposes of this analysis, the existence of any of these aircraft maintenance services qualifies an airport to meet this performance measure.

Figure 5-58 shows the percentage of airports by role that have at least one form of aviation maintenance. Statewide, 81 percent of the full Massachusetts system of airports offers some form of aircraft maintenance service. By role, this includes 57 percent of Commercial

Service/Scheduled Charter, 100 percent of Corporate/Business, 92 percent of Community/Business, and 63 percent of Essential/Business.

Figure 5-58: Percentage of Airports by Role with Aviation Maintenance



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

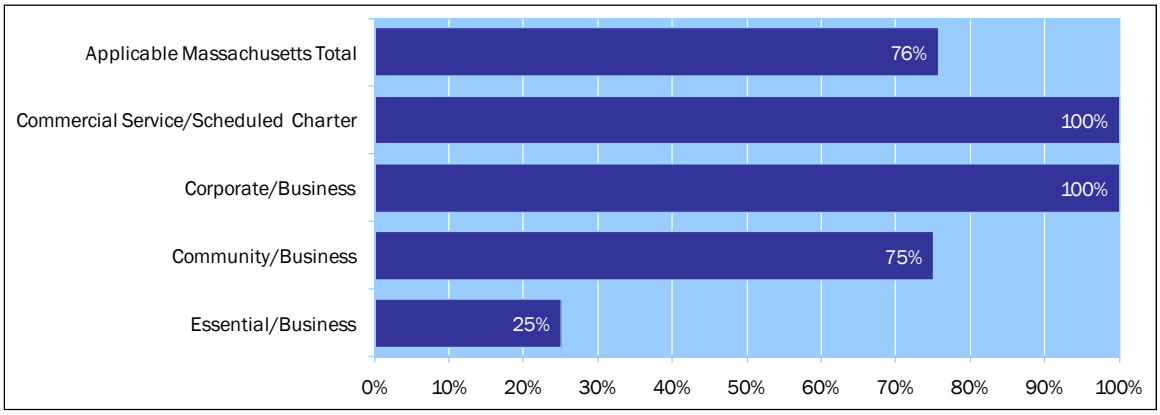
Similar to flight training, MassDOT Aeronautics endorses the development of aviation maintenance services as a mechanism of meeting the needs of general aviation throughout the Commonwealth. However, no specific future target was set for this informational performance measure.

Percent of system airports that offer aircraft charter services

Aircraft charter is another important service at Massachusetts system airports. Also known as air taxi, executive charter, and jet charter, air charter generally encompasses those businesses that rent an entire aircraft, as opposed to renting individual aircraft seats through traditional commercial carriers. While the airlines specialize in selling transportation by the seat, air charter companies focus on individual private aircraft and itineraries, urgent or time-sensitive freight, cargo, air ambulance and any other form of ad hoc air transportation.

According to the survey of airport management, 76 percent of airports included in the MSASP experience air charter activities. By role, this includes 100 percent of Commercial Service/Scheduled Charter and Corporate/Business, 75 percent of Community/Business, and 25 percent of Essential/Business. Figure 5-59 graphically displays the results of this measure by airport role category.

Figure 5-59: Percentage of Airports by Role with Air Charter Activity



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-60 graphically displays the frequency of air charter activity by airport. Statewide, 35 percent of all airports experience daily charter activity, 16 percent weekly, and 11 percent monthly. Among the airports with daily charter flights are those located on Martha's Vineyard, Nantucket, and Cape Cod.

Charter activity is a critical component of the state's air service network. As such, MassDOT Aeronautics monitors the location and frequency of these services. This performance measure is informational in nature, and no future target has been established.

Figure 5-60: Massachusetts System Airports with Charter Activity



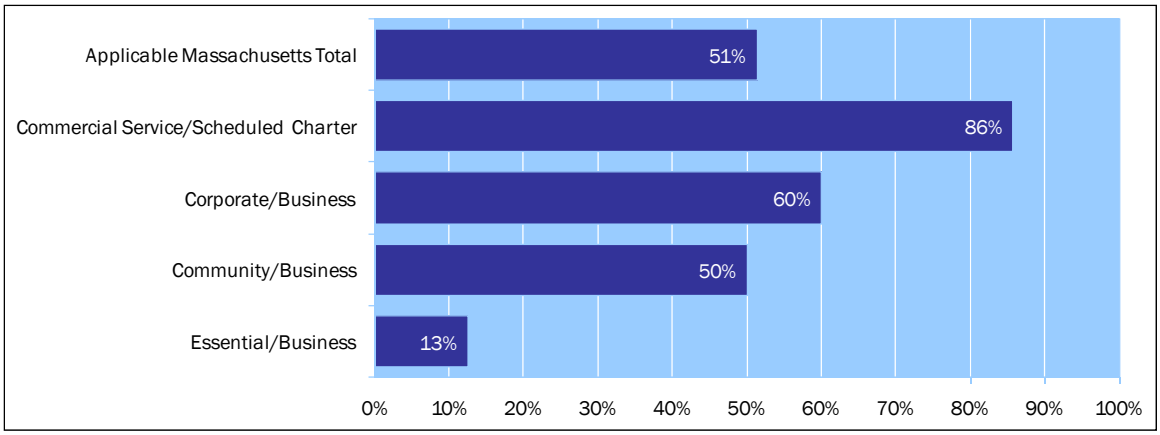
Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Percent of system airports that have a winter operations plan

A winter operations plan is an important document that helps airports appropriately and intentionally respond to adverse weather conditions during winter months, including snow fall, harsh runway surface conditions, and reduced aircraft visibility. These plans are especially critical for northern states like Massachusetts where quickly changing, and often extremely harsh, winter weather conditions can dramatically impact aircraft operations and compromise airport safety.

Figure 5-61 summarizes the MSASP airports by role that have a winter operations plan. Statewide, 51 percent of system airports report having a plan in place, with 86 percent of the Commercial Service/Scheduled Charter role meeting this performance measure. Sixty percent of Corporate/Business, 50 percent of Community/Business, and 13 percent of Essential/Business airports also indicated they have winter operations plans.

Figure 5-61: Percentage of Airports by Role with a Winter Operations Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target set for this performance measure is for all AIP-eligible airports to develop and maintain a winter operations plan. Figure 5-62 lists those AIP-eligible airports that are recommended to develop a winter operations plan. When including non-AIP-eligible airports that already meet this objective, it brings the total future target to 70 percent of the Massachusetts system total. As part of this plan, it is also recommended that MassDOT Aeronautics develop a template winter operations plan that could be used by those airports that currently do not have an established plan.

Figure 5-62: Airports Recommended to Develop a Winter Operations Plan

Airport Code	Associated City	Airport Name
Commercial Service/Scheduled Charter		
PVC	Provincetown	Provincetown Municipal Airport
Corporate/Business		
FIT	Fitchburg	Fitchburg Municipal Airport
GHG	Marshfield	Marshfield Municipal Airport-George Harlow Field
AQW	North Adams	Harriman and West
PSF	Pittsfield	Pittsfield Municipal Airport
Community/Business		
3B0	Southbridge	Southbridge Municipal Airport
Essential/Business		
GDM	Gardner	Gardner Municipal

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Number of system airports that have closed since 1980

The overall number of airports has continued to decline over the last 30 years in the U.S. and in Massachusetts, as increasing airport operational costs, increasing land values, and other economic and market shifts have forced airports to close. Figure 5-63 provides a listing of the public-use airports in Massachusetts that have closed to the public since 1980. While some of these, such as Pepperell, are still operating as private facilities, they are no longer part of the Massachusetts system of public airports. In total, there are 22 airports, heliports, and seaplane bases that are now unavailable for public activity or are closed altogether. Figure 5-64 shows the location of these closed facilities in relation to the current Massachusetts system.

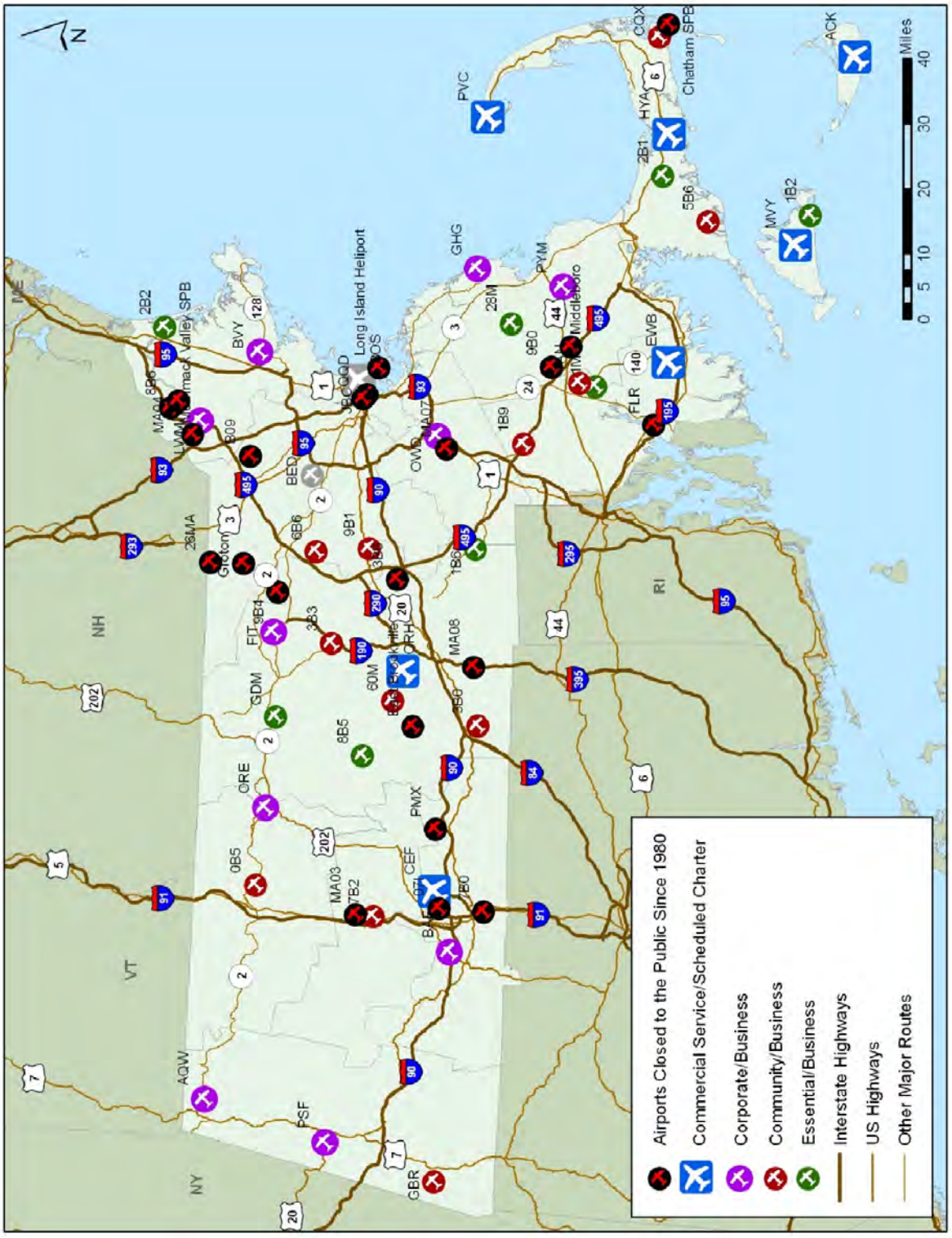
In identifying this as a performance measure, MassDOT Aeronautics was interested in only quantifying the overall loss of aviation facilities within the Commonwealth. There is no specific target established for this measure. However, it must be acknowledged that the loss of public use airports is considered to be an issue of critical importance within Massachusetts and the U.S. as a whole. As such, MassDOT Aeronautics is actively committed to preserving and maintaining the airport system as a vibrant and viable transportation resource for the Commonwealth now and in the future.

Figure 5-63: Airports in Massachusetts that have Closed to the Public Since 1980

Airport Code	*Associated City*	*Airport Name*	*Year Closed to Public*
07I	Agawam	Agawam-Springfield Seaplane Harbor	2002
7B0	Agawam	Bowles Agawam	1985
	Boston	Long Island	1993
JBC	Boston	Boston Heliport	1999
QQD	Boston	Nashua Street Heliport	1998
	Chatham	Chatham SPB	1990
	East Brookfield	East Brookfield	1980
FLR	Fall River	Fall River Municipal	1996
	Groton	Groton	1985
MA03	Hatfield	Hatfield-Pilgrim	1998
8B6	Haverhill	Haverhill-Dutton	1986
MA04	Haverhill	Haverhill-Riverside and SPB	1997
	Methuen	Merrimack Valley SPB	2007
	Middleboro	Middleboro	1987
MA07	Norfolk	Norfolk	2006
9B0	North Middleboro	North Middleboro Airpark	1988
MA08	Oxford	Oxford	2005
PMX	Palmer	Metropolitan	1998
26MA	Pepperell	Pepperell	2003
9B4	Shirley	Shirley	2004
B09	Tewksbury	Tew-Mac	1997
3B6	Westboro	Westboro	1980

Source: Federal Aviation Administration, Massachusetts Department of Transportation
Prepared: May 2010

Figure 5-64: Airports that have Closed to the Public Since 1980

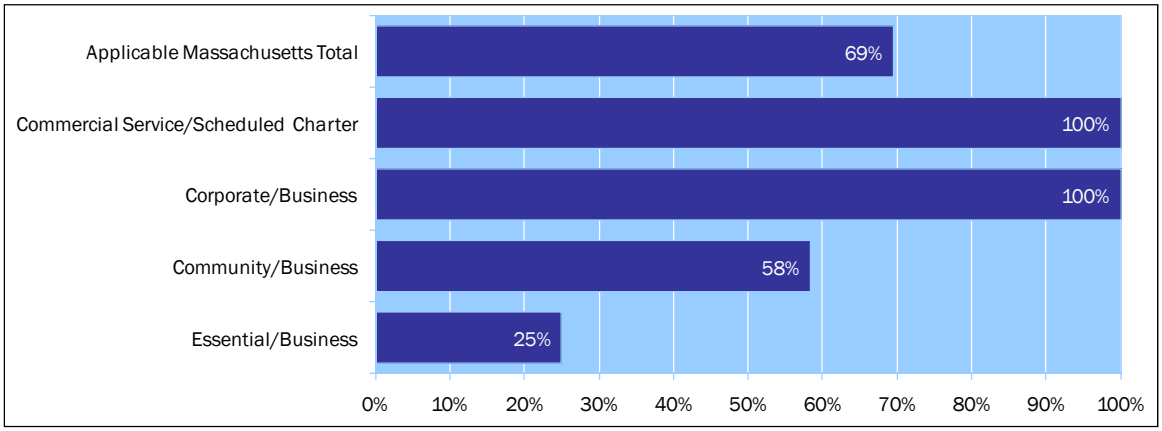


Source: Federal Aviation Administration, Massachusetts Department of Transportation
Prepared: May 2010

Percent of system airports that are recognized in local comprehensive plans

Being included in a local comprehensive plan is a good indicator of the level of support and recognition that an airport receives from its host community. Inclusion in these plans also helps to assist with appropriate airport land use and planning compatibility, increasing the airport's long-term viability and preserving its potential to meet aviation future needs. Figure 5-65 shows the percentage by role of airports in the Massachusetts system that are included in a local comprehensive plan. In total, 69 percent of airports included in the MSASP meet this performance measure, with 100 percent of both the Commercial Service/Scheduled Charter and Corporate/Business roles.

Figure 5-65: Percentage of Airports by Role Recognized in a Local Comprehensive Plan



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

It is the target of this plan that 100 percent of the airports in the Massachusetts system be recognized in their local comprehensive plans. Figure 5-66 details which airports are not currently included. These airports should seek out local and municipal planning organizations to coordinate airport involvement and recognition in future comprehensive planning efforts.

Figure 5-66: Airports Recommended to Gain Recognition in a Local Comprehensive Plan

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*
Corporate/Business			
AQW	North Adams	Harriman and West	Yes
Community/Business			
CQX	Chatham	Chatham Municipal	Yes
5B6	Falmouth	Falmouth Airpark	No
9B1	Marlborough	Marlboro Airport	No
7B2	Northampton	Northampton	No
60M	Spencer	Spencer Airport	No
Essential/Business			
1M8	Berkley	Myricks Airport	No
GDM	Gardner	Gardner Municipal	Yes
28M	Hanson	Cranland Airport	No
1B6	Hopedale	Hopedale Industrial Park	No
2B1	Marstons Mills	Cape Cod Airport	No
2B2	Newburyport	Plum Island Airport	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Goal Category: Public Outreach

Effective public outreach is extremely important to maintaining the future viability of the aviation industry in Massachusetts. While political agendas often inspire negative media coverage of aviation activities, the fundamental community and economic benefits of aviation and aviation-related industries typically go unreported. However, system airports can be valuable learning resources and centers for the promotion of the aviation industry. Traditional education programs and curricula typically do not prepare students for the wide variety of careers that exist in the field of aviation – local airports frequently fill in that gap by providing direct practical application to the aviation industry. Massachusetts recognizes that its system airports also act as aviation classrooms for not only those with a future in the aviation industry but also the law and policy makers of the Commonwealth. As more people learn about and appreciate airports and aviation, as well as the role that each plays in transportation and economic infrastructures, the more equipped these individuals will be to understand the development and expansion needs of airports throughout the state.

For the MSASP, the following performance measures have been set within the Public Outreach goal category:

- Percent of system airports that have established legislative outreach programs
- Percent of system airports that are members of their local chambers of commerce
- Percent of system airports that have an educational outreach program
- Percent of system airports that host annual air shows or fly-ins
- Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor

Percent of system airports that have established legislative outreach programs

Effective outreach to legislative representatives at all levels of government (including local, state, regional and federal) by airports in all roles helps to give the aviation industry a voice with the decision makers of a region. Emphasizing the transportation and economic importance of the aviation system of Massachusetts must continue to be an ongoing activity in order to keep the aviation industry in the active dialogue regarding the future of the Commonwealth's transportation system.

Airport managers were asked to report if their airport had active outreach programs to the local, state, or federal government. This data is represented graphically on **Figure 5-67**. Specifically, 51 percent of the Massachusetts system indicated they have outreach programs to the local government, 51 percent to the state government, and 41 percent have programs reaching out to the federal government.

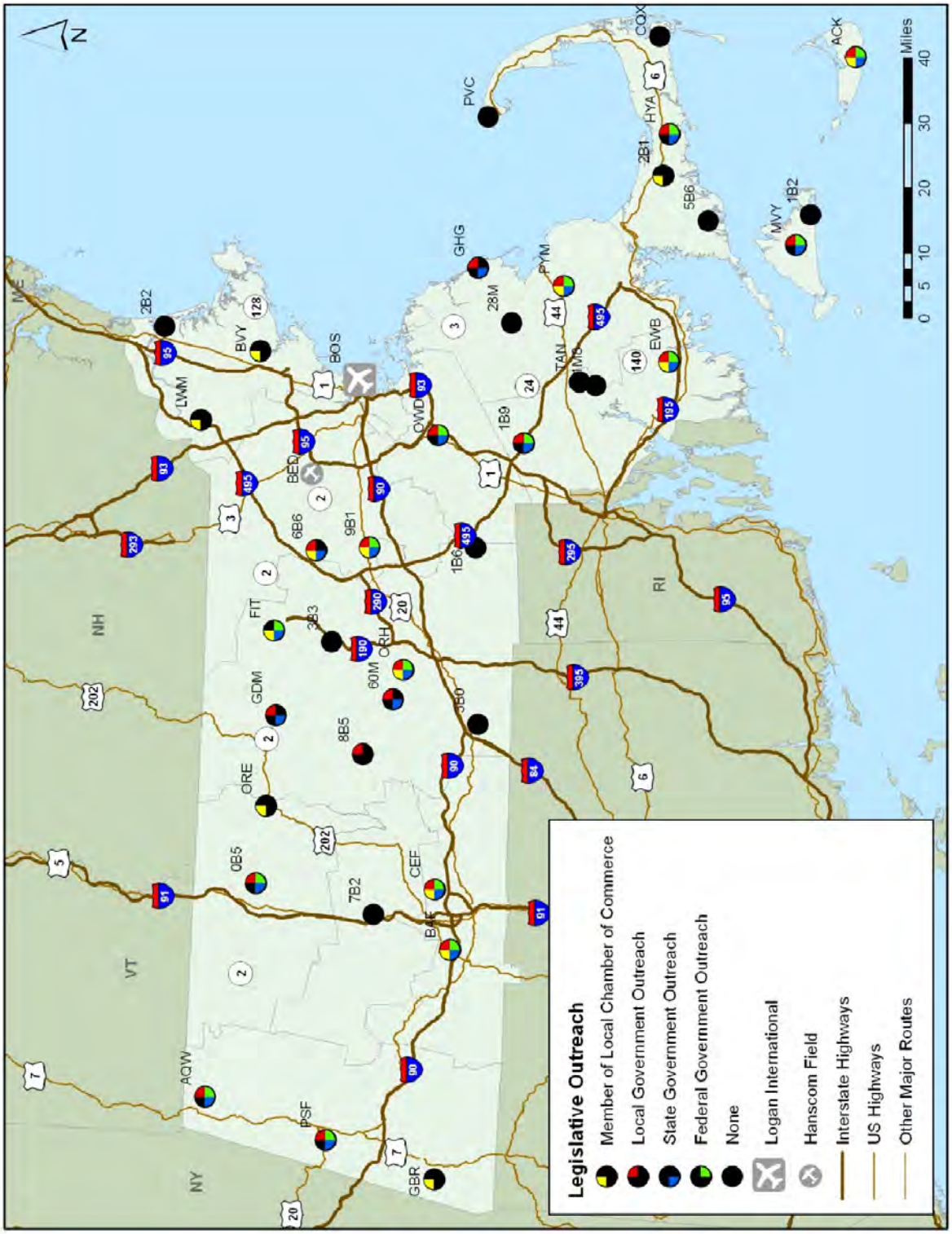
This informational performance measure has no specific target associated with it. However, all airports are strongly urged to develop intentional and active legislative outreach programs to ensure their long term viability, as well as to help ensure that a community or region is maximizing the benefits of aviation.

Percent of system airports that are members of their local chambers of commerce

Figure 5-67 also displays which airports reported being members of their local chambers of commerce, another key mechanism by which an airport can interject themselves into conversations regarding the local economy. In total, 38 percent of the Massachusetts system indicated membership in their local chamber of commerce. By role, this includes 57 percent of the Commercial Service/Scheduled Charter, 60 percent of Corporate/Business, 25 percent of Community/Business, and 13 percent of Essential/Business.

While all airports are strongly urged to become members of their local chambers of commerce, this performance measure is for informational purposes and has no specific target associated with it.

Figure 5-67: Airports with Legislative Outreach and Airports which are Members of their Local Chambers of Commerce



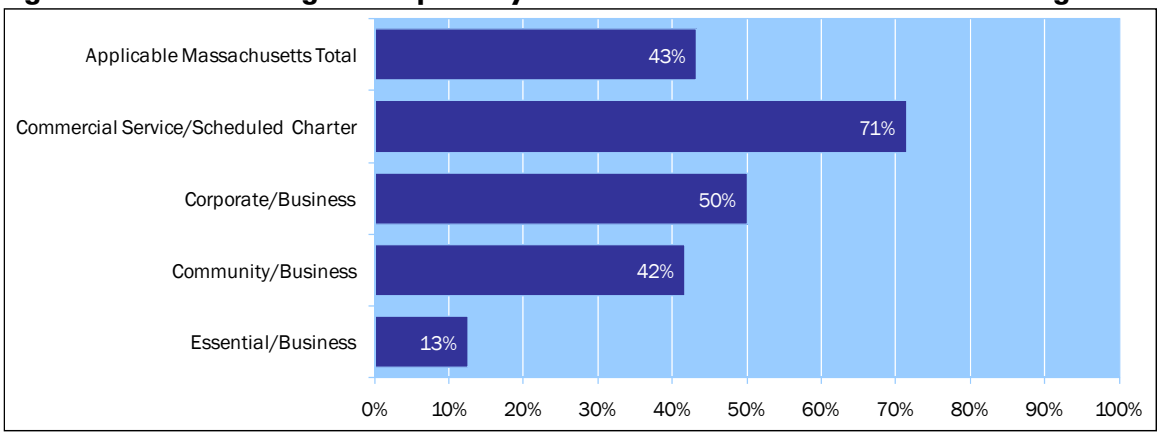
Source: Airport Inventory and Data Survey 2010, Wilbur Smith Associates
Prepared: May 2010

Percent of system airports that have an educational outreach program

Airports can be important educational and training centers for the aviation industry. There are many aviation-related careers, and around the country, there are numerous examples of colleges and technical schools that have partnered with local airports to provide aviation-related curricula. Because of this, it is important that airports seek our opportunities to initiate and foster stewardship programs. These programs often attract young people to the aviation industry, while also creating awareness of the importance of aviation and local airports to their host communities and region.

During the inventory process, airport managers were asked if their airports had educational outreach programs affiliated with local schools, community colleges, or technical/vocational schools. In total, 43 percent of Massachusetts' system airports reported having educational outreach programs intended to illustrate aviation career opportunities to students (Figure 5-68). By role, this includes 71 percent of Commercial Service/Scheduled Charter, 50 percent of Corporate/Business, 42 percent of Community/Business, and 13 percent of Essential/Business

Figure 5-68: Percentage of Airports by Role with an Educational Outreach Program



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target set for this performance measure is for 75 percent of system airports to have educational outreach programs. Figure 5-69 below lists the airports that do not currently have these programs. While it is understood that many airports may not have the resources to establish and maintain educational programs, MassDOT Aeronautics nevertheless strongly encourages that all airports pursue any opportunities available to expand aviation education avenues to the general public. However, it is also not critical for the entire system to have educational outreach illustrating aviation career opportunities.

Figure 5-69: Airports Currently Lacking an Educational Outreach Program

Airport Code	Associated City	Airport Name	AIP-Eligible
Commercial Service/Scheduled Charter			
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Yes
PVC	Provincetown	Provincetown Municipal Airport	Yes
Corporate/Business			
BVY	Beverly	Beverly Municipal Airport	Yes
LWM	Lawrence	Lawrence Municipal Airport	Yes
GHG	Marshfield	Marshfield Municipal Airport-George Harlow Field	Yes
AQW	North Adams	Harriman and West	Yes
ORE	Orange	Orange Municipal	Yes
Community/Business			
CQX	Chatham	Chatham Municipal	Yes
5B6	Falmouth	Falmouth Airpark	No
GBR	Great Barrington	Walter J. Koladza Airport	No
3B0	Southbridge	Southbridge Municipal Airport	Yes
60M	Spencer	Spencer Airport	No
3B3	Sterling	Sterling Airport	No
TAN	Taunton	Taunton Municipal Airport	Yes
Essential/Business			
8B5	Barre/Barre Plains	Tanner-Hiller	No
1M8	Berkley	Myricks Airport	No
1B2	Edgartown	Katama Airpark	No
GDM	Gardner	Gardner Municipal	Yes
28M	Hanson	Cranland Airport	No
1B6	Hopedale	Hopedale Industrial Park	No
2B1	Marstons Mills	Cape Cod Airport	No

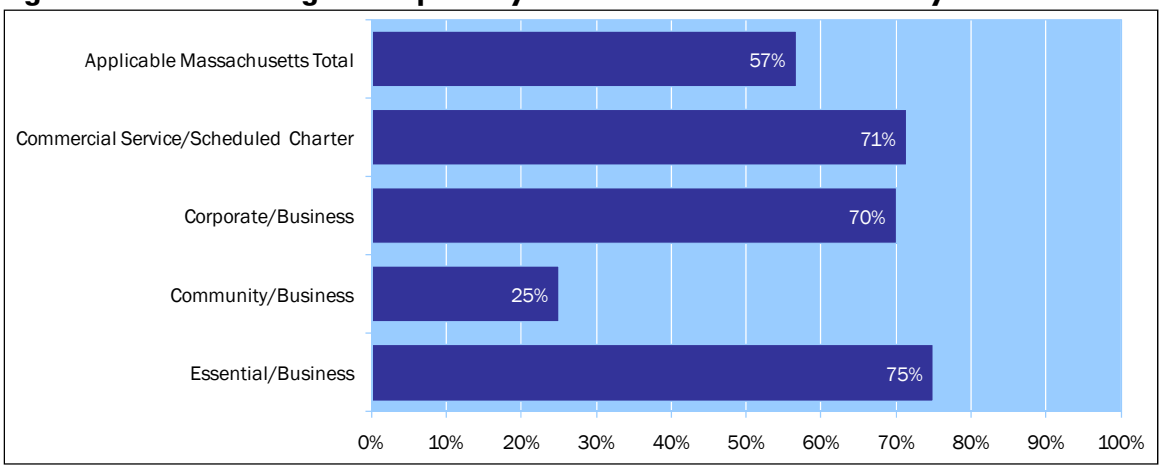
Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Percent of system airports that host annual air shows or fly-ins

Airport air shows and "fly-ins" are an additional way to attract community involvement and revenue to airports of all sizes, while also increasing awareness and education about the facilities. Figure 5-70 shows that statewide, 57 percent of Massachusetts system airports host air shows or fly-ins. By role, this includes 71 percent of Commercial Service/Scheduled Charter, 70 percent of Corporate/Business, 25 percent of Community/Business, and 75 percent of Essential/Business.

Additionally, Figure 5-71 details which airports have these events and at what frequency. Figure 5-72 shows these airports geographically.

Figure 5-70: Percentage of Airports by Role that Host Air Shows or Fly-Ins



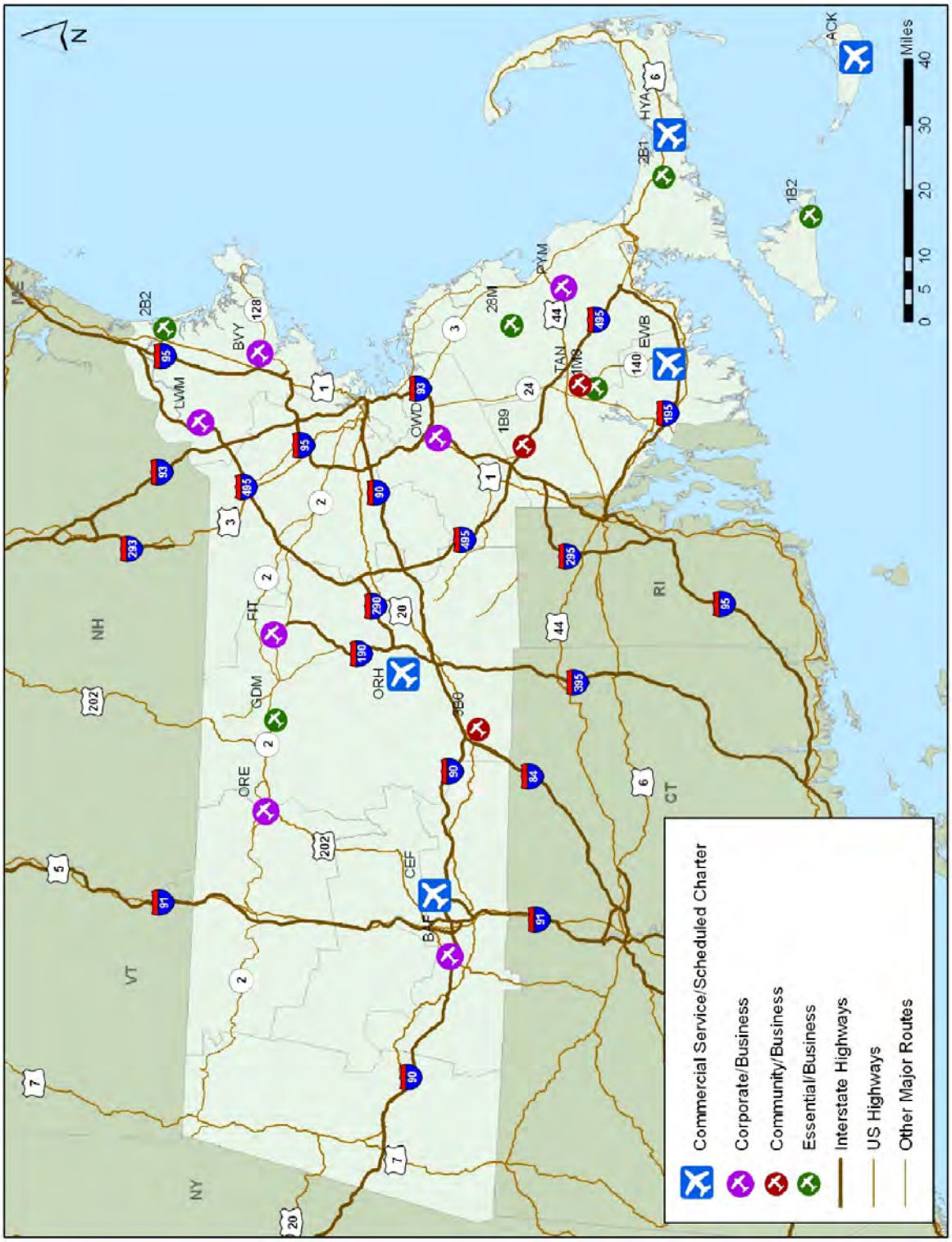
Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-71: Airports that Host Air Shows or Fly-Ins

Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*	*Air Show or Fly-In Frequency*
Commercial Service/Scheduled Charter				
HYA	Hyannis	Barnstable Municipal-Boardman Polando Field	Yes	Annual
ACK	Nantucket	Nantucket Memorial Airport	Yes	Annual
EWB	New Bedford	New Bedford Regional Airport	Yes	Annual
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	Yes	Biennial
ORH	Worcester	Worcester Regional Airport	Yes	Annual
Corporate/Business				
BVY	Beverly	Beverly Municipal Airport	Yes	Annual
FIT	Fitchburg	Fitchburg Municipal Airport	Yes	Annual
LWM	Lawrence	Lawrence Municipal Airport	Yes	Biennial
OWD	Norwood	Norwood Memorial Airport	Yes	Biennial
ORE	Orange	Orange Municipal	Yes	Annual
PYM	Plymouth	Plymouth Municipal Airport	Yes	Biennial
BAF	Westfield/Springfield	Barnes Municipal Airport	Yes	Biennial
Community/Business				
1B9	Mansfield	Mansfield Municipal Airport	Yes	Annual
3B0	Southbridge	Southbridge Municipal Airport	Yes	Unknown
TAN	Taunton	Taunton Municipal Airport	Yes	Annual
Essential/Business				
1M8	Berkley	Myricks Airport	No	Annual
1B2	Edgartown	Katama Airpark	No	Annual
GDM	Gardner	Gardner Municipal	Yes	3x Annually
28M	Hanson	Cranland Airport	No	2x Annually
2B1	Marstons Mills	Cape Cod Airport	No	Annual
2B2	Newburyport	Plum Island Airport	No	Annual

Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Figure 5-72: Location of Airports that Host Air Shows or Fly-Ins



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

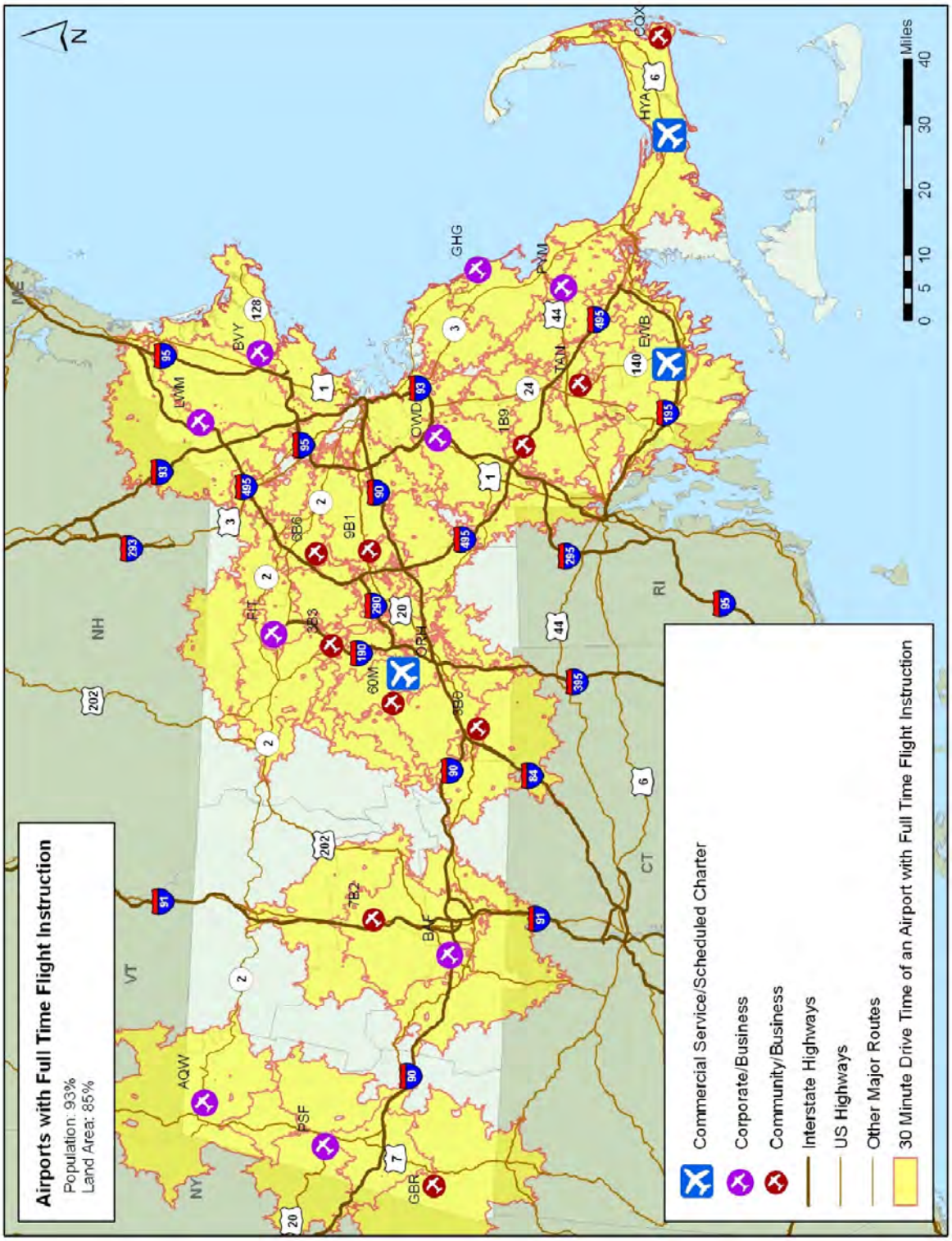
The existence of air shows and fly-ins at Massachusetts system airports is merely an informational performance measure. As such, no specific target was established. However, these events are effective tools to garner community support for an airport, as well as to potentially increase its revenue levels. For these reasons, all airports are encouraged to consider hosting such promotional events.

Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor

To ensure a continual flow of new pilots and aviation professionals, it is important that full-time flight instruction be available to as much of the Commonwealth's population as possible. Figure 5-73 maps airports in the Massachusetts system that have a full-time flight school or instructor based on site according to data provided during the inventory effort. In total, 22 of Massachusetts' system airports reported having full-time flight instruction, accommodating 93 percent of the Commonwealth's total population. This area also covers 85 percent of the Commonwealth's total geographic area. This level of population and land area coverage indicates that most of the state's population has immediate access to some form of flight instruction.

No specific target is set for this informational performance measure. All airports are, however, encouraged to develop flight training and aviation education of any sort. Full-time flight instruction is also one way for an airport to ensure regular operational activity.

Figure 5-73: Percentage of Population and Land Area within a 30 Minute Drive Time of a Massachusetts System Airport with Full-Time Flight Instruction



Source: Airport Inventory and Data Survey 2010, United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Goal Category: Transportation Integration and Accessibility

For an airport system to adequately and effectively serve its state, it should provide the level of facilities necessary to accommodate levels of demand from both current and future users. These users include the traveling public as well as individual aircraft operators. FAA system planning guidelines recommend that general aviation airports be located within 30 minutes of users.

Performance measures used to evaluate the system's ability to accommodate aviation development are as follows and discussed in detail below:

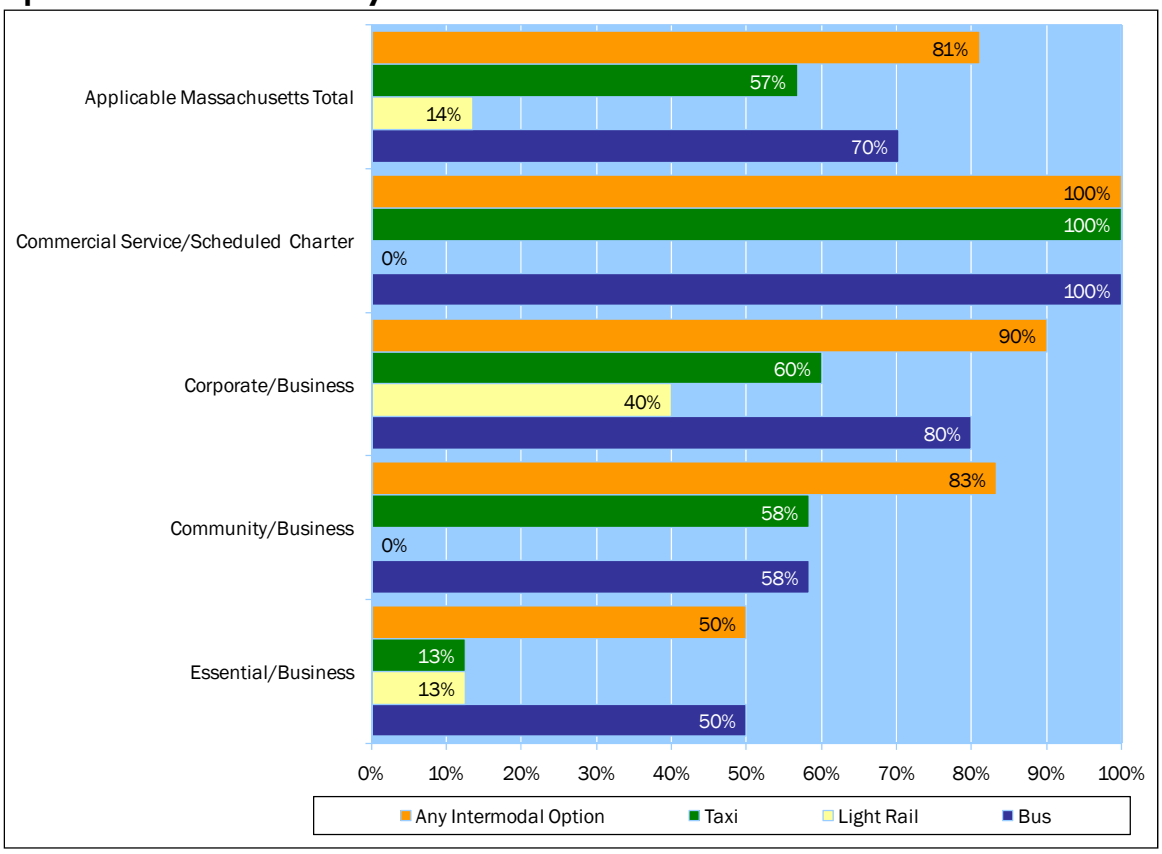
- Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports
- Percent of total population within 30 minutes of a publicly owned system airport and of a public/privately-owned system airport
- Percent of system airports accessed by roads within the National Highway System
- Percent of system airports that are adequately accessible in terms of signage (also phrased as "Percent of system airports that have adequate airport location signage on surrounding roadways")
- Percent of system airports that are acknowledged in local/regional transportation plans

Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports

An airport system is only one part of a region's integrated transportation system. In Massachusetts, airports integrate into a local transit system that also includes water, road and rail, comprising the majority of transportation assets in the state. Airports are encouraged to have intermodal nodes near the airfields themselves to provide multimodal accessibility. For the MSASP, GIS analyses were conducted to determine whether Massachusetts system airports were reasonably accessible either to regional bus routes or by Massachusetts Bay Transportation Authority (MBTA) light rail systems. Note that an airport was considered to be "accessible" if it was located within one mile of a bus or light rail line. Note that data about taxi accessibility was also gathered during the airport inventory process.

Figure 5-74 shows the percentage of Massachusetts system airports by role that have intermodal transportation access (i.e. are within one mile of a bus or light rail line). In total, 81 percent of system airports have at least one intermodal option. Individually, 57 percent have taxi service, 14 percent light rail, and 70 percent bus accessibility. Figure 5-75 maps bus routes in the Commonwealth as well as MBTA light rail lines and their geographic proximity to system airports.

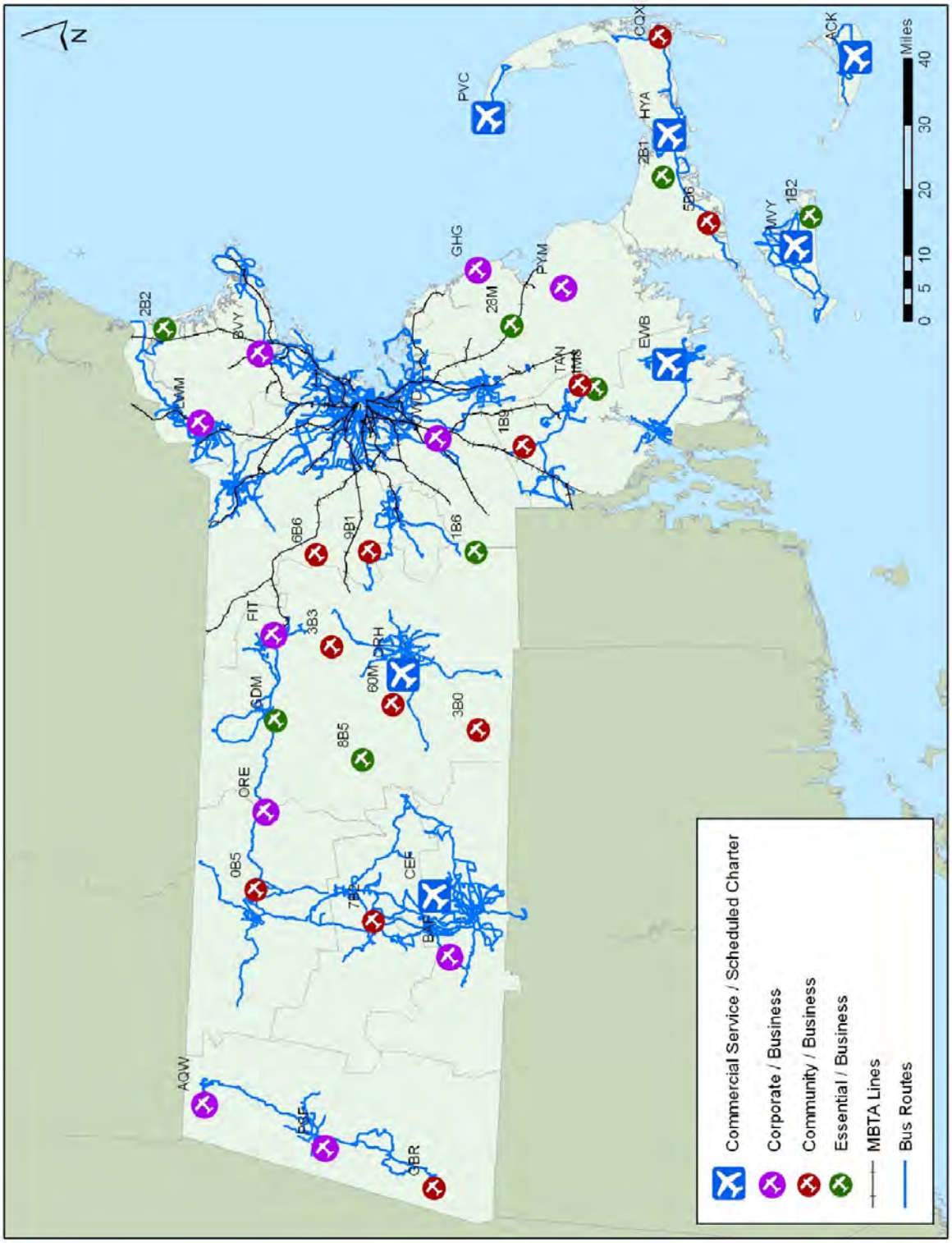
Figure 5-74: Percentage of Airports by Role that Provide Intermodal Transportation Options for their Community



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

Intermodal access is an important consideration for any integrated transportation plan. While there is no specific target established for this informational performance measure at this time, the data collected for the MSASP will be used by MassDOT Aeronautics as part of future statewide transportation planning efforts.

Figure 5-75: Proximity of System Airports to Bus and MBTA Light Rail Lines



Source: Airport Inventory and Data Survey 2010, Massachusetts Department of Transportation, Wilbur Smith Associates
Prepared: May 2010

Percent of total population within 30 minutes of a publicly owned system airport and of a public/privately-owned system airport

An important performance measure of any airport system is directly related to airport accessibility. In order for an airport system to adequately serve demand from both local and visiting users, the airport locations should relate to and reflect a state's population centers. GIS analyses presented in the exhibits below show that when all 37 system airports are considered using 30-minute drive times for each airport, over 96 percent of Massachusetts' population is located within a 30-minute drive of at least one and, in many cases, multiple system airports. This percent coverage increases to 99 percent with the inclusion of service areas associated with General Edward Lawrence Logan International and Laurence G. Hanscom Field airports. A GIS analysis was also conducted for the airports in each of the role categories to determine the percentage of the statewide population within a 30-minute drive time of each of the different airport roles.

To better evaluate the coverage provided by the various airport role categories, the coverage provided by each category was reviewed independently, as well as an "additive" process wherein the additional coverage provided by the various roles were added to the coverage from the previous roles. For example, on their own, airports in the Commercial Service/Scheduled Charter role category only cover 28 percent of the statewide population, but when combined with Corporate/Business airports, this increases to 86 percent. This information is presented in Figure 5-76.

Figure 5-76: Percentage of Statewide Population within a 30-Minute Drive Time of System Airports, by Role Category

Airport System Role	Individual Roles	Combined Roles
Commercial Service/Scheduled Charter	28%	28%
Corporate/Business	72%	86%
Community/Business	54%	95%
Essential/Business	39%	96%
Full System Total	96%	-
Full System with BOS and BED	99%	-

Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-77 graphically depicts the 30-minute drive time coverage for all system airports. Figures 5-78 through 5-81 map this information for the individual airport role categories, and Figures 5-82 and 5-83 show the combined airport role coverage.

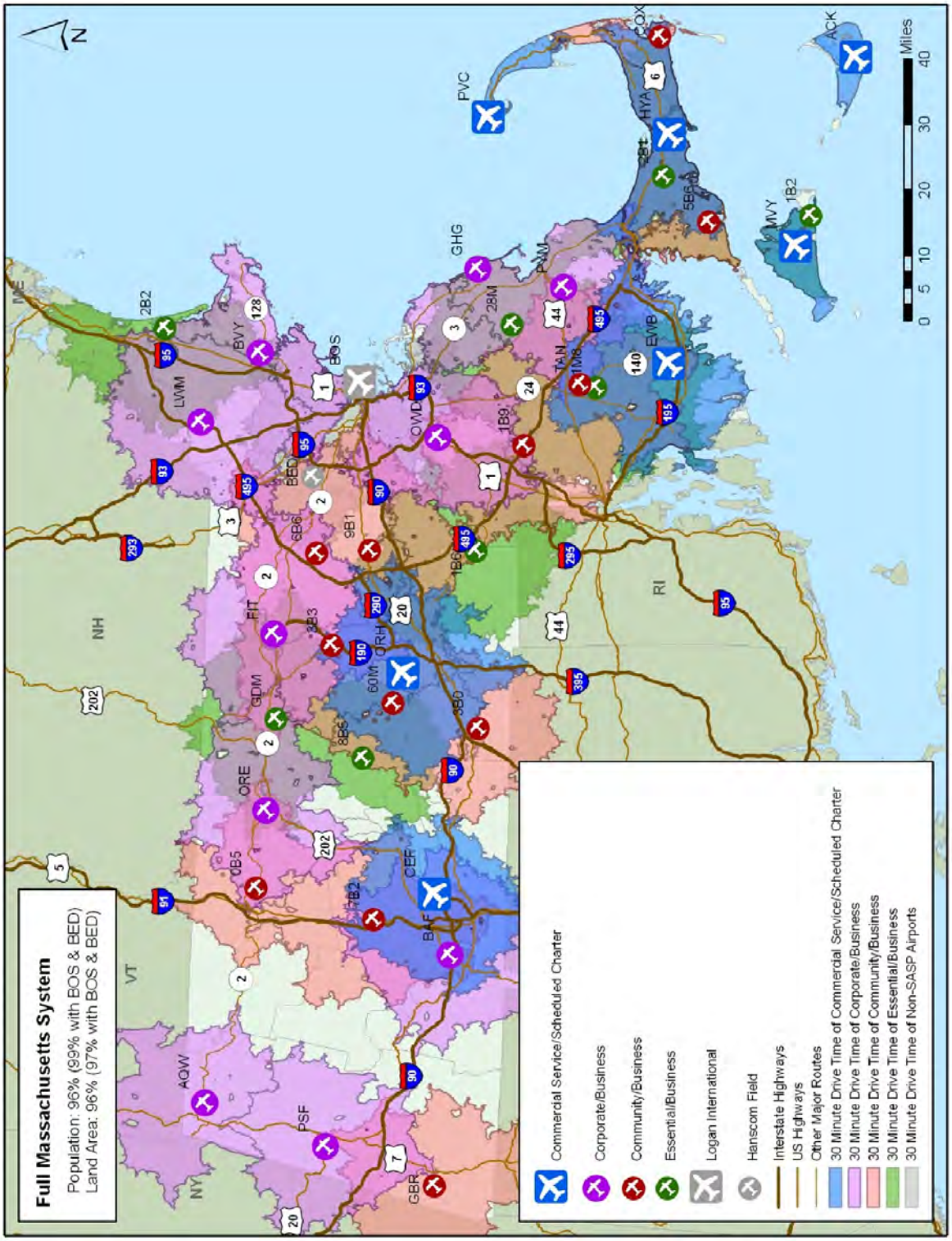
Note that the influence of out-of-state airports was also considered during the geographic analysis of population coverage within Massachusetts. The following airports were determined to be located within a 30-minute driving time of the Commonwealth:

- Connecticut:
  - Bradley International (BDL)
  - Skylark Airpark (7B6)
- New Hampshire:
  - Boire Field (ASH)
  - Dillant-Hopkins (EEN)

  - Jaffrey Airport-Silver Ranch (AFN)
  - Manchester (MHT)
  - Portsmouth International at Pease (PSM)
- New York:
  - Columbia County (1B1)
- Rhode Island:
  - Newport State (UUU)
  - North Central State (SFZ)
  - Theodore Francis Green State (PVD)
- Vermont:
  - William H. Morse State (DDH)

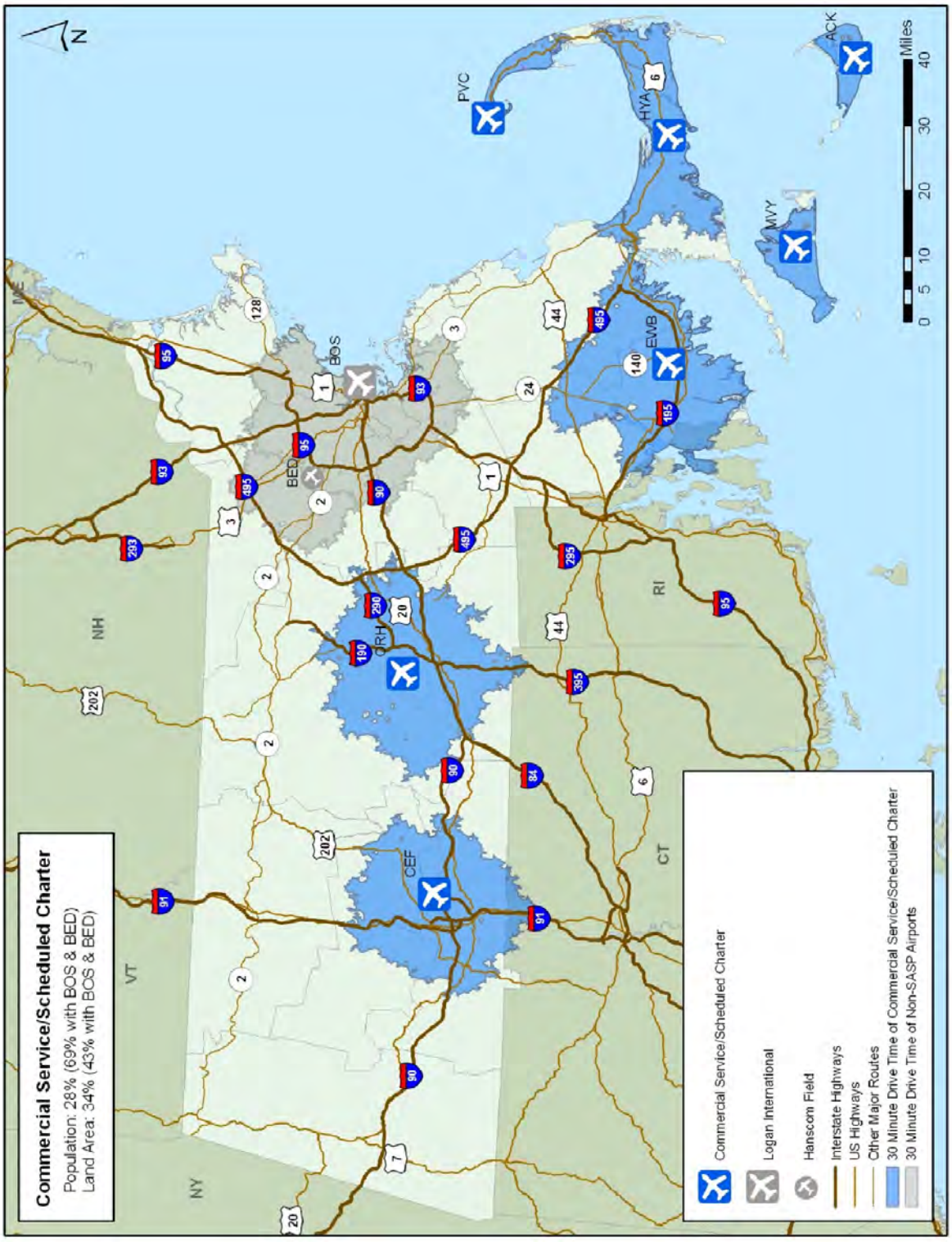
The vast majority of these airports' 30-minute drive time market areas overlap with those of airports in the Massachusetts system, and as such, add very little to the overall statewide population coverage. When added to the complete Massachusetts system, these 12 airports increase population coverage from 96 percent to 97 percent of the state total. With General Edward Lawrence Logan International and Laurence G. Hanscom Field included this population coverage increases to 99.6 percent. **Figure 5-84** shows the 30-minute drive time areas of these 12 airports.

Figure 5-77: 30-Minute Drive Times of System Airports, by Role



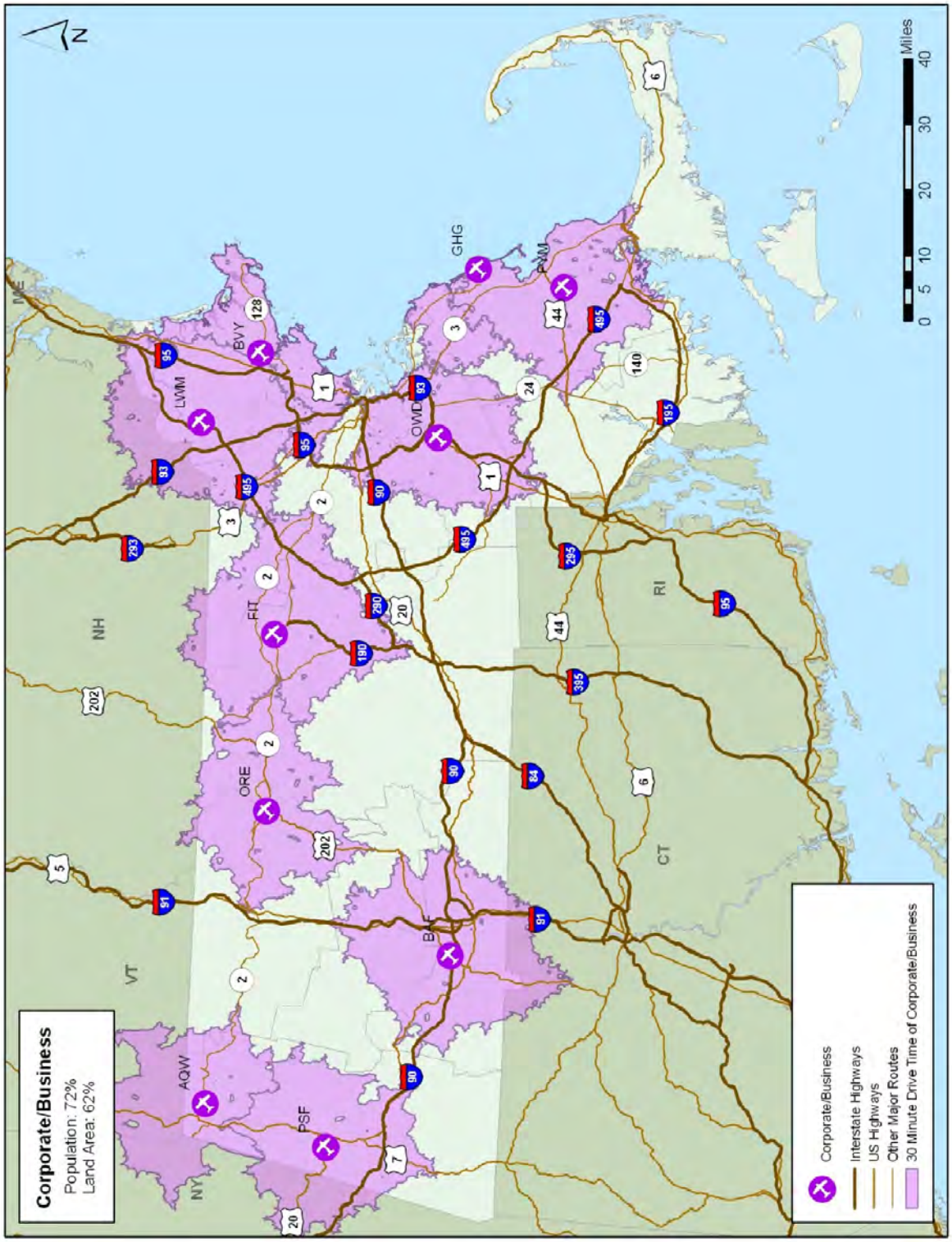
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-78: 30-Minute Drive Times of Commercial Service/Scheduled Charter Airports



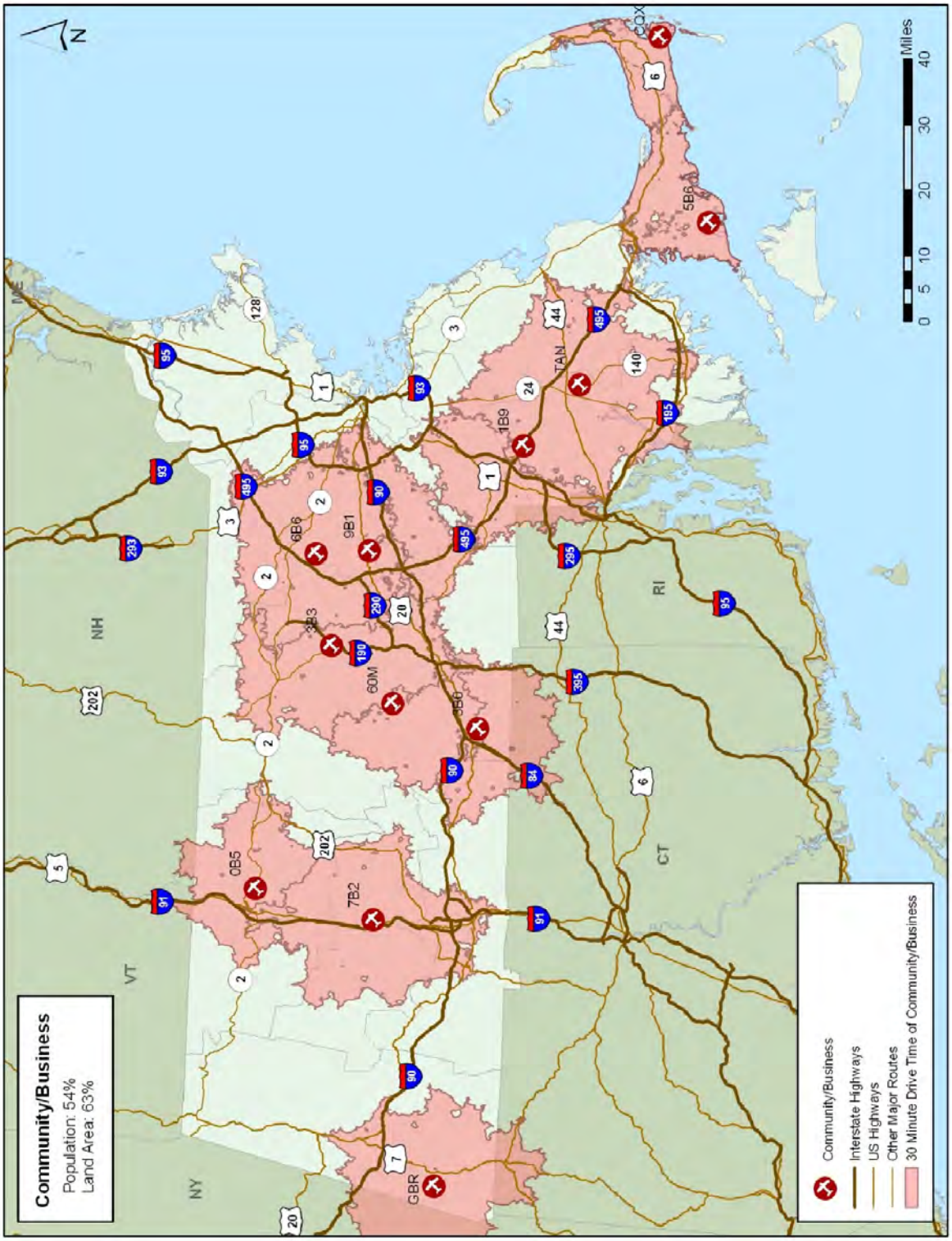
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-79: 30-Minute Drive Times of Corporate/Business Airports



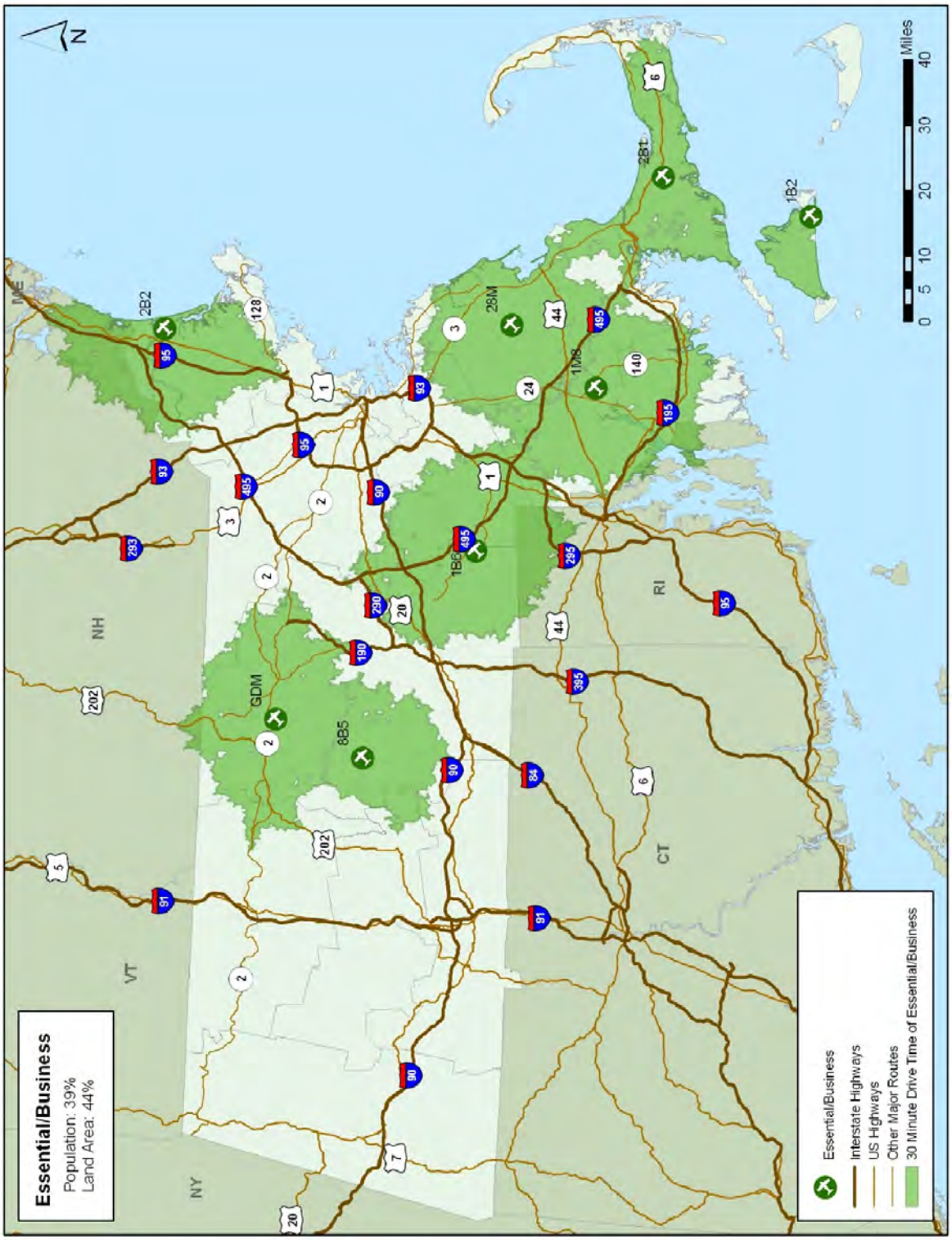
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-80: 30-Minute Drive Times of Community/Business Airports



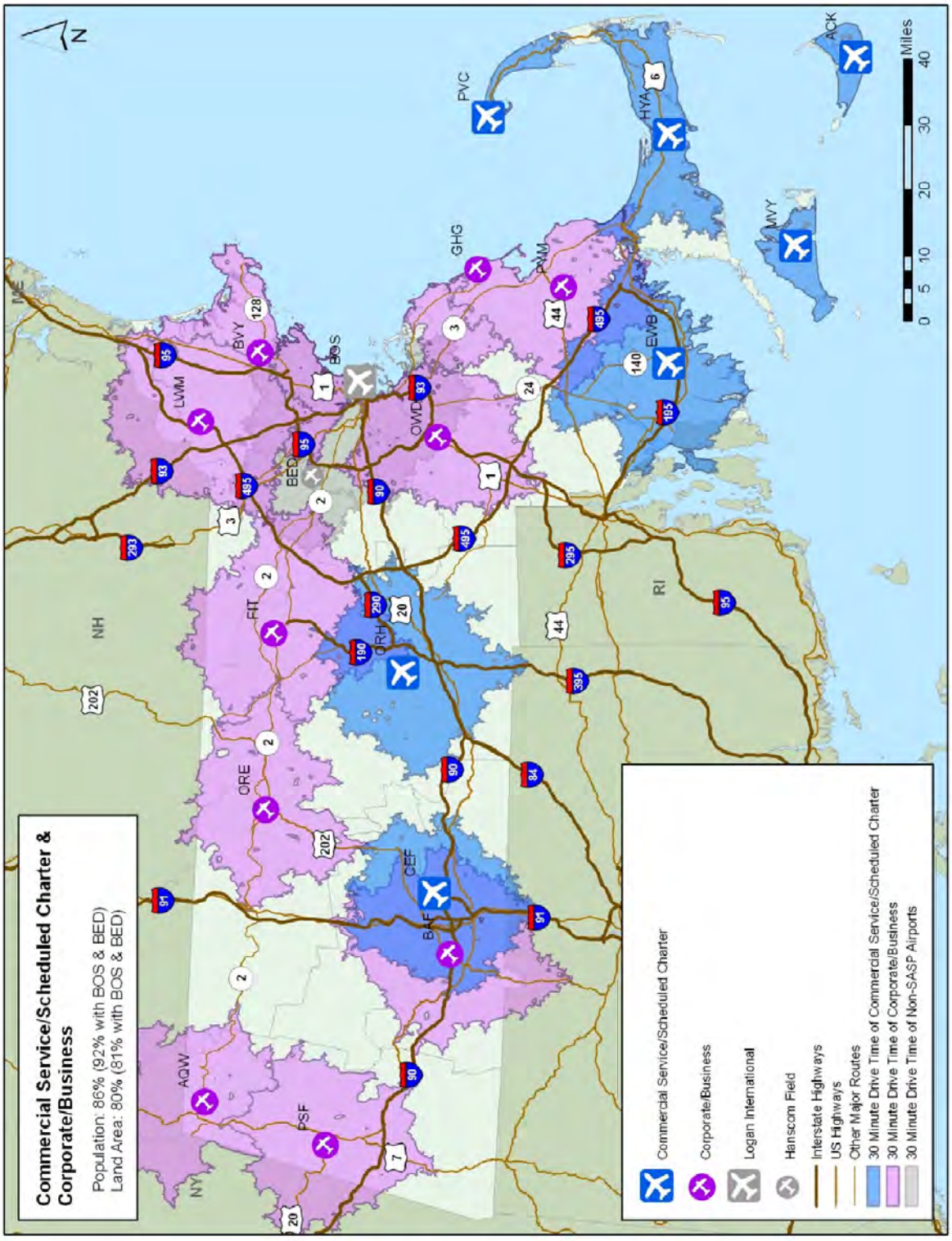
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-81: 30-Minute Drive Times of Essential/Business Airports



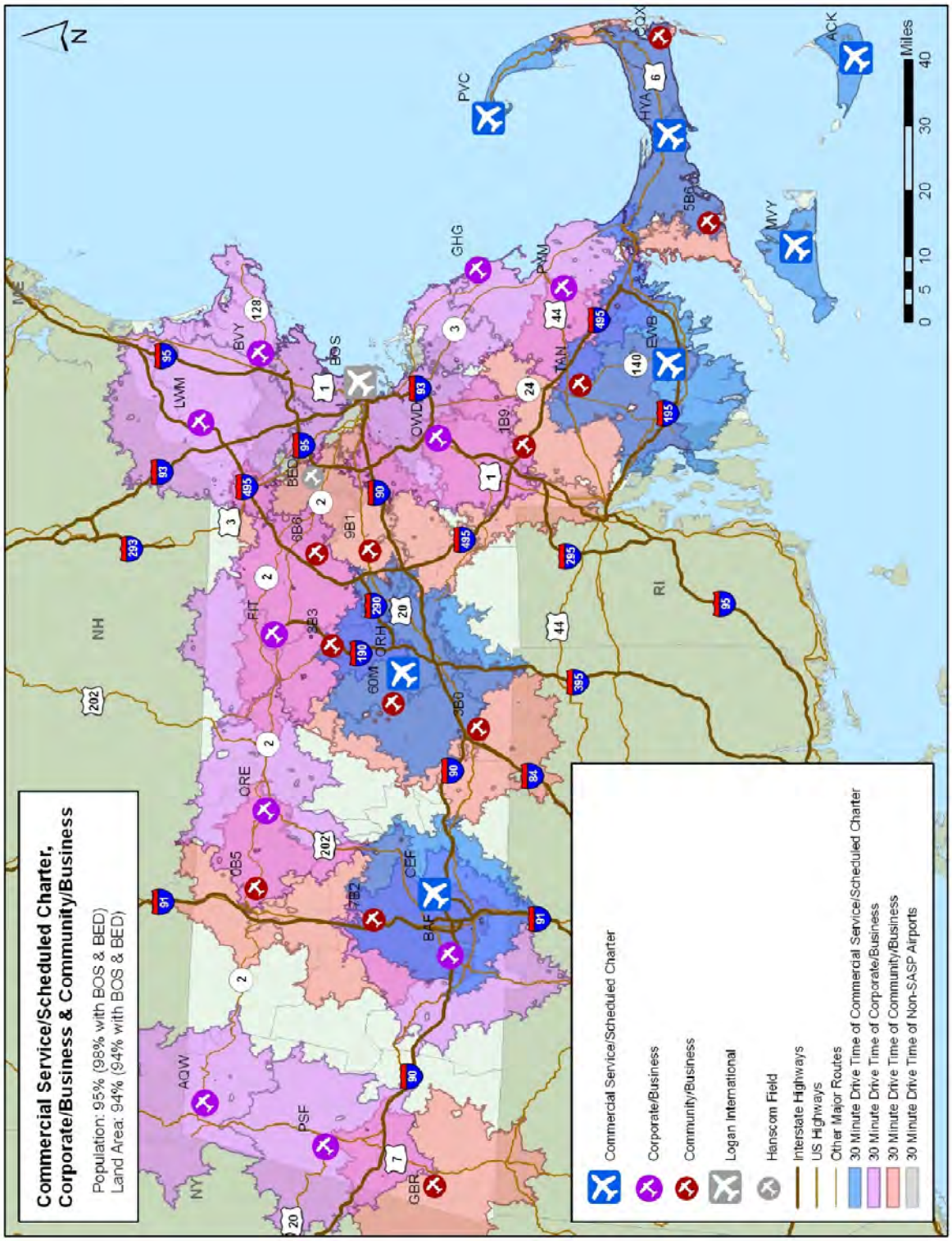
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-82: 30-Minute Drive Times of Commercial Service/Scheduled Charter and Corporate/Business Airports



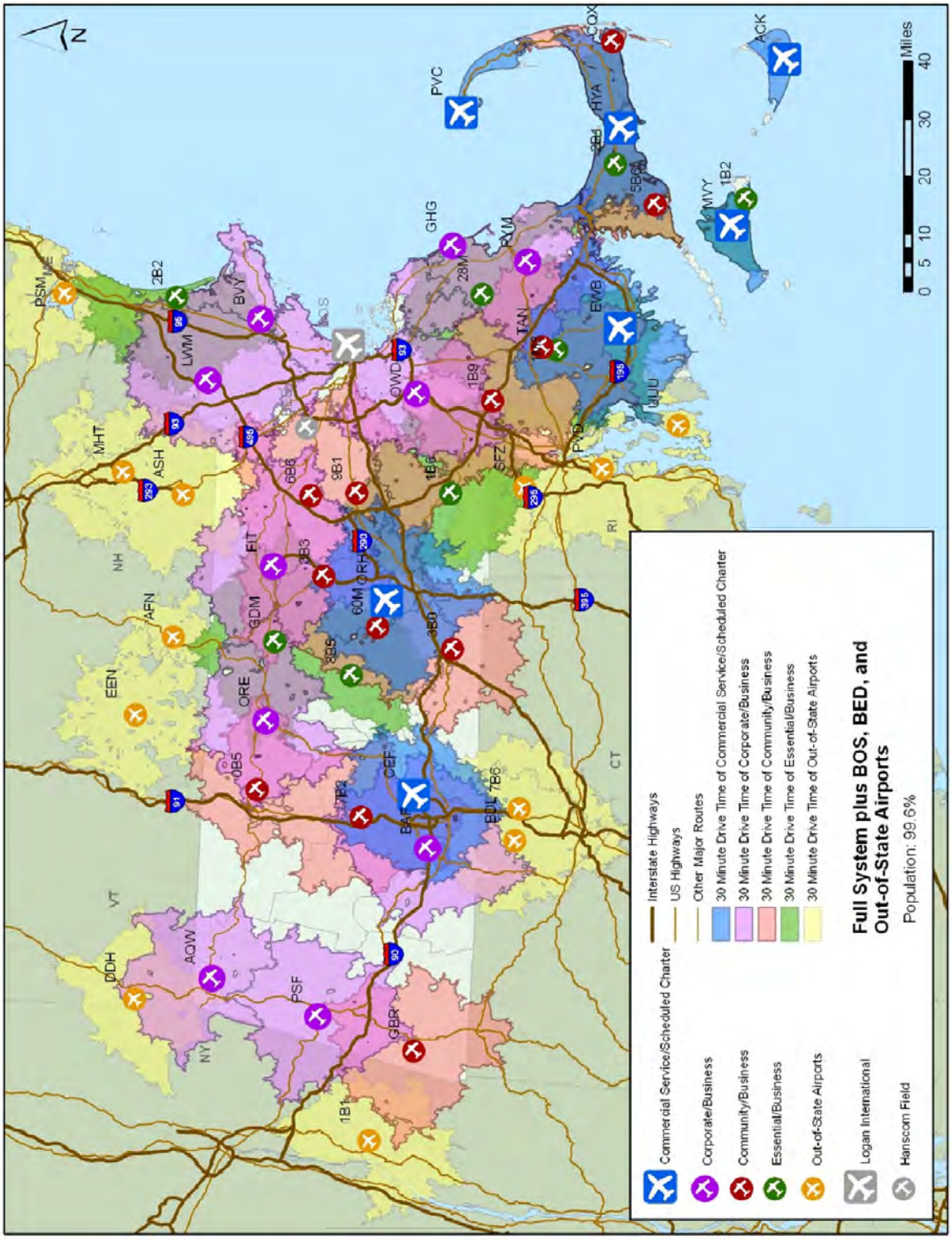
Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-83: 30-Minute Drive Times of Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business Airports



Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Figure 5-84: 30-Minute Drive Times of System Airports, by Role, with Out-of-State Airports Included

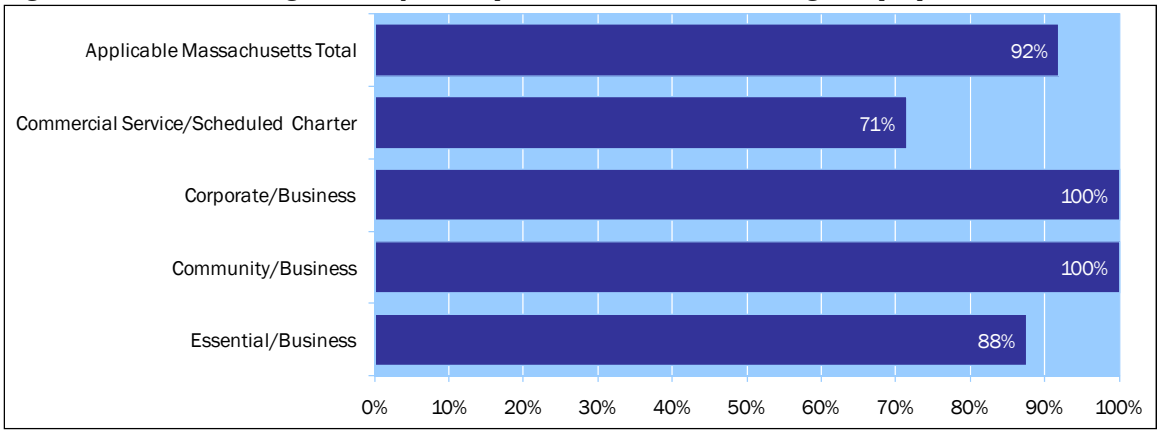


Source: United States Census Bureau, Wilbur Smith Associates
Prepared: May 2010

Percent of system airports accessed by roads within the National Highway System

Connection to the state and national highway system is another very important element of an airport's overall degree of accessibility. Using GIS, it was determined which airports were located no more than five miles from a road that is included in the National Highway System (NHS). Figure 5-85 shows the percentage of airports by role that meet this performance measure. It must be noted that airports on islands were automatically determined to lack access to the NHS since none of the roads on the islands are designated as being part of the NHS. In total, 92 percent of Massachusetts' system airports were determined to have access to an NHS roadway. It is also important to note that, while these airports are accessible to the NHS in terms of proximity, the condition of that accessibility may be affected by traffic patterns. For example, Worcester Regional Airport is located close to State Route 122, but due to congestion and traffic, it is widely acknowledged that this particular airport has accessibility challenges.

Figure 5-85 Percentage of Airports by Role with National Highway System Access



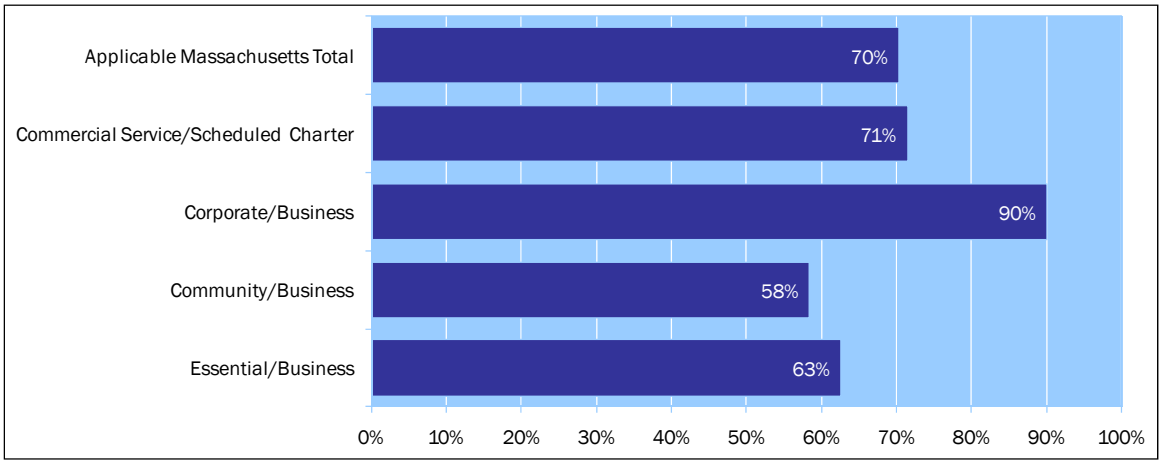
Source: Airport Inventory and Data Survey 2010, Wilbur Smith associates
Prepared: May 2010

No specific target is set for this informational performance measure. In some cases, such as on the islands, it is not feasible to be connected to the NHS. However, airports that are connected to the NHS but have local accessibility issues are strongly encouraged to work with local transportation planning agencies to resolve these issues. This is another performance measure that will be considered as part of future integrated transportation planning efforts.

Percent of system airports that have adequate airport location signage on surrounding roadways

Appropriate roadway signage directing travelers on surrounding roadways to an airport is important for easy and convenient access to any airport. Figure 5-86 shows the percentages of airports by role that are deemed to have adequate on-airport signage related to access (as reported by the airports themselves). Seventy percent of airport managers reported that their airport met this performance measure. By role, this includes 71 percent of Commercial Service/Scheduled Charter, 90 percent of Corporate Business, 58 percent of Community/Business, and 63 percent of Essential/Business airports.

Figure 5-86: Percentage of Airports by Role with Adequate Airport Signage for Access



Source: Airport Inventory and Data Survey 2010, Wilbur Smith associates
Prepared: May 2010

The target set for this performance measure is for all airports in the Massachusetts airport system to have adequate airport signage for access. Figure 5-87 details the airports that reported having less than adequate signage for airfield access. All of these 11 airports are recommended to work with MassDOT Aeronautics to meet this performance measure. It should also be noted that due to the importance of this particular performance measure, MassDOT Aeronautics is currently pursuing updated roadway signage standards and support for updating roadway signage as required for all system airports.

Figure 5-87: Airports Recommended to Improve Airport Signage to Adequate Levels

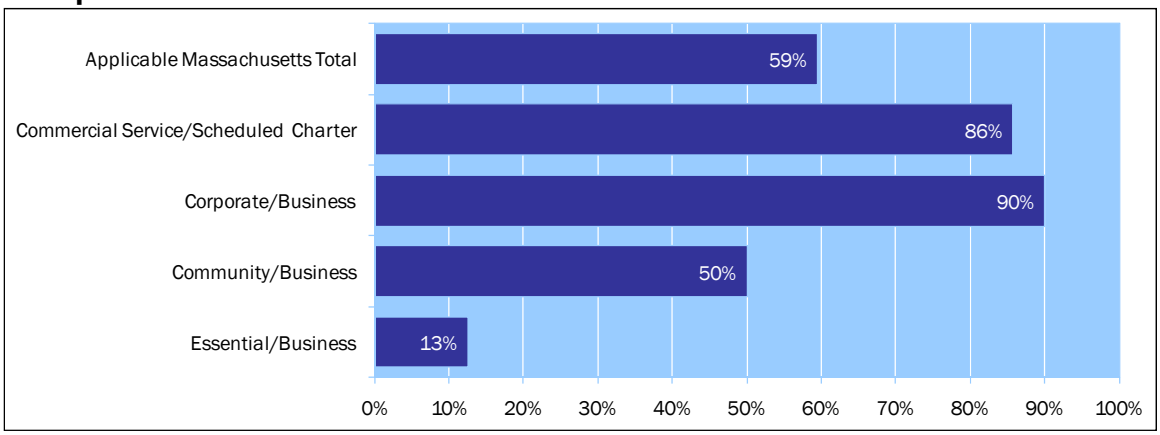
Airport Code	*Associated City*	*Airport Name*	*AIP-Eligible*
Commercial Service/Scheduled Charter			
EWB	New Bedford	New Bedford Regional Airport	Yes
CEF	Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	Yes
Corporate/Business			
AQW	North Adams	Harriman and West	Yes
Community/Business			
GBR	Great Barrington	Walter J. Koladza Airport	No
7B2	Northampton	Northampton	No
3B0	Southbridge	Southbridge Municipal Airport	Yes
60M	Spencer	Spencer Airport	No
6B6	Stow	Minute Man Airfield	No
Essential/Business			
8B5	Barre/Barre Plains	Tanner-Hiller	No
1M8	Berkley	Myricks Airport	No
2B1	Marstons Mills	Cape Cod Airport	No

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

Percent of system airports that are acknowledged in local/regional transportation plans

In addition to the local comprehensive plans discussed previously, inclusion in a local or regional transportation plan is another good indicator of the type of support and involvement that an airport can expect from their host community. Figure 5-88 shows that 59 percent of airports in the Massachusetts system are recognized in local or regional transportation plans. By role, this includes 86 percent of Commercial Service/Scheduled Charter, 90 percent of Corporate/Business, 50 percent of Community/Business, and 13 percent of Essential/Business.

Figure 5-88: Percentage of Airports by Role Acknowledged in Local/Regional Transportation Plans



Source: Airport Inventory and Data Survey 2010
Prepared: May 2010

The target set for this performance measure is for 100 percent of the Massachusetts system to be included in a local or regional transportation plan. Figure 5-89 lists the airports which are not currently acknowledged, and should seek to work with local and regional transportation planning organizations to meet this target. Meeting this target may have a positive effect on other accessibility targets such as roadway issues.

Figure 5-89: Airports Recommended to Seek Acknowledgement in Local/Regional Transportation Plans

Airport Code	*Associated City*	*Airport Name*
Commercial Service/Scheduled Charter		
MVY	Vineyard Haven	Martha's Vineyard
Corporate/Business		
AQW	North Adams	Harriman and West
Community/Business		
CQX	Chatham	Chatham Municipal
5B6	Falmouth	Falmouth Airpark
GBR	Great Barrington	Walter J. Koladza Airport
9B1	Marlborough	Marlboro Airport
7B2	Northampton	Northampton
60M	Spencer	Spencer Airport
Essential/Business		
8B5	Barre/Barre Plains	Tanner-Hiller
1M8	Berkley	Myricks Airport
GDM	Gardner	Gardner Municipal
28M	Hanson	Cranland Airport
1B6	Hopedale	Hopedale Industrial Park
2B1	Marstons Mills	Cape Cod Airport
2B2	Newburyport	Plum Island Airport

Source: Airport Inventory and Data Survey 2010
Prepared: July 2010

SUMMARY

The system's ability to meet current and target performance is summarized in Figure 5-90. The targets established and discussed in this chapter will be used to determine specific projects that may be needed to improve performance of the system.

Figure 5-90: Current and Target Performance of the Massachusetts Airport System

Performance Measures	Current Performance	Target Performance
Standards		
1. Percent of system airports reporting meeting applicable FAA Standards for Runway Safety Area (RSA) on their runways	49%	100% of AIP-Eligible (65% of system)
2. Percent of system airports with a runway pavement classification of "good"	All Runways: 41% Primary Runway: 51%	100% "Fair" 100% "Good"
3. Percent of system airports with access controls to the airport operating areas (airside/landside)	65%	100% of Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business; AIP-Eligible Essential/Business (81% of system)
4. Percent of system airports with a survey of aeronautical obstructions	Obstruction Survey: 59% Obstruction/Approach Analysis: 54%	100% of system 100% of system
5. Percent of system airports with an airport perimeter road	Full Perimeter: 14% At Least Partial: 41%	100% Partial or Complete
6. Percent of system airports with controlling interest (property ownership/easements) over Runway Protection Zones (RPZs) for each runway end	Complete: 24% Partial: 46%	100% AIP-Eligible (70% of system)
7. Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways	73%	100% AIP-Eligible (76% of system)
8. Percent of system airports with a security plan	100%	100% of system
9. Percent of system airports that have an Airport Emergency Plan	59%	100% of system
10. Percent of system airports with Airport Minimum Standards, and Airport Rules and Regulations for their facility	Minimum Standards: 62% Rules and Regulations: 59%	100% AIP-Eligible (70% of system) 100% AIP-Eligible (70% of system)
Environmental Compliance & Stewardship		
1. Percent of system airports that comply with the EPA's current Spill Prevention, Control, and Countermeasures (SPCC) rule	73%	100% of system (as required*)
2. Percent of system airports that comply with the EPA's current requirements for Storm Water Pollution Prevention Plan (SWPPP)	62%	100% of system (as required*)
3. Percent of system airports with a vegetation management plan (VMP)	49%	100% of system (as required*)
4. Percent of system airports with updated yearly operating plans associated with their existing VMP's	41%	100% of system (as required*)
5. Percent of system airports with a Conservation Management Plan	22%	100% of system (as required*)
6. Percent of system airports with a grassland management plan	32%	100% of system (as required*)
7. Percent of system airports with a Wildlife Hazard Management Plan	35%	100% of system (as required*)
8. Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls to help ensure that land uses within the airport environs are compatible with airport operations and development	42%	100% of system

Figure 5-90: Current and Target Performance of the Massachusetts Airport System (continued)

Performance Measures	Current Performance	Target Performance
Environmental Compliance & Stewardship, Continued		
9. Percent of system airports with alternative fuel vehicles or other alternative fuel equipment	47%	100% of system (as available*)
10. Percent of system airports with recycling programs	58%	100% of system
11. Percent of system airports with noise abatement programs and procedures	Noise Abatement Procedures: 61% Contours: 50%	100% of system (as required*) 100% of system (as required*)
Economic		
1. Percent of system airports whose revenues equal or exceed their operating expenses	38%	Informational: No Target
2. Percent of total employment within 30 minutes of a system airport	95% (99% with BOS & BED)	Informational: No Target
3. Percent of population and area within 30 minutes of a system airport meeting typical business user needs	Population: 73% (89% with BOS & BED) Land Area: 73% (76% with BOS & BED)	Informational: No Target
4. Percent of system airports with business development potential	100%	Informational: No Target
5. Percent of system airports with established/developable industrial park abutting/nearby airport	49%	Informational: No Target
6. Number of key tourism indicators (i.e. hotel rooms) within 30 minutes of system airports	75% (100% with BOS & BED)	Informational: No Target
Preservation		
1. Percent of airports meeting minimum facility and service objectives	See Appendix D	See Appendix D
2. Percent of system airports with displaced thresholds on their primary runway	32%	Informational: No Target
3. Percent of system airports with a waiting list for T-hangars or community hangars	57%	Informational: No Target
4. Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990	Terminal: 81% Constructed/Rehabilitated since 1990: 37%	100% of Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business (78% of system) Commercial Service/Scheduled Charter, Corporate/Business, and Community/Business airports should rehabilitate if older than 1990
6. Percent of system airports with an airport restaurant	41%	Informational: No Target
5. Percent of existing capital projects funding versus the future capital projects costs for system airports		Informational: No Target
7. Percent of system airports that offer based flight training	73%	Informational: No Target
8. Percent of system airports that offer aircraft maintenance services	81%	Informational: No Target
9. Percent of system airports that offer aircraft charter services	76%	Informational: No Target
10. Percent of system airports that have a winter operations plan	51%	100% AIP-Eligible (70% of system)
11. Number of system airports that have closed since 1980 (public-owned and privately-owned, public-use airports)	22	Informational: No Target
12. Percent of system airports that are recognized in local comprehensive plans	69%	100% of system

Figure 5-90: Current and Target Performance of the Massachusetts Airport System (continued)

Performance Measures	Current Performance	Target Performance
Public Outreach		
1. Percent of system airports that have established political outreach programs that include active coordination efforts with local, state, regional, and federal governmental representatives	Local Government: 51% State Government: 51% Federal Government: 41%	Informational: No Target (Recommended)
4. Percent of system airports that are members of their local chambers of commerce	38%	Informational (Recommended)
2. Percent of system airports that have an educational outreach program that illustrate aviation career opportunities to students	43%	75%
3. Percent of system airports that host annual air shows or fly-ins	57%	Informational: No Target
5. Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor	Population: 93% Land Area: 85%	Informational: No Target
Transportation Integration and Accessibility		
1. Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports (i.e. bus)	81%	Informational: No Target
2. Percent of total population within 30 minutes of a publicly owned system airport and of a public/privately-owned system airport	99%	Informational: No Target
3. Percent of system airports accessed by roads within the National Highway System	92%	Informational: No Target
4. Percent of system airports that are adequately accessible in terms of signage	70%	100% of system
5. Percent of system airports that are acknowledged in local/regional transportation plans	59%	100% of system

Source: Wilbur Smith Associates

Note: performance measures recommended to be met by all AIP-eligible airports have non-AIP-eligible airports included in the target performance if these airports currently meet the objective

*With respect to Environmental Compliance & Stewardship performance measures, it not necessarily currently known which airports must meet each performance measure since some measures are triggered only by an action (i.e. environmental review, a project, etc.) that the airport may not have already taken, but could potentially take in the future. As such, MassDOT Aeronautics advocates 100% compliance for every Massachusetts airport that is required to fulfill a particular performance measure by a related federal and/or state environmental agency.

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CHAPTER SIX:

FINANCIAL NEEDS AND RECOMMENDATIONS

INTRODUCTION

With the airport system analysis completed in the previous chapter, the final steps in the Massachusetts Statewide Airport System Plan (MSASP) are twofold. First, the level of financial need that would be required for the Massachusetts aviation system to perform at the desired level must be established. Second, recommendations to implement the findings of the MSASP, as well as to maintain the state airport system over the long term must be formally defined. This final chapter of the MSASP encapsulates these final steps.

Specifically, Chapter Five examined the existing statewide airport system with respect to each of the performance measures to define the system's current performance level. It was then determined whether or not the system's performance with respect to these measures could or should be improved in the future for the long-term benefit of the airport system. By doing so and in establishing respective "targets" for those measures identified as having improvement potential, gaps in each airport's ability to meet its role requirements and ways of remedying those deficiencies were identified. This effectively leads to an action plan for overall system improvement. The last step in this analysis process is to determine the financial needs related to improving performance for those action-oriented performance measures for which airport development could be implemented to enhance system performance. The *Financial Needs* component of this chapter provides guidance to MassDOT Aeronautics, the Federal Aviation Administration (FAA), and airport sponsors in determining funding requirements for enhancing airport system performance as defined by the MSASP over the 20-year planning period. Also included within the *Financial Needs* section of this chapter are additional recommendations for evaluating progress of system development and providing sustainable planning strategies.

Following the determination of those funding requirements, the *Recommended Plan and Policies section* of this chapter outlines how MassDOT Aeronautics can best proceed with implementing the recommendations of this study. A review of airport funding in the U.S. and in Massachusetts is conducted, and projects that allow for appropriate development of the airport system are identified. Finally, methods for protecting the Commonwealth's investment in its airports and potential policy enhancements are identified.

FINANCIAL NEEDS

Based on the target performance identified in Chapter Five, costs for those projects needed to reach the target performance are required to establish the overall development needs for Massachusetts' airport system. Development costs are those that may be incurred to address specific airport deficiencies noted for facility and service objectives (Chapter Three), to improve the performance of the system and meet identified targets (Chapter Five), and to implement current airport capital improvement plans (CIPs). Ultimately, costs associated with each are combined to establish the airport system's long term development financial need.

Within this section of the chapter, costs are developed for improving the system to meet the goals developed in Chapter One. These costs have been prepared for internal MassDOT Aeronautics planning purposes only in order to identify the overall long-term aviation financial needs of Massachusetts. Note that the costs developed for the MSASP are not intended to replace those developed in airport master planning or CIP processes and the inclusion of these costs in the MSASP do not imply a commitment of funding for these projects. As always, actual funding of projects will be subject to the requirements and administrative policies of MassDOT Aeronautics and FAA, as appropriate as well as the availability of funds.

It is important to emphasize that the MSASP cost estimates have been developed to a planning level of detail and summarize the general financial requirements for the entire airport system. Costs were developed for each airport in the MSASP for three planning periods: short term (0-5 years), medium term (6-10 years) and long term (11-20 years). However, this chapter only presents this information in summary format, with no individual airport data. The costs developed are in 2010 dollars and do not account for inflation.

Methodology / Process

As noted above, the overall airport system development costs presented in this chapter were established by combining the two principle planning approaches utilized in the previous chapters of the MSASP, as well as by utilizing current development costs generated by the airports and MassDOT Aeronautics. First, project development costs were estimated for each system airport by weighing their existing conditions against the applicable facility and service objectives established within Chapter Three for that particular airport's role category. These development costs include those potential projects associated with bringing system airports into compliance with the objectives for their recommended system role. For example, it has been defined by the MSASP that a Massachusetts airport within the Corporate/Business role category should have a full parallel taxiway to its primary runway. If a given airport in that role did not have a full parallel taxiway, development costs for the construction of that full parallel taxiway would be estimated as part of this costing effort. It should also be understood that each potential project was reviewed and considered in light of local historical development factors and the practicability of a project being completed based on existing known conditions. Those potential projects deemed to be impractical were not included.

Second, project development costs were estimated for specific airports related to the performance measures discussed in Chapter Five. As noted in that chapter, system goals for specific performance measures were established that resulted in some airports being identified as requiring some particular project in order to increase overall system performance. For example, five airports were identified that should address runway centerline to taxiway centerline separation requirement considerations so that the overall airport system can meet its specific goal with respect to this performance measure. As such, general cost estimates were generated for each of these potential projects. It is also important to note that not all recommended actions in Chapter Five have associated costs. In other instances, costs may not have been developed or developed completely because the full magnitude of the needed project could not be estimated given the scope of this plan. Further investigation and justification could be required before some projects stemming from the MSASP can be implemented. In particular, many projects seeking FAA funding could require additional study and definition.

Lastly, each airport's CIP as maintained by MassDOT Aeronautics, as well as the CIP established by MassDOT itself for statewide airport initiatives, was reviewed to compare those potential projects from the MSASP with the projects already planned at the airports and for the system. The intent of this effort is to avoid the potential redundancy of project efforts and estimates. For those projects needed to meet MSASP objectives that were not already included in an airport's or MassDOT Aeronautics' CIP, cost estimates were developed. Those project costs already listed in an airport's and/or MassDOT Aeronautics' CIP were reviewed for relative order of magnitude accuracy and were then directly carried forward into the final airport system financial needs analysis.

For those projects introduced by the MSASP, but not covered in an existing CIP, order of magnitude costs were estimated through a standardized, industry accepted approach. Simply stated, average unit costs from recently completed projects of a similar nature in Massachusetts were first identified and confirmed by MassDOT Aeronautics. (Note that in some circumstances in order to reflect the wide range of project potentials and site considerations, multiple unit costs for a particular project were established in an effort to provide a more refined estimate.) Where appropriate, applicable quantities (e.g. units, area, linear feet, etc.) were then grossly estimated and multiplied by the accepted unit costs to obtain the overall construction cost for a particular project. It is also important to recognize that since these are generalized cost estimates and that they cannot reflect the individual project particulars that would otherwise be reflected in a CIP or an engineering estimate, contingency costs in the form of gross percentages were included for each project estimate. The intent of including these costs is to help reflect the specific airport-related conditions that often cause project costs to be higher than projected.

It is also important to remember that inclusion of a project in the MSASP does not commit local, state, or federal funding for the project. An airport master plan and airport layout plan are still needed to provide sufficient justification and environmental documentation prior to the implementation of the project.

The analyses completed in previous chapters evaluated system development needs at airports over the next 20 years, based on each airport's role in the system as well as forecast activity and operational efficiency. One of the most critical elements in the planning process is the application of basic financial, economic, and management rationale to determine the feasibility of each project contained in the system plan. It is not critical to develop all recommended projects in this study immediately. On the contrary, it would be more prudent to systematically implement improvements in order to spread development costs through the 20-year period and focus efforts on critical projects in the early stages. Short, medium, and long-term implementation periods were established in order to generate a reasonable sequencing of individual projects over the next 20 years.

System Plan Cost Summary by Goal Objective

Total estimated costs based on the MSASP goal categories and related performance measures are presented in the following sections. The following tables present the MSASP goal categories and their associated performance measures. Additionally, those potential projects as defined by the MSASP that could be required as a result of a deficiency in a particular performance measure have also been included in these tables. For example, for the purposes

of the MSASP, a deficiency at a given airport in meeting the applicable FAA design standards for a runway safety area (RSA) (Goal Category: Standards; Performance Measure 1) could result in that airport requiring a project to expand its RSA(s). In that instance, a cost estimate was generated as part of the MSASP and is included in the following sections.

Additionally, as stated previously, some performance measures identified in Chapter One were only informational in nature and therefore did not have any potential project implications associated with them. It should also be noted that airports may incur additional costs beyond the cost of the project itself, such as surveying, environmental permitting, etc. These costs have not been estimated unless they were expressly identified as part of a project within an airport-specific CIP or master plan, in which case, they are integrated into the estimate.

It should be noted that through discussions with MassDOT Aeronautics, it was determined that that Performance Measure 10 under Goal Category "Standards" should be modified slightly to account for the inclusion of regular updates to airport master plans and airport layout plans, as recommended by FAA. As such, the performance measure description was updated to the following:

> *Percent of system airports with appropriate planning documentation for their facility (including Airport Minimum Standards, Airport Rules and Regulations, Airport Master Plans and Airport Layout Plan documents.)*

The specific projects that have been estimated are listed in Figure 6-1 below.

Figure 6-1: Project Listings by Goal Category and Performance Measure

Goal Category: STANDARDS	
Performance Measure	Associated Project
1. Percent of system airports meeting applicable FAA design standards for Runway Safety Areas (RSAs).	*Expand RSA*
2. Percent of system airports with a runway pavement classification of "good."	*Rehab/reconstruct runway*
3. Percent of system airports with access controls to the airport operating areas (AOA).	*Establish access control to AOA*
4. Percent of system airports with an updated survey of aeronautical obstructions.	*Conduct obstruction survey*
5. Percent of system airports with an airport perimeter road.	*Construct/extend perimeter road*
6. Percent of system airports with controlling interest (property ownership/easements) over the FAA design standard Runway Protection Zones (RPZs) for each runway end.	*Purchase control of RPZ*
7. Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways.	*Relocate taxiway*
8. Percent of system airports with a General Aviation Airport Security Plan.	*Establish/update plan*
9. Percent of system airports having an Airport Emergency Plan.	*Establish/update plan*
10. Percent of system airports with appropriate planning documentation for their facility (including Airport Minimum Standards, Airport Rules and Regulations, Airport Master Plans and Airport Layout Plan documents.)	*Establish/update plans*

Figure 6-1: Standards Goal Category - Project Costs 2010-2030 (continued)

Goal Category: ENVIRONMENTAL COMPLIANCE & STEWARDSHIP	
Performance Measure	Associated Project
1. Percent of system airports that comply with the EPA's current requirements for Spill Prevention, Control, and Countermeasure (SPCC).	*Establish/update plan*
2. Percent of system airports that comply with the EPA's current requirements for Stormwater Pollution Prevention Plans (SWPPP).	*Establish/update plan*
3. Percent of applicable system airports with a Vegetation Management Plan (VMP).	*Establish/update plan*
4. Percent of applicable system airports with updated yearly operating plans associated with their existing VMPs.	*No project (integral to updating VMP)*
5. Percent of system airports with a Wildlife Management Plan.	*Establish/update plan*
6. Percent of system airports with a Comprehensive Solid Waste Management Plan.	*Establish/update plan*
7. Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls to help ensure that land uses within the airport environs are compatible with airport operations and development.	*Establish/update plan*
8. Percent of system airports with alternative fuel vehicles or other alternative fuel equipment.	*Establish/update plan*
9. Percent of system airports with recycling programs.	*Establish/update plan*
10. Percent of system airports with airport noise contours.	*Establish/update plan*
Goal Category: ECONOMIC	
Performance Measure	Associated Project
1. Percent of the direct economic impacts of individual airports in terms of airport related jobs and dollars.	*No project (informational purposes only)*
2. Percent of total employment/businesses within 30 minutes of a system airport.	*No project (informational purposes only)*
3. Percent of population and area within 30 minutes of a system airport meeting traditional business user needs (supports business aviation/Part 135).	*No project (informational purposes only)*
4. Percent of system airports with expansion / development potential.	*No project (informational purposes only)*
5. Percent of system airports with established/developable industrial park abutting/nearby airport.	*No project (informational purposes only)*
6. Number of key tourism indicators (i.e. hotel rooms) within 30 minutes of system airports.	*No project (informational purposes only)*

Figure 6-1: Standards Goal Category - Project Costs 2010-2030 (continued)

Goal Category: PRESERVATION	
Performance Measure	Associated Project
1. Percent of airports meeting minimum facility and service objectives.	
a. Airside Facilities	*- Extend runway(s)* *- Improve/extend taxiways* *- Improve approach types* *- Improve airfield lighting* *- Improve visual aids* *- Improve NAVAIDs* *- Improve weather reporting*
b. Landside Facilities	*- Expand hangar storage* *- Expand apron storage* *- Expand auto parking*
c. Airport Services	*- Establish fixed base operator* *- Expand fuel service* *- Construct flight planning room* *- Construct pilots' lounge* *- Establish on-site rental car* *- Establish on-site courtesy car* *- Enhance airfield snow removal* *- Enhance aircraft de-icing*
2. Percent of system airports with displaced thresholds.	*No project (informational purposes only)*
3. Percent of system airports with a waiting list for T-hangars or community hangars.	*No project (informational purposes only)*
4. Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990.	*Construct/renovate terminal building*
5. Percent of existing capital projects funding versus the future capital projects costs for system airports.	*No project (informational purposes only)*
6. Percent of system airports with an airport restaurant.	*No project (informational purposes only)*
7. Percent of system airports that offer based flight training.	*No project (informational purposes only)*
8. Percent of system airports that offer aircraft maintenance services.	*No project (informational purposes only)*
9. Percent of system airports that offer aircraft charter services.	*No project (informational purposes only)*
10. Percent of system airports that have a Winter Operations Plan.	*Establish/update plan*
11. Number of system airports that have closed since 1980 (public-owned and privately-owned, public-use airports).	*No project (informational purposes only)*
12. Percent of system airports that are recognized in local comprehensive plans.	*Recognize airport in plan*

Figure 6-1: Standards Goal Category - Project Costs 2010-2030 (continued)

Goal Category: OUTREACH	
Performance Measure	Associated Project
1. Percent of system airports that have established public outreach programs that include active coordination efforts with the local community, as well as local, state, regional and federal governmental representatives.	*Establish/update formal public outreach plan*
2. Percent of system airports that have an educational outreach program that illustrate aviation career opportunities to students.	*No project (informational purposes only)*
3. Percent of system airports that host annual air shows or fly-ins.	*No project (informational purposes only)*
4. Percent of system airports that are members of their local chambers of commerce.	*No project (informational purposes only)*
5. Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor.	*No project (informational purposes only)*
Goal Category: TRANSPORTATION INTEGRATION	
Performance Measure	Associated Project
1. Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports (i.e. bus).	*No project (informational purposes only)*
2. Percent of total population within 30 minutes of a publicly owned system airport & of a public/privately-owned system airport.	*No project (informational purposes only)*
3. Percent of system airports accessed by roads within the National Highway System.	*No project (informational purposes only)*
4. Percent of system airports that are adequately accessible in terms of signage and access road quality.	*Install/upgrade roadway signage to airport*
5. Percent of system airports that are acknowledged in local/regional transportation plans.	*Recognize airport in plan*

System Costs by Goal Category: Standards

Figure 6-2 details estimated project costs associated with the Standards goal category. System-wide cost to meet these performance measures is estimated at $227.2 million. The Standards goal category cost includes regular updates to airport master plans.

Figure 6-2: Standards Goal Category - Project Costs 2010-2030

Performance Measure	System Plan Cost (2010-2030)				
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	Total
Percent of system airports meeting applicable FAA design standards for Runway Safety Areas (RSAs).	$0	$6,800,000	$0	$0	$6,800,000
Percent of system airports with a runway pavement classification of "good."	$70,048,688	$54,068,200	$23,934,750	$5,677,500	$153,729,138
Percent of system airports with access controls to the airport operating areas.	$0	$0	$1,250,000	$187,500	$1,437,500
Percent of system airports with an updated survey of aeronautical obstructions.	$218,750	$0	$375,000	$450,000	$1,043,750
Percent of system airports with an airport perimeter road.	$343,750	$668,750	$295,000	$195,000	$1,502,500
Percent of system airports with controlling interest (property ownership/easements) over the FAA design standard Runway Protection Zones (RPZs) for each runway end.	$5,875,000	$7,300,000	$1,312,500	$175,000	$14,662,500
Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways.	$8,750,000	$12,500,000	$4,375,000	$0	$25,625,000
Percent of system airports with a General Aviation Airport Security Plan.	$93,750	$393,750	$225,000	$50,000	$762,500
Percent of system airports that have an Airport Emergency Plan.	$93,750	$187,500	$218,750	$75,000	$575,000
Percent of system airports with appropriate planning documentation for their facility (including Airport Minimum Standards, Airport Rules and Regulations, Airport Master Plans and Airport Layout Plan documents.)	$7,768,750	$6,682,500	$3,977,500	$2,640,000	$21,068,750
Totals	**$93,192,438**	**$88,600,700**	**$35,963,500**	**$9,450,000**	**$227,206,638**

Source: MassDOT Aeronautics, Wilbur Smith Associates

System Costs by Goal Category: Environmental Compliance & Stewardship

Estimated project costs for the Environmental Compliance & Stewardship goal category are detailed in Figure 6-3. The system-wide cost to meet these performance measures is estimated at $20.2 million by 2030.

Figure 6-3: Environmental Compliance & Stewardship Goal Category - Project Costs 2010-2030

Performance Measure	System Plan Cost (2010-2030)				
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	Total
Percent of system airports that comply with the EPA's current requirements for Spill Prevention, Control, and Countermeasure (SPCC).	$875,000	$900,000	$900,000	$360,000	$3,035,000
Percent of system airports that comply with the EPA's current requirements for Stormwater Pollution Prevention Plans (SWPPP).	$2,500,000	$2,812,500	$2,250,000	$750,000	$8,312,500
Percent of applicable system airports with a Vegetation Management Plan (VMP).	$1,362,500	$2,187,500	$1,875,000	$750,000	$6,175,000
Percent of applicable system airports with updated yearly operating plans associated with their existing VMPs.	For Informational Purposes Only (associated projects included in MassDOT CIP)				$0
Percent of system airports with a Wildlife Management Plan.	$237,500	$250,000	$225,000	$100,000	$812,500
Percent of system airports with a Comprehensive Solid Waste Management Plan.	For Informational Purposes Only (associated projects included in MassDOT CIP)				$0
Percent of system airports with surrounding municipalities that have adopted appropriate controls/zoning controls to help ensure that land uses within the airport environs are compatible with airport operations and development.	$312,500	$375,000	$300,000	$100,000	$1,087,500
Percent of system airports with alternative fuel vehicles or other alternative fuel equipment.	$100,000	$112,500	$87,500	$31,250	$331,250
Percent of system airports with recycling programs.	$50,000	$56,250	$50,000	$43,750	$200,000
Percent of system airports with airport noise contours.	$100,000	$87,500	$30,000	$10,000	$227,500
Totals	**$5,537,500**	**$6,781,250**	**$5,717,500**	**$2,145,000**	**$20,181,250**

Source: MassDOT Aeronautics, Wilbur Smith Associates

System Costs by Goal Category: Economic

As noted previously, the Economic goal category has performance measures that are used for informational purposes only – they do not have any associated projects. Therefore, there are no projected costs associated with the Economic goal category.

System Costs by Goal Category: Preservation

Estimated project costs for the Preservation goal category are detailed in **Figure 6-4**. The system-wide cost to meet these performance measures is estimated at $377 million by 2030. However, it should also be noted that hangar and FBO development projects are frequently sponsored and funded by private interests and not by the actual airport.

Figure 6-4: Preservation Goal Category - Project Costs 2010-2030

Performance Measure	System Plan Cost (2010-2030)				Total
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	
Percent of airports meeting minimum facility and service objectives.					
Airside Facilities					
- Runways	$0	$0	$0	$0	$0
- Taxiways	$4,500,000	$4,600,000	$0	$0	$9,100,000
- Approach Type	$0	$0	$87,500	$0	$87,500
- Lighting	$0	$175,000	$1,318,750	$0	$1,493,750
- Visual Aids	$0	$0	$0	$0	$0
- NAVAIDs	$337,500	$1,050,000	$1,625,000	$0	$3,012,500
- Weather	$0	$0	$0	$0	$0
Landside Facilities					
- Hangar Storage	$108,616,050	$88,080,000	$29,292,400	$0	$225,988,450
- Apron Storage	$16,362,500	$5,562,500	$5,932,500	$0	$27,857,500
- Automobile Parking	$878,500	$543,750	$281,250	$0	$1,703,500
Services					
- FBO	$34,125,000	$0	$3,750,000	$0	$37,875,000
- Fuel	$250,000	$0	$0	$0	$250,000
- Flight Planning Room	$22,500	$12,500	$25,000	$0	$60,000
- Pilots' Lounge	$75,000	$37,500	$0	$0	$112,500
- On-site Rental Car	$0	$0	$0	$0	$0
- On-site Courtesy Car	$0	$187,500	$375,000	$0	$562,500
- Snow Removal	$175,000	$250,000	$850,000	$100,000	$1,375,000
- Aircraft De-Icing	$200,000	$1,250,000	$0	$0	$1,450,000

Source: MassDOT Aeronautics, Wilbur Smith Associates

Figure 6-4: Preservation Goal Category - Project Costs 2010-2030 (continued)

Performance Measure	System Plan Cost (2010-2030)				
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	Total
Percent of system airports with displaced thresholds.		For Informational Purposes Only			$0
Percent of system airports with a waiting list for T-hangars or community hangars.		For Informational Purposes Only			$0
Percent of system airports with a terminal/administration building, and percent of those buildings constructed since 1990.	$22,500,000	$35,650,000	$7,875,000	$0	$66,025,000
Percent of existing capital projects funding versus the future capital projects costs for system airports.		For Informational Purposes Only			$0
Percent of system airports with an airport restaurant.		For Informational Purposes Only			$0
Percent of system airports that offer based flight training.		For Informational Purposes Only			$0
Percent of system airports that offer aircraft maintenance services.		For Informational Purposes Only			$0
Percent of system airports that offer aircraft charter services.		For Informational Purposes Only			$0
Percent of system airports that have a Winter Operations Plan.	$10,000	$20,000	$2,500	$1,250	$33,750
Number of system airports that have closed since 1980 (public-owned and privately-owned, public-use airports).		For Informational Purposes Only			$0
Percent of system airports that are recognized in local comprehensive plans.		For Informational Purposes Only			$0
Totals	**$188,052,050**	**$137,418,750**	**$51,414,900**	**$101,250**	**$376,986,950**

Source: MassDOT Aeronautics, Wilbur Smith Associates

System Costs by Goal Category: Public Outreach

Estimated project costs for the Public Outreach goal category are detailed in **Figure 6-5**. The system-wide cost to meet these performance measures is estimated at $196,875 by 2030.

Figure 6-5: Stewardship & Public Outreach Goal Category - Project Costs 2010-2030

Performance Measure	System Plan Cost (2010-2030)				
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	Total
Percent of system airports that have established public outreach programs that include active coordination efforts with the local community, as well as local, state, regional and federal governmental representatives.	For Informational Purposes Only				$0
Percent of system airports that have an educational outreach program that illustrate aviation career opportunities to students.	$25,000	$62,500	$65,625	$43,750	$196,875
Percent of system airports that host annual air shows or fly-ins.	For Informational Purposes Only				$0
Percent of system airports that are members of their local chambers of commerce.	For Informational Purposes Only				$0
Percent of the population and area that are within 30 minutes of a system airport with a full-time flight school/flight instructor.	For Informational Purposes Only				$0
Totals	**$25,000**	**$62,500**	**$65,625**	**$43,750**	**$196,875**

Source: MassDOT Aeronautics, Wilbur Smith Associates

System Costs by Goal Category: Transportation Integration & Accessibility

Estimated project costs for the Transportation Integration & Accessibility goal category are detailed in Figure 6-6. The system-wide cost to meet these performance measures is estimated at $493,750 by 2030.

Figure 6-6: Transportation Integration & Accessibility Goal Category - Project Costs 2010-2030

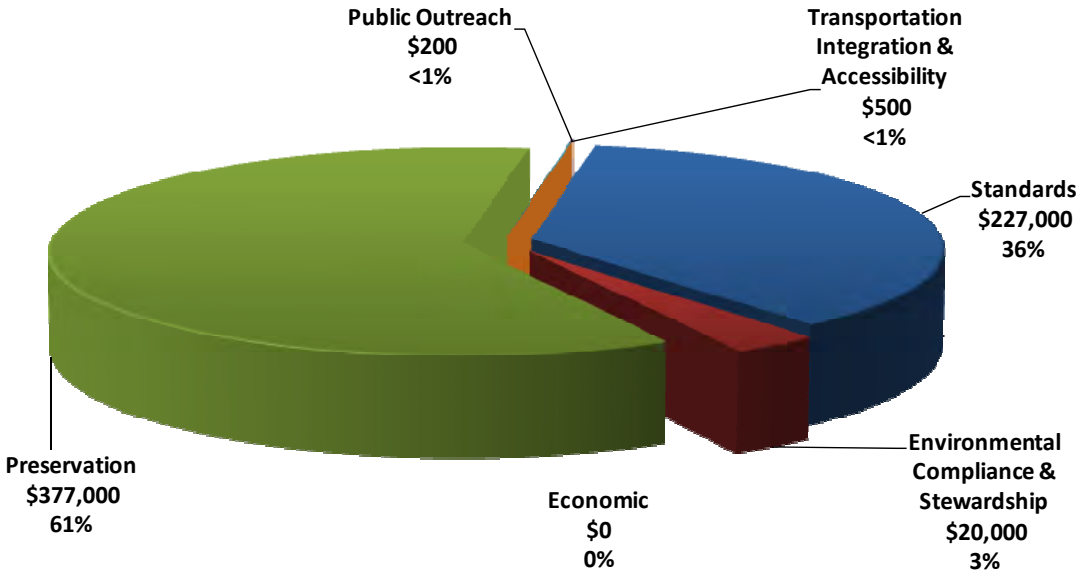
Performance Measure	System Plan Cost (2010-2030)				
	Commercial Service/ Scheduled Charter	Corporate/ Business	Community/ Business	Essential/ Business	Total
Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports (i.e. bus).	For Informational Purposes Only				$0
Percent of total population within 30 minutes of a publicly owned system airport & of a public/privately-owned system airport.	For Informational Purposes Only				$0
Percent of system airports accessed by roads within the National Highway System.	For Informational Purposes Only				$0
Percent of system airports that are adequately accessible in terms of signage and access road quality.	$125,000	$43,750	$125,000	$37,500	$331,250
Percent of system airports that are acknowledged in local/regional transportation plans.	$25,000	$18,750	$75,000	$43,750	$162,500
Totals	**$150,000**	**$62,500**	**$200,000**	**$81,250**	**$493,750**

Source: MassDOT Aeronautics, Wilbur Smith Associates

System Plan Cost Summary by Goal Category

Figure 6-7 reflects the total 20-year development costs summarized by goal category. The 20-year estimate of costs is approximately $625 million. Of that total cost, the largest portion (61 percent) falls under the Preservation goal category which not only includes items like terminal construction, but also the meeting of airport facility and service objectives, which can include hangar and apron construction. The Standards goal accounts for nearly 36 percent of the total cost and includes the establishment of appropriate runway safety areas, as well as the maintenance of existing runway pavements. Environmental Compliance & Stewardship represents almost three percent of the total cost, with both Public Outreach, and Transportation Integration & Accessibility each representing less than one percent of the total cost. Note that the Economic goal included only informational data and did not include any specific projects.

Figure 6-7: Summary of MSASP Costs, by Goal Category 2010-2030 (in thousands)

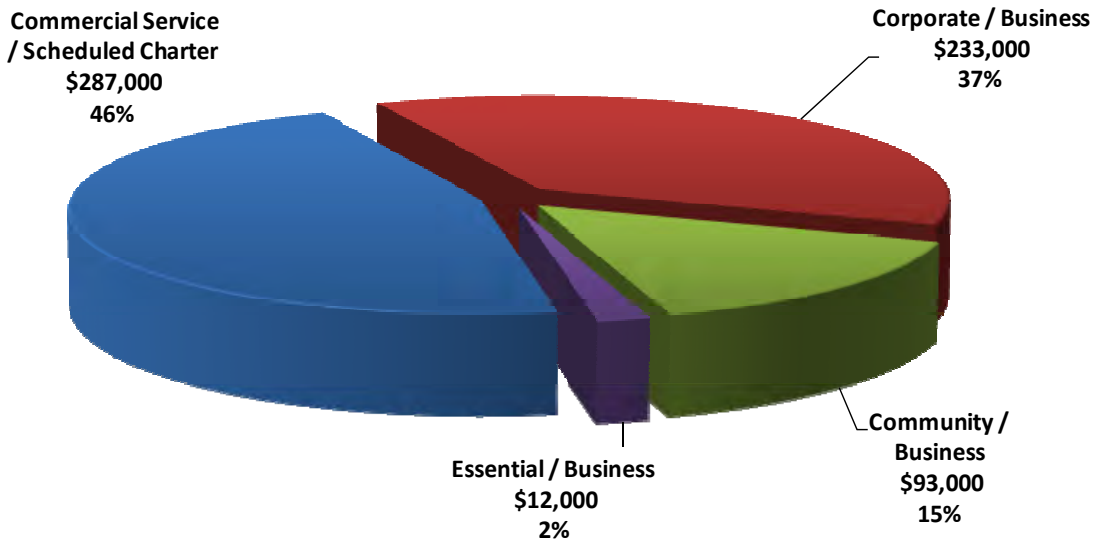


Source: Wilbur Smith Associates
Prepared: October 2010

System Plan Cost Summary by Airport Role

Figure 6-8 summarizes the estimated 20-year costs by airport role. As shown, 46 percent of these project costs relate to raising the level of performance for Commercial Service/Scheduled Charter airports in Massachusetts, with Corporate/Business airports representing 37 percent, Community/Business airports representing 15 percent and Essential/Business accounting for the remaining two percent.

Figure 6-8: Summary of MSASP Costs, by Airport Role 2010-2030 (in thousands)

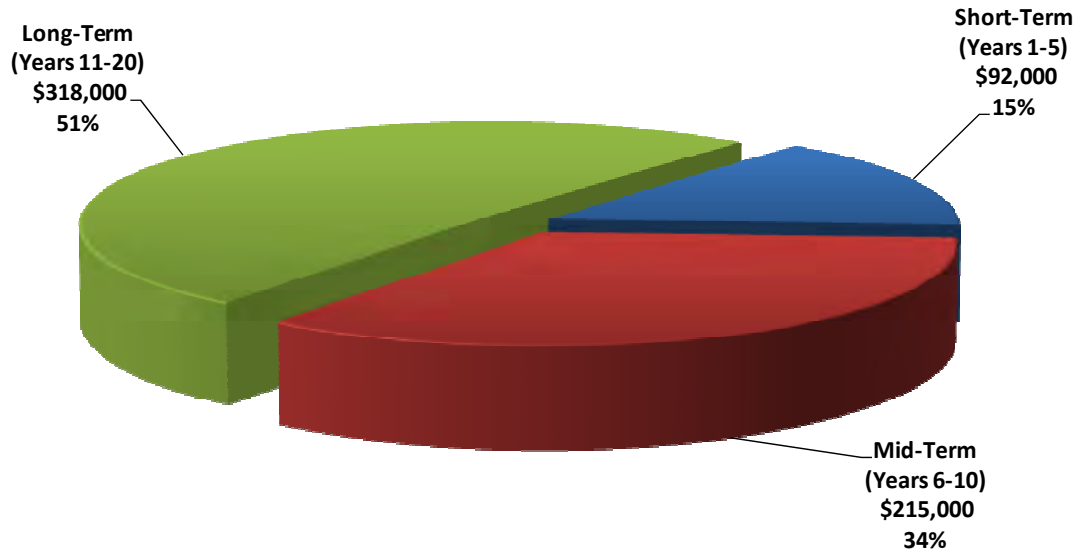


Source: Wilbur Smith Associates
Prepared: October 2010

System Plan Cost Summary by Time Period

Figure 6-9 breaks down the projected MSASP project costs into short-term (five years or less), mid-term (six to ten years), and long term (more than 10 years) time periods. As shown, 15 percent of the 20-year costs are expected to occur within the short-term, with 34 percent occurring in the mid-term, and the remaining amount (51 percent) occurring in the long-term time frame.

Figure 6-9: Summary of MSASP Costs, by Time Period (in thousands)



Source: Wilbur Smith Associates
Prepared: October 2010

Additional System Costs not included in MSASP Development Costs

Beyond the airport-specific costs generated in relation to the MSASP, MassDOT Aeronautics has projected funding requirements for multiple projects that it anticipates undertaking over the 20-year planning period. These are briefly described below.

Airport Safety & Maintenance Program (ASMP)

The mission of MassDOT Aeronautics has evolved over the years, but one of its core functions has always been to assist the Commonwealth's public-use airports with funding for airport development projects. Understandably, considerable effort is devoted to funding the state's matching share of projects included under the FAA's Airport Improvement Program (AIP). However, recognizing the fact that not all airport sponsors are eligible for federal AIP funding, and of those who are, none are eligible for AIP funding from the FAA for routine maintenance, MassDOT Aeronautics initiated a grants-in-aid program called the Airport Safety and Maintenance Program specifically designed for this purpose. The initial guidelines were promulgated pursuant to Chapter 811 of the Acts and Resolves of 1985, which authorized the establishment and administration of a program to assist in the maintenance and repair of airports included in the state airport system plan, excluding those airports owned and operated by the Massachusetts Port Authority.

The ASMP has been highly successful for the Commonwealth in not only supporting its airports for conducting important projects not funded by the FAA, but also in providing some level of support to those public-use airports ineligible to receive any federal grants. It is recommended that MassDOT Aeronautics continue to pursue opportunities for expanding this program, particularly with respect to privately-owned, public-use airports. Over the 20-year planning period, MassDOT Aeronautics has projected sponsoring a number of projects and programs through the ASMP, including the following:

- Pavement Crack Sealing
- Pavement Paint Striping
- Airport Maintenance and Snow Removal Equipment Purchase/Maintenance
- NAVAID Maintenance
- Statewide Herbicide Program
- Statewide Vegetation Management Plan (VMP) Yearly Operating Plans (YOP)
- Conservation Management Plans (CMPs)
- Statewide Airport Security Program
- Airport ID Badging Program
- Airport Business Plans
- Development of LPV Approaches
- Airport Handbooks (Environmental, Compatible Land Use, ASMP Funding, etc.)

Through the MSASP process, generalized cost estimates for each project were established over the planning period by MassDOT Aeronautics. In total, MassDOT Aeronautics currently projects a need of $93 million for the ASMP.

Airport Information Management System

MassDOT Aeronautics is currently transitioning its airport database management system from an outside consultant to an information technology group internal to MassDOT. It is

anticipated that the new system will continue its primary functions of airport data management, including activity, contacts, and capital improvement programs; state project grant applications, awards and management; project management elements, including summaries and scheduling; consultant management, including disadvantaged business enterprise (DBE) management; document management and tracking; report production; among many other functions critical to MassDOT Aeronautics. It is anticipated that the cost of the new system will be $600,000, with annual updates to the database being undertaken by MassDOT employees.

State Continuous Planning

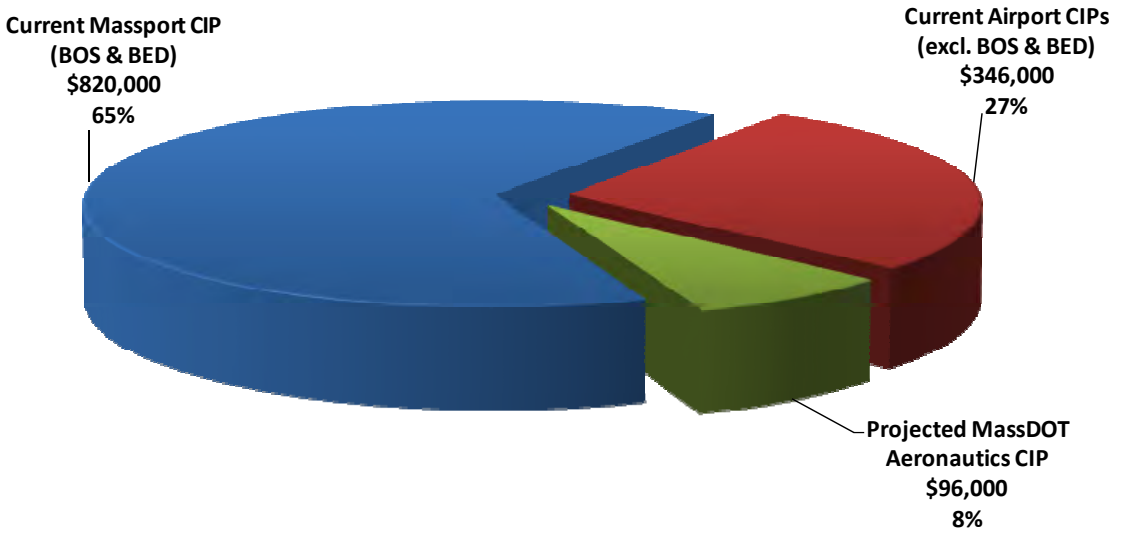
The MSASP provides MassDOT Aeronautics with a blueprint for the future development of the airport system. As the aviation industry changes and the Commonwealth's socioeconomic and demographic characteristics evolve, the system plan should again be updated. It is recommended that MassDOT Aeronautics consider updating the system plan at five-year intervals with updates in 2015, 2020, 2025, and 2030.

Additionally, in late 2010 MassDOT Aeronautics will undertake a complementary planning effort in the form of a statewide aviation economic impact study. Discussed in greater detail in a section below, this study should be updated at regular five-year intervals like the MSASP. Combined, the estimated cost for updating the system plan and the economic impact study through the forecast period would be $2.0 million.

CIP and Master Plan Costs not included in MSASP Development Costs

In addition to the projects identified in the system plan, most of the airports in Massachusetts have identified additional projects through their local planning and goal setting efforts. In fact, many of the airports in the Commonwealth have updated their master plans in the last five years. As part of those master planning efforts, airport-specific capital projects and costs are typically identified in each airport's master plan and on their respective airport layout plan (ALP). This is particularly important since many projects planned at airports anticipate utilizing federal and state funds. These projects are identified in the current MassDOT Aeronautics CIP, which has estimated project and cost information annually through 2017. **Figure 6-10** presents the additional project costs identified in the MassDOT Aeronautics CIP which includes the most current project projections from airports and their master plans. In addition to the $625 million identified to meet system plan recommendations, an additional $1.26 billion could be needed to meet airport needs. This total includes $95 million for other MassDOT Aeronautics CIP system costs (as described in the previous section), $346 million for other master plan/airport CIP costs (not including Logan and Hanscom Airports), and $820 million for Massport airports (Logan and Hanscom).

Figure 6-10: Other Future Airport Costs (in thousands)



Sources: Wilbur Smith Associates; MassDOT Aeronautics
Prepared: October 2010

Note that this cost summary is not exhaustive of all the airport projects that are needed through 2030. Several system airports like New Bedford Regional Airport currently or will soon have master planning efforts underway. Improvement costs that will come from these master plans are obviously not included in this MSASP. Since many airports also do not provide project costs throughout the entire system plan's forecast period (through 2030), the MassDOT Aeronautics database was utilized as the basis for accumulating CIP information. While this approach is helpful in that it helps normalize the data, it only extends to 2017. As such, there are likely some projects at airports beyond that timeframe that are not being captured in the CIP. Additionally, it should be noted that master plans and CIPs are most typically generated by airports eligible to receive federal funding; therefore, it is reasonable to assume that potential projects at privately-owned, public-use airport are not fully reflected in this total.

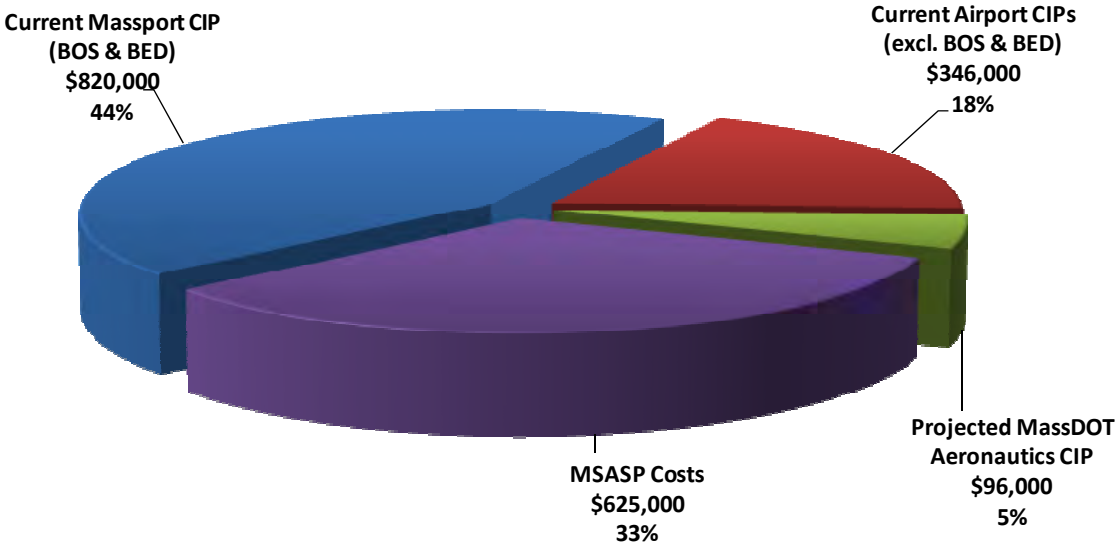
Finally, pricing in many construction-related aspects has increased, decreased, and increased again in recent years due to economic conditions worldwide. These rising construction costs impact original project cost estimates developed in the state CIP or the airport master plans including pavement projects, runway and taxiway extensions, and apron projects. The cost estimates provided for these types of projects in older master plans tended to be lower than the costs actually needed to perform the project today.

Total Future Development Funding Needs

Figure 6-11 presents the total future development funding needs for the Massachusetts airport system. This 20-year projection includes all MSASP project costs, the projected MassDOT Aeronautics CIP, the current CIPs for all system airports other than Boston and Hanscom, and the current airport CIPs for both Boston and Hanscom. When totaled, the 20-year development need for the Massachusetts airport system is approximately $1.89 billion. The largest portion of this need (44 percent) represents the Massport airport CIPs for Boston and

Hanscom, with the next largest (33 percent) representing MSASP project costs. Current system airport CIPs and the projected MassDOT Aeronautics CIP comprise the balance at 18 percent and 5 percent, respectively.

Figure 6-11: Total Airport Development Costs 2010-2030 (in thousands)



Sources: Wilbur Smith Associates; MassDOT Aeronautics
Prepared: October 2010

FUNDING SOURCES

When projecting the future of its airport system, securing appropriate funding for airport improvement projects over the long term is a critical issue for Massachusetts. Because of the relatively significant cost of most airport projects, airports must typically rely on funding sources beyond their own individual revenue streams in order to meet user demands. As such, airport development is often a function of an individual airport sponsor's ability to both identify funding sources and to successfully obtain that funding.

While there are multiple funding sources available to Massachusetts airports for development projects, it must be understood that each year, the funding requested far outweighs available funding from any of these sources. In general, funding for capital improvement projects can be secured from the following sources: federal, state, local, or private funds. Implementation of the recommendations presented in the MSASP will require significant effort and contributions on the part of all these funding agencies over the long term. A brief description of each source of funding is presented in the following sections.

Federal Funding Sources

To promote the development of airports to meet the nation's needs, the Federal Government embarked on a Grants-In-Aid Program to units of state and local government after the end of World War II. Following multiple earlier versions of federal funding programs, the Airport Improvement Program (AIP) was established through the Airport and Airway Improvement Act of 1982. The initial AIP provided funding legislation through fiscal year 1992, but since then,

it has been authorized and appropriated on a yearly or even quarterly basis. Funding for the AIP is generated through taxes on airline tickets, freight way bills, international departure fees, general aviation fuel, and jet fuel.

AIP grants include entitlement grants, which are allocated among airports by a formula that is driven by passenger enplanements, and by discretionary grants that are awarded in accordance with specific guidelines. Generally, primary airports receive entitlements based on the number of enplaning passengers and landed cargo weights, while non-primary airports, which include general aviation airports, likewise receive some entitlements and may also be eligible for federal state apportionment funding. The total amount of state apportionment funding is based on an area/population formula for the state, while the amount of non-primary entitlements is computed from the needs list for the particular airport in the published National Plan of Integrated Airport Systems (NPIAS). Note that only publicly-owned airports included in the FAA's NPIAS are eligible to apply for this federal funding. Of the existing 37 public-use airports in Massachusetts, 28 are included in the NPIAS and 25 are eligible for federal funding (three NPIAS airports in Massachusetts are privately owned and are not eligible for federal funding).

Federal Airport Improvement Funds must be spent on FAA-eligible projects as defined in FAA Order 5100.38C "Airport Improvement Program (AIP) Handbook." The handbook and the latest authorization, Vision 100 - Century of Aviation Reauthorization Act, state that:

- An airport must be included in the current version of the NPIAS;
- Non-primary entitlement funds of $150,000 per year can be accumulated for up to four years;
- The federal portion of AIP grants increases to 95% for all general aviation airports; and
- If an airport has no airside improvement needs, entitlement funds can be used for certain landside projects.

General aviation and commercial service airports also compete for federal discretionary funds. These funds are awarded based on priority ratings given to each potential project by the FAA. The prioritization process makes certain that the most important and beneficial projects (as viewed by the FAA) are the first to be completed, given the availability of adequate discretionary funds. Federal funding is limited to development that is justified to meet aviation demand according to FAA guidelines. Each NPIAS airport development project is subject to eligibility and justification requirements as part of the normal AIP funding process.

In FY2008, AIP provided $3.5 billion in funding to eligible NPIAS airports in the United States. A similar level of AIP funding was appropriated for FY2009 in addition to $1.1 billion for "shovel-ready" airport projects around the country as part of the American Recovery and Reinvestment Act (ARRA) of 2009 aimed at revitalizing the U.S. economy. It has been reported by the FAA Airports Financial Assistance Division that these figures should increase for FY2011.

Figure 6-12 presents total AIP funding for all eligible U.S. airports for fiscal years 2000 through 2010.

Figure 6-12: All U.S. Historical AIP Funding (Billions)

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Total AIP Funding	$3.3	$3.4	$3.4	$3.5	$3.6	$3.7	$3.5	$3.5[1]	$3.5[1]

[1] Does not include ARRA funding
Source: FAA Airports Financial Assistance Division
Prepared: October 2010

Vision 100 was signed into law in December 2003 and reauthorized the AIP Program through 2007. Because Vision 100 expired at the end of FY2007 and a long term reauthorization has yet to be finalized at the time of the MSASP writing, no funding targets have been established for future years. While FY2008, FY2009, FY2010 AIP funding was eventually appropriated approximately at the FY 2006 level of $3.6 billion, the future of the AIP is largely unknown without a program reauthorization. Additionally, since a long term reauthorization has yet to be finalized, the U.S. Congress has had to authorize multiple continuing resolutions to extend the original program in order to maintain funding. Unfortunately, the ongoing use of continuing resolutions (with as many as five occurring within a single fiscal year) makes it difficult to project future FAA AIP funding levels, which in turn has a ripple effect on conducting many airport projects since appropriate AIP funding may not be guaranteed.

State Apportionment & Non-Primary Entitlement Funding for Massachusetts

General aviation airports (included in the NPIAS) are eligible for State Apportionment funds and Non-Primary Entitlement funds. State Apportionment funds are allocated to states based on a formula using population and geographic size. Those funds are distributed to airports based on FAA prioritization of projects. According to MassDOT Aeronautics, Massachusetts non-primary airports received approximately $3.7 million in State Apportionment funds in FY2009 and FY2010 for federally funded projects at non-primary airports only.

Additionally, as noted above, general aviation airports are also eligible for up to $150,000 in Non-Primary Entitlement funds. To obtain the funds, publicly-owned airports must be included in the NPIAS and have a 5-Year CIP with eligible projects that meet AIP funding guidelines. In FY2009, 12 Massachusetts airports received Non-Primary Entitlement funds for a total of $4.3 million.

Federal Discretionary Funding for Massachusetts

General aviation and commercial service airports also compete for Federal Discretionary funds, which are awarded based on priority ratings given to each potential project by the FAA. The prioritization process ensures that (from the FAA's viewpoint) the most important and most beneficial projects are the first to be completed, given the availability of adequate discretionary funds. This source of funding is over and above entitlement funding, and is provided to airports for projects that have a high federal priority for enhancing safety, security, and capacity of the airport, and would be difficult to fund otherwise. The dollar amounts of individual grants vary and can be significant in comparison to entitlement funding.

From FY2005 through FY2009, the discretionary funding for Massachusetts airports (including Logan International and Hanscom Field) from the FAA New England Region was over $165 million. The following Massachusetts airports received discretionary funds during the five year period:

Barnes Municipal ($9.2M)
Barnstable Municipal ($0.05M)
Beverly Municipal ($1.1M)
Chatham Municipal ($3.7)
Gardner Municipal ($0.3)
Hanscom Field ($3.7M)
Harriman-And-West ($0.4M)
Lawrence Municipal ($0.5M)
Logan International ($83.3M)
Mansfield Municipal ($0.7M)
Marshfield Municipal ($0.6M)
Martha's Vineyard ($5.9M)
Nantucket Memorial ($6.2M)
Norwood Memorial ($1.9M)
Orange Municipal ($0.3M)
Pittsfield Municipal ($3.6M)
Plymouth Municipal ($1.8M)
Taunton Municipal ($1.1M)
Turners Falls ($4.5M)
Westover ARB/Metropolitan ($12.1M)
Worcester Regional ($10.0M)

American Recovery and Reinvestment Act (ARRA) of 2009

President Barack Obama signed the $787 billion American Recovery and Reinvestment Act (ARRA) of 2009 in February 2009. This one time economic stimulus package included $48.1 billion in domestic spending on infrastructure improvements. Of this, $1.1 billion was provided to the FAA for airport projects. Priority was given to projects that were ready for construction (also referred to as "shovel ready") and could be completed within two years. Seven Massachusetts airports were awarded one of these 100 percent federal funded grants for a total of $19.9 million. These airport projects include the following:

- Barnes Municipal - Rehabilitate Runway ($1.3M)
- Beverly Municipal - Rehabilitate Taxiway ($0.8M)
- Gardner Municipal - Install Airport Beacons ($0.4M)
- Logan International - Rehabilitate Runway 09/27 ($13.5M)
- Logan International - Install Taxiway Lighting ($1.3M)
- Hanscom Field - Rehabilitate Taxiways ($1.8M)
- Lawrence Municipal - Rehabilitate Runway ($0.54M)
- Orange Municipal - Rehabilitate Runway ($0.3M)

Federal Funding Summary

Federal funding is limited to development that is justified to meet aviation demand, according to FAA standards. Each airport development project, including those recommended in the MSASP, will be subject to eligibility and justification requirements in the normal AIP funding process.

State Funding

MassDOT Aeronautics also provides funding for airport capital improvement projects at the 37 public-use general aviation airports throughout the Commonwealth. The primary goal of this program is to support the long-term development and sustainability of the Massachusetts' airport system by effectively coordinating with the FAA and airport sponsors to leverage the maximum amount of federal dollars available, while also providing financial support for non-federal initiatives that are of great importance to the Commonwealth.

MassDOT Aeronautics obtains its funding for airport development and planning projects through an annual appropriations request which is included in an overall funding request for all of MassDOT that eventually is supported through an annual transportation bond. These

requests are processed by the Executive Office for Administration and Finance (A&F) which establishes a "bond cap" amount for MassDOT Aeronautics that ultimately reflects the available monies for airport capital infrastructure projects. Note that as a key component of its annual budgeting process, MassDOT Aeronautics Division works very closely with the FAA and the individual airports to maximize the leveraging capabilities of project partners.

Under the FAA's current Vision 100 AIP, federal funding is available for up to 95 percent of the cost of eligible airport projects. Historically, MassDOT Aeronautics has committed to provide at least 50 percent of the local share for projects receiving federal AIP funding. These are often referred to as Federal/State/Local grants. Current sponsor obligations on federal projects for most airports are 2.5 percent of a project's total cost, making the Commonwealth's current share 2.5 percent as well. It should also be noted that this matching of local funding for AIP projects is in fact the minimum to which MassDOT Aeronautics has traditionally committed. For AIP projects that are of great importance to the Commonwealth (i.e. projects that would result in economic development; projects that would support high priority initiatives, like security; etc.) but that may fall lower on the federal ranking for funding, MassDOT Aeronautics has traditionally extended its funding commitment as a means to secure federal funding more expediently. In fact, MassDOT Aeronautics has previously provided 50 percent or more of the cost of some important projects on the guarantee that federal funding, albeit at lower percentage levels, would be provided immediately.

Airport Safety and Maintenance Program (ASMP)

As described previously, MassDOT Aeronautics utilizes a grants-in-aid program called the Airport Safety and Maintenance Program (ASMP) to assist airport sponsors that are either not eligible for federal grants, or for routine maintenance projects not eligible for AIP funding from the FAA. Additionally, state grants for projects under the ASMP are only given to public use airports included in the MSASP. Further, to be eligible for a grant, the project must be included in MassDOT Aeronautics' statewide CIP. Projects are often programmed for routine maintenance which address deficiencies noted in an annual state airport inspection, but airport planning and new construction are also considered eligible projects under the ASMP. Typically, projects funded by MassDOT Aeronautics under the ASMP are done so on a 20 percent local share and 80 percent state share, although some statewide programs have historically had 100 percent state funding. ASMP grants are typically issued to airport sponsors for the following activities:

- Airport Planning - Typical planning projects may involve planning on statewide or individual airport bases, ranging from a large integrated statewide/regional airport system planning to smaller airport master planning for individual sponsors. These plans identify and evaluate the aviation facilities needed to meet the current and future air transportation needs of a particular study group. Other planning related projects may include feasibility studies and environment permitting projects.
- Airport Development - Eligible development projects may include facilities or equipment associated with the construction, improvement, maintenance and repair of an airport. Typical work items include: site preparation; vegetation management projects, including tree clearing and herbicide treatment for long term management; 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; safety equipment; maintenance

equipment; snow removal equipment; terminal buildings and related site development; and equipment to measure runway surface friction.

State Funding Summary

The availability of funding support from MassDOT Aeronautics can fluctuate on an annual basis and funding needs typically exceed available funds. Increased construction expenses exacerbate the funding dilemma. However, MassDOT Aeronautics is fully committed to maximizing federal funding opportunities; aggressively pursuing projects deemed to be very important to the Commonwealth; and providing funding opportunities to all system airports for those projects not covered under AIP, but nevertheless still seen as critical to the Commonwealth of Massachusetts.

Local Funding

Local airport sponsors are responsible for costs associated with airport development projects that remain after federal and state shares have been applied. Beginning in 2004, the local and state match for federal projects is 2.5 percent, while the local share for state projects is typically 20 percent. However, it should be noted that there are exceptional instances when MassDOT Aeronautics does contribute a larger percentage than the 2.5 percent for federal projects and the 80 percent for state projects. These occasions typically result for projects that are very important to the Commonwealth and/or are statewide in nature.

Local government funding of airport development projects is derived from the following sources:

- General Fund Revenues
- Bond Issues
- Airport-Generated Revenues
- Private Funding

Of these, general fund revenues and general obligation bonds are by far the most common funding sources. Revenue bonds supported by airport generated revenues are seldom used because most general aviation airports do not generate enough money to pay operating expenses and the debt service of capital funding requirements.

General Fund Revenues

Capital development expenditures for airports from general fund revenues are often difficult to obtain. One reason for this difficulty is the seemingly universal shortfall in local general fund revenues. Budgetary problems combined with the economic downturn have created an environment where local funding streams are reduced and uncertain. The amount of general fund support for airport improvement projects can vary greatly by airport, but is typically based upon the local tax base, priority of development projects, historical funding trends, and, of course, local attitudes concerning the importance of aviation.

Bond Funds

Airport authorities can issue bonds without approval from the city or county. However, they must use their own revenues (typically airport revenues) to repay the bonds. A city or county that also operates an airport can issue bonds as well. However, for these airport sponsors, bond issues funding the local share of airport development projects must compete with bond

issues for other types of community improvements such as schools, highways, and sewer systems. As with the general fund apportionment, bond issues supporting airport development depend greatly on the priority assigned to such projects by the local community.

Airport-Generated Revenues

It is not uncommon for revenues generated by an airport operation, in particular a general aviation airport operation, to fail to match the expense of the operation. In such cases, the airport sponsor will often subsidize the operating and the capital improvement expenses of the airport. This is done for the purposes of supporting the airport as an economic generator for the host community. However, commercial service airports, via the collection of revenue from landing fees, space rental, auto parking, fuel sales and/or fuel flowage fees, concession fees, etc., are more likely to generate the revenue necessary for operating and capital improvement expenses.

Private Funds

Items such as storage and maintenance hangars, fuel systems, and pay parking lots are not typically eligible for federal or state grant funding at public airports because they generate income for the airport. Given appropriate demand, airports will often work with FBOs and other business interests to fund these types of improvements. This frequently occurs in the development of hangar facilities whereby an airport will commit to a long term ground lease (30+ years) to a developer who will then provide the investment required to develop the hangars. The developer will then realize financial returns on hangar leases or sales over the term of the ground lease, at which point the structures revert to airport ownership.

Total Funding Summary

Figure 6-13 presents a summary provided by MassDOT Aeronautics and the FAA of total project funding provided for airports in Massachusetts over the last five fiscal years (July 1 through June 30). The funding includes federal, state, and local funding for this time period. Note that local funding levels are reflected only for projects with federal and state funding matches; projects that use 100 percent of local funds or PFC funding are not included. Between FY2005 and FY2009, funding for Massachusetts airports has averaged approximately $32 million, considerably less than the needs of the system presented above. It should also be acknowledged that even that total is likely skewed upward by a limited number of large projects, including a new terminal building and several other costly RSA projects.

Figure 6-13: Massachusetts Airport Historic Funding FY2005-2009

Project Type / Source	*FY2005*	*FY2006*	*FY2007*	*FY2008*	*FY2009*
Federal/State/Local[1]					
Federal					
Entitlement	$12,140,000	$9,480,000	$20,370,000	$10,010,000	$11,530,000
Discretionary	$4,950,000	$7,100,000	$19,030,000	$6,300,000	$23,700,000
Federal Total	*$17,090,000*	*$16,580,000*	*$39,400,000*	*$16,310,000*	*$35,230,000*
Local Match	$520,000	$950,000	$5,010,000	$290,000	$770,000
State Match	$540,000	$1,560,000	$13,220,00	$650,000	$1,150,000
Total	**$18,150,000**	**$19,090,000**	**$57,630,000**	**$17,250,000**	**$37,150,000**
State/Local[2]					
State	$454,500	$5,678,700	$240,500	$3,379,800	$95,600
Local	$67,000	$335,900	$57,600	$778,100	$23,900
Total	**$521,500**	**$6,014,600**	**$298,100**	**$4,157,900**	**$119,500**
State[3]	**$187,500**	**$55,000**	**$10,000**	**$200,000**	**$0**
Total Funding	**$18,859,000**	**$25,159,600**	**$57,938,100**	**$21,607,900**	**$37,269,500**
Total State Funding	**$1,182,000**	**$7,293,700**	**$13,470,500**	**$4,229,800**	**$1,245,600**

[1] AIP Grant Projects with Federal, State and Local participation
[2] MassDOT Aeronautics ASMP Projects with State and Local participation
[3] MassDOT Aeronautics ASMP Projects with State participation only
Source: MassDOT Aeronautics
Prepared: October 2010

RETURN ON INVESTMENT

Like most states across the country, Massachusetts continues to face increasing demand for limited financial resources. The MSASP identified the importance of addressing airport considerations related to the long-term goal of the statewide airport system. However, one of the most important challenges is to prioritize which airport capital investment projects should be funded with state assistance and when those should occur. Factors considered in the decision-making process include aviation activity (i.e., aircraft operations and based aircraft), emergency access, and economic development (business attraction and retention). From an economic development perspective, the objective is to identify how the greatest benefit can be achieved given aviation's role compared to many other economic development factors, such as labor (availability, skill levels and rates), taxes, accessibility, etc.

A 2000 study (*Economic Impact of Public Use Airports in Massachusetts*) completed by the Massachusetts Aeronautics Commission (now MassDOT Aeronautics) for public airports in Massachusetts concluded that there were over 9,000 jobs throughout the state in 2000 that were linked directly to the airports and their operations. Total economic output contributed by the public-use airports included in the MSASP was estimated at over $900 million in 2000. (Recognizing that this data is dated, MassDOT Aeronautics intends to update this economic impact study in the 2010-2011 timeframe.)

While the results of airport economic impact analyses are extremely useful in illuminating the importance of the aviation industry to Massachusetts, they do not shed light on the potential

return on investment (ROI) of aviation as a whole. The return on investment goes beyond the airport itself, and extends into the local and regional economies that they operate within. Without the availability of airports, the ability of the local or regional economy to expand is impacted. Airports serve an important role in providing access for the local business, as well as access for visitors and vendors of the business that is not easily quantified as a specific return on investment.

When a company is looking to expand or relocate, there are many factors that affect their decision-making process. In a MSASP survey of more than 2,000 businesses within Massachusetts, survey respondents were asked to rank the importance of the following factors when considering expansion or relocation of their businesses. The factors are listed from most important to least in terms of the results:

- Availability of trained workforce
- Convenient highway access
- Quality of life
- Tax incentives
- *A commercial service airport*
- Proximity of suppliers
- Universities or R&D centers
- An urban business district
- Historic location of business
- Rail transportation facilities
- *A general aviation airport*
- Raw materials/natural resources
- Water transportation facilities
- Development land on or near an airport

As shown, the location of a commercial service airport ranks very high (fifth out of 14 factors), indicating the economic value of commercial airline service to businesses and the overall economy. Proximity to a general aviation airport ranks 11th in the listing.

The survey confirmed that many businesses depend on the state's airports for the transport of employees, clients, and suppliers, as well as goods. Without access to commercial and general aviation airports, some companies would be forced to cut employment or possibly locate outside the state. It is the off-airport, value added benefit that non-aviation businesses gain through their use of aviation that is extremely difficult to quantify.

Role of the Airport in Economic Development

Airports are often catalysts for economic development; however, investment in airport infrastructure does not necessarily directly stimulate economic development. Airport investment (development) is more often an important facilitator of growth, not the origin, or the cause of growth. Within any market area, rising demand for goods and services stimulates economic growth, and subsequently the need to invest in and grow airports.

Rising demand for goods and services is most often linked to growth in population and employment, capital investment (public and private), and/or technological progress. These three measures are not easily quantified. Studies have shown that when a market area has

certain characteristics, there is a greater propensity for rising demand for goods and services. Rising demand for goods and services equates to the need to invest in and grow airport facilities. When certain characteristics are present in a market area, these characteristics generally indicate a higher demand for aviation services and hence a greater potential for return when investment is made in airports. It is more often the characteristics of an airport's market area, and not the airport specific development project, which determine if there will be a positive off-airport return on investment.

SUMMARY OF FINANCIAL NEEDS

The Massachusetts Statewide State Airport System Plan has identified costs to elevate the overall performance of the state's airport system and to enable individual airports in the system to fulfill their designated roles. Through 2030, the approximate annual average cost to raise the level of performance of airports throughout Massachusetts to meet MSASP recommendations alone would be approximately $31.3 million. When additional funding needs are considered based on airport CIPs (not including Logan and Hanscom) and MassDOT Aeronautics' CIP, the annual level of need is estimated to jump to $53.4 million or a total of $1.07 billion over the 20-year forecast period. Finally, when adding both Boston and Hanscom, the annual level of need rises to $94.4 million or a total of $1.89 billion over the planning period.

When all federal, state, and local funding sources (prior to FY 2009) are quantified, an average of $32 million has been invested in the Massachusetts airport system (excluding Boston and Hanscom) each year. However, when considering that there is an estimated $53.4 million in annual estimated need, a deficit of $22.1 million per year in funding shortfall is realized. As such, immediate action is needed at all levels to help ensure that Massachusetts' airports can be appropriately maintained and improved. Historically, state funding for Massachusetts' airport system has been largely uneven, with spikes in funding levels in response to individual project requirements. MassDOT Aeronautics relies on funds appropriated through the annual transportation bonding set by the Executive Office for Administration and Finance to maintain a healthy and safe statewide aviation system. While this process has been able to secure funding appropriate to address immediate needs and some larger projects, it's largely irregular funding patterns potentially hamper the Commonwealth's ability to match federal grants while also trying to maintain any special state programs like airport pavement maintenance. Simply stated, aside from funds to match federal grants, additional dedicated state funding is needed for the maintenance and development of public airports in Massachusetts.

The importance of Massachusetts' airports to the economies of the Commonwealth, its cities, towns and counties is undeniable. The system must be maintained and justifiably expanded not only to meet the needs of the aviation community but also the economic objectives of the state. The return on the investment in Massachusetts' airports can be great, if the funding is in place to maintain and support its system.

ADDITIONAL RECOMMENDATIONS/CONTINUOUS PLANNING

The final section of this report identifies steps for evaluating progress of the system and providing sustainable planning. MassDOT Aeronautics should plan to revisit the findings from the MSASP at regular intervals. Monitoring performance over time will identify gaps and assist in developing strategies to meet the ongoing needs of the aviation system. As the system is monitored, further refinement to airport categories, as assigned in this plan, may be warranted.

In their advisory circular on aviation system planning (FAA AC 150/5070-7, *The Airport System Planning Process*), the FAA recognizes the need for continuous planning as part of an effective system planning process. Continuous system planning is typically comprised of the following five elements:

- Surveillance
- Reappraisal
- Service and Coordination
- Special Studies
- Updates

These five continuous planning elements, as they relate to the MSASP, are discussed in the following subsections.

Surveillance

Aviation is a dynamic and fluid industry, one that is constantly changing. Similarly, the system of airports supporting aviation demand must also reasonably continue to change. As part of the continuous planning process, surveillance of the airport system is recommended as it relates to the demand components and to the facilities/services of the airports.

As part of the MSASP, data on a number of demand indicators for system airports have been assembled. These include statistics on the number of aircraft based at each airport in the system, as well as the total annual aircraft takeoffs and landings (i.e. operations) at each airport. As part of a successful, continuous airport system planning effort, the following actions should be considered:

Activity Indicators

- MassDOT Aeronautics should use the base data on total annual operations and based aircraft that have been assembled and documented from the MSASP to establish an informational database. During annual airport inspections that MassDOT Aeronautics conducts at each airport, updated information on total based aircraft and annual operational levels should be obtained. For consistency, collecting this updated information should occur at the same time each year.
- Follow-on activities for system airports on their specific operating fleets are also desirable. The future planning and development of all airports in the system is largely contingent on the specific types of aircraft operating at these airports. Ideally, MassDOT Aeronautics should work with and encourage system airports to keep an operational log, especially for transient (visitor) aircraft. Each airport's planning and

development guidelines are determined by the most demanding/critical aircraft that operates at the airport on a regular basis. Logs of the types of aircraft operating at each airport and the frequency of their operations are important to establishing facility recommendations for all system airports. Similarly, MassDOT Aeronautics should reach out to emergency medical evacuation and air ambulance operators to determine the airports they use most. These actions are recommended as part of the continuous planning process.

Facilities/Services

- Airports within the Massachusetts system will continue to develop between the completion of this update of the MSASP and the next update. System airports should be asked to provide MassDOT Aeronautics with a summary of major facility enhancements that are accomplished following the conclusion of this plan. Facilities that should be included in this reporting process include: runways (new, extended, rehabilitated), taxiway improvements (in particular how they relate to new, upgraded, or lengthened parallel taxiways), airfield lighting and approach aids, instrument approaches, weather reporting facilities, and aircraft hangars.
- Specific service-related guidelines were also established in the MSASP, and a process to collect and update airport-specific services should be considered. In particular, information on fueling and FBO services/availability, as well as general aircraft maintenance and flight training services should be consistently updated.

The MSASP has been conducted through use of a performance-based approach to evaluate Massachusetts' airport system. The major output of this approach is a system "report card," as reflected in Chapter Five. This system report card provides an important element to system sustainability in the system planning process by identifying a long-term basis for tracking system performance. As part of the continuous planning effort, the system report card should be updated by MassDOT Aeronautics through whatever available means by refreshing system data and information.

Reappraisal

Airports in the system will continue to grow, and as they grow, conclusions drawn as part of the MSASP may need to be reevaluated. As part of its follow-on activities, MassDOT Aeronautics should contact system airports at least annually to recognize and record any changes or potential changes to each airport's ability to meet identified facility and service objectives.

Service and Coordination

As part of the continuous planning process, there are necessary follow-on coordination and communication activities between and among the critical system stakeholders. Some of these communications are between MassDOT Aeronautics and the system airports; some are between MassDOT Aeronautics and the FAA, while others are among all three entities. Continuous planning efforts in this category may be summarized as follows:

- Implementation Priorities – As system airports act upon their individual planning and development initiatives, added consideration should be given to projects needed to

move the system toward target objectives established in the MSASP. Particular emphasis should be placed on projects needed to meet the performance measures.

- Security Issues – It is recommended that MassDOT Aeronautics continue the process of encouraging and directly assisting system airports in taking appropriate security measures. MassDOT Aeronautics remains at the national forefront of airport security issues and compliance, while FAA, through the Transportation Security Administration (TSA), continues to examine and establish new security guidelines and requirements for the nation's commercial service and general aviation airports. As these security measures are formulated, follow-on efforts to make certain that the MSASP airports are in compliance with both state and federal security guidelines may be required.
- Compatible Land Use Issues – Throughout the country, incompatible land use development around existing airports has evolved from a growing concern to a critical issue in the fight to maintain the capacity and safety of the nation's aviation transportation system. In Massachusetts, commercial and residential development around the MSASP airports continues to encroach on land areas and airspace that are critical to their operation. It is recommended that MassDOT Aeronautics continue and enhance its efforts to protect lands in order to support the long-term viability of its system airports.
- Airspace Issues – Massachusetts has historically been a leader in the protection of airspace around airports, having instituted one of the first laws establishing and protecting airport airspace surfaces in the country. Similar to the issue of land use compatibility, encroachment of obstructions into airspace can have a dramatically negative impact on the operational capabilities of an airport, which in turn will significantly affect its long-term viability. This issue is particularly important in Massachusetts (and the northeast, in general) where airspace obstructions will naturally occur in the form of fast-growing trees. Unless otherwise acted upon and maintained, vegetation within the region can grow as much as five feet in a single season. It is recommended that MassDOT Aeronautics continue to enhance its efforts to protect airport airspace in order to support the long-term viability of its system airports.
- Environmental Issues – While MassDOT Aeronautics' principle charge has always been the development and sustenance of the Commonwealth's airport system, it has also done so in full recognition of its environmental responsibilities. MassDOT Aeronautics has a long history of promoting environmental protection, maintenance and sustainability on and around its airports. As evidenced through the development of its vegetation management plans (VMPs) among other initiatives, MassDOT Aeronautics has maintained its efforts to ensure airport environmental compatibility. As such, it is recommended that MassDOT Aeronautics continue to monitor changing environmental regulations and conditions in order to be responsive to their current and future requirements. Additionally, MassDOT Aeronautics should continue to promote the establishment and updating of environmental plans (like VMPs, among others) as required at the MSASP airports.

Special Studies

There is often a need for follow-on special studies that are desirable to address needs identified during the system planning process. As part of the continuous system planning process, the need for the following special studies has been identified:

- MassDOT Statewide Economic Impact Study – Airports are an essential component of the Commonwealth of Massachusetts' intermodal transportation system. Airports are typically viewed as transportation resources that facilitate air movements by people and goods. Like other transportation resources, this facilitation allows economic activity to take place. However, unlike other transportation modes such as highways, airports are also economic generators themselves in terms of supporting employment at the airports themselves. For Massachusetts, its system of commercial and general aviation airports are major economic catalysts, responsible for generating hundreds of millions of dollars in economic benefit, supporting thousands of jobs, and helping to sustain, lead, and diversify the state economy. In addition to the people who work at the airport, many other people derive significant economic benefits from the daily operation of an airport. These groups include the commercial and industrial employers, whose shipments arrive or depart via the airports; the tourism industry, including hotels, restaurants and tourism-related activities, whose patrons use the commercial service and general aviation airports to visit Massachusetts tourist destinations; and the employees of businesses and corporations, as well as vendors that serve these businesses, who utilize Massachusetts' airports to conduct their business activities. Without airports, many companies in the state would experience adverse impacts to business activity levels. Because of the efficiencies gained by the availability of aviation, many businesses receive additional benefits that are not always easily quantified

  Establishing the economic value that airports bring the Commonwealth is so important that some elements of a typical economic impact study were undertaken on a limited basis in the MSASP in the form of an Aviation Employment Report. Specifically, a statewide business survey was distributed and a census of airport-based employees was undertaken to provide an estimate of the employment associated with the activity of Massachusetts' airports. Through this MSASP effort, it was noted that over 2,100 jobs in Massachusetts are directly attributed to airport activities, with another 2.7 million jobs reliant on the availability of aviation services (see Appendix E for a summary). However, it should be noted that this was just a preliminary limited effort and that a full economic impact analysis considers not just employment, but also payroll and output/spending (gross sales or capital expenditures associated with the airport's operation).

  As such, a recommended follow-on effort to the MSASP is the development of a Statewide Economic Impact Study that would assess and provide a complete picture of the economic benefit of airports to the Commonwealth's economy. The study would identify current jobs, payroll, and annual economic activity attributable to each system airport. Further, it is recommended that the MassDOT Aeronautics update the Statewide Economic Impact Study concurrently with future updates to the MSASP.
- Pavement Management Plan – It is a goal of the MSASP to assure that all primary runway pavements are maintained in at least "good" condition, with secondary runways maintained to at least a "fair" condition. As part of the MSASP, MassDOT Aeronautics conducted pavement assessments of the current conditions of runway pavements at the 37 public-use airports within the Commonwealth of Massachusetts. These pavement assessments serve as a means to comparatively prioritize and budget order-of-magnitude costs for future reconstruction needs for runways at the study

airports beyond MassDOT Aeronautics' current five-year CIP. This information will also be used to better understand the general level of investment needed for future out-year runway reconstruction projects, which generally represent a higher cost than most other airport infrastructure improvements.

While an effective tool by itself, these assessments should be expanded and continued to develop a pavement maintenance management plan for the Massachusetts airport system. It is recommended that the management plan be implemented and conducted on a continuous basis for airports in the Commonwealth. This plan would identify current pavement conditions, possible maintenance or rehabilitation projects, and costs attributable to each airport. A feasible pavement maintenance management plan should be developed in order to obtain the most useful life of airport pavement in the most cost-effective manner. Further, this information should be included in the next update to the MSASP.

- Land Use Compatibility Guidelines – As noted in a previous section, incompatible land use in the airport environment has the potential to further limit the future growth and development of Massachusetts' airports. Recognizing this fact, follow-on steps should be taken to develop guidelines for a land use compatibility handbook that would be made available for use by all Massachusetts airports. Land use compatibility can generally be described as the compatibility of the area around each airport where the height of objects should be limited so as not to impede safe airport operations, where noise impacts could most logically be expected, and where typical aircraft traffic patterns would occur. These guidelines could be used by all system airports to enable them to research, craft and formalize land use policies and/or ordinances that could be taken to each municipality for potential adoption. The objective would be to have all municipalities tailor a model land use or zoning ordinance to their particular circumstances, and for each to adopt a height and hazard zoning ordinance that would ensuring unobstructed approaches to each airport's runway(s).
- Runway Approach Obstruction Study – One of the objectives of MassDOT Aeronautics and FAA is for all airports to have clear approaches to both ends of their primary runway. To meet this objective, it is recommended that a follow-on study be conducted to identify those airports that currently do not comply or are in danger of not complying with approach airspace clearance requirements. The study would evaluate runways without clear approaches and identify potential strategies for resolving, mitigating, and preventing obstructions, including the establishment of VMPs and/or lighting mitigations where obstructions cannot by resolved. Coordination and meetings with each airport, municipalities, and other key stakeholders would be included as part of this follow-on study.
- Airport Safety & Maintenance Program (ASMP) Handbook – As discussed previously in this chapter, it is recommended that MassDOT Aeronautics pursue the establishment of an agency "handbook" that codifies its policies and procedures for administering the ASMP. The handbook could include the following:
  - a program narrative summary;
  - current policies applicable to administering the ASMP such as funding eligibility criteria, the current and recommended funding policies, etc.;
  - an overview of the MassDOT Aeronautics' CIP process;
  - an overview of the grant process including a flowchart of standard action items;

  - a summary of MassDOT Aeronautics' public meeting process, grant amendments, etc.;
  - procedures for consultant selection;
  - a project management overview for implementing typical planning projects, design & construction projects, equipment purchase projects, etc.;
  - a section summarizing project payments and close-out procedures; and
  - a summary of issues germane to the MassDOT Aeronautics' oversight of the AIP (e.g. the MassDOT Aeronautics' requirement for Pre-Apps, the grant application process, project expenditure schedules associated with the MassDOT Aeronautics' spending plan, etc.)
- Airport Business Plans – As funding availability for airports continues to decline, airports must continue to strive to operate like any traditional business - working to generate revenue among competition by other airports, while simultaneously working to reduce costs. Efforts to differentiate an airport from its competitors can result in higher traffic levels and higher potential revenue. Most airports in Massachusetts would benefit significantly from the development of a business plan specifically designed toward their particular circumstances. As such, it is recommended that MassDOT Aeronautics consider establishing a program that would develop individual business plans for airports on a rotating basis. These plans should be designed to analyze the strengths and weaknesses of current airport business operations at a given airport, and how that airport might best use its resources to attract new users. In addition to or in lieu of such a program, MassDOT Aeronautics could develop an airport business planning handbook that would be made available for use by all system airports that would assist them in formulating their own, customized business plans.

Regular Planning Updates

As part of the existing continuous planning process, two types of regular updates are appropriate: individual airport master plans/airport layout plans, and an update to the MSASP.

- Master Plans and Airport Layout Plans – MassDOT Aeronautics has concluded that it was desirable for all publicly-owned airports to have current master plans and/or airport layout plans. Depending on each airport's role, it is recommended that the airports in Massachusetts update their master plans or airport layout plans (ALP) according to the following schedule:
  - Commercial Service/Scheduled Charter: master plan every 5 years
  - Corporate/Business: master plan every 7 years
  - Community/Business: master plan or ALP every 10 years
  - Essential/Business: ALP every 10 years for AIP-eligible airports; ALP as needed for non-AIP-eligible airports.
- Massachusetts Statewide Airport System Plan – The system plan provides MassDOT Aeronautics with a blueprint for the development of the airport system. As the aviation industry changes and the Commonwealth's socioeconomic and demographic characteristics evolve, the system plan should again be updated. It is recommended that MassDOT Aeronautics consider updating the system plan in 5-year intervals with the next update in the 2015-2016 timeframe.

SUMMARY

Airports in Massachusetts are critical transportation and economic resources. For communities throughout the Commonwealth, airports are important economic generators and catalysts for activities. By responding to the performance measures and the facility/service objectives outlined in this update to the MSASP, MassDOT Aeronautics will have a plan that will help guide the development of the airport system through the next 20 years.

POLICY OVERVIEW

This section provides direction and guidance to MassDOT Aeronautics for implementing the division's mission and goals for aviation transportation specific to findings of the Massachusetts Statewide Airport System Plan.

As highlighted throughout this study, the MSASP uses a strategic approach to identify and evaluate the needs of the Massachusetts airport system over the next 20 years. The primary goal of the system plan is to provide a framework that supports informed decisions related to planning and developing the statewide aviation system, which is considered to be an important asset to the Commonwealth. These decisions play an important role in assisting the system to meet Massachusetts' transportation needs.

Current Aviation Policies

MassDOT Aeronautics is a relatively new entity within the Commonwealth of Massachusetts. The Aeronautics Division is one of four divisions included in the Massachusetts Department of Transportation (MassDOT) which was created under Chapter 25 of the Acts of 2009, "An Act Modernizing the Transportation System of the Commonwealth of Massachusetts" on November 1, 2009. Although largely based on the Massachusetts Aeronautics Commission (MAC) which had been an active force in the Commonwealth for 70 years, MassDOT Aeronautics is, in fact, a new division within a new statewide organization. As such, formal MassDOT Aeronautics aviation policies are still in the process of being updated and established, currently remaining largely informal albeit based on the historical precedents of the MAC.

In general, the MassDOT Aeronautics Division is responsible for overseeing the statewide airport system that encompasses 37 public-use general aviation airports throughout the Commonwealth. The division's responsibilities include fostering airport development, enhancing aviation safety, conducting aircraft accident investigation, maintaining navigational aids, performing statewide aviation planning, licensing of airport managers, conducting annual airport inspections, and enforcing airport security regulations. Specifically, MassDOT Aeronautics has adopted the following mission statement:

> *Promote aviation throughout the Commonwealth, while providing an efficient integrated airport system that will enhance airport safety, economic development, and environmental stewardship.*

However, it should be noted that MassDOT also remains largely based on the foundations of the MAC. As stated above, MassDOT Aeronautics is a relatively new organization and the

general laws have yet to be fully updated to reflect its current status. The General Laws of Massachusetts are the laws established by the Massachusetts legislature and contain more than 280 chapters, including those which address aviation and airports. However, among other requirements, the statutes under Chapter 90 establish the requirements for the former MAC and the commission's duties for the development of aviation in the state. With respect to MassDOT Aeronautics, this continuity with historical MAC legislation is reflected in Section 60 of the enabling legislation for the establishment of MassDOT and the Aeronautics Division (Chapter 25 of the Acts of 2009) that states the following:

> *The (aeronautics) division shall be responsible for the administration and enforcement of sections 35 through 52, inclusive, of chapter 90 and other laws relating to aeronautics.*

Additionally, references are made to the MAC and to aviation activities within Massachusetts in the Code of Massachusetts Regulations (CMR), which contain regulations promulgated by state agencies pursuant to the Administrative Procedures Act. These rules and regulations form part of the body of administrative law along with administrative orders and decisions. Figure 6-14 presents a listing of the chapters and sections that are relevant to aviation in Massachusetts and that form the current basis of MassDOT Aeronautics' existing policies.

Figure 6-14: Relevant Massachusetts Statutes and Regulations Annotated

Massachusetts General Laws	
Chapter 90 - Motor Vehicles and Aircraft	
Section 35	Definitions
Section 35A	Structures within airport approaches; regulation of location and height
Section 35B	Structures within airport approaches; permits for erection or addition
Section 35C	Structures within airport approaches; application for permit; notice of denial; hearing
Section 35D	Structures within airport approaches; maintenance, repair or replacement; initial approval
Sections 36-39	Repealed
Section 39	Aeronautics commission; powers; rules and regulations
Section 39A	Plan for development of airports and air navigation facilities
Section 39B	Certificate of approval of site for municipal airport or restricted landing area; application; hearing; issuance
Section 39C	Reimbursement of towns and cities for airport construction; federal funds
Section 39D	Repealed
Section 39E	Engineering or technical services of commission to cities and towns
Section 39F	Reimbursement of city or town constructing, establishing or enlarging airport
Section 39G	Applicability of secs. 35—52 to counties
Section 40	Purposes of aeronautics commission; discretionary powers of commission; enforcement of laws
Section 40A	Airport approach regulations by cities or towns
Section 40B	Reasonableness of airport approach regulations
Section 40C	Adoption, amendment or repeal of airport approach regulations; public hearing
Section 40D	Erection, replacement or alteration of structures or trees; variance
Section 40E	Administrative agency
Section 40F	Removal of structures erected in violation of regulations; trees; procedure
Section 40G	Protection of airport approaches; removal of structures and trees; compensation
Section 40H	Appeal by aggrieved corporations
Section 40I	Approval of regulations by commission
Section 41	Investigations or hearings; accidents
Section 42	Equitable jurisdiction of superior court
Section 43	Public inspection of copies of orders, rules and regulations
Section 44	Penalties
Section 45	Appeals

Section 46	Altitude of aircraft flights
Section 47	Federal pilot's license, permit or certificate
Section 48	Aircraft license, permit or certificate
Section 49	Registration of federal certificates; fees; exceptions
Section 49A	Retention of court records of cases involving violations; abstracts
Section 49B	Definitions of terms used in secs. 49B—49R
Section 49C	Administration and enforcement of secs. 49B—49R; hearings; judicial review
Section 49D	Accident reports; security; suspension of aircraft registration; waiver
Section 49E	Policy or bond of insurer or surety company
Section 49F	Restoration or renewal of registration or non-resident's operating privilege
Section 49G	Certificate of self-insurance
Section 49H	Certificate of registration or non-resident's operating privilege; allowance; suspension; notice
Section 49I	Security; form; limits; reduction or increase
Section 49J	Delivery and release of security
Section 49K	Availability of information and material of commission
Section 49L	Transfer of registration of aircraft after suspension of owner's registration
Section 49M	Return of suspended registration certificate
Section 49N	Illegal operation of aircraft; failure to return suspended registration certificate
Section 49O	Application of secs. 49B—49R to certain aircraft
Section 49P	Availability of other legal processes; enforcement
Section 49Q	Service of process; proof of service
Section 49R	Discharge in bankruptcy
Section 49S	Severability; constitutionality
Section 49T	Interpretation and construction of uniform aircraft financial responsibility act
Section 50	Appointment of chairman of commission as attorney for service of process
Sections 50A-50L	Inoperative February 17, 1959 upon title vesting in the Massachusetts Port Authority
Section 51	Repealed
Sections 51A-51C	Repealed
Section 51D	Municipal airports and air navigation facilities
Section 51E	Establishment of airport commissions for municipal airports; appointment of members; vacancies; airport managers
Section 51F	Leasing of land at airports
Section 51G	Acquisition of property to establish airport; eminent domain; purchase; lease
Section 51H	Charges or rentals for use of properties, facilities, installations; terms and conditions of contracts
Section 51I	Power of commission to expend funds and to make contracts for maintenance, operation, construction and enlargement of airports
Section 51J	Rules and regulations; use of airports; safety of public
Section 51K	Federal funds; receipt by aeronautics commission; bids; contracts; loans in anticipation of funds
Section 51L	Contracts for construction, enlargement or improvement of airports by airport commission
Section 51M	Exclusive contracts, permits or licenses to transport persons for hire or to receive or deliver passengers
Section 51N	Establishment, maintenance and operation of airport by municipalities as joint enterprise; contents of agreement; joint airport commission
Section 52	Partial unconstitutionality and invalidity of secs. 35—51
Code of Massachusetts Regulations (CMR),	
702 CMR: Massachusetts Aeronautics Commission	
702 CMR 2	General
702 CMR 3	General Rules
702 CMR 4	Flight Rules
702 CMR 5	Airports and Restricted Landing Areas

702 CMR 6	Aircraft Accidents
702 CMR 7	Alteration of Licenses, Approval Forms, Etc.

Source: The Commonwealth of Massachusetts
Prepared: October 2010

It is also important to note that, although not represented in the above listing, the MAC had integrated aviation-specific language into several additional statutes and regulations in Massachusetts, such as the state building codes.

MassDOT Aeronautics Division Responsibilities

In support of its mission statement to "promote aviation throughout the Commonwealth, while providing an efficient integrated airport system that will enhance airport safety, economic development, and environmental stewardship," MassDOT Aeronautics has defined the following as its primary responsibilities:

- Airport Capital Projects Program - MassDOT Aeronautics awards grants to address airport capital infrastructure and maintenance projects at the public-use general aviation airports throughout the Commonwealth. There are two capital funding programs that are utilized by the Aeronautics Division: the Federal Aviation Administration's Airport Improvement Program, and the Aeronautics Division's Airport Safety and Maintenance Program.
- Aviation Safety Programs - There are various types of aviation safety programs that MassDOT Aeronautics leads or participate in. For example, the Aeronautics Division works closely with the FAA in hosting various safety seminars at the 37 public use general aviation airports throughout the Commonwealth. Under state statute, MassDOT Aeronautics is responsible for conducting airspace review requests for potential airspace obstructions (cell towers, wind turbines, etc) at or nearby an airport.
- Statewide Navigation Aids - MassDOT Aeronautics maintains various navigation aids that are located at airports throughout the Commonwealth. These navigational aids are critical infrastructure that assists pilots in air navigation at airports during inclement weather.
- Statewide Aviation Planning - MassDOT Aeronautics is responsible for the development and implementation of the Statewide Airport System Plan. The Statewide Airport System Plan provides an extensive assessment of the current system, as well as a plan for meeting current and future needs of the airport system. Other types of statewide planning activities include economic impact studies, environmental compliance studies, and pavement analysis studies.
- Licensing of Airport Managers - Under state statutes, MassDOT Aeronautics is responsible for licensing each airport manager at the 37 public use general aviation airports throughout the Commonwealth. Each airport manager is required to pass the Aeronautics Division's Airport Managers Exam.
- Annual Airport Inspections - MassDOT Aeronautics is responsible for inspecting each of the 37 public-use general aviation airports annually to ensure compliance with federal and state safety requirements.
- Airport Security Directive - Following the tragic terrorist attacks on September 11, 2001, the former Massachusetts Aeronautics Commission issued a statewide Airport Security Directive for the 37 public-use general aviation airports throughout the Commonwealth. One critical component of the statewide airport security directive is the statewide airport identification badge program. MassDOT Aeronautics issues

identification badges to pilots and airport tenants based at an airport located in the Commonwealth.

- Aviation Education Outreach - MassDOT Aeronautics is actively involved in various aviation education outreach programs. The Aeronautics Division is the lead organization in Massachusetts regarding the national program "Real World Design Challenge" which focuses on STEM (Science, Technology, Engineering, and Math).

In that the formal establishment of these responsibilities is relatively recent and that MassDOT Aeronautics continues to develop and adjust them, Figure 6-15 provides a comparison of these duties with those performed by other state aeronautical organizations in the New England region.

Figure 6-15: Comparison of MassDOT Aeronautics Division Responsibilities/ Programs with Other New England States

State Duty	MA	VT	NH	ME	CT	RI[1]
Block grant state						
Channeling state	X					
Aviation education		X	X			
Pilot registration						
Aircraft registration	X		X	X	X	
License airports	X	X	X	X	X	
Airfield pavement management program		X	X		X	
Air service assistance program		X			X	
Airport preservation program	X		X		X	
Search and rescue program		X	X		na[2]	
Own and operate state aircraft	X	X				
State funding (FAA matching only)	X	X	X	na[2]	na[2]	
State funding (state-only grants)	X	X	X	na[2]	na[2]	
State-only loans		X		na[2]	na[2]	
Operate state-owned airports		X		X	X	
Hangar construction funding		na[2]	X	na[2]	na[2]	
NAVAID project funding	X	na[2]	X	na[2]	na[2]	
Airfield maintenance project funding		na[2]	X	na[2]	na[2]	
Scoring System to Rank Projects	X	X	X	X	na[2]	
Participate in Disaster Planning	X	X	X		X	
Airport directory		X		X	X	
Newsletter	X				X	
Number of full-time employees	11	7	6	2	157	

[1] Rhode Island did not participate in the NASAO survey.
[2] No response to survey question.
Source: NASAO State Aviation Funding and Organizational Data Report FY 2007
Prepared: October 2010

Future Aviation Policies

It is important for MassDOT Aeronautics to utilize state-level policies to help guide decision-making with regard to the public-use airports to make certain that future development contributes to the long-term goals of the MSASP. As a new state entity, MassDOT Aeronautics is in the process of identifying formal policies specifically for the maintenance and

development of the Massachusetts airport system. This section introduces several potential policies specific to the Massachusetts airport system that can serve as the foundation for future decision making with respect to public-use airports within the Commonwealth.

Working from the performance measures and benchmarks established in the MSASP, policies can be derived to help ensure that system airports fulfill the goals of the airport system plan. As discussed previously in the MSASP, performance measures and benchmarks were developed from both an airport level (or role) perspective and from a statewide (or big picture) perspective. Goals for the aviation system were established in Chapter One: Airport System Vision, Goals and Performance Measures, and each airport's role was determined in Chapter Three: Airport Roles and Facility/Service Objectives. Using those analyses, an overall development plan for each airport in the system can be established.

A policy is an agreed upon high-level strategy for meeting goals and developing procedures that optimize the resources for the MSASP. During the system planning process, MassDOT Aeronautics and the Project Management Team (PMT) have actively worked to develop goals and goal categories that reflect the needs of the Commonwealth's transportation and aviation system goals as follows:

System Goals	Goal Categories
"The Commonwealth of Massachusetts should be served by a system of airports that are safe, secure, and meet applicable FAA design standards that will satisfy the current and future needs of aviation."	*Standards*
"The Commonwealth of Massachusetts should be served by a system of airports that complies with all federal, state, and local environmental regulatory requirements."	*Environmental Compliance & Stewardship*
"The Commonwealth of Massachusetts should identify the economic impact of the Massachusetts' system airports and the economic benefit of incremental investment in the aviation system."	*Economic*
"The Commonwealth of Massachusetts should be served by an efficient airport system with sufficient facilities and services to maintain the airport and address the current/future needs of the aviation community."	*Preservation*
"The Commonwealth of Massachusetts should be served by a system of airports that promote and support aviation educational programs and community outreach programs."	*Public Outreach*
"The Commonwealth of Massachusetts should be served by a system of airports that support integration with other modes of transportation."	*Transportation Integration & Accessibility*

Recommended policies provide appropriate and effective guidance in order to implement these goals and performance measures and they should provide adequate detail to enhance the system while accommodating the diversity of airports in the system.

As the aviation industry in Massachusetts continues to grow, it is apparent that a policy structure will be needed as a tool to serve as the basis for decision making. Therefore, the following policies are offered for consideration by MassDOT Aeronautics for its airport system (not shown in order of importance) as they relate to addressing the goals for the statewide airport system:

1. Maintain adequate access to public-use commercial service and general aviation airports for all of Massachusetts.
2. Promote the economic and social value of airports, both commercial service and general aviation through the use of the Massachusetts Statewide Airport Economic Impact Study.
3. Service as an advocate for the promotion of aviation and airports within the Commonwealth through quality of life improvements, economic development, and education of youth and flight training to promote sustainability of Massachusetts' aviation industry.
4. Advocate for the promotion of environmentally friendly actions.
5. Support efforts to work internally with other MassDOT divisions and groups to promote aviation planning efforts.
6. Utilize available state funds to invest in public-use airports for projects with an emphasis on non-federally eligible portions of projects.
7. Establish and utilize a formal funding priority system for ASMP projects to provide for more accountability and reappraise the funding distribution process to allow for more flexibility as the need arises.
8. Promote compatible land use near airports and evaluate land use legislation to address evolving issues.
9. Provide technical assistance to airports.
10. Increase small and privately-owned, public-use airport sustainability.
11. Evaluate and seek changes to plans and facilities to respond to new technology and aircraft fleets to accommodate future air transportation system needs.
12. Promote and encourage in-state commercial air service development.
13. Coordinate and maintain continuous airport system planning activities.

These policies are for MassDOT Aeronautics to consider for potential adoption and implementation. They work in concert with the goals of the MSASP and with the Aeronautics Division mission statement. **Figure 6-16** shows the relationship between each of the recommended policies and how it is directly tied to either a MSASP goal category.

Figure 6-16 – Recommended Policy Relationship Matrix

Policy Consideration for MassDOT Aeronautics	*MSASP Goal Categories*					
	Standards	*Environmental Compliance & Stewardship*	*Economic*	*Preservation*	*Public Outreach*	*Transportation Integration & Accessibility*
1. Maintain adequate access to public-use commercial service and general aviation airports for all of Massachusetts.	X			X		X
2. Promote the economic and social value of airports, both commercial service and general aviation through the use of the Massachusetts Statewide Airport Economic Impact Study.			X	X	X	
3. Service as an advocate for the promotion of aviation and airports within the Commonwealth through quality of life improvements, economic development, and education of youth and flight training to promote sustainability of Massachusetts' aviation industry.				X	X	
4. Advocate for the promotion of environmentally friendly actions.		X			X	
5. Support efforts to work internally with other MassDOT divisions and groups to promote aviation planning efforts.			X		X	X
6. Utilize available state funds to invest in public-use airports for projects with an emphasis on non-federally eligible portions of projects.	X	X	X	X		
7. Establish and utilize a formal funding priority system for ASMP projects to provide for more accountability and reappraise the funding distribution process to allow for more flexibility as the need arises.	X	X	X	X	X	
8. Promote compatible land use near airports and evaluate land use legislation to address evolving issues.	X	X	X	X	X	X
9. Provide technical assistance to airports.	X	X	X	X	X	X
10. Increase small and privately-owned, public-use airport sustainability.	X	X	X	X	X	
11. Evaluate and seek changes to plans and facilities to respond to new technology and aircraft fleets to accommodate future air transportation system needs.	X	X	X	X		
12. Promote and encourage in-state commercial air service development.			X			
13. Coordinate and maintain continuous airport system planning activities.				X	X	

Source: Wilbur Smith Associates
Prepared: November 2010

SUMMARY

Besides being a critical transportation link locally, regionally, nationally and internationally, airports are important catalysts to economic growth. Employers throughout Massachusetts agree that commercial and general aviation airports are vital to business attraction, development and retention. By responding to performance measures, benchmarks and facility/service objectives outlined in the Massachusetts Statewide Airport System Plan, the Commonwealth of Massachusetts will have a vision and a plan that will take it through 2030 and beyond

It is important to note that the Massachusetts Statewide Airport System Plan is not a programming or implementation document, but a resource document that MassDOT Aeronautics can follow to provide an aviation system that will meet the air transportation needs for Massachusetts, now and into the future. It is also important to recognize that while the MSASP is a "top down" planning analysis, the findings from this plan must still be implemented by individual airports from the "bottom up."

Over the next 20 years, this plan has shown that an annual average of $53.4 million will be needed to raise the performance of the Massachusetts airport system and to respond to the needs that the airports themselves have identified. When factoring current annual funding levels for Massachusetts airports (excluding Boston-Logan and Hanscom) is an average of $31.3 million (including federal grant funding), a deficit of $22.1 million per year in funding shortfall is realized. It is critical that this deficit be addressed in that a well-maintained and developed aviation system is an important component of the Commonwealth's multi-modal transportation system that is vital to support the long-term economic growth and development of Massachusetts.