# Augusta State Airport
# Master Plan Update

March 2008

HNTB

Augusta Your Maine Connection! STATE AIRPORT

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**March 2008**

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HNTB

Augusta Your Maine Connection! STATE AIRPORT

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# Chapter One
# Goals and Objectives

The purpose of this Master Plan is to provide the Maine Department of Transportation and AUG staff with a blueprint for short- (five-year), intermediate- (10-year), and long-term (20-year) development of the Augusta State Airport.

In order to provide community guidance on future airport developments, the City formed a Planning Advisory Committee (PAC). The PAC is a review group responsible for providing input and insight on issues addressed in the process of updating the 1992 Airport Master Plan. The first PAC meeting was held on December 14, 2006. A key element of the meeting was the development of goals and objectives for the Airport. A goals and objectives session was led by MaineDOT, where opinions and concerns of the aviation and local communities were identified and prioritized. A mission statement and the supporting goals and objectives are summarized below:

Mission Statement: *To provide the City of Augusta, the Central Maine region, and the state government agencies, safe and efficient airport facilities, to promote economic growth by developing airport activities that will enable the airport to become more self-sustaining, while remaining responsive to the neighboring community.*

**Goal: Improve the airports ability to promote economic growth**

- Install better signage to the airport;
- Encourage Very Light Jet (VLJ) usage by soliciting the VLJ market;
- Create a more 'charming' atmosphere for the terminal. Airport needs 'atmosphere', sports bar, lounge area, etc. Create a 'professional image' for the airport;
- Evaluate the pros/cons of a different hub (other than Boston);
- Engage in a marketing campaign;
- Seek and receive grant funds from various sources;
- Evaluate current and future sport pilot usage at the Airport; and
- Educate the public on the definition, etc. of the VLJ aircraft generation.

**Goal: Provide additional capacity for corporate jet hangars and parking**

- Expand GA activities;
- GA activities are more compatible with neighborhood than the scheduled service;

- GA activities have a greater positive impact than scheduled service: air ambulance, military, cargo, fuel sales, aircraft parking;
- Increase jet hangar space (there are already four requests for medium jet hangar spaces);
- Prepare a conceptual drawing of the runway safety area project; and
- Acquire some or all of Camp Keyes property if the Master Plan Update determines it is necessary.

**Goal: Continue to monitor airport master plan recommendations and implementation**

- Determine if it is cost-effective to continue to offer scheduled service;
- Colgan is proposing a larger aircraft. Colgan will not operate in AUG without EAS. Colgan is 25% capacity in summer and 5-10% capacity in winter. Consider the cost of 139 Certificate;
- Review intermodal potential; and
- Review Runway 35 instrument approach.

**Goal: To improve the safety at the airport, the runway safety capital improvements**

- Correct runway safety area deficiencies;
- Implement Airport Master Plan recommendations for safety; and
- Complete Wildlife Assessment.

**Goal: Develop airport with sensitivity to the neighboring community**

- Changes in Airport Road will work with the City and State roads commissioners, and look at using Green Street (used to be open through Camp Keyes to the Airport – kept traffic off of Blaine Ave.);
- Bond Brook is already a preserved watershed as written in the City of Augusta's best management practices;
- Establish a noise abatement program;
- Provide a noise complaint hotline;
- Monitor noise levels through Airport Master Plan update process;
- Maintain the "no noise complaints" record at the Airport;
- Preserve "buffer zone" of trees; and
- Create hiking area, dog walking area if applicable to the development of facilities.

# Chapter Two
# Inventory of Existing Conditions

## 2.1 OVERVIEW

This chapter provides an overview of the existing conditions at Augusta State Airport (AUG) and updates information presented in the last Airport Master Plan Update from 1992.

This Airport Master Plan Update (AMPU) was conducted using recommendations and guidelines from the latest FAA Advisory Circular (AC) 150/5070-6B Airport Master Plans, dated July 29, 2005 and 5300-13 Change 10 Airport Design, dated September 29, 2006.

The initial step, inventory, is the collection of data needed to update the status and existing condition of AUG and the market area that it serves and identify issues that need to be addressed. The inventory provides a foundation on which the subsequent phases of analysis will be based.

The development of an AMPU for AUG requires the collection and evaluation of data relating to the Airport and the surrounding area. Information on the Airport was obtained through interviews with the State, Airport Manager, Airport staff, the Fixed Base Operator (FBO), Airport users, affected parties like Camp Keyes and Fire Rescue, and review of previous studies.

The inventory is separated into the following sections:

- Airport Setting and History
- Airside Facilities
- Landside Facilities
- Essential Air Service
- Socioeconomic Data
- Land Use
- Environmental Overview
- Airport Management
- Financial Data
- Key Issues

## 2.2 AIRPORT SETTING AND HISTORY

### 2.2.1 Primary Function of AUG

AUG is a non-towered regional airport that serves the local community by offering scheduled passenger service via Colgan Air with Essential Air Service (EAS) to/from Boston, a full-service Fixed Base Operator (FBO), bus service, car rental, restaurant, and facilities for GA users. The Airport also houses the facilities for the Maine National Guard, Civil Air Patrol, and the Maine Professional Engineers Licensure board.

The Airport is located in the City of Augusta, the capital of Maine (est.1827).

AUG is situated on Winthrop Hill, one mile northwest from Water Street, the location of the Central Business District (CBD). For a vicinity map see **Figure 2-1.**

The Augusta city limits straddle the Kennebec River in southeast Kennebec County (**Figure 2-2**) and encompass approximately 37,300 acres. Augusta is the center of employment, education, commerce, and service for central Maine where most of the state and county governmental agencies are located. According to the 2000 census, the City is home to 18,560 inhabitants.

The Airport is owned by the State of Maine, but managed and operated by the City of Augusta.

### 2.2.2 Airport Access

Augusta is conveniently accessible by a number of state and interstate highways. The Airport terminal is just over one mile from Exit 109/109A on Interstate 95 (See Figure 2-1). From I-95, the Airport terminal can be accessed from Western Avenue (US-202) and the Airport Access Road. Local access linking AUG's terminal area to the downtown business district is via Winthrop Street and the Airport Access Road (See Figure 2-1). While the airport is easily accessible, signage indicating its location is not well placed. The existing airport signs are small and unlit in locations outside the typical driver's viewpoint. Community awareness of the Airport and its location is of paramount importance to the success of the Airport.

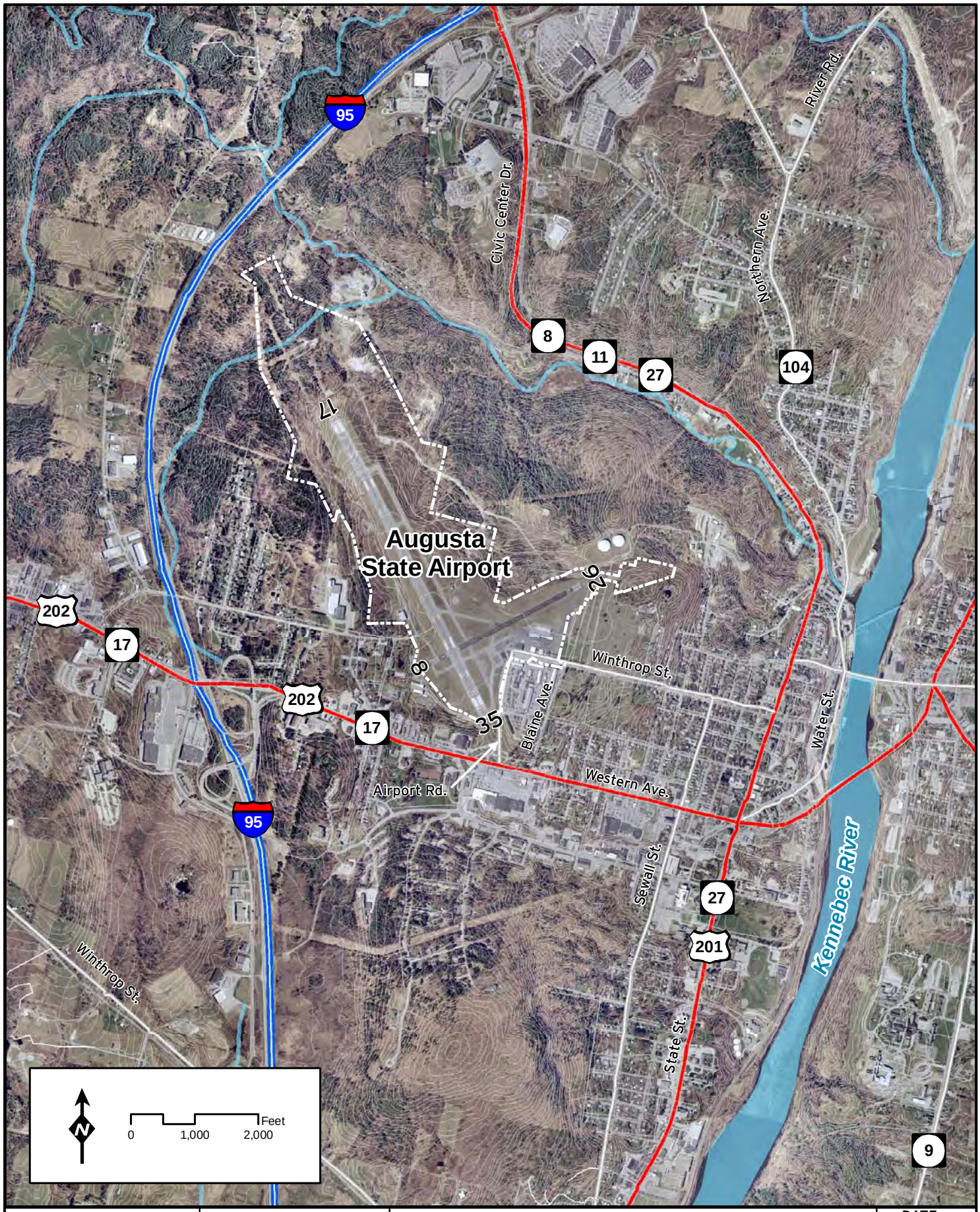
### 2.2.3 Airport History

The Augusta State Airport started to take form in the late 1920s when the State Legislature passed a bill authorizing the State to utilize the plateau located northwest of the city center, where AUG is currently located. During the depression, the State received a grant under the Work Projects Administration for the paving of two runways, both presently abandoned. The old wood frame terminal building was also built at this time. The first scheduled air carrier service to Augusta began in the 1930s. In the late-1930s under several other government programs, the primary Runway 17-35 and crosswind Runway 8-26 were constructed. During this period, the Airport was prominent in air shows, boasting then the largest show in the United States, "Maine Aero-Rendezvous."

William L. Perry, the first successful Fixed Base Operator (FBO) at the Airport, established the Maine Instrument Flight (MIF) School in 1946. Several years later, Runway 17-35 was extended to 4,200 feet. In the mid-1960s, Maine Helicopters was established, and by the end of the decade the present terminal was constructed.

A timeline of FAA-funded Airport Improvement Projects from 1974 to 2006 are shown in **Table 2.1**.

FAA grants are awarded to airports through the Airport Improvement Program (AIP). Projects in Maine are typically 90 percent funded by the FAA, 5 percent by the State, and 5 percent through local funding. AIP funds are divided into two categories:




Source: HNTB, MEGIS
Aerial: USGS (12/2004)

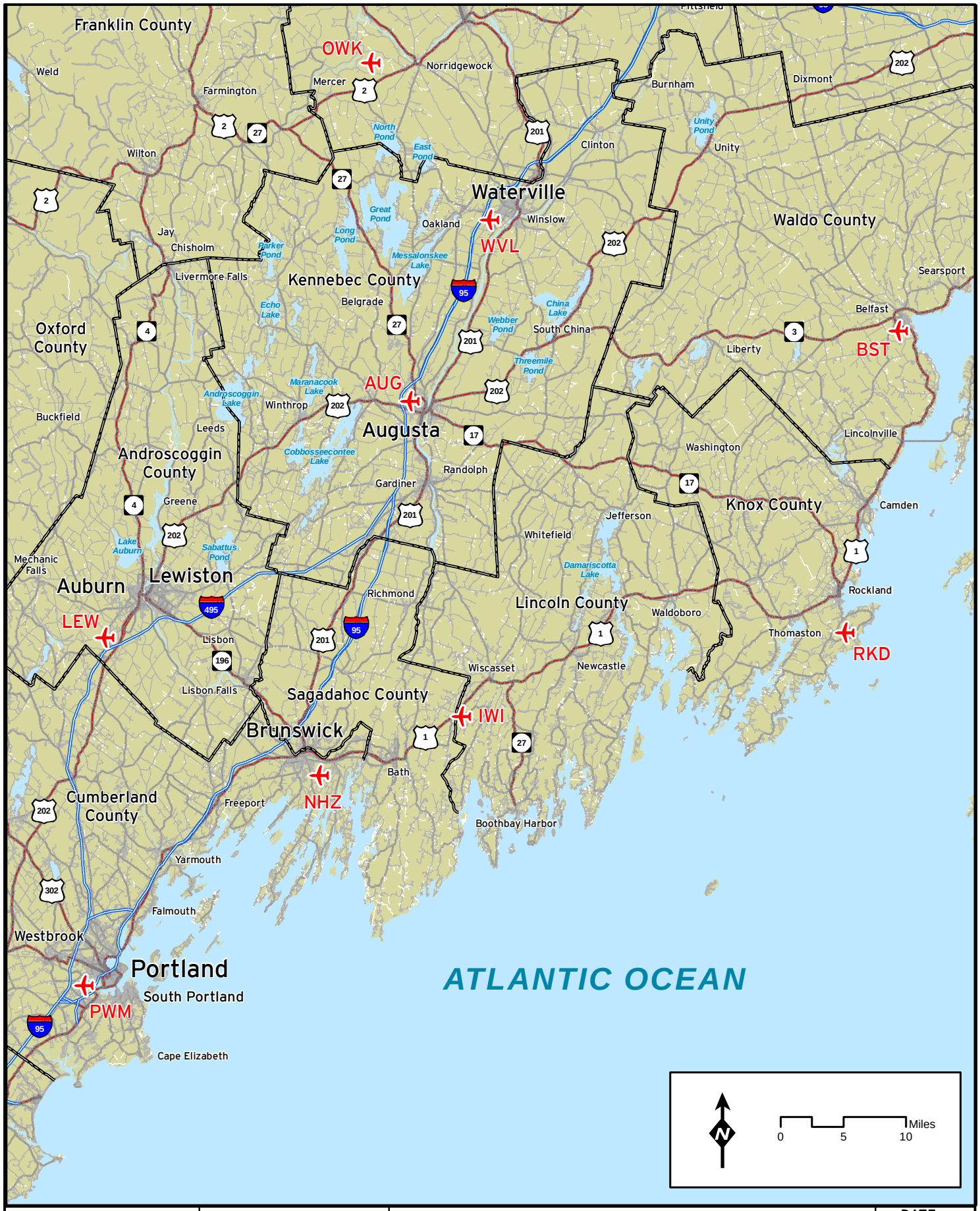
HNTB

Vicinity Map

Augusta State Airport
Augusta, Maine

DATE:
12/2006

Figure:
2-1




| | | | |
|---|---|---|---|
| Source: HNTB, MEGIS<br>Aerial: USGS (12/2004) | HNTB | Location Map | DATE:<br>3/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure:<br>2-2 |

Table 2.1

**Historical Airport Improvement Projects (1974-2006)**

| Grant Year | Grant Number | Project Description |
|---|---|---|
| 1974 | 8-23-0003-01-74 | Reconstruct portions and mark RWY 17-35 (4,200x150'). |
| 1975 | 8-23-0003-07-75 | Construct, mark and light taxiway to RWY 35. Install security fence and relocate a portion of the main access road. Clear transition surfaces to RWY 17-35. |
| 1976 | 6-23-0003-04-76 | Acquire land in approach or RWY 17. Install hazard beacon on Gannet Hill. Install security fencing. Clear approach to RWY 26. |
| 1977 | 6-23-0003-05-77 | Acquire snow removal equipment. |
| 1979 | 79-2-6-23-0003-06 | Construct GA Parking apron. |
| 1980 | 79-1-6-23-0003-07 | Construct embankment, extend mark and light extension to RWY 17-35. |
| 1980 | 80-2-6-23-0003-09 | Construct RWY 17-35 extension to final grade. |
| 1981 | 81-1-6-23-0003-10 | Reconstruct, mark and light RWY 17-35, 8-26 and taxiways. |
| 1983 | 001-1983 | Acquire snow removal equipment. |
| 1987 | 002-1987 | Install perimeter fencing. |
| 1989 | 003-1989 | Acquire snow removal equipment; self-contained snow blower, and plow truck with 11 foot plow and sander. |
| 1990 | 004-1990 | Acquire snow removal equipment. |
| 1990 | 3-23-0003-04 | Airport Master Plan Update (Completed 1992). |
| 1991 | 006-1991 | Acquire Security Equipment, Acquire Snow Removal Equipment, Improve SRE Building, Install Guidance Signs, Rehabilitate Apron. |
| 1992 | 007-1992 | Acquire Miscellaneous Land, Improve SRE Building. |
| 1992 | | Expand Apron, Porous Friction Course installed on RWY 17-35. |
| 1993 | 009-1993 | Expand Apron, Extend Taxiway, Extend Taxiway. |
| 2001 | 010-2001 | Acquire snow removal equipment. |
| 2002 | 011-2002 | Security Enhancements. |
| 2003 | 013-2003 | Update Miscellaneous Study: Runway Safety Area Study, Airport Obstruction Study, Vegetation Management Study (Completed 2004). |
| 2005 | 015-2005 | Update Airport Master Plan Study. |
| 2006 | 014-2006 | Rehabilitate Taxiway C, C1. |

Sources: FAA and New England Region

discretionary funds and entitlement funds. Discretionary funds are awarded at the discretion of the FAA, based on certain eligibility criteria, while entitlement funds are distributed to airports based on their airport classification. AUG is a small non-hub scheduled service airport eligible to receive non-primary and state apportioned entitlements as well as discretionary.

## 2.3 AIRSIDE FACILITIES

The components of the airfield as they existed in 2006 are summarized in this section. Included are the airfield pavement system (comprising of the runways, taxiways, and aprons), landing navigational aids, and obstructions to air navigation. The existing airfield is shown on Sheet 2 at the end of this document.

### 2.3.1 Runways

Augusta State Airport has two active asphalt runways. Runway 17-35 is in "fair" condition showing moderate signs of stress with some raveling and longitudinal/transverse cracking. It has a Porous Friction Course (PFC) installed, which is essentially grooved pavement that helps drain water from the runway surface for improved traction during precipitation events. Runway 8-26 is in "good" condition. The load bearing strengths for the runways are 50,000 for single wheel and 60,000 for dual wheel. Further detail on both runways is shown in **Table 2.2**.

Runway 17-35 is the primary runway and is 5,001 feet long by 150 feet wide. It is equipped with an Instrument Landing System (ILS - horizontal and vertical guidance), an approach lighting system (MALSR), High Intensity Runway Lights (HIRL), and a Visual Approach Slope Indicator (VASI) system. Runway 17-35 does not meet runway line-of-sight criteria as the line-of-sight of departing aircraft at either ends of the runway are obstructed by the runway itself. This is due to a significant raise in the profile of the runway about $^{2}/_{3}$ down the Runway from the 17 end, which prevents a clear line-of-sight. There is a disparity of approximately 36 feet between the elevations of both runway ends. FAA design criteria[1] require a clear line-of-sight from a point five feet above one runway end to a point five feet above the other runway end. To remedy this, a significant portion of the runway would need to be raised/lowered, or a 24-hour control tower would need to be provided. This will be addressed later in the Alternatives Chapter.

Runway 8-26 is the crosswind runway and is 2,703 feet long by 75 feet wide. The runway is equipped with medium intensity runway lights but has no ILS, MALSR, or VASI.

A crosswind runway is necessitated when Runway 17-35 does not provide at least 95 percent of wind coverage. The maximum crosswind component for a B-II Airport Reference Coded-airport is 13 knots. This will be discussed further in Section 2.3.9, Weather and Runway Usage.

- There is one precision instrument approach procedure published for AUG on Runway

[1] FAA AC 150/5300-13 Airport Design Change 10, paragraph 503.

Table 2.2
**Existing Runway Data**

| | Runway 17 | Runway 35 | Runway 8 | Runway 26 |
|---|---|---|---|---|
| Airport Reference Code (ARC) | B-II | | B-I | |
| Runway Length/Width | 5,001' x 150' | | 2,703' x 75 | |
| Threshold Displacement | 0' | 142' | 0' | 0' |
| Runway Bearing (true) | 153 deg | 333 deg | 62 deg | 242 deg |
| Effective Runway Gradient | 0.73% | -0.73% | - | - |
| Runway End Elevation (AMSL) | 310.5' | 346.8' | 349.3' | 351.5' |
| Pavement Strength (Pounds) | SW. 50,000 / DW. 60,000 | | SW 30,000 | |
| Pavement Material | Asphalt (PFC) | | Asphalt | |
| Runway End Coordinates (Lat.) | 44-19.659390N | 44-18.925367N | 44-19.035523N | 44-19.244070N |
| (Long.) | 069-48.220625W | 069-47.701810W | 069-47.886510W | 069-47.339100W |
| Runway Approach Surfaces | 50:1 | 34:1 | 20:1 | 20:01 |
| Visual Aids | MALSR, VASI V4R | REIL, VASI V4L | N/A | |
| Runway Lighting | High Intensity (HIRL) | | Medium Intensity (MIRL) | |
| Runway Marking | Precision | | Non-Precision | |
| Navaids | ILS, VASI, VOR, GPS | VASI, VOR, GPS | VOR, GPS | NONE |
| Controlling Obstruction | None | Road | Brush | Road/Fence |
| Obstruction Height Above Rwy End | N/A | 15' | 26' | 6' |
| Obstruction Clearance Slope | 50:1 | 0:1 | 2:1 | 0:1 |
| Required Part 77 Surface | 50:1 | 34:1 | 20:1 | 20:1 |
| RSA (Width/Length) | 300 X 200 | 300 X 200 | 120' X 150' | 120' X 240' |
| Required RSA (Width/Length) | 300' X 600' | 300' X 600' | 120' X 240' | 120' X 240' |
| ROFA (Width/Length) | 800' X 600' | 800' X 0' | 400' X 150' | 400' X 30' |
| Required ROFA (Width/Length) | 800' X 600' | 800' X 600' | 400' X 240' | 400' X 240' |

Sources: FAA 5010 Data, Runway Safety Area Study, and Vegetation Management Plan.
Notes: SW = Single Wheel, DW = Dual Wheel

17, and non-precision instrument approaches (horizontal guidance or vertical guidance only, but not both) for all runways except Runway 26. Published approaches and minimums are listed below:

- ILS RWY 17 (549-½ mile visibility)
- RNAV (GPS) B (880–1 mile visibility)
- RNAV (GPS) RWY 35 (610–1 mile visibility)
- VOR/DME RWY 8 (920–1 mile visibility)
- VOR/DME RWY 17 (760–½ mile visibility)
- VOR/DME – A (960–1 mile visibility)
- VOR RWY 35 (800–1 mile visibility)
- GPS RWY 8 (920–1 mile visibility)
- GPS RWY 17 (780–½ mile visibility)

### 2.3.2 Taxiways

All taxiways at Augusta State are 40 feet wide, except for Taxiway C1 which is 50 feet wide. All taxiways were last rehabilitated in 1981 under the same FAA ADAP project as the runway rehabilitation. Taxiway C, C1, B, and A were repaved as part of a 2006 project and are in "excellent" condition. Information on existing taxiways is shown on **Table 2.3**.

Taxiway C runs parallel Runway 17-35 to the end of Runway 35, but only partially extends 4,100 feet down to the Runway 17 end. This requires aircraft departing from Runway 17 to back taxi, and due to the excessive grade of the runway, pilots on either end of the runway cannot see each other, which is not recommended. The separation distance of Taxiway A to Runway 17-35 is 250 feet which does not meet the FAA design criteria of 300 feet for a B-II runway. Taxiway A connects Runway 35 with the terminal apron and also intersects Taxiway C.

The existing Airport Reference Code (ARC) B-II is defined by two factors: the Aircraft Approach Category and the Airplane Design Group. The 2004 RSA Study designated Category B aircraft for their approach speeds in excess of 91 knots and the Group II aircraft (Beech 1900, Saab 340). This will be addressed further in the Forecast and Alternatives Chapter.

Taxiway E runs parallel to Runway 8-26 with a separation distance of 200 feet to the end of Runway 8 and 1,400 feet down the Runway to the GA apron. This separation distance does not meet the FAA design criteria of 225 feet for a B-I runway. For a depiction of the taxiways and the existing Airport see Sheet 2, at the end of the report.

The load bearing strengths for the taxiways are equal to those of the runways, 50,000 pounds for single wheel, and 60,000 pounds for dual wheel.

### 2.3.3 Aprons

AUG has three defined aprons: the passenger terminal apron, the itinerant apron, and the based aircraft apron. **Table 2.4** summarizes apron use, area, and pavement condition and **Figure 2-3** shows the passenger terminal and the GA area. The itinerant apron in front of the Maine

Table 2.3
**Existing Taxiways**

| Taxiway | Length (Ft.) | Width (Ft.) | Runway to Taxiway Separation (Ft.) | Required Separation (1) | Markings | Lighting | Condition |
|---|---|---|---|---|---|---|---|
| A | 750 | 40 | N/A | | centerline and edge | Medium Intensity | Fair |
| B | 1,020 | 40 | N/A | | centerline and edge | Medium Intensity | Poor |
| C | 4,029 | 40 | 250 | 300 (B-II) | centerline and edge | Medium Intensity | Excellent |
| C1 | 155 | 50 | N/A | | centerline and edge | Medium Intensity | Excellent |
| D | 170 | 40 | N/A | | centerline and edge | Medium Intensity | Fair |
| E | 1,333 | 40 | 200 | 225 (B-I) | centerline and edge | Medium Intensity | Fair/Good |
| F | 450 | 40 | N/A | | centerline and edge | Medium Intensity | Good |

Note: (1) Runway reference codes B-II and B-I are based on designations made in the 2004 Runway Safety Area Study.

Source: Field Observation, 2006.

Table 2.4
**Existing Aprons**

| Apron | Use | Area (SQ YDs) | Condition |
|---|---|---|---|
| Terminal Apron | Commercial Air Service | 5,734 | Good |
| Maine Instrument Flight Apron - Itinerant | Aircraft storage | 21,223 | Fair |
| Maine Instrument Flight Apron - Based Aircraft | Aircraft Storage | 5,354 | Fair |
| Apron B (along Taxiway F) | Aircraft Storage (Rarely Used) | 2,926 | Fair |

Note: One weekend per July, demand for ramp space exceeds capacity. Runway 8/26 is closed, it and several taxiways are used to to park 60+ large a/c; during camp season.

| | | | | |
|---|---|---|---|---|
| | HNTB | | EXISTING AIRPORT TERMINAL AREA | DATE: Jan 12, 2007 |
| | | | AUGUSTA STATE AIRPORT<br>AUGUSTA, MAINE | FIGURE: 2-3 |

P:\Projects\38673 Augusta MP\Plans\AUG Terminal Area 8.5\Using Layout1 @ Jan 12, 2007 - 3:03pm

Instrument Flight building has eight marked tie-down positions and the GA apron has 20 marked tie-downs. There are also infrequently used tie-downs on "Apron B" northeast of the GA apron. The FBO reported that many of the tie-downs have been paved over and need to be dug out or reinstalled in addition to making more apron space. This will be addressed later in the Alternatives Chapter.

### 2.3.4 FAA Airport Design Standards and Imaginary Surfaces

AC 150/5300-13 Change 10, titled Airport Design, provides airport design guidelines for the safe, efficient, and unobstructed movement of aircraft while operating on the ground. The AC specifies the requirements for various safety zones or areas required for the safe conduct of moving aircraft. Maintenance of these areas is the responsibility of the airport owner. In order to receive FAA AIP funding, it is imperative that specified FAA design standards be met. Design surfaces include:

- Runway Safety Areas (RSA)
- Object Free Area (OFA)
- Runway Protection Zones (RPZ)
- Obstacle Free Zone (OFZ)
- FAR Part 77

See Table 2.2 for a tabular summary of Runway Design Surfaces and obstructions.

**Runway Safety Areas**

RSAs are defined and graded areas beyond and between runway ends that can support an aircraft undershooting, overshooting, or veering off, the runway. The dimensions of an RSA are based on two key components: the ARC and Instrument Approach visibility minimums.

The existing RSAs for both Runways 17-35 and 8-26 do not meet FAA design criteria. This is due to the Airport being located on the edge of a plateau/hill, which drops off drastically at the runway ends. A preferred solution for meeting the FAA criteria will be included in the Alternatives Chapter.

**Object Free Areas**

An OFA is an area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects needed for air navigation or ground maneuvering purposes. The OFAs are required to be 800 feet wide by 600 feet beyond the runway end for 17-35 and 400 feet wide by 240 feet beyond the runway end for 8-26. The existing runway OFAs for the Runway 35 end and Runway 8-26 do not meet the FAA design criteria for each respective Runway's reference code, B-II and B-I. There are roadways within the OFA of Runway 35 and perimeter fence/road in the OFA of Runway 26, which do not meet FAA requirements. Also identified in the Vegetation Management Plan (2004), there is vegetation (off Airport property) that interferes with Runway 35, 8, and 26 OFAs. These objects and vegetation need to be removed to meet FAA safety requirements.

need to be removed to meet FAA safety requirements.

**Runway Protection Zones**

The RPZ is a two-dimensional trapezoid centered about the extended runway centerline off of each runway end. Its function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects, land uses, and any structures/areas used for public gathering. Control is preferably exercised through the acquisition of sufficient property interest or easements in the RPZ. The RPZs for AUG are not fully under Airport control (i.e., easement or ownership) as they extend outside the airport property boundary. RPZ area that extends outside the airport boundary equates to approximately 74 acres.

**Obstacle Free Zones**

OFZs preclude taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function. The OFZ is composed of the runway OFZ, the inner-approach OFZ, and the inner-transitional OFZ. The dimensions of the OFZ depend upon the size of aircraft regularly using the runway and approach visibility minimums.

The runway OFZ is centered above the runway centerline and is the volume of airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway.

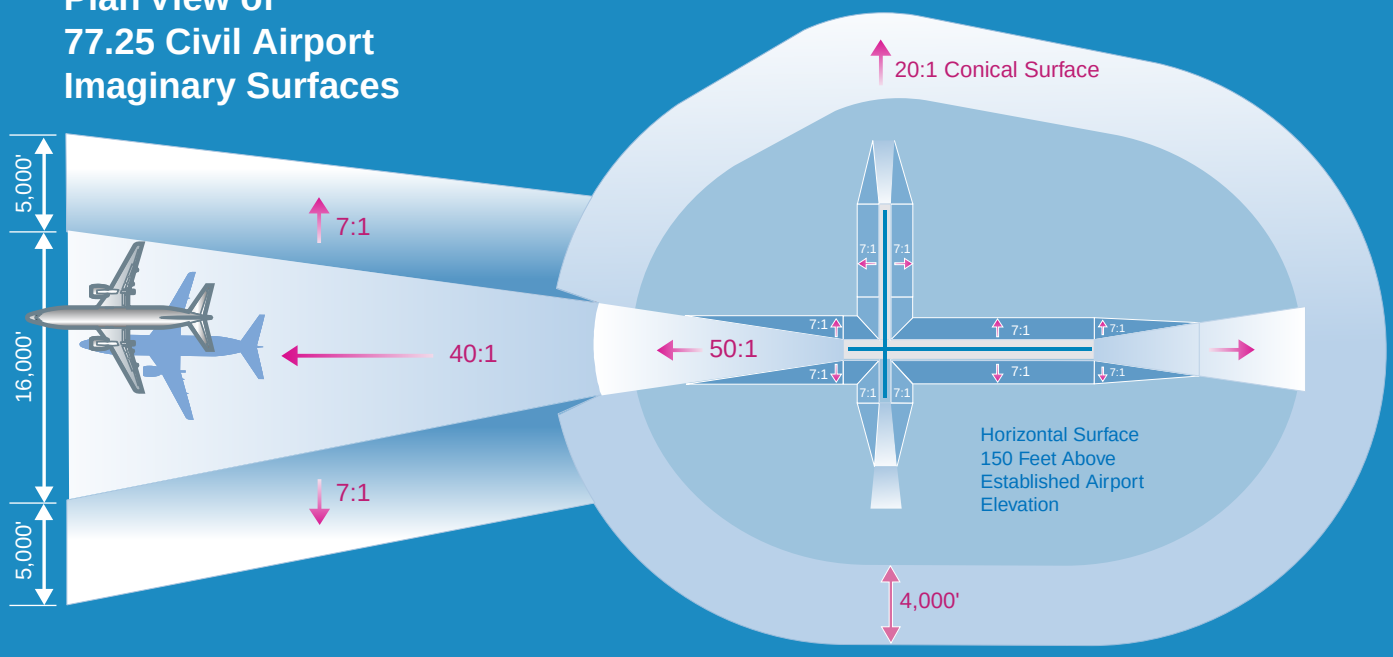
Runway 17-35, the precision instrument Runway serves large airplanes (>12,500 pounds) and has an OFZ 400 feet wide, extending 200 feet beyond the runway ends. The inner-approach OFZ only applies to Runway 17, which is the only runway with an approach lighting system. It begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet past the last light unit in the approach lighting system. Its width is the same as the runway OFZ and rises at a slope of 50:1. The inner-transitional OFZ is a defined volume of airspace along the sides of the runway and inner-approach OFZ, then rises vertically for a height of 45.2 feet and slopes 6:1 to a height of 150 feet.

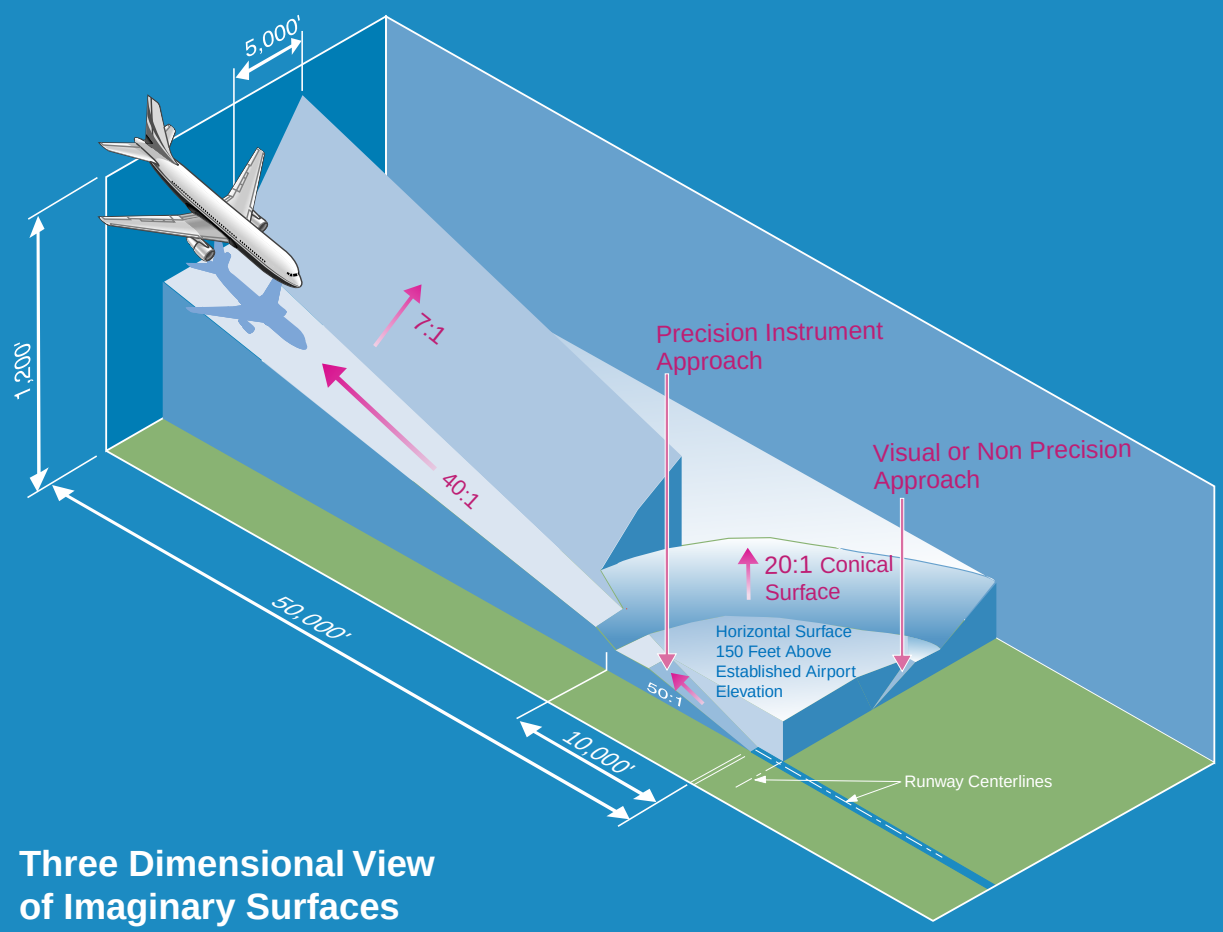
Runway 8-26 has a 250-foot wide OFZ extending 200 feet beyond each runway end. These surfaces meet FAA design standards.

### 2.3.5 Part 77

Title 14 Code of Federal Regulations (CFR) Part 77, Objects Affecting Navigable Airspace, defines the standards used for determining obstructions in navigable airspace around an airport. Objects which penetrate the three-dimensional imaginary surfaces established in Title 14 CFR Part 77 are defined as obstructions. Part 77 imaginary surfaces vary based on the type of runway (air carrier, GA, etc.) to which they are assigned. **Figure 2-4** is a 3-D representation of these surfaces. CFR Part 77 obstructions in the approach and primary surfaces will be analyzed later in the planning process.

The FAA does not exercise regulatory or permitting functions regarding structures




Three Dimensional View
of Imaginary Surfaces

| | | | |
|---|---|---|---|
| Source: FAA, HNTB Analysis | HNTB | FAR Part 77 Imaginary Surfaces | DATE: 12/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure: 2-4 |

that might penetrate navigable airspace, therefore, the FAA must rely on state and local zoning regulations to provide height and airspace protection of the RPZs and FAR Part 77 surfaces.

The City of Augusta has provisions to protect the airspace of the Airport. Appendix A (Land Use Ordinance) of the Revised Code of Ordinances (November 21, 2005) states the following in Section 3.4.3: *Aviation clearance requires that "no part of any new structure, planting, etc." shall protrude to an extent so as to "interfere with aviation requirements of the Augusta State Airport…" as determined by FAA based on plans on file. The section also requires submitting a copy of an "intent-to-build" letter to the Airport Manager.*

It is especially important for Airport management and the City to review all new development plans around Augusta that are in the vicinity of approaches and imaginary surfaces, i.e. Part 77. Currently, there are obstructions in several Part 77 surfaces, which will be addressed. Those surfaces are shown on the Part 77 drawing, Sheets 6 and 7, at the end of this document.

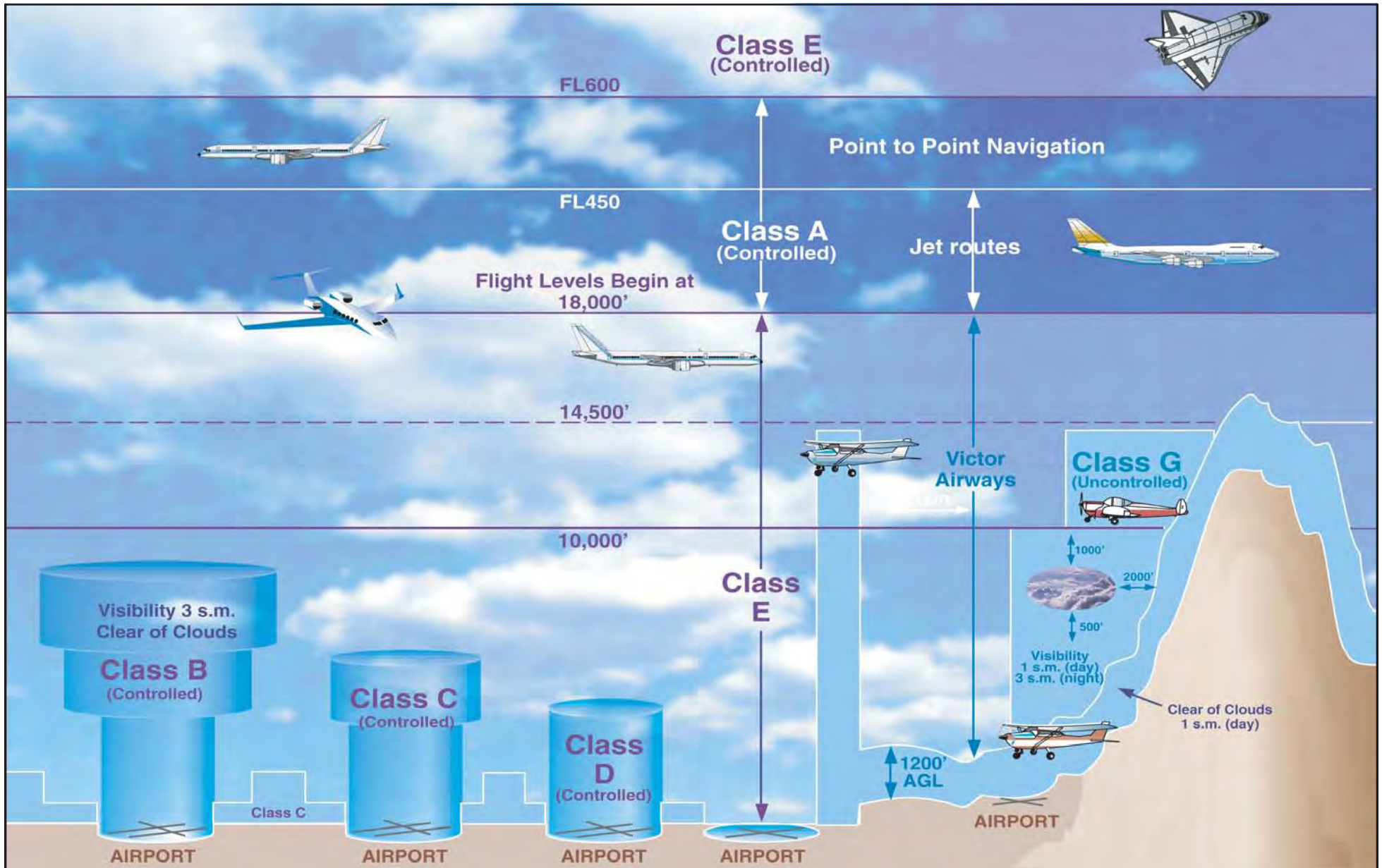
### 2.3.6 Airspace Management System

The FAA has jurisdiction over all U.S. airspace. This authority was granted by Congress in the Federal Aviation Act of 1958. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts and information; associated rules, regulations, and procedures; technical information; personnel; and material. System components shared jointly with the military are also included.

Airspace is currently classified as either controlled or uncontrolled. Controlled airspace is supported by ground-to-air communications, navigation aids, and air traffic services, whereas neither air traffic control (ATC) clearance or radio contact is required in uncontrolled airspace.

The FAA classifies airspace into six categories: five controlled categories (Class A through Class E) and one uncontrolled category (Class G), as shown in **Figure 2-5**. AUG falls under Class E airspace, as shown in the "Montreal" Sectional Aeronautical Chart (FAA) in **Figure 2-6**.

Controlled airspace that is not Class A through D, is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet above ground level (AGL), used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the U.S., including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous states and Alaska. Class E




| | | | | |
|---|---|---|---|---|
| Source: FAA, HNTB Analysis | HNTB | 2900 S. QUINCY ST., SUITE 200<br>ARLINGTON, VIRGINIA 22206<br>PH (703) 824-5100<br>FAX (703) 671-6210 | FAA Airspace Classifications | DATE:<br>12/2006 |
| | | | | FIGURE:<br>2-5 |

Source: FAA Sectional Aeronautical Chart (75th Edition, Aug 30, 2006)

HNTB

# Augusta Airspace Environment

Augusta State Airport
Augusta, Maine

DATE: 12/2006

Figure: 2-6

airspace does not include the airspace between 18,000 MSL to 60,000 MSL (FL 60).

### 2.3.7 NAVAIDS and Airfield Lighting

Navigational aids (NAVAIDS) are established to maintain accurate en-route air navigation. A variety of ground-based facilities transmit signals which can be received and interpreted by airborne aircraft to aid in the safe navigation of aircraft.

There is one precision instrument approach procedure published for AUG on Runway 17, and non-precision instrument approaches for all runways except Runway 26.
For specific information on all the approaches available see the FAA Terminal Procedures, **Figures 2-7 through 2-15**. For a summary of existing approaches for each runway end see the following table:

**Approach Summary for Each Runway End**

| | 17 | 35 | 8 | 26 |
|---|---|---|---|---|
| ILS (549' ceiling - 1/2 mile vis) | ● | | | |
| VOR | ● | ● | ● | |
| GPS/RNAV | ● | ● | ● | |
| VASI | ● | ● | | |
| REIL | | ● | | |

Source: FAA Terminal Procedures.

**ILS**

Runway 17 is equipped with an ILS and a MALSR approach lighting system, see Figure 2-7.

An ILS is comprised of two main components: the glide slope antenna array, sited to one side of the touchdown zone, which provides vertical approach guidance to approaching aircraft, and the localizer (a directional antenna situated beyond the departure end of the runway, which provides horizontal guidance). In concert, these two components work together to provide a precision approach.

**VASI**

Runway 17-35 is also equipped with a VASI system.

A VASI is a system of lights arranged to provide visual descent guidance information during the approach to a runway. These lights are visible from three to five miles during the day and up to 20 miles at night. The visual glide path of the VASI should provide safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 4 NM from the runway threshold (FAA AIM 2/2004).

**VOR**

Very high-frequency Omni directional Range (VOR) is a ground-based NAVAID which transmits a two-phase directional signals 360 degrees in azimuth from the station. The aircraft's VOR receiver enables a pilot to identify his radial or bearing from/to the ground station. VORs are used in conjunction with distance measuring equipment (DME), a combination of ground and airborne equipment which gives a continuous slant range distance-from-station readout by measuring time-lapse of a signal transmitted by the aircraft to the station and responded back. A DME can also provide groundspeed and time-to-station readouts by differentiation.

The “AUGUSTA” VOR is located on the north side of the airfield near the runway

AUGUSTA, MAINE

AL-29 (FAA)

# ILS or LOC RWY 17
## AUGUSTA STATE (AUG)

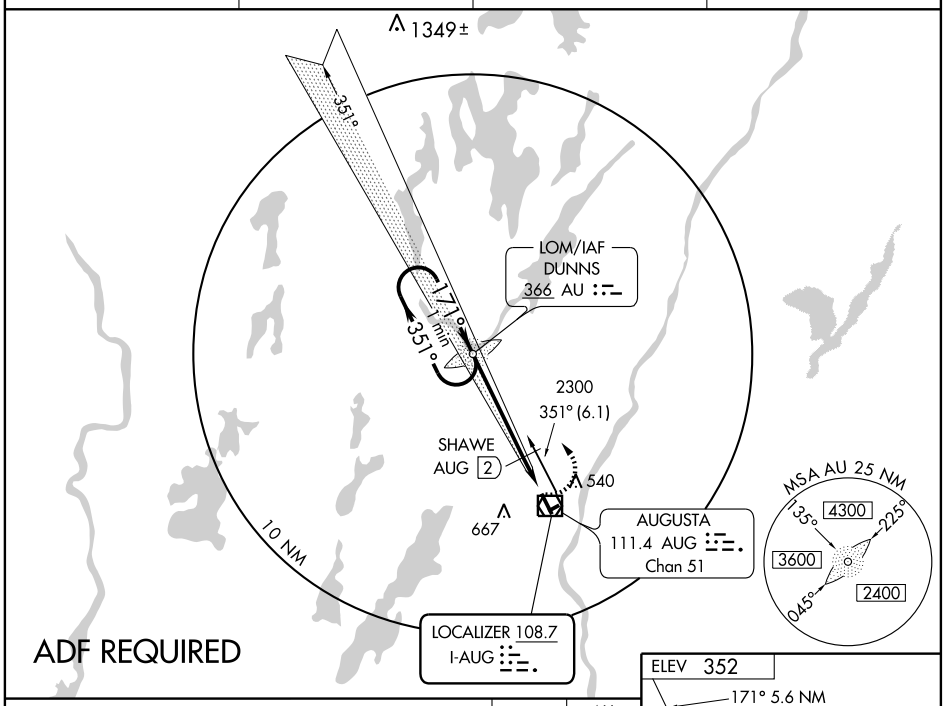
| LOC I-AUG | APP CRS | Rwy ldg | 5001 |
|---|---|---|---|
| 108.7 | 171° | TDZE | 349 |
| | | Apt Elev | 352 |

DME minimums Cat. D S-LOC 17 visibility increased to 1 mile for inoperative MALSR.
Glideslope unusable below 430 feet.

MALSR

MISSED APPROACH: Climbing left turn to 2300 direct AU LOM and hold.

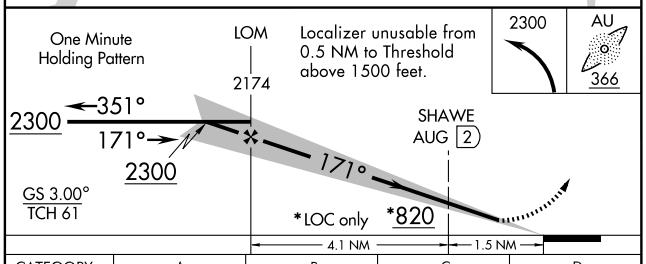
| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |




ADF REQUIRED

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007




ELEV 352

171° 5.6 NM from FAF

TDZE 349

HIRL Rwy 17-35 L
MIRL Rwy 8-26 L
REIL Rwy 35 L

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-ILS 17 | 549-½ 200 (200-½) | | | |
| S-LOC 17 | 820-½ 471 (500-½) | | 820-¾ 471 (500-¾) | 820-1 471 (500-1) |
| CIRCLING | 880-1 528 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |
| DME MINIMA | | | | |
| S-LOC 17 | 680-½ 331 (400-½) | | | 680-¾ 331 (400-¾) |

| FAF to MAP 5.6 NM | | | | | |
|---|---|---|---|---|---|
| Knots | 60 | 90 | 120 | 150 | 180 |
| Min:Sec | 5:36 | 3:44 | 2:48 | 2:14 | 1:52 |

AUGUSTA, MAINE
Amdt 2E 06299

44°19′N - 69°48′W

AUGUSTA STATE (AUG)
ILS or LOC RWY 17

| HNTB | RWY 17 ILS/LOC Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-7 |

AUGUSTA, MAINE

AL-29 (FAA)

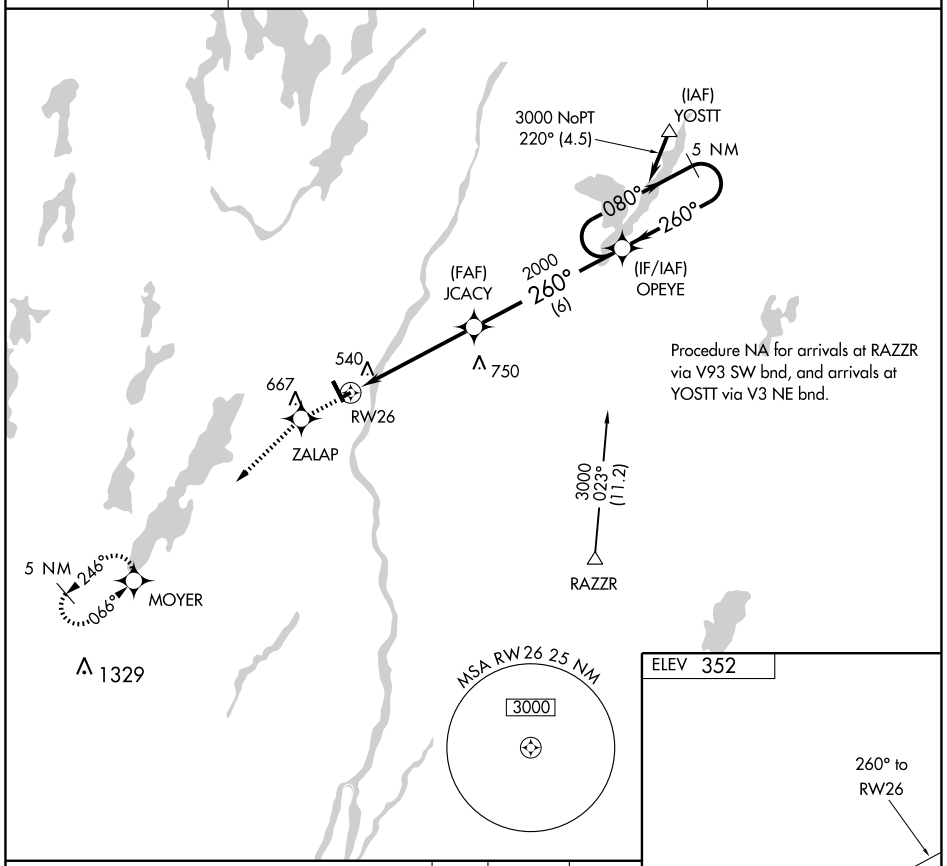
| APP CRS | Rwy ldg | N/A |
|---|---|---|
| 260° | TDZE | N/A |
| | Apt Elev | 352 |

# RNAV (GPS)-B
## AUGUSTA STATE (AUG)

DME/DME RNP-0.3 NA.
If local altimeter setting not received, use Auburn-Lewiston Muni altimeter setting and increase all MDAs 80 feet.

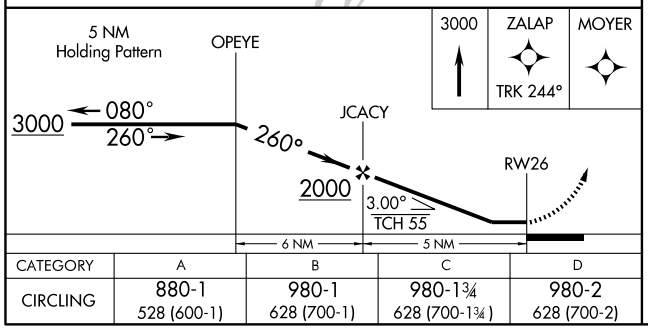
MISSED APPROACH: Climb to 3000 direct ZALAP and via 244° track to MOYER and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |




ELEV 352

260° to RW26




| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| CIRCLING | 880-1<br>528 (600-1) | 980-1<br>628 (700-1) | 980-1¾<br>628 (700-1¾) | 980-2<br>628 (700-2) |

MIRL Rwy 8-26 L
HIRL Rwy 17-35 L
REIL Rwy 35 L

AUGUSTA, MAINE
Orig-B 06327

44°19′N - 69°48′W

AUGUSTA STATE (AUG)
RNAV (GPS)-B

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

| HNTB | RNAV (GPS)-B Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-8 |

AUGUSTA, MAINE

AL-29 (FAA)

| WAAS CH 62999 W35A | APP CRS 351° | Rwy ldg 5001<br>TDZE 350<br>Apt Elev 352 |
|---|---|---|

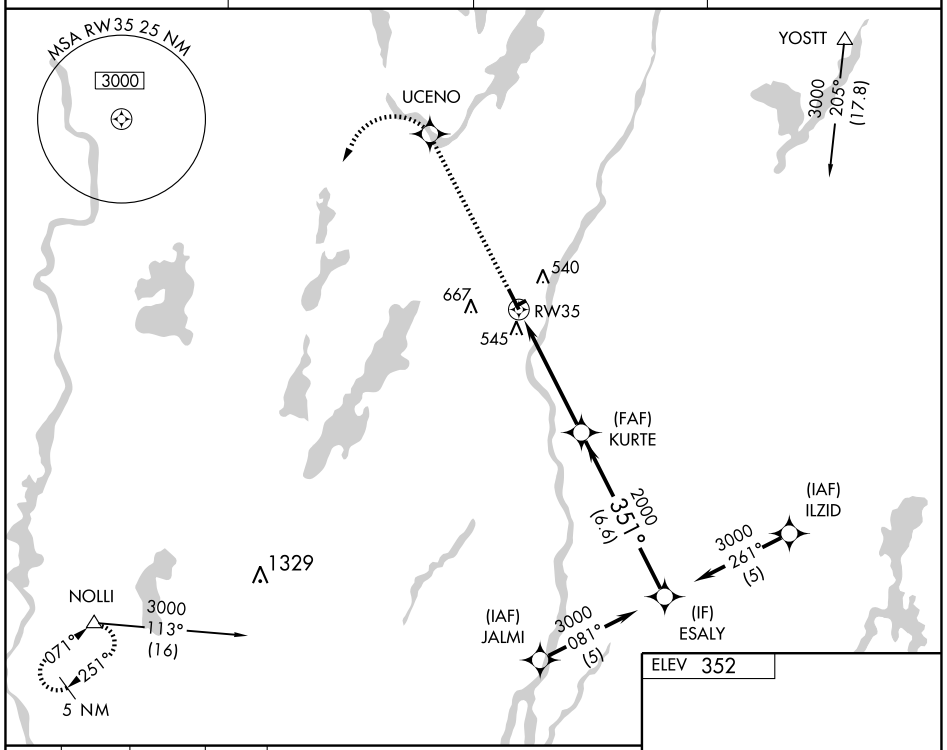
# RNAV (GPS) RWY 35

## AUGUSTA STATE (AUG)

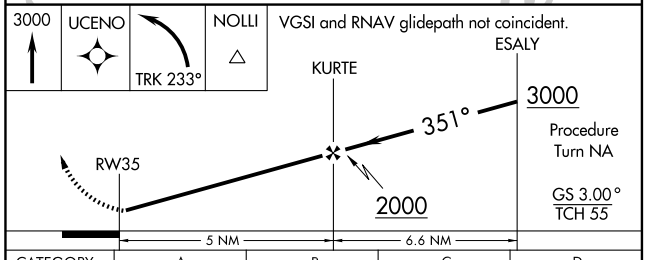
Baro-VNAV NA below -16°C (4°F), DME/DME RNP-0.3 NA.
If local altimeter setting not received, use Auburn-Lewiston Muni altimeter setting and increase all DAs 71 feet and all MDAs 80 feet.

MISSED APPROACH: Climb to 3000 direct UCENO and left turn via 233° track to NOLLI and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |




ELEV 352




| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| LPV DA | 610-1 260 (300-1) | | | |
| LNAV/VNAV DA | 850-1¾ 500 (600-1¾) | | | |
| LNAV MDA | 840-1 490 (500-1) | | 840-1¼ 490 (500-1¼) | 840-1½ 490 (500-1½) |
| CIRCLING | 880-1¾ 528 (600-1¾) | 980-1¾ 628 (700-1¾) | | 980-2 628 (700-2) |

TDZE 350

351° to RW35

MIRL Rwy 8-26 L
HIRL Rwy 17-35 L
REIL Rwy 35 L

AUGUSTA, MAINE
Orig-A 06131

44°19′N - 69°48′W

AUGUSTA STATE (AUG)
RNAV (GPS) RWY 35

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

| HNTB | RNAV (GPS) RWY 35 Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-9 |

AUGUSTA, MAINE

AL-29 (FAA)

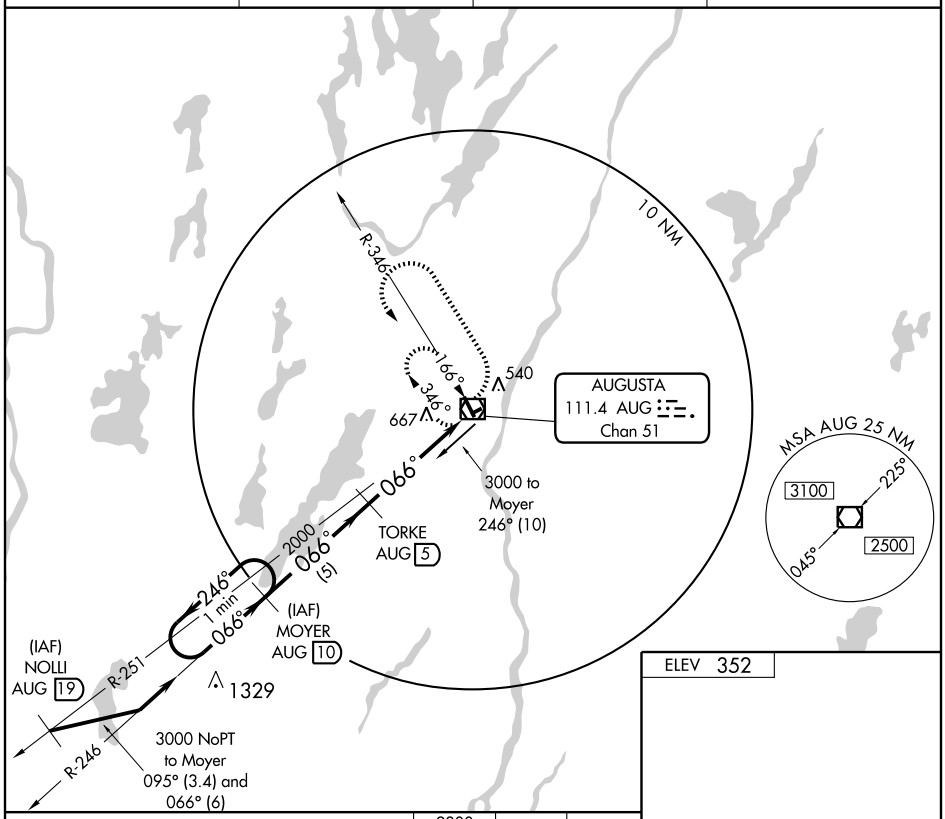
| VOR/DME AUG | APP CRS | Rwy ldg | 2703 |
|---|---|---|---|
| 111.4 | 066° | TDZE | 352 |
| Chan 51 | | Apt Elev | 352 |

# VOR/DME RWY 8

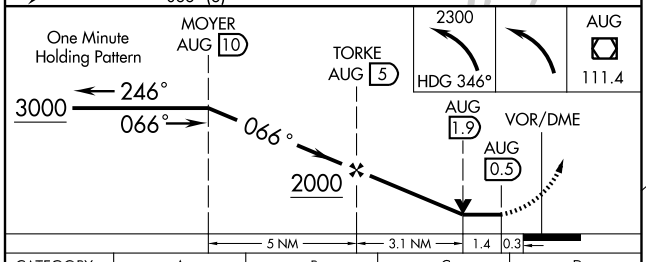
AUGUSTA STATE (AUG)

MISSED APPROACH: Climbing left turn to 2300 via heading 346° then left turn direct AUG VOR/DME and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) |




ELEV 352




TDZE
352
066° 4.5 NM
from FAF
HIRL Rwy 17-35
MIRL Rwy 8-26
REIL Rwy 35

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-8 | 920-1 568 (600-1) | | 920-1½ 568 (600-1½) | 920-1¾ 568 (600-1¾) |
| CIRCLING | 920-1 568 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |

| Knots | 60 | 90 | 120 | 150 | 180 |
|---|---|---|---|---|---|
| Min:Sec | | | | | |

AUGUSTA, MAINE
Amdt 11 06047

44°19'N-69°48'W

AUGUSTA STATE (AUG)
VOR/DME RWY 8

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

| HNTB | VOR/DME RWY 8 Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-10 |

AUGUSTA, MAINE

AL-29 (FAA)

# VOR/DME RWY 17
AUGUSTA STATE (AUG)

| VOR/DME AUG | APP CRS | Rwy ldg | 5001 |
|---|---|---|---|
| 111.4 | 166° | TDZE | 348 |
| Chan 51 | | Apt Elev | 352 |

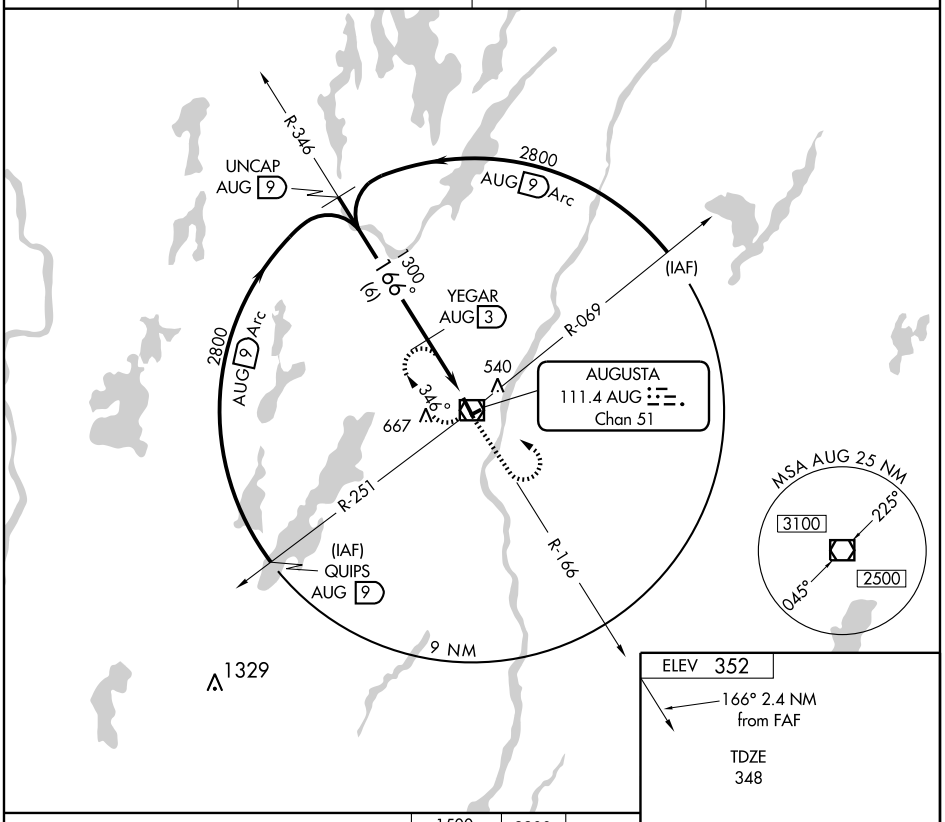
Cat. D S-17 visibility increased to 1¼ miles for inoperative MALSR.

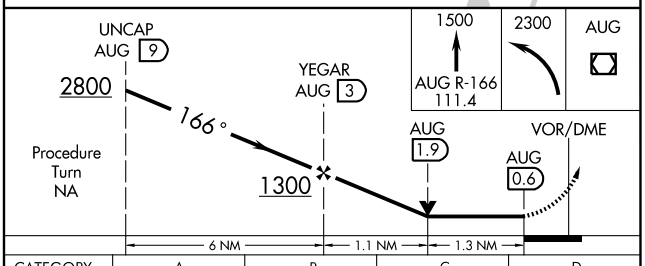
MALSR

MISSED APPROACH: Climb to 1500 via R-166, then climbing left turn to 2300 direct AUG VOR/DME and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |

NE-1, 21 DEC 2006 to 18 JAN 2007




ELEV 352

166° 2.4 NM from FAF

TDZE 348

HIRL Rwy 17-35 L
MIRL Rwy 8-26 L
REIL Rwy 35 L

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-17 | 760-½ 412 (500-½) | | 760-¾ 412 (500-¾) | 760-1 412 (500-1) |
| CIRCLING | 880-1 528 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |

| Knots | 60 | 90 | 120 | 150 | 180 |
|---|---|---|---|---|---|
| Min:Sec | | | | | |

AUGUSTA, MAINE
Amdt 4A 03023

44°19′N-69°48′W

AUGUSTA STATE (AUG)
VOR/DME RWY 17

NE-1, 21 DEC 2006 to 18 JAN 2007

HNTB

VOR/DME RWY 17 Approach

Augusta State Airport
Augusta, Maine

DATE: 12/2006

Figure: 2-11

AUGUSTA, MAINE

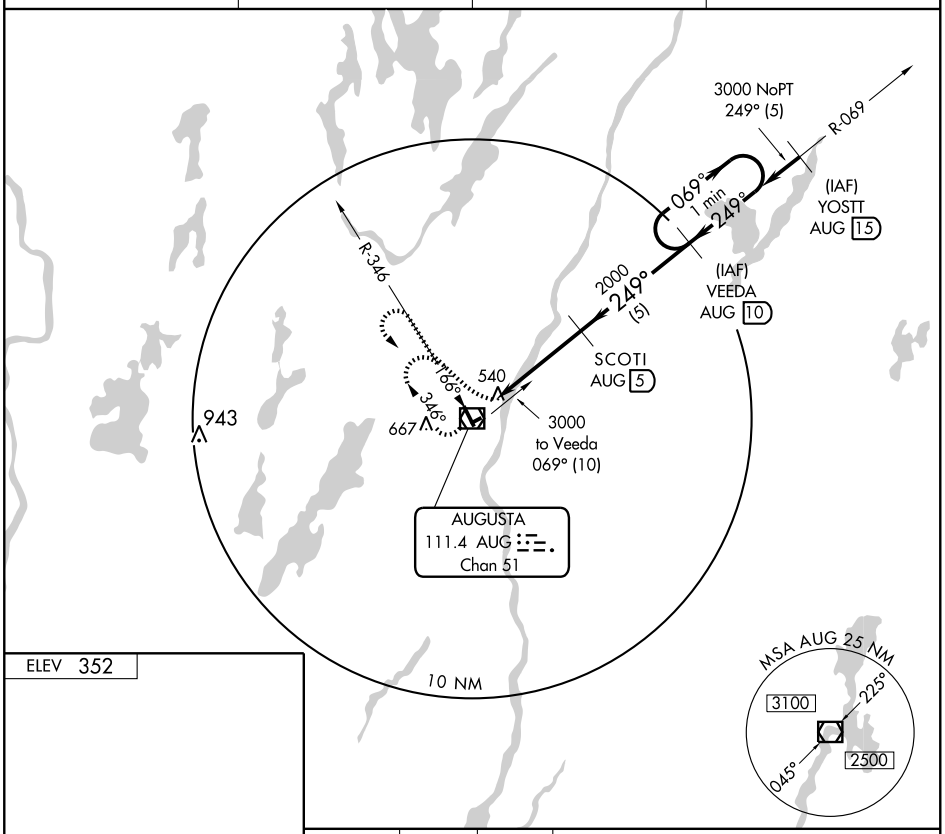
AL-29 (FAA)

| VOR/DME AUG | APP CRS | Rwy ldg | N/A |
|---|---|---|---|
| 111.4 | 249° | TDZE | N/A |
| Chan 51 | | Apt Elev | 352 |

# VOR/DME-A
## AUGUSTA STATE (AUG)

MISSED APPROACH: Climbing right turn to 2300 via AUG R-346, then left turn direct AUG VOR/DME and hold.

| ASOS | PORTLAND APP CON ★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |

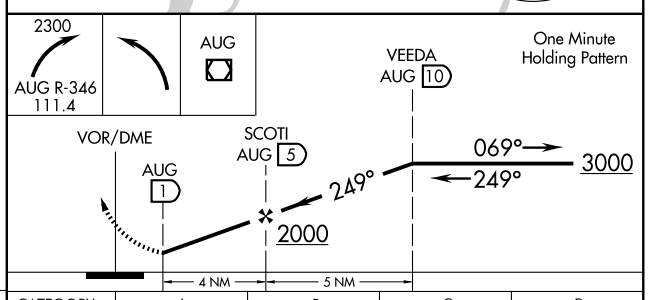



NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

ELEV 352

HIRL Rwy 17-35 L
MIRL Rwy 8-26 L
REIL Rwy 35 L




| Knots | 60 | 90 | 120 | 150 | 180 |
|---|---|---|---|---|---|
| Min:Sec | | | | | |

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| CIRCLING | 960-1<br>608 (700-1) | 980-1<br>628 (700-1) | 980-1¾<br>628 (700-1¾) | 980-2<br>628 (700-2) |

AUGUSTA, MAINE
Amdt 11A 03191

44°19'N-69°48'W

AUGUSTA STATE (AUG)
VOR/DME-A

| HNTB | VOR/DME -A Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-12 |

AUGUSTA, MAINE

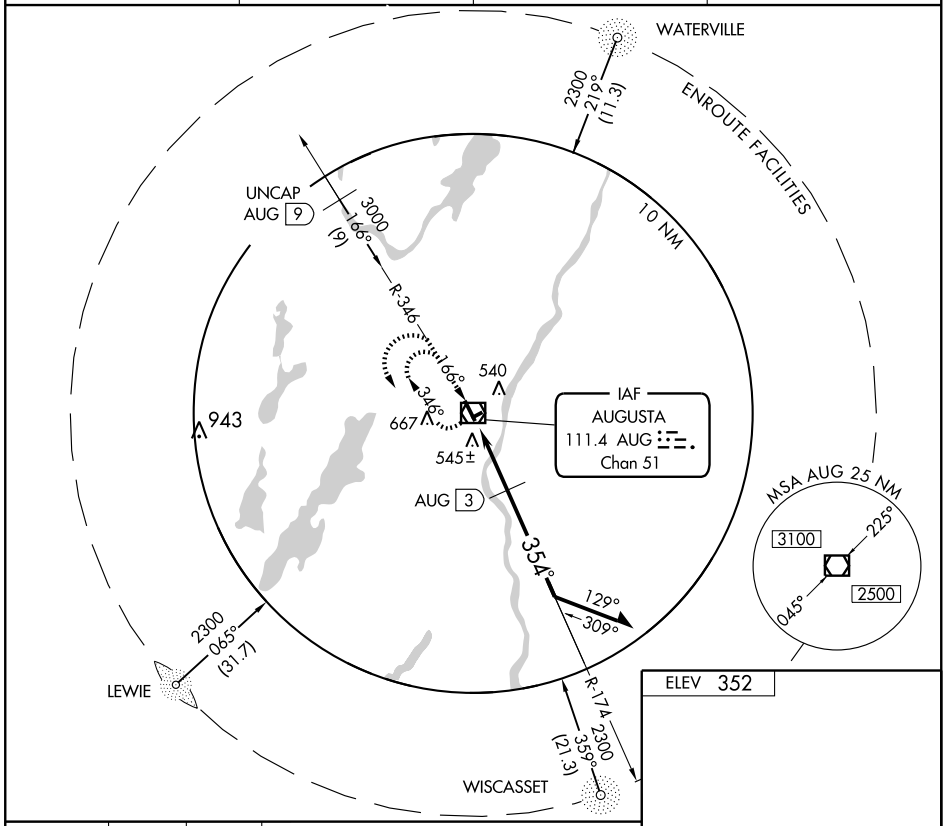
AL-29 (FAA)

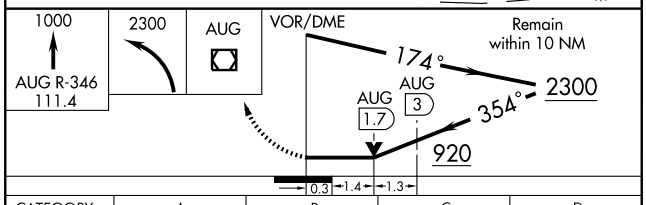
| VOR/DME AUG | APP CRS | Rwy ldg | 5001 |
|---|---|---|---|
| 111.4 | 354° | TDZE | 351 |
| Chan 51 | | Apt Elev | 352 |

# VOR RWY 35
## AUGUSTA STATE (AUG)

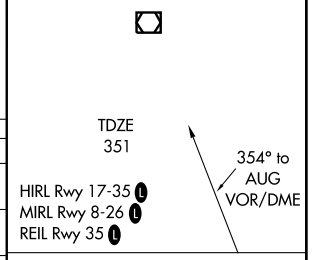
MISSED APPROACH: Climb to 1000 via AUG R-346, then climbing left turn to 2300 direct AUG VOR/DME and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |




ELEV 352




HIRL Rwy 17-35 L
MIRL Rwy 8-26 L
REIL Rwy 35 L

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-35 | 920-1 | 569 (600-1) | 920-1½ 569 (600-1½) | 920-1¾ 569 (600-1¾) |
| CIRCLING | 920-1 568 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |
| DME MINIMA | | | | |
| S-35 | 800-1 | 449 (500-1) | 800-1¼ 449 (500-1¼) | 800-1½ 449 (500-1½) |

| Knots | 60 | 90 | 120 | 150 | 180 |
|---|---|---|---|---|---|
| Min:Sec | | | | | |

AUGUSTA, MAINE
Amdt 5 06327

44°19'N-69°48'W

AUGUSTA STATE (AUG)
VOR RWY 35

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

| HNTB | VOR RWY 35 Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-13 |

AUGUSTA, MAINE

AL-29 (FAA)

| APP CRS | Rwy ldg | 2703 |
|---|---|---|
| 080° | TDZE | 352 |
| | Apt Elev | 352 |

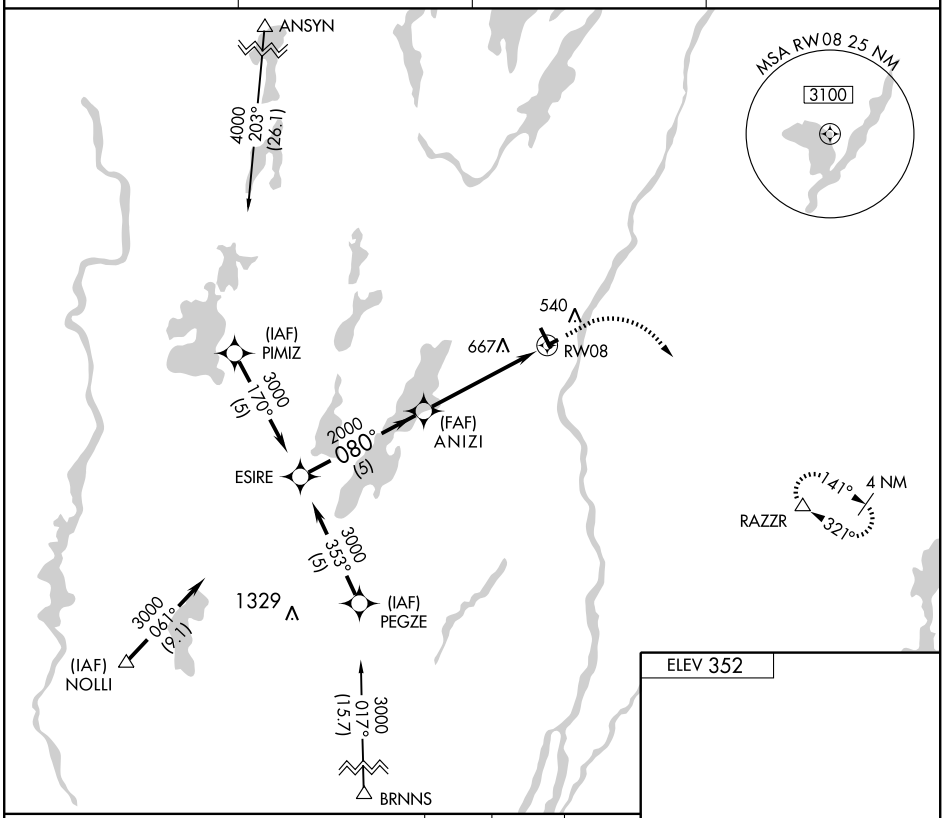
# GPS RWY 8

## AUGUSTA STATE (AUG)

NA

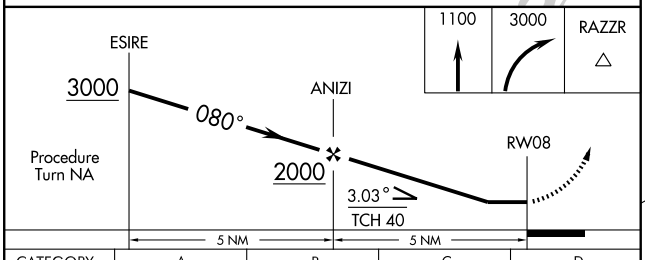
MISSED APPROACH: Climb to 1100, then climbing right turn to 3000 direct RAZZR WP and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |




NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007




ELEV 352

TDZE 352

080° to RW08

| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-8 | 920-1 568 (600-1) | | 920-1½ 568 (600-1½) | 920-1¾ 568 (600-1¾) |
| CIRCLING | 920-1 568 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |

MIRL Rwy 8-26 L
HIRL Rwy 17-35 L
REIL Rwy 35 L

AUGUSTA, MAINE
Orig-A 06327

44°19′N - 69°48′W

AUGUSTA STATE (AUG)
GPS RWY 8

| HNTB | GPS RWY 8 Approach | DATE: 12/2006 |
|---|---|---|
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-14 |

AUGUSTA, MAINE

AL-29 (FAA)

| APP CRS | Rwy ldg | 5001 |
|---|---|---|
| 171° | TDZE | 349 |
| | Apt Elev | 352 |

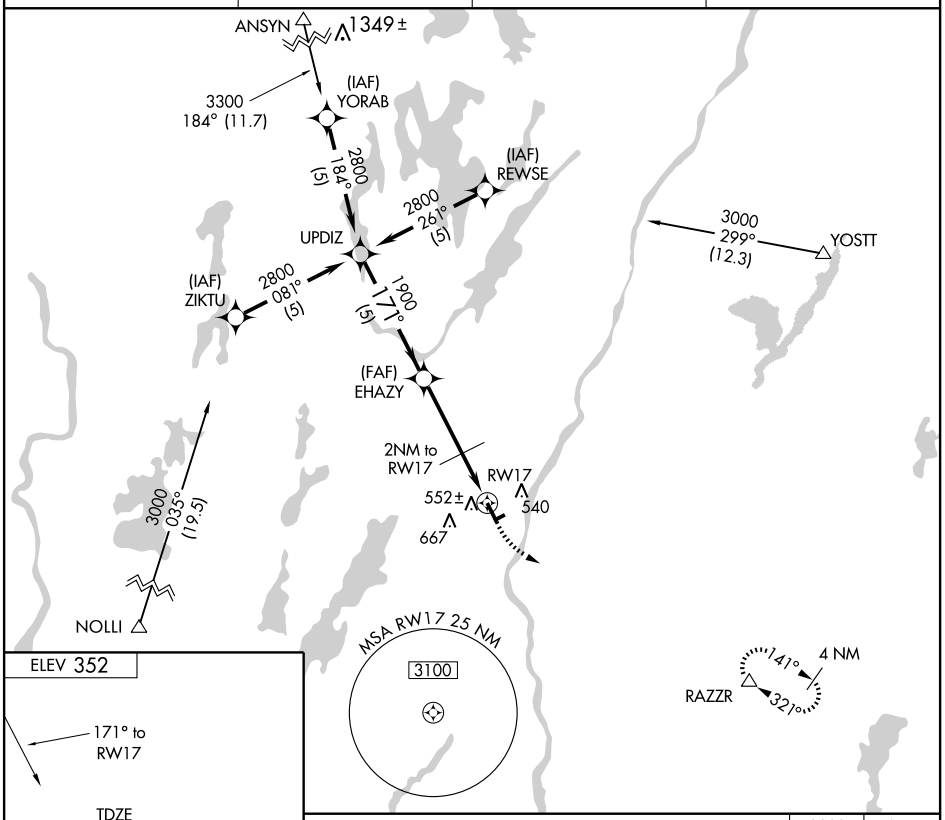
# GPS RWY 17
## AUGUSTA STATE (AUG)

T
A NA

MALSR

MISSED APPROACH: Climbing left turn to 3000 direct RAZZR WP and hold.

| ASOS | PORTLAND APP CON★ | CLNC DEL | UNICOM |
|---|---|---|---|
| 118.325 | 128.35 299.2 | 119.95 | 123.0 (CTAF) L |



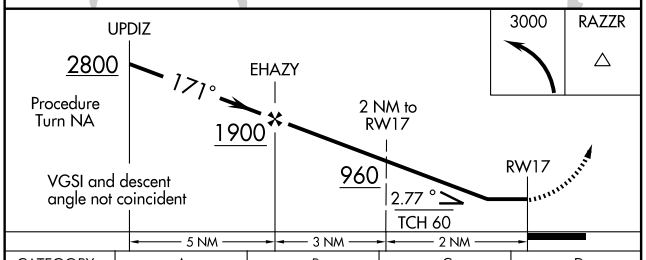

NE-1, 21 DEC 2006 to 18 JAN 2007

NE-1, 21 DEC 2006 to 18 JAN 2007

ELEV 352

171° to
RW17

TDZE
349




| CATEGORY | A | B | C | D |
|---|---|---|---|---|
| S-17 | 780-½ 431 (500-½) | | 780-¾ 431 (500-¾) | 780-1 431 (500-1) |
| CIRCLING | 920-1 568 (600-1) | 980-1 628 (700-1) | 980-1¾ 628 (700-1¾) | 980-2 628 (700-2) |

MIRL Rwy 8-26 L
HIRL Rwy 17-35 L
REIL Rwy 35 L

AUGUSTA, MAINE
Orig 06327

44°19′N - 69°48′W

AUGUSTA STATE (AUG)
GPS RWY 17

| | | |
|---|---|---|
| HNTB | GPS RWY 17 Approach | DATE: 12/2006 |
| | Augusta State Airport<br>Augusta, Maine | Figure: 2-15 |

intersection. The VOR/DME and VOR approach procedures have been included at the end of this chapter (See Figures 2-7 through 2-10). It should be noted that the VOR requires a significant amount of ground space to operate correctly and may need to be relocated or decommissioned in the future to accommodate aviation development which is quite limited by lack of developable land. This will be addressed later in the Alternatives Chapter.

**GPS/RNAV**

Global Positioning System (GPS) is a navigational system using orbiting satellites to determine the aircraft's position on the Earth. Developed at first for military use, then widespread on commercial and private aircraft, it is now expected to replace the ground-based navigational systems for its accuracy and reliability.

Area Navigation (RNAV) is a system of radio navigation which permits direct point-to-point off-airways navigation by means of an on-board computer creating phantom VOR/DME transmitters termed waypoints. Runways 17, 35, and 8 have GPS and GPS/RNAV/LNAV/LPV approaches (see Figures 2-8, 2-9, 2-14, and 2-15).

**Airfield Lighting**

Both runways at AUG are equipped with runway edge lights, which outline the edge of pavement, particularly in low visibility conditions.

Runway 17-35 is equipped with High Intensity Runway Lights (HIRL) and Runway 8-26 is equipped with Medium Intensity Runway Lights (MIRL), which were both installed in 1981 when the runways were rehabilitated.

Runway 17 is equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 35 is equipped with synchronized flashing lights located laterally on each side of the runway threshold, facing the approach area. They aid the pilot in quickly identifying the end of a runway in low visibility conditions.

All taxiways and the edge of the terminal apron are equipped with Medium Intensity Taxiway Edge Lights.

The airfield lighting vault is nearing the end of its useful life at 45 years old (typically planned for 50 year service) with a back-up generator.

**Rotating Beacon**

AUG has a relatively new rotating airport beacon located adjacent to the terminal building. See the existing ALP, at the end of the report, for a depiction of the beacon's location on the airfield.

### 2.3.8 Weather Reporting Equipment

AUG is equipped with an Automated Surface Observation System (ASOS), an assembly of sensors, which measure, collect, and broadcast weather data to help pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for takeoffs and landings. The ASOS at AUG is owned and operated by the National Weather Service. ASOS units provide minute-to-

The data collected by the ASOS typically include:

- Wind speed, direction, and gusts
- Temperature and dew point
- Cloud height and coverage
- Visibility
- Present weather (rain, drizzle, snow)
- Rain accumulation
- Thunderstorms and lightning
- Altimeter
- Fog, mist, haze, freezing fog

The ASOS is located just south of the Runway 17-35/8-26 intersection. See the existing ALP for a depiction of the ASOS location on the airfield.

### 2.3.9 Weather and Runway Usage

See **Figures 2-16 through 2-18** for All Weather, VFR, and IFR windroses.

Runway use data is important for estimating critical aircraft by runway end and for noise modeling. **Table 2.5** shows reported use for landings and takeoffs, Runway 17 is the dominant runway used at AUG. For touch-and-goes, Runway 35 is the dominant runway end for all aircraft types.

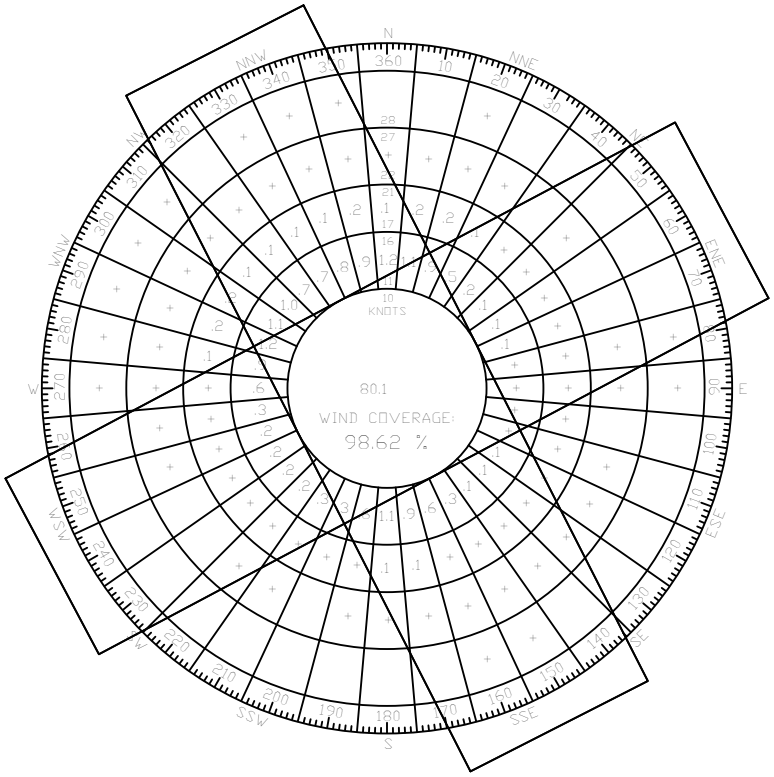
### 2.3.10 Facilities and Tenants

The following section identifies and defines the role of the main facilities and tenants at AUG. A tabular inventory of all buildings on the Airport is listed in **Table 2.6**.

**Passenger Terminal**

The terminal building is located southeast of the Runway 17-35/8-26 intersection. See Figure 2-3 for an aerial of the passenger terminal and the GA areas. The terminal building is a two-story structure of approximately 8,900 square feet. **Table 2.7** quantifies the existing allocation of space in the terminal by specific function. The terminal building is in "good" condition. No problems were noted with heating/AC or plumbing utilities.

While the terminal building functions for current passenger levels, it was evident that the size of certain functions and layout of the building is not optimal for passenger transportation. Airport users and local residents noted that the atmosphere of the terminal was lacking. Upon entering the terminal through the double doors passengers immediately see the Greyhound/Vermont transit office and ticket counter to the right of the entrance. Bus line agents utilizing the small ticket office noted that there is no window on an exterior wall allowing them to see out the front of the terminal building. This poses problems for announcing the arrival of busses, particularly when multiple busses arrive.

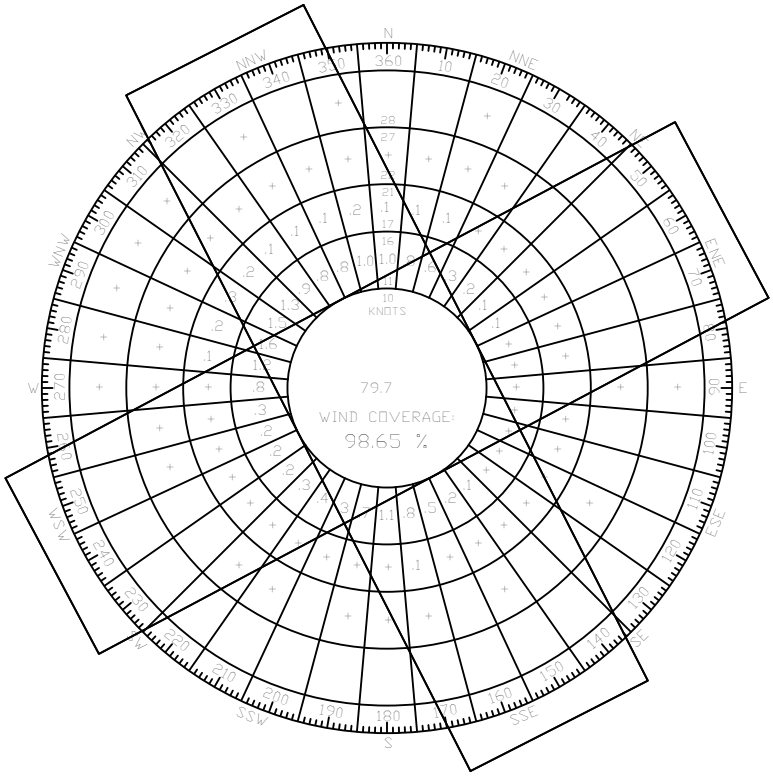



All-weather

| | 17 | 35 | 8 | 26 |
|---|---|---|---|---|
| **10.5-knot** | 71.6% | 79.7% | 74.8% | 79.7% |
| **13.0-knot** | 72.6% | 82.3% | 78.5% | 84.2% |
| **16.0-knot** | 73.3% | 83.7% | 81.8% | 88.0% |
| **20.0-knot** | 73.4% | 84.0% | 82.6% | 89.0% |
| **Combined @ 10.5 knots** | 95.1% | | 87.6% | |
| **Combined @ 13 knots** | 98.0% | | 93.6% | |
| **Total Existing @ 10.5 knots** | 98.6% | | | |

Station: KAUG
Period: 1994 - 2006
Observations: 116,142
Tail Wind: 5 Knots
Source: National Climatic Data Center, Asheville North Carolina

| | | | |
|---|---|---|---|
| | HNTB | All Weather Wind Rose | DATE: 12/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure: 2-16 |

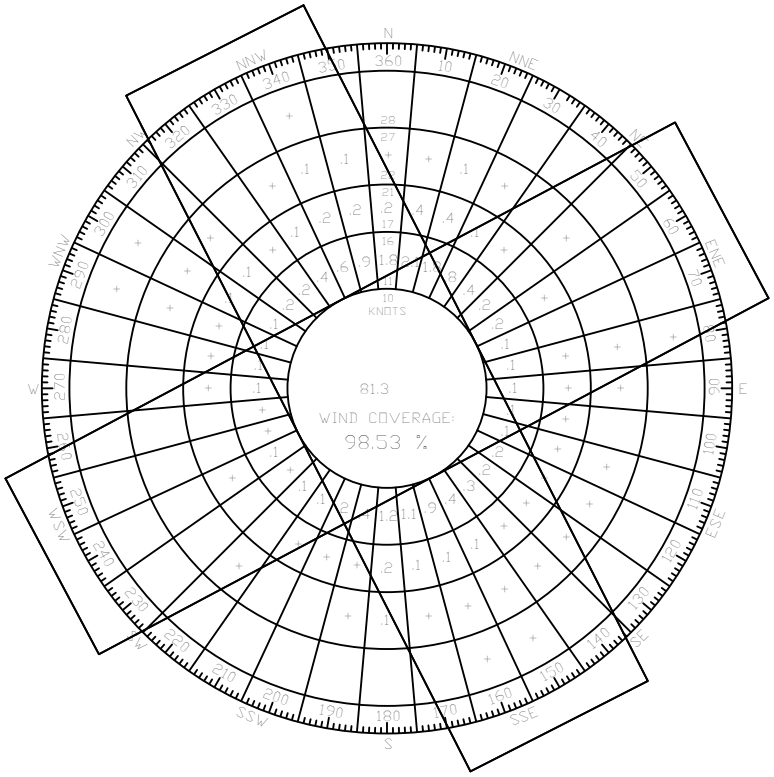



VFR

| | 17 | 35 | 8 | 26 |
|---|---|---|---|---|
| **10.5-knot** | 70.0% | 81.4% | 71.8% | 81.9% |
| **13.0-knot** | 71.0% | 84.1% | 75.1% | 86.9% |
| **16.0-knot** | 71.9% | 85.6% | 78.3% | 91.0% |
| **20.0-knot** | 72.0% | 85.9% | 79.0% | 92.0% |
| **Combined @ 10.5 knots** | 94.8% | | 87.6% | |
| **Combined @ 13 knots** | 97.9% | | 93.7% | |
| **Total Existing @ 10.5 knots** | 98.7% | | | |

Station: KAUG
Period: 1994 - 2006
Observations: 86,443
Tail Wind: 5 Knots
Source: National Climatic Data Center, Asheville North Carolina

| | | | |
|---|---|---|---|
| | HNTB | VFR Windrose | DATE: 12/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure: 2-17 |




IFR

| | 17 | 35 | 8 | 26 |
|---|---|---|---|---|
| **10.5-knot** | 76.2% | 74.8% | 83.7% | 73.3% |
| **13.0-knot** | 77.0% | 77.0% | 88.4% | 76.2% |
| **16.0-knot** | 77.6% | 78.2% | 92.1% | 79.2% |
| **20.0-knot** | 77.7% | 78.4% | 93.1% | 80.2% |
| **Combined @ 10.5 knots** | 95.8% | | 87.8% | |
| **Combined @ 13 knots** | 98.3% | | 93.4% | |
| **Total Existing @ 10.5 knots** | 98.6% | | | |

Station: KAUG
Period: 1994 - 2006
Observations: 29699
Tail Wind: 5 Knots
Source: National Climatic Data Center, Asheville North Carolina

| | | | |
|---|---|---|---|
| HNTB | IFR Windrose | | DATE: 12/2006 |
| | Augusta State Airport<br>Augusta, Maine | | Figure: 2-18 |

Table 2.5

**Operations By Runway End**

| **Landings** - % Runway End | | | | |
|---|---|---|---|---|
| | **Runway 17** | **Runway 35** | **Runway 8** | **Runway 26** |
| Single-Engine-Piston | 30% | 40% | 10% | 20% |
| Multi-Engine-Piston | 45% | 40% | 5% | 10% |
| Small-Turboprop | 60% | 40% | 0% | 0% |
| Mid-Sized Turboprop | 60% | 40% | 0% | 0% |
| Small GA Jet | 60% | 40% | 0% | 0% |
| Large GA Jet | 60% | 40% | 0% | 0% |
| Commerical Jet | 0% | 0% | 0% | 0% |
| Helicopters | 35% | 35% | 10% | 20% |
| Military | 70% | 30% | 0% | 0% |
| Gliders/Ultralights | 10% | 10% | 50% | 30% |
| **Takeoffs** - % Runway End | | | | |
| | **Runway 17** | **Runway 35** | **Runway 8** | **Runway 26** |
| Single-Engine-Piston | 30% | 40% | 10% | 20% |
| Multi-Engine-Piston | 40% | 45% | 5% | 10% |
| Small-Turboprop | 55% | 45% | 0% | 0% |
| Mid-Sized Turboprop | 55% | 45% | 0% | 0% |
| Small GA Jet | 55% | 45% | 0% | 0% |
| Large GA Jet | 55% | 45% | 0% | 0% |
| Commerical Jet | 0% | 0% | 0% | 0% |
| Helicopters | 5% | 5% | 15% | 75% |
| Military | 60% | 40% | 0% | 0% |
| Gliders/Ultralights | 10% | 10% | 30% | 50% |
| **Touch & Goes** - % Runway End | | | | |
| | **Runway 17** | **Runway 35** | **Runway 8** | **Runway 26** |
| Single-Engine-Piston | 30% | 40% | 15% | 15% |
| Multi-Engine-Piston | 30% | 40% | 15% | 15% |
| Small-Turboprop | 50% | 50% | 0% | 0% |
| Mid-Sized Turboprop | 0% | 0% | 0% | 0% |
| Small GA Jet | 0% | 0% | 0% | 0% |
| Large GA Jet | 0% | 0% | 0% | 0% |
| Commerical Jet | 0% | 0% | 0% | 0% |
| Helicopters | 70% | 30% | 0% | 0% |
| Military | 70% | 30% | 0% | 0% |
| Gliders/Ultralights | 25% | 25% | 25% | 25% |

Source: Maine Instrument Flight estimate.

Table 2.6

**Existing Airport Buildings**

| Structure | Use | Length (ft.) | Width (ft.) | Area (sq. ft.) | No. of Floors | Condition |
|---|---|---|---|---|---|---|
| Terminal | Air Service, Bus service, Rental Car, TSA, FAA, Maine PE Board | 94 | 50 | 8,900 | 2 | Fair |
| Restaurant (attached to Terminal bldg.) | Thai Restaurant | 40 | 50 | 1,900 | 1 | Good |
| Maine Instrument Flight | Office | | | 4,430 | | Good |
| | Hangar | | | 6,800 | | |
| MIF Maintenance Hangar | Aircraft Repair | 80 | 80 | 6,400 | 1 | |
| T-Hangars (25 bays total) | | | | | | |
| A | Aircraft Storage | 180 | 52 | 9,360 | 1 | Good |
| B | Aircraft Storage | 198 | 32 | 6,336 | 1 | Fair |
| C | Aircraft Storage | 221 | 52 | 11,492 | 1 | Good |
| Civil Air Patrol | Storage | 84 | 43 | 3,612 | 1 | Fair |
| MDOT Maintenance | Storage | 68 | 48 | 3,260 | 1 | Fair |
| MDOT (old SRE building) | Storage | 75 | 70 | 5,250 | 1 | Poor |
| Snow Removal Equipment | Equipment Storage/ Maintenance offices | 140 | 80 | 11,200 | 2 | Good |

Source: Observations, 2006.

Table 2.7

**Passenger Terminal Building - Program Area by Function by Year**
**(Square Feet)**

| LEVEL ONE | Existing (SF) | % of Total |
|---|---|---|
| **Airline Functions** | | |
| Ticket Counter | 250 | 2.8% |
| Ticket Counter Queuing | 150 | 1.7% |
| Airline Ticket Offices | 240 | 2.7% |
| Hold Bag Screening | 300 | 3.4% |
| Departure Lounge (1) | 500 | 5.6% |
| Baggage Claim | 110 | 1.2% |
| Subtotal | 1,550 | 17.3% |
| **Concessions Space** | | |
| Restaurant | 1,920 | 21.5% |
| Rental Car | 60 | 0.7% |
| Bus Line | 110 | 1.2% |
| Subtotal Concessions Space | 2,090 | 23.4% |
| **Security Screening** | | |
| Security Checkpoint (1) | 530 | 5.9% |
| Subtotal | 530 | 5.9% |
| **Secure Public Area** | | |
| Hold Room | 125 | 1.4% |
| Circulation to Apron | 55 | 0.6% |
| Subtotal | 180 | 2.0% |
| **Non-Secure Public Area** | | |
| Circulation - General (2) | 985 | 11.0% |
| Restrooms | 350 | 3.9% |
| Lift | 20 | 0.2% |
| Subtotal | 1,355 | 15.1% |
| **Non-Public Area** | | |
| TSA Office | 120 | 1.3% |
| ARFF Equipment/Garage | 325 | 3.6% |
| Janitor Closet | 30 | 0.3% |
| Subtotal | 475 | 5.3% |
| **Subtotal Level One** | **6,180** | 69.1% |
| **LEVEL TWO** | | |
| FAA Radio Room | 240 | 2.7% |
| Airport Administration | 380 | 4.2% |
| TSA Supervisor Office | 240 | 2.7% |
| Board Of Professional Engineers | 530 | 5.9% |
| Budget Rental Car Office | 64 | 0.7% |
| Storage/Janitor Closet | 135 | 1.5% |
| Restrooms | 155 | 1.7% |
| General Circulation | 1,020 | 11.4% |
| **Subtotal Level Two** | **2,764** | 30.9% |
| **Grand Total** | **8,944** | 100.0% |

Source: HNTB analysis.

**Terminal Building Utilities**

Water is provided to the terminal by a 6 inch line which branches off the 12 inch Camp Keyes pumping station main. It runs along Winthrop Street and the airport access road.

The waste water sewer is gravity feed system that runs down the airport access road to Western Avenue.

Electric service to the airport is provided by the Central Maine Power company. The airport lighting system is not equipped with a back-up generator in the event of power failure.

For both levels of the terminal building layout see **Figure 2-19**.

**Level One**

The first level of the terminal provides essential facilities for departing and arriving air passengers. This includes an airline ticket counter, rental car counter, and inbound and outbound baggage. There is also a restaurant (Thai Lanna) at the south end of the terminal. The Greyhound/ Vermont Transit bus line office is also located in the terminal providing some intermodal transfer possibilities.

The Transportation Security Administration (TSA) security screening area is located on the first floor, which includes a small processing area and sterile hold room for passengers waiting to board the plane. A sterile area is any area beyond the passenger screening checkpoint, but inside the terminal area. AUG does not have any designated Security Identification Areas (SIDA).s

**Level Two**

The second floor of the terminal building houses the Airport Manager's office, TSA offices, FAA radio room, the Professional Engineers Licensure Board, the administration break room, and some storage area.

**Fixed Base Operator**

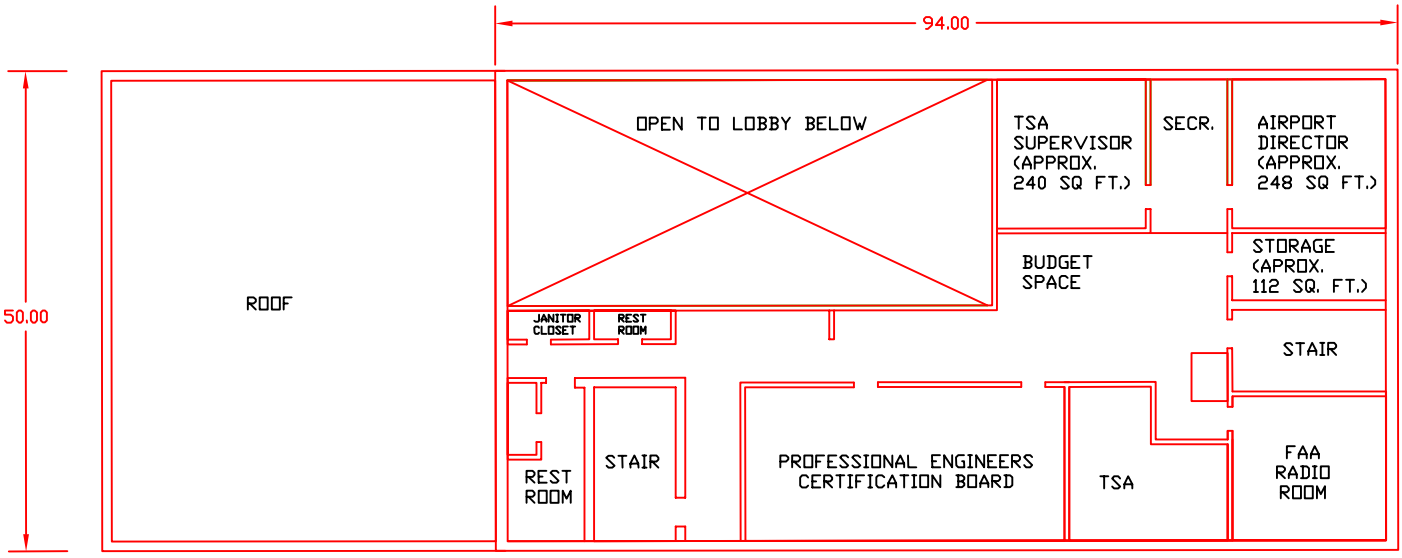
MIF is the original and sole FBO at AUG (since 1946). They are a full service FBO offering fuel, charter service with single/multi engine aircraft, rental aircraft, aircraft sales, flight instruction, aircraft storage, major airframe repair/maintenance, pilot rest area, courtesy cars, catering, two conference rooms, internet access, and more.

MIF occupies five buildings on the Airport: an office and hangar building located northeast of the terminal building with approximately 4,400 square feet of office space and 6,800 square feet of hangar space; a maintenance hangar just east of their main building with 6,400 square feet of shop/ repair space; and, three T-hangar building as detailed below. Note, MIF owns four of the aforementioned buildings on leased property except for the main office and hangar building which is leased from the airport.

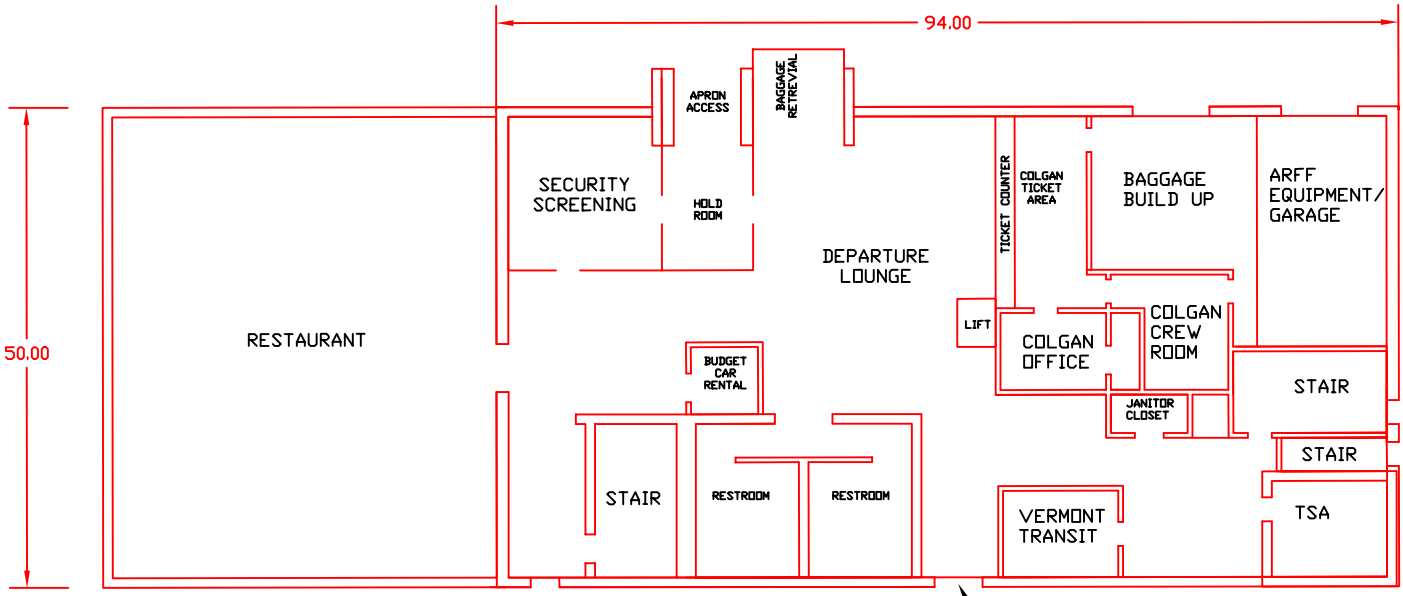
See **Table 2.8** for a listing of all services offered at AUG by MIF.

**T-Hangars**

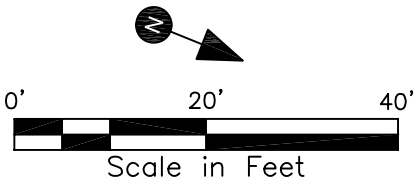
There are four different hangars owned by MIF located northeast of their main office building. The old T-hangars have sliding




SECOND FLOOR PLAN




FIRST FLOOR PLAN




| | | | |
|---|---|---|---|
| | HNTB | Terminal Layout | DATE: 12/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure: 2-19 |

P:_Projects\38673 Augusta MP\Plans\terminal floor plan.dwg Layout3 Dec 28, 2006 - 2:05pm

Table 2.8

**Types of FBO Services Offered**

| Services | Discussion |
|---|---|
| Fuel - 100LL | No 100LL Fueler, just self-service fuel farm. |
| Fuel - Jet-A | Jet A Truck. |
| APU | Used for re-starts only. |
| Heat | |
| Hangars | 24 T-hangars, plus heated general hangar capable of housing small jets. |
| Catering | Full service catering. |
| Concierge | |
| Rental - Aircraft | Beechcraft Sports, Cessna Skyhawk, Beech Sierra and Baron. |
| Charter - Single Engine | Cessna Skyhawk and Beech Sierra available. |
| Charter Multi-Engine | 3 Beech Barons. |
| Visiting Rooms | Place for passengers to meet in privacy. |
| Aircraft Maintenance | Major and minor airframe repair. |
| Aircraft Sales | |
| Flight Instruction | Recreational Pilot through ATP Rating. |
| Pilot Service | |
| Weather Computer | Internet access computer. |
| Quiet Rooms | Available to pilots for rest, quiet area. |
| Conference Rooms | Available to rent to general public. |
| Courtesy cars | Available to pilots to borrow. |

Source: Maine Instruent Flight.

doors, the new T-hangars have bi-fold doors, the general hangar (heat upon request), and the maintenance hangar (heated); however, its use is highly restricted due to space availability. The three T-hangars provide 25 aircraft storage positions. These buildings are currently full of tenants, and according to the FBO, there is a waiting list of up to six people. There is a lack of ramp space for itinerant/based aircraft, and little available land for expansion. The terminal layout will be analyzed later in the Alternatives Chapter.

**Maine Wing Civil Air Patrol**

The Maine Wing Civil Air Patrol leases a 3,600 square feet building, which is located at the far northeast corner of the GA area. The Maine Wing Civil Air Patrol is Maine's civilian auxiliary of the United States Air Force. They are a volunteer-based organization that provides air search and rescue, disaster relief, homeland security, and education programs for youth and the general public.

**MaineDOT Airfield Maintenance**

The Maine Department of Transportation owns the maintenance building used for equipment maintenance and storage of airfield maintenance equipment. The building is approximately 3,260 square feet and is located just east of the MIF maintenance building. The building is in "fair" condition.

One of the two stalls in this building is used to store the Airport Rescue and Firefighting (ARFF) vehicle.

**Snow Removal Equipment Building**

The MaineDOT owns the Snow Removal Equipment (SRE) storage building on the west side of Runway 17-35. It is a relatively new facility and is in excellent condition. It has four bays that can accommodate two vehicles each. Three of these are occupied by plows/ blowers and spreaders. The fourth bay has a heated sand storage stall which takes up a good portion of the bay. A list of equipment used for Airport maintenance and other Airport tasks is shown on **Table 2.9.**

**Fuel Storage and Distribution**

MIF leases and operates three State-owned 15,000-gallon Underground Storage Tanks (UST) situated on the north-northwest side of their main office building. All of these tanks are compliant with NFPA and EPA regulations. They provide both JetA (with fuel truck and at the pump) and Avgas (at the pump only) to Airport users. As reported by the FBO, the existing fuel storage is adequate. During peak activity at AUG their fuel supply will last approximately one week. On average, they must refresh their fuel supplies every four weeks for the remainder of the year.

A tabular inventory of the existing fuel facilities is located in **Table 2.10**.

**Seaplane Base**

Augusta also has a seaplane base (Identifier M00) on the Kennebec River, just South of the Memorial bridge. It should be noted that it's location is incorrectly depicted on the FAA sectional chart. For the actual location in relation to AUG and the airspace

Table 2.9

**Existing Snow Removal Equipment**

| Year Of Manufacture | Item | Model |
|---|---|---|
| 1992 | Chevrolet 1/2ton PU | CK10903 |
| 1992 | International | Dump Truck TK |
| 1990 | International | Dump Truck 2554 |
| 1977 | SMI Snowblower | 5000 |
| 1975 | John Deere Tractor | JD301A |
| 1991 | Volvo 9yd Loader | L160 |
| 1984 | John Deere Loader | 644C |
| 1993 | John Deere Tractor | 5200 |
| 1993 | Flail Mower | 390 |
| 1975 | Mott Flail Mower | 88 |
| 1993 | John Deere Backhoe Attachment Model | n/a |
| 1999 | Lazer Mark Z Riding Mower | LHP4818KC |
| 1971 | Allis Chalmers Forklift | n/a |
| 1966 | Gallion Grader | 104H |
| 1996 | Echo Weedwacker | SRM2110 |
| | Husqvarna Chainsaw | 23 |
| 1999 | JD Power Broom | PB270 |
| 2002 | Volvo Truck | VHD42F |
| 2003 | Kodiak Snowblower | CR4.5D |
| 2004 | Chevrolet | Silverado |

Source: Airport Manager.

Table 2.10

**Existing Fuel System/s**

| Item | Location | Above- / Underground | No. of Tanks | Total Capacity (Gallons) |
|---|---|---|---|---|
| Jet-A Storage | North of Terminal Building | Underground | 1 | 15,000 |
| AvGas | North of Terminal Building | Underground | 1 | 15,000 |
| Spare Tank | North of Terminal Building | Underground | 1 | 15,000 |
| Heating Oil Storage | Terminal Building | Underground | 1 | 2,500 |
| Diesel Fuel Tank | Old SRE Building | Underground | 1 | 2,500 |
| Propane | SRE | Above-ground | 2 | 2,000 |

Source: Airport Management.

environment see the corrected aeronautical sectional chart, Figure 2-6. The seaplane base has one sealane 13W-31W. It is 2,500 feet long by 100 feet wide. The sealane is poorly marked with an irregularly shaped channel. It has no control tower or manned facilities and is only suitable for daytime use. It receives approximately 30 operations per year, 100 percent of which are itinerant (2006). Aircraft must taxi north of the Memorial bridge to reach the docks serving the seaplane base. They are removed during the winter months (October to May). The river is reported to have a tidal fluctuation of four feet.

## 2.4 LANDSIDE FACILITIES

Landside facilities refer to any airport-supporting element outside of the security fence and the function they serve in the context of the airport.

### 2.4.1 Parking Lots

The auto parking areas are located in proximity to the terminal building and MIF area. There are four individual lots which provide a total of 166 spaces; however, the largest lot is located across the street on a blind curve which should be reviewed for safety issues. For more information on the location and capacity of each lot see **Table 2.11** and Figure 2-3.

### 2.4.2 ARFF

Airports certified under FAR Part 139 (Certification and Operations: Land Airports Serving Certain Air Carriers) must comply with specific ARFF operational requirements. The two primary considerations in determining compliance are response time requirements and equipment and agent requirements. These criteria were developed through research conducted by the FAA and the International Civil Aviation Organization (ICAO) Rescue and Firefighting Panel. Five airport classes, referred to as indices, and their corresponding ARFF equipment requirements were identified in this research. The applicable airport index is determined by the length of the longest aircraft operated by a passenger air carrier performing an average of five scheduled departures per day (computed on an annual basis). The table below identifies the five ARFF indices and details the specific requirements for an airport to meet each index.

AUG is currently served by a Beechcraft 1900 (19 seats and 4 departures a day) with a length of 57 feet and 10 inches. AUG is classified as an Index A Airport. Currently, AUG is not required to have ARFF staffed on-airport since the Airport is served by a 19-seat aircraft. If a larger aircraft were to provide scheduled service, more stringent ARFF requirements would need to be followed. This will be addressed in the Alternatives Chapter.

ARFF response is provided by the Augusta Fire Department, which has 42 full-time fire-fighters and medics in three separate stations. Primary and secondary response for AUG is provided by the Central Station located on Grove Street, approximately 1.5 miles from the midpoint of runway 17-35 via the MIF gate. The Augusta Fire department has two Class A pump trucks: a 2006 American Lafrance and a 2004 E-One. They are both capable of pumping 1500 gal/minute and carry 30 gallons of Class B

Table 2.11

**Existing Auto Parking Areas**

| Lot (Location) | Use | Capacity (Spaces) |
|---|---|---|
| Terminal Lot - (Northeast of Terminal building, adjacent to MIF lot) | Short term (15 min) | 5 |
| | Short term (handicap) | 1 |
| | Colgan | 1 |
| | PE Board | 2 |
| | TSA | 1 |
| | FAA | 1 |
| | Airport | 5 |
| | Airport Seasonal | 4 |
| | Budget Rental Car | 3 |
| Terminal Lot Subtotal | | **23** |
| Sattelite Lot - (East of Terminal building on east side of Airport road) | Long-Term Airport ($2/day) | 63 |
| | Thai Restaurant | 9 |
| | Budget Rental Car | 17 |
| Sattelite Lot Subtotal | | **89** |
| Maine Instrument Flight - (West of MIF building) | For MIF customers | **16** |
| South Lot - (South of Terminal on west side of Airport road | Public | 25 |
| | Thai Restaurant | 13 |
| South Lot Subtotal | | **38** |
| **Total Spaces** | | **166** |

Source: Observations, 2006.

foam. On airport there is also a fire suppression trailer and an additional ARFF vehicle (1973 Mack) stored on the Airport in the MaineDOT maintenance garage that can be deployed during an event.

### 2.4.3 National Guard Facility

The Maine Army National Guard owns a number of buildings on State-owned property outside the Airport property near the Airport terminal. The development is referred to as Camp Keyes which is approximately a 20-acre site directly abutting the airport (38 acres total). Guard storage buildings are located south of the Runway 8 end, on the Airport's perimeter road, and National Guard bunkers are located on the perimeter road.

## 2.5 ESSENTIAL AIR SERVICE

EAS is a government program that was enacted to guarantee that small communities, that prior to deregulation were served by certificated airlines, maintain scheduled service. This came in response to The Airline Deregulation Act, passed in 1978, which gave US airlines almost total freedom to determine which markets to serve domestically and what fares to charge.

The United States Department of Transportation (US DOT) currently subsidizes airlines to serve approximately 140 rural communities across the country that otherwise would not receive any scheduled air service. AUG is one of these airports in addition to three additional EAS airports in Maine; Rockland, Bar Harbor, and Presque Isle.

A community is ineligible to receive subsidized essential air service if it is within 70 miles of a medium or large hub, or if its subsidy exceeds $200 per passenger (unless it is more than 210 miles from a medium or large hub).

### 2.5.1 Essential Air Service at AUG

AUG service with Colgan Air was subsidized in the amount of $1,065,475 (paid to Colgan Air) from October 16, 2004 to October 31, 2006 (US DOT). In 2005, there were 4,387 enplaned passengers and approximately 8,774 (enplaned/ deplaned) passengers at AUG (2005 Airline Records). If analyzed by cost per enplaned/ deplaned passenger in 2005, the subsidy of $532,738 would be paying $61 per passenger. This is well below the $200 per passenger subsidy maximum established by the US DOT for EAS routes.

On 8/24/2006 the Augusta EAS subsidy was renewed through to 10/31/2008.

**Essential Air Service Analysis**

| 2005 Subsidy Amount | 2005 Total Passengers | Subsidy per Passenger (2005) | Breaking point >$200/passenger |
|---|---|---|---|
| $532,738 | 8,774 | $61 | 2,664 |

Source: FAA records and HNTB analysis.

Based on the existing annual subsidy of $532,738, the total number of passengers at AUG must stay above 2,664 passengers per year to remain eligible for EAS (as stated by the USDOT) subsidy of $200 per passenger. This equates to an average monthly minimum of 111 enplaned passengers and four departing passengers per day.

The other pertinent factor regarding EAS at AUG is its distance from a medium or large-hub airport. The recognized distance for AUG in the context of EAS is 68 miles (See

the FAA proximity analysis from 2003). This is not the actual distance from AUG to PWM, but is instead the distance from PWM to a point between Augusta and Waterville. This was accepted by the FAA after many negotiations between the FAA, the State of Maine, and Augusta City government.

It should be noted that AUG is not the only airport below the 70-mile mark. As summarized in the Subsidized EAS Communities and Distances to Nearest Hub/Jet Service analysis, there are eight communities less than 70 miles from a medium or large-hub airport (see the table below). None of these communities are a state's capital, like Augusta.

The EAS subsidy to Augusta/Waterville was again approved in October of 2006 through October 2008.

**EAS Communities <70 Miles from Nearest Hub**

| | EAS Community | Nearest Med-Large Hub | Miles |
|---|---|---|---|
| 1 | Rutland, VT | Burlington Int'l, VT | 69 |
| 2 | Augusta/Waterville, ME | Portland Int'l Jetport , Maine | 68 |
| 3 | Watertown, NY | Syracuse-Hancock Int'l, NY | 65 |
| 4 | Muscle Shoals, AL | Huntsville-Madison County Int'l, AL | 60 |
| 5 | Hot Springs, AR | Adams Field, Little Rock, AR | 53 |
| 6 | Pueblo, CO | Peterson Field, Colorado Springs, CO | 43 |
| 7 | Kamuela, HI | Keyhole Airport, Kailua Kona, HI | 39 |
| 8 | Hana, HI | Kahului, Maui, HI | 32 |

Source: Subsidized EAS Communities and Distances to Nearest Hub/Jet Service (Updated 10/2003).

## 2.6 SOCIOECONOMIC DATA

Passenger demand is ultimately determined by the strength of the economy in the service area and the cost of available services (fares). Consequently, a clear understanding of three basic factors is required to understand the demographics and local economy of AUG. Those factors are population, per capita income, and employment statistics.

The service area for AUG was identified in the Maine Aviation Systems Plan Update (MASPU) as any area within a 30-minute drive, which equates to 2,115 square miles reaching a potential population of 357,000. This area is a good measure of the market served, but exceeds the specific geographical limits of the available data. Data is only available at several levels, for the City of Augusta, Kennebec County, and the State of Maine, but not by the service area defined in the MASPU. For the purpose of this study, we will use Kennebec County as the service area for AUG.

The socioeconomic data was collected from the Maine County Economic Forecast, the Augusta Comprehensive Plan (2006), the Maine Housing Forecast, and the US Census.

Population is the first of three key socioeconomic variables that are examined when determining the potential number of travelers that could use an airport. Population and housing unit figures of Augusta, Kennebec County, the State of

Maine, and the United States are tabulated in **Table 2.12.**

The Population and Demographics Inventory of the Augusta Comprehensive Plan noted that the population of Augusta had peaked at 22,000 residents in 1970 and has been decreasing from 1970 to 2005 to the current population of 18,560. The Population and Demographics Summary in the Augusta Comprehensive Plan, however, projects that Augusta population will increase through 2015 by 2.1 percent driven by an expanding household and group quarters population. The Kennebec County population for the same time period is projected to increase by four percent and the State of Maine by seven percent. Compared to the national population trend which is projected to increase 16 percent, this indicates comparatively slow growth in Augusta, Kennebec, and Maine.

Another gauge of the regional population is indicated in the MASPU, which defines the market area for AUG as any area within a 30-minute drive of the Airport. While these market areas overlap, it is still a reasonable indicator of the potential market within reach of the Airport and how Augusta's market compares to the rest of Maine. As shown in the table of the top 10 populations served, Augusta has the fifth largest potential market, but ranks sixth out of the six scheduled service airports in enplaned passengers. This is a strong indicator that the proximity and potential market of an airport are obviously overruled by other factors. People in Maine and in the United States are willing to drive a significant distance for a cheaper fare and better connection.

The second key socioeconomic factor critical to determining the potential number of travelers that could use an airport is the per capita income and personal income. Wealthier populations have a higher propensity to travel by air. **Table 2.13** compares income and other socioeconomic indicators useful for profiling a community for Augusta, Kennebec County, the State of Maine, and the nation. Selected comparisons are as follows:

- Per capita income in Kennebec County is 5.4 percent below the Maine average and 16.5 percent below the national average.

- Per capita income in Augusta is approximately 12.7 percent lower than the National Average, but 3.3 percent higher than Kennebec County. While Kennebec is the defined service area, this indicator within the service area shows a slightly more affluent population in the Augusta vicinity.

Table 2.12

**Socioeconomic Trends**

**Population**

| Year | City of Augusta (1) | Kennebec County (2) | State of Maine (2) | United States (4) |
|---|---|---|---|---|
| 2000 | 18,000 | 117,226 | 1,277,393 | 281,421,906 |
| 2005 | 18,227 | 120,645 | 1,317,253 | 296,468,313 |
| 2010 | 18,406 | 123,595 | 1,363,966 | 311,034,645 |
| 2015 | 18,612 | 124,780 | 1,389,732 | 326,491,564 |
| 2020 | 18,818 | 125,966 | 1,415,497 | 342,544,203 |
| % Change (2005 - 2020) | 3% | 4% | 7% | 16% |

**Number of Housing Units**

| | City of Augusta (3) | Kennebec County (3) | State of Maine (3) | |
|---|---|---|---|---|
| 2000 | 9,117 | 49,562 | 530,221 | - |
| 2005 | 8,888 | 50,784 | 550,780 | - |
| 2010 | 8,731 | 52,523 | 577,842 | - |
| 2015 | 8,873 | 54,462 | 603,086 | - |
| 2020 | 9,015 | 56,401 | 629,110 | - |
| % Change (2005 - 2020) | 1% | 11% | 14% | - |

Notes:
(1) Maine County Economic Forecast, Maine State Planning Office, September 2005. Interpolated for 2015. 2004 values are used for 2005.
(2) Population & Demographics, Augusta Comprehensive Plan, 2006. Interpolated for 2010 and extrapolated to 2020.
(3) Maine Housing Unit Forecast by Town to 2015, Maine State Planning Office, October 2003. Extrapolated to 2020.
(4) US Census.

**Population Served**

| | City | Airport | Polulation Served |
|---|---|---|---|
| 1 | Portland | Portland International Airport | 614,679 |
| 2 | Biddeford | Biddeford Municipal Airport | 541,552 |
| 3 | Sanford | Sanford Municipal | 481,925 |
| 4 | Auburn | Auburn - Lewiston Municipal | 439,422 |
| 5 | Augusta | Augusta State Airport | 357,227 |
| 6 | Oxford | Oxford County Regional | 200,298 |
| 7 | Waterville | Waterville Robert Lafleur | 165,929 |
| 8 | Bangor | Bangor International | 146,945 |
| 9 | Wiscasset | Wiscasset | 133,090 |
| 10 | Old Town | Dewitt Field | 129,767 |

Source: Maine Aviation Systems Plan Update.

Table 2.13

**Socioeconomics of Augusta, Kennebec County, and Maine**

| | Augusta | Kennebec County | Maine | United States |
|---|---|---|---|---|
| **Median age** | | | | |
| 2000 Census | 40.3 years | 38.7 years | 38.6 years | 35.3 years |
| | | | | |
| **Households** | | | | |
| 2000 Census | | | | |
| Households | 8,565 | 47,683 | 518,200 | 115,904,641 |
| Average household size | 2.1 | 2.38 | 2.39 | 2.59 |
| Average family size | 2.77 | 2.89 | 2.9 | 3.14 |
| | | | | |
| **Income** (1999 dollars) | | | | |
| 2000 Census | | | | |
| Median household income | $29,921 | $36,498 | $37,240 | $41,994 |
| Median family income | $42,230 | $43,814 | $45,179 | $50,046 |
| Per capita income | $19,145 | $18,520 | $19,533 | $21,587 |
| | | | | |
| **Educational attainment** | | | | |
| **25 years or older** | | | | |
| 2000 Census | | | | |
| High school graduate | 82.00% | 85.20% | 85.40% | 80.4% |
| College degree | 22.00% | 20.70% | 22.90% | 24.4% |

Source: City of Augusta Economic and Community Development Department; from 2000 Census.

See **Table 2.14** for an overview of employment industry distribution in Kennebec County. The dominant employment sectors in the county are in the services industry (20 percent), public administration (16.2 percent), and retail (14.7 percent).

In summary the population, income, and employment statistics for Kennebec County and Augusta are a slightly depressed market and behind the growth curve of the country. The Augusta market is certainly capable of yielding more passenger activity at AUG, but is losing many of its passengers to neighboring airports, such as Portland and Bangor which have lower fares, more destinations, and greater frequency of flights.

### 2.6.1 Airport User Profile

According to records kept by the FBO and Airport management, the primary user of AUG is the business traveler, coming to the region for one to two days on average (Colgan). They arrive primarily via scheduled service, but also by charter service. This is indicated in **Table 2.15** which breaks out categories of airport use. The secondary user of the Airport would fall into the GA category, using the Airport for getting flight instruction, personal transport, and aircraft rental. Military also utilize the airfield for occasional transport of National Guard personnel and supplies. The civil air patrol and Emergency/Medivac use the Airport for emergency transport to medical centers in New England and for search and rescue missions.

## 2.7 LAND USE CONTROLS SURROUNDING AUG

The City of Augusta Revised Code of Ordinances, as codified on November 21, 2005, incorporates a number of ordinances such as general provisions, city and community services, emergency management, public safety, and motor vehicles. Appendix A of the Ordinances is the Land Use Ordinance. The Land Use Ordinance contains zoning, subdivision and site plan review, performance standards, appeals processes, noise and airport noise contours, and freshwater wetlands. For an off-Airport land use map see Sheet 8 (upon receipt of data) in the plan set at the end of this document.

There are three general types of zoning districts:

- Urban Growth Area: Contains residential, capital-commerce, civic center, business and industrial, planned development, and government services districts.

- Rural Performance District: Contains rural river, rural residential, and rural ponds districts.

- Overlay Districts: Contains shore land, highway overlay, capital view, historic, and resource conservation and use districts.

A number of the Ordinances pertain specifically to the Airport:

- Chapter 6, Article 6 establishes the eight-member Airport Advisory Committee.

Table 2.14

**Industry Distribution for Kennebec County 2004**

| Industry Group | Establishments | Employees | Percentage |
|---|---|---|---|
| Health Care and Social Assistance | 466 | 11,200 | 19.6% |
| Public Administration | 183 | 9,261 | 16.2% |
| Retail Trade (44 & 45) | 528 | 8,436 | 14.7% |
| Education Services | 89 | 5,558 | 9.7% |
| Accommodation and Food Services | 254 | 3,983 | 7.0% |
| Wholesale Trade | 143 | 2,838 | 5.0% |
| Manufacturing (31-33) | 114 | 2,621 | 4.6% |
| Construction | 431 | 2,523 | 4.4% |
| Professional, Scientific & Technical Svc | 319 | 1,774 | 3.1% |
| Other Services (except Public Admin.) | 333 | 1,687 | 2.9% |
| Admin., Support, Waste Mgmt, Remediation | 160 | 1,462 | 2.6% |
| Finance and Insurance | 167 | 1,204 | 2.1% |
| Transportation and Warehousing (48 & 49) | 82 | 1,112 | 1.9% |
| Management of Companies and Enterprises | 22 | 867 | 1.5% |
| Information | 51 | 836 | 1.5% |
| Arts, Entertainment, and Recreation | 55 | 742 | 1.3% |
| Real Estate and Rental and Leasing | 107 | 571 | 1.0% |
| Agriculture, Forestry, Fishing & Hunting | 35 | 306 | 0.5% |
| Utilities | 18 | 289 | 0.5% |
| **Total** | **3,557** | **57,270** | **100%** |

Sources: Maine Department of Labor and Labor Market Information Services.

Table 2.15

**Existing Airport User Profile**

| Types Of Use | Percentage of each use | If Main Purpose is to arrive at AUG (typical origin points?) | If Main Purpose is to Depart from AUG (typical destination points?) |
|---|---|---|---|
| Charter | 21% | Bangor, Portland, Presque Isle, Rockland, 57B, Caribou, Boston, Teterboro, White Plains, New York-LaGuardia, New York-Kennedy, Newark, Bedford | Bangor, Portland, Presque Isle, Rockland, 57B, Caribou, Boston, Teterboro, White Plains, New York-LaGuardia, New York-Kennedy, Newark, Bedford |
| Business | 17% | Teterboro, New York-Kennedy, Boston, Presque Isle, Frenchville, Bangor | Teterboro, New York-Kennedy, Boston, Presque Isle |
| Scheduled Service | 17% | | Boston, Rockland |
| Flight Instruction | 13% | | PWM, BGR, WVL, LEW, BGR, RKD |
| Personal | 8% | | |
| Camps | 4% | | |
| Emergency / Medivac | 4% | Boston, Auburn-Lewiston, Portland | Boston |
| Military | 4% | Bangor | Bangor |
| Political | 4% | | |
| Rental | 4% | Bar Harbor, Auburn-Lewiston, Rockland, Manchester | Bar Harbor, Auburn-Lewiston, Rockland, Manchester |
| Schools | 4% | | |
| Total | 100% | | |

Source: Adjusted by HNTB from Maine Instrument Flight input.

- Appendix A-C contains an Airport Noise Contour Map.

- Section 5.1.15.1 of Chapter 5 in Appendix A contain performance standards pertaining to noise levels. It provides that "any development within the 60 DNL noise contours of the Augusta State Airport shall submit a copy of an 'intent to build' letter submitted to the Augusta State Airport. Applications for development within the 60 DNL noise contour shall also attach any written comments from the authorities of the Augusta State Airport."

- Section 3.4.3, Aviation Clearances, requires that "no part of any new structure, planting, etc." shall protrude to an extent to "interfere with aviation requirements of the Augusta State Airport…," as determined by the FAA, based on plans on file. The Section also requires submitting a copy of an intent to build letter with the Airport Manager.

Parcel use and zoning districts are found on the online information available from the Assessors Department. The Airport is bordered by Western Avenue to the south, Blaine Avenue, Winthrop Street, and the Kennebec River to the east; the Kennebec River and I-95 to the north; and Winthrop Road to the west.

In general, land uses around the Airport are as follows:

- South: Commercial (shopping mall and restaurants)

- East to Northeast: Maine National Guard, cemeteries, City Water District, and developable land.

- North: Industrial, single-family, and residential.

- West to Southwest: warehouse, vacant land, single-family residential, and multi-family condominiums.

- Southwest to South: Health offices, transport, restaurant, and armory.

In general, City zoning districts around the Airport are as follows:

- South: Regional Business.

- East to Northeast: Local business, medium-density residential, government services, and rural residential.

- North: Limited residential.

- West to Southwest: Rural residential, low-density residential, and regional business.

## 2.8 ENVIRONMENTAL OVERVIEW

This section provides an overview of the existing environmental conditions at AUG as indicated in **Figure 2-20,** the environmental study area. Each of these categories are analyzed to assess the potential environmental impacts that will need to be considered in the implementation of future projects.

### 2.8.1 Geology

Geology data were obtained from MGS geologic maps, the Maine Office of

Figure 2-20

Study Area
Augusta State Airport
Augusta, ME

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Geographical Information Systems (GIS) website, the Augusta Comprehensive Plan Update, and the Maine Geological Survey website.

**Bedrock Geology**

The bedrock underlying the Augusta area is composed of Ordovician to Silurian age marine sandstones and slate with areas of igneous intrusions. Bedrock outcrops are found at several locations east of Runway 17-35.

**Surficial Geology**

Much of the Airport is underlain by sand and gravel deposited as glacio-marine deltas during the retreat of the Wisconsin ice sheet. The northern portion of the property is underlain by Presumscot formation deposits where areas of sand and gravel deposited as glacio-marine fans were overlain by silt, clay, and sand. An area of glacial till – loose to very compact, poorly sorted sands, silts, and clay – abuts Airport property to the northeast.

### 2.8.2 Topography

Topography data were obtained from the Maine Office of GIS website and the Airport's ALP. The Airport is located atop a topographic high northwest of the downtown section of Augusta as shown in **Figure 2-21**. Elevations at the Airport range from approximately 90 feet National Geodetic Vertical Datum (NGVD) in the northern portion of the property to a high of approximately 350 feet NGVD in the southern portion. The topography in the central portion of the Airport is generally flat, sloping away moderately to the west and north and more steeply to the south and east.

### 2.8.3 Soils

Soil data were obtained from the Maine Office of GIS website, the Augusta Comprehensive Plan Update, and the Kennebec County soils survey (USDA, 19768). The soils map, **Figure 2-22** for the area underlying the Airport lists the predominant soil type as Hinckley gravelly, sandy, loam and Hartland very fine, sandy loam. Hinckley soils are described as deep, moderately textured soils that formed in areas of glacial outwash with slopes varying from 3 to 30 percent. Depths to bedrock generally exceed five feet, and water table depths exceed six feet. They are excessively drained with a permeability of greater than six inches per hour. Hartland soils are described as deep moderately well-drained soils that formed on marine or lacustrine sand and silt, with slopes of 8 to 15 percent. Depths to bedrock generally exceed five feet, and water table depths exceed six feet. Hartland soils have moderate to moderately slow permeability in the range of 0.6 to 2.0 inches per hour.

Hartland very fine sandy loam with 8 to 15 percent slopes (soil map symbol HfC) and Hinckley gravelly sandy loam with slopes of three to eight percent (soil map symbol HkB) have been designated as "farmlands of statewide significance."

Due to the alteration of the local surficial deposits during the construction of the Airport, portions of the land beneath the Airport are referred to as "made land."

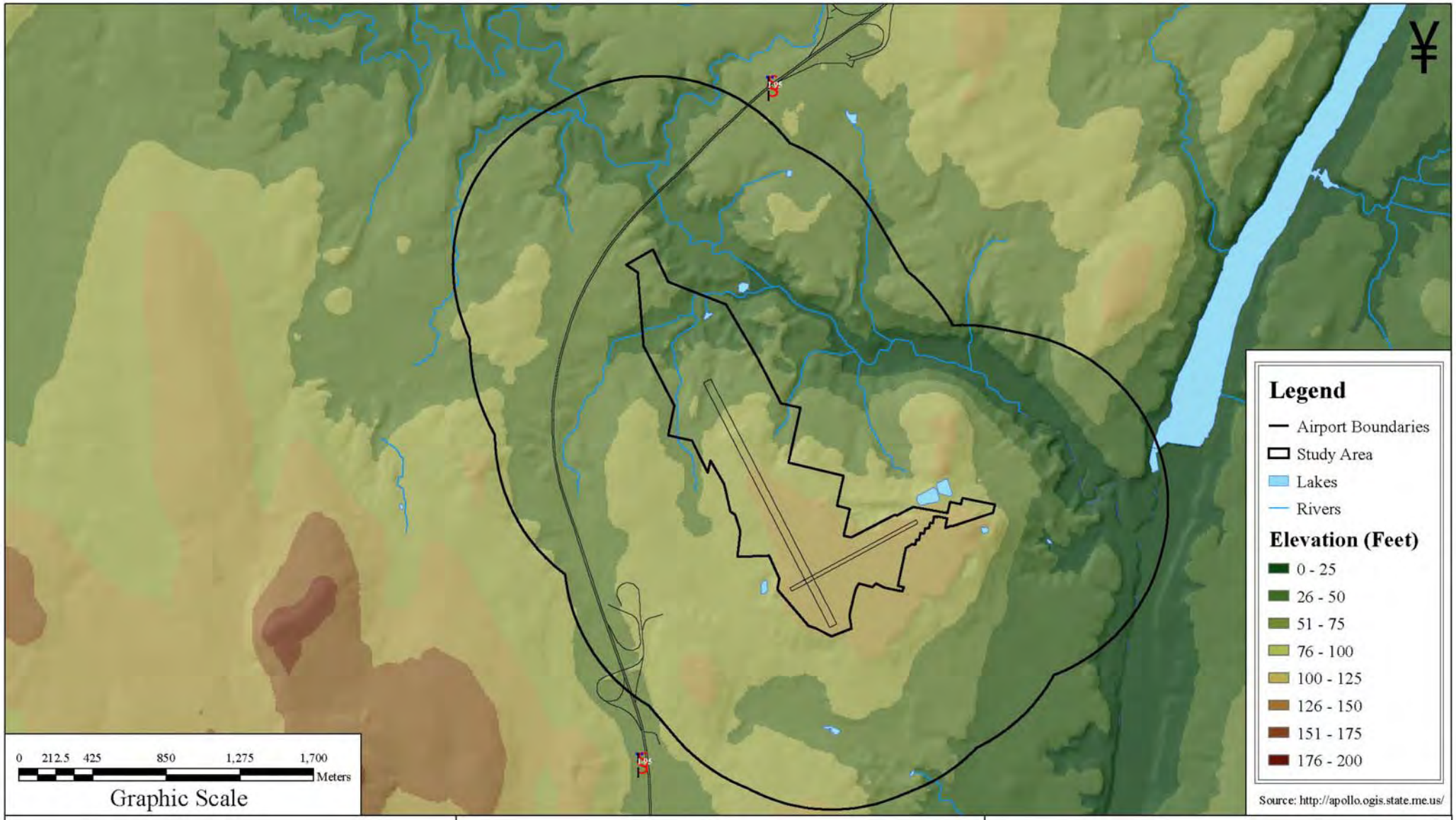


Figure 2-21

Topography
Augusta State Airport
Augusta, ME

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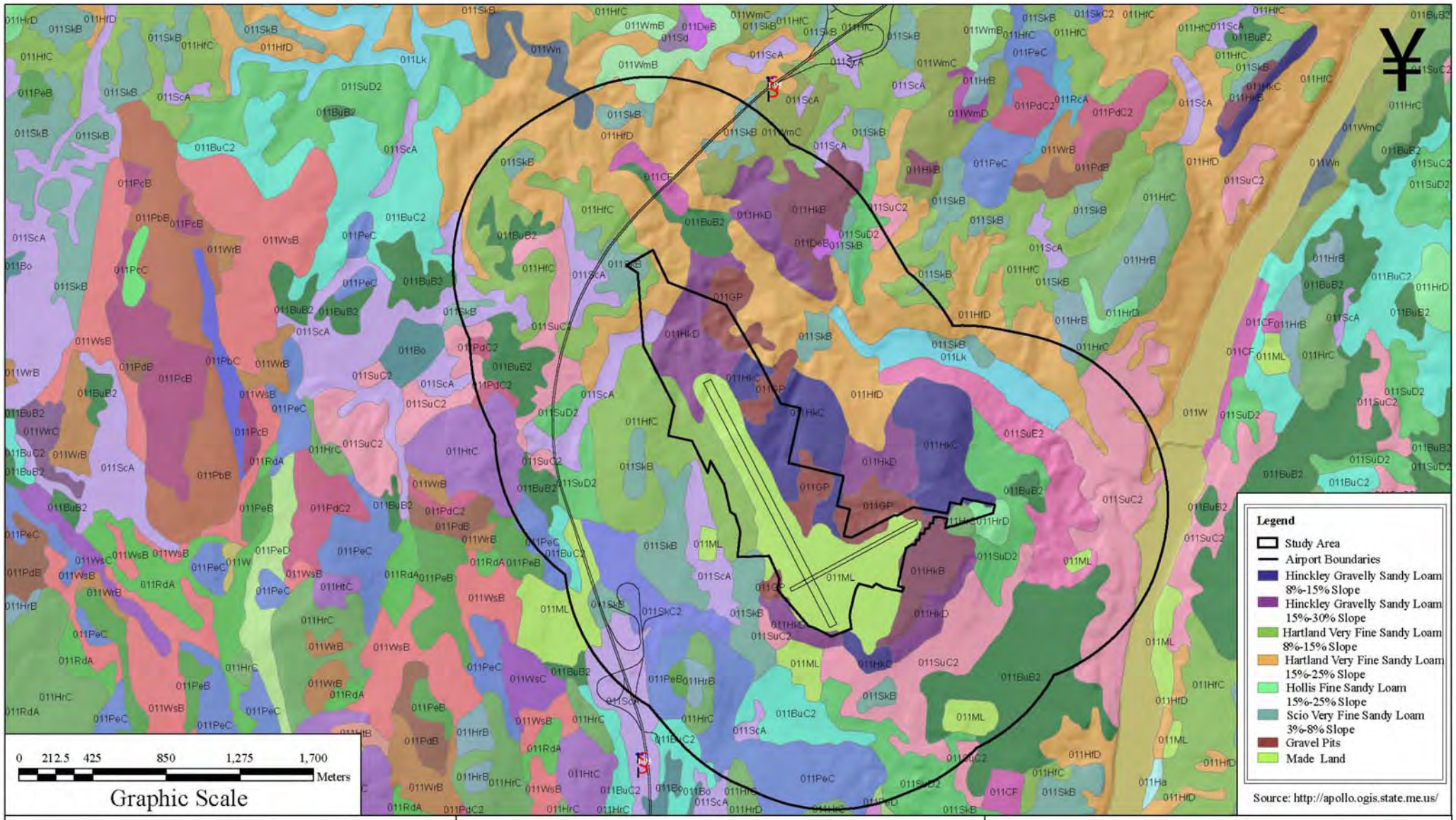


Figure 2-22

Soils
Augusta State Airport
Augusta, ME

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### 2.8.4 Water Resources

Water resource data was obtained from the DEP website, the Maine Office of GIS website, and the Augusta Comprehensive Plan Update **(Figure 2-23)**.

**Surface Water**

The dominant drainage feature in the Augusta area is the Kennebec River which flows from north to south through the region. The dominant local drainage feature is Bond Brook, located north/northeast of the Airport which flows from northwest to southeast to its confluence with the Kennebec River approximately 0.2 miles east of the Airport. The Bond Brook Watershed drains approximately two-thirds of the west side of Augusta.

Drainage from the Airport is essentially radial. Flows from the western and northern portions of the property drain to two unnamed tributaries of Bond Brook that flow along the western side of the Airport, then northeasterly through the northern portion of the property where they join before discharging to Bond Brook. Two additional unnamed tributaries collect drainage from the east and northeast portion of the Airport and discharge to Bond Brook. The drainage from the southwestern corner, southern and southeastern portions of the Airport is radial through the commercial and the residential section of Augusta and likely does not contribute flow to Bond Brook.

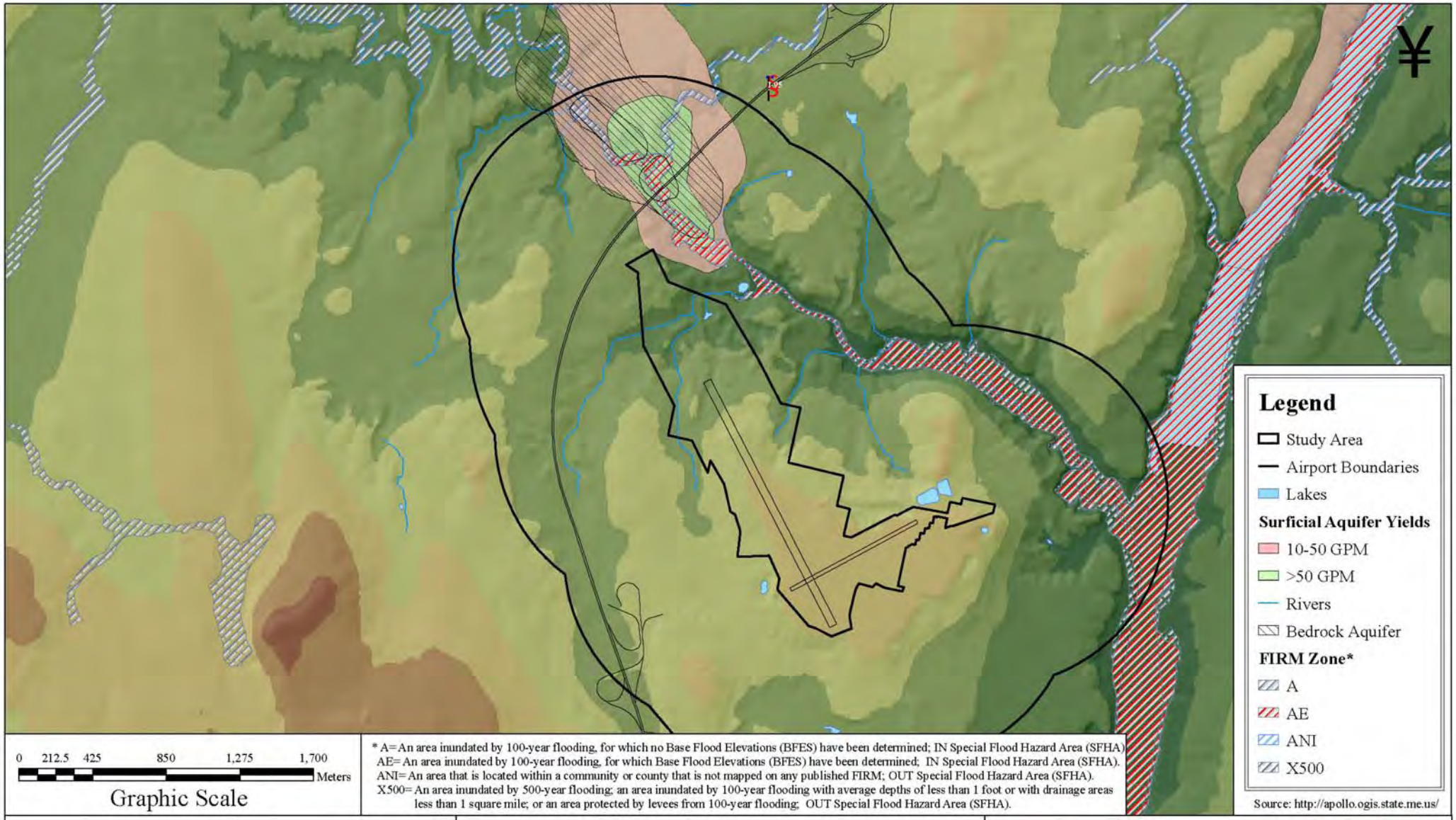
**Groundwater**

There are no mapped aquifers on the Airport property. The Bond Brook Aquifer is located just north of the property, hydraulically up gradient of the active portions of the facility. Depths to bedrock in that area are in the range of 20 to 30 feet. The range of yields from the Bond Brook aquifer is from 10 to >50 gallons per minute (gpm). Mapping prepared by the MGS identifies three drinking water wells in the area with yields of 600-700 gpm. No data were found regarding local groundwater quality or private use of groundwater in proximity to the Airport.

**Potential Contaminant Sources**

Several potential sources of groundwater and/or surface water contamination were identified and include:

- Urban runoff from impervious surfaces at the Airport that may contain petroleum hydrocarbons, nitrates/ nitrites, and heavy metals;
- Propylene glycol that is applied to aircraft as deicing fluid;
- Hydrocarbon compounds accidentally released during the fueling and/or maintenance of aircraft or ground service vehicles; and,
- Accidental releases of hydrocarbon compounds from Underground Storage Tanks (UST). The Airport owns five UST as summarized below and in Table 2.10; two 15,000 fuel tanks (holding Jet A and Avgas), one 15,000 gallon, a 2,500-gallon UST used for the storage of #2 heating oil, and a 2,500-gallon tank used to store diesel fuel.




* A= An area inundated by 100-year flooding, for which no Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA)
AE= An area inundated by 100-year flooding, for which Base Flood Elevations (BFES) have been determined; IN Special Flood Hazard Area (SFHA).
ANI= An area that is located within a community or county that is not mapped on any published FIRM; OUT Special Flood Hazard Area (SFHA).
X500= An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding; OUT Special Flood Hazard Area (SFHA).

Source: http://apollo.ogis.state.me.us/

Figure 2-23

Floodplains and Water Resources
Augusta State Airport
Augusta, ME

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**Wild, Scenic, and Recreational Rivers**

No rivers subject to protection under the Federal Wild and Scenic Rivers Program were identified in proximity to the Airport.

**Wetlands**

Data on wetlands for the Airport were obtained from the Maine Office of GIS website, the National Wetland Inventory (NWI) layer, and from wetland boundaries shown on the Airport's ALP **(Figure 2-24)**. Due to the steepness of slopes and excessively drained nature of the local soils, there are few wetlands on or in proximity to the Airport. The NWI mapping shows only one area of wetlands within the Airport's boundaries. This wetland, located near the northwest end of Runway 17/35 is a storm water detention basin that is classified as a palustrine, unconsolidated bottom, semi-permanent, impounded wetland. The ALP shows a small area of wetland in a swale west of the central portion of Runway 17/35, a larger wetland on the east side of Runway 17/35 near the beginning of the Central Maine Power Easement, and another larger wetland associated with a tributary to Bond Brook that crosses the Airport property north of Runway 17/35.

A detailed delineation and functional assessment should be completed for all the wetlands on Airport property, if they have not already been completed, prior to initiating any Airport improvements in those areas.

**Floodplains**

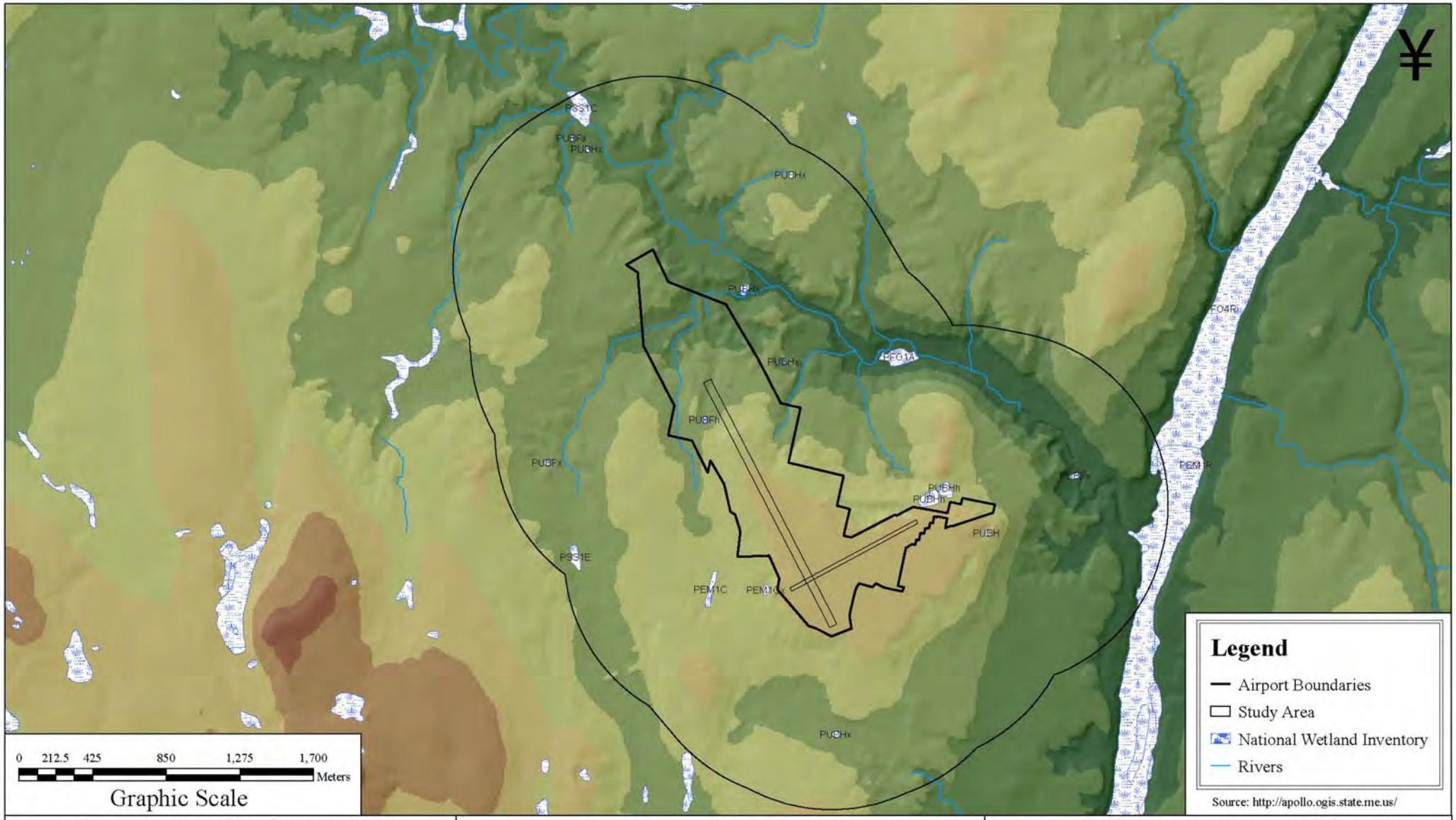
Floodplain data were obtained from the Maine Office of GIS website and is based on flood rate maps prepared for the Federal Emergency Management Agency (FEMA). As a result of the steep slopes adjacent to waterways in proximity to the Airport, floodplains are generally narrow and confined to the areas immediately adjacent to Bond Brook. There are no 100-year floodplains within the boundaries of the Airport.

### 2.8.5 Wildlife

Data regarding wildlife habitat at the Airport were obtained from the Maine Office of GIS website, a review of available aerial imagery, and telephone conversations with the Airport's FBO. Land use along the south-west, south, and southeast portions of the Airport consists primarily of commercial development and residential neighborhoods. Such land use is not generally compatible with wildlife; however, certain small to medium-sized species of mammals such as raccoon (*Procyon lotor*) and skunks (*Mephitis mephitis*) adjust well to living near such areas.

The land use around the northwest, north, and northeast portions of the Airport is basically open, undeveloped land. This area would provide suitable habitat for a broad range of wildlife including larger species such as white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), and coyote (*Canis latrans*) that can present wildlife strike hazards to Airport operations. Avian species such as wild turkeys (*Meleagris gallopavo*) may also be found in this type of habitat.

The open-grassed area of the Airport provide habitat for small mammals such as mice, shrews, and voles, and for certain bird




Source: http://apollo.ogis.state.me.us/

Figure 2-24

Wetlands
Augusta State Airport
Augusta, ME

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species that seek open grasslands to feed and nest. Certain species of raptors, such as kestrels (*Falco sparverius*) also are frequently found feeding at airports.

Wildlife impact hazards are a major concern at airports that abut areas of wildlife habitat. The Airport's FBO has noted the presence of deer at the Airport, and reported at least one incident of seagulls striking a commercial aircraft. Other potential hazardous wildlife includes migrating water fowl, such as Canada geese (*Brantus Canadensis*), which will land in open fields and wetlands to rest and feed.

**Threatened and Endangered Species**

Threatened and endangered species data were obtained from the Maine Office of GIS website and the Augusta Comprehensive Plan Update. There are no mapped deer wintering areas, waterfowl and wading bird habitat, or threatened or endangered plant species in proximity to the Airport. Bond Brook which flows from northwest to southeast just north of the Airport has been identified as a salmon spawning and rearing area. A critical habitat that may support populations of two bird species, the endangered Grass Hopper Sparrow (*Ammodramus savannahrum*), and the threatened Upland Sandpiper (*Bartramia longicauda*) has been identified at the Airport. Both species have been identified at airports throughout the region, and are known to inhabit areas of open grassy expanses where they can find food and suitable nesting locations.

### 2.8.6 Conservation Lands

No lands subject to protection under Section 6(f) of the Federal Land and Water Conservation Fund or Section 4(f) of the US DOT Act were identified in proximity to the Airport.

## 2.9 AIRPORT MANAGEMENT AND FINANCIAL

### 2.9.1 Airport Management Structure

AUG is owned by the State of Maine, which funds the operating and administrative costs of the Airport. The City of Augusta is fully responsible for the management and operation of the Airport. The Airport Manager and staff are City employees that are funded by the State.

Because the City is responsible for the administration portion and the MaineDOT is responsible for the financial portion, a dual-track organization was created with the Augusta City Manager and Director of the MaineDOT-Office of Passenger Transportation (OPT) being at the same level. Planning issues fall under the MaineDOT-OPT; engineering falls under the Airport Management; and Police and Fire Department support the Airport under the City Manager.

### 2.9.2 Financial Data

**Table 2.16** shows detailed information on Airport revenue and expenses for FY 2004–07. Data for 2004 and 2005 are actual, data for 2006 is adopted, and numbers for 2007 are from the City Manager's budget.

Table 2.16

**Airport Revenues and Expenses**

| REVENUES | Actual FY 2004 | Actual FY 2005 | Adopted FY 2006 | Manager FY 2007 |
|---|---|---|---|---|
| Management Fee - State of Maine | $270,957 | $278,727 | $296,800 | $346,880 |
| Commission Income - Tenants | $21,775 | $23,733 | $19,000 | $19,000 |
| Commission Income - Concessions | $457 | $753 | $1,000 | $1,000 |
| Landing Fees - Contract | $11,244 | $8,738 | $10,500 | $10,250 |
| Landing Fees - Contract | $9,967 | $10,931 | $7,000 | $7,000 |
| Miscellaneous | $2,132 | $1,951 | $3,000 | $3,000 |
| Rental Of Rooms | $43,911 | $38,548 | $42,000 | $42,000 |
| Rental of Lands | $2,217 | $0 | $3,600 | $3,600 |
| Fuel Flow Fees | $9,842 | $15,122 | $13,000 | $13,000 |
| Parking Fees | $2,498 | $10,738 | $4,000 | $4,000 |
| Unclassified | $0 | $31,455 | $0 | $0 |
| **Total** | **$375,000** | **$420,696** | **$399,900** | **$449,730** |
| | | | | |
| **EXPENSES** | | | | |
| Salaries - Regular Employees | $154,686 | $139,187 | $147,563 | $177,622 |
| Salaries - Parttime/Temp | $1,986 | $13,037 | $13,464 | $8,900 |
| Overtime | $17,651 | $19,397 | $20,400 | $20,000 |
| Unemployment Insurance | $106 | $334 | $2,411 | $2,132 |
| Workers Compensation | $3,282 | $2,444 | $2,467 | $2,113 |
| Health Benefits | $39,086 | $38,151 | $41,638 | $48,511 |
| Fringe Benefits | $8,232 | $7,781 | $6,291 | $9,246 |
| **Total Wages and Benefits** | **$225,029** | **$220,331** | **$234,234** | **$268,524** |
| | | | | |
| Airfield Maintenance Supvr. | $5,861 | $17,777 | $10,000 | $12,500 |
| Airfield Maintenance - Equipment | $3,472 | $3,975 | $2,500 | $4,000 |
| Airfield Maintenance - Supplies | $4,041 | $7,455 | $6,000 | $4,500 |
| Buildling - Maint. Supplies | $8,022 | $16,137 | $8,500 | $8,000 |
| Print, Binding, Stationery | $0 | $9,518 | $0 | $0 |
| Technical Services | $7,851 | $2,060 | $7,500 | $3,500 |
| Building - Maint. Equipment | $3,408 | $27,748 | $2,000 | $2,000 |
| Building - Maint. Supplies | $17,826 | $2,187 | $22,500 | $25,233 |
| Advertising Services | $4,082 | $15,721 | $3,000 | $2,500 |
| Vehicle - Maint. Supplies | $8,368 | $5,128 | $10,000 | $16,000 |
| Vehicle - Maint. Equipment | $3,890 | $3,042 | $6,000 | $4,000 |
| Vehicle - Maint. Services | $1,109 | $2,547 | $5,000 | $3,000 |
| Office Services | $2,267 | $318 | $2,216 | $2,500 |
| Postage | $267 | $4,152 | $500 | $300 |
| Personnel - Supplies/Serv. | $3,219 | $4,041 | $3,800 | $4,500 |
| Telephone | $3,934 | $18,673 | $4,200 | $4,000 |
| Electricity | $18,998 | $1,579 | $16,200 | $17,785 |
| Water | $1,575 | $6,713 | $4,000 | $2,000 |
| sewer | $6,559 | $1,720 | $10,000 | $12,756 |
| Travel Expense & COnferences | $954 | $635 | $1,500 | $2,000 |
| Training | $0 | $498 | $1,000 | $1,000 |
| Professional Services | 0 | 0 | 0% | 300 |
| **Total Contractural** | **$105,703** | **$151,624** | **$126,416** | **$132,374** |
| | | | | |
| Office Supplies | $665 | $643 | $700 | $800 |
| Printing & Reproduction | $333 | $0 | $300 | $300 |
| Fuel Oil | $8,667 | $6,978 | $8,000 | $12,300 |
| Heating Gas | $12,629 | $9,852 | $9,000 | $11,000 |
| Gasoline, Oil, Lubricant | $3,102 | $8,723 | $5,000 | $9,500 |
| **Total Supplies** | **$25,396** | **$26,196** | **$23,000** | **$33,900** |
| | | | | |
| **Dues & Memberships** | $523 | $245 | $500 | $500 |
| **Licenses** | $500 | $695 | $1,000 | $700 |
| **Property & Casualty** | $11,726 | $7,477 | $7,440 | |
| **Total Fixed Charges** | **$12,749** | **$8,417** | **$8,940** | **$1,200** |
| | | | | |
| IUUAL Principal | $125 | $624 | $1,247 | $1,902 |
| ILLUAL Interest | $4,918 | $4,200 | $4,163 | $4,100 |
| **Total Debt Service** | **$5,043** | **$4,824** | **$5,410** | **$6,002** |
| | | | | |
| **Total Airport** | **$373,920** | **$411,392** | **$398,000** | **$442,000** |

Source: 2007 Budget City of Augusta website.

For the 2004–07 time period:

- Revenue:
  - Increased by 19.93 percent.
  - Largest increase was in commission income – concessions.
- Expenses:
  - Increased by 19 percent.
  - Largest increase was 1,911 percent for unemployment insurance, followed by 348 percent for salaries – part-time/temp.
  - Largest decrease was personnel – supplies.

**Table 2.17** is a listing of existing entities that have leases, rights-of-purchase, or easements rights, etc., at AUG with rates and terms.

## 2.10 SUMMARY OF KEY ISSUES

Although all major aspects of the Airport's facilities and operations will be examined during the master plan process, the focus and direction of the AMPU are driven by several key issues. The following is a summary of some of the key issues for AUG, as identified during the data collection process:

- Correct RSAs to FAA standards.
- Correct runway line-of-sight issue.
- Extend Taxiway C to the end of Runway 17 to eliminate the need to back taxi and mitigate the line-of-sight issue on Runway 17-35.
- Acquire easements or control over RPZs.
- Explore way to provide more apron and T-hangars in the GA area.
- Help stimulate additional passenger activity.
- Improve Terminal Building.
- Need more developable land (with airfield access) to increase revenue opportunities.
- Explore impacts of on-airport ARFF facility (if passenger service is provided by Saab 340).

Table 2.17

**Leases, Licenses, and Easements/Access Rights at AUG**

| Lessor | Lessee | Instrument | Facility Leased | Time Period | Lease Rate | Special Terms |
|---|---|---|---|---|---|---|
| State Of Maine | City Of Augusta | Lease and Option | Augusta State Airport | 12/1/1996 - 11/30/2001<br>Renew for 5 years | Option for City to purchase for $1.00. | Lease all airport property (except for hangars owned by MIF and National Guard building), airport vehicles, roads, utilities, owned by State of Maine.<br>Subject to: Lease agreement between State and MIF dated 1/3/1989 as amended, leases between State and airport tenants, retention of the State "records room" in the SRE building, retention of the State radio shop at the airport, providing State area at the airport to collect fees (if assessed), access by State executive aircraft.<br><br>State to prepare Phase 1 Environmental Audit and City accept conditions therein as an environmental baseline. City then agrees to indemnify State against any claims arising from environmental conditions, oro remediation of environmental conditions.<br><br>Rider "A" specifies City's responsibility for operating the airport. This covers items such as keeping the airport open, airfield lighting, compliance with grant assurances, City support and promotion of the airport, city enforcement of subleases, City staffing, City maintenance, airport closure procedures, and protection of approaches. |

Table 2.17

**Leases, Licenses, and Easements/Access Rights at AUG**

| Lessor | Lessee | Instrument | Facility Leased | Time Period | Lease Rate | Special Terms |
|---|---|---|---|---|---|---|
| State Of Maine | Maine Instrument Flight | Agreement | | 1/1/99-12/31/2010 | 2% commission of gross with a minimum annual guarantee of $12,000 | State has the option to purchase MIF improvements (hangers) at the termination of this agreement. |
| | | | 4,430 Office Space in the FBO Bldg. | | $0.35/ Sq. ft. annually | Rate will increase for calendar years 2007-2010. |
| | | | 6,800 Sq. Ft. Hanger Space in the FBO Bldg. | | $0.24/ Sq. ft. annually | Rate will increase for calendar years 2007-2010. |
| | | | 33,588 Sq. Ft. of land that is occupied by MIF owned structures (Maintenance Hanger, Three T Hangers) | | $0.11/ Sq. ft. annually | Rate will increase for calendar years 2007-2010. |
| | | | Aviation Fuel Storage and Pumping Facility | | $0.07/Gal monthly | Rate will increase for calendar years 2007-2010. |
| | | | 30 Tie Down Positions | | 40% of revenue generated | Rate will increase for calendar years 2007-2010. |
| State Of Maine | Vermont Transit | Agreement | 108 SQ. Ft. of office space on 1st floor of the Terminal Bldg. | 8/1/2003 - 7/1/2008 | 8/1/2003-7/31/2005 -- $150/month<br>8/1/2005-7/31-2008 -- $175/month | Fax and Photocopying facilities are available for an additional fee. |
| Augusta State Airport, City OF Augusta Fire Department, City of Augusta Dispatch, Colgan Air | | Memorandum Of Agreement | | | | |
| State Of Maine | Thai Star II | Agreement | Approximately 1,800 SQ. Ft. in the first floor of the Terminal Bldg. and 21 parking spaces | 1/1/2003 - 12/31/2007 | $500/month and 4% of gross sales | The agreement was transfered to new owners (Siamese Orchid) on 10/11/2005. |
| State Of Maine | Siamese Orchid | Agreement | Approximately 1,800 SQ. Ft. in the first floor of the Terminal Bldg. and 21 parking spaces | 10/11/2005 - 12/31/2007 | $500/month and 4% of gross sales | |
| City OfAugusta | Colgan Air, Inc. | Agreement | | 7/1/2001 - 6/30/2006 | $1,200/ month rent, landing fees of $0.50/1,000 lbs), fuelling $0.08/Gal | |
| State Of Maine | United States Government (TSA) | Lease | Two offices on the second floor of the Terminal Bldg. and a storage room on the first floor. | 11/06/02-11/05/07 | $579.75/month | |
| State Of Maine / City of Augusta | Board Of Professional Engineers | Lease | 532 SQ. Ft. of office space on the second floor of the Terminal Bldg. | 7/1/2005 - 6/30/2006 | $532/ month | Fax and Photocopying facilities are available for an additional fee. |

Table 2.17

**Leases, Licenses, and Easements/Access Rights at AUG**

| Lessor | Lessee | Instrument | Facility Leased | Time Period | Lease Rate | Special Terms |
|---|---|---|---|---|---|---|
| State Of Maine - Office of Passenger Transportation | Chambers Leasing (Budget Rent-A-Car) | Concessionare Agreement | 47 Sq. Ft. of office space on the first floor of the Terminal Bldg. | 4/1/1997-7/1/1997 | $500/month | **Being updated.** |
| Camp Keyes | City Of Augusta | Memorandum | Clear Trees | | | |
| **Grantor** | **Grantee** | **Instrument** | **Area** | **Time Period** | **Lease Rate** | **Special Terms** |
| State | Augusta Water District | R.O.W. | 60' Wide (3,800' long) from west border to east border (Crosses RW 17-35 1,500' south of RW 17 end). | From 12/11/1982 | n/a | n/a |
| State | Augusta Water District | R.O.W. | 60' wide (100' long) across west end of Parcel 6 | From 12/11/1982 | n/a | n/a |
| State | Central Maine Power | Easement Right | 100'-130'-wide area along northwest edge of airport; 100' wide 1,150' north of RW 17 end; south to 650' south of RW 17 end, then 100' wide southeast to airport property, | From 08/07/1981 | n/a | n/a |
| City | State | Fence Maintenance Easement | 1,160' from southeast end of CMP easement to airport property north of RW 26 end. | | n/a | n/a |

Source: MDOT/City of Augusta data and HNTB analysis.

# Chapter Three
# Forecasts

## 3.1 INTRODUCTION

This chapter contains the activity forecasts for AUG. The forecasts will be used to determine facilities requirements for both airside and landside area development. A credible and usable forecast is critical to ensure that the type and size of facilities that are planned are appropriate for future conditions. Consequently, passenger movements, based aircraft, and aircraft operations are all examined. Forecasts are presented for 2010, 2015, and 2025 and are based on the recently approved Maine Aviation Systems Plan.

Section 3.2 presents commercial airline enplanement and operations forecasts. Section 3.3 presents commercial airline operations forecasts. Section 3.4 presents the general aviation activity forecasts (based aircraft and operations). Section 3.5 presents a summary of the forecasts, including military activity. Peak month and peak hour activity forecasts are discussed in Section 3.6. Finally, a comparison between the AUG Master Plan Update forecasts and the 2006 FAA TAF is made in Section 3.7.

## 3.2 COMMERCIAL AIRLINE ENPLANEMENT FORECASTS

**Table 3.1** presents historical and forecast passenger enplanements. The passenger enplanement forecast from the Maine Aviation Systems Plan Update Phase I report (March 2006) was adopted as the baseline forecast for AUG. Because the forecast horizon years in Master Plan Update do not coincide with those in the System Plan Update, the growth rates from the latter document were used to interpolate and extrapolate the actual enplanement values. As shown, under the base case forecast, passenger enplanements are forecast to increase from 4,519 in 2005 to 5,900 in 2025.

Recognizing that the purpose of this Master Plan Update is for facility planning purposes, a high forecast scenario was also developed. The high forecasts assumed a growth rate of 4.2 percent through the forecast period. This growth rate is assumed by the FAA for regional carrier enplanements at the national level.[2] Under this high scenario, annual passenger enplanements at AUG would increase to 9,900 by 2025 which translates into a 36 percent load factor assuming four daily departures of a 19-seat aircraft (which is still well below the industry average). While it is acknowledged that this growth rate is optimistic, the 2025 enplanement level under the high forecast is only half the historical high enplanement level experienced in the late 1970s (more than 20,000 passengers) and provides an upper bound for planning purposes.

[2] FAA Aerospace Forecasts FY 2006-2017, Table 24.

Table 3.1

Historical and Forecast Annual Passenger Enplanements

| | *Historical* | |
|---|---|---|
| 1978 | 21,948 | |
| 1979 | 22,999 | |
| 1980 | 21,846 | |
| 1981 | 14,909 | |
| 1982 | 10,791 | |
| 1983 | 16,345 | |
| 1984 | 13,855 | |
| 1985 | 10,490 | |
| 1986 | 8,933 | |
| 1987 | 10,968 | |
| 1988 | 10,875 | |
| 1989 | 7,447 | |
| 1990 | 9,277 | |
| 1991 | 7,105 | |
| 1992 | 7,227 | |
| 1993 | 5,496 | |
| 1994 | 2,548 | |
| 1995 | 5,019 | |
| 1996 | 3,473 | |
| 1997 | 3,190 | |
| 1998 | 4,290 | |
| 1999 | 3,284 | |
| 2000 | 4,361 | |
| 2001 | 4,190 | |
| 2002 | 3,935 | |
| 2003 | 2,858 | |
| 2004 | 4,204 | |
| 2005 | 4,519 | |
| | *Forecast* | |
| | **Base Case (1)** | **High Scenario (2)** |
| 2010 | 5,100 | 5,500 |
| 2015 | 5,400 | 6,500 |
| 2025 | 5,900 | 9,900 |

Notes: (1) Interpolated/expapolated from Maine Airport Systems Plan Update (2006).
(2) Assumes FAA national growth rate for regional airline enplanements as stated in 2006-2017 Aerospace Forecast.

Sources: As listed above and HNTB analysis.

A constrained forecast (i.e., on which assumes Airport facilities will not be adequate to accommodate future demand resulting in lower activity levels) was not developed, recognizing that existing airfield, terminal, and landside facilities all accommodated activity levels that were higher than the base case and high forecast.

## 3.3 COMMERCIAL AIRLINE OPERATIONS FORECAST

**Table 3.2** presents historic and forecast scheduled service operations at AUG. The MASP Update forecast of scheduled service operations was used as the base case forecasts for the AUG Master Plan Update. Because the forecast horizon years in Master Plan Update do not coincide with those in the MASP Update, the growth rates from the latter document were used to interpolate and extrapolate the actual operations values. The base case forecast shows scheduled service operations increasing from 2,366 in 2005 to 2,940 by 2025.

As with the Master Plan Update forecasts for enplanements, a high scenario was also developed for facility planning purposes. The high scenario assumed that, in the near term, the completion factor for airline operations (i.e., the percentage of scheduled flights that were actually flown) would increase, and that, ultimately, a fifth flight would be added to the schedule by 2025. Under this scenario, annual scheduled service operations would increase to 3,650 at the end of the planning period.

## 3.4 GENERAL AVIATION ACTIVITY

GA operations account for the majority of the activity at AUG. Forecasts of based aircraft and GA operations are presented below.

### 3.4.1 GA Based Aircraft

In 2005, there were a total of 46 based aircraft (41 single engine and five multi-engine) at AUG. There are no business jets or helicopters based at the Airport. The forecast of total based aircraft was adopted from the MASP Update. Because the forecast horizon years in Master Plan Update do not coincide with those in the System Plan Update, the growth rates from the latter document were used to interpolate and extrapolate the based aircraft values. Although no GA jets are currently based at AUG, it was assumed that, by 2010, one GA jet would be based at the Airport. This assumption reflects prudent planning as the GA jet sector continues to be the most rapidly growing in the GA market. This growth is expected to continue with the advent of micro-jets. Based on the forecasts, AUG will have 45 single engine, nine multi-engine, and two jet aircraft based at the Airport by 2025 (as shown in **Table 3.3)**.

### 3.4.2 GA Operations

As noted previously, AUG does not have a control tower; therefore, GA operations were estimated from various sources. In 2005, there were approximately 27,500 GA operations. The 2006 MASP Update forecasts GA operations to reach 43,920 by 2025, an increase of approximately 60 percent compared to the base year. (See **Table 3.4**.)

Table 3.2

**Historical and Forecast Commercial Service Operations**

| | *Historical* | | |
|---|---|---|---|
| 2000 | 2,542 (1) | | |
| 2001 | 2,280 (2) | | |
| 2002 | 2,456 (2) | | |
| 2003 | 2,240 (2) | | |
| 2004 | 2,032 (2) | | |
| 2005 | 2,366 (2) | | |
| | *Forecast* | | |
| | **Base Case (3)** | **High Scenario (4)** | **FAA TAF (5)** |
| 2010 | 2,630 | 2,880 | 5,100 |
| 2015 | 2,770 | 3,200 | 5,100 |
| 2025 | 2,940 | 3,650 | 5,100 |

Notes: (1) 2006 MASP Update.
(2) U.S. DOT T-100 data.
(3) Interpolated/expapolated from Maine Airport Systems Plan Update (2006).
(4) Assumes FAA national growth rate as stated in 2006-2017 TAF.
(5)Assumes increase in operations due to higher completion rate in the near term and the addition of one flight (for a total of five departures) by 2025.

Sources: As listed above and HNTB analysis.

Table 3.3

**Historical and Forecast Based Aircraft**

| | Single Engine Piston | Multi-Engine | Jet | Helicopter | Other | Total |
|---|---|---|---|---|---|---|
| | | | *Historical* | | | |
| 1990 (1) | 47 | 9 | - | 4 | - | 60 |
| 1995 (2) | 40 | 7 | - | 6 | - | 53 |
| 2000 (2) | 40 | 7 | - | 6 | - | 53 |
| 2005 (3) | 41 | 5 | - | - | - | 46 |
| | | | *Forecast (4)* | | | |
| 2010 | 42 | 7 | 1 (5) | - | - | 50 |
| 2015 | 43 | 8 | 1 | - | - | 52 |
| 2025 | 45 | 9 | 2 | - | - | 56 |

Notes: (1) 1992 AUG Master Plan.
(2) FAA TAF historical.
(3) From AirNav website.
(4) Total based aircraft interpolated/extrapolated from MASP Update. Growth of aircraft within each category roughly equivalent to FAA national growth rates in active aircraft for each category.
(5) Assumes introduction of one based jet aircraft by 2010. (See narrative.)

Sources: As listed above and HNTB analysis.

Table 3.4

**GA Aircraft Operations**

| | *Historical (1)* | |
|---|---|---|
| 1978 | 42,000 | |
| 1979 | 43,680 | |
| 1980 | 42,000 | |
| 1981 | 42,000 | |
| 1982 | 35,000 | |
| 1983 | 35,000 | |
| 1984 | 35,000 | |
| 1985 | 35,000 | |
| 1986 | 35,000 | |
| 1987 | 42,000 | |
| 1988 | 43,000 | |
| 1989 | 44,000 | |
| 1990 | 54,200 | (2) |
| 1991 | 40,000 | |
| 1992 | 40,000 | |
| 1993 | 40,000 | |
| 1994 | 40,000 | |
| 1995 | 40,000 | |
| 1996 | 40,000 | |
| 1997 | 40,000 | |
| 1998 | 40,000 | |
| 1999 | 40,000 | |
| 2000 | 40,000 | |
| 2001 | 27,500 | (3) |
| 2002 | 25,000 | |
| 2003 | 25,000 | (4) |
| 2004 | 26,250 | (5) |
| 2005 | 27,500 | (6) |
| | *Forecast* | |
| 2010 | 32,360 | |
| 2015 | 36,140 | |
| 2025 | 43,920 | |

Notes: (1) FAA TAF historical data, unless otherwise noted.
(2) 1992 AUG Master Plan.
(3) 2006 MASP Update.
(4) AUG RSA Study (2004).
(5) Interpolated from 2003 and 2005 values.
(6) Airport records.

Sources: As listed above and HNTB analysis.

## 3.5 SUMMARY OF ANNUAL FORECASTS

**Table 3.5** presents a summary of forecast enplanements and total operations (including commercial airline, GA, and military) through the forecast period. The operations forecast for military activity is drawn from the 2006 MASP Update and is expected to remain constant at 3,000 annual operations through the planning horizon. **Figure 3-1** illustrates historical and future activity.

## 3.6 PEAK PERIOD FORECASTS

Since facility requirements are typically based on peaking characteristics rather than annual forecasts, peak month, average day peak month, and peak hour forecasts were developed for passengers and operations.

### 3.6.1 Passenger Activity Peaking

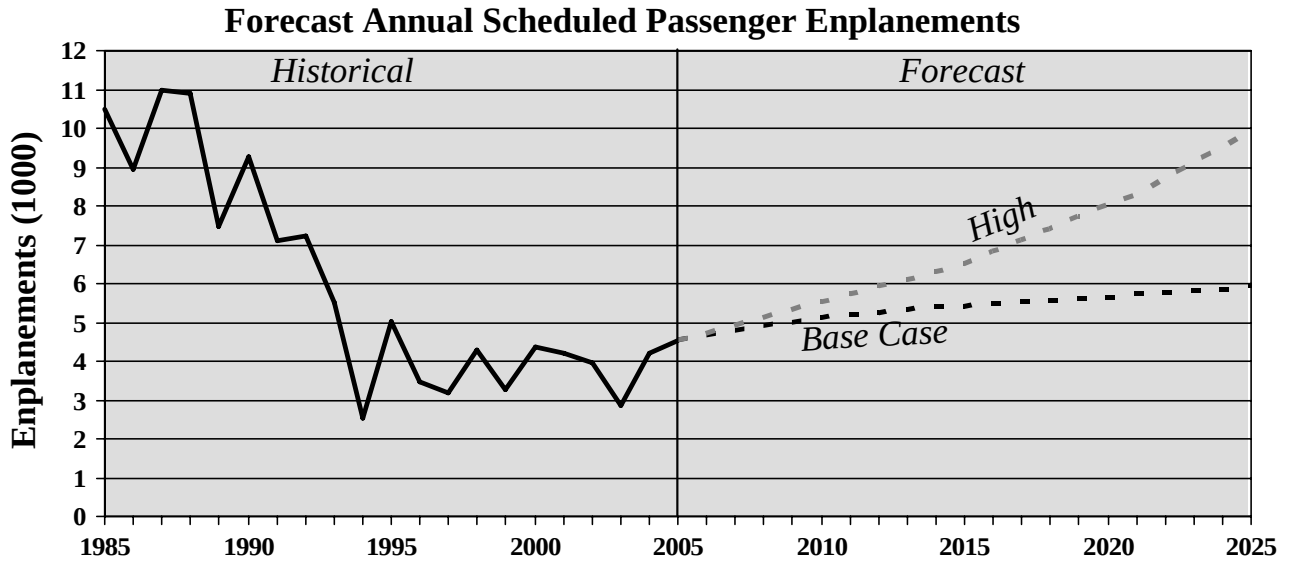
**Table 3.6** shows that the number of enplaned passengers in the peak month (August) reached 631 in 2005 (approximately 14 percent of annual activity). For planning purposes, it was assumed that the ratio of peak month passengers to annual passengers would remain constant. Dividing peak month enplanements by 31 (i.e., the number of days in August), produces an average day peak month enplanement level of 20 passengers. The forecasts assume that average day peak month enplanements will increase at the same rate as annual growth and reach 171 passengers by 2025.

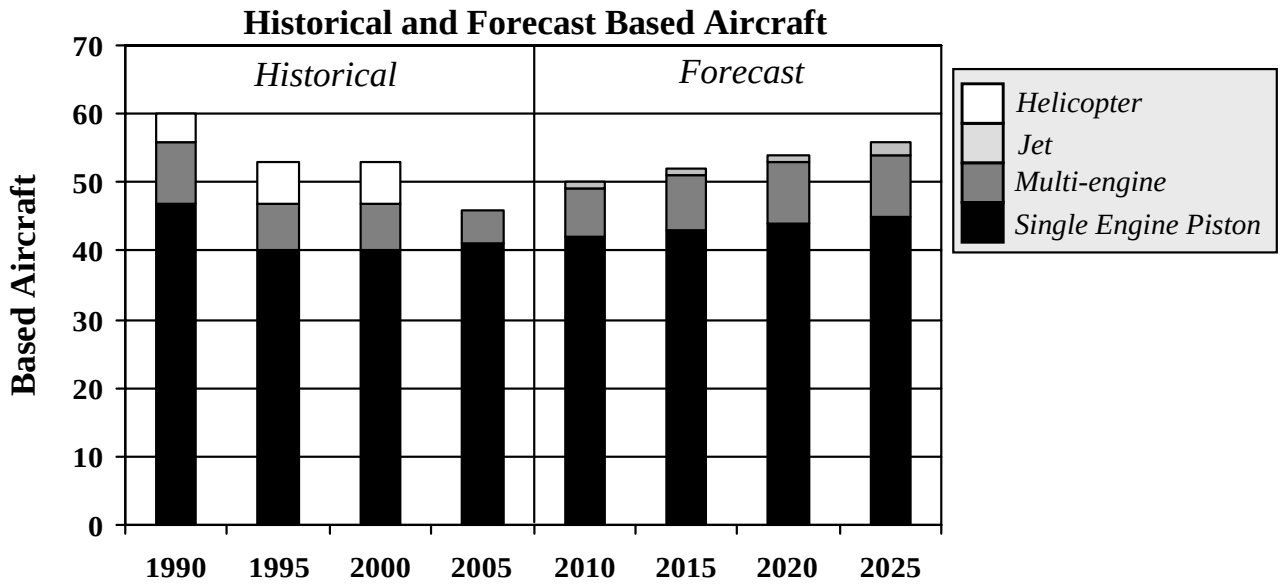
The peak hour enplanement level assumed a 50 percent load factor on one of the scheduled flights. Since the seating capacity of the B-1900 is 19, the number of peak hour enplanements is estimated to be roughly 10 passengers. Peak hour enplanements are forecast to increase at the same rate as average day peak month activity, reaching 13 passengers by 2025.

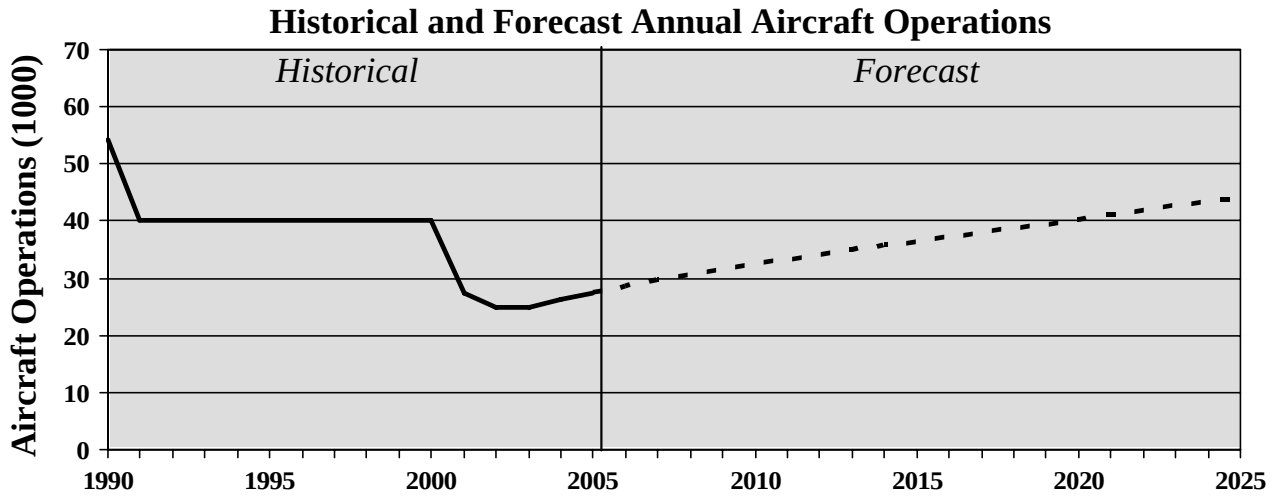
Based on Airport records, the number of passenger airline operations in the peak month (August 2005) was 214, or nine percent of annual passenger airline operations. It was assumed that this ratio would remain constant through the forecast period. The average day peak month commercial airline operations in 2005 was seven (i.e., 214 operations divided by 31 days). Peak hour operations for scheduled airline activity was two (i.e., one arrival and one departure) in 2005. The Master Plan Update forecasts assume this level will remain constant through the planning horizon, as any additional flights would likely be introduced by the same carrier and would be timed to coincide with a different bank of operations at Boston Logan.

### 3.6.2 Total Aircraft Operations Peaking

Total aircraft operations (i.e., commercial plus GA plus military) peaking activity was forecast based on FBO input and comparisons to nearby towered airports. Peak month operations in 2005 were estimated to be approximately 10.6 percent of annual activity (i.e., 3,514 operations). It was assumed that this ratio would remain constant through the forecast period. Average day peak month activity was in 2005 equaled 113 operations (i.e., 3,514 operations divided by 31 days). Average day peak month activity is forecast to increase to 171 by 2025.




| | | | |
|---|---|---|---|
| Source: HNTB analysis. | HNTB | **Historical and Forecast Activity** | DATE: 12/2006 |
| | | Augusta State Airport<br>Augusta, Maine | Figure: **3-1** |

Table 3.5

**Historical and Forecast Total Operations**

| | Commercial Passenger (1) | General Aviation | Military | Total |
|---|---|---|---|---|
| | | *Historical* | | |
| 2000 | 2,542 | 40,000 | 1,000 | 43,542 |
| 2001 | 2,280 | 27,500 | 3,000 | 32,780 |
| 2002 | 2,456 | 25,000 | 3,000 | 30,456 |
| 2003 | 2,240 | 25,000 | 3,000 | 30,240 |
| 2004 | 2,032 | 26,250 | 3,000 | 31,282 |
| 2005 | 2,366 | 27,500 | 3,240 | 33,106 |
| | | *Forecast* | | |
| 2010 | 2,630 | 32,360 | 3,000 (2) | 37,990 |
| 2015 | 2,770 | 36,140 | 3,000 (2) | 41,910 |
| 2025 | 2,940 | 43,920 | 3,000 (2) | 49,860 |

Notes: (1) Assumes base case forecast.
(2) From 2006 MASP Update.

Sources: Tables 4.1-4.4; HNTB analysis.

Table 3.6

**Historical and Forecast Peaking Characteristics**

| | 2005 | 2010 | 2015 | 2025 |
|---|---|---|---|---|
| Enplanements | | | | |
| Annual (1) | 4,519 | 5,100 | 5,400 | 5,900 |
| Peak Month (2) | 631 | 712 | 754 | 824 |
| Avg. Day Peak Month (3) | 20 | 23 | 24 | 27 |
| Peak Hour (4) | 10 | 11 | 12 | 13 |
| Commercial Passenger Operations | | | | |
| Annual (5) | 2,366 | 2,630 | 2,770 | 2,940 |
| Peak Month (6) | 214 | 238 | 251 | 266 |
| Avg. Day Peak Month (3) | 7 | 8 | 8 | 9 |
| Peak Hour (7) | 2 | 2 | 2 | 2 |
| Operations | | | | |
| Annual (8) | 33,106 | 37,990 | 41,910 | 49,860 |
| Peak Month (9) | 3,514 | 4,032 | 4,448 | 5,292 |
| Avg. Day Peak Month (3) | 113 | 130 | 143 | 171 |
| Peak Hour (10) | 23 | 26 | 29 | 35 |

Notes: (1) Table 3.1.
(2) Airport records.
(3) Peak month divided by 31.
(4) Assumed to equal 50 percent load factor for 19-seat aircraft in 2005, then growing at same rate as average day peak month enplanements.
(5) Table 3.2.
(6) Airport records.
(7) OAG; one arrival + one departure; assumed to remain constant through planning horizon.
(8) Table 3.5.
(9) Based on FBO input and monthly activity patterns at nearby towered airports.
(10) Based on FBO input; assumed to increase at same rate as average day peak month operations.

Source: As noted above and HNTB analysis.

Based on input from the FBO and a comparison with similar airports, it was estimated that total peak hour operations on an average day in the peak month in 2005 was approximately 23. This translates to 20 percent of daily traffic. For planning purposes, it was assumed that this ratio would remain constant through the planning period. Total peak hour operations are therefore forecast to grow to 35 operations by 2025.

## 3.7 COMPARISON TO FAA TAF

**Table 3.7** presents a comparison between the AUG Master Plan Update forecast and the FAA's TAF published in 2006. Although both the passenger forecasts and operations forecasts vary from the TAF by more than 10 percent (i.e., 25 percent and 51 percent, respectively), they are based on the forecasts contained in the FAA-approved 2006 MASP Update. It is recommended that these forecasts be adopted for the balance of study as they are based on a thorough examination of national, Statewide, and local trends (as documented in the MASP Update) and are therefore the most appropriate for determining a long-range development plan for AUG.

Table 3.7

**Comparison of Master Plan and TAF Forecasts**

| | Passenger Enplanements | | |
|---|---|---|---|
| | **Master Plan Update** | **FAA TAF (2)** | **Pct. Difference** |
| 2005 | 4,519 | -- | -- |
| 2025 | 5,900 (1) | 4,719 | 25.0% |

| | Total Aircraft Operations | | |
|---|---|---|---|
| | **Master Plan Update** | **FAA TAF (2)** | **Pct. Difference** |
| 2005 | 33,106 | -- | -- |
| 2025 | 49,860 | 33,100 | 50.6% |

Notes: (1) Baseline forecast.
(2) 2006 publication.

Source: As above and HNTB analysis.

# Chapter Four
# Facility Requirements

## 4.1 INTRODUCTION

This chapter describes the facilities required to accommodate aviation demand at Augusta State Airport (AUG) over the 20-year planning period to the year 2025. Facility requirements were developed by taking the aviation demand forecasts presented in Chapter Three and performing demand/capacity analyses on the various functional elements of the Airport. To ensure a logical sequence of future development, separate facility requirements were developed for the horizon years 2010, 2015, and 2025. Analyses were performed for the following functional areas:

- Airfield
- NAVAIDS
- Terminal
- General Aviation
- Support Facilities
- Surface Transportation and Auto Parking

The facility requirements in this chapter were developed at a level of detail appropriate for an airport master plan, not the level of detail suitable for an architectural or engineering design study. Required facility improvements are identified and quantified, and in subsequent chapters specific alternative methods of meeting these facility requirements will be identified and evaluated.

## 4.2 AIRFIELD

FAA Advisory Circular 150/5300-13, *Airport Design*, lists the recommended design standards for airports. The standards consider safety, economy, efficiency, and longevity; as such, criteria vary based on an airport's role and the existing and anticipated type of aircraft expected to regularly use an airport.

### 4.2.1 Airport Reference Code

The following section addresses an important part of the master planning process, identifying the Airport Reference Code (ARC). The significance of this determination is that it determines the airfield geometry and safety factors as required by the FAA. An explanation of the ARC system is included below.

The ARC is a coding system established by the FAA to relate airport design criteria to the operational and physical characteristics of the airplanes using an airport. The ARC has two primary components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to aircraft approach speed. The second component, depicted by a Roman numeral, is the airplane design group and relates to airplane wingspan or

tailheight (physical characteristics), whichever is the most restrictive. Generally, runway standards are related to aircraft approach speed, wingspan, and designated or planned approach visibility minimums. Taxiway and taxilane standards are related to airplane design group. The FAA requires a minimum of 500 operations by a single or similar group of aircraft to establish the Airport Reference Code.

**Aircraft Approach Category**

The approach category is a grouping of aircraft based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- Category A: Speed less than 91 knots.
- Category B: Speed 91 knots or more but less than 121 knots.
- Category C: Speed 121 knots or more but less than 141 knots.
- Category D: Speed 141 knots or more but less than 166 knots.
- Category E: Speed 166 knots or more.

The airplane design group (ADG) is a grouping of airplanes based on wingspan or tail height. Where an airplane falls in two categories (wingspan in one and tail height in another), the most demanding category should be used. The groups are as follows:

- Group I: Up to but not including 49 feet (15 m) wingspan or tail height up to but not including 20 feet.
- Group II: 49 feet (15 m) up to but not including 79 feet (24 m) wingspan or tail height from 20 up to but not including 30 feet.
- Group III: 79 feet (24 m) up to but not including 118 feet (36 m) wingspan or tail height from 30 up to but not including 45 feet.
- Group IV: 118 feet (36 m) up to but not including 171 feet (52 m) wingspan or tail height from 45 up to but not including 60 feet.
- Group V: 171 feet (52 m) up to but not including 214 feet (65 m) wingspan or tail height from 60 up to but not including 66 feet.
- Group VI: 214 feet (65 m) up to but not including 262 feet (80 m) wingspan or tail height from 66 up to but not including 80 feet.

The 1992 AMPU identified the ARC as Category C-II. The group of aircraft used to define the ARC included: G-III, Falcon 50, Lear 35 and HS-125. In 2004 a Runway Safety Area Study was conducted and performed an activity forecast which identified the critical aircraft as a Beechcraft 1900, determining Category B-II as the ARC.

Based on existing and forecast operations, the critical aircraft will remain a Beechcraft 1900. With an approach speed of 120 knots and a wingspan of 54.5 feet, this aircraft is designated as a B-II. The ARC designation will remain B-II. This ARC meets the forecast aviation activity requirements and

can be supported by the airport infrastructure.

### 4.2.2 Approach Minimums

Interviews with airport management, the FBO manager, and airport users indicated that approach minimums at AUG are acceptable and adequately meet the requirements of scheduled service operators and the flying public. However, it is important that the airport continue to pursue lower approach minimums as technology advances and new procedures are developed to improve service reliability.

See pages 2-4 and 2-6 for the existing approach minimums.

### 4.2.3 NAVAIDS

The existing NAVAIDS were reviewed and through interviews with airport management, the FBO, and airport users, it was determined that the compliment of instrument and visual NAVAIDS at AUG are acceptable and meet the existing and planned service requirements. Any future construction or alternatives involving modification to airfield geometry, airport facilities, and construction off airport should consider the NAVAIDS, NAVAID critical areas, and all associated airspace. Any modifications to NAVAIDS will be covered in the Alternatives Chapter.

**Localizer**

Planned improvements to the RWY 35 RSA may require relocating the localizer. The alternatives chapter will explore this in further detail.

All future planning should maintain a clear localizer critical area, which is a keyhole-shaped area surrounding the antenna and extending over a portion of the runway. See the existing ALP, at the end of the report, for a depiction of the localizer critical area.

**Glide Slope**

The existing equipment meets current and planned service requirements. There are no anticipated changes that will be made to the glide slope antenna array aside from possible recalibration that may need to take place if the existing localizer is relocated.

All future planning should maintain a clear glide slope critical area, which is depicted on the existing ALP, at the end of the report.

**VOR**

There has been some discussion regarding the removal or decommissioning of the VOR from AUG airport property as GPS technology becomes the standard. In the short-term it appears the VOR will continue to serve AUG and the surrounding region. The FAA is currently in the process of phasing out select VOR across the country. Any mid to long-term planning should consider the possibility of decommissioning the VOR and utilizing that area for alternative aviation uses.

**Airfield Lighting**

Runway 17-35 is equipped with High Intensity Runway Lights (HIRL) and Runway 8-26 is equipped with Medium Intensity Runway Lights (MIRL). The lighting for both runways are 26 years old, in fair condition. Lights for runway 17-35 should be replaced in conjunction with

runway rehabilitation, which is scheduled to be completed in the near term (2011-2012). Lighting for 8-26 should be maintained and replaced once the runway is due for rehabilitation.

The inventory process revealed that the airport lighting vault is 45 years old and is nearing the end of its useful life.

## 4.3 AIRFIELD CAPACITY AND DELAY

The calculation of airfield capacity and delay is essential in evaluating the capability of existing runway and taxiway systems to effectively serve existing and future airport activity levels. This section describes the demand/capacity relationship and resulting aircraft delays.

### 4.3.1 Airfield Capacity

The capacity of the existing runway system depends on a number of factors including aircraft separation, weather, aircraft mix, and runway operational configurations. Airfield capacity is defined as the maximum number of aircraft that an airfield configuration can accommodate when there is a continuous demand for service (i.e., an aircraft is always waiting to depart or land). Capacity is typically measured in one-hour time periods, which is defined as hourly capacity. Airfield capacity in this chapter was calculated using FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.

AUG's hourly and annual capacities were estimated based on the factors described above. The current (2005) estimated hourly capacity for AUG is estimated to range from 72 to 97 operations in VMC and 22 operations in IMC, depending on operating mode. The lower hourly capacity stated above occurs in south flow due to aircraft having to back-taxi to utilize the full runway. Existing peak hour operations are approximately 23, forecast to increase to 35 by 2025. This meets VMC capacity and exceeds the hourly capacity of the airfield in IMC conditions. It should be noted that 74.4 percent of operations are done in VFR conditions; therefore the smaller aircraft contributing to the majority of that activity, which account for >85 percent of operations are less likely to be operating during IMC conditions. Based on those assumptions the existing hourly capacity of the Airport's airfield is adequate to meet long-term hourly demand; no additional capacity is required to meet the Airport's forecast peak hour operations.

### 4.3.2 Annual Service Volume

Annual Service Volume (ASV) is an FAA capacity measure that provides a reasonable estimate of the capacity of an airport on an annual basis, and is useful for long-range planning. FAA Advisory Circular 150/5060-5 was used to estimate the Airport's ASV. While hourly capacities are physical capacities that generally cannot be exceeded, ASV can be exceeded, sometimes by significant amounts, with corresponding increases in delay. ASV is calculated based on hourly capacity estimates and historical demand patterns, such as the ratio of annual demand to average daily demand in the peak month and the ratio of average daily demand to average peak hour demand in the peak month. As annual aircraft operations approach the ASV of an airport's airfield, average annual aircraft delays increase

rapidly with relatively small increases in aircraft operations. The ASV reflects the approximate annual capacity with an average annual delay of between three and four minutes

The ASV for the existing airfield system at AUG was estimated to be 225,000 annual operations.

### 4.3.3 Airfield Delay

Based on the ASV methodology, average annual delays can be estimated by the ratio between annual operations and the calculated ASV. When the ratio is between 0 and 80 percent, average annual delays increase in a roughly linear manner. When the ratio is greater than 80 percent, delays increase geometrically.

In 2005, AUG had approximately 33,000 operations, about 15 percent of its ASV, resulting in an average annual delay of 0.1 minutes. By 2025, the Airport is forecast to have 50,000 operations, approximately 22 percent of its capacity, resulting in average annual delay of about 0.3 minutes. It should be noted that, during the peak hour, individual aircraft may experience delays of five to 10 times the average annual delay. This means that, by 2025, some aircraft operating at AUG during peak periods may have delays of up to three minutes.

### 4.3.4 Airfield Layout

The Airport has two runways: Runway 17-35 and Runway 8-26. Runway 17-35 is the primary runway and carries the majority of traffic at AUG. Runway 8-26 serves small general aviation aircraft and is used primarily during periods of strong crosswinds.

**Aircraft Separation**

The separation maintained between individual aircraft affects the capacity of both the airspace and airfield. Generally, the closer the spacing between arriving and departing aircraft, the greater the capacity of the airspace and the airfield. Many factors influence the separation between aircraft, including safety considerations, runway occupancy times, the size and type of aircraft that operate within the airspace system or at the Airport, the flight rules under which aircraft operate, and the prevailing weather conditions.

**Flight Rules**

The flight rules under which aircraft must operate affect aircraft separation and therefore airfield and airspace capacity. The FAA has two basic types of flight rules: visual flight rules (VFR) and instrument flight rules (IFR). The distinction between VFR and IFR is important because aircraft operating under each set of flight rules are subject to different aircraft separation rules, weather minimums, and aircraft equipment. These differences have an effect on the efficiency of the Airport ATC system.

In general, aircraft operating under VFR are not subject to direct ATC control for most phases of flight. The general principle for maintaining aircraft separation under VFR is “see and be seen,” which places greater responsibility for maintaining separation on the pilot. In contrast, pilots operating under IFR are required to fly assigned navigational routes and altitudes and maintain a

minimum separation of three nautical miles, and are subject to ATC control throughout all phases of flight. Additionally, IFR pilots are required to meet minimum proficiency levels, and IFR aircraft have a minimum equipment requirement.

VFR aircraft are not required to meet the same minimum equipment requirements, because VFR navigation is done by reference to geographic landmarks, charts, and other visual references, while IFR navigation is done by reference to navigational facilities.

Most commercial and corporate aircraft operate under IFR flight plans regardless of weather conditions, and IFR flight plans are required for operations above 18,000 feet MSL, regardless of weather conditions. This is due to the complexity of the existing airspace structure in the U.S., the high volume of traffic in the air, and congestion within terminal areas. Aircraft which do not meet the equipment requirements for IFR flight may only operate under VFR.

**Meteorological Conditions**

The FAA classifies weather conditions according to two basic types: visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). VMC conditions are weather conditions in which an aircraft can maintain safe separation by visual means. IMC conditions prevail when the visibility or ceiling falls below those minimum prescribed for VMC conditions. VMC minimums are a 1,000-foot ceiling above airport elevation and three statute miles visibility. During periods of IMC, all aircraft must operate under IFR flight plans and operating patterns become the responsibility of ATC. Based on 1994 through 2006 meteorological data from the National Climatic Center, VMC conditions exist 74.4 percent of the time and IMC conditions 25.6 percent of the time at AUG.

**Fleet Mix**

Fleet mix affects the aircraft separation requirement and, therefore, airfield capacity in two ways. First, light aircraft must be adequately separated from heavy aircraft to avoid wake turbulence generated by the heavy aircraft. Second, faster aircraft must be separated from slower aircraft to maintain minimum spacing requirements. Air traffic controllers, where possible, assign different arrival and departure routes or altitudes within a controlled airspace to segregate faster jet aircraft from the slower propeller aircraft.

The FAA's Advisory Circular 150/5060-5 groups aircraft by four weight classifications:

- A (single engine aircraft weighing 12,500 pounds or less),
- B (multi-engine aircraft weighing 12,500 pounds or less),
- C (multi-engine aircraft weighing 12,500 pounds to 255,000 pounds[3]), and
- D (multi-engine aircraft weighing more than 255,000 pounds.

Based on information provided in the Augusta State Airport RSA Study, the

[3] Reduced from 300,000 pounds based on FAA ATC Manual Appendix A.

current airline operating schedule, input from the FBO, and professional judgment, the Airport's 2005 weight classification mix was estimated to consist of 92 percent Class A and B aircraft and eight percent Class C aircraft. No Class D aircraft operate at the Airport. The mix index (a mathematical expression which equals the percent of Class C aircraft plus three times the percent of Class D aircraft) is a key factor in determining airfield capacity using AC 150/5060-5. In 2005, the mix index was approximately 8. The mix index is forecast to remain fairly constant through the planning horizon. The existing and future mix index and aircraft operations are shown by class in **Table 4.1**.

## 4.4 AIRFIELD REQUIREMENTS

Runway and taxiway requirements are planned according to the recommendations in the latest version of the FAA's AC 150/5300-13, *Airport Design* and the ARC previously identified. For a summary of runway and taxiway requirements see Table 4.5.

### 4.4.1 Additional Runways

Additional runways are needed at airports for two main reasons: to alleviate capacity constraints and/or to improve wind coverage. The following section describes existing wind coverage at the airport.

When feasible, aircraft typically land and takeoff into the wind. Under strong crosswind conditions, aircraft may not be able to operate at an airport that does not provide adequate crosswind coverage. AC 150/5300-13 recommends that an airport's runway system provide 95 percent wind coverage, which is computed on the basis of the crosswind component not exceeding 10.5 knots for ARCs A-I and B-I, 13 knots for ARCs A-II and B-II, 16 knots for ARC A-III, B-III, and C-I through D-III, and 20 knots for ARCs A-IV through D-IV. Based on the fleet mix at AUG wind coverage for 10.5 knots should be provided. As shown below in **Table 4.2**, the existing two-runway system exceeds the recommended wind coverage in all conditions; therefore, additional runways to increase wind coverage are not required.

### 4.4.2 Runway Length

Runway length calculations for AUG were developed for the existing and forecast critical aircraft, a Beech 1900D using AUG's mean maximum temperature of 80 degrees Fahrenheit (in July), airport elevation of 352 feet MSL, 100% load factor, and an approximate 200 mile stage length (AUG to RKD to BOS).

**Table 4.3** summarizes runway length requirements for the forecast critical aircraft. Based on the analysis the existing runway length of 5,001 feet for the primary runway 17-35 is sufficient to meet requirements.

It should be noted that the airport is in the process of bringing runway safety areas up to FAA standards and is considering various alternatives which may affect the existing runway length. This will be evaluated in the alternatives chapter.

Runway 8-26, the 2,703 by 75 foot crosswind runway at AUG, primarily serves small single engine aircraft (ADG A-I) during crosswind conditions. Based on wind coverage this runway is not required for

Table 4.1

**Existing and Future Mix Index and Aircraft Operations by Class**

| Weight Class | Weight Range (Pounds) | Example Aircraft | 2005 (1) | | 2010 (2) | | 2015 (2) | | 2020 (2) | | 2025 (2) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ann. Ops. | Pct. | Ann. Ops. | Pct. | Ann. Ops. | Pct. | Ann. Ops. | Pct. | Ann. Ops. | Pct. |
| A/B | 12,500 or less | Beech Baron, Cessna 172, Piper Navajo, Very Light Jets | 30,461 | 92.0% (1) | 34,750 | 91.5% (1) | 38,520 | 91.9% (1) | 41,740 | 92.0% (1) | 44,960 | 92.0% |
| C | 12,501-255,000 | King Air, B1900, Lear 35, Citation, Falcon, CRJ-200, ER-145, B737, MD80, A320 | 2,645 | 8.0% (2) | 3,240 | 8.5% (2) | 3,390 | 8.1% (2) | 3,650 | 8.0% (2) | 3,900 | 8.0% |
| D[3] | over 255,000 | B757, B767, B777, B747, A300, A330, A340 | - | 0.0% (3) | - | 0.0% (3) | - | 0.0% (3) | - | 0.0% (3) | - | 0.0% |
| Total | | | 33,106 | 100.0% | 37,990 | 100.0% | 41,910 | 100.0% | 45,390 | 100.0% | 48,860 | 100.0% |
| Mix Index[4] | | | | 8 | | 9 | | 8 | | 8 | | 8 |

Notes:
(1) 2005 estimate based on Augusta State Airport RSA Study, discussions with FBO, and professional judgment.
(2) All forecst scheduled passenger flights included in Weight Class C (Table 3.6); assumes addition of one based GA jet in 2010 and a second based GA jet in 2025 as shown in Table 3.3
(3) Includes all aircraft in Table 4.35 weighing more than 255,000 pounds.
(4) Percent Class C aircraft + 3 times Class D aircraft.

Table 4.2

**Runway Wind Coverage**

| Condition | 17-35 | 8-26 | Combined |
|---|---|---|---|
| 10.5-knot | | | |
| VFR | 94.8% | 87.6% | 98.7% |
| IFR | 95.8% | 87.8% | 98.5% |
| All-weather | 95.1% | 87.6% | 98.6% |
| 13.0-knot | | | |
| VFR | 97.9% | 93.7% | 99.7% |
| IFR | 98.3% | 93.4% | 99.6% |
| All-weather | 98.0% | 93.6% | 99.7% |
| 16.0-knot | | | |
| VFR | 99.7% | 98.6% | 99.9% |
| IFR | 99.7% | 97.9% | 99.9% |
| All-weather | 99.7% | 98.39 | 99.9% |
| 20.0-knot | | | |
| VFR | 99.9% | 99.7% | 100.0% |
| IFR | 99.9% | 99.3% | 100.0% |
| All-weather | 99.9% | 99.62 | 100.0% |

Source: National Climatic Data Center (1994-2006); HNTB analysis.

Table 4.3

**Runway Length Requirements for Beech 1900D (1)**

| Aircraft | Weight (lbs) | Length (Ft) |
|---|---|---|
| Beech 1900D | 16,600 (2) | 4,500 |
| Beech 1900D | 17,120 (MTOW) | 4,650 |

Notes:
(1) Mean maximum temperature of 80 degrees, airport elevation 352 feet MSL, corrected for 0.8 percent runway gradient. Used FAA Runway Length Adjustment Factors.
(2) Approximate weight based on 19 pax and 200NM stage length
Source: Raytheon/Beechcraft; HNTB analysis.

larger aircraft. The existing runway length is sufficient for the small single engine aircraft that it serves. In the event that equipment is changed or additional markets are introduced at AUG in the future, runway length requirements for Saab 340B at maximum take-off weight were also calculated. Based on this analysis additional runway length would be required as depicted in **Table 4.4**. While this exceeds the existing runway length, a Saab would typically not be operating at max take-off weight (MTOW), which would result in a shorter runway length requirement.

Table 4.4

**Runway Length Requirements for Saab 340B (1)**

| Aircraft | Weight (lbs) | Length (Ft) |
|---|---|---|
| Saab 340B | 29,000 (MTOW) | 5,200 |

Notes:
(1) Mean maximum temperature of 80 degrees, airport elevation 352 feet MSL, corrected for 0.8 percent runway gradient. Used FAA Runway Length Adjustment Factors.
Source: Saab aircraft performance manuals; HNTB analysis.

### 4.4.3 Runway Line of Sight

FAA design criteria require a clear line-of-sight from a point five feet above one runway end to a point five feet above the other runway end. Runway 17-35 has a significant elevation change along its profile. The 17 end begins at 310.5 feet MSL and rises to 349.8 feet before reaching 346.8 feet at the 35 end. The runway ends differ in elevation by 36 feet. To remedy this, a significant portion of the runway would need to be raised/lowered, or a 24-hour control tower would need to be provided. Alternatives to correct this will be explored in the alternatives section.

Runway 8-26 is nearly flat with a very slight change in elevation along its profile. The 8 end elevation is 349.3 feet MSL and the 26 end is 351.7 feet MSL. This runway meets Line of Sight requirements.

Both runways meet runway-to-crosswind runway line of sight requirements as shown on the existing airport layout drawing.

### 4.4.4 Runway Widths and Shoulders

Runway 17-35 is 150 feet wide with turf shoulders. This exceeds the FAA runway width requirements of 100 feet for a B-II design group runway with approach visibility minimums lower then ¾-mile. There have been discussions on narrowing the Runway to 100 feet, and based on the forecast there are no aircraft that would justify maintaining the existing width. This will be evaluated in the alternatives chapter.

Runway 8-26 is 75-feet wide with turf shoulders and exceeds the FAA runway width requirements for a B-I runway with minimums not lower than ¾-mile.

### 4.4.5 Runway Blast Pads

For airports serving Group II aircraft, AC 150/5300-13 recommends 95-foot by 150-foot blast pads at the end of runways to provide blast erosion protection beyond runway ends.

The blast pad on the northern end of Runway 17-35 (Runway 17 end) is 150 feet wide by 150 feet long. This exceeds the FAA requirements, which are: 95 feet wide by 150 feet long for design group B-II.

There is no blast pad on the southern end of Runway 17-35 (Runway 35). There are no blast pads on either end of Runway 8-26. The alternatives chapter will explore the feasibility of adding blast pads as any construction off the runway ends may have a significant financial impact..

### 4.4.6 Runway Safety Areas

Runway safety areas (RSAs) enhance safety by providing cleared areas for airplanes which undershoot, overrun, or veer off the runway. They also provide improved accessibility for firefighting and rescue equipment during emergencies. The planned FAA design standard for B-II runways with approach minimums below ¾ mile visibility require RSAs to be 300 foot wide, centered along the runway and extending 600 feet beyond the runway threshold. For B-II runways with approach minimums not below ¾ mile visibility require RSAs to be 150 foot wide, centered along the runway and extending 300 feet beyond the runway threshold.

The Runway 17-35 RSA is 300 feet wide and extends 200 feet off of the Runway 17 end and 200 feet off of the 35 end. The existing RSA does not meet FAA design standards for design group B-II which requires an RSA of 300 feet centered along the runway and extending 600 feet beyond the runway threshold.

The Runway 8-26 RSA is 120 feet wide and extends 240 feet off of the Runway 26 end and 150 feet off of the Runway 8 end. The Runway 8 end does not meet the FAA design standard for B-I which requires an RSA of 120 feet centered along the runway and extending 240 feet beyond the runway threshold.

Options for providing full safety areas for those runway ends not meeting design standards have been explored in a separate study, the results of which will be presented in the Alternatives chapter.

### 4.4.7 Runway to Taxiway Separation Standards

There are two parallel taxiways at AUG. Taxiway C runs parallel to Runway 17-35 and is separated by 250 feet. The FAA runway-to-taxiway separation standard for an ADG B-II runway with minimums lower than ¾-mile is 300 feet.

Taxiway E runs parallel to runway 8-26 and is separated by 200 feet. The FAA runway-to-taxiway separation standard for an ADG B-I runway with minimums not lower than ¾ mile is 225 feet. Options for providing the full runway-to-taxiway separation will be presented in the Alternatives Chapter of the Master Plan Update.

### 4.4.8 Obstacle Free Zone

Obstacle Free Zones (OFZs) preclude taxiing and parked aircraft and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function. The OFZ is comprised of runway OFZ and, where applicable, the precision OFZ, the inner-approach OFZ, and the inner transitional OFZ. All portions of the OFZ are free of obstacles.

**Runway OFZ**

The runway OFZ is a defined volume of airspace centered above the runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway and is 400 feet wide for runways serving large airplanes. The OFZ meets existing and planned facility requirements.

**Inner-approach OFZ**

The inner-approach OFZ is a defined volume of airspace centered on the approach area and applies only to runways with an approach lighting system. Runway 17 has a MALSR approach lighting system. The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation of the threshold and extends 200 feet beyond the last light unit in the approach lighting system. Its width is the same as the runway OFZ and rises at a slope of 50:1 from its beginning. The inner-approach of the OFZ meets existing and planned facility requirements.

**Inner-transitional OFZ**

The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies only to runways with lower than ¾-statute mile approach visibility minimums. Runway 17 provides an ILS approach with a visibility limit of ½ mile for Approach Speed A and B aircraft. The inner-transitional portion of the OFZ meets existing and planned facility requirements.

**Precision OFZ**

The precision OFZ is a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide.

The surface is in effect only when all the following operational conditions are met:

- Vertically guided approach,
- Reported ceiling below 250 feet and/or visibility less than ¾-mile (or RVR below 4,000 feet), and
- An aircraft on final approach within two miles of the runway threshold.

The POFZ is applicable at all runway ends including displaced thresholds, however a POFZ is only required on the Runway 17 end. The POFZ meets existing and planned facility requirements.

### 4.4.9 Runway Object Free Area

The runway object free area (OFA) is centered on the runway centerline. The runway OFA clearing standard precludes

placing above-ground objects protruding above the runway safety area elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the OFA. For design group B-II the OFA is 800 feet wide and extends 600 feet beyond the runway end. Based on the vegetation management plan (2004) the OFA for both runways are not entirely clear. Some clearing of vegetation along the edge of the OFA are required to satisfy FAA requirements. See the 2004 vegetation management plan, which identifies those obstructions.

### 4.4.10 Runway Protection Zones

The runway protection zone's (RPZ's) function is to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. RPZ dimensions vary by approach visibility minimums for each Runway. There are two components to the RPZ: the controlled activity area and the portion of the runway OFA within the RPZ. Other than with a special application of declared distances, the RPZ begins 200 feet beyond the end of the area usable for takeoff or landing.

The FAA recommends clearing all objects from the RPZ; however, it permits some uses, provided they do not attract wildlife, are outside the runway OFA, and do not interfere with navigational aids. Residences and places of public assembly are prohibited within RPZs; fuel storage facilities should not be located in the RPZ.

Runway 17 provides a precision approach with visibility minimums below ¾ mile, requiring an RPZ that is 2,500 feet long (measured 200 feet beyond the runway threshold), 1,000 feet wide along its inner width, and 1,750 along its outer width. The current RPZ meets these dimensional requirements and is clear of obstructions.

Runway 35 provides instrument approach minimums that are not lower than 1 mile, requiring an RPZ (Approach Category C) that is 1,700 feet long (measured 200 feet beyond the runway threshold), 500 feet wide along its inner width, and 1,010 feet along its outer width. For Approach Category B the RPZ is required to be 1,000 feet long (measured 200 feet beyond the runway threshold), 500 feet wide along its inner width, and 700 along its outer width. The current RPZ meets the dimensional requirements for Approach Category B. Obstructions (trees) on the 35-end were cleared in 2006. It should also be noted that the possibility exists for GPS minimums to provide precision approaches and should be planned for by preserving an RPZ that is 2,500 feet long (measured 200 feet beyond the runway threshold), 1,000 feet wide along its inner width, and 1,750 along its outer width. This will be further explored in the alternatives chapter.

Runway 8 and 26 provide instrument approach procedures with minimums not lower than 1 mile, each requiring an RPZ (B-I) that is 1,000 feet long (measured 200 feet beyond the runway threshold), 500 feet wide along its inner width, and 700 along its outer width. The current RPZs meets these dimensional requirements, however some clearing of vegetation is required as

identified in the vegetation management plan.

### 4.4.11 Taxiway Requirements

A taxiway is a defined path established for the taxiing of aircraft from one part of an airport to another. The biggest deficiency in airfield circulation at AUG is that taxiway C, which runs parallel to Runway 17-35, is not a full length parallel taxiway. The lack of a full-length taxiway requires aircraft departing from Runway 17 to back-taxi. Also larger aircraft arriving on Runway 35 may have to back taxi to access taxiway C. Extending taxiway C will be explored in the alternatives chapter.

Taxiway requirements at AUG for taxiway-to-fixed or movable object are based on Aircraft Design Group (ADG) II. **Table 4.5** provides a summary of the separation standards for the existing runway/taxiway requirements. Existing taxiways provide sufficient taxiway to fixed or movable object separation with the exception of a short segment of taxiway E, which is slightly encroached by fencing in the terminal area.

**Taxiway Width**

All taxiways at AUG are 40 feet wide, except for Taxiway C1 which is 50 feet wide. This meets and exceeds the existing and planned group II design standards which require 35 foot wide taxiways.

**Taxiway Shoulders**

All taxiway shoulders at AUG are turf, which meet the needs of an airport of this size which is recommended to have at least 10 foot shoulders. Only airports of ADG-III and up are required to have paved or stabilized shoulders.

**Taxiway Safety Area**

The Taxiway Safety Area (TSA) is centered on the taxiway centerline. The TSA should be cleared and graded, properly drained, capable of supporting snow removal and rescue/firefighting equipment and the occasional passage of aircraft, and free of objects (except those needed to be in the safety area due to their function). The TSA for ADG-II aircraft should be 79 feet wide. All TSAs at AUG meet FAA design standards.

**Taxiway and Taxilane Object Free Area**

Taxiway and Taxilane Object Free Areas (TOFAs) are clearing standards centered on taxiway and taxilane centerlines provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. Vehicles may operate within the taxiway/taxilane OFA provided they give right of way to oncoming aircraft. For taxiways, the ADG-II OFA is 131 feet wide; for taxilanes, the OFA is 115 feet wide. All TOFAs at AUG meet FAA design standards with the exception of a short segment of taxiway E, which is slightly encroached by fencing in the terminal area. To meet FAA standards it is recommended that the corner of the fence be realigned to clear the TOFA of any obstructions.

Table 4.5

**Runway/Taxiway Requirements**

| **Runway Requirements** | **Runway 17-35 ADG B-II (1)** (FT) | **Runway 8-26 ADG B-I (2)** (FT) |
|---|---|---|
| Runway Width | 100 | 60 |
| Runway Shoulder Width | 10 | 10 |
| Runway Blast Pad Width (3) | 120 | 80 |
| Runway Blast Pad Length | 150 | 100 |
| Runway Safety Area Width | 300 | 120 |
| Runway Safety Area Length | 600 | 240 |
| (Beyond Rwy End) | | |
| Runway Obstacle Free Zone (OFZ) | | |
| Width | 400 | 250 |
| Length (Beyond Rwy End) | 200 | 200 |
| Inner Approach OFZ (Rwy 17 end only) | | |
| Width | 400 | N/A |
| Length | 200 feet beyond MALSR | N/A |
| Inner Transitional OFZ | Rising vertically from edge of OFZ to 54.5' then rising at a slope of 6:1 to 150' above the | N/A |
| Runway Object Free Area | | |
| Width | 800 | 400 |
| Length (Beyond Rwy End) | 600 | 240 |
| Runway Centerline to: | | |
| Taxiway/Taxilane Centerline | 300 | 225 |
| Aircraft Parking Area | 400 | 200 |

| **Taxiway Requirements** | **ADG B-II** | **ADG B-I** |
|---|---|---|
| Taxiway Width | 35 | 25 |
| Taxiway Edge Safety Margin | 7.5 | 5.0 |
| Taxiway Shoulder Width | 10 | 10 |
| Taxiway Safety Area Width | 79 | 49 |
| Taxiway Object Free Area Width | 131 | 89 |
| Taxilane Object Free Area Width | 115 | 79 |
| Taxiway Centerline to: | | |
| Parallel Taxiway/Taxilane Centerline | 105.0 | 69.0 |
| Fixed or Movable Object | 65.5 | 44.5 |
| Taxilane Centerline to: | | |
| Parallel Taxilane | 97.0 | 64.0 |
| Fixed or Movable Oject | 57.5 | 39.5 |

Source: FAA AC 150/5300-13; HNTB analysis.
(1) Approach minimums lower than 3/4 mile visibility.
(2) Approach minimums not lower than 3/4 mile visibility.
(3) No blast pad on Runway 35.

### 4.4.12 Ground Vehicle Circulation

A series of roadways provides access to various parts of the airfield. The airfield is accessed via a card access gate in the terminal parking lot, adjacent to the FBO, which leads directly onto the GA apron. From this point the perimeter circulation roads are only accessible by traversing the airfield to the end of Runway 8, which connects the Snow Removal Equipment (SRE) building with the airfield. Beyond the SRE building is a dirt road which runs parallel and around the northeast end of runway 17. There is an additional access point to this road approximately 900 feet from the end of Runway 17. The road continues around the northeast side of the runway towards Runway 26 which intersects a dirt road that connects to the intersection of Taxiway C and C1.

It should be noted that these are unimproved roads, and may not be useable in all conditions, particularly for ARFF/firefighting vehicles.

According to AC 150/5300-13, rescue and firefighting access roads are needed to provide unimpeded two-way access for rescue and firefighting equipment to potential accident areas. Connecting these access roads, to the extent practical, with the operational surfaces and other roads will facilitate aircraft rescue and firefighting operations.

The AC recommends that the entire RSA and RPZ be made accessible to rescue and firefighting vehicles so that no part of the RSA or RPZ is more than 330 feet from either an all-weather road or a paved operational surface.

The concepts phase of the Master Plan Update will identify improvements that will complement the existing roads and recommended facility development.

## 4.5 TERMINAL FACILITY REQUIREMENTS

Facility requirements for the passenger terminal building were based on forecasts of peak hour activity (including originating and terminating passengers, baggage, and aircraft operations), application of industry standards, FAA planning guidelines (AC 150/5360-9 and 150/5360-13), information gathered during the inventory process, and tenant interviews. The program areas for each major terminal function for each forecast year are presented in **Table 4.6**. The following sections describe these major functional areas and their respective facility requirements.

### 4.5.1 First Floor Terminal Facilities

This section covers the first floor elements of the terminal building, including ticketing, concessions, hold bag screening, airline ticket offices, outbound bag, bag claim, and restrooms.

**Ticketing**

The ticketing area for the terminal consists of a single linear ticket counter which runs perpendicular to the face of the terminal facade. The ticket counter is approximately 16 feet long by 2.5 feet deep with 7.5 feet of circulation space between the counter and wall behind the counter. This is sufficient for the single-station (occupied by Colgan) to handle passenger demand at existing and forecast levels. A typical ticket counter with

Table 4.6

**Passenger Terminal Building - Program Area by Function by Year**
**(Square Feet)**

| | | Required (SF) (3) | | | |
|---|---|---|---|---|---|
| | **Existing (SF)** | **2005** | **2010** | **2015** | **2025** |
| **LEVEL ONE** | | | | | |
| **Airline Functions** | | | | | |
| Ticket Counter | 250 | 90 | 99 | 108 | 117 |
| Ticket Counter Queuing | 150 | 120 | 132 | 144 | 156 |
| Airline Ticket Offices | 240 | 120 | 132 | 144 | 156 |
| Hold Bag Screening | 300 | 120 | 132 | 144 | 156 |
| Departure Lounge (1) | 500 | 507 | 558 | 608 | 659 |
| Baggage Claim | 110 | 120 | 132 | 144 | 156 |
| Subtotal | 1,550 | 1,077 | 1,185 | 1,292 | 1,400 |
| **Concessions Space** | | | | | |
| Restaurant | 1,920 | 45 | 51 | 54 | 59 |
| Rental Car | 60 | 45 | 51 | 54 | 59 |
| Bus Line | 110 | 110 | 110 | 110 | 110 |
| Subtotal Concessions Space | 2,090 | 200 | 212 | 218 | 228 |
| **Security Screening** | | | | | |
| Security Checkpoint (1) | 530 | 900 | 900 | 900 | 900 |
| Subtotal | 530 | 900 | 900 | 900 | 900 |
| **Secure Public Area** | | | | | |
| Hold Room | 125 | 143 | 172 | 182 | 199 |
| Circulation to Apron | 55 | 43 | 52 | 55 | 60 |
| Subtotal | 180 | 185 | 224 | 237 | 259 |
| **Non-Secure Public Area** | | | | | |
| Circulation - General (2) | 985 | 114 | 138 | 146 | 159 |
| Restrooms | 350 | 350 | 350 | 350 | 350 |
| Lift | 20 | 20 | 20 | 20 | 20 |
| Bus Departure Lounge | n/a | 90 | 90 | 90 | 90 |
| Subtotal | 1,355 | 574 | 598 | 606 | 619 |
| **Non-Public Area** | | | | | |
| TSA Office | 120 | 120 | 132 | 144 | 156 |
| ARFF Equipment/Garage | 325 | 200 | 200 | 200 | 200 |
| Janitor Closet | 30 | 30 | 30 | 30 | 30 |
| Subtotal | 475 | 350 | 362 | 374 | 386 |
| **Subtotal Level One** | **6,180** | **3,287** | **3,481** | **3,627** | **3,793** |
| **LEVEL TWO** | | | | | |
| FAA Radio Room | 240 | 240 | 240 | 240 | 240 |
| Airport Administration | 380 | 380 | 380 | 380 | 380 |
| TSA Supervisor Office | 240 | 240 | 240 | 240 | 240 |
| Board Of Professional Engineers | 530 | 530 | 530 | 530 | 530 |
| Budget Rental Car Office | 64 | 64 | 64 | 64 | 64 |
| Storage/Janitor Closet | 135 | 135 | 135 | 135 | 135 |
| Restrooms | 155 | 155 | 155 | 155 | 155 |
| General Circulation | 1,020 | 1,020 | 1,020 | 1,020 | 1,020 |
| **Subtotal Level Two** | **2,764** | **2,764** | **2,764** | **2,764** | **2,764** |
| **Grand Total** | **8,944** | **6,051** | **6,245** | **6,391** | **6,557** |

Source: HNTB analysis.
(1) SF take-off includes circulation space.
(2) Some circulation space is not included in this figure as it has been included in other terminal functions.
(3) Future planning requirements based on industry standard planning factors based on peak hour enplanements/deplanements and professional judgment. Security screening requirements are based on typical single TSA checkpoint design requirements.

baggage well/scale is approximately 4.5 to six feet wide by three feet deep with approximately eight feet of circulation space between the counter and wall behind the counter. The additional counter width at AUG is useful to accommodate a second agent position for passenger processing.

While the ticket counter meets the needs of the facility, it is not ideally located as it is obscured by a wheelchair lift, and, therefore not immediately visible upon entrance. Typically ticket counters are placed near the terminal entrance to increase visibility and improve flow. It was noted that the ticket counter height does not meet the American with Disability Act (ADA) requirements. In order to provide ADA access, ticket counters should have an available lower counter height for transactions. Airlines have the option, however, to facilitate transactions by assisting passengers with a clipboard, in lieu of an ADA writing surface.

**Queuing Space**

The ticketing line forms parallel to the ticket counter in an area approximately 15 feet long and 10 feet wide from the front of the ticketing counter to the pre-screening departure lounge seating. The queuing area appears to be adequate for the existing and forecast demand levels. Industry standards at a scheduled service facility typically plan to accommodate the peak hour enplaned passengers (PHEP) (10 to 13 passengers). Industry standards typically plan 12 square feet (4x3 feet) per PHEP which would require a queue ranging from 40 to 52 feet in length for a stanchioned line. The existing area could accommodate a 30 foot-long stanchioned queue which doubles back on itself. Therefore, it would be an improvement to provide additional queuing length and circulation space with a slightly larger buffer between the ticket queue and pre-screen departure seating. In peak hour conditions the queue of passengers could begin to limit circulation to/from the pre-screen departure lounge and ticketing area.

**Airline Ticket Office**

Directly adjacent to the area behind the ticket counter is the Colgan ticketing office and the crew room. They are each approximately 120 square feet. These facilities are typically sized by individual airline requirements and demand levels. During the inventory process, airline staff indicated that the space is cramped and more support area is required.

**Hold Bag Screening**

The baggage screening area is approximately 300 square feet and is located directly behind the ticketing counter. The baggage screening area requirements are based on the forecast of peak hour enplaned passengers. This was calculated by taking the number of peak hour originating passengers, multiplying by 0.7 (an industry average ratio of passengers checking a bag), and multiplying this number by an average 1.5 bags per passenger checking bags. The existing baggage screening area is sufficient to handle the existing number of 10.5 peak hour bags. For the year 2025, the peak hour number of bags is forecast to reach nearly 14, and a full flight would reach approximately 20. The existing baggage screening area is sufficient to accommodate these requirements.

**Pre-screening Departure Lounge**

The center of the terminal is the pre-screen departure lounge, which is located on the non-secure-side of the terminal building. Ticketed passengers typically wait here until their flight arrives and then proceed through the TSA checkpoint. There is a short amount of time that arriving passengers, departing passengers, visitors, and meeter greeters may share the same space.

Public seating is located adjacent to the ticket counters. There are 12 seats centered in the room, two against the wall near the restroom entrance, and three opposite the rental car counter, for a total of 17 seats. The pre-screen departure lounge amounts to approximately 500 square feet including shared circulation space for the surrounding functions. This is adequate to accommodate the existing and planned demand of 10 to 13 peak hour enplanements with visitors (3 to 4 peak hour visitors). When arriving passengers and meeter/greeters are included in peak hour conditions, the pre-screen lounge area will be at the limit of acceptable area requirements.

**Passenger Security Screening**

The passenger security screening area totals approximately 500 square feet and is undersized compared to standard industry checkpoint design. A typically sized single checkpoint is approximately 900 square feet. The existing configuration leaves very little area for passenger queuing and circulation, which causes passengers to queue in front of the restaurant entrance and extend over to the rental car counter. The following should be provided:

- Additional queue area
- More area for passengers to divest their belongings prior to the checkpoint area.
- A private pat down interview/inspection room/area.
- Area to accommodate probable security equipment upgrades in future years.

**Baggage Claim**

The baggage claim area is approximately 110 square feet with a simple baggage claim shelving system. The baggage claim requirements are based on the forecast of peak hour bags. This was calculated by taking the number of peak hour originating passengers, multiplying by 0.7 (the ratio of passengers checking a bag), and multiplying this number by an average 1.5 bags per passenger checking bags. The existing baggage claim facility is sufficient to handle existing number of 10.5 peak hour bags. For the year 2025, the peak hour number of bags is forecast to reach nearly 14. (With a full flight, the peak number of bags would reach approximately 20.) The existing baggage claim is sufficient to accommodate these requirements.

**Restrooms**

Restrooms at AUG are centrally located on the non-secure side of the terminal, adjacent to the pre-screen departure lounge. The facilities are adequate for existing and planned activity levels. They are, however, not outfitted to meet ADA standards which require a minimum of 5-foot by 5.5-foot stalls with wall-mounted hand rails. No restrooms are provided on the secure side,

which for this type of facility is acceptable as wait times in the holdroom are relatively short. It is recommended, however that, should the terminal be renovated, providing restrooms in the secure area would improve customer service.

**Restaurant**

The terminal houses a restaurant on the south side of the building. This provides a great service to both airport users and the general public. The restaurant occupies approximately 30 percent of total first floor square footage. For a terminal that is short on space supporting air passengers this may be considered an excessive allocation of space to the function of concessions. To better accommodate other primary airport functions consideration should be given to reallocating space in the terminal.

**Rental Car Counter**

The rental car counter is located just outside the restrooms in a low-walled cubicle between the departure lounge and security screening area. It is both visible and accessible for deplaning passengers, who presumably have just picked up their baggage. While the location is convenient, it does constrict the lounge area and inhibits circulation between security and the departure lounge. Relocating the facility towards the south exit of the facility with a collocated office would greatly improve customer service.

Table 4.6 shows existing and forecast passenger terminal building requirements by year.

### 4.5.2 Second Floor Terminal Functions

The second floor of the terminal is accessed via the north stairwell. It is a non-secure public area which houses airport management offices and aviation/non aviation related tenants. The airport manager's office, located in the north corner of the building overlooks the airfield and provides a clear view of existing weather conditions and airfield activity. The office contains a small meeting area and adequately meets the needs of airport management.

There are four tenants on the second floor of the terminal:

- TSA (supervisor office and staff lounge/break room)
- FAA (radio room)
- Budget Rental Car
- Professional Engineers Certification Board

The existing facilities appear to meet the needs of all of the tenants on the second floor. In the future however, space on the second floor should be reserved for aviation tenants. There is approximately 530 square feet of space leased to non aviation tenants (Professional Engineers Certification Board). This space could be better utilized to accommodate aviation tenants in need of additional space; i.e. Colgan who require a supervisor's office and dedicated break room.

### 4.5.3 Restrooms

There are restroom facilities on the second floor. The men's room is undersized compared to typical industry standards which recommend 5-foot by 5.5-foot stalls with wall-mounted hand rails to meet ADA standards.

### 4.5.4 Additional Terminal Considerations

**Terminal Access**

The passenger terminal is located directly off of Airport Road. and can be easily accessed via Western Avenue (connecting to I-95) and Winthrop Street, which links the airport to downtown Augusta.

The terminal is situated on the outside of a 90 degree bend which transitions from Airport Road. to Winthrop Street. While the existing road alignment and terminal access are functional, they are not desirable. Traffic passing through Airport Road/Winthrop Street pose a significant risk to passengers parking across the street in the overnight lot because the crosswalks are located at the apex of the 90 degree turn in the road where the visibility is poor for both pedestrians and approaching automobiles. Installing speed reduction devices (i.e. rumble strips, speed bumps, or visual cues indicating a lower speed environment) would be the most effective solution aside from reconfiguring the entire road alignment and crosswalk.

**Terminal Curbside**

The passenger terminal curb is accessed by turning through the short-term terminal parking lot and through an approximate 25 foot wide pick-up/drop-off lane. The curb is approximately 100 feet long by 5 feet wide and is used by both air and Greyhound/Vermont Transit bus passengers to access and egress the terminal facility. The curb is reported to be inadequate for the purposes of both bus and air passengers. When buses arrive at the terminal, they block a significant portion of the building front and main entrance to the facility. Given the proximity of the curb front to the terminal entrance, exhaust fumes from an idling bus permeate the building creating an undesirable environment for both bus and air passengers. Alternatives to alleviate this situation will be reviewed in the alternatives chapter.

**Bus Passengers**

Scheduled bus service is offered from the air passenger terminal. There are three northbound and three southbound trips daily with an average of 10 passengers per day. The placement of the bus ticketing window, directly to the right of the main terminal entrance is convenient for bus passenger, but may slightly impede the passage of air passengers entering the terminal. It is not a recommendable location for an air passenger facility and should ideally be relocated to an area independent of air passenger access/egress. No space is allocated to support departing bus passengers. It is recommended that a small departure lounge be provided. This will improve the customer service level for bus passengers and aid the separation of bus and air traffic.

## 4.6 PARKING REQUIREMENTS

This section documents anticipated passenger terminal parking activity and requirements at AUG. Separate facility requirements were developed for existing activity levels and forecast levels through 2025. (See **Table 4.7**.) There are three lots associated with terminal activity, the satellite lot, terminal lot and rental car lot. The capacities of these lots are assessed below.

### 4.6.1 Satellite Lot

Currently, both long-term and short-term parking activity occurs in the satellite lot located across the street from the terminal. This lot also supports rental car, and restaurant parking leaving approximately 63 spaces for passenger/scheduled service use. Existing parking demand as indicated by airport management averages 60 percent occupancy and peaks at 90 percent occupancy or 57 spaces. If parking demand is increased at the same rate that passenger activity is forecast to increase, parking demand in 2025 will exceed available capacity by approximately 11 spaces. Therefore either additional parking is required or reallocating leased spaces can be done to meet forecast demand.

### Terminal Lot

The terminal lot has approximately 20 spaces available for terminal building tenants, and short-term users. The number of employees at the terminal facility are not forecast to change significantly over the planning period. A survey of airport management indicated that the existing terminal lot provides sufficient spaces for employees and short-term users. It should be noted that this assumes all air passenger parking occurs across the street in the satellite lot.

Table 4.7

**Parking Requirements**

| | Existing | Required Spaces | | | |
|---|---|---|---|---|---|
| **Lot** | **2005** | **2005** | **2010** | **2015** | **2025** |
| Satellite (Passenger Parking) | 63 | 57 | 62 | 68 | 74 |
| Terminal Lot | 20 | 20 | 20 | 20 | 20 |
| Rental car ready/return spaces | 20 | 10 | 11 | 12 | 13 |
| Total Air Passenger Related Parking | 103 | 88 | 94 | 101 | 108 |

Source: Airport Management, Budget Rental Car, MIF, HNTB Analysis.

**Rental Cars**

Through tenant surveys, Budget indicated that an average of 10 cars are available on-airport for rent. Budget leases three parking spaces in the terminal lot and 17 across the street in the satellite lot. If rental car demand is increased at the same rate that passenger activity is forecast to increase, demand in 2025 will reach 65 percent of available capacity or 13 spaces. Based on information provided the number of spaces available for rental cars is more than adequate for existing and forecast activity levels.

## 4.7 GA FACILITIES

GA facility requirements were identified based on the forecasts of GA demand presented in Chapter 3. Specific facility needs were identified for the GA terminal/FBO, apron parking (including transient and based tie-down), T-hangars, and conventional hangars. **Table 4.8** summarizes GA facility requirements.

### 4.7.1 GA Terminal/FBO

The current FBO terminal/office building comprises 11,230 square feet, of which 4,430 square feet is dedicated terminal space. Although the size of a GA terminal building is typically related to peak hour passenger activity, the GA terminal must be of minimum size to accommodate basic functions. Based on a review of a range of similarly sized airports' minimum standard documents for FBOs, a minimum of 1,500 square feet is recommended to provide space for basic functions, including a lobby, pilot lounge, flight planning room, classroom (flight school), restrooms, administrative space, and circulation space. Although the existing area dedicated to GA terminal functions is nearly three times greater than the minimum, the additional space provides room for a conference room, flight shop, and additional office space and provides opportunity for a higher level of customer service. It is therefore recommended that the existing area be maintained to continue the high level of service currently offered GA customers.

Automobile parking for the GA terminal is provided in a common lot which serves both this facility and the commercial passenger terminal. The spaces designated for the FBO were recently re-striped to provide 23 spaces. Interviews with the FBO indicated that employees typically require eight to 10 spaces, with the remaining reserved for customers. During the annual peak in July, the lot fills to capacity, which requires customers to park across the street in the satellite lot. The existing FBO parking does not meet existing and future facility requirements. Additional over flow spaces should be planned for in the satellite lot across the street.

### 4.7.2 Transient Parking and Aircraft Storage

Transient aircraft parking and aircraft storage includes apron for parking visiting aircraft, and tie-down apron, T-hangar, and conventional hangar facilities to store based aircraft.

**Transient Aircraft Parking**

Approximately 8,000 square feet of apron is available for transient aircraft parking. The existing transient apron is extremely limited

Table 4.8

**Summary of General Aviation Facility Requirements**

| | Existing | | Required | | | | |
|---|---|---|---|---|---|---|---|
| | 2005 | | 2005 | 2010 | 2015 | 2020 | 2025 |
| Terminal/FBO | | | | | | | |
| Building (SF) | 4,430 | (1) | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| Auto Parking (Spaces) | 23 | (2) | 23 | 23 | 23 | 23 | 23 |
| Auto Parking/Circulation (SF) | 10,800 | (2) | 10,800 | 10,800 | 10,800 | 10,800 | 10,800 |
| Aircraft Storage/Transient Parking | | | | | | | |
| Transient Parking (Spaces) | | | | | | | |
| ADG-I | 3 | | 2 | 2 | 2 | 2 | 2 |
| ADG-II | 1 | | 3 | 3 | 3 | 3 | 4 |
| ADG-III | | | | | | | |
| Total | 4 | (3) | 5 | 5 | 5 | 5 | 6 |
| Transient Aircraft Pkg (SF) | 8,000 | (3) | 8,940 | 8,940 | 8,940 | 8,940 | 12,676 |
| Based Aircraft Tie Down (Spaces) | | | | | | | |
| ADG-I | 40 | (4) | 11 | 11 | 12 | 12 | 13 |
| ADG-II | - | | - | - | - | - | - |
| ADG-III | - | | - | - | - | - | - |
| Total | 40 | (4) | 11 | 11 | 12 | 12 | 13 |
| Based Aircraft Tie Down (SF) | 42,020 | | 13,200 | 13,200 | 14,400 | 14,400 | 15,600 |
| T-hangar | | | | | | | |
| Units | 25 | (5) | 32 | 34 | 34 | 35 | 36 |
| Building (SF) | 27,188 | (5) | 34,800 | 37,000 | 37,000 | 38,100 | 39,200 |
| Adjacent Ramp/Circ. (SF) | 71,812 | | 104,400 | 111,000 | 111,000 | 114,300 | 117,600 |
| Conventional Hangar | | | | | | | |
| Stored Aircraft | 3 | (6) | 3 | 5 | 6 | 7 | 7 |
| Building (SF) | 6,800 | (6) | 6,800 | 11,300 | 13,600 | 15,900 | 15,900 |
| Adjacent Ramp/Circ. (SF) | 5,600 | (7) | 6,800 | 11,300 | 13,600 | 15,900 | 15,900 |
| Aircraft Maintenance (SF) | | | | | | | |
| Building (SF) | 6,000 | (8) | 6,000 | 6,500 | 6,700 | 6,900 | 7,400 |
| Adjacent Ramp/Circ. (SF) | - | (7) | 6,000 | 6,500 | 6,700 | 6,900 | 7,400 |
| Total Estimated GA Circulation Area | 141,617 | (9) | 178,240 | 178,240 | 178,240 | 178,240 | 178,240 |
| Total GA Site Area (SF) (3) | 182,650 | (10) | 199,240 | 218,040 | 224,240 | 233,640 | 243,976 |
| Total GA Site Area (Acres) (3) | 7.4 | (10) | 8.7 | 9.1 | 9.2 | 9.5 | 9.7 |

Notes: (1) Includes northwest portion of Building No. 2.
(2) Estimated.
(3) Includes apron directly adjacent to FBO Building No. 2; typical configuration.
(4) Assumes Apron B along Taxiway F is fully striped for tie-downs. Based on percentage of forecast based aircraft growth.
(5) Includes Buildings No's. 7, 8, and 9. Based on documented waiting list and percentage of forecast based aircraft growth.
(6) Includes southeast portion of Building No. 2. Based on percentage of forecast based aircraft growth.
(7) Forecast apron requirements based on survey, which determined building to apron ratio of appx. 1.0
(8) Building No. 3; excludes approximately 400 square feet of space used by FAA.
(9) Estimates circulation area based on FAA taxilane requirements. Existing configuration does not meet stnadards.
(10) Includes building area, aprons, taxilanes, parking.

Source: HNTB analysis.

in size. If analyzed while providing a minimum circulation corridor (per FAA guidelines) to the tie down area, T-hangars and fuel farm only four positions are available; three ADG-I (typical SEP) positions and one ADG-II position.

Based on discussions with the FBO manager, during typical peak periods, about five transient spaces are required: two for ADG-I aircraft, three for ADG-II aircraft. Forecast transient apron requirements were estimated to increase by approximately the same rate as the forecast increase in based aircraft. Under this assumption, one additional transient parking position would be required, for a total of six positions by 2025.

**Based Aircraft Storage Requirements**

Based aircraft may be kept tied down on an apron, stored in T-hangars, or stored in conventional hangars. In general the propensity to use one method of storing an aircraft versus another is based on an aircraft's value (i.e., smaller, less expensive aircraft are parked on the apron, while more expensive aircraft are kept in hangars) and climate (i.e., the more severe weather conditions experienced at an airport, the greater the likelihood that aircraft would be stored in a structure). The based aircraft at AUG are forecast to increase from 46 in 2005 to 56 by 2025. The following discusses how those additional aircraft are expected to be accommodated.

The apron area available for based aircraft tie-down is approximately 42,000 square feet (4,666 square yards), although some portions of this area are not currently capable of accommodating tie-downs. There are also 25 T-hangar stalls (each is occupied) and about 6,800 square feet of conventional hangar space. According to the FBO, there is immediate demand for additional T-hangar storage.

Based on the existing storage pattern and the input provided by the FBO, a demand profile for the various storage options was estimated. It was assumed that about 28 percent of single engine aircraft would be tied-down and 72 percent would be stored in a T-hangar. About 40 percent of multi-engine props would be stored in T-hangars and 60 percent would be stored in conventional hangars. The activity forecasts show smaller business jets being introduced to the AUG based aircraft fleet beginning in 2010. It was assumed that all business jets would be stored in conventional hangars. Based on this profile, the GA area would need to provide 11 tie-down positions, 32 T-hangar stalls, and conventional storage space for three aircraft to accommodate existing demand.

By applying the storage distribution assumptions described above, the number of based aircraft needing tie-down space is forecast to increase from 11 in 2005 to 13 in 2025. The number of based aircraft needing a T-hangar stall is forecast to increase from 32 in 2005 to 36 in 2025. Finally, the number of aircraft needing storage space in a conventional hangar is forecast to increase from three in 2005 to seven in 2025.

### 4.7.3 GA Aircraft Maintenance

GA maintenance activity occurs in Building 3 which provides about 6,000 square feet of floor space. Assuming that the relationship between demand for maintenance and the

floor capacity of the hangar is currently well-balanced, future maintenance hangar requirements were forecast to grow at the same rate as based aircraft and transient aircraft parking positions. According to this assumption, the square footage requirement for GA aircraft maintenance will grow by 400 square feet by 2025.

### 4.7.4 GA Site Circulation

Typically taxilanes are clearly defined and provide full taxilane object free areas to ensure a safe environment where aircraft can independently access the itinerant apron, fuel facilities, tie-downs, and aircraft storage. An ADG-I taxilane should provide a clear swath of 79 feet centered on the taxilane center line. An ADG-II taxilane should provide a clear swath of 115 feet centered on the taxilane center line. Aircraft circulation within the existing GA site does not meet these design requirements. Options for improving circulation will be discussed further in the alternatives chapter.

### 4.7.5 Total GA Site Requirements

Total GA site requirements include the land occupied by buildings, aircraft aprons, automobile parking, and taxilanes/taxilane object free area. The existing GA area is approximately 7.4 acres and existing GA requirements indicate a need of approximately 8.7 acres. The total site area needed for GA facilities by 2025 is estimated to be approximately 9.7 acres.

## 4.8 Airport Airfield Maintenance

The airport's field maintenance building is located east of the airfield next to the FBO maintenance hangar. The Airfield Maintenance building is approximately 3,260 square feet. The building is primarily used for equipment storage and maintenance.

Airfield maintenance requirements are directly related to the amount of developed area within the Airport boundary, including areas that are cleared, graded, or paved. Based on discussions with Airport staff, the existing facility has adequate capacity for current and forecast activity levels. It should be noted however that the facilities are in fair and poor condition and may require rehabilitation or reconstruction in the future. The alternatives chapter will explore this further.

### 4.8.1 Snow Removal Equipment

According to AC 150/5220-20, Airport Snow and Ice Control Equipment, the minimum snow removal required for an airport is determined by the airport type (commercial or non-commercial), the number of annual operations, and the amount of annual snowfall. The AC recommends that runways and taxiways be maintained, if possible, to a "no worse than wet" condition during inclement weather.

Minimum equipment requirements for existing activity levels were determined using the FAA Snow Removal Sizing Guide computation tool, and the graphical solution, table 2-6 in AC 150/5220-20. To be included **Appendix B** for assumptions and calculations used for existing conditions. Based on this analysis the following will be adequate to meet minimum snow removal equipment requirements:

Either one Class IV (≤ 3000 tons/hr) or two Class II rotary plows (≤ 1500 tons/hr each)

- Two displacement plows (13.6 foot moldboard) with carrier vehicles having 175-250 bhp
- Two towed or self propelled air blast power sweepers
- Two hopper spreaders for abrasives and solid deicing chemicals

Based on information collected in the inventory process, the rotary plows, displacement plows and hopper spreaders owned by the airport exceed the requirements as outlined above. The airport only owns one power sweeper; an additional unit will need to be acquired to meet minimum FAA requirements.

Minimum equipment requirements for 2025 forecast activity levels:

- Two Class III (≤ 3000 tons/hr) rotary plows
- Two displacement plows (24 foot moldboard) with carrier vehicles having 200-300 bhp.
- Two towed or self propelled air blast power sweepers
- Two hopper spreaders for abrasives and solid deicing chemicals

If activity at AUG meets forecast activity levels, additional snow removal will be required to meet future minimum equipment requirements. One additional rotary plow, one displacement plow (to meet the total actual moldboard requirement of 47 feet) and one additional power sweeper.

**Snow Removal Equipment Storage**

The existing snow removal equipment (SRE) storage facility is located northwest of intersection of runway 17-35 and 8-26. The facility meets existing requirements and may be able to accommodate long-term requirements as old equipment is retired.

## 4.9 AIRPORT RESCUE AND FIRE FIGHTING REQUIREMENTS

AUG is currently classified as a Class III (scheduled small air-carrier airport) Part 139, ARFF Index A facility. Based on the forecast fleet mix presented in Chapter 3, the Airport will remain an Index A facility through the 20-year planning horizon. ARFF Index A requires airports to provide either:

- One vehicle carrying at least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent and 1,500 gallons of water and the commensurate quantity of Aqueous Film Forming Foam (AFFF) for foam production; or
- Two vehicles, with one vehicle carrying the extinguishing agents as specified above and one vehicle carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons.

Primary and secondary response for AUG is provided off-airport by the Central Station located on Grove Street, approximately 1.5 miles from the midpoint of runway 17-35

via the MIF gate. The Augusta Fire department has two Class A pump trucks staffed full-time for ARFF: a 2006 American Lafrance and a 2004 E-One. They are both capable of pumping 1500 gal/minute and carry 1,000 gallons of water and 30 gallons of Class A and B foam. There are also two back-up Class A pump trucks that carry 1,000 gallons each and can pump 1,250 gallons/minute.

On airport there is also a fire suppression trailer carrying extra water and dry chemical. This equipment meets the Part 139 requirements for an airport of this size and service level.

Should the level of service change (i.e. with onset of Saab 340 service) utilizing aircraft with >30 seats, the ARFF index at AUG will not change. The type of operating certificate will change from a class III to a Class I, Part 139 airport, which has the same ARFF equipment requirements as the existing Class III certification. This will require updating the Airport Certification Manual (ACM) pursuant to FAA requirements. Determining whether on-airport ARFF support be provided is based on schedule frequency, which at this point is undetermined. The alternatives chapter will identify a site for ARFF should full time ARFF support be required by the FAA.

## 4.10 Fuel Farm

The existing fuel farm is located in the GA area, directly in front of the main MIF building. There are three 15,000-gallon underground tanks. Two store Jet-A and one stores Avgas. Based on interviews with MIF (the FBO) the existing fuel facilities at AUG have about four weeks of reserve and are sufficient to meet existing and forecast activity levels. During peaks in fuel demand, which fall around Memorial Day and the 4th of July, the fuel supply has about one week of reserve. In an emergency an Exxon fuel truck can be dispatched in short order.

## 4.11 Utilities

### 4.11.1 Electrical

Electricity is provided by Central Maine Power company. Given the existing and forecast activity levels, which are not expected to change significantly, the existing supply has adequate capacity to meet long-term requirements. The airfield lighting vault is 45 years old and is nearing the end of its useful life. It should be upgraded in conjunction with a related project. Typically airfield lighting vaults are planned to have a 50 year service life.

### 4.11.2 Water

Water is supplied via the Camp Keyes 12-inch pumping station main. Given the existing and forecast activity levels, which are not expected to change significantly, the existing supply has adequate capacity to meet long term requirements. The inventory process did identify that the airport and Camp Keyes share the same bill. It is recommended that the airport change this to meter water consumption independently from Camp Keyes.

### 4.11.3 Sanitary Sewer

The sanitary sewer is a gravity feed system that runs from the terminal building down the airport access road to Western Avenue pump stations. Based on the fact that the

existing fixture count is not expected to increase, the existing capacity meets existing and anticipated demand.

### 4.11.4 HVAC System

No specific issues have been identified with the HVAC system outside of routine maintenance. No significant changes in the terminal facility requiring additional cooling/heating capacity are anticipated. The existing system is adequate to meet facility requirements.

### 4.11.5 Communications

No specific issues have been identified with airport communications infrastructure, and no significant changes requiring additional infrastructure are anticipated. The existing infrastructure is adequate to meet facility requirements.

## 4.12 SUMMARY OF 20-YEAR FACILITY REQUIREMENTS

- Improve RSAs to meet FAA standards.
- Acquire property for forecast GA area requirements
- Acquire property or easements within RPZs.
- Improve runway 17-35 line-of-sight condition.
- Provide full length Taxiway C to eliminate the need to back taxi and mitigate the line-of-sight issue on Runway 17-35.
- Provide full runway-to-taxiway separation on Taxiway C.
- Upgrade 45 year old airfield lighting vault and 25 year old airfield lighting.
- Renovate/redesign major terminal functions to improve level of service.
- Reallocate or add additional passenger parking spaces to the satellite lot in the mid to long-term.
- Size maintenance hangar to accommodate larger aircraft.
- Increase capacity of transient aircraft apron.
- Construct 11 additional T-Hangar units.
- Increase conventional hangar space to accommodate 4 additional aircraft.
- Improve circulation in GA area to meet FAA standards.
- Purchase additional power sweeper to meet minimum snow removal equipment requirements.

# Chapter Five
# Alternative Concepts and Recommended Development Plan

## 5.1 INTRODUCTION

This chapter describes the process used to prepare a recommended development plan for AUG. As described in the facility requirements chapter, the existing airfield and terminal facility can accommodate forecast aircraft operations and passenger demand through the planning period. Therefore, the majority of the concept analysis focused on providing additional facilities to meet general aviation facility requirements. Qualitative analysis was conducted on certain airfield, terminal, and ground transportation components to meet FAA design standards and improve customer service as identified through the planning process. In addition, several post-2025 terminal area development scenarios were evaluated at the request of the Airport and MaineDOT to identify an ultimate terminal location. Recognizing the significant constraints of expanding terminal facilities within existing Airport property, a new terminal facility designed to meet potential increases in demand beyond 2025 would require the use of Camp Keyes property.

## 5.2 OVERALL CONCEPT DEVELOPMENT STRATEGY

The strategy for identifying and evaluating concepts was driven by the Airport Master Plan Update's goals and objectives (presented in Chapter 1), where key improvements and concerns of the aviation and local communities were identified and prioritized. From these goals and objectives, three key elements were considered to be points of focus:

1. Provide safe and efficient Airport facilities and meet long-term requirements;
2. Promote economic growth that will enable the Airport to become more self-sustaining; and
3. Remain responsive to input received from neighboring communities.

In addition, it was recognized that three other factors needed to be considered:

1. It is desirable to meet facility requirements on existing Airport property;
2. The Airport's cash flow during the period will likely be limited; and
3. There is a possibility that scheduled service could be discontinued.

The process used to develop alternative concepts and select a recommended development plan is outlined below.

## 5.3 CONCEPT DEVELOPMENT APPROACH

A collaborative approach between Airport staff, MaineDOT, FAA and HNTB was used to develop and evaluate concepts and to select the preferred concept for each functional element to be included in the recommended plan.

The first step in the process was development of a range of preliminary concepts for presentation in a one-day planning workshop that included representatives from the Airport, MaineDOT, HNTB, members of the Planning Advisory Committee (PAC) and representatives from the local community. In addition to considering the goals and objectives stated above, each concept was also developed with the intent of meeting long-term (2025) facility requirements. The primary purpose of this initial meeting was to solicit input to help identify the opportunities and constraints at the Airport.

The concepts were then refined based on input from the workshop. Over a several month process the concepts were further refined and evaluated through a series of teleconferences with airport staff, MaineDOT and FAA.

The following sections discuss the alternative concepts that were developed through this process.

## 5.4 GA CONCEPTS

The facility requirements analysis identified the need for additional GA facilities within the 2025 planning period. The primary facilities needed to meet these requirements include 11 additional T-hangars, approximately 10,000 square feet of additional conventional hangar space, six transient parking positions (two multi engine and four turbojet sized spaces) and 13 based aircraft tie-downs (sized for multi-engine aircraft). AUG is a very constrained facility with limited development area. While there are areas within the Airport boundaries that appear to be developable, expansion into these areas is complicated by terrain, access, and lack of infrastructure. The cost of development in areas on the Airport other than the existing GA area would be prohibitive. As a result, relatively few viable GA development options exist. The concept analysis therefore focused on the existing GA area. Due to the constraints in this area this analysis concluded that there were only two alternatives worth evaluating. These two options are described below.

### 5.4.1 GA Alternative 1

The theme of Alternative 1 was to maximize the full extent of the development area. This was accomplished by utilizing the existing building line as the western boundary of the development area and closing Taxiway F to allow for future development.

The primary issue associated with this option is penetration of the FAR Part 77 transitional surface. The facilities along the existing building line are already penetrations to Part 77. The proposed facilities would not create any higher penetrations to the transitional surface, but they would create additional penetrations which would not be supported by the FAA. The hangar line, however, is clear of the Object Free Zone, which, by definition, is a

more critical surface. By following the existing hangar line, sufficient developable area is available to meet and even exceed 2025 facility requirements.

There are two options for providing additional transient aircraft parking positions. In the first option, additional transient aircraft parking positions would be provided directly adjacent to the FBO building. This would require relocating some existing GA auto parking to a new satellite lot adjacent to the T-hangars. In the second option, Buildings 4 and 5, which have reached the end of their useful life, would be torn down, and the area would be reconstructed for transient aircraft parking. Building 4 is an airfield maintenance garage. Building 5 is a MaineDOT sand storage facility. Because these facilities do not need direct airfield access and the land they occupy has a clearly identified higher and better use, this site should be redeveloped to serve activities requiring direct airfield access. The airfield maintenance equipment in Building 4 and sand in Building 5 (if necessary, as the SRE facility already has heated sand storage) would be relocated to the SRE storage site, which is located 800 feet northwest of the intersection of Runway 17-35 and Runway 8-26. (See **Figure 5-1.**)

### 5.4.2 GA Alternative 2

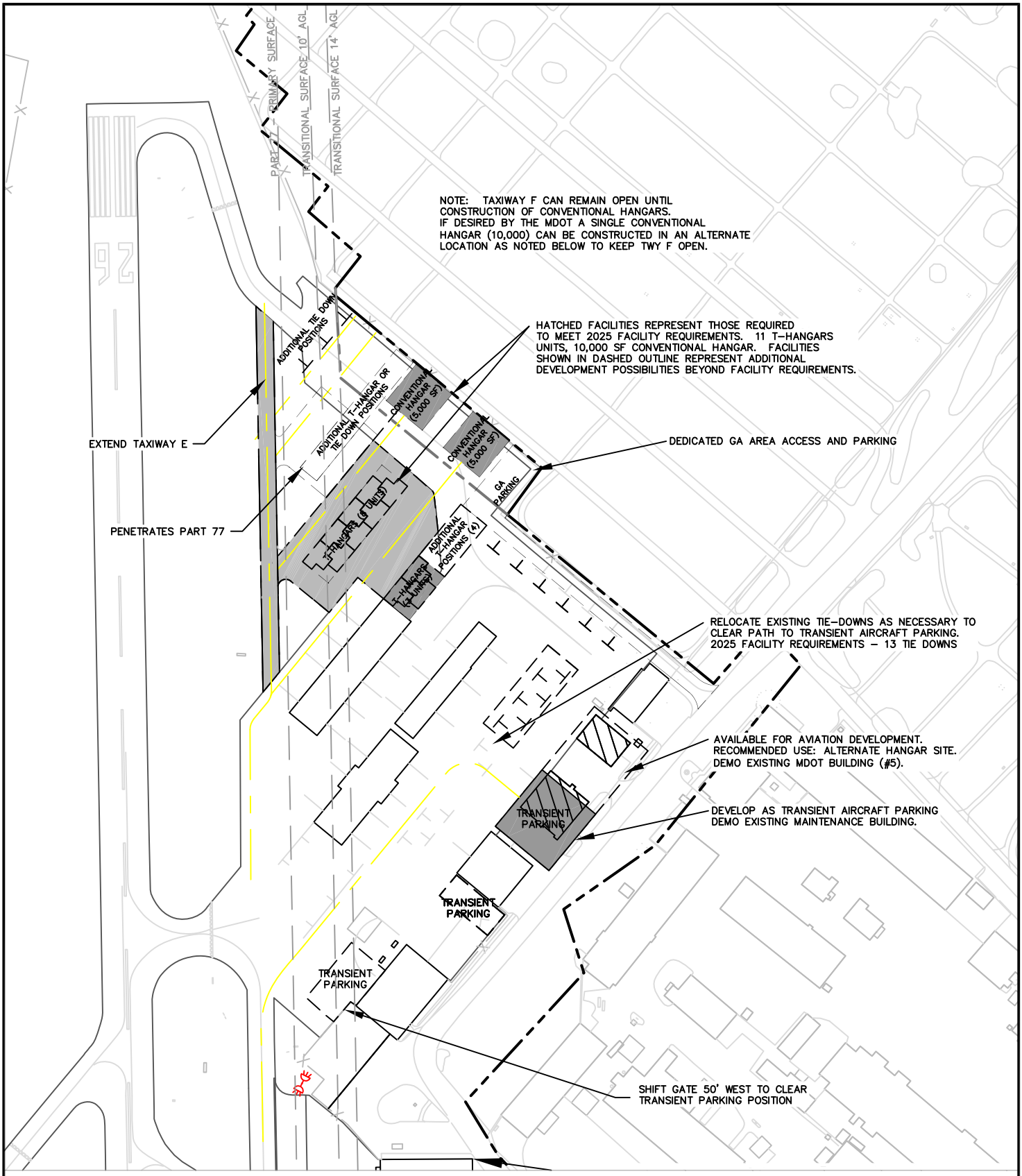
The theme of Alternative 2 was to expand GA facilities clear of the FAR Part 77 transitional surface. This was achieved by closing Taxiway F and extending Taxiway E to provide a full parallel taxiway to access Runway 8 and the new hangars.

As with GA Alternative 1, there are two options for providing additional transient aircraft parking positions. In the first option, additional transient aircraft parking positions would be provided directly adjacent to the FBO building. This would require relocating some existing GA auto parking to a new satellite lot adjacent to the T-hangars. In the second option, Buildings 4 and 5, which have reached the end of their useful life, would be torn down and the area would be reconstructed for transient aircraft parking. Building 4 is an airfield maintenance garage. Building 5 is a MaineDOT sand storage facility. Because these facilities do not need direct airfield access and the land they occupy has a clearly identified higher and better use, this site should be redeveloped to serve activities requiring direct airfield access. The airfield maintenance equipment in building 4 and sand in building 5 (if necessary, as the SRE facility already has heated sand storage) would be relocated to the SRE storage site, which is located 800 feet northwest of the Runway 17-35 and Runway 8-26 intersection.

The parking spaces adjacent to the FBO building are critical to the operation of MIF. It is recommended that additional transient aircraft parking spaces be gained by removing Buildings 4 and 5 and redeveloping a portion of the area for transient aircraft parking. See **Figure 5-2.**

**Recommendation**

Although Alternative 1 provides more development area, hangar development will penetrate Part 77. Therefore, Alternative 2 is the recommended plan for GA development.

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# GENERAL AVIATION CONCEPT 1

## AUGUSTA STATE AIRPORT
AUGUSTA, MAINE

DATE:
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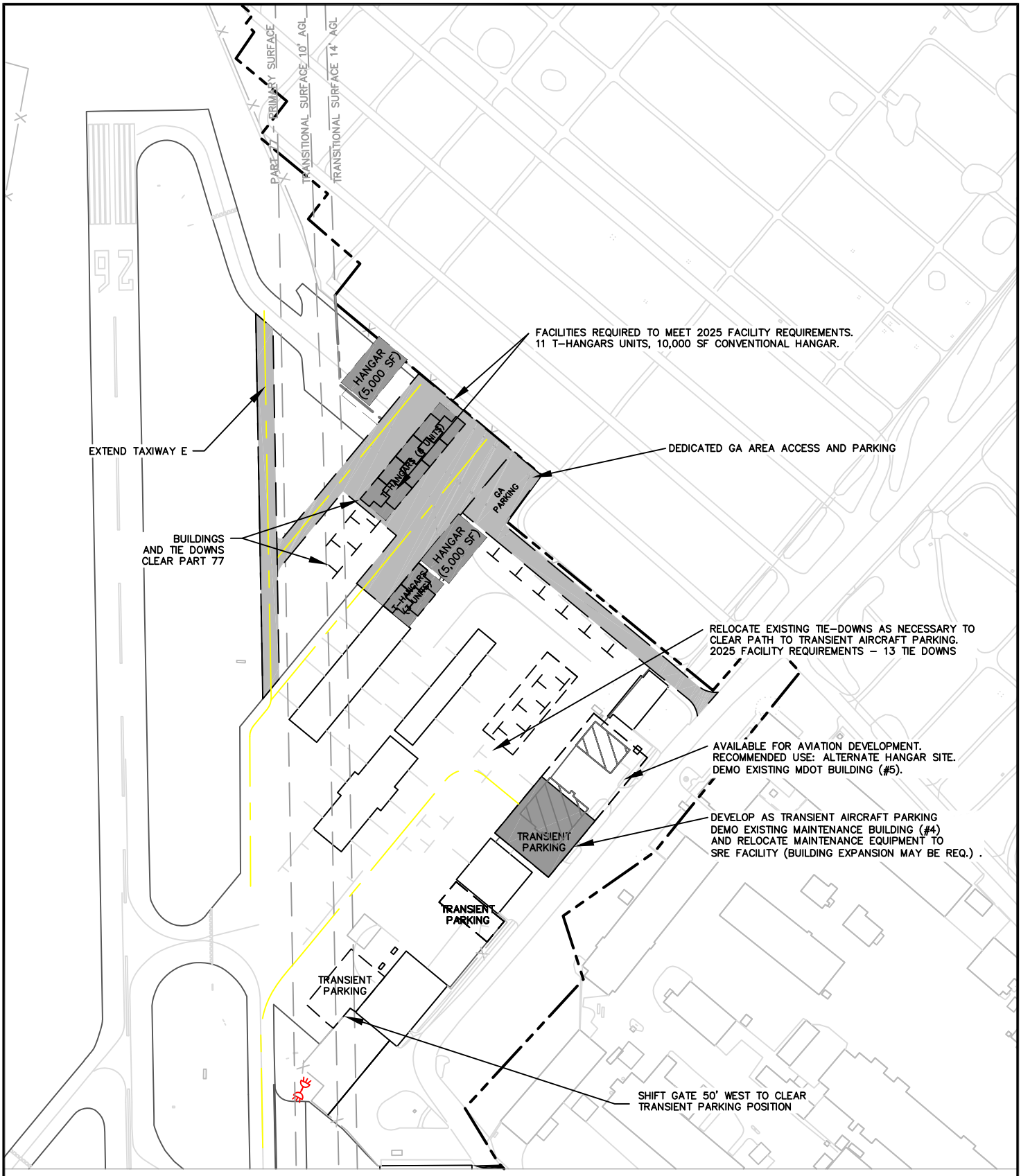


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# GENERAL AVIATION CONCEPT 2

## AUGUSTA STATE AIRPORT
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## 5.5 AIRFIELD DEVELOPMENT CONCEPTS

The airfield development concepts focused on providing improvements to increase efficiency, safety, and address deficiencies in existing design standards. These improvements included meeting runway line-of-sight requirements, runway-to-taxiway separation standards, reducing runway width, and extending Taxiway C.

### 5.5.1 Runway Line of Sight

Runway 17-35 does not have a full-length parallel taxiway. Its' existing profile does not meet FAA "line of sight" standards. As specified in Chapter 5, Section 503, paragraph a. of Advisory Circular 5300-13 *Airport Design*, without a full-length parallel taxiway, "an acceptable runway profile permits any two points five feet above the runway centerline to be mutually visible for the entire runway length." The existing profile does not meet this criterion because the high point along the runway centerline, which occurs approximately 1,000 feet from the Runway 35 threshold, prohibits visibility across the full length of the runway.

To meet this criterion, extensive regrading of the runway would be required. Not only would a maximum cut of approximately 10 feet be required, but approximately 3,500 feet of runway would be affected by this change. Approximately 105,000 cubic yards of material would have to be removed. Although not evaluated at this time, the crosswind runway and intersecting taxiways would also be affected by the lowering of the profile. Based on preliminary analysis, it was determined that improving this condition would be cost prohibitive at a cost of approximately $8.5 million.

A second option would be to provide a full-length parallel taxiway. As specified in the AC, “if the runway has a full length parallel taxiway, the runway profile may be such that an unobstructed line of sight will exist for any other point five feet above the runway centerline to any other point five feet above the runway centerline for one-half the runway length."

At the present time Taxiway C ends approximately 950 feet east of the Runway 17 threshold. This taxiway ends prior to a severe "drop off”. To extend the taxiway to the end of runway 17, significant fill will be required. As with the previous RSA improvements, the extensive filling will dictate this gradient of the slope. In this case, a 2-to-1 slope was used in the calculations. Approximately 90,000 cubic yards of fill would be required to extend Taxiway C to the end of Runway 17. By doing this the "unobstructed line of sight for one-half the runway length" requirement can be met.

In evaluating the difference between cutting the runway profile and filling for a new taxiway, one must look at the overall operation of the Airport. Lowering the profile of the runway mandates lowering the profile of the crosswind runway and the intersecting taxiways as well as potentially requiring the temporary shut down of the Airport for an extended period of time. Extending the taxiway would allow the Airport to remain open during construction with very little interruption of airport operations.

### 5.5.2 Taxiway C Extension

As discussed above, the existing parallel taxiway to Runway 17-35 does not extend the full length of the runway to the 17 end. To meet precision instrument approach requirements, improve the line-of-sight condition, and eliminate the need to back taxi, Taxiway C should be extended to provide a full parallel taxiway.

### 5.5.3 Runway Rehabilitation and Narrowing

Runway 17-35 is planned to be rehabilitated in the near future. The existing Runway width is 150 feet. Based on the forecast critical aircraft (B-II), the appropriate width of the Runway is 100 feet. While the runway can cost effectively be narrowed during the upcoming runway rehabilitation effort, the reduced runway width could affect the airport's long-term (post-2025) operational flexibility. Recognizing the dynamic nature of the aviation industry the Master Plan Update recommends that the reduced 100 foot runway width be confirmed prior to undertaking the rehabilitation project.

Previous discussions have noted that the profile of runway will have to be corrected in conjunction with runway 17-35 rehabilitation to meet line-of-sight standards. The analysis above on line-of-sight indicates this to be an infeasible effort, considering there is a less disruptive solution, extending Taxiway C.

### 5.5.4 Runway to Taxiway Separation

As noted in the previous chapter, the Airport Reference Code is B-II which requires a runway-to-taxiway separation of 300 feet.

The distance from Runway 17-35 to Taxiway C is only 250 feet. This condition has an FAA approved modification of standards (MOS #22, 02/09/77).

It should be noted that there would be significant costs associated with increasing the runway-to-taxiway separation, including relocation of NAVAIDS, approach lights, and surrounding airfield lighting. Based on discussions with the FAA, it appears this project would not be cost justifiable and is therefore not included in the recommended development plan.

Taxiway E runs parallel to Runway 8-26 and is separated by 200 feet. The FAA runway-to-taxiway separation standard for an ADG B-I runway with minimums not lower than ¾ mile is 225 feet. As with improving separation standards on the main runway, providing FAA-recommended separation standards on the crosswind runway would also not appear to be cost-justifiable (due to significant impacts to existing infrastructure) and is therefore not included in the recommended development plan.

### 5.5.5 Runway Safety Areas

RSAs for both ends of Runway 17-35 and the west end of Runway 8-26 do not meet FAA design standards.

Options for providing improved safety areas for those runway ends not meeting design standards were explored in a separate study, the 2004 *Augusta State Airport Runway Safety Area Study*. The results of this study were to determine a preferred RSA

alternative that would be incorporated into the Airport Master Plan Update.

For Runway 17-35, the preferred options and final recommendations of that report were not implemented by MaineDOT and AUG. That preferred option (3C) recommended raising approach minimums above ¾-mile visibility, and shifting the runway north to accommodate 150-foot by 300-foot RSAs. This option was not implemented due to the need to raise approach minimums to reduce RSA size requirements. This would have adverse impacts to operational efficiency.

A subsequent solution not identified in the report was developed and later discarded due to significant impact to the local community. This alternative extended the RSA to the south (Runway 35 end), requiring the access road be realigned.

Through discussions with MaineDOT, AUG, and the FAA, the use of an Engineered Material Arresting System (EMAS) was identified as a preferred solution. An EMAS engineering specialist, ESCO, was contacted in an effort to identify a viable solution. Based on a reluctance to extend the safety areas off of either end of Runway 17-35, an option requiring essentially no extension of graded RSA surface was identified as a viable solution. EMAS pads would be installed at both Runway ends and would be approximately 165 feet long by 121 feet wide with a total site preparation area of approximately 210 feet long by 150 feet wide. See **Figure 5-3**, the recommended Development Plan. This option was chosen as it can be constructed with minimal site preparation, would maintain existing runway length, and would result in essentially no impact to the surrounding community while still allowing the airport to meet FAA safety area requirements. Systems are rated to last 20 years or more and with the addition of a plastic material on top and bottom require essentially no maintenance. Monthly inspections by airport staff are however recommended by the manufacturer. It is also recommended that EMAS specific snow removal equipment be used to clear the pads. Cost for the required equipment will be included in the CIP.

The 2004 *Runway Safety Area* study identified a preferred solution to improve the Runway 8 RSA. The recommendations of that report were not implemented by MaineDOT and AUG. The preferred alternative, 3E, required shifting Runway 8-26 90 feet to the east and extending the runway on the 26 end.

The preferred improvement is shown on the previous ALP (March 2007) and shifts the Runway 8 threshold by 90 feet and reduces the runway length to 2,613 feet, an option that poses little degradation in the operability of the runway. See **Figure 5-3**, the recommended development plan.

## 5.6 TERMINAL DEVELOPMENT

As noted in Chapter Four, the current terminal facility is adequate to accommodate forecast demand. However, the building may require renovation and modifications in the future to meet changes to passenger processing and security protocols.

The terminal curb is reported to be inadequate for the purposes of both bus and

| LEGEND | EXISTING | FUTURE |
|---|---|---|
| Object Free Area | OFA | FOFA |
| Runway Safety Area | RSA | FRSA |
| Object Free Zone | OFZ | FOFZ |
| Runway Visibility Zone | RVZ | RVZ |
| Roads/Landside Pavement | | |
| Airfield Pavement | | |
| Ultimate Airfield Development | N/A | |
| Runway Protection Zone (RPZ) | | |
| RPZ Outside Airport Property | | |
| On-Airport Property Buildings | | |
| Buildings to be Demolished | N/A | |
| Off-Airport Property Buildings | | |
| Property Line | | |
| Fence Line | x x | x x |
| Wetlands | | N/A |

NOTE: AERIAL BASE IS USED FOR REFERENCE ONLY. DUE TO PARALLAX DISTORTION IMAGE DOES NOT ALIGN PERFECTLY WITH BASE LINEWORK.

| NO. | ON-AIRPORT BUILDINGS |
|---|---|
| 1 | TERMINAL |
| 2 | FBO/MAINE INSTRUMENT FLIGHT |
| 3 | FBO MAINTENANCE HANGAR |
| 4 | MAINTENANCE GARAGE / OFFICES - STATE |
| 5 | SAND STORAGE - STATE |
| 6 | CIVIL AIR PATROL |
| 7-9 | T-HANGARS - PUBLIC |
| 10 | VOR CONTROL BUILDING - FAA |
| 11 | SNOW REMOVAL EQUIPMENT STORAGE |

AIRPORT BOUNDARY IS FROM MOST RECENT EXHIBIT "A" AND DOES NOT MATCHUP WITH KNOWN AIRPORT INFRASTRUCTURE. AN AIRPORT BOUNDARY SURVEY AND EXHIBIT "A" UPDATE MAY BE REQUIRED.

GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 feet

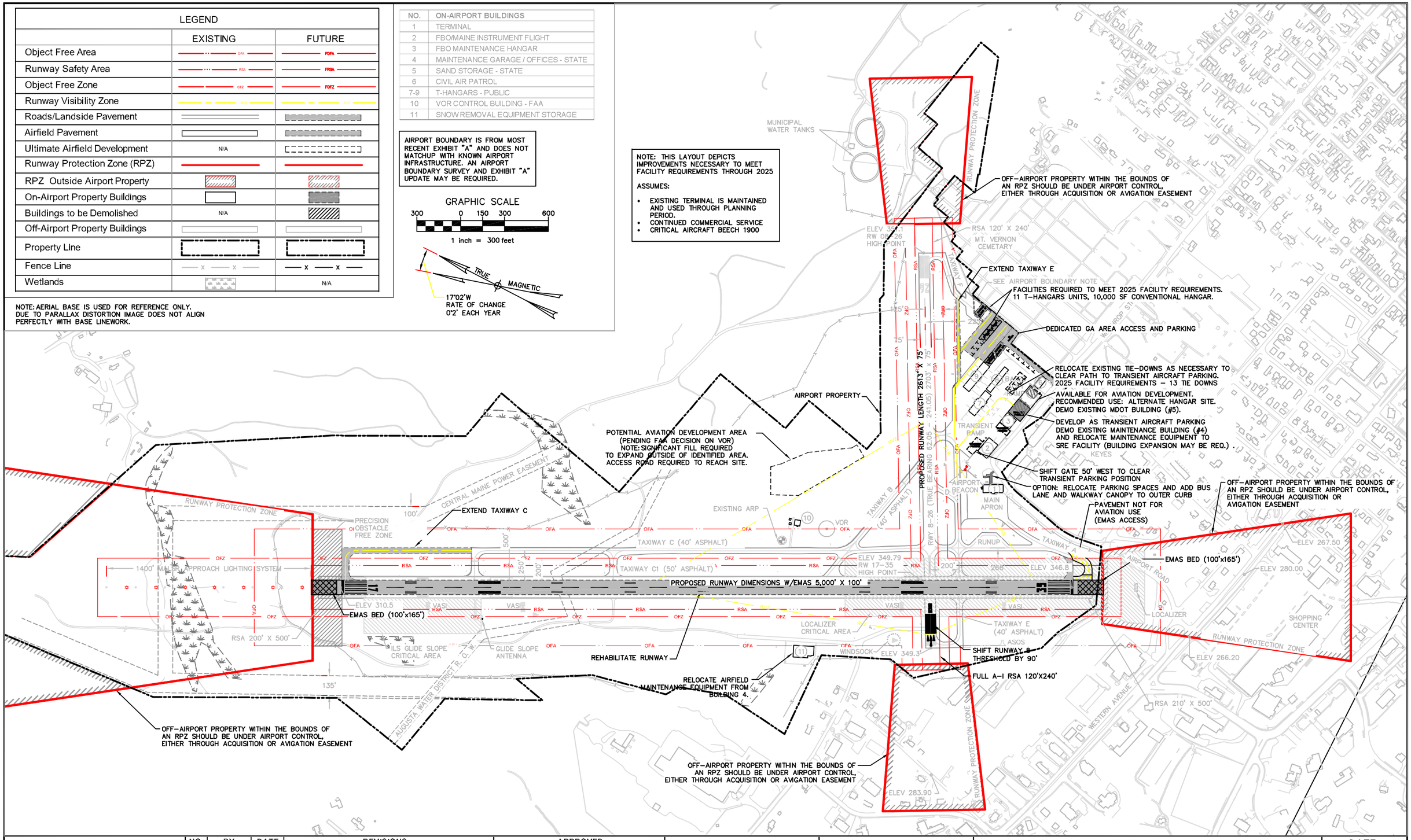
TRUE MAGNETIC

17°02'W
RATE OF CHANGE
0°2' EACH YEAR

NOTE: THIS LAYOUT DEPICTS IMPROVEMENTS NECESSARY TO MEET FACILITY REQUIREMENTS THROUGH 2025

ASSUMES:

- EXISTING TERMINAL IS MAINTAINED AND USED THROUGH PLANNING PERIOD.
- CONTINUED COMMERCIAL SERVICE
- CRITICAL AIRCRAFT BEECH 1900

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# 2025 AIRPORT LAYOUT

## AUGUSTA STATE AIRPORT
AUGUSTA, MAINE

DATE: Mar 21, 2008

FIGURE 5-3

air passengers. When buses arrive at the terminal, they block a significant portion of the building frontage and main entrance. In addition, bus exhaust often enters the terminal building creating an undesirable environment. A simple solution could be achieved by creating a bus lane on the other side of the terminal access corridor in place of several short-term and handicapped spaces. The handicapped spaces would have to be relocated to the existing lot northeast of the terminal, while the remaining spaces could be relocated to the satellite lot in place of restaurant/rental car spaces. Given the inclement weather often experienced in the Northeast, a small walkway canopy could be constructed to shelter passengers accessing the outer curb bus lane and satellite parking.

## 5.7 AUTOMOBILE PARKING

The facility requirements chapter identified a long-term need for approximately 20 additional parking spaces to be accommodated in the satellite lot. This is both a result of an anticipated increase in parking demand and spaces relocated from the terminal lot. When the need arises, it is recommended that the remaining restaurant and rental car spaces located in the satellite lot be reallocated to the South Lot on Airport Road in place of some of the designated public spaces.

## 5.8 AIRPORT ACCESS

The existing Airport access road is a penetration to the Part 77 primary surface and transitional surface. Alternatives were evaluated to realign the road to clear Part 77. Any of the options would require the acquisition of a significant portion of Camp Keyes property. The Camp Keyes parcel is 17.6 acres and valued at approximately $ 10 million. To acquire just the property required for realigning the road would equate to approximately 12 Acres and $7 million. The cost of realigning the road would be approximately $1.5 million. Based on discussions with the FAA, it appears this existing road alignment will not adversely affect current operating conditions and therefore realignment of the road would not be cost justifiable. It is therefore not included in the recommended development plan.

## 5.9 OTHER CONSIDERATIONS

To ensure maximum flexibility, the Master Plan Update process considered the likely development implications of replacing existing B1900 service with Saab 340 service or losing essential air service entirely.

Overall, existing airport facilities are adequate to accommodate Saab 340 service to Boston. It is possible, however, that an on-airport ARFF station would be required to meet Part 139 response times. Based on response times and other considerations, the Master Plan Update identified a site directly west of Runway 17-35, adjacent to the existing SRE facility. Secondly, the Saab 340 would require a larger hangar than is currently available. A portion of the site of Buildings 4 and 5 could be redeveloped in conjunction with additional transient apron to provide a larger hangar. See **Figure 5-4.**

Should AUG lose its existing air service, the Airport's focus could be redirected toward promoting GA activity (including business aviation), and the passenger terminal facility

| LEGEND | EXISTING | FUTURE |
|---|---|---|
| Object Free Area | OFA | FOFA |
| Runway Safety Area | RSA | FRSA |
| Object Free Zone | OFZ | FOFZ |
| Runway Visibility Zone | RVZ | RVZ |
| Roads/Landside Pavement | | |
| Airfield Pavement | | |
| Ultimate Airfield Development | N/A | |
| Runway Protection Zone (RPZ) | | |
| RPZ Outside Airport Property | | |
| On-Airport Property Buildings | | |
| Buildings to be Demolished | N/A | |
| Off-Airport Property Buildings | | |
| Property Line | | |
| Fence Line | x x | x x |
| Wetlands | | N/A |

NOTE: AERIAL BASE IS USED FOR REFERENCE ONLY. DUE TO PARALLAX DISTORTION IMAGE DOES NOT ALIGN PERFECTLY WITH BASE LINEWORK.

| NO. | ON-AIRPORT BUILDINGS |
|---|---|
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| 3 | FBO MAINTENANCE HANGAR |
| 4 | MAINTENANCE GARAGE / OFFICES - STATE |
| 5 | SAND STORAGE - STATE |
| 6 | CIVIL AIR PATROL |
| 7-9 | T-HANGARS - PUBLIC |
| 10 | VOR CONTROL BUILDING - FAA |
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GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 feet

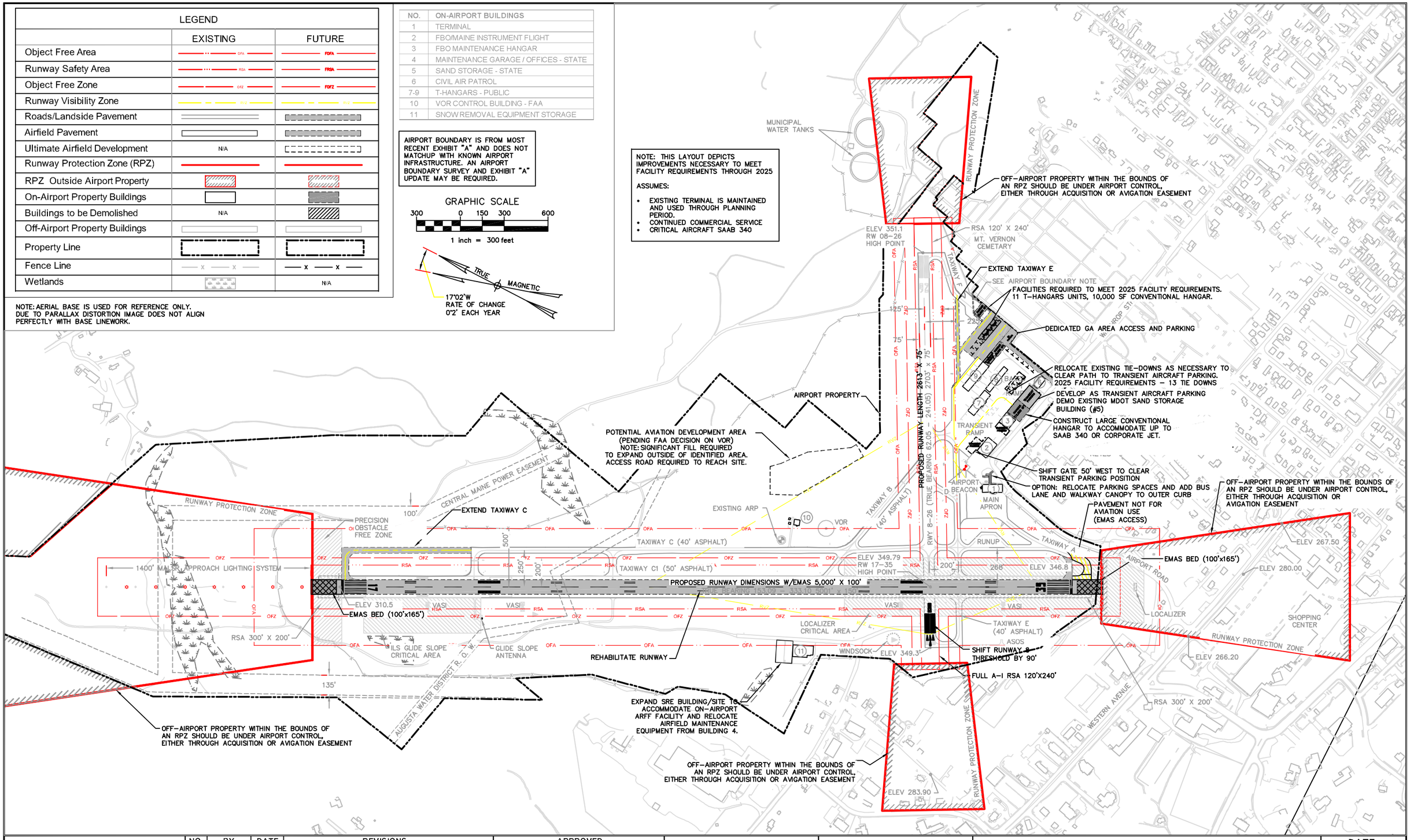
TRUE MAGNETIC

17°02'W
RATE OF CHANGE
0°2' EACH YEAR

NOTE: THIS LAYOUT DEPICTS IMPROVEMENTS NECESSARY TO MEET FACILITY REQUIREMENTS THROUGH 2025

ASSUMES:

- EXISTING TERMINAL IS MAINTAINED AND USED THROUGH PLANNING PERIOD.
- CONTINUED COMMERCIAL SERVICE
- CRITICAL AIRCRAFT SAAB 340

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# 2025 AIRPORT LAYOUT - W SAAB

## AUGUSTA STATE AIRPORT
AUGUSTA, MAINE

DATE: Mar 21, 2008

FIGURE 5-4

could be redeveloped into a dedicated, upscale GA terminal. See **Figure 5-5.**

Finally, at the request of MaineDOT, the Master Plan Update identified a site for a new, expanded terminal should passenger activity grow at a significantly faster rate than shown in the FAA-approved forecasts. Three ultimate concepts were developed and are shown **Appendix C.**

## 5.10 ENVIRONMENTAL CONSIDERATIONS

The alternatives recommended in this Master Plan Update were reviewed to assess any potential environmental impacts. The proposed projects are the types of actions that are normally categorically excluded per paragraphs 310e and 310f of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures.* Provided the proposed projects do not involve extraordinary circumstances as described in paragraph 204 of Order 1050.1E, categorical exclusion(s) will be the appropriate National Environmental Policy Act (NEPA) documentation.

## 5.11 RECOMMENDED DEVELOPMENT PLAN

The concept analysis described above produced a recommended development plan which is summarized below.

### 5.11.1 Airfield

The Master Plan Update recommends meeting FAA runway safety area requirements by installing 165-foot long by 121-foot wide EMAS pads at both ends of Runway 17-35 and relocating the Runway 8 threshold 90 feet to the east to achieve a 240-foot long by 120-foot wide RSA.

In addition, the Master Plan Update recommends extending Taxiway C to the end of Runway 17 to meet line-of-sight standards and to eliminate the need for partial back-taxiing on this runway.

Finally, the Plan shows Runway 17-35 being narrowed from 150 feet to 100 feet. Lighting for both runways and the lighting vault are at the end of their useful life. The master plan recommends upgrading these lighting systems as associated projects are constructed. As noted in the CIP the additional lighting costs have been included in each associated project.

### 5.11.2 Passenger Terminal

The existing terminal square footage is adequate to accommodate long-term passenger demand; however, the Master Plan Update recommends that the current layout and assignment of space ultimately be reallocated to better serve air passengers. Although the redesign of specific interior elements is beyond the scope of this Master Plan Update, some projects could include reconfiguring the ticketing area, providing more queuing space, expanding security screening and queuing, creating a separate area for bus passengers, and updating finishes in the facility to create a more appealing environment. For more detail the terminal building was reviewed by functional element in the Chapter 4, Facility Requirements.

Secondly, the Master Plan Update recommends relocating bus loading/unloading to the outer curb area to

| LEGEND | EXISTING | FUTURE |
|---|---|---|
| Object Free Area | OFA | FOFA |
| Runway Safety Area | RSA | FRSA |
| Object Free Zone | OFZ | FOFZ |
| Runway Visibility Zone | RVZ | RVZ |
| Roads/Landside Pavement | | |
| Airfield Pavement | | |
| Ultimate Airfield Development | N/A | |
| Runway Protection Zone (RPZ) | | |
| RPZ Outside Airport Property | | |
| On-Airport Property Buildings | | |
| Buildings to be Demolished | N/A | |
| Off-Airport Property Buildings | | |
| Property Line | | |
| Fence Line | x x | x x |
| Wetlands | | N/A |

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| 5 | SAND STORAGE - STATE |
| 6 | CIVIL AIR PATROL |
| 7-9 | T-HANGARS - PUBLIC |
| 10 | VOR CONTROL BUILDING - FAA |
| 11 | SNOW REMOVAL EQUIPMENT STORAGE |

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GRAPHIC SCALE

300 0 150 300 600

1 inch = 300 feet

TRUE MAGNETIC

17°02'W
RATE OF CHANGE
0°2' EACH YEAR

NOTE: THIS LAYOUT DEPICTS IMPROVEMENTS NECESSARY TO MEET FACILITY REQUIREMENTS THROUGH 2025

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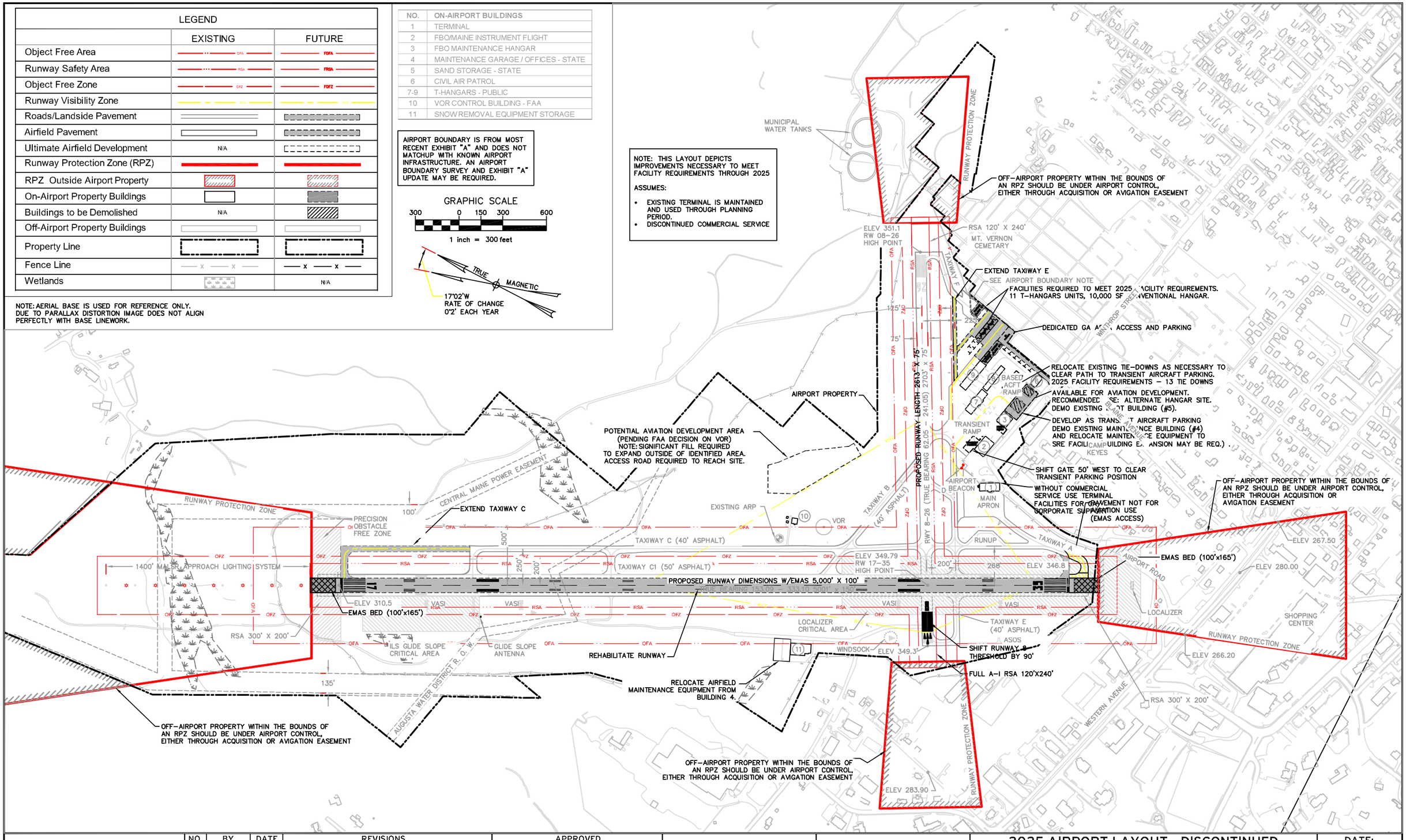
- DISCONTINUED COMMERCIAL SERVICE

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# 2025 AIRPORT LAYOUT - DISCONTINUED COMMERCIAL SERVICE

## AUGUSTA STATE AIRPORT
AUGUSTA, MAINE

DATE: Mar 21, 2008

FIGURE 5-5

provide sufficient curb area for airline passengers and to reduce the amount of exhaust seeping into the building.

### 5.11.3 General Aviation

The Master Plan Update recommends providing additional transient GA parking by removing Buildings 4 and 5 and redeveloping a portion of the area to meet facility requirements. As shown in Alternative 2, 11 additional T-hangar units and two small conventional hangars would be constructed in the vicinity of the existing T-hangar development. The Master Plan Update recommends constructing a GA access roadway and parking lot to serve the new GA development. Full parallel taxiway access should be provided by closing Taxiway F and extending Taxiway E.

### 5.11.4 Automobile Parking

By 2025, the Airport will require a total of approximately 162 parking spaces to support forecast demand for all functions. To meet this requirement the Master Plan recommends reallocating nine restaurants, and 11 rental car spaces from the Satellite Lot to the South Lot taking the place of some unassigned/un-leased spaces.

### 5.11.5 Airport Access

The capacity of the existing roadway network is sufficient for long-term growth; therefore, no significant roadway improvements are needed. Although the existing airport access road penetrates the Part 77 primary surface and transitional surface, any realignment would require the acquisition of approximately 12 Acres of Camp Keyes property valued at approximately $7 million. Based on discussions with the FAA, it appears this existing road alignment will not adversely affect current operating conditions and therefore realignment of the road would not be cost justifiable. It is therefore not included in the recommended development plan.

Based on discussions with the FAA, it appears this project would not be cost justifiable and is therefore not included in the recommended development plan.

### 5.11.6 Support Facilities

The support facilities addressed in the Master Plan Update include the airfield maintenance facility, snow removal equipment facility, airfield rescue fire fighting facility, and fuel farm.

The Master Plan Update shows that the existing SRE facility and fuel farm are adequate to meet 20-year requirements and that each facility is in good condition. If activity at AUG meets forecast activity levels, additional snow removal equipment will be required to meet future minimum equipment requirements, including one additional rotary plow, one displacement plow (to meet the total actual moldboard requirement of 54 feet) and one additional power sweeper. The existing SRE should be able to accommodate long-term storage requirements as old equipment is retired.

The airfield maintenance facility and salt storage (Buildings 4 and 5) should be relocated to the SRE site. As noted previously, should the Saab 340 be used for future air service, a new on-airport ARFF station may be required to meet minimum

response times. The Master Plan Update recommends that a site adjacent to the SRE building be reserved for such a facility.

### 5.11.7 Airport Property

This Master Plan did not identify a need to acquire property to accommodate airport development. However, per AC 150/5300-13, *Airport Design*, paragraph 212, the FAA recommends gaining control of properties within the airport's Runway Protection Zones. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through acquisition or easement over the property in the RPZ. The associated cost of procuring easements over the properties within the RPZs and those with penetrations to the approach are estimated in Chapter 6.

# Chapter Six
# Airport Plans

## 6.1 AIRPORT LAYOUT PLANS

The ALP set shows the layout of existing and proposed Airport facilities. An airport is required to have a current ALP set approved by the FAA to participate in the Federal Airport Improvement Program (AIP). The ALP set was updated as part of the Master Plan Update effort to reflect the recommended development projects as described in the Recommended Development Plan in Chapter 5.

The ALP set was updated in cooperation with the Maine Department of Transportation and AUG Airport management, and followed the standards outlined in FAA AC 150/5070-6A, *Airport Master Plans*, and AC 150/5300-13, Change 8, *Airport Design*. The ALP consists of the following drawings:

1. Title Sheet
2. Existing Airport Layout
3. Future Airport Layout
4. Data Sheet
5. Terminal Area Drawing
6. Runway 17-35 Approach Profiles
7. Runway 17-35 Approach Profiles
8. Part 77 Full Airspace
9. Part 77 Conical Surface
10. 2025 Noise Contour/ Off Airport Land-Use
11. Pavement History Plan

**Appendix A** provides a half-size ALP set. It should be noted that the half-size ALP set included in this report precludes the approved FAA plan set. The approved set is subject to change.

### 6.1.1 Title Sheet

The Title Sheet shows the Airport name, a location map, vicinity map, an ALP sheet index, and signature blocks.

### 6.1.2 Existing Airport Layout

The Existing Airport Layout portrays the Airport's airfield, structures (keyed to a building index), roadway system, and clearances in their current configuration.

### 6.1.3 Future Airport Layout

The Future ALP overlays the recommended future projects that were identified in the Master Plan Update, including those pertaining to the airfield, buildings, aprons, and roadway/parking system.

### 6.1.4 Data Sheet

The Data Sheet provides All Weather, IFR, and VFR wind roses; wind coverage summary tables; key airport data; a listing of buildings and facilities; and a runway data table.

### 6.1.5 Terminal Area Plan

The Terminal Area Plan is an enlargement of the terminal area and features terminal

and general aviation related projects that were identified in the Master Plan Update.

### 6.1.6 Runway Approach Profiles

Two sheets show ultimate plan and profile diagrams for each runway end. The sheets highlight objects penetrating Part 77 approach surfaces.

### 6.1.7 Part 77 Drawings

Two drawings show the ultimate Part 77 surfaces for each runway, including the horizontal surface, conical surface, approach surfaces, and transitional surfaces.

### 6.1.8 2025 Noise Contours/Off-Airport Land Use Drawing

The Noise Contour/Off-Airport Land Use Drawing depicts 2025 noise contours and land uses in the area around the Airport (based on GIS data obtained from the City of Augusta).

Potential noise impacts at AUG were evaluated using the FAA's Integrated Noise Model (INM) Version 7.0. Using Runway geometry, forecast operations, typical flight tracks, and aircraft types the program was used to generate future year contours.

### 6.1.9 Pavement History Plan

The Pavement History Plan shows the existing condition and last documented construction/rehabilitation date of pavement on the airfield.

## 6.2 PRELIMINARY COST AND PHASING

This section provides a summary of the overall capital costs associated with the recommended development plan and their estimated timing based on the forecasts and facility requirements identified earlier in this Study.

Project timing is based on a balance of meeting forecast facility needs and the Airport's financing ability. Projects may be rescheduled should activity increase either more quickly or more slowly than anticipated. Likewise, the availability of financial resources may also result in either programming some projects sooner or deferring them.

The cost estimates presented in this Study are for planning purposes only; implementation of the recommended capital projects will involve refinement of designs and costs through architectural and engineering analyses. For this reason, the costs shown should be considered "best estimates," sufficient for the planning of projects. Actual costs will vary at the time of construction. When possible it is recommended that related projects be combined as much as possible to reduce associated costs (mobilization, security, engineering etc.).

**Table 6.1** is a list of the Augusta State Airport capital projects, their cost, and anticipated schedule of implementation (in 2008 dollars). The list includes projects from the existing MaineDOT CIP, and projects identified in the Master Plan Update. The total capital cost for the

Table 6.1

**Capital Improvement Program**
**Estimated Funding Sources**

| Phase | Expected Year | Project Decription | FAA Funding | Private Funding | State Funding | Total Cost (2008 $) |
|---|---|---|---|---|---|---|
| Phase I | 2008 | Obstruction Removal and Lighting Including Property Easements | $ 112,500 | $ - | $ 12,500 | $ 125,000 |
| | 2008 | Spill Prevention Control and Countermeasures Plan (SPCC) | $ 27,000 | $ - | $ 3,000 | $ 30,000 |
| | 2009 | Obstruction Removal and Lighting Including Property Easements | $ 112,500 | $ - | $ 12,500 | $ 125,000 |
| | 2010 | Design Phase - EMAS improvements | $ 300,000 | $ - | $ 224,480 | $ 524,480 |
| | 2011 | Construct RWY 35 RSA (EMAS) Improvement, Taxiway stub, Specialized Snow Blower | $ 3,213,215 | $ - | $ 169,117 | $ 3,382,332 |
| | 2012 | Construct Runway 17 RSA (EMAS) Improvement | $ 3,014,983 | $ - | $ 158,683 | $ 3,173,667 |
| | 2013 | Rehabilitate Runway 17-35, Lighting and Electrical Upgrades | $ 150,000 | $ - | $ 3,474,167 | $ 3,624,167 |
| | 2013 | Improve Runway 8 Safety Area, Lighting and Electrical Upgrades (a) | $ - | $ - | $ 700,400 | $ 700,400 |
| | 2014 | Extend Taxiway C | $ 150,000 | $ - | $ 2,005,200 | $ 2,155,200 |
| | 2014 | Purchase ARFF Equipment | $ - | $ - | $ 265,000 | $ 265,000 |
| | 2014 | Replace Terminal Building HVAC | $ - | $ - | $ 60,000 | $ 60,000 |
| | | Subtotal | $ 7,080,198 | $ - | $ 7,085,046 | $ 14,105,245 |
| Phase II | 2015 | Acquire Approach Easements | $ 3,676,228 | $ - | $ 982,959 | $ 4,659,188 |
| | 2016 | Terminal Building/FBO Building Renovations | $ - | $ - | $ 80,000 | $ 80,000 |
| | 2016 | Construct Twy E extension | $ 246,600 | $ - | $ 12,979 | $ 259,579 |
| | 2017 | Construct T-Hangar Apron | $ 53,400 | $ - | $ 262,720 | $ 316,120 |
| | 2017 | Construct T-Hangars (8 Units) | $ - | $ 475,000 | $ - | $ 475,000 |
| | 2017 | Construct Conventional GA Hangar (5,000 SF) | $ - | $ 675,000 | $ - | $ 675,000 |
| | 2017 | Demo Building 4 (5,300 SF) | $ - | $ - | $ 53,000 | $ 53,000 |
| | 2018 | Construct Transient Apron (on Building 4 Site) | $ 143,007 | $ - | $ 7,527 | $ 150,533 |
| | 2019 | Install 11 tie down positions | $ - | $ - | $ 24,750 | $ 24,750 |
| | | Subtotal | $ 4,119,235 | $ 1,150,000 | $ 1,423,935 | $ 6,693,170 |
| Phase III | 2020 | Purchase SRE Equipment (Snowblower, Plow, Blower) (b) | $ 306,993 | $ - | $ 143,007 | $ 450,000 |
| | 2020 | Construct Conventional GA Hangar - 5,000 SF | $ - | $ 675,000 | $ - | $ 675,000 |
| | 2025 | Construct T-Hangars (3 Units, 90x55') | $ - | $ 247,500 | $ - | $ 247,500 |
| | | Subtotal | $ 306,993 | $ 922,500 | $ 143,007 | $ 1,372,500 |
| | | **Total (2008-2025)** | **$ 11,506,427** | **$ 2,072,500** | **$ 8,591,988** | **$ 22,170,914** |

Notes: All costs are in 2008 dollars and include 25% engineering and 20% contingency.
State Apportionment share of funding estimated by MaineDOT.
(a) Scheduled to be constructed simultaneously with runway rehabilitation.
(b) Assumes that Year 2019 entitlements are carried forward.

recommended development plan is approximately $22.06 million, including design, engineering/inspection, and construction contingency. **Sheet 3** in the ALP set (Appendix A) shows the locations of these projects.

### 6.2.1 Phase I (2008-2014)

In Phase I, the priority is to improve critical airfield elements. The most significant airfield projects are rehabilitating Runway 17-35, improving the Runway 17-35 and Runway 8 RSAs with EMAS, extending Taxiway C and upgrading airfield lighting. Also included with the cost of EMAS is the approximate cost for EMAS specific snow removal equipment, which costs approximately $65,000. The total costs for the airfield improvements are approximately $13 million.

A new ARFF response vehicle was identified by MDOT as being required. The estimated cost for a new vehicle is estimated at approximately $265,000.

Based on obstructions identified in the latest Airport mapping some obstruction clearing or lighting is required in this phase. Some of the obstructions are off-airport and may require an avigation easement. The cost for easements and clearing is estimated at approximately $250,000.

Facility improvements required in this Phase include the replacement of the Terminal HVAC system, which is estimated to cost approximately $60,000.

The total cost for this phase is $14.1 million.

### 6.2.2 Phase II (2015-2019)

In Phase II the focus is on accommodating additional GA demand. This includes construction of T-hangars, a conventional hangar, transient aircraft parking apron, tie-downs, additional GA apron and extending Taxiway E. The estimated cost for GA development is $2.0 million.

Based on FAA guidance described in AC150/5300-13, the Master Plan Update recommends that all properties within the RPZs be controlled via acquisition or easement. Due to financial constraints, clearance easements may be the most cost effective solution. Based on assessed property values and typical easement costs, the cost of obtaining easements over all properties within the RPZs is estimated to be $4.7 million. (Note: estimates are only to be used for planning purposes; a formal appraisal must be completed to determine the actual easement cost.)

Also included in this phase is a cost for terminal building/FBO building renovations, which is estimated at approximately $80,000.

The total cost for this phase is $6.7 million.

### 6.2.3 Phase III (2020-2025)

In Phase III, key projects include construction of a T-hangar and a conventional hangar. The cost for these projects totals approximately $900,000.

The Master Plan recommends acquiring additional snow removal equipment, a Class III rotary plow, a single displacement plow,

and a power sweeper. The total estimated cost is $450,000.

The total cost for this phase is $1.4 million.

## 6.3 FUNDING SOURCES

The recommended development plan was subjected to an assessment of likely or desired funding sources in order to provide a guide for the State as it pursues the implementation of these projects. The State has three potential sources of funding for capital projects at this time:

- FAA AIP funds
- Private Funding
- State funding

### 6.3.1 FAA AIP Funds

Funding is provided to airports through the AIP as awarded by the FAA. AIP funds are divided into two categories: discretionary funds and entitlement funds. Discretionary funds are awarded at the discretion of the FAA based on certain eligibility criteria, while entitlement funds are distributed to airports on a per enplanement basis, subject to an annual minimum.

As a nonprimary airport[4], the Airport is entitled to a share of annual AIP entitlement funding. In the event that AIP is funded at $3.2 billion or more, the Airport share of the nonprimary airport apportionments is –

(1) 20 percent of the 5-year cost of the need listed for a particular airport in the most recently published NPIAS; or

(2) an overall cap of $150,000.

The Airport has received minimal discretionary funding in the past, but it expects to obtain increased levels in the future. This increased federal participation would be obtained because several of the projects identified in the recommended development plan are high-priority projects that will enhance the safety of the Airport. This analysis assumes a total of approximately $11.6 million in entitlement and discretionary funding between 2008 and 2025.

### 6.3.2 Private Funding Sources

Private third-party sources, such as tenant-funded projects, were factored into the funding source plan for the new GA hangar projects. It is projected that tenants will directly finance more than $2.07 million of the Master Plan projects between 2008 and 2025.

### 6.3.3 State Funding

There are two categories of State funding, State apportionment funds and funds that the State contributes in its role as Airport owner.

State apportionment funds are directed to states through the AIP. Because the State must share these funds with all Maine airports, funding is not often available for any one airport. For AUG, it was assumed that apportionment funding would be available for two key projects.

[4] A nonprimary airport is a scheduled service airport enplaning between 2,500 and 10,000 passengers annually.

After exhausting the AIP, private, and State apportionment sources of funding, it is assumed that the State would have to use its own revenues to fund the remaining project costs. This creates some funding challenges for the State, as its share of project costs would be significant. Total State funding for AUG, including apportionment, is estimated to be approximately $8.6 million during the planning period.

As will be discussed below, the Airport/State will ultimately be responsible for nearly $7.5 million of capital improvements if the federal, State apportionment, and private funding assumptions described previously come to pass. If federal discretionary funding is not obtained, this figure would be much higher.

### 6.3.4 Estimated Funding Sources

Table 6.1 summarizes the recommended development plan by assumed funding source. The assumptions are based on the eligibility criteria for the alternative funding sources and comments from State staff.

Projects eligible for AIP entitlement funds were assumed to be financed from this source to the extent that funds are available. Projects that have a strong safety justification, such as runway safety area (RSA) enhancements, were assumed to be able to obtain AIP discretionary funding.

The projected total estimated cost of the recommended development plan was estimated at nearly $22.2 million for the period 2008-2025 (2008 dollars). AIP entitlement and discretionary funds are expected to fund approximately $11.6 million of the total costs. Tenants and other private third parties will provide more than $2.07 million in direct funding. State funds are expected to total almost $8.5 million.

In using this funding plan during the planning period, the State should continually consider other funding mechanisms that could reduce its capital exposure. For example, when negotiating a deal with a tenant to finance and construct t-hangars, it could negotiate the financing of the associated t-hangar ramp as part of the project. It would require the State to grant much more flexible terms to the tenant, but it could result in more capital for the Airport. The State should also continually consider the phasing of these projects. The recommended development plan includes a large number of projects in Phase I. With entitlements limited to the annual cap of $150,000, much of these projects' capital requirements would fall to the State. Any projects that could be pushed into Phase II would benefit from additional entitlement funds not yet programmed in this analysis to be used.