

I. Introduction

The Metropolitan Nashville Airport Authority (MNAA or “the Authority”) has contracted RW Armstrong, a CHA company, and its team of subconsultants, including Albersman and Armstrong, Ltd.; Atkins North America, Inc.; Broadwater and Associates; Communications Strategies; Gresham, Smith and Partners, Inc.; Harris Miller Miller and Hanson, Inc., and MAC Consulting LLC, to prepare a Master Plan Update for the Nashville International Airport (BNA or “the Airport”). This introductory chapter provides a brief overview and history of the Airport, as well as a discussion of the primary objectives of this study.

The Master Plan Update provides planning and development guidance to address landside and airside facilities and land development considerations for the next 20 years and beyond. It serves as a strategic plan and marketing tool for the improvement of the Airport. Consistent with the guidance provided in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and contractual agreements with the Authority, the contents of the complete report will include:

- Chapter I: Introduction
- Chapter 1: Inventory of Existing Facilities and Conditions
- Chapter 2: Forecasts of Aviation Demand
- Chapter 3: Demand/Capacity Analysis and Facility Requirements
- Chapter 4: Airport Landside Development Plan
- Chapter 5: Airport Development Concepts
- Chapter 6: Environmental Overview
- Chapter 7: Airport Plans
- Chapter 8: Financial Plan

The Airport maintains a website offering flight information, parking information and news releases at www.flynashville.com. Updates and materials related to the Master Plan Update are available to the public on the website.

I.1 Purpose and Objectives

The purpose of this study is to provide long-term guidance for future Airport improvements required to satisfy regional aviation demand in a logical and financially feasible manner. Consistent with this purpose, the following objectives were developed for the Master Plan Update:

- Provide a framework that allows the Airport to meet the long-term air transportation needs of the Region in a safe, secure, and efficient manner that is in compliance with all FAA and Transportation Security Administration (TSA) requirements.
- Document changes in the aviation industry and economy to assist with preparing BNA for future challenges and competition.
- Identify the airfield, passenger terminal, ground transportation system, and aviation support facilities necessary to accommodate future aviation demand and fulfill the needs of all Airport users and stakeholders.
- Develop a flexible and detailed long-range plan for terminal area expansion and the enhancement of passenger amenities within the terminal complex.
- Identify and plan for the impacts of the FAA's NextGen initiative.
- Provide strategies for improving Airport accessibility and the level-of-service of ground transportation, curbside, and parking activities.
- Support the development of compatible land uses in the Airport's vicinity in a manner sensitive to the surrounding environment.
- Identify aviation and non-aviation revenue-generation opportunities.
- Ensure that Master Plan Update findings are in harmony with the recommendations in the BNA Sustainability Master Plan, Strategic Business Plan, and where appropriate, previous planning efforts.
- Ensure that development plans are consistent with the safe, secure, efficient, environmentally responsible, and financially sound operation of the Airport.
- Actively solicit public input throughout the planning process.

In addition to addressing these objectives, this Master Plan Update will also fulfill the broad master planning goals set forth by the FAA in AC 150/5070-6B *Airport Master Plans*. These goals are:

- Document issues that the proposed development will address.
- Justify the proposed development through the technical, economic, and environmental investigation of concepts and alternatives.
- Provide an effective graphic presentation of the development of the Airport and anticipated land uses in the vicinity.

- Establish a realistic schedule for implementing the development proposed in the Master Plan Update, particularly the short-term capital improvement program.
- Propose an achievable financial plan to support the implementation schedule.
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required before the project is approved.
- Present a plan that adequately addresses the issues and satisfies local, state, and federal regulations.
- Document policies and future aeronautical demand to support the MNAA's considerations concerning spending, debt, land-use controls, and other policies necessary to preserve the integrity of the Airport and its surroundings.
- Set the stage and establish the framework for a continuing planning process. Such a process should monitor key conditions and permit changes in plan recommendations as required.

I.2 Airport Background

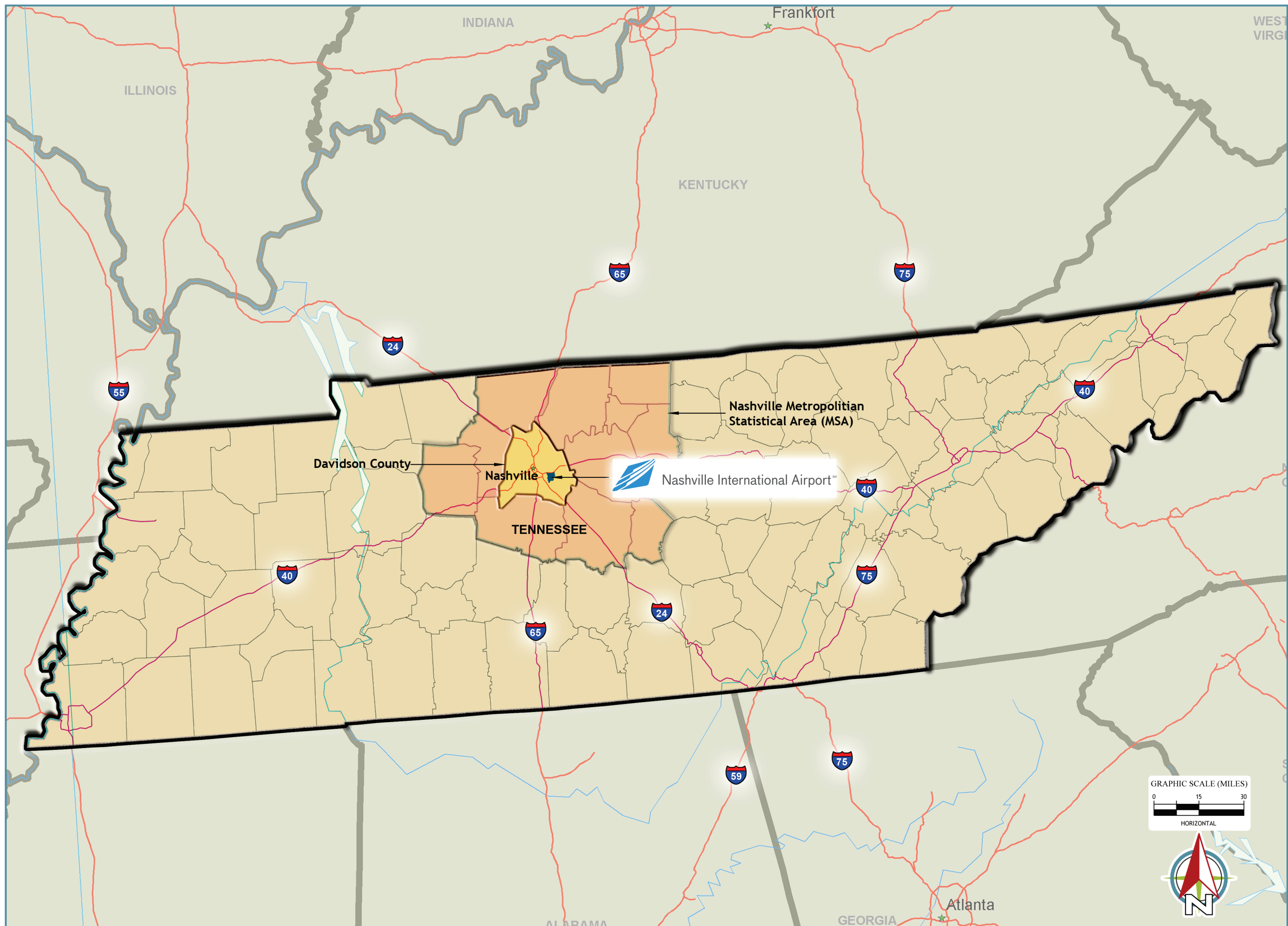
Understanding the background of an airport and the region it serves is essential to making informed decisions pertaining to airport-related improvements. This section discusses the background of the Airport.

I.2.1 Location

The City of Nashville ("the City"), located on the Cumberland River in Middle Tennessee, is the capital of Tennessee and the county seat of Davidson County. It is a center for the healthcare, publishing, banking, and transportation industries, and is home to a large number of colleges and universities. It may be best known as a center of the music industry, earning it the nickname "Music City." The population of Nashville was estimated to be 626,681 in 2010, according to United States Census Bureau, making it the fourth largest city in the Southeastern United States and the 25th largest city in the United States. The 2010 population of the entire 13-county Nashville Metropolitan Statistical Area (MSA) was 1,589,935.

The Airport is located about six miles southeast of downtown Nashville on approximately 4,500 acres, as shown on **Figures I-1** and **I-2**. Currently there are four runways and more than 1 million square feet of terminal space. The Airport is accessible directly from Interstate 40 and indirectly from Interstates 24 and 65. The interstate system connects the Airport to downtown Nashville.

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SOURCE: ESRI ARCGIS VERSION 9.3 2011

Figure I-1
Location Map

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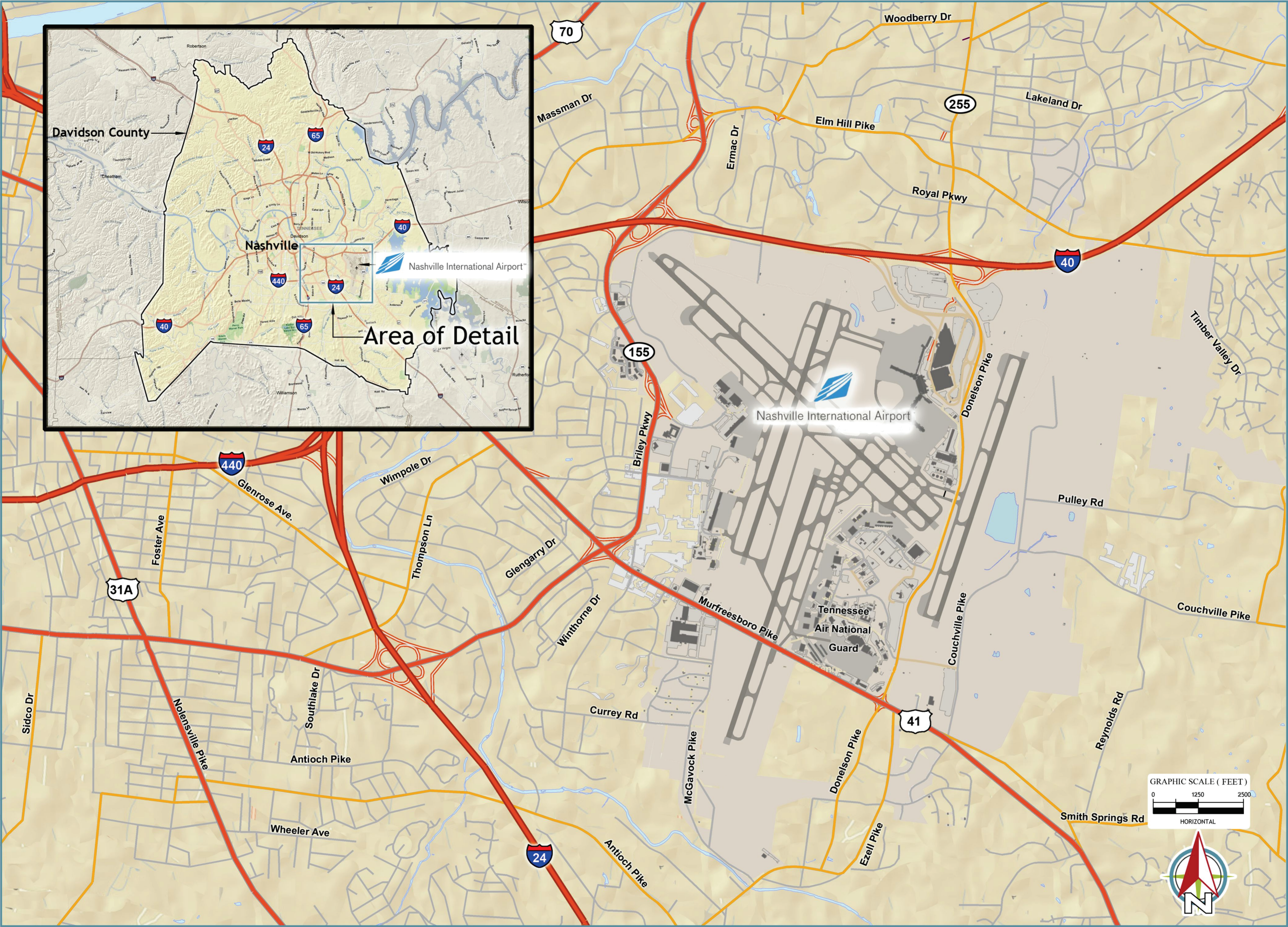


Figure I-2
Vicinity Map

SOURCE: Metropolitan Nashville Airport Authority

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I.2.2 History

Historically, the City has provided the necessary facilities and services throughout the evolution of the aviation industry. Major improvement projects and key planning studies have been completed regularly. Key periods of development are subsequently described.

I.2.2.1 1930s and 1940s

In 1935, a Citizens Committee appointed by Nashville Mayor Hillary Howse, identified a 340-acre site comprised of four adjoining farms located along the Dixie Highway (now Murfreesboro Road) to become Nashville's first airport site. After two years of construction, the Airport opened in 1937 as Berry Field in honor of Colonel Harry S. Berry. It consisted of a terminal building, two hangars, a 4,000-foot concrete runway and a flashing beacon. American Airlines and Eastern Airlines were the first air carriers to serve Nashville, and within a year, 189,000 passengers had used the facilities. During World War II, Berry Field became a military base for the 4th Ferrying Command. The military returned a 1,500-acre airport to the City in 1946.

I.2.2.2 1950s and 1960s

A new 145,900-square-foot passenger terminal opened in 1961, a year after the inaugural flight of jet-powered service at Nashville. By 1961, six airlines were serving Nashville, and airline passengers exceeded 500,000 people. In 1963, the existing Runway (2L/20R) was extended by 600 feet and construction began on a new crosswind Runway (13/31).

I.2.2.3 1970s and 1980s

In 1970, the Metropolitan Government of Nashville/Davidson County formed the Metropolitan Nashville Airport Authority to replace the City Aviation Department. The Authority was created in 1970 by the 86th General Assembly of the State of Tennessee to provide a framework through which air carriers could interact with the community in a businesslike manner and to establish a system of governance that would be self-financing and ensure a safe, efficient, and modern airport for the Nashville area.

The Authority completed a Master Plan in 1973 to direct the Airport's long-term growth. To meet future demand, the Plan recommended additional terminal space (a new terminal) and a new parallel runway east of Donelson Pike. By 1977, the Airport consisted of 3,300 acres with three runways. The passenger terminal was renovated and expanded to 189,000 square feet to accommodate growing passenger demand.

The Authority updated the 1973 Master Plan in 1980 and began an Environmental Assessment (EA) for a new terminal. The Authority unveiled designs for the new terminal and started site

preparation in 1984. Airport revenue bonds in the amount of \$128.5 million financed the terminal construction. In 1985, an additional \$76 million in Airport revenue bonds was issued to fund terminal program expansion. A preliminary Environmental Impact Statement (EIS) on the new parallel north/south runway was completed. In 1987 the Airport dedicated the new 750,000-square-foot passenger terminal.

Major construction began on a new parallel runway east of Donelson Pike in February 1988. The Airport's name was changed that year to the Nashville International Airport to reflect its international air service goals and the establishment of an American Airlines hub. In 1989 the old terminal building was demolished and the new parallel Runway (2R/20L) was dedicated.

I.2.2.4 1990s and 2000s

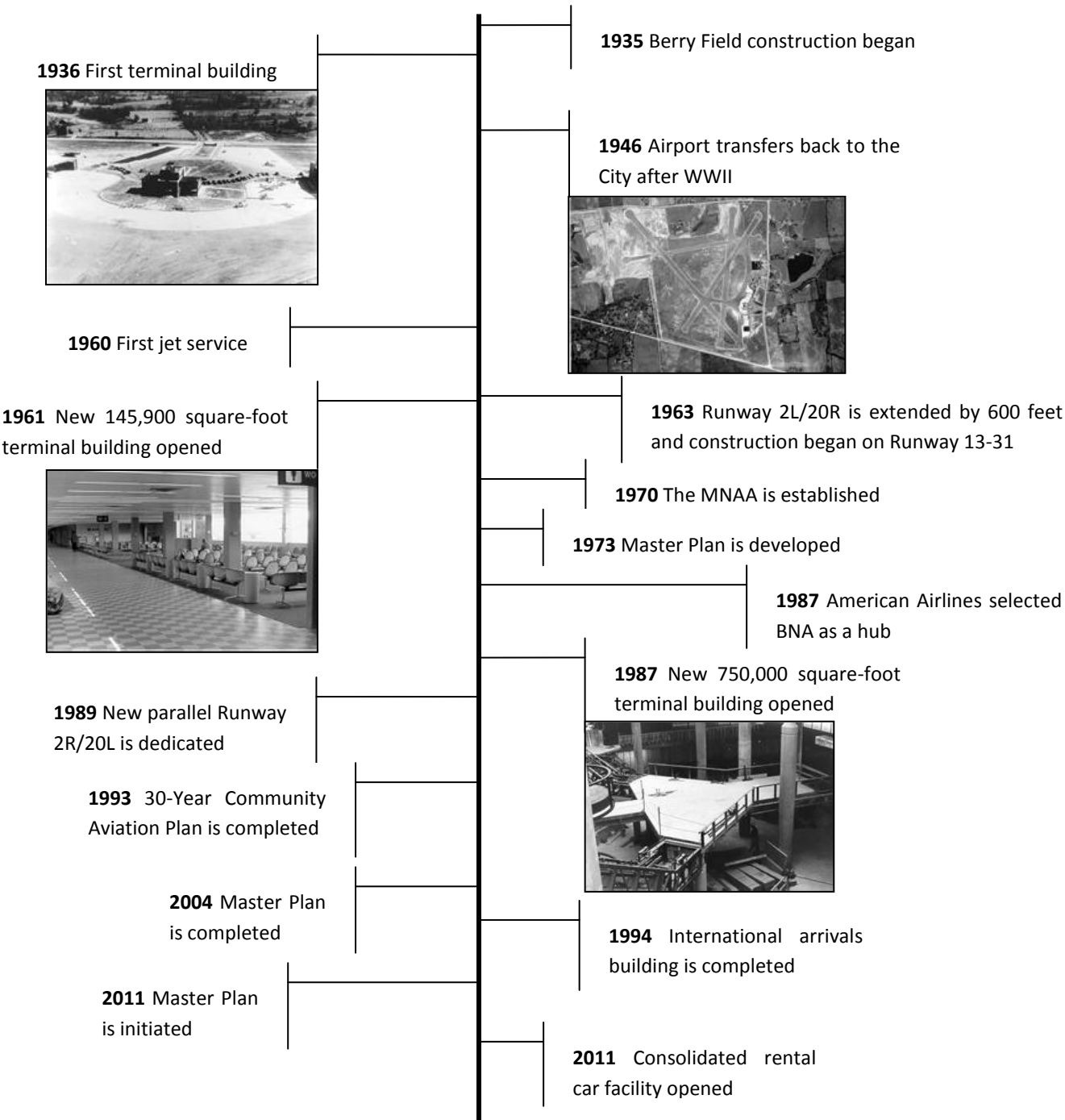
In 1994, the Airport relocated Runway 2C/20C and extended it to 8,000 feet. Major airline industry changes since the 1990s (including the growth of Southwest Airlines and legacy airline consolidation) have resulted in significantly different demand patterns, a reduction in the number of connecting passengers, and growth in the number of origin and destination passengers.

The most recent Master Plan (completed in 2004) addressed these significant changes (i.e., aircraft type, aircraft performance and FAA regulations) which have tremendously affected overall traffic levels and demand patterns at the Airport. Additionally, the events of September 11, 2001, and their economic and regulatory aftermath, had significant impacts on airport and terminal development throughout the country.

Environmental rules and regulations have also changed significantly in the last few years, particularly in the areas of air and water quality. Current rules specify that any projects requiring federal approvals (e.g., an Airport Layout Plan change) or involving federal funding and/or use of passenger facility charges require compliance with the National Environmental Policy Act of 1969 (NEPA).

Today, Nashville International Airport is served by 12 carriers. More than 380 average daily arriving and departing flights operate from 46 air carrier gates. The Airport provides direct air service to 70 locations serving 9.4 million passengers annually. Of the Airport's destinations, 50 are non-stop and include cities within the U.S., Canada, and Mexico. The terminal has been expanded to over 1 million square feet of space.

Figure I-3 – Timeline of Major Events



Source: MNAA, 2011.

I.3 Airport Organization

Nashville International Airport is publicly owned and is operated by the MNAA. The Authority operates separately from local government without the benefit of local tax dollars. Its primary functions are to plan, construct, operate, and manage a system of airports formerly owned by the City and to ensure the promotion and development of commerce and industry through air transportation.

The MNAA is run by a Board of Commissioners, nine of whom are appointed by the mayor and subject to confirmation by the Nashville Metropolitan Council. The Board is made up of three business and finance representatives, two pilot representatives, two neighborhood representatives, one engineering representative, one legal representative, and the mayor of Nashville. In accordance with the enabling legislation, commissioners must each represent one of the following professional and managerial disciplines: engineering, aviation, law, commerce, finance, and industry. Current board members are:

- Karl F. Dean - Mayor
- Juli Mosley, P.E. - Chair
- A. Dexter Samuels, PhD – Vice Chair
- Robert J. Walker - Secretary
- Jack O. Bovender Jr.
- Rod Essig
- Amanda Farnsworth
- Robert J. Joslin
- Deborah Wright

The Board employs the president of the Authority, who is the chief executive and administrative officer responsible for day-to-day operations and planning. The president heads a full-time staff of professional and technical personnel.

I.3.1 Tennessee Center for Performance Excellence

The Tennessee Center for Performance Excellence (TNCPE) is a nonprofit economic development organization that believes education, recognition of significant achievement, and sharing winning strategies will help Tennessee corporations and organizations become more competitive on a national and international level. Since its inception in 1993, the Nashville-based organization has attempted to fulfill its mission by providing in-depth, low-cost assessments of regional organizations using the “Criteria for Performance Excellence.” Through

a methodology based on the “Baldrige Performance Excellence Program,” organizations receive detailed feedback they use to improve their processes and results. As organizations grow and improve, their communities benefit from increased revenue and job opportunities, as well as better education, government, and healthcare services. In 2009 the MNAA received a Level 2 Commitment Award. The award levels are:

- Level 1 Interest Recognition (beginner level)
- Level 2 Commitment Award (intermediate level)
- Level 3 Achievement Award (advanced level)
- Level 4 Excellence Award (highest level)

The MNAA has used the findings of this self-assessment program to improve its operating structure. In 2011, the MNAA completed the “Metropolitan Nashville Airport Authority Performance Excellence 2011 Nonprofit TNCPE Application.” Seven categories were detailed as required by the TNCPE:

- Category One – Leadership
- Category Two – Strategic Planning
- Category Three – Customer Focus
- Category Four – Measurement, Analysis, and Knowledge Management
- Category Five – Workforce Focus
- Category Six – Operations Focus
- Category Seven – Nashville Airport Experience Results

I.3.2 Lean Six Sigma

Lean Six Sigma is a business management strategy developed in 1986 by Motorola, USA. This strategy aims to improve manufacturing and business processes by developing quality management methods and statistical measurement tools. The MNAA has incorporated the Six Sigma process improvement methodology as the cornerstone of its continuous improvement activities.

MNAA employees focus on driving improvements with support from Six Sigma experts (black and green belts). This focus helps increase opportunity for all of the MNAA’s employees by building a culture of continuous improvement and business excellence.

I.4 Review of Existing Studies

Numerous detailed studies have been completed or are in progress for BNA and the surrounding area. It is important to be familiar with these studies when analyzing future needs to ensure compatibility, efficiency and effectiveness with local, state, and federal transportation plans. The following subsections summarize these studies.

I.4.1 2004 BNA Airport Master Plan

A primary goal of the 2004 BNA Master Plan was to determine appropriate land use development “envelopes” for accommodating major Airport development in the foreseeable future. The plan focused on the needs of the terminal complex, cargo operations, airfield operations, airline support, non-aviation development, and the Tennessee Air National Guard (TANG). A key conclusion of the 2004 BNA Master Plan was that the long-term facility and level-of-service requirements for airfield, terminal, air cargo, air freight, general aviation (GA), terminal support, and Airport support activities could generally be met at the existing site. Recommended development was estimated to cost \$652,390,000 from 2004 through 2020.

I.4.2 2007 MNAA Land Use and Development Options Plan

The purpose of the 2007 Land Use and Development Options Plan was to identify opportunities and constraints associated with developing specific Airport properties, to prepare conceptual plans and sequencing schedules for that development and to estimate development costs. Using clearly defined objectives established by the MNAA, the Consultant generated development concepts and recommendations to allow the MNAA staff and Board of Commissioners to make informed decisions on developing the Airport property.

The process was undertaken in three phases: 1) data collection and assessment; 2) preparation of alternative land development options and selection of a preferred development approach; and 3) generation of a recommended plan of development with associated development costs and resulting land values. Six defined geographic areas immediately adjacent to the Airport were studied. The result was a conceptual design phasing plan for the six areas: Area 1 – Elm Hill/McCrory Creek; Area 2 – East of Runway 2R/20L; Area 3 – Town Park; Area 4 – South of Runway 2C/20C; Area 5 – Airport Estates, and Area 6 – Former Days Inn.

I.4.3 2007 Economic Impacts of MNAA Airports

The MNAA conducted an economic impact study to estimate the economic benefits generated by on-Airport businesses and visitors to the Nashville region. In 2006, the Airport enplaned nearly 9.7 million passengers and accommodated 67,900 metric tons of cargo. Impacts due to

on-Airport and visitor expenditures generated an estimated 25,100 jobs, \$671.4 million in earnings, and generated an economic impact of \$2.2 billion. Secondary impacts were estimated at 14,440 jobs, \$505.9 million in payroll, and \$1.5 billion in output. Nashville International Airport's economic impact comprises 6.2 percent of the estimated Gross Metropolitan Product (GMP) for the Nashville MSA. Additionally, John C. Tune Airport (JWN), Nashville's GA reliever airport, generated an estimated 115 jobs, \$3.1 million in earnings, and a \$10.8 million economic impact.

I.4.4 2009 General Aviation Land Use Plan

A GA land use plan was conducted with the primary objective of accommodating future development in the GA area. The study consisted of an updated forecast of aviation demand, market analysis, and a single preferred layout option. Recommendations resulting from this plan included:

- Expand GA facilities into the rental car service area, where feasible
- Upgrade water and sewer services
- Remove or renovate existing asbestos-laden facilities
- Resurface existing ramp and taxiway
- Review direct leases vs. leased parcels to ascertain the best approach to tenant agreements
- Improve drainage
- Extended Hangar Court to intersect with Knapp Boulevard for additional internal access to the GA area

I.4.5 2010 NEM Update

Federal Aviation Regulations (FAR) Part 150 Studies have two components: Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP). The NEMs provide information on the existing and five-year projected boundaries of significant levels of annual average noise exposure surrounding an airport. The NCP sets forth measures intended to mitigate the impacts of significant noise exposure on residential and noise-sensitive areas near an airport and to restrict the introduction of new incompatible land uses into locations exposed to significant noise levels. This document updated the NEMs for existing and future conditions at BNA.

I.4.6 October 2011 BNA User Satisfaction Study

In October of 2011, the MNAA completed an on-site survey of passengers at the airport. The study was conducted to determine a level of airport user satisfaction. Information gathered during the passenger and waiting area interviews was used to create passenger profiles during seasonal travel periods. In addition to determining various levels of Airport user satisfaction, a perceived level of importance related to key Airport services, such as parking access, ticket-counter service, security screening procedures, Airport signage and restrooms, was also obtained (see **Table I-1**). The following is a brief summary of the survey results:

- 87 percent reported as traveling without children.
- 53 percent reported as traveling alone.
- 36 percent reported as traveling for business.
- 73 percent reported having traveled three or more times in the past year.
- 46 percent reported having flown out of BNA at least twice within the past year.
- 59 percent of the surveyed passengers and 49 percent of the people located in the waiting areas reported BNA as better than other airports.

Table I-1 – Importance of Service Items by Age

< 35 Year of Age	Age 35 – 54	> 55 Years of Age
Free Wireless Internet	Shopping Variety	Safe & Secure Feeling
Restaurant Variety	Restaurant Variety	Clear Directional Signage
Access to Electric Outlets	Banking/ATM Access	Visible Flight Information
Convenient Parking	Children’s Play Area	Courteous Security
Drinking Establishments		Passenger-Friendly Accommodations

Source: MNAA Satisfaction Study Fall 2011.

I.5 Airport Role

The National Plan of Integrated Airport Systems (NPIAS) identifies nearly 3,400 existing and proposed airports that are significant to national air transportation and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). It also includes estimates of the amount of AIP funds needed for infrastructure development projects that will bring these airports into compliance with current design standards and add capacity to congested airports. The FAA is required to provide Congress with a five-year estimate of AIP-eligible development every year.

The Airport is currently designated as a Part 139, medium-hub commercial service airport. Medium hubs are defined as airports that account for between 0.25 percent and 1.0 percent of total U.S. passenger enplanements. There are 37 medium-hub airports in the United States accounting for 20 percent of all enplanements. Medium-hub airports usually have sufficient capacity to accommodate air carrier operations and a substantial amount of GA activity.

On a regional level, BNA serves as an economic engine supporting multiple types of commerce in addition to passenger travel. The Airport serves a trade area of 79 counties in Middle Tennessee, Southern Kentucky, and Northern Alabama.

I.6 Key Planning Issues

Several key planning issues have been identified by the MNAA. Although the Master Plan Update analyzes all facets of the Airport, special emphasis has been placed on the following:

- **Air Cargo Expansion Areas** –The area previously prepared to accommodate an expansion of cargo facilities at the Airport will be reviewed. MNAA will re-consider the area for cargo potential and other revenue-generating opportunities both aviation- and non-aviation-related, as part of this Master Plan Update.
- **Terminal Planning** –This Master Plan will identify a comprehensive and detailed terminal strategy based on forecast passenger traffic activity levels over 5-, 10-, and 20-year periods.
- **Specific planning necessities include:** a terminal program analysis to address expansion needs within the terminal based on passenger traffic activity level “triggers;” a capacity analysis for terminal curbsides at all roadway levels; an FIS analysis to determine the impacts on the original FIS facility and develop future FIS requirements; and an emerging trends analysis to develop passenger ticketing processes, future passenger check-in processes, and ticket counter configurations.
- **Additionally, 2017 is a significant year regarding the planning process,** as it represents the end of the current 30-year airline facility leases. This can lead to opportunities for new entrant airlines, common or shared use of existing facilities, or airlines shifting operations to different locations within the terminal.
- **Coordination with Ongoing Studies** –Special emphasis has been placed on ensuring that recent ongoing studies, specifically the BNA Sustainability Master Plan, are consistent with the findings of this Master Plan Update.

- **Market Changes** – This Master Plan will provide a comprehensive look into future aircraft types, econometric forecasts, and market strategies, ensuring that the Airport is prepared for sudden and unforeseen changes in both the aviation industry and the economy as a whole.
- **Future Runway** – Consider runway extensions, an additional runway east of the quarry, protect the area for future development, and identify other future requirements.

I.7 Public Involvement

Public involvement is an important part of any significant airport study, as it encourages information-sharing and collaboration among the Airport sponsor, users and tenants, resource agencies, elected and appointed public officials, residents, travelers, and the general public. Collectively these stakeholders have an interest in the outcome of the Master Plan Update. Since complex, large, or unfocused stakeholder groups can impede meaningful input, it is important to use a variety of forums, such as committees, public information meetings, and public awareness campaigns.

Members of the project Technical Advisory Committee (TAC) review working papers at various milestones throughout the course of the Master Plan Update to ensure that all relevant issues are adequately addressed. Additionally, public workshops allow all interested individuals and/or groups to provide input concerning recommendations and findings.

This Master Plan effort includes the TAC and a Community Advisory Committee (CAC). The TAC is responsible for providing input and insight on technical issues. Committee members will review the Master Plan to evaluate its technical merit. The CAC weighs the recommendations against community goals, values and needs, and provides feedback regarding public opinions.

In addition to the TAC, CAC, and other coordination meetings, public meetings/workshops will provide an opportunity to convey public statements about the Master Plan Update. These meetings are conducted in an “open house” format with interactive information stations staffed by the MNAA and their Consultants.