

# Air Installation Compatible Use Zone (AICUZ) Study Westover Air Reserve Base, Massachusetts

United States Air Force  
February 2013



**FINAL**

**Volume I**



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# **Air Installation Compatible Use Zone (AICUZ) Study**

**Westover Air Reserve Base,  
Massachusetts**

**United States Air Force**

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Appendix A: The AICUZ Concept, Program, Methodology, and Policies

Appendix B: Accident Potential Zones

Appendix C: Description of the Noise Environment

Appendix D: Height and Obstructions Criteria

Appendix E: Noise Level Reduction Guidelines

## **Volume III: Implementation and Maintenance Plan**

**ACRONYMS**

AAC	Air Armament Center
AFB	Air Force Base
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AOD	Airport Overlay District
APZ	Accident Potential Zone
ARB	Air Reserve Base
ART	Air Reserve Technicians
CZ	Clear Zone
dB	Decibel
DNL	Day-Night Average A-Weighted Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EPF	Environmental Planning Function
ETL	Engineering Technical Letter
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
IFR	Instrument Flight Rules
INM	Integrated Noise Model
LZ	Landing Zone
NLR	Noise Level Reduction
RISO	Regionalized Isochronal
SLUCM	Standard Land Use Coding Manual
SOS	Special Operations Squadron
the Base	Westover Air Reserve Base
UFC	Unified Facilities Criteria
US	United States
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VFR	Visual Flight Rules



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# 1 Purpose and Need

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## 1.1 Introduction

This study is an update to the Westover Air Reserve Base (ARB) Air Installation Compatible Use Zone (AICUZ) Study conducted in 1996. The Study reaffirms Air Force policy of promoting public health, safety, and general welfare in areas surrounding Westover ARB. The report presents changes in flight operations since the last study, and provides current noise zones and future noise zones and compatible use guidelines for land areas surrounding the Base. It is hoped this information will assist the local communities, and serve as a tool for future planning and zoning activities.

Since the previous AICUZ was conducted, Westover ARB has adopted new flight operations and maintenance procedures required by Air Force headquarters, largely due to wartime and efficiency considerations. The Air Force is consolidating from eight into three C-5 isochronal inspection/repair facilities and Westover ARB was selected as one of the three. It is projected that Westover ARB will double isochronal (equal time interval) aircraft inspections from 13 to 26 per fiscal year due to this consolidation. The increase in inspection and maintenance may result in increased noise from the additional aircraft arrivals, departures and engine runs. The year 2009 is used as the Baseline/Existing Condition for aircraft operations and 2014 (5 years following implementation) is the year used for the Future Condition of aircraft operations.

In addition, flight tracks and procedures have been modified in response to new

flying tactics and flight training following the September 11, 2001 terrorist attacks and 2002 War on Terrorism. This has necessitated changes in flying altitudes and throttle settings, and airspeeds have also been changed. Following September 11th, C-5s were required to deliver materials into the warzone in Iraq. New threats to the aircraft in that environment required C-5 crews to adopt new flying tactics and flight training.

To summarize, the changes in the AICUZ are attributed to the following:

- Increase in C-5 operations and maintenance due to consolidation of isochronal inspection/repair facilities.
- Increase in personnel assigned to Westover ARB to accomplish the additional C-5 inspections.
- Changes to flying tactics and flight training as a result of September 11, 2001 attacks. Westover ARB aircrews now perform tactical flight training for departures and approaches.

## 1.2 Purpose and Need

As stated in the previous Westover ARB AICUZ Study, the purpose of the AICUZ program is to promote compatible land development in areas subject to aircraft noise and accident potential. As the cities of Springfield and Chicopee and the towns of Ludlow, Granby and South Hadley prepare and modify their land use development plans, recommendations from this updated AICUZ Study should be included in their

planning process to prevent incompatibility that may compromise Westover ARB's ability to fulfill its mission requirements. Accident potential and aircraft noise should be major considerations in their planning processes.

Air Force AICUZ land use guidelines reflect land use recommendations for clear zones, accident potential zones I and II, and five noise zones.<sup>1</sup> These guidelines have been established on the basis of studies prepared and sponsored by several federal agencies, including the Department of Housing and Urban Development, United States Environmental Protection Agency, Air Force, and state and local agencies. The guidelines recommend land uses which are compatible with airfield operations while allowing beneficial use of adjacent properties. The Air Force has no desire to recommend land use regulations which render property economically useless. It does, however, have an obligation to the inhabitants of the Westover ARB environs and to the citizens of the United States to point out ways to protect the people in adjacent areas, as well as the public investment in the installation itself.

The AICUZ program uses the latest technology to define noise levels in areas near Air Force installations. An analysis of Westover ARB's flying operations was performed, including types of aircraft, flight patterns utilized, variations in altitude, power settings, number of operations, and hours of operations. This information was used to develop the noise zones contained in this study. The Department of Defense (DoD) NOISEMAP methodology and the Day-Night Average A-Weighted Sound Level (DNL) metric was used to define the noise zones for Westover ARB.<sup>2</sup>

The DNL metric was developed and approved in the early 1970s by the USEPA to describe the noise environment. DNL is the energy-averaged sound level measured over 24 hours, with a 10 dB penalty applied to nighttime (10:00 p.m. to 7:00 a.m.) sound events to account for increased annoyance from late night noise. The Air Force program is based upon the amount of noise generated during an Average Busy Day (ABD), which includes night operations. The AICUZ Study contains noise zones plotted in increments of 5 decibels (dB), ranging from a DNL of 65 dB up to 80+ dB.

### 1.3 Process and Procedure

Preparation and presentation of this update to Westover ARB's AICUZ Study is part of the continuing Air Force participation in the local planning process. It is recognized that, as local communities prepare land use plans and zoning ordinances, the Air Force has the responsibility of providing inputs on its activities relating to the community. This study is presented in the spirit of mutual cooperation and assistance by Westover ARB to aid in the local land use planning process.

This study updates information on base flying activities since 1996. Noise zones portrayed on the AICUZ maps in this study are based on current mission plans.

Data collection for the noise analysis was conducted at Westover ARB in October 2009. Aircraft operational data, which includes arrival, departure and closed pattern operations and maintenance data, was obtained to derive average daily operations by runway and type of aircraft. This data was supplemented by flight track information, which is the ground track of the flight path flown by the aircraft

and flight profile information (altitude, speed and thrust), and ground engine run-up information. After verification for accuracy, this data was input into the NOISEMAP program to produce DNL noise zones<sup>3</sup>. Noise zones were plotted on an area map and overlaid with clear zone and accident potential zone areas. Appendix A of Volume II contains detailed information on the development of the AICUZ program.

## 2 Installation Description

### 2.1 Background and Population

Westover ARB is a joint-use military and civilian airfield with Westover Metropolitan Airport (WMA) that consists of approximately 2,500 acres of land in the City of Chicopee and the Town of Ludlow in Massachusetts. Located in the Pioneer Valley of Western Massachusetts, the Westover facility is operated under a joint use agreement with the DoD hosting the Westover Metropolitan Development Corporation (WMDC), a non-profit industrial development corporation established in 1974. See **Figure 2-1** for a map of the vicinity of Westover ARB.

As the largest Air Force Reserve base in the country by land mass, it is also the closest U.S. owned military runway to Europe. The neighboring towns and cities include the cities of Springfield and Chicopee and the towns of Ludlow, Granby and South Hadley.

Some of the larger communities near Westover, such as Springfield and Chicopee have well diversified economies with a mix of residential, commercial and industrial development. Although historically an industrial and agricultural economy, much of the employment in western Massachusetts near Westover ARB has transitioned into a service and retail trade economy, as has been the trend with the national economy in recent years. The area is home to diverse colleges and universities, including Amherst College, Mt. Holyoke College, and Smith College.

As shown in **Table 2.1**, the populations of the five communities adjacent to Westover ARB remained relatively constant between 2000 and 2010 and have not experienced significant changes in recent decades.

Table 2.1

**Westover Area Population Trends: 1970 to 2010**

	1970	1980	1990	2000	2010	% Growth (2000-2010)
Chicopee	66,676	55,112	56,650	54,735	55,298	1.0%
Granby	5,473	5,380	5,583	6,143	6,240	1.6%
Ludlow	17,580	18,150	18,815	21,217	21,103	-0.5%
South Hadley	17,033	16,399	16,685	17,196	17,034*	-0.9%
Springfield	163,905	152,319	156,964	151,894	153,060	0.8%

Source: Pioneer Valley Planning Commission, 2011.

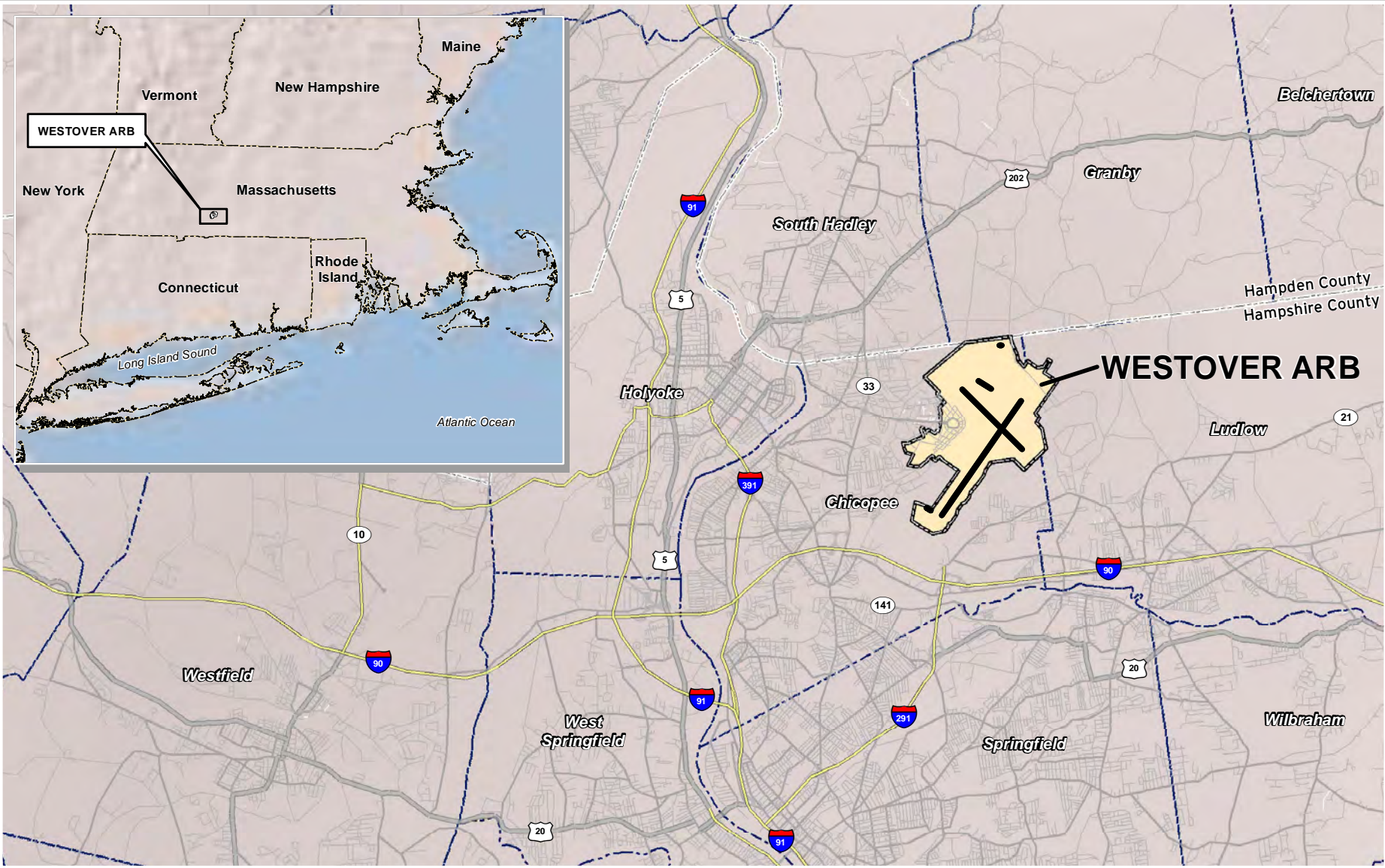
\*2010 population not available for South Hadley; 2006 population is provided.

### 2.2 History




Westover ARB has been in operation since 1940 and served as a bomber training base and port of embarkation/ debarkation during World War II. Following the war, the Base

was a staging point for the Berlin Airlift and headquarters of the Military Air Transport Service's Atlantic Division until April 1955. From that time until 1974, the Base was a

Westover Air Reserve Base / Metropolitan Airport



LEGEND

-  Installation Area
-  County Boundary
-  Town Boundary



Vicinity Map  
Figure 2-1



major Strategic Air Command installation. Since May 19, 1974 Westover has been an Air Force Reserve Command base.

From that time until October 1987 the 439th Tactical Airlift Wing operated C-130 Hercules and C-123 Provider aircraft. The wing converted to C-5As in 1987 and the unit eventually became designated as the 439th Airlift Wing.<sup>4</sup> Also in 1974, the WMDC was established by an act of the Massachusetts legislature as a quasi-public development corporation created to convert former military property at Westover Air Force Base to civilian use.

The Base included approximately 5,000 acres when it was first activated by DoD in 1940 to fulfill the government's need for a major installation in the northeast U.S. The Base currently includes about 2,500 acres due to transferring land to the communities of Chicopee and Ludlow.

## 2.3 Mission

Westover ARB is the nation's largest Air Force Reserve base, and is home to the Air Force's largest cargo aircraft, the Lockheed C-5 Galaxy. The 439th Airlift Wing is the military host unit at Westover ARB. The Wing operates Westover ARB as a joint use (i.e., military and civilian) airfield. Westover's 439th Airlift Wing operates 16 C5-B model aircraft at Westover ARB. The 439th Airlift Wing, a unit of the Air Force Reserve Command, currently has 2,500 reservists assigned to the wing at Westover. They train one weekend each month and also serve a 15-day annual tour of duty each year.

The mission of the 439th Airlift Wing is to provide worldwide air movement of troops, supplies, equipment and medical patients.

The Wing's flying unit is the 337th Airlift Squadron, which operates the C-5. The C-5 specializes in missions involving outsized and oversized cargo that no other aircraft can carry. The gigantic C-5 Galaxy, one of the largest aircraft in the world, provides the Air Mobility Command intertheater airlift in support of United States national defense. The aircraft carries fully equipped combat-ready military units to any point in the world on short notice then provides field support required to help sustain the fighting force.<sup>5</sup>



**Westover Aircraft: C-5 Galaxy**

Source: Westover ARB website, 2011.

Aircraft noise zones are being developed for this AICUZ update to determine and document the environmental effects of the Base's evolved aircraft maintenance and flying operations, as well as those of Westover Metro Airport. The previous AICUZ was performed in 1996 and since then new aircraft maintenance and flying training procedures have been implemented as required by Air Force headquarters. As mentioned previously, the Air Force is consolidating from eight into three C-5 isochronal inspection/repair facilities and Westover ARB was selected as one of the three. It is projected that Westover ARB will double isochronal (equal time interval) aircraft inspections from 13 to 26 per fiscal year due to this consolidation. The increase in inspection and maintenance results in

additional aircraft arrivals, departures and engine runs.

The 439th Airlift Wing operates the Base, which is also home to several tenant units including Marine Air Support Squadron Six; 4th Marine Aircraft Wing Reserve Training Center; Marine Air Support Squadron Six; the United States Army Corps of Engineers; the United States Armed Forces Reserve Training Center; Army Air Force Exchange Service; a Reserve Readiness and Mobility Squadron, the 226th Transportation Company (U.S. Army Reserve); the Springfield Military Entrance Processing Station (MEPS); a Defense Contract Management Administration office and Naval Construction Battalion 27, U.S. Navy Reserve.

As for civilian operations at Westover Metropolitan Airport, the WMDC has acquired over 1,300 acres and has developed them into three industrial parks and the WMA. Over 50 companies have located in the industrial parks, employing over 3,200 people. The corporation manages day-to-day operations of the WMA and the continuing development of commercial and industrial real estate at each of the parks.<sup>6</sup> The WMA has a 14,600 square foot passenger terminal and over 300,000 square feet of hangar space. The WMA is a Federal Aviation Administration and Transportation Security Administration certified air carrier facility handling scheduled public charter flights and general aviation traffic.

## 2.4 Economic Impact

The Air Force has prepared an Economic Impact Report to quantify the economic contributions of the Base. Westover ARB

employs 3,902 Air Force personnel. These include 2,826 military members, 766 civilian employees, and 310 other civilians (contractor or non-appropriated fund employees). An additional 2,160 people are employed through the multiple Army, Navy, and Marine Corps Reserve units on base, although these figures are not included in the Economic Impact Report.<sup>7</sup> **Table 2.2** provides the numbers of personnel at Westover ARB by military or civilian classification. There were no personnel living on base in 2012.



Table 2.2

**Personnel by Classification – FY 2012**

<b>Classification</b>	<b>Total No.</b>
<b>Appropriated Fund Military</b>	
Active Duty	346
Active Guard Reserve (AGRs)	87
Non-Extended Active Duty Reserve (incl. TRs, ARTS (Part B))	2,293
Individual Mobilization Augmentees (IMAs)	100
<i>Total Appropriated Fund Military</i>	<i>2,826</i>
<b>Appropriated Fund Civilians (Includes ARTS, Part A)</b>	
General Schedule	423
Federal Wage Board	341
Other	2
<i>Total Appropriated Fund Civilian</i>	<i>766</i>
<b>Non-Appropriated Fund, Contract Civilians and Private Business</b>	
Civilian NAF	86
Civilian BX	26
Contract Civilians (not elsewhere included)	197
<i>Private Businesses On Base, By Type:</i>	<i>1</i>
Branch Banks/Credit Union	1
Other Civilians (not elsewhere included)	0
<i>Total Non-Appropriated Fund, Contract Civilians and Private Business</i>	<i>310</i>
<b>Grand Total</b>	<b>3,902</b>

Source: Westover ARB Economic Impact Analysis, Fiscal Year 2012.

Note: All personnel live off Base.

Westover ARB's payroll in FY 2012 was over \$139 million. The breakdown of the payroll is shown in **Table 2.3**. Of the appropriated funds (for military and civilians), 49 percent of the payroll went to military and 51 percent of the payroll was to civilians. Non-appropriated payroll amounted to approximately \$4.4 million.

Table 2.3

**Summary of Annual Gross Payroll – FY 2012**

<b>Classification</b>	<b>Total (\$)</b>
<b>Appropriated Fund Military</b>	
Active Duty	\$19,118,315
Active Guard Reserve (AGRs)	\$7,072,578
Non-Extended Active Duty Reserve (incl. TRs, ARTS (Part B))	\$36,999,963
Individual Mobilization Augmentees (IMAs)	\$3,081,008
<i>Total Appropriated Fund Military</i>	<i>\$66,271,864</i>
<b>Appropriated Fund Civilians (Includes ARTS, Part A)</b>	
General Schedule	\$37,143,540
Federal Wage Board	\$31,193,561
Other	\$106,729
<i>Total Appropriated Fund Civilian</i>	<i>\$68,443,829</i>
<b>Non-Appropriated Fund, Contract Civilians and Private Business</b>	
Civilian NAF	\$1,853,591
Civilian BX	\$835,473
Contract Civilians (not elsewhere included)	\$1,697,500
<i>Private Businesses On Base, By Type:</i>	<i>\$46,085</i>
Branch Banks/Credit Union	\$46,085
Other Civilians (not elsewhere included)	\$0
<i>Total Non-Appropriated Fund, Contract Civilians and Private Business</i>	<i>\$4,432,649</i>
<b>Total Annual Payroll</b>	<b>\$139,148,342</b>

Source: Westover ARB Economic Impact Analysis, Fiscal Year 2012.

In addition to payroll, Westover ARB spent approximately \$46.6 million on construction, services, and procurement of materials, equipment and supplies. **Table 2.4** provides a breakdown of these expenditures.

The FY 2012 Economic Impact Analysis estimated the number and dollar value of indirect jobs created by the Base (See **Table 2.5**). Using indirect job multipliers to determine the number of indirect jobs created by the Base, it was estimated that the Base produces 1,131 jobs in addition to

the direct base jobs (3,902). Using the indirect jobs created and the average annual pay for the local community (\$46,086), it is estimated that the annual dollar value of jobs created is over \$52.1 million. Therefore the total direct and indirect contribution of Westover ARB spending to the local economy during FY 2012 is estimated to be over \$237 million. See **Table 2.6** for a summary of the direct and indirect contribution that Westover ARB makes to the local economy.

Table 2.4

**Summary of Construction, Contracts and Expenditures for Materials,  
Equipment and Supplies, FY 2012**

Variable	Actual Annual Expenditure
<b>Construction</b>	
Military Construction Program (Appropriation 3730)	\$0
O & M Minor Construction	\$22,381,863
Military Family Housing	\$0
Non-Appropriated Fund	\$0
Other	\$0
<i>Total Construction</i>	<i>\$22,381,863</i>
<b>Services</b>	
Services Contracts*	\$8,478,752
Other Services (not elsewhere included)	\$7,092,253
<i>Total Services</i>	<i>\$15,571,005</i>
<b>Other Expenditures</b>	
Commissary	\$0
Base Exchange (BX)	\$86,536
Health (CHAMPUS, Government cost only)	\$0
Education (Impact aid and tuition assistance)	\$266,974
TDY	\$2,932,000
RPA	\$1,466,000
O & M	\$1,466,000
Other Materials, Equipment & Supplies (not elsewhere included)	\$5,426,766
<i>Total Other Expenditures</i>	<i>\$8,712,275</i>
<b>Total Annual Expenditures</b>	<b>\$46,665,143</b>

Source: Westover ARB Economic Impact Analysis, Fiscal Year 2012.

\*Includes only contracts in the local economic area or contracts requiring the use of locally supplied goods and services.

Table 2.5

**Estimate of Number and Dollar Value of Indirect Jobs Created, FY 2012**

Type of Personnel	# of Base Jobs	Indirect Job Multiplier*	# of Indirect Jobs
Active Duty Military	346	0.41	142
Reserve / ANG / Trainees	2,480	0.16	397
APF Civilians	766	0.55	421
Other Civilians	310	0.55	171
<i>Total (Estimated # of Indirect Jobs Created)</i>	3,902	--	1,131

Average annual pay for the local community: \$46,086

Estimated annual dollar value of jobs created: \$52,123,266

Source: Westover ARB Economic Impact Analysis, Fiscal Year 2012.

\*Multipliers: LMI Economic Impact Database, Installations and Indirect and Indirect/Induced Job Multipliers, Feb 1995.

Table 2.6

**Summary: Total Annual Economic Impact Estimate, FY 2012**

Expense	Amount (\$)
Military	\$66,271,864
Federal Civilian	\$68,443,829
Other Civilian	\$4,432,649
<i>Annual Direct Payroll</i>	<b>\$139,148,342</b>
<i>Annual Expenditures</i>	<b>\$46,665,143</b>
Estimated Indirect Jobs Created	1,131
Average Annual Pay	\$46,086
<i>Estimated Annual Dollar Value of Jobs Created</i>	<b>\$52,123,266</b>
<b>Grand Total Economic Impact</b>	<b>\$237,936,752</b>

Source: Westover ARB Economic Impact Analysis, Fiscal Year 2012.

## 3 Aircraft Operations

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### 3.1 Introduction

In order to identify the relationship between aircraft activity, noise exposure, and land use compatibility, it is necessary to fully evaluate the type, frequency, and geographic distribution of flying activity at Westover ARB, as well as operations associated with WMA. Aircraft activity was inventoried in 2009, which serves as the baseline condition in this AICUZ.

Section 3.2 discusses the airfield and facility layout, Section 3.3 summarizes aircraft activity at Westover ARB and Westover Metropolitan Airport, and aircraft flight patterns are discussed in Section 3.4. Finally, aircraft maintenance activity is discussed in Section 3.5.

### 3.2 Airfield and Facilities

Westover has an elevation of approximately 241 feet above mean sea level (MSL), and has two runways (05/23 and 15/33). The primary runway is Runway 05/23, oriented in a north-south direction with a length of 11,597 feet and a width of 300 feet. There is a displaced threshold on the Runway 05 end (to the south) of approximately 1,200 feet, meaning aircraft land approximately 1,200 feet from the end of the runway. Both Runway 05 and Runway 23 provide an Instrument Landing System (ILS) for aircraft arriving in adverse weather. The crosswind runway (Runway 15/33) is 7,082 feet long and 150 feet wide, oriented east-west. Additionally, one helicopter landing pad is located on the airfield to the northwest of the Runway 05 end.

Runway 05/23 is utilized by nearly 94% of all military fixed wing aircraft operations, with Runway 23 accounting for approximately 62% of all operations and Runway 05 accounting for 32% of operations. Runway 33 includes 6.2% of all operations, while Runway 15 accounts for less than 1% of all fixed wing operations. Helicopter operations utilize the landing pad and account for less than 1% of all operations at Westover. See **Figure 3-1** for an illustration of the airfield layout.

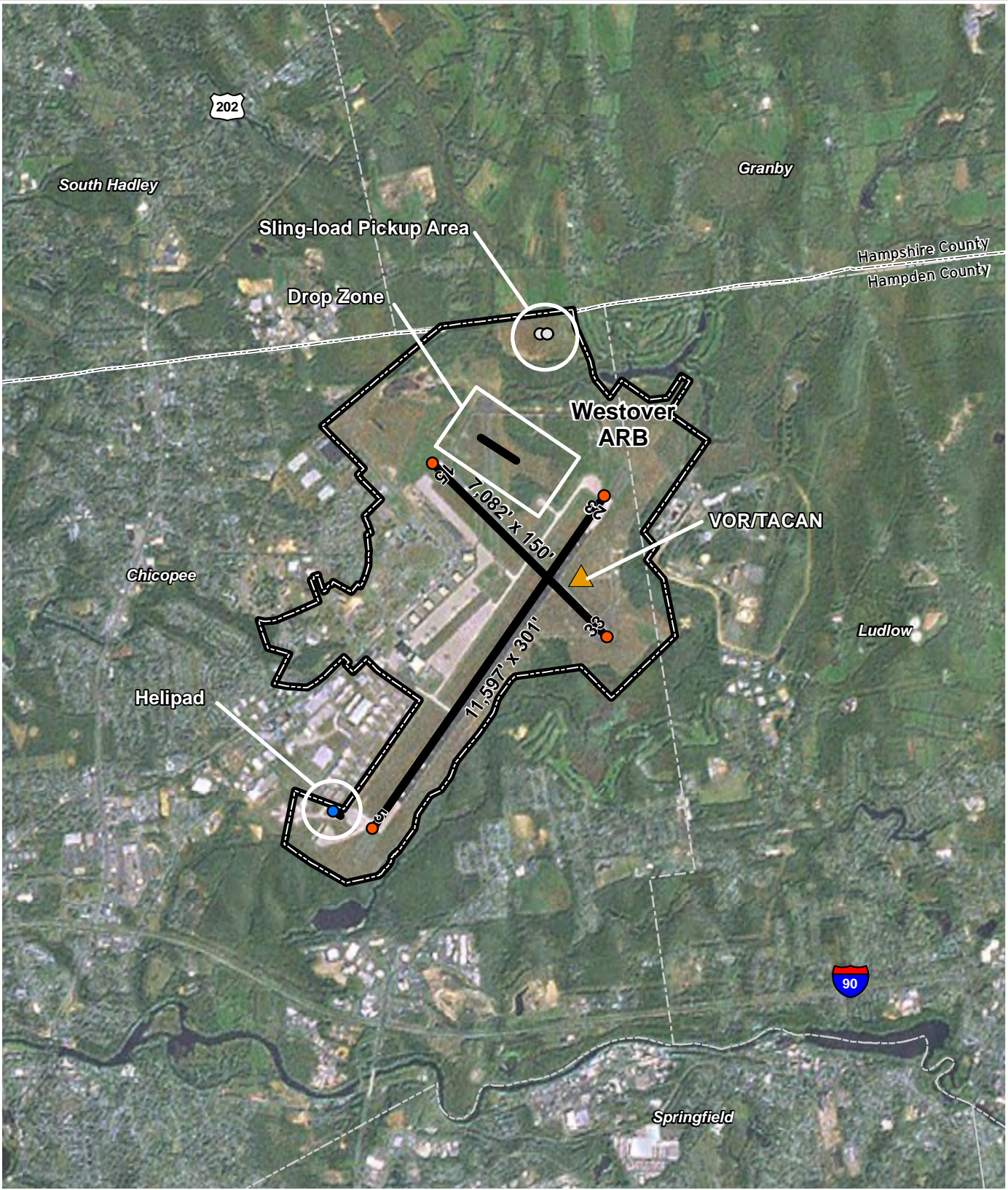
### 3.3 Westover ARB Flight Activity

Aircraft operations at Westover can be categorized into three groups: Based military operations, transient military operations, and civilian operations. A majority of aircraft activity at Westover is flown by the 439th Airlift Wing, utilizing the Lockheed C-5 Galaxy aircraft, which fly approximately 260 days per year. Transient military aircraft operate 365 days per year at Westover on a less frequent basis, and include the C-130 Hercules, F-16 fighter planes, and the twin-turboprop C-21, among others. Helicopter operations include the UH-60 Blackhawk and CH-47 Chinook, while business jets and single/twin engine propeller aircraft comprise a majority of operations associated with Westover Metropolitan Airport. **Table 3.1** depicts the average daily operations occurring at Westover ARB/WMA.

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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- NAVAID
- Runway End
- Helipad
- Drop Zone
- Sling-load
- County Boundary
- Airport Property



0 1,000 2,000 4,000 Feet

Airfield Map  
Figure 3-1

Table 3.1

**Average Daily Operations at Westover ARB/ Westover Metropolitan Airport**

Category/ Aircraft Type	Daily Arrival Operations	Daily Closed Pattern Operations	Daily Departure Operations	Daily Total Operations
<b>Westover ARB Based Aircraft</b>				
C-5 Galaxy	2.35	1.20	2.35	5.9
<b>Subtotal</b>	<b>2.35</b>	<b>1.20</b>	<b>2.35</b>	<b>5.9</b>
<b>Westover ARB Transient Aircraft</b>				
A-10 Thunderbolt	0.0		0.1	0.1
Boeing 737-500	0.0		0.0	0.0
C-12 Huron	0.0		0.0	0.0
C-130 Hercules	1.1	0.1	1.1	2.3
C-17 Globemaster	0.1		0.1	0.2
Learjet C-21	1.4		1.4	2.9
C-23 Sherpa	0.1	0.1	0.1	0.3
Boeing CH-47 Chinook	0.3	0.5	0.3	1.2
F-15 Fighter	0.0		0.0	0.1
F-16 Fighter	0.7		0.7	1.3
KC-10 Extender	0.0	0.1	0.0	0.1
KC-135 Stratotanker	0.1	0.2	0.1	0.3
UH-60 Blackhawk	0.3	1.1	0.3	1.7
<b>Subtotal</b>	<b>4.2</b>	<b>2.1</b>	<b>4.3</b>	<b>10.6</b>
<b>Westover Metropolitan Airport (Civilian)</b>				
Falcon 20	0.0	0.0	0.0	0.1
Learjet 60	0.0	0.0	0.0	0.1
Piper PA-32	0.0	0.0	0.0	0.1
Mooney 201LM	0.0	0.0	0.0	0.1
Beechcraft Bonanza	0.0	0.0	0.0	0.1
Beech King Air	0.0	0.0	0.0	0.1
Cessna 182	0.0	0.0	0.0	0.1
Cessna 414	0.0	0.0	0.0	0.1
Piper PA-28	0.1	0.0	0.1	0.1
Pilatus PC-6	0.1	0.0	0.1	0.1
Generic Single-Engine Prop	0.1	0.0	0.1	0.1
Learjet 35	0.1	0.0	0.1	0.1
Cessna 208	0.1	0.0	0.1	0.1
Gulfstream GV	0.1	0.0	0.1	0.2
Beechcraft Beechjet 400	0.1	0.0	0.1	0.2
Boeing 737-200	0.1	0.0	0.1	0.2
Cessna 172	0.1	0.0	0.1	0.3
Cessna 550 Citation	0.2	0.0	0.2	0.4
British Aerospace 125	0.3	0.0	0.3	0.5
<b>Subtotal</b>	<b>1.4</b>	<b>0.0</b>	<b>1.4</b>	<b>2.9</b>
<b>Grand Total</b>	<b>8.0</b>	<b>3.3</b>	<b>8.0</b>	<b>19.3</b>

Source: Westover ATC, 2009, HNTB analysis, 2012.

**Notes:** C-5A Based Aircraft assumed to operate 260 days per year. Transient and Civilian Operations operate 365 days per year.

Civilian Aircraft with less than 0.1 total operations omitted from table.

An operation is one arrival/departure or one takeoff/landing. A closed pattern operation consists of both an arrival and a departure, and is counted as two operations.



### 3.4 Aircraft Flight Patterns

Westover ARB flight patterns are implemented based on several considerations, including takeoff patterns that are routed to avoid heavily populated areas as much as possible; by following Air Force criteria that govern the speed, rate of climb, and turning radius for each type of aircraft; and by efforts to control and schedule missions to keep noise levels low, especially at night.

Aircraft operations can be defined as either a takeoff/departure, an approach/landing, or as one half of a closed pattern. Closed pattern operations occur when an aircraft departs an airfield with the express intent of circling back to approach, and is therefore counted as two operations. Westover ARB aircraft utilize a number of basic flight patterns, including:

- Straight out departures following the runway heading,
- Straight in approaches,
- Instrument flight rules (IFR) or radar closed pattern operations,
- Visual flight rules (VFR) or closed pattern operations, which include new flying training procedures as required by higher Air Force headquarters, and
- Re-entry VFR pattern operations.

Westover aircrews perform tactical flight training for departures and approaches, adopted due to the focus on wartime and efficiency of C-5 operations. As compared to the operations flown by C-5 aircraft studied in the previous AICUZ, the new C-5 tactical training requirements generally result in aircraft profiles with a higher rate of climb in a spiral pattern above the airdrome,

fast arrivals with turns above the airdrome, and a steeper angle of descent before arrivals.

Flight tracks are depicted in **Figures 3-2 through 3-12**.

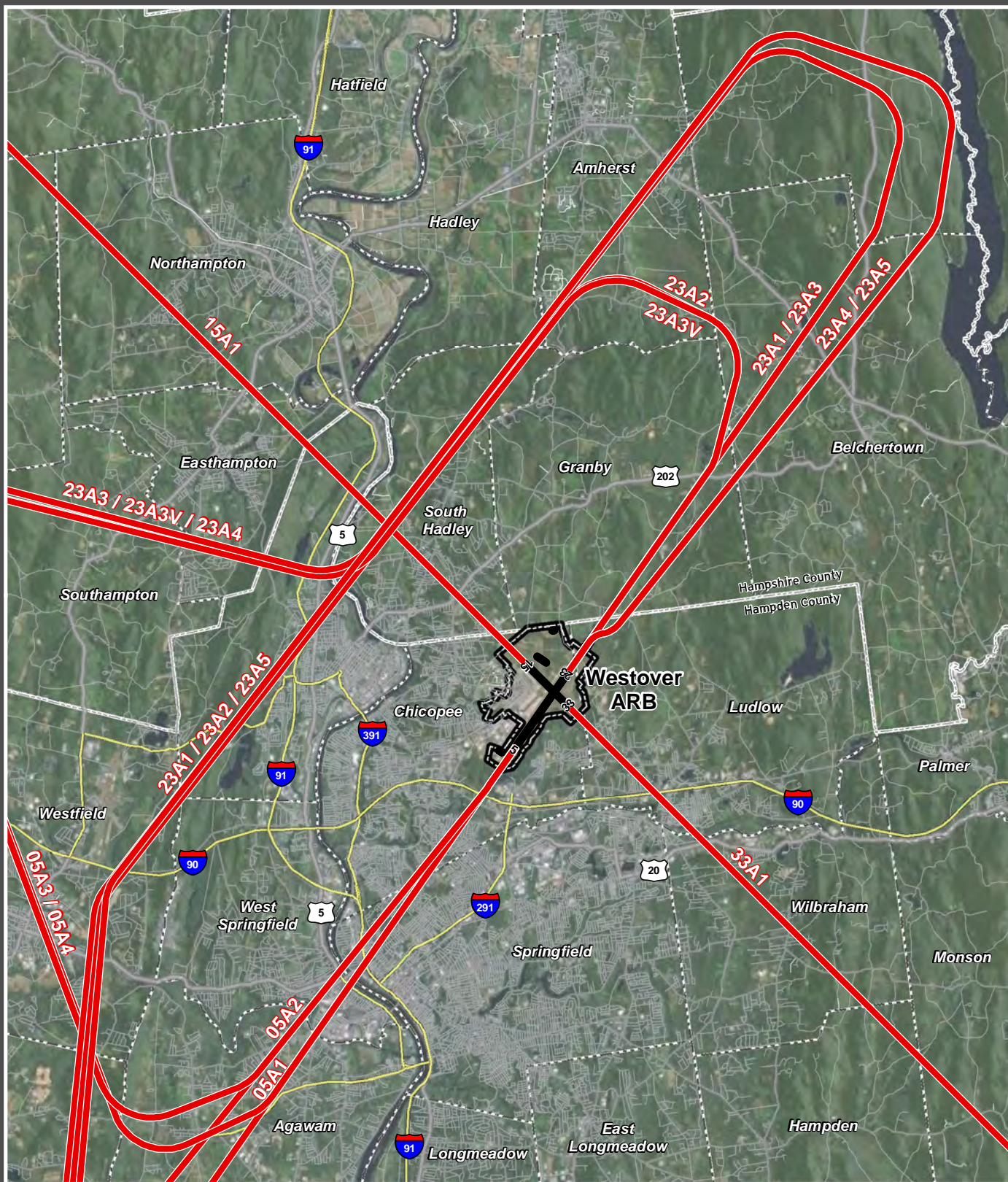
### 3.5 Aircraft Maintenance Activity

To the maximum extent possible, aircraft maintenance engine run-up locations have been established in areas to minimize noise for people on Base, as well as for those in the surrounding communities. Maintenance activity was collected for a 12-month period from Base personnel and input into the noise model. Aircraft maintenance engine run-up operations are performed on based C-5 aircraft at Westover ARB. As mentioned previously, Westover is one of three regional isochronal (equal time interval) inspection/repair facilities for the Air Force, and conducts isochronal maintenance procedures on both based C-5 aircraft and on those assigned to other bases. Run-ups are performed on the East Ramp with the aircraft oriented at 330 degrees. A majority of engine run-up activity is conducted between the hours of 7:00 a.m. and 10:00 p.m.

### 3.6 Comparison of 2009 and 2014 Conditions

It is not anticipated that aircraft operations will change between 2009 and 2014, and as such, there is no increase in overall flight activity by 2014. However, due to the consolidation of Air Force C-5 maintenance facilities, it is anticipated that Westover will double the number of isochronal maintenance operations by 2014.

# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

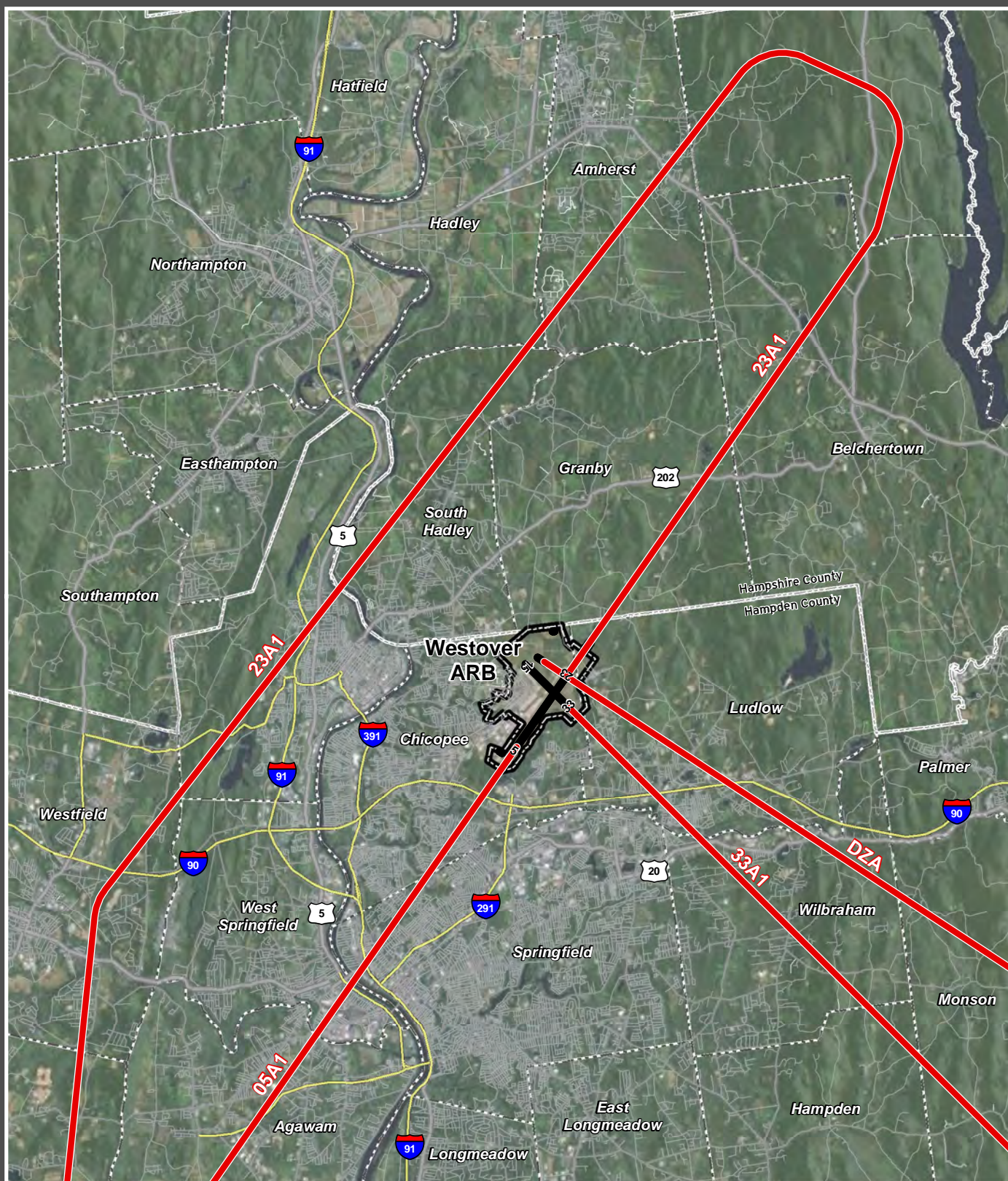
- Arrival Flight Track
- Installation Area
- County Boundary
- Town Boundary

## Arrival Flight Tracks - C-5's Figure 3-2





# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Arrival Flight Track
- Installation Area
- County Boundary
- Town Boundary

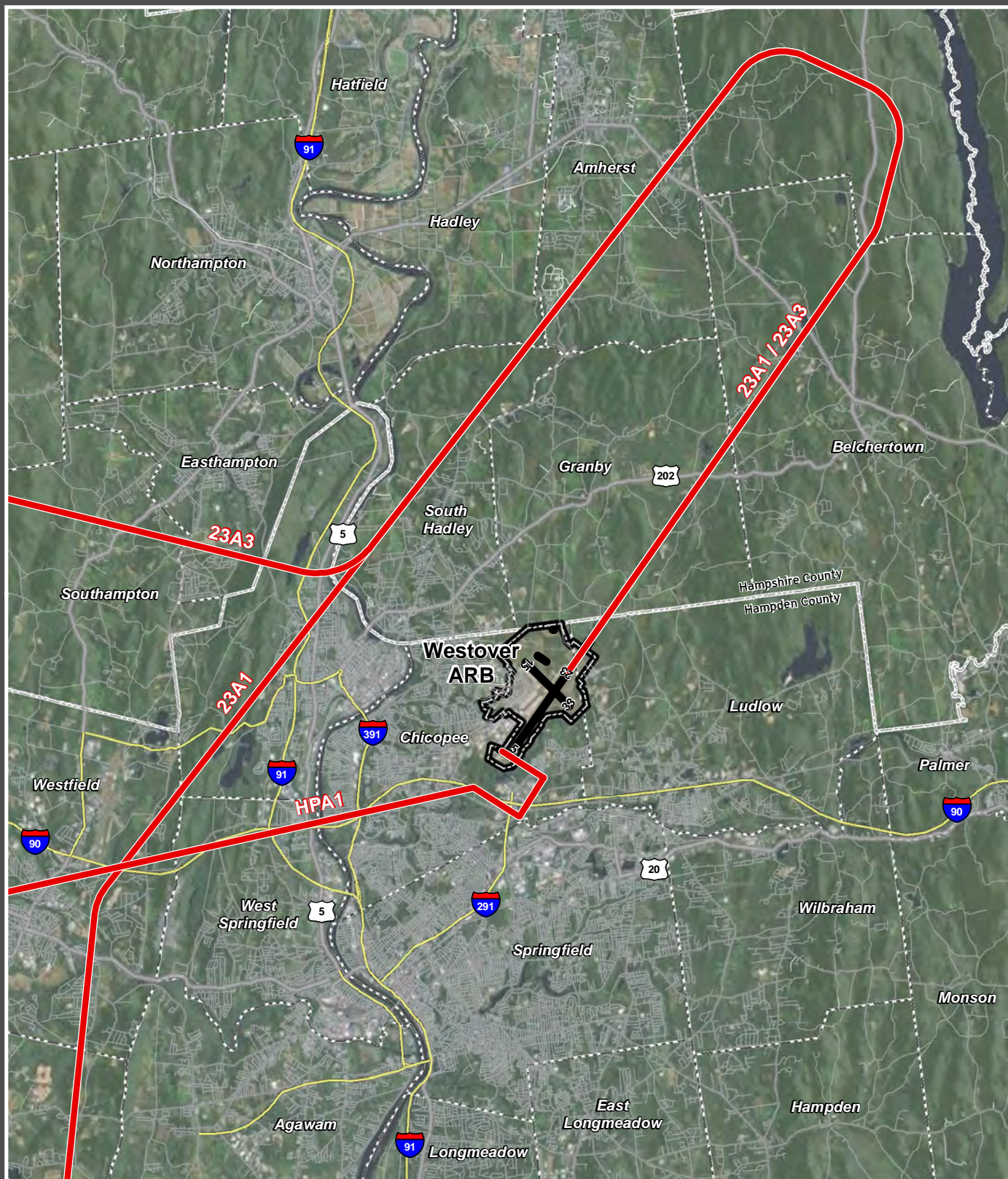
## Arrival Flight Tracks - Transient Aircraft Figure 3-3



Source: MassGIS, ESRI Data, and HNTB Analysis  
Page 17



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Arrival Flight Track
- Installation Area
- County Boundary
- Town Boundary

## Arrival Flight Tracks - Rotary Wing Aircraft Figure 3-4

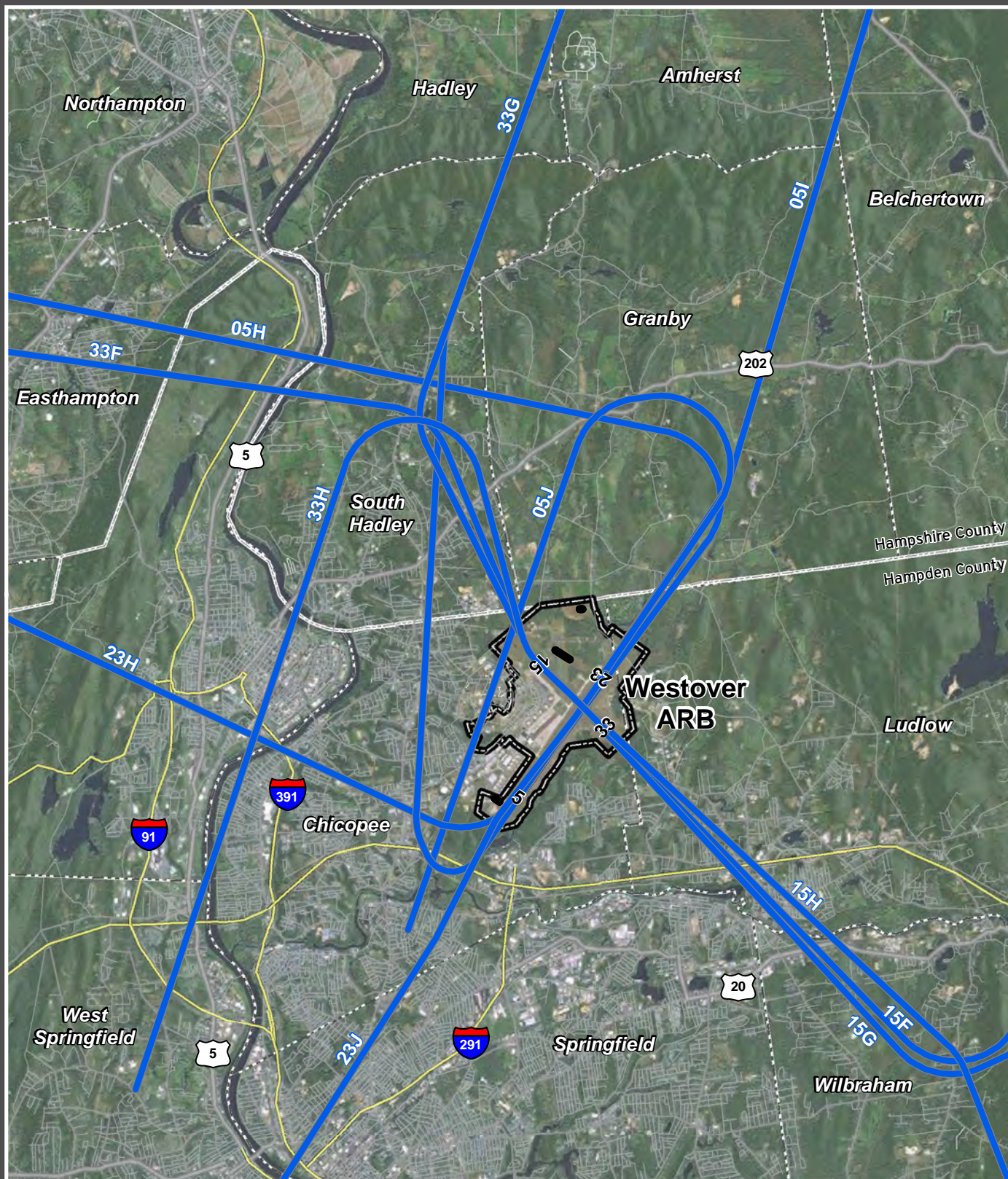


0 4,000 8,000 16,000 Feet

Source: MassGIS, ESRI Data, and HNTB Analysis  
Page 18



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

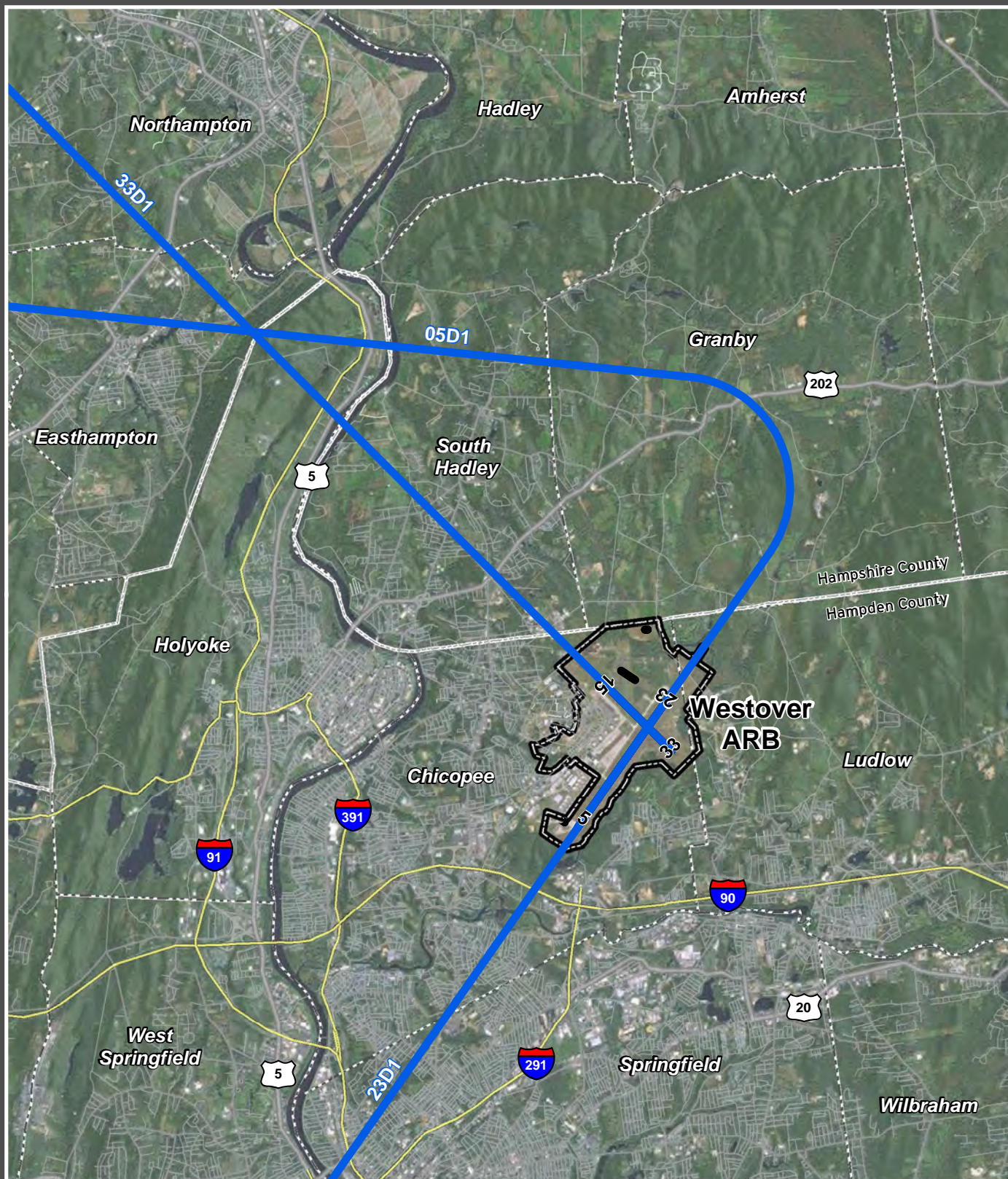
- Departure Flight Track
- Installation Area
- County Boundary
- Town Boundary

## Departure Flight Tracks - C-5's Figure 3-5





# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Departure Flight Track
- Installation Area
- County Boundary
- Town Boundary

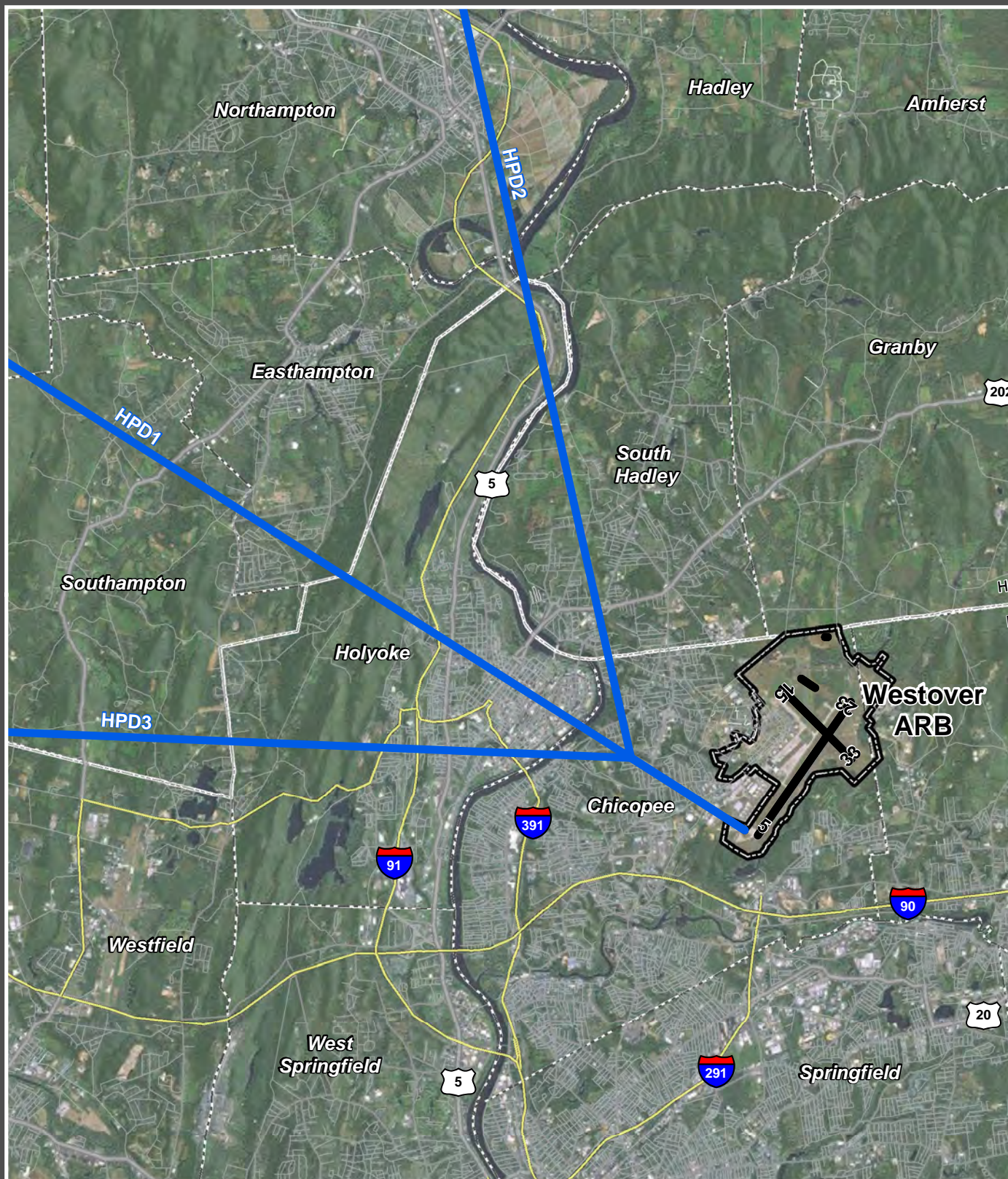
**Departure Flight Tracks - Transient Aircraft**  
**Figure 3-6**



0 2,500 5,000 10,000 Feet



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Departure Flight Track
- Installation Area
- County Boundary
- Town Boundary

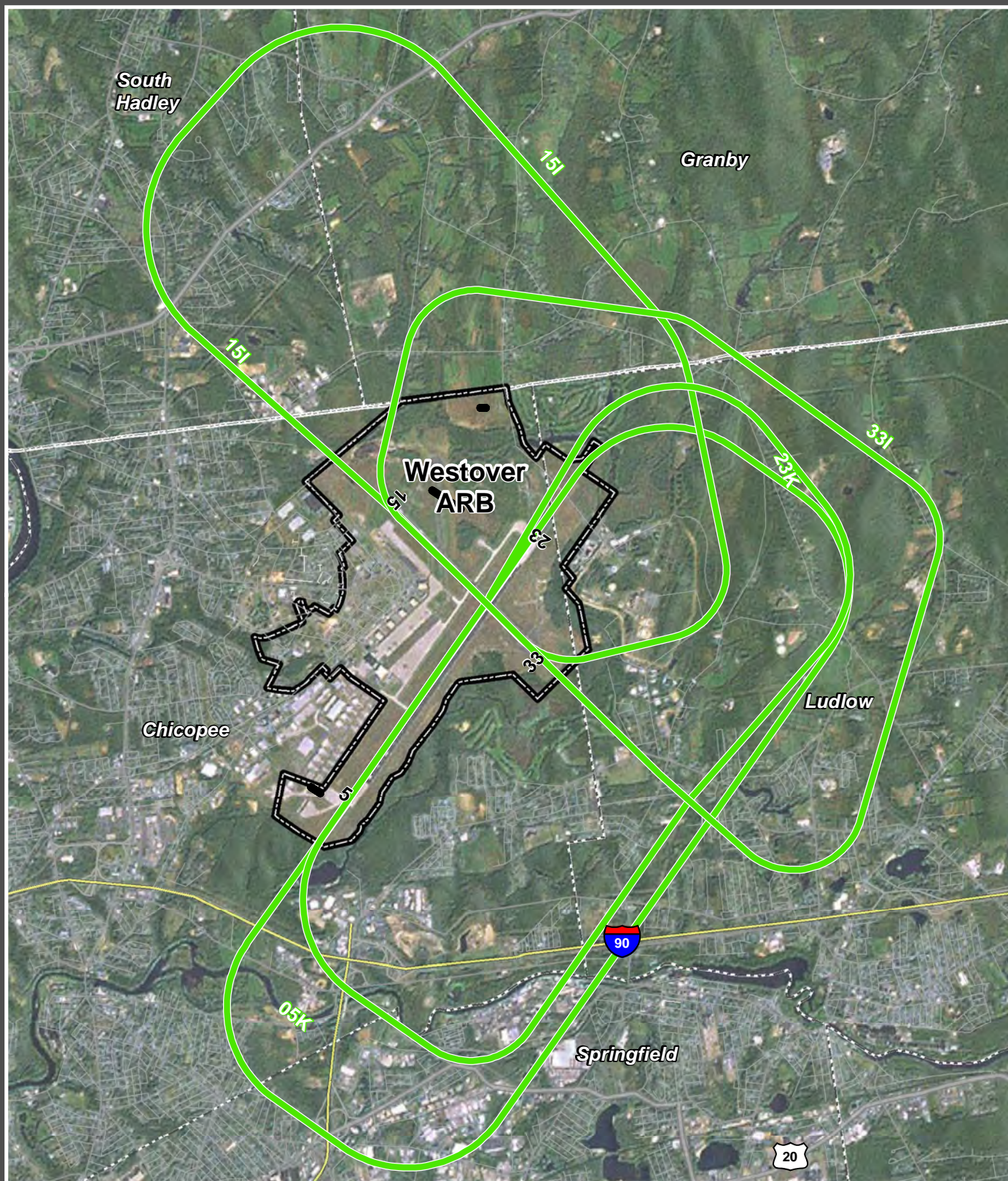
**Departure Flight Tracks - Rotary Wing Aircraft**  
**Figure 3-7**







Source: MassGIS, ESRI Data, and HNTB Analysis



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

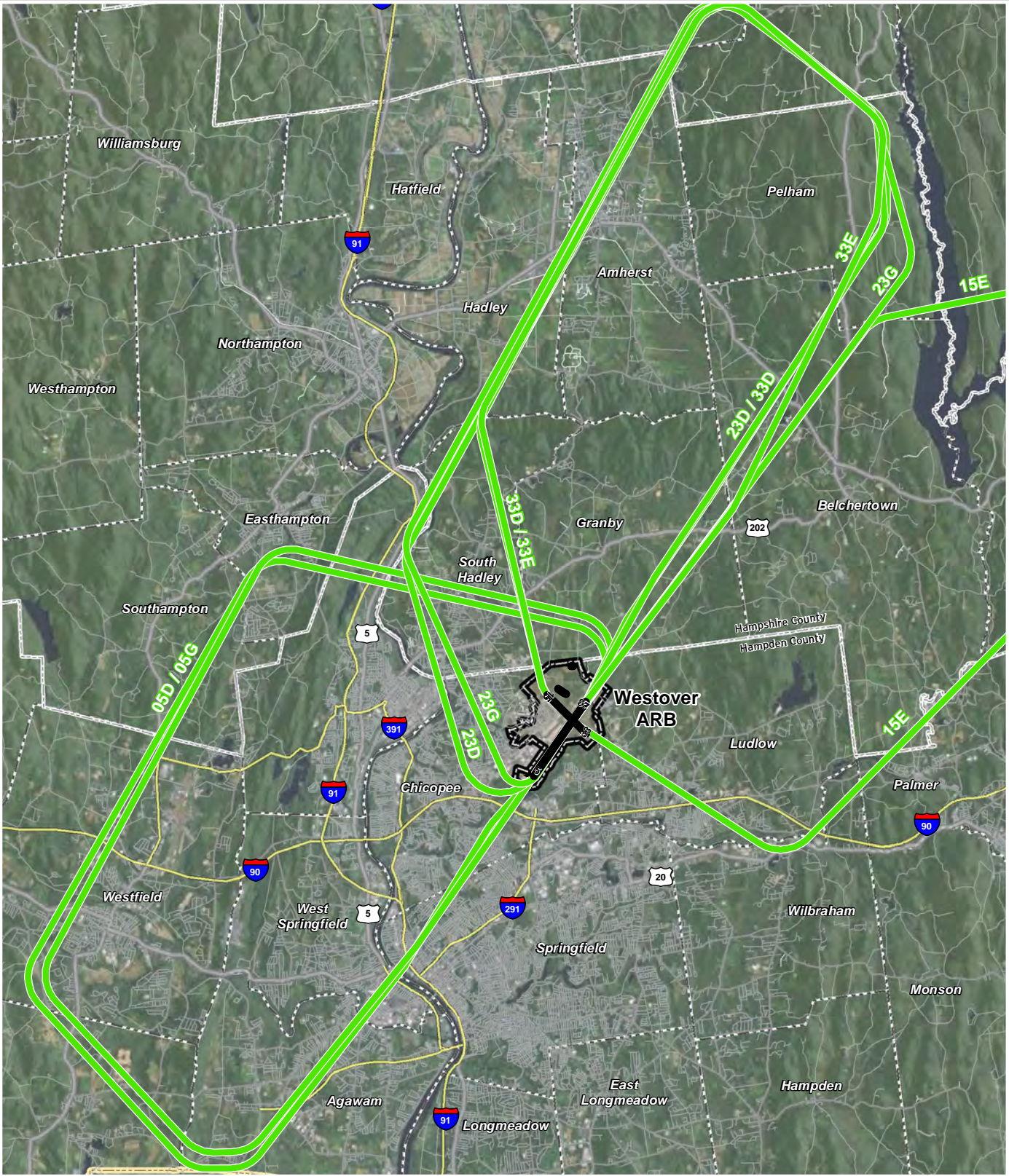
-  Closed Pattern Flight Track
-  Installation Area
-  County Boundary
-  Town Boundary

**Closed Loop Flight Tracks - C-5's**  
**Figure 3-8**





# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

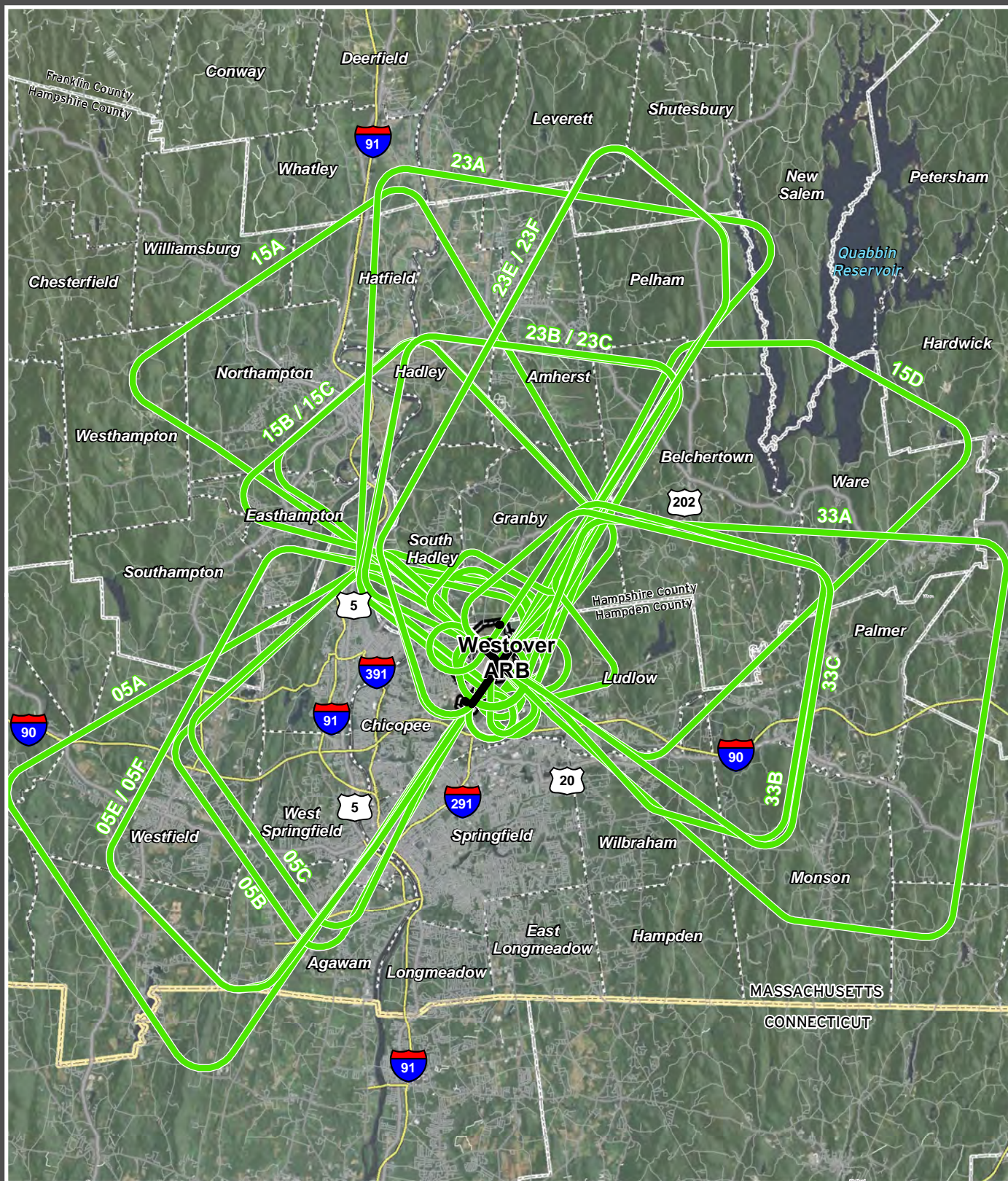
- Closed Pattern Flight Track
- Installation Area
- County Boundary
- Town Boundary

Closed Loop Flight Tracks - C-5's (GCA Arrivals)  
Figure 3-9





# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Closed Pattern Flight Track
- Installation Area
- County Boundary
- Town Boundary

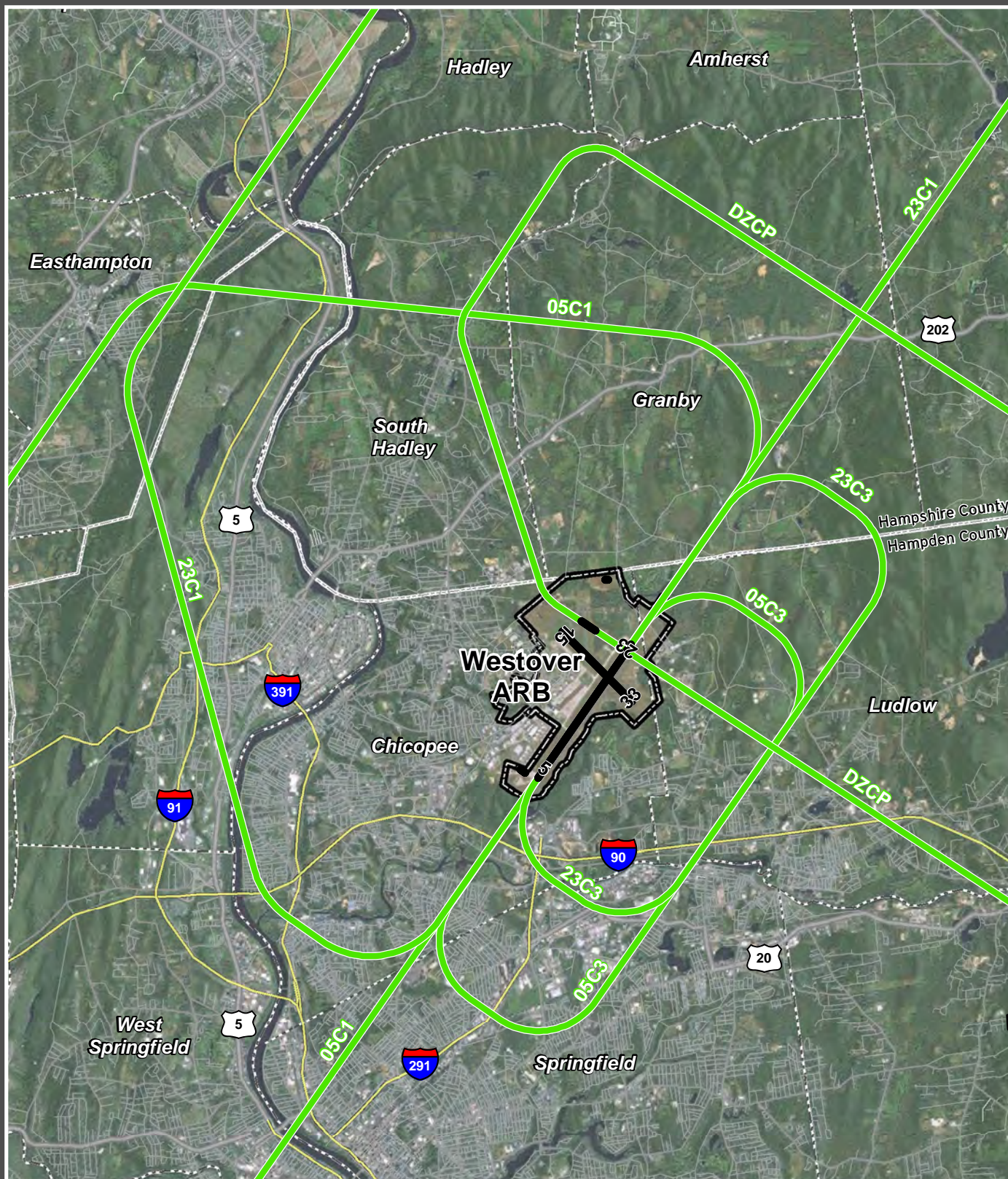
**Closed Loop Flight Tracks - C-5's (Tactical TACAN Approaches)**  
**Figure 3-10**



0 6,250 12,500 25,000 Feet



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Closed Pattern Flight Track
- Installation Area
- County Boundary
- Town Boundary

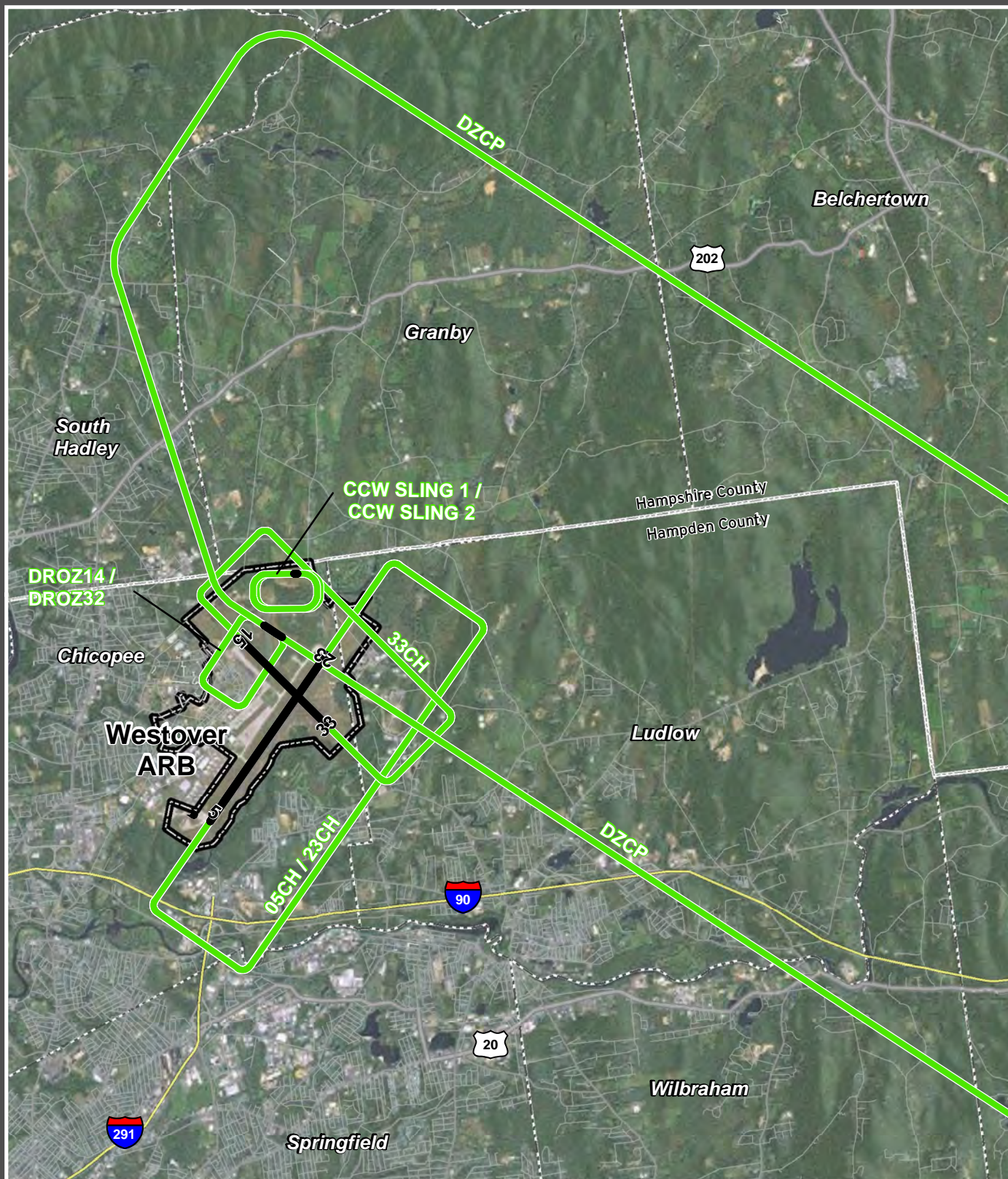
**Closed Loop Flight Tracks - Transient Aircraft**  
**Figure 3-11**



0 2,500 5,000 10,000 Feet



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Closed Pattern Flight Track
- Installation Area
- County Boundary
- Town Boundary

**Closed Loop Flight Tracks - Rotary Wing Aircraft**  
**Figure 3-12**



0 2,000 4,000 8,000 Feet

## 4 Land Use Compatibility Guidelines

---

### 4.1 Introduction

The DoD developed the AICUZ program for military airfields. Using this program, DoD works to protect aircraft operational capabilities at its installations and to assist local government officials in protecting and promoting the public health, safety, and quality of life. The goal is to promote compatible land use development around military airfields by providing information on aircraft noise exposure and accident potential.

AICUZ reports describe three basic types of constraints that affect, or result, from flight operations. They are height and obstruction, noise zones, and clear zones/accident potential zones. The first constraint involves areas which the FAA and DoD have identified for height limitations (see Height and Obstruction Criteria in Appendix D of Volume II). Air Force obstruction criteria are based upon those contained in Federal Aviation Regulation Part 77, Subpart C.

### 4.2 Noise Zones

The second constraint involves noise zones produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the DoD NOISEMAP methodology. Using the NOISEMAP program, which is similar to FAA's Integrated Noise Model (INM), DoD produces noise zones showing the noise levels generated by current aircraft operations.

DNL adds 10 dB to the noise events occurring during the nighttime (between 10 PM and 7 AM). This weighting reflects the added intrusiveness of nighttime noise

events due to community background noise levels that typically decrease by about 10 dB during the nighttime hours. The AICUZ report contains noise zones plotted in increments of 5 dB, ranging from DNL 65 dB to 85+ dB.<sup>9</sup> **Figure 4-1** shows 2009 DNL noise zones (2009 Existing Condition). Additional information on noise methodology is contained in Appendix C of Volume II of this report. **Figure 4-2** shows the DNL noise zones based on 2014 Future Conditions. **Figure 4-3** shows the 2009 Existing Condition noise conditions compared to 2014 Future Condition noise zones.

Westover ARB published an AICUZ study in 1996, including a 1996 "current conditions" noise exposure contour. A comparison of the two sets of noise contours shows that the general pattern of noise exposure remains consistent; however, the 2009 AICUZ noise contours have receded in many areas, and grown in others. Areas of growth include to the southeast of Runway 33, and in areas to the west. **Figure 4-4** compares the 2009 Existing Condition with the 1996 AICUZ noise zones.

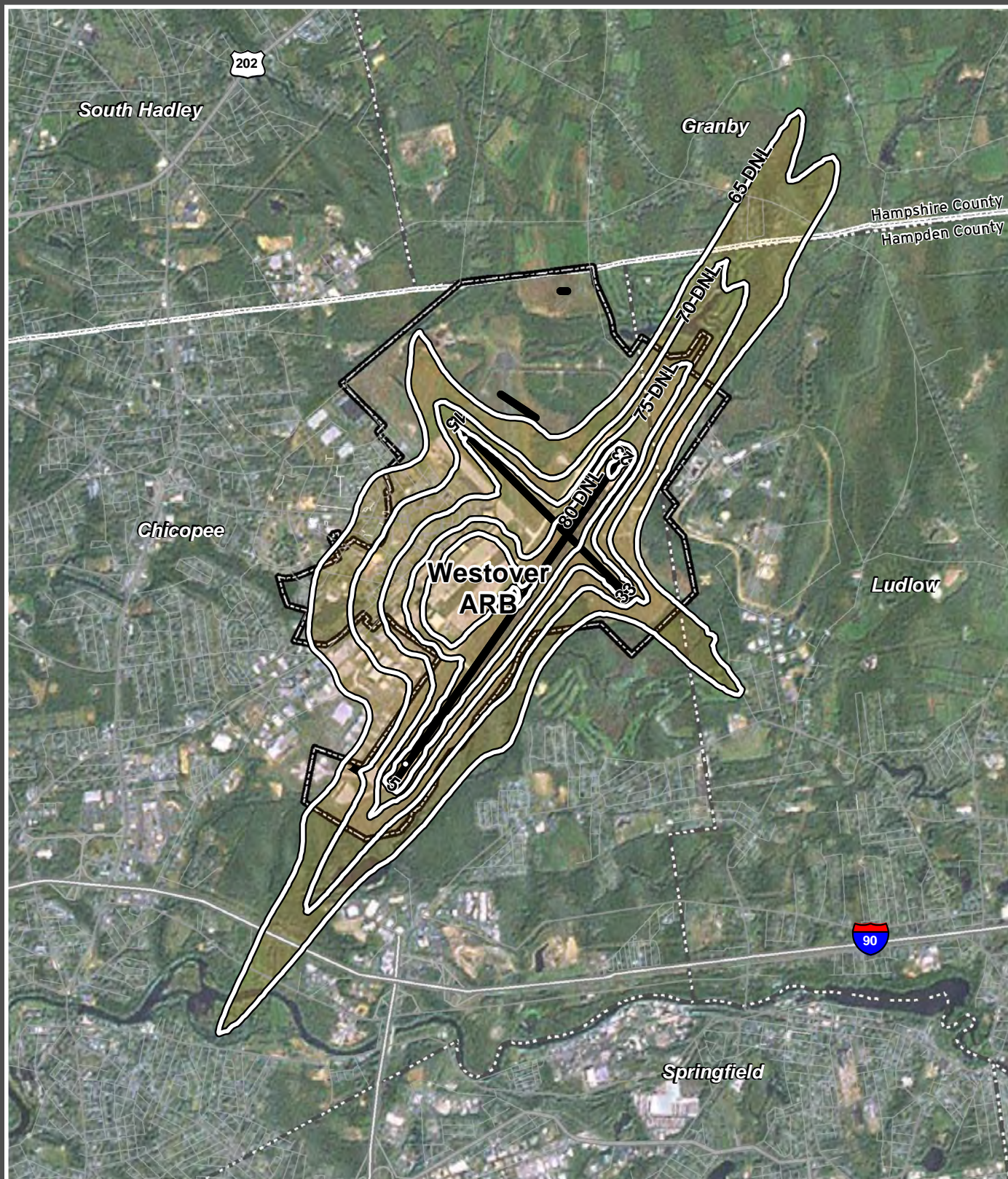
In 2004, the *Westover ARB/ Westover Metropolitan Airport Joint Land Use Study Update* was published, and included noise exposure contours prepared for an existing (2002) condition and forecast future (2007) condition. **Figure 4-5** compares the 2009 Existing Condition with the 2002 Joint Land Use Study noise contours. The noise contours, which are a function of the aircraft, flight profiles, runway utilization, and flight track utilization, retain a similar pattern to the 2002 noise contours, however, the current noise contours are

smaller in size. A number of factors influence the difference in noise exposure, including the noise model used (the Integrated Noise Model for the JLUS, and NOISEMAP for this AICUZ, which allows more customization of flight profiles based on pilot input), the number of overall flight operations, and the types of operations and profiles flown by C-5 aircraft. The new, tactical operations flown by the C-5 include increases in the rate of climb for departures, which results in the aircraft having a higher altitude as compared to historic C-5 operating patterns.

The Westover Metropolitan Development Corporation sponsored the development of Noise Exposure Maps and a Noise Compatibility Program under the 14 CFR Part 150 program. The Noise Compatibility Study was undertaken in conjunction with the Joint Land Use Study, and resulted in noise exposure contours for 2003 and forecast 2008 conditions. **Figure 4-6** compares the 2009 Existing Condition with the 2003 Noise Compatibility Study Noise Exposure Map contours, which are nearly identical to the 2004 JLUS study.



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

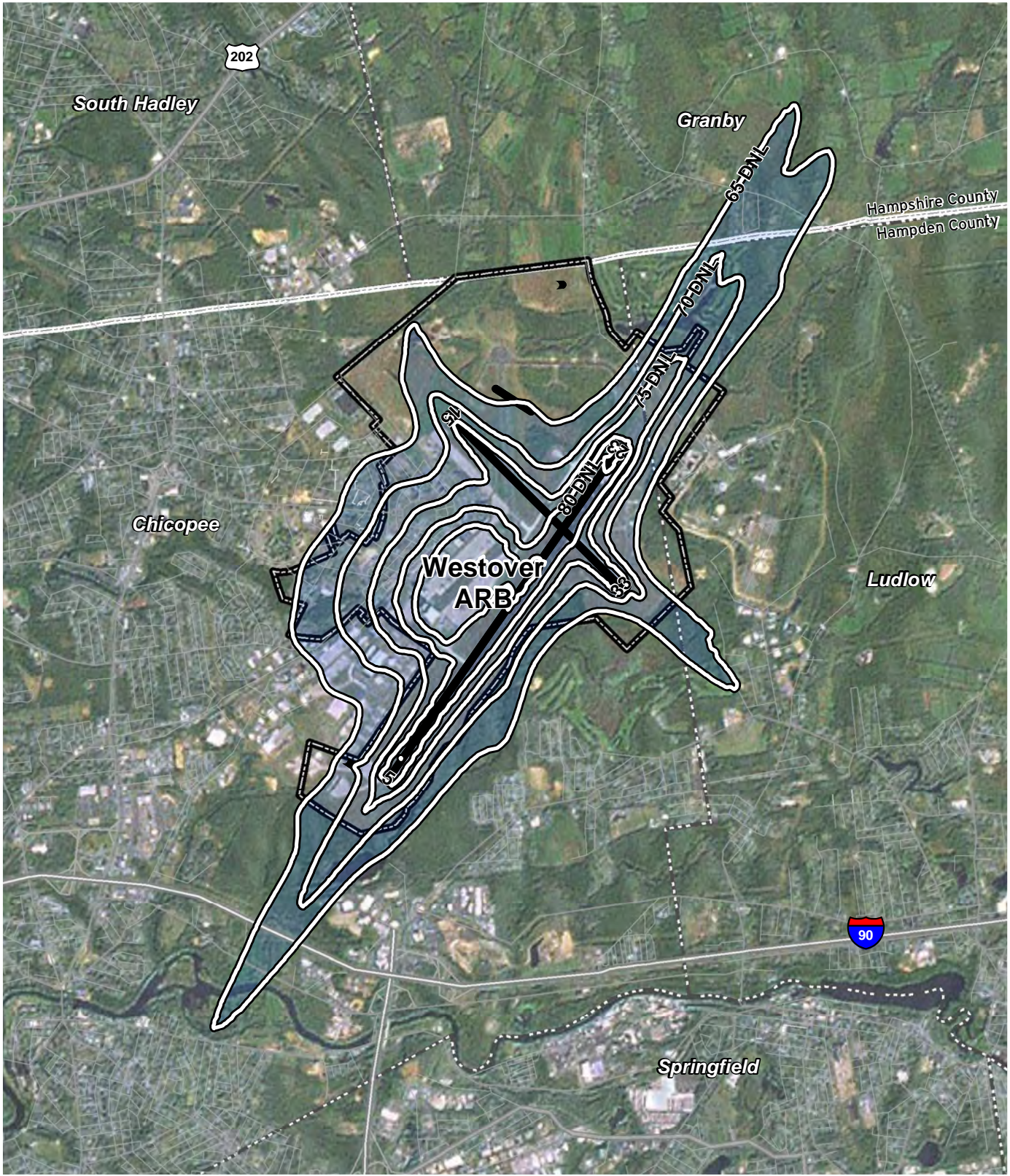
- 2009 Noise Contours
- Installation Area
- County Boundary
- Town Boundary

**2009 Existing Conditions Noise Zones**  
**Figure 4-1**





Westover Air Reserve Base / Metropolitan Airport



LEGEND

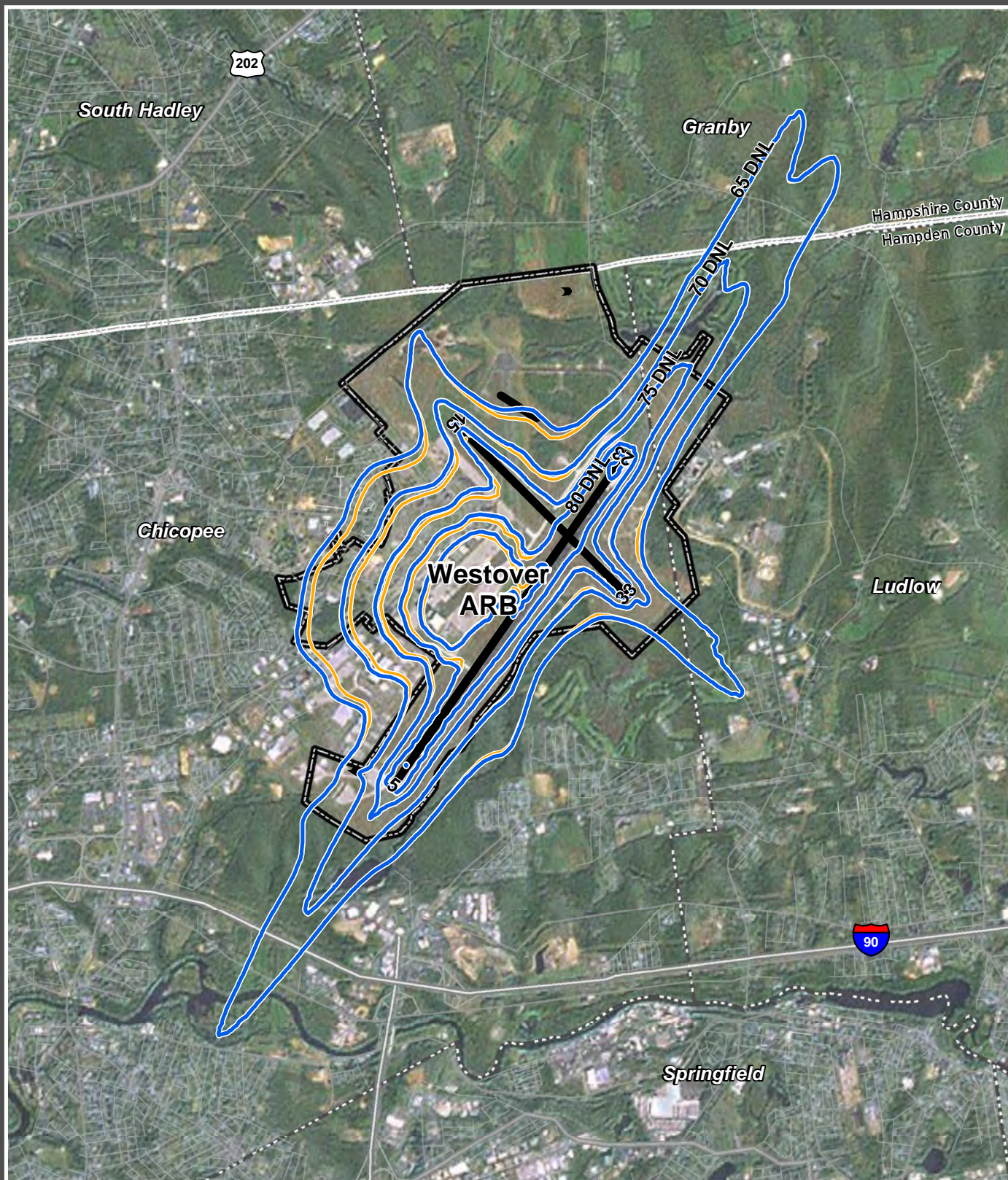
- 2014 Noise Contours
- Installation Area
- County Boundary
- Town Boundary

2014 Future Condition Noise Zones  
Figure 4-2





# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- 2009 Noise Contours
- 2014 Noise Contours
- Installation Area
- County Boundary
- Town Boundary

**2009 Existing and 2014 Future Conditions Noise Zones**  
**Figure 4-3**

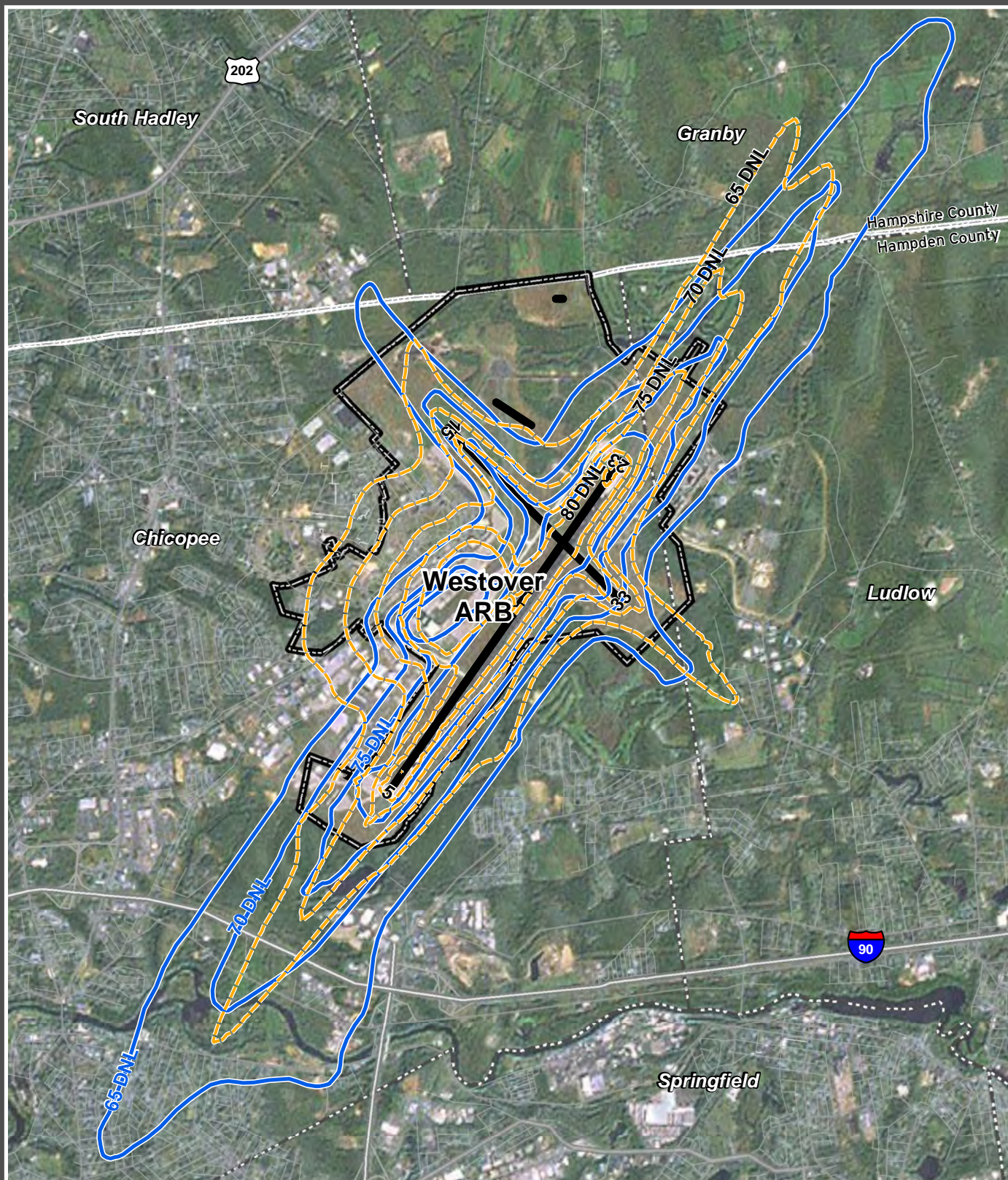


0 1,000 2,000 4,000 Feet

Source: MassGIS, ESRI Data and HNTB Analysis  
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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- 2009 Noise Contours
- 1996 AICUZ Noise Contours
- Installation Area
- County Boundary
- Town Boundary

**Comparison of 1996 AICUZ and  
2009 Existing Noise Zones  
Figure 4-4**

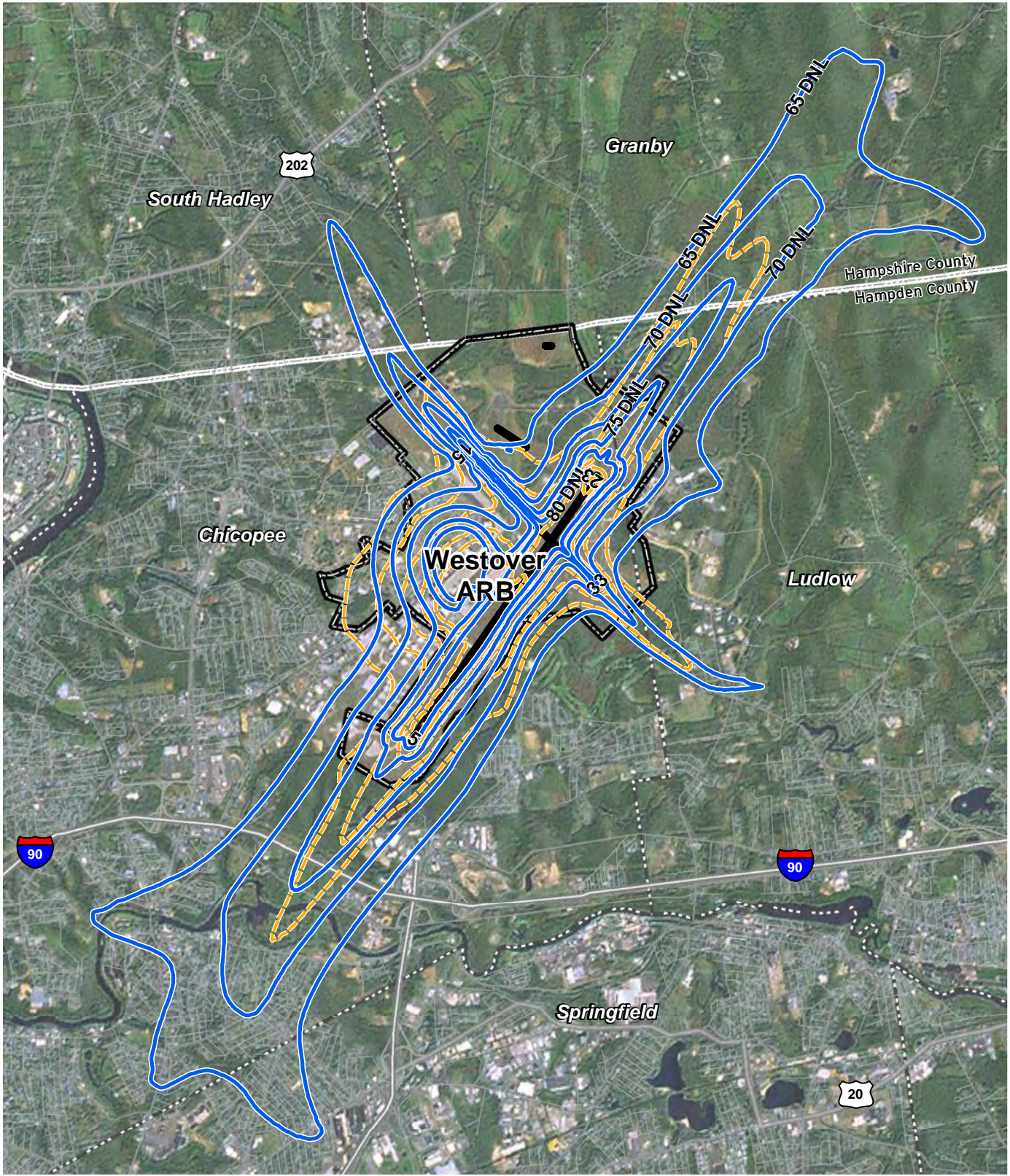


0 1,000 2,000 4,000 Feet

Source: MassGIS, ESRI Data and HNTB Analysis



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- 2009 Noise Contours
- JLUS 2002 DNL Noise Contours
- Installation Area
- County Boundary
- Town Boundary

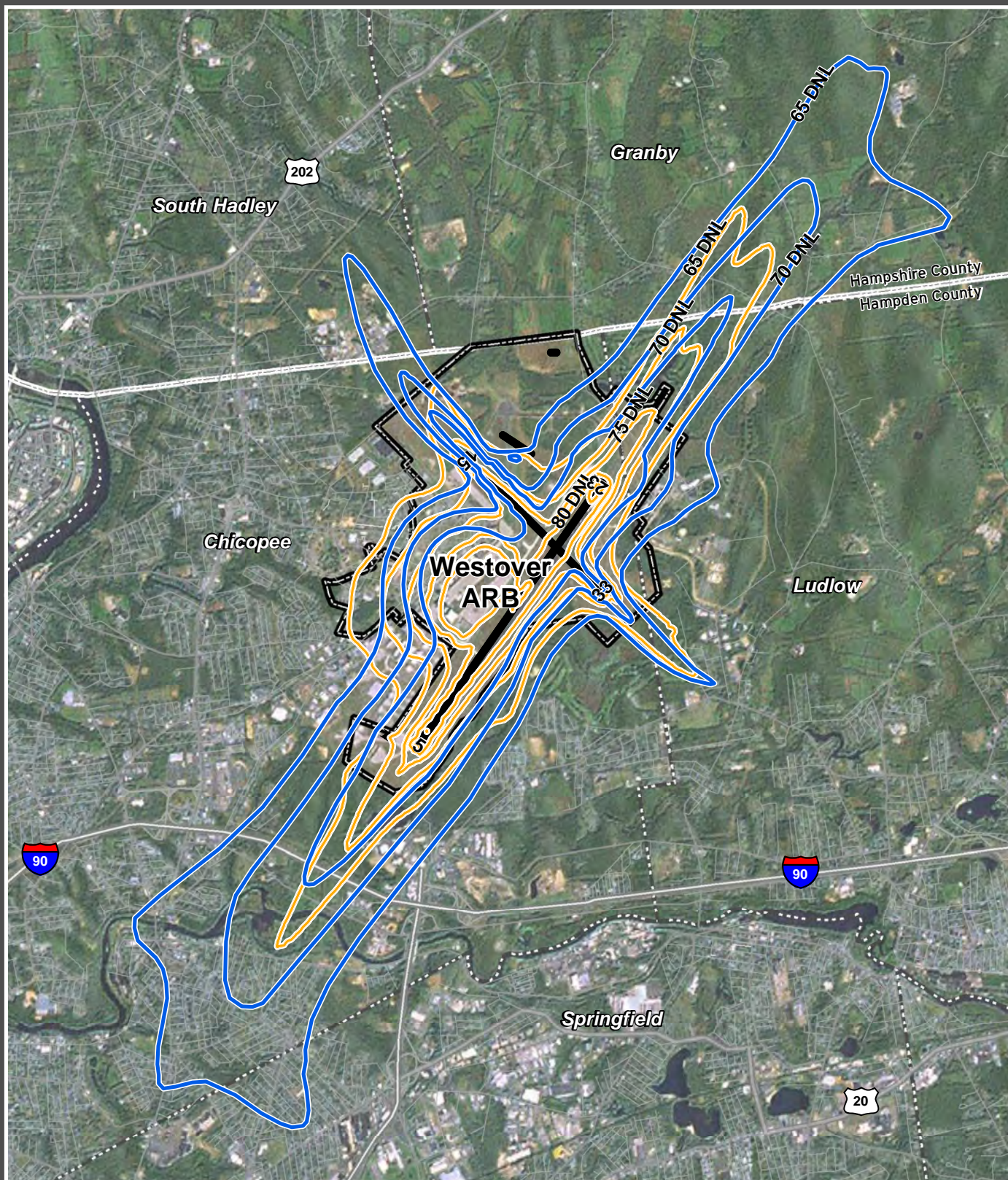
Comparison of 2002 (JLUS) and  
2009 Existing Condition Noise Zones  
Figure 4-5



Source: MassGIS, ESRI Data and HNTB Analysis  
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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- 2009 Noise Contours
- 2003 NEM Noise Contours
- Installation Area
- County Boundary
- Town Boundary

**Comparison of 2003 NEM and  
2009 Existing Condition Noise Zones**  
**Figure 4-6**



Source: MassGIS, ESRI Data and HNTB Analysis  
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**Table 4.1** shows the estimated acreage on- and off-Base property and **Table 4.2** shows the estimated population within the DNL 65 dBA and greater noise area for aircraft operations at Westover ARB in 2009 and 2014. The population estimates were developed using the population in the affected Census Blocks (U.S. Census 2010) in Hampden County and Hampshire County. The percent of the Census block contained within each noise zone was calculated using GIS and was then applied to the population within each block. For example, if Block Y's population is 20 and half (50%) of the block is within the DNL 65 dB noise zone, a population of 10 is estimated. The estimated count of impacted population does not take into consideration any sound insulation program(s) that have been introduced or implemented at WMA or Westover ARB.

Table 4.1

**Total Acres within DNL 65 dB and  
Greater Noise Exposure Area (Off-Base  
and On-Base)**

<b>DNL Noise Zone</b>	<b>2009</b>	<b>2014</b>
65-69 dB	1,250	1,296
70-74 dB	597	624
75-79 dB	370	383
80+ dB	389	414
<b>Total</b>	<b>2,606</b>	<b>2,717</b>

*Source: HNTB analysis, 2012.*

Table 4.2

**Population Estimate within DNL 65 dB  
and Greater Noise Exposure Area**

<b>DNL Noise Zone</b>	<b>2009</b>	<b>2014</b>
65-69 dB	505	583
70-74 dB	21	35
75-79 dB	0	0
80+ dB	0	0
<b>Total</b>	<b>526</b>	<b>618</b>

*Source: U.S. Census Bureau, 2010 and HNTB analysis, 2012.*

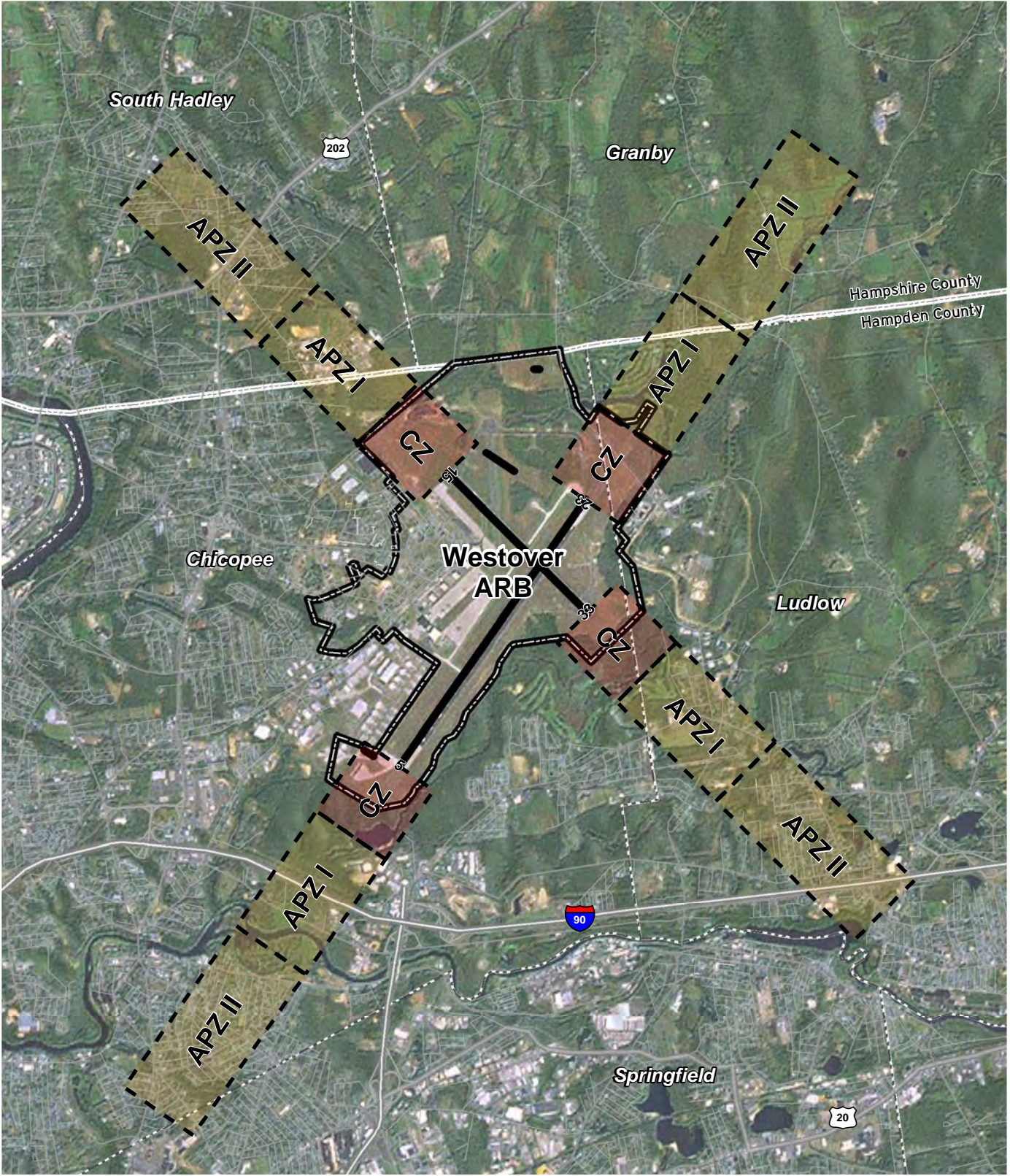
### 4.3 Clear Zones and Accident Potential Zones

The third constraint involves accident potential zones based on statistical analysis of past DoD aircraft accidents. DoD analysis has determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this analysis, DoD developed three zones that have high relative potential for accidents. Clear zones and accident potential zones are established for each runway.






**Figure 4-7** shows the Westover ARB clear zones and accident potential zones. The clear zone, the area closest to the runway end, is the most hazardous. The overall risk is generally high enough that DoD generally acquires the land through purchase or easement to prevent development. Clear Zones are closest to the runway ends; therefore the accident potential in these areas is the highest. Each end of Runway 15/33 and 5/23 at Westover ARB have a clear zone that encompasses an area 3,000 feet wide by 3,000 feet long.

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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

-  Clear Zone
-  Accident Potential Zone
-  Installation Area
-  County Boundary
-  Town Boundary

Clear Zones and Accident Potential Zones  
Figure 4-7





Accident potential zone I (APZ I) is an area beyond the clear zone that possesses a significant potential for accidents. Westover ARB APZ I at each runway end is 3,000 feet wide by 5,000 feet long.

Accident potential zone II (APZ II) is an area beyond APZ I having lesser, but still significant potential for accidents. Westover ARB APZ II at each runway end is 3,000 feet wide by 7,000 feet long.

While aircraft accident potential in APZs I and II does not warrant acquisition by the Air Force, land use planning and controls are strongly encouraged in these areas for the protection of the public. Additional information on accident potential is contained in Appendix B of Volume II of this report.

#### 4.4 Land Use Compatibility

Each AICUZ report contains land use guidelines. **Tables 4.3 and 4.4** list land uses versus all possible combinations of accident potential (Table 4.3) and noise zones (Table 4.4) at Westover ARB, showing land uses that are compatible or incompatible, as promulgated by the DoD. Noise guidelines are based upon those published by the Federal Interagency Committee on Urban Noise in the June 1980 publication, *Guidelines for Considering Noise in Land Use Planning and Control*. The U.S. Department of Transportation publication, *Standard Land Use Coding Manual (SLUCM)*, has been used for identifying and coding land use activities. Land use data was obtained from the Massachusetts Office of Geographic Information (MassGIS).

##### 4.4.1 Clear Zones and Accident Potential Zones

According to noise guidelines (See Table 4.3), the only land use compatible with Clear Zones is Agricultural land use (except livestock; no buildings, fenced highways without sidewalks or bicycle trails, and undeveloped land).

Land uses compatible with APZ I are those that limit the density and intensity of use. See Table 4.3 footnotes, especially 1. They include some Retail Trades and Services, as well as Cultural, Entertainment and Recreational activities. Some Transportation, Communications and Utilities land uses are considered compatible with APZ I, as are some Resources Production and Extraction (i.e., agriculture, livestock, forestry). Residential land uses and the majority of manufacturing land uses are not compatible with APZ I. See Table 4.3 for specific land use compatibility.

Land uses compatible with APZ II include all of those compatible with APZ I, with additional compatibility of certain Services, Entertainment, Retail Trade, and Manufacturing Land Uses. Single unit, detached housing at very low density (1-2 units/acre) is the only type of Residential land use considered compatible with APZ II. See Table 4.3 for specific land use compatibility.



#### **4.5 Participation in the Planning Process**

As local communities prepare their land use plans, the Air Force must be ready to provide additional inputs. The Base Civil Engineer has been designated as the official liaison with the local community on all planning matters. This office is prepared to participate in the continuing discussion of zoning and other land use matters as they may affect, or may be affected by, Westover ARB.

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
10	Residential				
11	Household Units				
11.11	Single units: detached	N	N	Y <sup>2</sup>	Maximum density of 2 Du/Ac
11.12	Single units: semi-detached	N	N	N	
11.13	Single units: attached row	N	N	N	
11.21	Two units: side-by-side	N	N	N	
11.22	Two units: one above the other	N	N	N	
11.31	Apartments: walk-up	N	N	N	
11.32	Apartment: elevator	N	N	N	
12	Group quarters	N	N	N	
13	Residential hotels	N	N	N	
14	Mobile home parks or courts	N	N	N	
15	Transient lodgings	N	N	N	
16	Other residential	N	N	N	
20	Manufacturing <sup>3</sup>				
21	Food and kindred products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
22	Textile mill products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	N	N	N	
24	Lumber and wood products (except furniture); manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
25	Furniture and fixtures; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
26	Paper and allied products; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
27	Printing, publishing, and allied industries	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
28	Chemicals and allied products; manufacturing	N	N	N	
29	Petroleum refining and related industries	N	N	N	
31	Rubber and miscellaneous plastic products; manufacturing	N	N	N	
32	Stone, clay, and glass products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
33	Primary metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
34	Fabricated metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	N	N	N	
39	Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
40	Transportation, communication, and utilities <sup>3,4</sup>				
41	Railroad, rapid rail transit, and street railway transportation	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
42	Motor vehicle transportation	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
43	Aircraft transportation	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
44	Marine craft transportation	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
45	Highway and street right-of-way	Y <sub>5</sub>	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
46	Automobile parking	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
47	Communication	N	Y <sup>6</sup>	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48	Utilities <sup>7</sup>	N	Y <sup>6</sup>	Y <sub>6</sub>	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48.5	Solid waste disposal (landfills, incinerators, etc.)	N	N	N	
49	Other transportation, communication, and utilities	N	Y <sup>6</sup>	Y	See Note 6 below
50	Trade				
51	Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
52	Retail trade – building materials, hardware and farm equipment	N	Y	Y	See Note 8 below
53	Retail trade <sup>9</sup> – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	N	N	Y	Maximum FAR of 0.16 in APZ II
54	Retail trade – food	N	N	Y	Maximum FAR of 0.24 in APZ II
55	Retail trade – automotive, marine craft, aircraft, and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
56	Retail trade – apparel and accessories	N	N	Y	Maximum FAR of 0.28 in APZ II
57	Retail trade – furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II
58	Retail trade – eating and drinking establishments	N	N	N	
59	Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
60	Services <sup>10</sup>				
61	Finance, insurance and real estate services	N	N	Y	Maximum FAR of 0.22 in APZ II
62	Personal services	N	N	Y	Office uses only. Maximum FAR of 0.22 in APZ II.
62.4	Cemeteries	N	Y <sup>11</sup>	Y <sup>11</sup>	
63	Business services (credit reporting; mail, stenographic, reproduction; advertising)	N	N	Y	Maximum FAR of 0.22 in APZ II
63.7	Warehousing and storage services <sup>12</sup>	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
64	Repair Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
65	Professional services	N	N	Y	Maximum FAR of 0.22 in APZ II
65.1	Hospitals, nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
67	Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
68	Educational services	N	N	N	
68.1	Child care services, child development centers, and nurseries	N	N	N	
69	Miscellaneous	N	N	Y	Maximum FAR of 0.22 in APZ II
69.1	Religious activities	N	N	N	
70	Cultural, entertainment and recreational				
71	Cultural activities	N	N	N	
71.2	Nature exhibits	N	Y <sup>13</sup>	Y <sup>13</sup>	
72	Public assembly	N	N	N	
72.1	Auditoriums, concert halls	N	N	N	

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
72.11	Outdoor music shells, amphitheaters	N	N	N	
72.2	Outdoor sports arenas, spectator sports	N	N	N	
73	Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y	
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y <sup>13</sup>	Y <sup>13</sup>	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
75	Resorts and group camps	N	N	N	
76	Parks	N	Y <sup>13</sup>	Y <sup>13</sup>	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
79	Other cultural, entertainment and recreation	N	Y <sup>11</sup>	Y <sup>11</sup>	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
80	Resource production and extraction				
81	Agriculture (except live-stock)	Y <sup>4</sup>	Y <sup>14</sup>	Y <sup>14</sup>	
81.5, 81.7	Livestock farming and breeding	N	Y <sup>14,15</sup>	Y <sup>14,15</sup>	
82	Agriculture related activities	N	Y <sup>14</sup>	Y <sup>14</sup>	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
83	Forestry activities <sup>16</sup>	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives

Table 4.3  
Land Use Compatibility in CZs and APZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation <sup>1</sup>	APZ-I Recommendation <sup>1</sup>	APZ-II Recommendation <sup>1</sup>	DENSITY Recommendation <sup>1</sup>
84	Fishing activities <sup>17</sup>	N <sup>17</sup>	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
85	Mining activities <sup>18</sup>	N	Y <sup>18</sup>	Y <sup>18</sup>	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
89	Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
90	Other				
91	Undeveloped land	Y	Y	Y	
93	Water areas <sup>19</sup>	N <sup>19</sup>	N <sup>19</sup>	N <sup>19</sup>	

Source: Department of Defense Instruction No. 4165.57 Air Installations Compatible Use Zones (AICUZ), Appx. 2, Table 1, May 2, 2011.

#### KEY TO TABLE 4.3 – LAND USE COMPATIBILITY IN APZS

**SLUCM** – Standard Land Use Coding Manual, U.S. Department of Transportation

**Y (Yes)** – Land uses and related structures are normally compatible without restriction

**N (No)** – Land use and related structures are not normally compatible and should be prohibited.

**Y<sup>x</sup>** – Yes with restrictions. The land uses and related structures are generally compatible. However, see notes indicated by the superscript.

**N<sup>x</sup>** – No with exceptions. The land uses and related structures are generally incompatible. However, see notes indicated by the superscript.

**FAR** – Floor Area Ratio. A floor area ratio is the ratio between the square feet of floor area of the building and the gross site area. It is customarily used to measure non-residential intensities.

**Du/Ac** – Dwelling Units an Acre. This is customarily used to measure residential densities.

#### NOTES FOR TABLE 4.3 – LAND USE COMPATIBILITY IN APZS

1. A "Yes" or a "No" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist air installations and local governments, general suggestions as to FARs are provided as a guide to density in some categories. In general, land use restrictions that limit occupants, including employees, of commercial, service, or industrial buildings or structures to 25 an acre in APZ I and 50 an acre in APZ II are considered to be low density. Outside events should normally be limited to assemblies of not more than 25 people an acre in APZ I, and maximum assemblies of 50 people an acre in APZ II. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I and II. For APZ I, the formula is  $FAR = 25 \text{ people an acre} / (\text{Average Vehicle Occupancy} \times \text{Average Parking Rate} \times (43560/1000))$ . The formula for APZ II is  $FAR = 50 / (\text{Average Vehicle Occupancy} \times \text{Average Parking Rate} \times (43560/1000))$ .
2. The suggested maximum density for detached single family housing is two Du/Ac. In a planned unit development (PUD) of single family detached units where clustered housing development results in large open areas, this density could possibly be increased

slightly provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

3. Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.
4. No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in Clear Zone areas on or off the air installation. The Clear Zone is subject to the most severe restrictions.
5. Rights-of-way for fenced highways, without sidewalks or bicycle trails, are allowed.
6. No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.
7. Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact military operations through hazards to flight or electromagnetic interference. Each new development should be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.
8. Within SLUCM Code 52, maximum FARs for lumberyards (SLUCM Code 521) are 0.20 in APZ-I and 0.40 in APZ-11. For hardware, paint, and farm equipment stores, SLUCM Code 525, the maximum FARs are 0.12 in APZ I and 0.24 in APZ II.
9. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and superregional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively. Included in this category are such uses as big box discount clubs, home improvement superstores, office supply superstores, and electronics superstores. The maximum recommended FAR for SLUCM 53 should be applied to the gross leasable area of the shopping center rather than attempting to use other recommended FARs listed in Table 1 under Retail or Trade.
10. Ancillary uses such as meeting places, auditoriums, etc., are not recommended.
11. No chapels or houses of worship are allowed within APZ I or APZ II.
12. Big box home improvement stores are not included as part of this category.
13. Facilities must be low intensity, and provide no playgrounds, etc. Facilities such as club houses, meeting places, auditoriums, large classes, etc., are not recommended.
14. Livestock grazing is a compatible land use, but feedlots and intensive animal husbandry are excluded. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.
15. Feedlots and intensive animal husbandry are included as compatible land uses.
16. Lumber and timber products removed due to establishment, expansion, or maintenance of Clear Zone lands owned in fee will be disposed of in accordance with applicable DoD guidance.
17. Controlled hunting and fishing may be permitted for the purpose of wildlife management.
18. Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.
19. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses. Naturally occurring water features that attract waterfowl present a potential BASH. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract water fowl.



Table 4.4  
Land Use Compatibility in Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
10	Residential	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11	Household units	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.11	Single units: detached	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.12	Single units: semidetached	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.13	Single units: attached row	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.21	Two units: side-by-side	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.22	Two units: one above the other	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.31	Apartments: walk-up	N <sup>1</sup>	N <sup>1</sup>	N	N	N
11.32	Apartment: elevator	N <sup>1</sup>	N <sup>1</sup>	N	N	N
12	Group quarters	N <sup>1</sup>	N <sup>1</sup>	N	N	N
13	Residential hotels	N <sup>1</sup>	N <sup>1</sup>	N	N	N
14	Mobile home parks or courts	N <sup>1</sup>	N <sup>1</sup>	N	N	N
15	Transient lodgings	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N	N
16	Other residential	N <sup>1</sup>	N <sup>1</sup>	N	N	N
20	Manufacturing					
21	Food and kindred products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
22	Textile mill products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N

Table 4.4  
Land Use Compatibility in Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
24	Lumber and wood products (except furniture); manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
25	Furniture and fixtures; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
26	Paper and allied products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
27	Printing, publishing, and allied industries	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
28	Chemicals and allied products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
29	Petroleum refining and related industries	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
31	Rubber and misc. plastic products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
32	Stone, clay and glass products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
33	Primary metal products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
34	Fabricated metal products; manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
40	Transportation, communication and utilities					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
42	Motor vehicle transportation	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N

Table 4.4  
Land Use Compatibility in Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
43	Aircraft transportation	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
44	Marine craft transportation	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	255	305	N	N
48	Utilities	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
49	Other transportation, communication and utilities	Y	255	305	N	N
50	Trade					
51	Wholesale trade	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y <sup>4</sup>	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories					
57	Retail trade – furniture, home, furnishings and equipment					

Table 4.4  
Land Use Compatibility in Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N
60	Services					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4,11</sup>	Y <sup>6,11</sup>
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
64	Repair services	Y	Y <sup>2</sup>	Y <sup>3</sup>	Y <sup>4</sup>	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N <sup>1</sup>	N <sup>1</sup>	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y <sup>1</sup>	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Child care services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous	Y	25	30	N	N
69.1	Religious activities	Y	25	30	N	N
70	Cultural, entertainment and recreational					
71	Cultural activities (& churches)	25	30	N	N	N
71.2	Nature exhibits	Y <sup>1</sup>	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N

Table 4.4  
Land Use Compatibility in Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y <sup>7</sup>	Y <sup>7</sup>	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational activities (including gold courses, riding stables, water recreation)	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	Resource production and extraction					
81	Agriculture (except live-stock)	Y <sup>8</sup>	Y <sup>9</sup>	Y <sup>10</sup>	Y <sup>10,11</sup>	Y <sup>10,11</sup>
81.5	Livestock farming	Y <sup>8</sup>	Y <sup>9</sup>	N	N	N
81.7	Animal breeding	Y <sup>8</sup>	Y <sup>9</sup>	N	N	N
82	Agriculture related activities	Y <sup>8</sup>	Y <sup>9</sup>	Y <sup>10</sup>	Y <sup>10,11</sup>	Y <sup>10,11</sup>
83	Forestry activities	Y <sup>8</sup>	Y <sup>9</sup>	Y <sup>10</sup>	Y <sup>10,11</sup>	Y <sup>10,11</sup>
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

Source: Department of Defense Instruction No. 4165.57 Air Installations Compatible Use Zones (AICUZ), Appx. 3, Table 2, May 2, 2011.

#### KEY TO TABLE 4.4 – LAND USE COMPATIBILITY IN NOISE ZONES

**SLUCM** – Standard Land Use Coding Manual, U.S. Department of Transportation

**Y** (Yes) – Land use and related structures compatible without restrictions.

**N** (No) – Land use and related structures are not compatible and should be prohibited.

**Y\*** – Yes with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

**N\*** – No with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

**25, 30, or 35** – The numbers refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure.

Land use and related structures are generally compatible; however, measures to achieve NLR of 25, 30, or 35 must be incorporated into design and construction of structures. However, measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted. Also, see notes indicated by superscripts where they appear with one of these numbers.

**DNL** – Day-Night Average Sound Level.

**CNEL** – Community Noise Equivalent Level (normally within a very small decibel difference of DNL)

**Ldn** – Mathematical symbol for DNL.

#### NOTES FOR TABLE 4.4 – LAND USE COMPATIBILITY IN NOISE ZONES

1. General
  - a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.
  - b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.
  - c. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.
  - d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.
2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.
6. Buildings are not permitted.
7. Land use is compatible provided special sound reinforcement systems are installed.
8. Residential buildings require an NLR of 25
9. Residential buildings require an NLR of 30.
10. Residential buildings are not permitted.
11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

## 5 Land Use Analysis

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### 5.1 Introduction

Land use planning and control is a dynamic, rather than a static process. The specific characteristics of land use determinants will always reflect, to some degree, the changing conditions of the economic, social, and physical environment of a community, as well as changing public concern. The planning process accommodates this fluidity in that decisions are normally not based on boundary lines, but rather on more generalized area designations.

Westover ARB was originally developed in a relatively undeveloped area in northern Hampden County, Massachusetts. In recent years, however, intensive development has increased to the south and west of the Base, and industrial and low-to-medium density residential development has developed to the north and east. The Base is situated in Chicopee and Ludlow, with Granby and South Hadley just to the north in Hampshire County. The cities of Springfield and West Springfield are to the south and southwest of Chicopee.

Today, Westover ARB is located close to the largest population center in Western Massachusetts but is also near rural areas that could be susceptible to sprawling residential development.

The use of Geographic Information Systems (GIS) has enabled the Air Force to more precisely display its flight tracks and noise zones for land use planning purposes. This improvement in technology in recent years reveals that the Base's region of influence extends into the cities of Springfield and

Chicopee and the towns of Ludlow, South Hadley, and Granby.

For purposes of this Study, land uses are simplified into classifications in accordance with *Air Force Handbook 32-7084*, as follows:

Residential: Includes all types of residential activity, such as single and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.

Commercial: Includes offices, retail, restaurants, and other types of commercial establishments.

Industrial: Includes manufacturing, warehousing, and other similar uses.

Institutional: Includes schools and churches, which can be classified under Public/Quasi-Public, but are more specifically identified closer to the Base.

Public/Quasi-Public: Includes publicly owned lands and/or land to which the public has access, including military reservations and training grounds, public buildings, cemeteries, and hospitals.

Recreational: Includes land areas designated for recreational activity, including parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc. Recreational land uses includes golf courses.

Open/Agricultural/Low Density: Includes undeveloped land areas, agricultural areas, grazing lands, and areas with residential activity at densities less than or equal to one dwelling unit per acre.

## 5.2 Existing Land Use

Existing land uses in the vicinity of Westover ARB are shown in **Figure 5-1**. The compatibility of existing land use in each of the surrounding communities is discussed in detail in the following subsections.

As mentioned previously, Westover ARB is located within the City of Chicopee and the Town of Ludlow. The CZ and APZs I and II and 2009 and 2014 DNL 65+ dB noise zones also include the towns of Granby and South Hadley and the City of Springfield.

Westover ARB itself is almost entirely classified as Public/Quasi-Public land use. Several parts of the Base, predominantly the northern edge of the Base adjacent to Granby, is classified as Open/ Agricultural/ Low Density and Wetland. There is a small area of Residential land use on the west end of the Base near the James Street Gate that is used today as Visiting Officers Quarters.

As mentioned previously, the only discernible change between the 2009 and 2014 noise zones is on the west side of the Base as a result of the location of the C-5 run-up operations. Although it is not anticipated that aircraft operations will change between 2009 and 2014, it is anticipated that Westover will double the number of isochronal maintenance operations by 2014 and therefore the noise zones for 2014 extend slightly beyond those of 2009 in the area between Runway 15 and 05 where the C-5 run-up's occur.

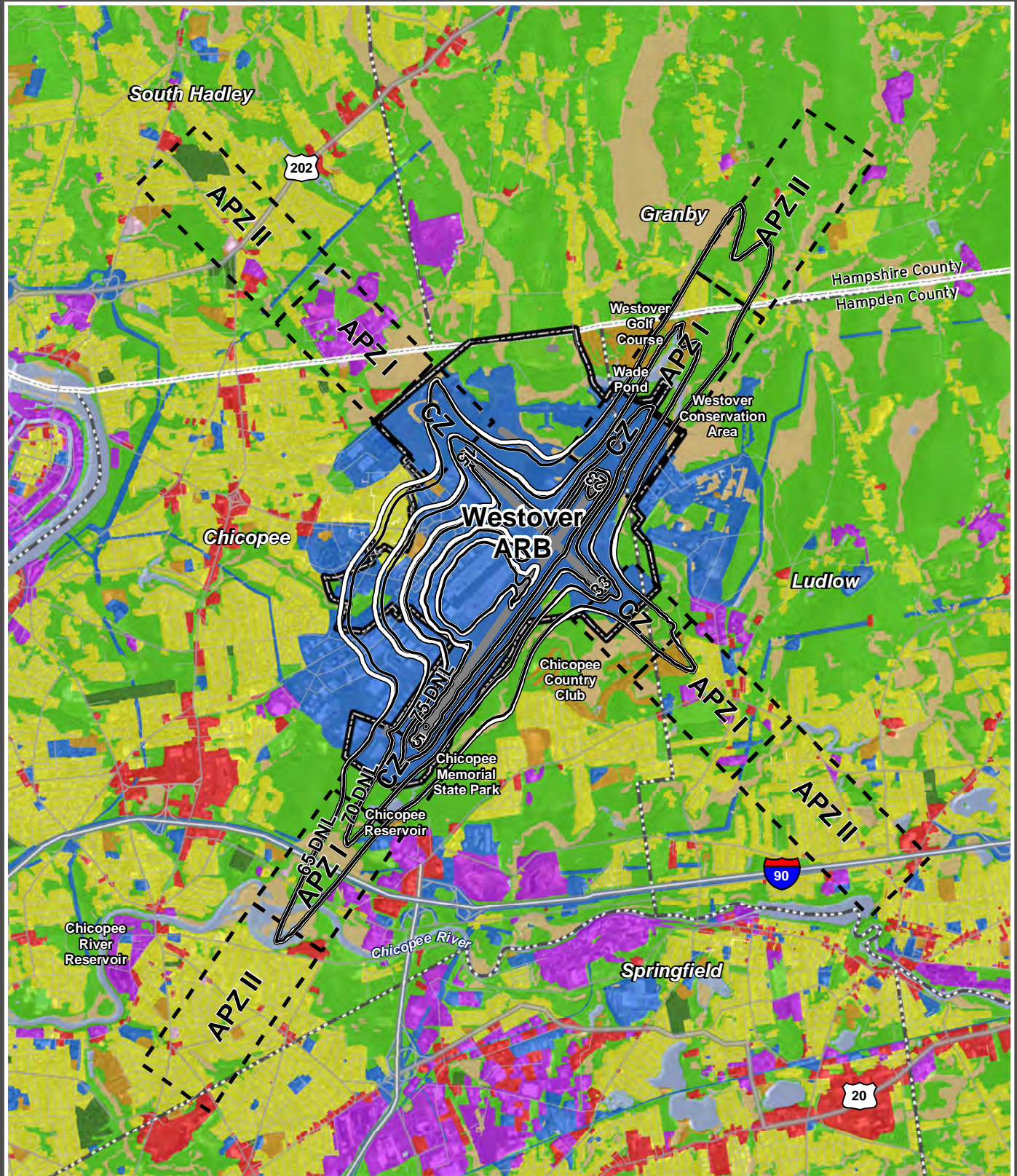
**Table 5.1** summarizes the acreage by land use category within the CZ and APZ I and APZ II. **Table 5.2** summarizes the acreage by land use category within the DNL 65 dBA and greater noise exposure area for 2009

and 2014. The Incompatible Development/ Land Uses section (Section 5.5) specifies the type of land use within the DNL 65 dB noise zones in 5 dB increments. Note that the estimated count of impacted population does not take into consideration any sound insulation program(s) that have been introduced or implemented at WMA or Westover ARB.



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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

Commercial	Cemetery	County Boundary
Industrial	Institutional	Town Boundary
Open/Agricultural/Low Density	Water	2009 Noise Contours
Public/Quasi-Public	Wetland	2014 Noise Contours
Recreational	Installation Area	
Residential	Clear Zone/Accident Potential Zone	

## Generalized Existing Land Use Figure 5-1



Source: MassGIS, ESRI Data and HNTB Analysis  
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Table 5.1

**Acreage by Land Use Within the Clear Zone and APZ I and II (On-Base and Off-Base)**

Category	On-Base Acreage				Off-Base Acreage				Total On- and Off-Base Acreage
	Clear Zone	APZ I	APZ II	Total On-Base	Clear Zone	APZ I	APZ II	Total Off-Base	
Residential	0	0	0	0	0	166.3	917.2	1,083.5	1,083.5
Commercial	0	0	0	0	0	25.5	60.5	86.0	86.0
Industrial	0	0	0	0	0.8	153.5	19.2	173.5	173.5
Public/Quasi-Public	23.7	0	0	23.7	1	5.9	0.2	7.1	30.8
Institutional	0	0	0	0	0	4.4	10.5	14.9	14.9
Cemetery	0	0	0	0	0	0	47.8	47.8	47.8
Recreational	0.8	0	0	0.8	14.6	87.1	8.9	110.6	111.4
Open/Agricultural/ Low Density	14	0.6	0	14.6	151.7	591.6	632.6	1,375.9	1,390.5
Transportation/ Utility	503.8	8	0	511.8	3.4	47.4	26.6	77.4	589.2
Water	0.5	0	0	0.5	23.9	64.4	45.5	133.8	134.3
Wetland	32.3	0	0	32.3	55.2	223.0	160.8	439	471.3
<b>Total</b>	575.1	8.6	0	583.7	250.6	1,369.1	1,929.8	3,547.6	4,133.2

Source: HNTB analysis, 2012.

Table 5.2

**Generalized Existing Land Use Within DNL 65 dBA and Greater Noise Exposure Area (Acres) (On-Base and Off-Base)**

Category	2009			2014		
	On-Base	Off-Base	Total	On-Base	Off-Base	Total
Residential	16.3	73.9	90.2	16.5	91.4	107.9
Commercial	0	0	0	0	0	0
Industrial	0	1.1	1.1	0	1.1	1.1
Public/Quasi-Public	166.1	7.9	174	180.5	18.2	198.7
Institutional	0	0	0	0	0	0
Cemetery	0	0	0	0	0	0
Recreational	12.9	53.1	66	15.6	53.3	68.9
Open/Agricultural/ Low Density	50.6	469.9	520.5	54.5	478.2	532.7
Transportation/Utility	1,381.9	164.8	1,546.7	1,414.7	181.4	1,596.1
Water	0.4	60.8	61.2	0.4	61.3	61.7
Wetland	16.9	128	144.9	19.3	130.4	149.7
<b>Total</b>	1,645.1	959.5	2,604.6	1,701.5	1,015.3	2,716.8

Source: HNTB analysis, 2012.



The compatibility of existing land uses in each of the surrounding communities is discussed in detail in the following subsections by city or town.

### 5.2.1 City of Chicopee

Residential, Industrial and Open/Agricultural/ Low Density are the dominant land uses closest to Westover ARB in the City of Chicopee. The Open/Agricultural uses contain forest and wetland to the south of the end of Runway 05. The Chicopee Reservoir is just south of Runway 05, and Chicopee Memorial State Park is just east of the Base, also toward the Runway 05 end. Chicopee Country Club and Golf course are east of the Base. Land use just west of the Base, nearest the end of Runway 05 is classified as industrial, and includes Westover Industrial Airpark.

The Runway 05 CZ beyond the Base boundary extends into Open/Agricultural Land, the Chicopee Reservoir and a small area of Recreation land. There is a small group of buildings classified as Public/Quasi-Public just outside the Base in the CZ as well. APZ I at the end of Runway 05 includes Open/ Agricultural, Institutional, Industrial and Residential land use. APZ II at the end of Runway 05 is predominantly residential (multi-family and high density), with some Commercial, Institutional (one school and one church), and Open/Agricultural land uses intermixed.

The DNL 65 dB noise zone in Chicopee extends into APZ II of Runway 05 and impacts Open/Agricultural, water and wetlands. The DNL 70 dB zone off Runway 05 impacts Open/Agricultural land uses only, and the DNL 75 and 80 dB noise zones remain within the Base border.

The Runway 15 end CZ and part of APZ I are in Chicopee; the CZ consists almost entirely of Public/Quasi-Public land uses with some private wetland and the part of APZ I in Chicopee consists of Industrial, Commercial, and minimal Residential land use.

The area of the Runway 33 CZ outside of the Base in Chicopee includes Open Space/Agriculture land uses and a limited amount of Recreation land use, specifically the Chicopee Country Club golf course. The DNL 65 and 70 dB noise zones off of Runway 33 outside of the Base boundary in Chicopee extend to the Runway 33 APZ 1, and include Open/Agricultural, Recreation, and wetlands only.

Less than ½ of the Runway 23 CZ is in Chicopee. It is entirely on base. Noise levels there vary from 65-75 DNL.

While the DNL 70, 75 and 80+ dB noise zones remain mostly within the installation area boundaries or the APZs, the DNL 65 dB noise zone extends beyond the Base in several locations in Chicopee that are not within the CZ or APZs. The DNL 65 dB noise zone also extends beyond the installation area boundary southeast of the Airport into Open/Agricultural land (between Runways 05 and 33).

The DNL 70 noise zone encroaches into City of Chicopee area just west of the Base (in the “bulb-out” area nearest where the C-5 run-ups occur) into Public/Quasi-Public and light industrial land uses. This area includes WMA facilities and other Transportation and Industrial land uses. The DNL 65 dB noise zone also extends beyond the Base and beyond the Public/Quasi-Public land use into light industrial and Residential land use (multi-

family) near the James Street Gate. Another Residential land use, the Visiting Officers Quarters, is considered temporary housing by the Base.

This area with the noise zone “bulb-out” due to the C-5 run-up operations is the only area where a visible difference in the 2009 and 2014 Noise Zones can be observed. The noise zones for 2014 extend slightly beyond the 2009 noise zones in this location. Therefore while the 2014 noise zones encroach slightly further into the aforementioned land uses in this area than with the 2009 noise zones, the difference is not significant and does not impact any additional land uses than are discussed above.

### **5.2.2 Town of Ludlow**

Most of APZ I and all of APZ II at the end of Runway 33 are within the Town of Ludlow. Residential, Open/Agricultural, Industrial, Commercial, Recreational, and Public/Quasi-Public land uses all exist within APZ I. APZ II contains almost entirely residential land use. The tip of the DNL 65 dB extends just into Ludlow (and APZ I) and consists of Recreational land.

Part of the CZ and APZ I at the Runway 23 end are also in Ludlow. The CZ consists entirely of Public/Quasi-Public land and is within the Westover ARB installation boundaries. APZ I in Ludlow consists of Open Space/Agriculture and Recreational land uses (Westover Golf Course), and also contains Wade Pond. The DNL 70 dB noise zone in Ludlow includes the same aforementioned uses in APZ I and the 65 dB noise zone is primarily Open/Agricultural uses, but does contain several residential parcels just within the APZ I and DNL 65 dB noise zone where the town borders Granby.

### **5.2.3 Town of Granby**

Part of APZ I and all of APZ II off of the Runway 23 end are in the Town of Granby. There is Residential land use in both of the APZs in Granby, however the dominant land use in APZ II is Open Space/Agricultural. Several commercial parcels also exist within the APZ II. The DNL 65 dB noise zone in Granby is primarily within APZ I and APZ II of Runway 23 and includes Residential and Open/Agricultural land uses.

### **5.2.4 Town of South Hadley**

Part of APZ I and all of APZ II off of the end of Runway 15 are in South Hadley. APZ I in South Hadley contains primarily Industrial land uses (industrial park and self-storage buildings) with some Residential (medium density) and Open Space/Agricultural uses.

The APZ II off of Runway 15 in South Hadley contains Residential, Open Space/Agricultural, Institutional, cemeteries, and some Industrial and Commercial land uses. Black Stevens Conservation Area makes up the Open/Agricultural land use at the east edge of the APZ II and Notre Dame Cemetery is located at the north edge of the APZ.

No noise contours extend into South Hadley.

### **5.2.5 City of Springfield**

The southern edge of APZ II at the end of Runway 05 encroaches into the City of Springfield and contains Commercial and Residential land use. Springfield is nearly 1.5 miles south of the Base, and is beyond the extents of the 2009 and 2014 noise zones.

### 5.3 Zoning

**Figure 5-2** depicts the current zoning in the vicinity of Westover ARB. Generalized zoning data was provided by the Pioneer Valley Planning Commission. Single-Family Residential is the predominant zoning in all of the installation's APZ II's. There is some land zoned for Limited Business and Residential-Agricultural in APZ II of Runway 33 and a limited amount of land zoned for General Industrial in APZ II of Runway 05. A limited area of APZ II of Runway 15 is zoned General Industrial or Residential-Agricultural.

APZ I of all four runway ends include Single-Family Residential zoning, with the exception of the Town of Ludlow, which classifies the land in APZ I of Runway 23 as Residential-Agricultural zoning. The Runway 15 APZ I is zoned General Industrial with a limited amount of area zoned for Single-Family Residential.

The CZs of Runway 05 and Runway 33 are both zoned Single-Family Residential within Chicopee city limits. In Ludlow, the Runway 33 CZ is zoned for Residential-Agricultural and Professional-Research Park. The CZ off Runway 15 is zoned General Industrial and the CZ off Runway 23 is zoned General Industrial in Chicopee and Residential-Agricultural in Ludlow.

As recommended by the Land Use Compatibility Guidelines, the land within the CZs and APZs and the DNL 65+ dB noise zones are not compatible with Residential zoning. There is a significant amount of land Residential (Single Family) in all of the APZs. The CZs in Chicopee are also zoned for Residential (Single Family) use. The same is true within the DNL 65 dB noise zones in Granby and Chicopee. There is

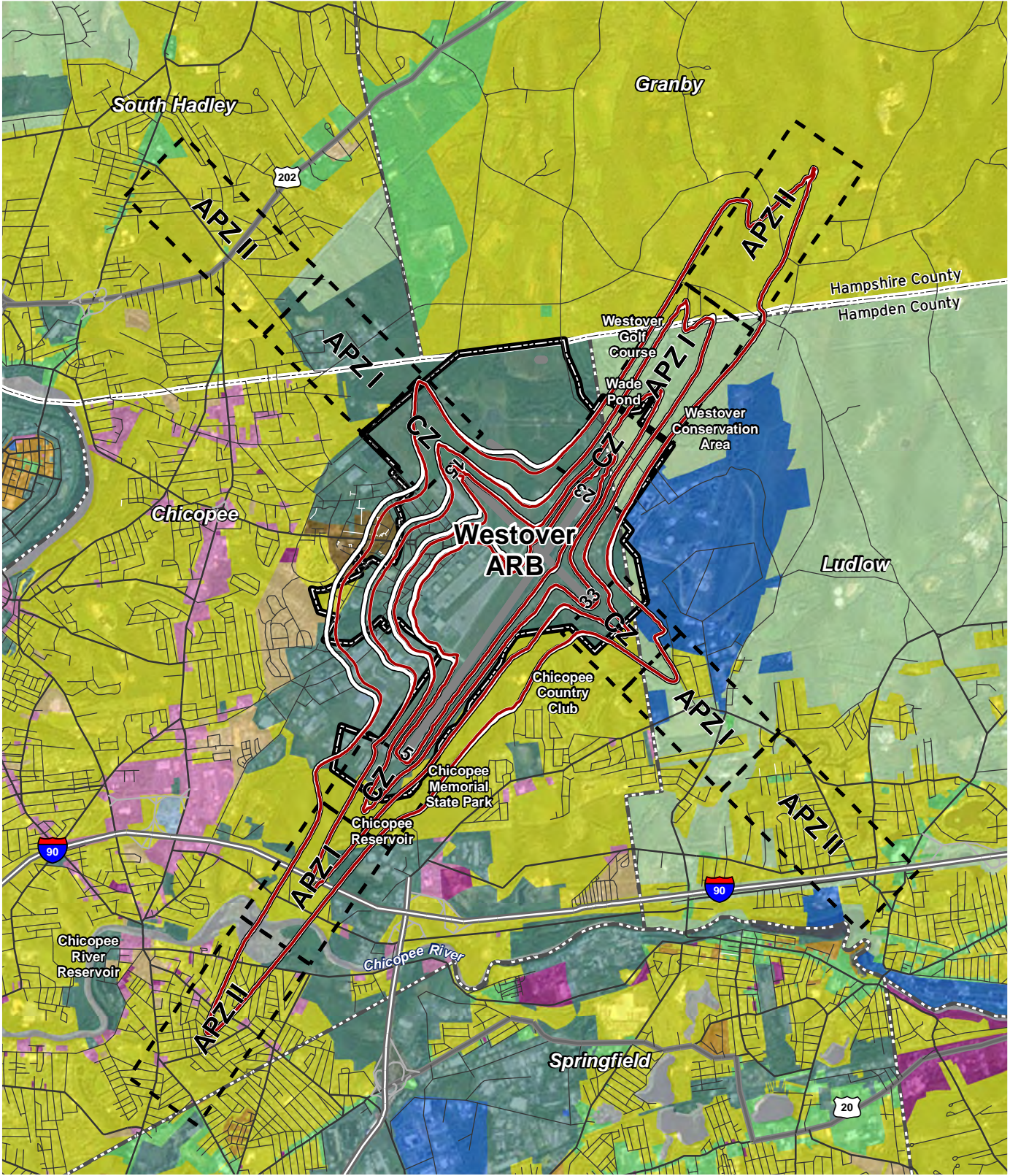
zoning for Professional & Research Park in the CZ and APZ I of Runway 33. Depending on the use and intensity of the use, the zoning may be compatible with the Professional and Research Park.

The only community within the affected noise area at Westover ARB with zoning restrictions in the APZs and CZs is the Town of Ludlow. In 1994, Ludlow implemented an Aircraft Flight Overlay District "...to protect the public health, safety, and general welfare, and to protect human life and property from hazards of aircraft noise and accident potential created by the town's proximity to Westover Air Force Base."<sup>10</sup> The overlay district prohibits the use of nursing homes, schools, hospitals, day care centers, auditoriums, places of worship and concert halls.

In order for the other local governments to implement additional zoning restrictions and/or a zoning overlay to restrict development of residential uses, places of worship, schools, places of worship and public gathering through overlay districts, state enabling legislation will be required to be submitted on behalf of the Town or City and approved by a majority vote of the legislature. The Town of Ludlow underwent this process in order to enable the Aircraft Flight Overlay Zoning District in use today.



# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

Central Business	Residential (Single Family)	2009 Noise Contours
General Business	Residential (Multi Family, Low/Med Density)	2014 Noise Contours
General Industrial	Residential (Multi Family, High Density)	Installation Area
Highway Business	Residential-Agricultural	County Boundary
Limited Business	Professional & Research Park	Town Boundary
Mixed Use	Not Zoned	CZ/APZ

## Generalized Zoning Map Figure 5-2



Source: MassGIS, ESRI Data, Pioneer Valley Planning Commission and HNTB Analysis

As stated in the 1996 Westover ARB AICUZ, local governments have implemented height restrictions in order to help maintain existing land use characteristics. While none of these height restrictions were designed specifically in accordance with FAR Part 77 obstruction limits, they tend to be compatible with them.

## 5.4 Future Land Use

**Figure 5-3** illustrates future land use overlaid with the existing CZs, APZs and 2009 and 2014 noise zones. Future land use in this AICUZ is based on the Valley Vision 2 Model provided by the Pioneer Valley Planning Commission. The figure illustrates lands suitable for development at various densities and lands suitable for open space protection. It also identifies areas that are suitable for study as Smart Growth Districts. The map is intended to serve as a general guide and planning tool for the communities and others in managing growth and development.

Land in all of the CZs is primarily designated as Existing Developed Land or Existing Protected Land with a few exceptions. There is an area within the installation boundary in the CZ off of Runway 05 that is classified as Developed Land Possibly Suitable for Infill. Development in the CZ would not be considered compatible with the purposes of the CZ. The CZ at the Runway 23 end has pockets of land designated for Land Suitable for Environmental Protection and Low Density Residential, Agricultural and Forestry Use. No residential land uses are compatible with being located in the CZ. The CZ at the Runway 33 end includes designations for Land Suitable for Protected

Openspace-Farmland and Land Suitable for Environmental Protection and Low Density Residential, Agricultural and Forestry Use. Some types of infill development are permitted in APZ I, however Residential would not be. The CZ at the Runway 15 end is designated Existing Developed Land.

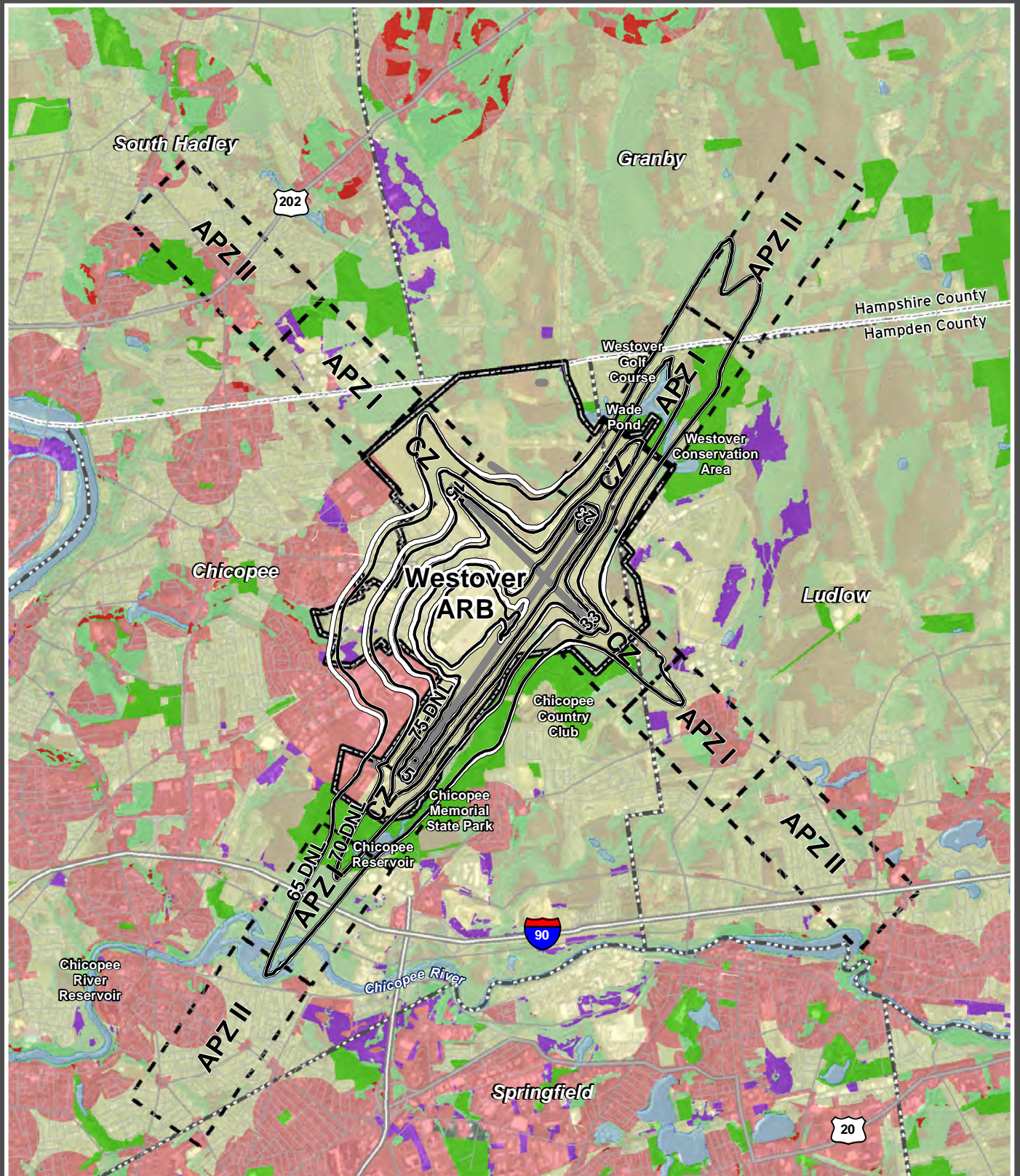
## 5.5 Incompatible Development/Land Uses

**Tables 5.3 and 5.4** summarize land use compatibility in the CZs and APZs Off-Base (Table 5.3) and On-Base (Table 5.4). **Figure 5-4** illustrates the incompatible land uses within the CZs, APZs and noise zones.

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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- Open Water
- Existing Developed Land
- Existing Protected Land
- Land Suitable for Protected Openspace & Farmland
- Land Suitable for Environmental Protection and Low Density Residential, Agriculture or Forestry
- Undeveloped Land Suitable for Smart Growth Districts

- Land Suitable for Industrial or Commercial Development
- Developed Land Possibly Suitable for Infill Development
- Sensitive Land Within Smart Growth Boundary
- Installation Area
- County Boundary
- Town Boundary
- Clear Zone/Accident Potential Zone

- 2009 Noise Contours
- 2014 Noise Contours

## Generalized Future Land Use Figure 5-3



0 1,250 2,500 5,000 Feet

Source: MassGIS, ESRI Data, Pioneer Valley Planning Commission and HNTB Analysis  
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Table 5.3

**Incompatible Land Use within CZs and APZs for  
Runways 05/23 and 15/33 at Westover ARB (Off-Base)**

Category	Acreage Within CZs and APZs Off-Base			
	Clear Zone	APZ I	APZ II	Total
Residential	0	166.3	917.2	1,083.5
Commercial	0	25.5	+	25.5
Industrial	0.8	+	+	0.8
Institutional	0	4.4	10.5	14.9
Cemetery	0	0	47.8	47.8
Public/Quasi-Public	1	5.9	0.2	7.1
Recreation/Open/ Agricultural/Low Density	+	+	+	0
<b>Incompatible Off-Base Total</b>	<b>1.8</b>	<b>202.1</b>	<b>975.7</b>	<b>1,179.6</b>

+ Represents Compatible Land Use.

Source: HNTB analysis, 2012.

Table 5.4

**Incompatible Land Use within CZs and APZs for  
Runways 05/23 and 15/33 at Westover ARB (On-Base)**

Category	Acreage Within CZs and APZs On-Base			
	Clear Zone	APZ I	APZ II <sup>1</sup>	Total
Residential	0	0	0	0
Commercial	0	0	+	0
Industrial	0	+	+	0
Public/Quasi-Public	23.7	0	0	23.7
Recreation/Open/ Agricultural/Low Density	+	+	+	0
<b>Incompatible On-Base Total</b>	<b>23.7</b>	<b>0</b>	<b>0</b>	<b>23.7</b>

+ Represents Compatible Land Use.

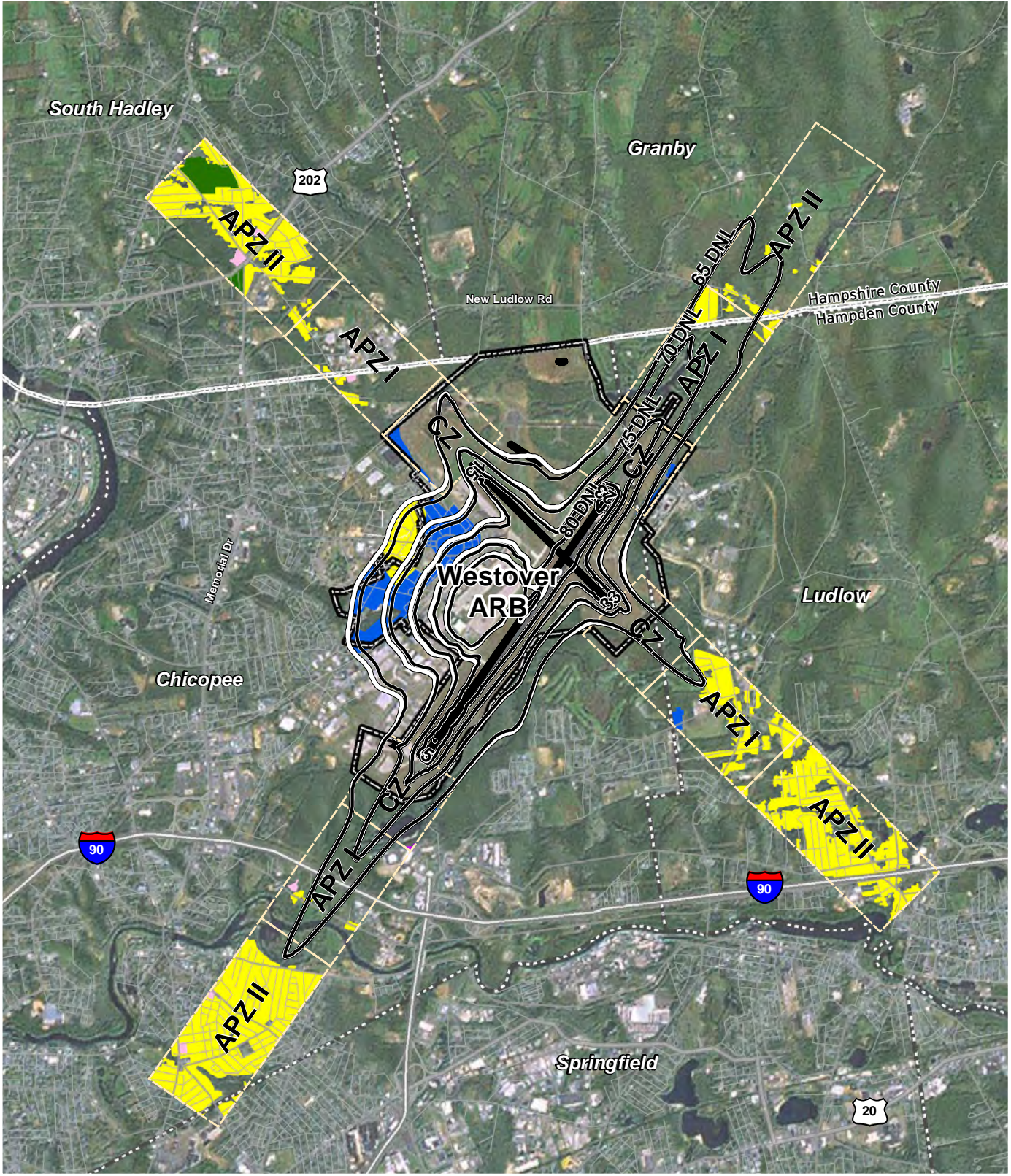
<sup>1</sup> None of APZ II is within installation boundaries.

Source: HNTB analysis, 2012.

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# Westover Air Reserve Base / Metropolitan Airport



## LEGEND

- |  |                       |
|--|-----------------------|
| — 2009 Noise Contours                    | ■ Cemetery            |
| — 2014 Noise Contours                    | ■ Public/Quasi-Public |
| - - - Clear Zone/Accident Potential Zone | ▭ Installation Area   |
| ■ Residential                            | ▭ County Boundary     |
| ■ Institutional                          | ⋯ Town Boundary       |
| ■ Industrial                             |                       |

## Incompatible Land Use Figure 5-4



Source: MassGIS, ESRI Data and HNTB Analysis  
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### **5.5.1 Runways 05 and 23 Clear Zones and Accident Potential Zones**

#### **Runway 05 Clear Zone (South of Airfield)**

Outside of the Base boundary, there is one small parcel with several buildings classified as Public/Quasi-Public land use at the Runway 05 CZ. Because the buildings are often occupied, this is not compatible with the CZ. A small Industrial parcel crosses into the southern tip of the CZ but is mostly within APZ I. Other uses are compatible with the CZ.

#### **Runway 05 APZ I (South of Airfield)**

Residential and Institutional land uses occur within the Runway 05 APZ I; neither are compatible with APZ I. Compatibility of Commercial and Public/Quasi-Public land uses within APZ I's is dependent on density and intensity of uses. The buildings are used for Transportation/Utility, which is generally compatible with APZ I. The other land uses that exist in the Runway 05 APZ I are generally considered compatible land uses.

#### **Runway 05 APZ II (South of Airfield)**

Residential and Institutional land uses in the Runway 05 APZ II occur. Uses related to educational services, medical services, and places of worship, however, are not compatible with APZ II. The Residential land uses include medium density houses and multi-family housing here, which is incompatible with APZ II.

#### **Runway 23 Clear Zone (North of Airfield)**

The entirety of the Runway 23 CZ is within the Base boundary and uses are compatible.

#### **Runway 23 APZ I (North of Airfield)**

Medium-density residential land uses occur at the northern border of the Runway 23 APZ I. All types of Residential land use are considered incompatible with APZ I's. A golf course is located within the APZ I, which is a compatible land use in APZ I as long as the facility is low intensity and the clubhouse is not within APZ I. This clubhouse is in APZ I, however. Areas for "gatherings" here are also not recommended in APZ I.

#### **Runway 23 APZ II (North of Airfield)**

Residential land uses exist in the Runway 23 APZ II, however the residential land uses here are low and very low density (1/2-acre to 1-acre per dwelling unit), which is considered compatible with the APZ II.

### **5.5.2 Runways 15 and 33 Clear Zones and Accident Potential Zones**

#### **Runway 15 Clear Zone (West of Airfield)**

Almost all of the Runway 15 CZ is within the Base boundary. The sliver of land off base is privately owned marshy open space.

#### **Runway 15 APZ I (West of Airfield)**

Residential and Institutional land uses all occur in the Runway 15 APZ I. The residential land uses include very-low density and medium-density residential uses, however no residential land uses are considered compatible within the APZ I. The Institutional land use is a place of worship, which is not considered compatible with the APZ I.

Runway 15 APZ II (West of Airfield)

Residential and Institutional land uses occur within the Runway 15 APZ, as well as cemeteries. Dense, medium density and low density residential land uses occur within the APZ II. While the low density residential land use is compatible with the APZ II (1/2- to 1-acre lot), the dense and medium density residential land uses are not compatible with APZ II. The Notre Dame Cemetery is compatible with APZ II; however any chapels associated with the cemetery are not. The Institutional land uses along Highway 202 in the APZ II (an elementary school and a place of worship) are not considered compatible with occurring in an APZ II.

Runway 33 Clear Zone (East of Airfield)

Outside the Base boundary in the Clear Zone, the Chicopee Country Club golf course encroaches into the southern corner of the Runway 33 CZ (a Recreational land use), which is not considered a compatible land use.

Runway 33 APZ I (East of Airfield)

Residential, Public/Quasi-Public, and Institutional land uses occur within the Runway 33 APZ I. Low-, medium-, and dense Residential land uses are within APZ I, which are all incompatible land uses. The Public/Quasi-Public land uses are primarily the Chicopee Country Club golf course, which is compatible with the APZ I provided that the facility is low intensity and there is no clubhouse. The clubhouse is outside APZ 1. Several commercial parcels occur along Holyoke Road; some Commercial land uses are compatible with the APZ I, depending on the density and intensity of the land use.

Runway 33 APZ II (East of Airfield)

Residential and Institutional land uses occur within the Runway 33 APZ II. Medium and low-density residential land uses are within the APZ II. While the low-density Residential land uses (1/2- to 1-acre lot) are compatible with APZ II, the medium-density residential land use is not compatible. Some Institutional land uses related to educational services, medical services, and places of worship, are not compatible with APZ II.

## 5.6 Noise Zones

**Tables 5.5 and 5.6** summarize land use compatibility in Noise Zones in 5 dB increments for the 2009 Existing Condition and the 2014 Future Condition numerically by acreage off-base (Table 5.5) and on-base (Table 5.6).

Figure 5-4 illustrates the incompatible land uses within the CZs, APZs and noise zones.



Table 5.5

**Incompatible Land Use within 65+ Noise Zones (in 5 dB increments) for Runways 05/23  
and 15/33 at Westover ARB (Off-Base, 2009 and 2014) in Acreage**

Category	2009				2014			
	65-69	70-74	75-79	80+	65-69	70-74	75-79	80+
Residential	73.9	0	0	0	87.1	4.3	0	0
Commercial	+	+	+	0	+	+	+	0
Industrial	+	+	+	+	+	+	+	+
Institutional	0	0	0	0	0	0	0	0
Public/Quasi-Public	6.3	1.6	0	0	15.1	3.1	0	0
Recreation/Open/ Agricultural/Low Density	+	+	+	+	+	+	+	+
<b>Incompatible Off-Base Total</b>	<b>80.2</b>	<b>1.6</b>	<b>0</b>	<b>0</b>	<b>102.2</b>	<b>7.4</b>	<b>0</b>	<b>0</b>

+ Represents Compatible Land Use.

Source: HNTB analysis, 2012.

Table 5.6

**Incompatible Land Use within 65+ Noise Zones (in 5 dB increments) for Runways 05/23  
and 15/33 at Westover ARB (On-Base, 2009 and 2014) in Acreage**

Category	2009				2014			
	65-69	70-74	75-79	80+	65-69	70-74	75-79	80+
Residential	13.8	2.5	0	0	9.4	7.1	0	0
Commercial	+	+	+	0	+	+	+	0
Industrial	+	+	+	+	+	+	+	+
Public/Quasi-Public <sup>1</sup>	+	n/a	n/a	n/a	+	n/a	n/a	n/a
Recreation/Open/ Agricultural/Low Density	+	+	+	+	+	+	+	+
<b>Incompatible On-Base Total</b>	<b>13.8</b>	<b>2.5</b>	<b>0</b>	<b>0</b>	<b>9.4</b>	<b>7.1</b>	<b>0</b>	<b>0</b>

+ Represents Compatible Land Use.

n/a = not applicable

<sup>1</sup>The Westover ARB installation is designated Public/Quasi-Public land use and therefore has been removed from the Incompatible Land Use on-base total.

Source: HNTB analysis, 2012.

In this AICUZ study, the only incompatible land use type in the DNL 65-69 dB range is Residential land use (without noise level reduction materials). Residential uses exist in 2009 (74 acres off-base; 13.8 acres on-base) and 2014 (91.4 off-base; 9.4 acres

on-base) within the DNL 65-69 dB noise zones on- and off-base in the bulb-out nearest the Runway 15 end at the northwest part of the Base, west of Ellipse Drive on James Street. The 2014 DNL 65 dB noise zone extends slightly beyond the 2009

noise zone and therefore encroaches further into the Residential land use in this area. There are residential land uses within the DNL 65 dB to the north of the Base off the Runway 23 end in Ludlow and Granby, crossing over into Hampshire County.

Residential and Public/Quasi-Public land uses are both incompatible with DNL 70-74 dB noise zones. Residential land uses exist within this noise zone in 2009 (0 acres off-base; 2.5 acres on-base) and 2014 (4.3 acres off-base; 7.1 acres on-base). Approximately 7 acres of Residential land use exist within the 2014 DNL 70-74 dB noise zone. The Residential uses in this noise zone exist primarily to the north of the Base off the Runway 23 end in Granby at the boundary where it meets Ludlow. In the DNL 70-74 dB noise zone, there are incompatible land uses off-base (classified as Public/Quasi-Public and Residential). This area in the noise zone is concentrated to the west of the Base. Much of this land use is associated with the Base and WMA in the same bulb-out area to the west of the Base, between Runways 15 and 05. This land use also exists outside the Base to the north off Runway 23 at the northern boundary of Ludlow/Hampden County, where Westover Golf Course is located.

Almost the entire installation is classified as Public/Quasi-Public land use on base within the DNL 70+ dB. In keeping with the mission of the Base, these acreages are not considered incompatible and are not shown in Table 5.6 above as incompatible in the DNL 70-74, 75-79 or 80+ dB.

Within the DNL 75-79 dB, Residential and Public/Quasi-Public are considered incompatible land uses. There are no residential land uses on or off-base within this noise zone in 2009 or 2014.

Within the DNL 80+ dB noise zone, Residential, Commercial and Public/Quasi-Public land uses are all considered incompatible. No incompatible land uses exist within the DNL 80+ dB noise zone.

## 5.7 Additional Local Planning Considerations

AICUZ noise zones describe the noise characteristics of a specific operational environment, and as such, will change if a significant operational change is made. Should a new mission be established at Westover ARB, adding a larger number of airplanes or additional model types, the AICUZ could be amended.

With this in mind, Westover ARB has revised the 1996 AICUZ Study and has provided flight track, APZ, and noise zone information in this report that reflects the most current and accurate picture of aircraft activities.

## 6 Implementation and Maintenance Responsibilities

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The implementation of the AICUZ Study must be a joint effort between the Air Force and the adjacent communities.

The Air Force's role is to minimize the impact on the local communities by Westover ARB operations consistent with the military mission. The role of the communities is to ensure that development in the environs is compatible with accepted planning and development principles and practices.

### 6.1 USAF Responsibilities

In general, the Air Force perceives its AICUZ responsibilities as encompassing the areas of flying safety, noise abatement, and participation in the land use planning process.

Well maintained aircraft and well trained aircrews do much to assure that aircraft accidents are avoided. Despite the best training of aircrews and maintenance of aircraft, however, history makes it clear that accidents do occur. It is imperative that flights be routed over sparsely populated areas as much as possible to reduce the exposure of lives and property to a potential accident.

By Air Force regulation, commanders are required to periodically review existing traffic patterns, instrument approaches, weather minima, and operating practices, and evaluate these factors in relationship to populated areas and other local situations. This requirement is a direct result and expression of Air Force policy that all AICUZ plans must include an analysis of flying and flying related activities designed to reduce and control the effects of such operations

on surrounding land areas. Noise is generated from aircraft both in the air and on the ground. In an effort to reduce the noise effects of Westover ARB operations on surrounding communities, the Base restricts nighttime flying activities and has routed flight tracks to avoid populated areas. Practice takeoffs/landings and instrument approaches are conducted at times when individuals are normally awake. These activities are not scheduled between 10:00 P.M. and 7:00 A.M. During this time, only mission essential aircraft arrivals and departures are conducted. Whenever possible, traffic patterns are all located away from the population centers, both on and off-base. Base maintenance run-up activities are not performed between 10:00 P.M. and 7:00 A.M., except for high priority mission requirements.

The preparation and presentation of this Westover ARB AICUZ Study is one phase of the continuing Air Force participation in the local planning process. It is recognized that as the local community updates its land use plans, the Air Force must be ready to provide additional inputs.

It is also recognized that the AICUZ program will be an ongoing activity even after compatible development plans are adopted and implemented. Base personnel are prepared to participate in the continuing discussion of zoning and other land use matters as they may affect, or may be affected by Westover ARB. Base personnel will also be available to provide information, criteria and guidelines to state, regional and local planning bodies, civic associations, and similar groups.



## 6.2 Local Community Responsibilities

Area residents and the personnel at Westover ARB have a long history of working together for mutual benefit. We feel that adoption of the following recommendations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the Base's flying mission:

- Consider the health, safety and general welfare implications of this AICUZ Study when municipal or regional staff or officials make recommendations or decisions on zoning, site plans, special permits, etc.
- Incorporate AICUZ policies and guidelines into the zoning ordinances and comprehensive plans of the cities of Chicopee and Springfield and the towns of Granby and South Hadley. Use overlay maps of the AICUZ, CZs, APZs and noise zones and Air Force Land Use Compatibility Guidelines to evaluate existing and future land use proposals. For example, the Town of Ludlow has been successful in the implementation of an Aircraft Flight Overlay Zoning District.
- Modify existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study and deter incompatible land uses where appropriate.
- Implement defined height and obstruction ordinances that reflect current Air Force and FAA Part 77 requirements.
- Petition the state legislature for the home rule legislation in Chicopee, Springfield, Granby and South Hadley (as Ludlow did) to prohibit development of places of worship, schools, nursing homes, hospitals and day care facilities within APZs and noise zones and to enact building codes requiring sound attenuation for construction within noise zones.
- Modify building codes to ensure that new construction within the AICUZ area has the recommended noise level reductions incorporated into its design and construction.
- Continue to inform Westover ARB of planning and zoning actions that have the potential of affecting base operations.
- Develop a working group representing city planners, county planners, and base planners to meet regularly to discuss AICUZ concerns and major development proposals that could affect airfield operations.
- Enact real estate disclosure ordinances for properties within CZs, APZs and high noise zones to inform prospective buyers about proximity to airport operations and potential for safety hazards and noise concerns.
- Partnerships between local conservation organizations, Westover ARB and Westover Metropolitan Airport should be sought and cultivated to help preserve sensitive natural areas.
- Develop a working group/roundtable consisting of local officials and citizens to meet regularly and exchange recent planning updates, requests and initiatives by the local jurisdictions.

## Endnotes

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<sup>1</sup> Department of Defense, *Department of Defense Instruction (DODI)* Number 4165.57. “Air Installations Compatible Use Zones,” May 2, 2011.

<sup>2</sup> *Air Force Handbook (AFH)* 32-7084, *AICUZ Program Manager’s Guide*, 1 March 1999.

<sup>3</sup> Westover ARB estimates 5 operations per month between 10:00 p.m. and 7:00 a.m. during 2009. They have decreased to about 2 night operations per month since then. Only 2% of operations at Westover ARB occur at night. They have been reduced by the base to the point that they are not part of its ABD. Thus, the 10 dB penalty does not apply to this study of flying at Westover ARB.

<sup>4</sup> Westover Air Reserve Base Factsheet,  
<http://www.westover.afrc.af.mil/library/factsheets/factsheet.asp?id=16352> July 2011.

<sup>5</sup> Westover Air Reserve Base, <http://www.westover.afrc.af.mil/main/welcome.asp>, accessed 9/21/11.

<sup>6</sup> City of Chicopee, *Westover Metropolitan Development Corporation*,  
<http://www.chicopeema.gov/page.php?id=142>, 2008. (Accessed November 2011).

<sup>7</sup> Westover Air Reserve Base Press Release, *Westover Adds \$238 Million to Local Economy in 2012*,  
<http://www.westover.afrc.af.mil/news/story.asp?id=123325279>, 11/06/12.

<sup>9</sup> Department of Defense, *Department of Defense Instruction (DODI)* Number 4165.57. “Air Installations Compatible Use Zones,” May 2, 2011.

<sup>10</sup> Town of Ludlow Zoning Bylaws, effective May 9, 2011. <http://www.ludlow.ma.us/planning/table.pdf>, accessed 12/1/11.