Final Noise Study
104th Fighter Wing
at Westfield-Barnes Regional Airport (BAF), Massachusetts
for the Air National Guard
F-15EX Eagle II & F-35A
Operational Beddowns
Environmental Impact Statement

January 2024

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ACRONYMS AND ABBREVIATIONS

%	percent
104 FW	104th Fighter Wing
AAD	Average Annual Day
AEDT	Aviation Environmental Design Tool
AFB	Air Force Base
ACM	Air Combat Maneuvering
AGL	Above Ground Level
AHC	Aircraft Handling Characteristics
ANG	Air National Guard
ANSI	American National Standards Institute
ASA	Acoustical Society of America
ATCAA	Air Traffic Control Assigned Airspace
ATCT	Air Traffic Control Tower
BAF	Westfield-Barnes Regional Airport
BFM	Basic Fighter Maneuver
CFR	Code of Federal Regulations
CDNL	C-weighted Day-Night Average Sound Level
DAF	Department of the Air Force
dB	Decibel
dBA	A-weighted decibel
DCA	Defensive Counter Air
DNL	Day-Night Average Sound Level
DNWG	Department of Defense Noise Working Group
DoD	Department of Defense
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FICON	Federal Interagency Committee on Noise
FL	Flight Level
FY	Fiscal Year
Hz	Hertz
kPa-s/m^2	kilopascal-seconds per square meter
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average A-weighted Sound Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
MOA	Military Operation Area
MRNmap	Military Operating Area and Range Noise Model
MSL	mean sea level
NA	Number of Events Above
NED	National Elevation Dataset
NEM	Noise Exposure Map
NGB	National Guard Bureau
OCA	Offensive Counter Air
OCA-SEAD	Offensive Counter Air-Suppression of Enemy Air Defenses
OPSNET	Operations Network
PA	Probability of Awakening
PHL	Potential for Hearing Loss
POI	Point of Interest
SEL	Sound Exposure Level
SUA	Special Use Airspace
TA	Time Above
TAF	Terminal Area Forecast
TI	Tactical Intercept
U.S.	United States
USGS	United States Geological Survey
W-	Warning Area

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1.0 INTRODUCTION

1.1 BACKGROUND

The United States (U.S.) Department of the Air Force (DAF) and National Guard Bureau (NGB) propose to maintain the combat capability of the Air National Guard (ANG) by recapitalizing the remaining F-15C/D aircraft, which are being retired due to age and associated maintenance costs. There are three remaining ANG units that are still flying the F-15C/D aircraft (that are not already undergoing similar evaluation); these include the 104th Fighter Wing (104 FW) at Westfield-Barnes Regional Airport (BAF) in Westfield, Massachusetts (Figure 1-1); the 144th Fighter Wing at Fresno Yosemite International Airport (FAT) in Fresno, California; and the 159th Fighter Wing at Naval Air Station Joint Reserve Base New Orleans, in Belle Chasse, Louisiana. Figure 1-2 depicts the 104 FW's associated training airspace.

This Noise Study is in support of the beddown, operation, and associated infrastructure construction of one squadron of F-15EX Eagle II (F-15EX) aircraft or one squadron of F-35A Lightning II (F-35A) aircraft squadrons at BAF. One of these aircraft could replace the aging fleet of F-15C fighter aircraft at BAF, which is the subject of this Noise Study.

Civilian aircraft noise modeling was accomplished using the Aviation Environmental Design Tool (AEDT) Version 3e software program. The data (numbers and types of aircraft, time of day, runway assignments, type of operation) used were developed with data obtained from recent noise studies and coordination with representatives from the Federal Aviation Administration (FAA), air traffic controllers, and the NGB. Actual times were used to assign operations to acoustic day and night, and, where applicable, using daylight savings time conversion. Standardized flight profile data (power settings, airspeeds, etc.) available with AEDT were used for civilian aircraft operations.

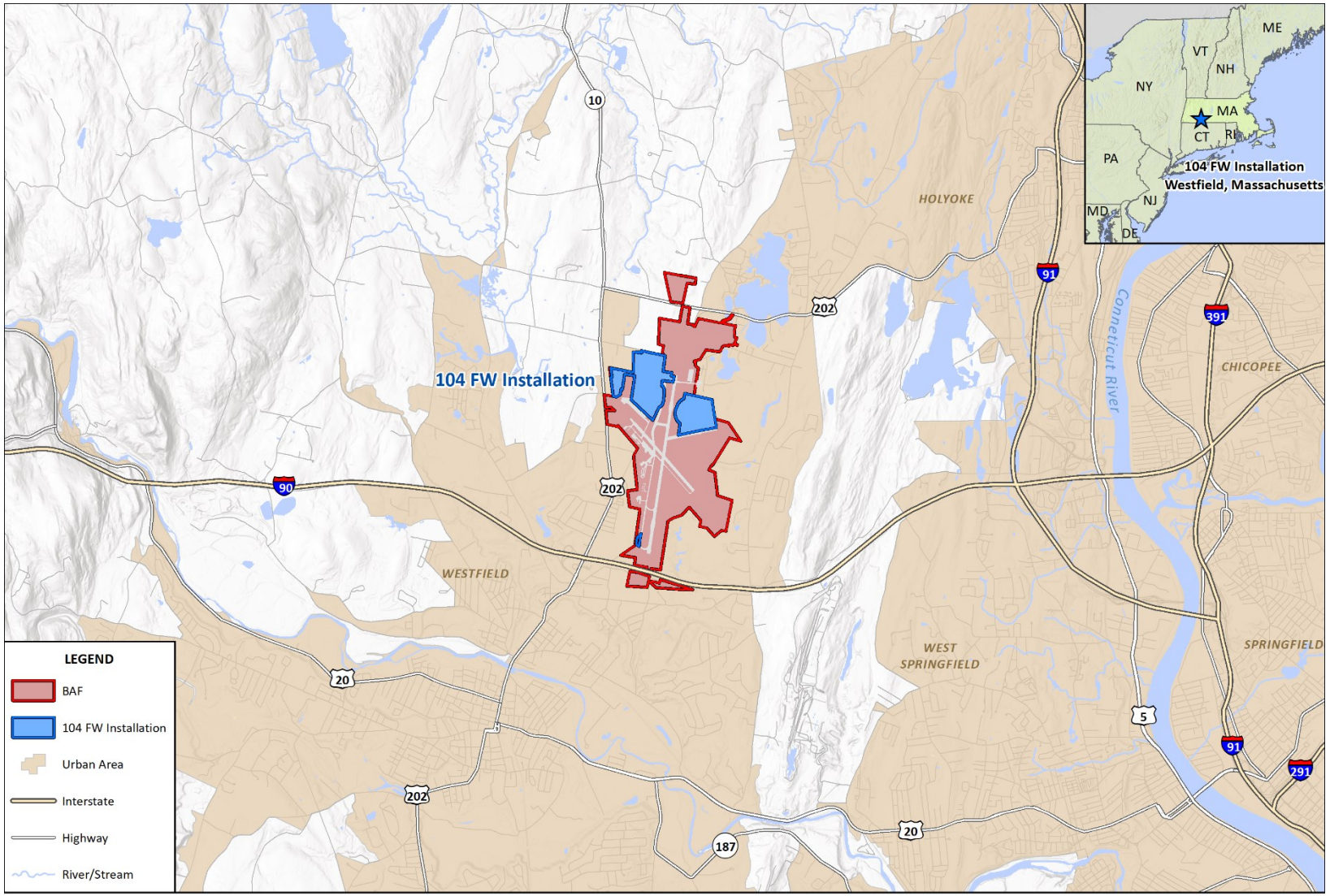

Figure 1-1 Location of the 104 FW at BAF

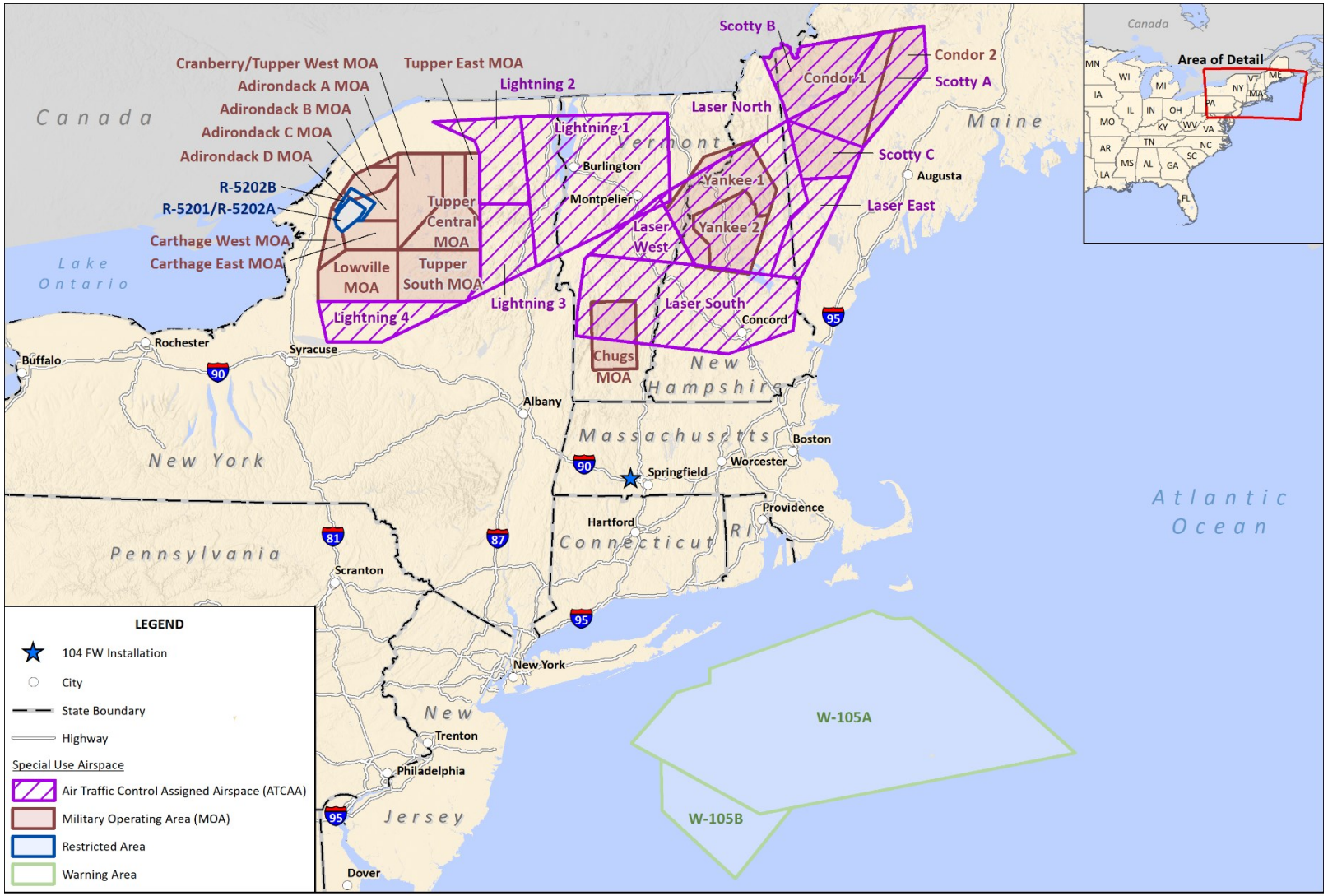

Figure 1-2 Airspace Associated with the 104 FW at BAF

In situations that require the preparation of a noise analysis in accordance with FAA Order 1050.1F, information in forecasts is a key data point when preparing this type of analysis under the National Environmental Policy Act. Airports can rely on a forecast they prepare, and is approved by the FAA, or seek approval from the FAA to use the Terminal Area Forecast (TAF), which is issued annually and projects civilian and commercial operations into the near future, and these projections are utilized to determine operations levels associated with the noise impact analysis. However, operational data based on a TAF was not utilized to inform development of the inputs for the noise modeling and subsequent noise impact analysis described in this draft Environmental Impact Statement (EIS). Instead, the NGB relied upon the 'best available information' at the time of preparing this analysis at the time of data collection in 2021 and 2022, which was a combination of civilian aircraft operations as modeled in prior Noise Exposure Map (NEM) updates completed under 14 Code of Federal Regulations (CFR) Part 150 and average historical civilian operations levels from the FAA Operations Network (OPSNET).

For BAF, the 2019 NEM update 2024 forecast condition civilian operations were used without adjustment as they fell within 3 percent (%) of a 3-year historical average of recorded operations in the FAA OPSNET from 2017–2019. This noise study and corresponding EIS assumed that the historical 3-year average of civilian operations as recorded in the FAA OPSNET from 2017–2019 was representative of when civilian air traffic associated with this action would return to pre-COVID-19 conditions at BAF and represented the 'best available' data source from which to forecast civilian operations at the time the Proposed Action or alternatives would be implemented. This noise study also assumed that there would not be substantial additional growth in civilian operations at BAF above and beyond the pre-COVID-19 conditions at the time the Proposed Action or alternatives would be implemented. Thus, the No Action Alternative for this noise study and EIS for BAF was assumed to be equivalent to the existing conditions prior to COVID-19 interruptions in terms of aircraft and airfield operations.

Though the analysis of aircraft (military and civil) noise impacts was completed during the development of this noise study and corresponding EIS, updated civil aircraft operations data became available for the FAA's 2022 TAF published in February 2023 prior to the planned date for the publication of the draft EIS for public review. Therefore, before publishing the noise study and draft EIS for public review, the NGB in coordination with the FAA, determined it was appropriate to consider if this updated civil aircraft operations data would change the results of the noise analysis, and conducted a comparative review. Section 7.0 of this noise study presents the additional, comparative review of the newly available 2022 civilian aircraft fleet mix and FAA 2022 TAF and evaluates their potential effects on the noise analysis presented in this noise study and the EIS to best inform both the public and the decision makers. This review found that the updates to projections of civil aircraft operations and fleet mix would result in relatively minor changes to the projected noise contours as shown in Section 7.0. Therefore, noise impacts and the conclusions based upon the FAA 2022 TAF and 2025 forecasted civilian aircraft fleet mix would not substantially change from those currently presented in this noise study and draft EIS. Estimated changes in acreages and number of individuals affected utilizing the revised 2022 TAF and 2025 forecasted civilian fleet mix can be found in Section 7.0.

Military flight operations were based on interviews with members of the 104 FW and updated as needed to reflect current operational data for based military operations, which were determined to be an accurate estimate of anticipated military operations several years into the future. Transient military operations remain consistent with the NEM Update with only minor adjustments to flight tracks based upon military personnel input.

This analysis also includes various possible afterburner usage scenarios. The F-35A is modeled with 5, 50, and 95 percent afterburner usage for departure operations, while the F-15EX is modeled with 50 and 80 percent afterburner usage for departures. All other flight activity would remain consistent with the existing conditions.

Thus, within this Noise Study for the 104 FW, the following aircraft alternatives and afterburner usage scenarios are modeled:

- F-15C – 18 Primary Aerospace Vehicle Authorized (PAA) (existing conditions)
- F-15EX – 21 PAA (proposed alternative)
  - 50 percent afterburner usage
  - 80 percent afterburner usage
- F-35A – 21 PAA (proposed alternative)
  - 5 percent afterburner usage
  - 50 percent afterburner usage
  - 95 percent afterburner usage

1.2 DOCUMENT STRUCTURE

Section 1.0 introduced this study; while Section 2.0 describes the methodology used in the analysis. Section 3.0 provides the modeling data used and the noise exposure for the current operations (existing conditions). Section 4.0 provides the noise exposure for the proposed F-15EX and F-35A (and their various afterburner scenarios) and Section 5.0 describes the No Action Alternative. Section 6.0 presents conclusions, Section 7.0 presents the TAF analysis, and Section 8.0 provides the references.

2.0 METHODOLOGY

The Department of Defense (DoD) and the Federal Interagency Committee on Noise (FICON) (1978) outline the types of metrics to describe noise exposure for environmental impact assessment, while the Defense Noise Working Group (DNWG) provides guidance on military noise modeling methodology. The following subsections describe these noise metrics and noise modeling methodology.

2.1 NOISE MODELING AND PRIMARY NOISE METRICS

The DoD prescribes use of the Noisemap suite of computer programs (Wyle 1998; Wasmer Consulting 2006) containing the core computational programs called "NMAP," version 7.3, and "MRNMap," version 3.0, and the FAA's AEDT 3e for environmental analysis of aircraft noise. For this Noise Study, the Noisemap suite of programs refers to BASEOPS as the input module, Noisemap as the noise model for predicting noise exposure in the airfield environment, and MRNMap as the noise model used to predict noise exposure in the Special Use Airspace (SUA). Supersonic noise is estimated with BOOMAP96. NMPLOT is the tool used to combine the noise contours produced by Noisemap and AEDT into a single NEM. Table 2-1 presents noise modeling parameters used in this analysis. Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz (Hz), varies by frequency. To account for this effect, sound measured for environmental analysis utilizes A-weighting, which emphasizes sound roughly within the range of typical speech and de-emphasizes very low and very high frequency sounds. All decibels (dB) presented in this study utilize A-weighted (dBA or dB[A]) but are presented as dB for brevity, unless otherwise noted.

Table 2-1 Noise Modeling Parameters

Software	***Analysis***	***Version***
NMAP	Airfield noise – military aircraft	7.3
AEDT	Airfield noise – civilian aircraft	3e
MRNMap	Airspace Noise (subsonic)	3.0
BOOMAP	Airspace Noise (supersonic)	96
Parameter	***Description***	
Receiver Grid Spacing	500 ft in x and y	
Metrics	DNL and CDNL (primary) L_{dnmr}, SEL, L_{max}, L_{eq}, NA	
Basis	AAD Operations (NMAP/AEDT); Average Month (MRNMap)	
Topography		
Elevation Data Source	USGS 30m NED	
Elevation Grid Spacing	500 ft in x and y	
Impedance Data Source	USGS Hydrography DLG	
Impedance Grid spacing	500 ft in x and y	
Flow Resistivity of Ground (soft/hard)	225 kPa-s/m^2 / 100,000 kPa-s/m^2	
Military Modeled Weather (Monthly Averages 2015-2020; March selected)		
Temperature	36°F	
Relative Humidity	64.5%	
Barometric Pressure	29.92 in Hg	

Legend: °F = degrees Fahrenheit; % = percent; AAD = Average Annual Day; AEDT = Aviation Environmental Design Tool; CDNL = C-weighted Day-Night Average Sound Level; DLG = Digital Line Graph; DNL = Day-Night Average Sound Level; ft = feet; in Hg = inches Mercury; kPa-s/m^2 = kilopascal-seconds per square meter; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level; L_{eq} = Equivalent Sound Level; L_{max} = maximum sound level; m = meters; NA = Number of Events at or above a specified threshold; NED = National Elevation Dataset; SEL = Sound Exposure Level; USGS = United States Geological Survey.

The primary noise metric utilized in this analysis for noise impacts is the Day-Night Average Sound Level (L_{dn}, also written as DNL), which is A-weighted applicable for subsonic aircraft operations. DNL is a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. (2200) and before 7 a.m. (0700). The daytime period is defined as 7 a.m. (0700) to 10 p.m. (2200). An adjustment (weighting) of 10 dB is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. Note that "daytime" and "nighttime" in calculation of DNL are sometimes referred to as "acoustic day" and "acoustic night" and always correspond to the times given above. This is often different than the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset applicable for military training in dark conditions. These times vary latitudinally, and throughout the year with the seasonal changes.

Similar to DNL, C-weighted Day-Night Average Sound Level (CDNL) represents a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. (2200) and before 7 a.m. (0700). FAA requires the use of Average Annual Day (AAD) for describing DNL, which was used in this analysis for airfield operations at BAF. CDNL is C-weighted for impulsive sounds that contain greater low frequency noise, like ordnance or supersonic "booms," to better reflect the level of annoyance generated by these activities that may occur in military airspace.

DoD Noise Program Policy (DoD Instruction 4715.13, 28 January 2020) requires the use of the DNL noise metric to describe aircraft noise exposure levels at airfields based on AAD averaged over 365 days for purpose of long-term compatible land use planning. Consistent with that standard, this study analyzed both military and civil operations at the airfield on an average annual basis. Flight activity in the SUA can vary throughout the year, so AAD may not always be the most informative approach for SUA for military operations. Therefore, SUA analysis typically considers the 'busiest month' to better reflect flight activity during an average day of the 'worst month' of the year. However, in this particular case, airspace operations were fairly evenly spread throughout the year such there really was not a 'worst month,' so average annual daily operations were analyzed instead.

Assessment of noise associated with a proposed action requires prediction of future conditions that cannot be easily measured until after implementation or would require excessive cost or time to measure. The solution to this includes the use of computer software to simulate the future conditions, as detailed in the following sections. A recent congressionally mandated study compared the accuracy of noise modeling methods described in this section to real-world field measurements. The report found that DoD-approved noise models operate as intended providing accurate prediction of noise exposure levels from aircraft operations for use in impact assessments and long-term land use planning (Department of the Navy 2021). The study also determined that the largest variable in any aircraft noise-modeling effort is the expected operational flight parameter data, such as runway and flight track utilization, altitudes at various points in the flight track, engine power settings, and other parameters.

2.1.1 Westfield-Barnes Regional Airport (BAF)

This section discusses the airport facilities, including the airspace, air traffic control tower (ATCT), and runways at BAF and the aircraft noise modeling.

2.1.1.1 Airport Facilities

Airspace

The airspace surrounding BAF, and all airspace within the U.S. National Airspace System, is classified into a number of classes (A, B, C, D, E, and G) based on availability of air traffic control services and/or restrictions of ownership (civilian vs. military). BAF is considered a Class D airport, which is positively controlled by an ATCT that operates from 7 a.m. (0700) to 10 p.m. (2200) daily. BAF's Class D airspace extends to 2,500 feet above ground level (AGL) and has a diameter of 5 statute miles (or approximately 4.3 nautical miles). Class D airspace rules require aircraft to maintain positive radio contact with the ATCT at the airport when operating within the airspace. The airspace surrounding the airport shifts to uncontrolled airspace designated as Class G airspace when the tower is not in operation. The BAF Class D airspace is bordered to the south by Bradley International Class C airspace, and also to the east by Westover Air Reserve Base/Metropolitan Airport's Class D airspace.

Air Traffic Control Tower

The airport's ATCT is an FAA facility which is staffed daily between the hours of 7 a.m. (0700) and 10 p.m. (2200). The ATCT, located on an airfield, is responsible for the movement of aircraft on and around the immediate airport. The BAF ATCT is operated by a private contractor that adheres to all rules and regulations set forth by the federal government.

Runways

BAF is comprised of two runways with Runway 02/20 oriented in a northeast and southwest direction, while Runway 15/33 heads in a southeast and northwest direction, as depicted in Figure 2-1. The majority of aircraft operations and all DoD aircraft operations occur along Runway 02/20 which is 9,000 feet in length and 150 feet in width. Helicopters were modeled to arrive at runway ends before turning to head to their ramp to park. The exception to this is helicopter hoist training that occurs to the grassy area north of the Massachusetts Army National Guard Support Hangar and depicted in the appendix under based helicopter patterns.

Aircraft Noise Modeling

Standard noise modeling methodology was carried forward adhering to both DoD and FAA noise modeling criteria. Modeling of noise using the Noisemap software suite and AEDT was accomplished by determining and building each aircraft's flight tracks (paths over the ground) and profiles, which includes altitude, airspeed, power settings, and other flight conditions. Included in this development was the confirmation associated with the airfield, which included runway locations and dimensions, elevations, and whether displaced thresholds existed. Table 2-2 describes airfield details utilized within this Noise Study. This information was developed iteratively with a team primarily made up of representatives from the installation's flying squadrons and air traffic controllers as well as the NGB. The data was compiled in a data validation package, reviewed by the team, and approved for use by the NGB team prior to modeling (NGB 2022). This data has been combined with the numbers of each type of operation by aircraft/track/profile, local climate, terrain surrounding the airfield, and similar data related to aircraft engine runs that occur at specific locations on the ground (e.g., pre- and post-flight and maintenance activities). Appendix A shows summary flight tracks, as well as representative flight profiles for the aircraft operations modeled. The proposed F-15EX noise modeling utilized recent measurements obtained in 2022 at Eglin AFB, while other aircraft types used existing data within the NMAP's Noisefile for fixed-wing aircraft and NCspheres for rotary-wing aircraft.

Table 2-2 BAF Airfield Details for Noise Modeling

Runway	*Start*	*End*	*Length*	*Width*	*Elevation*	*Displaced Threshold*	*Traffic Pattern*	*Instrument Approach*
02	42.14530N 72.718820W	42.169604N 72.712932W	9,000 ft	150 ft	260.4 ft	N/A	Left	N/A
15	42.164107N 72.721767W	42.153567N 72.709964W	5,000 ft	75 ft	261.5 ft	490 ft	Left	N/A
20	42.169604N 72.712932W	42.1453N 72.718820W	9,000 ft	150 ft	266.5 ft	N/A	Left	ILS
33	42.153567N 72.709964W	42.164107N 72.721767W	5,000 ft	75 ft	246.9 ft	N/A	Left	N/A

Legend: Start and End in Decimal Degrees; ft = feet; N/A=non-applicable; ILS=Instrument Lighting System.
Source: AIRNAV 2023.

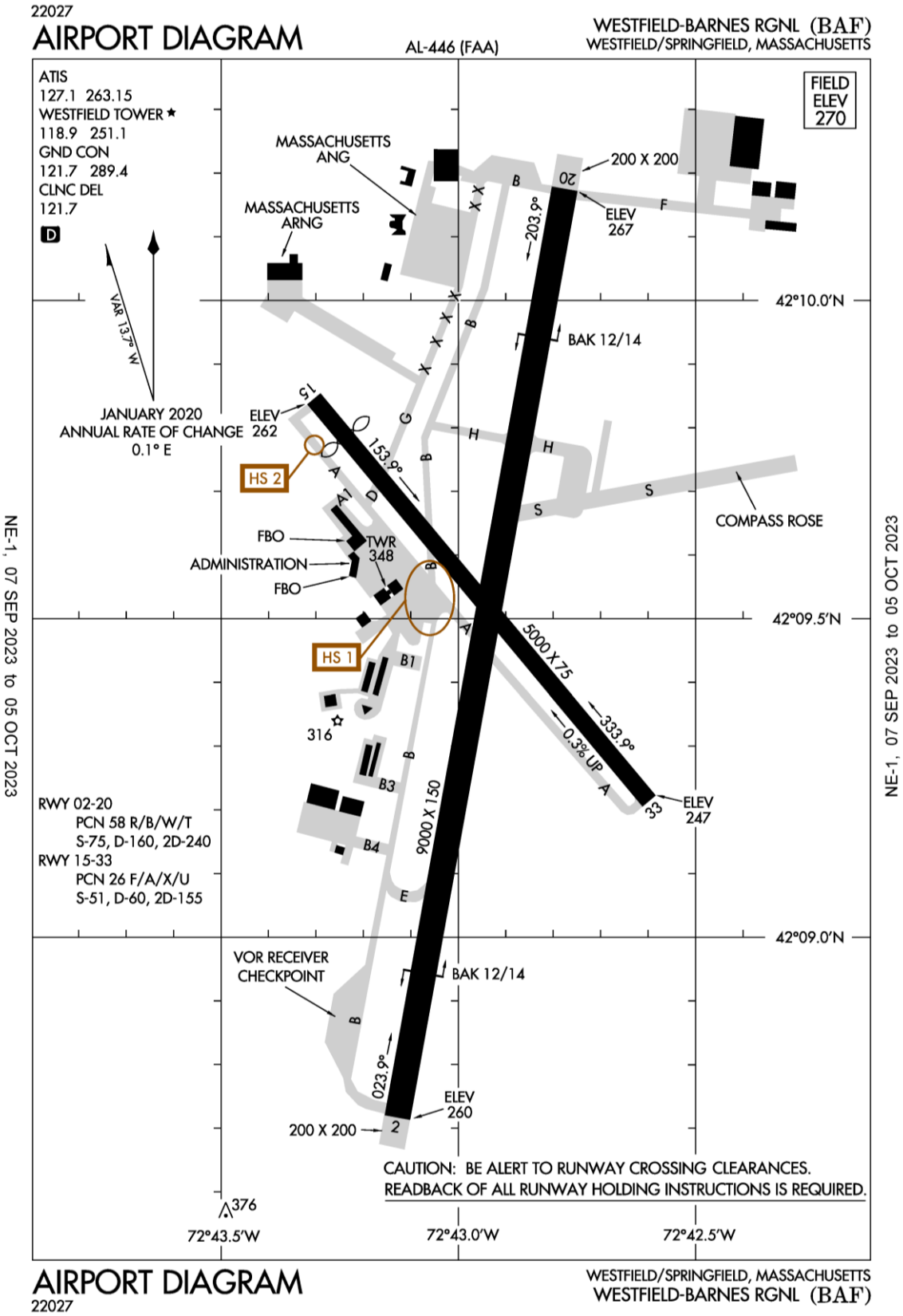

Figure 2-1 BAF Airport Layout

Noisemap's ability to account for the effects of sound propagation includes consideration of varying terrain elevation, taken from the U.S. Geological Survey (USGS) National Elevation Dataset (NED), and ground impedance conditions, taken from USGS Hydrography data. In this case, "soft ground" (e.g., grass-covered ground) is modeled with a flow resistivity of 225 kilopascal-seconds per square meter (kPa-s/m^2) and "hard ground" (in this case, water) is modeled with a flow resistivity of 100,000 kPa-s/m^2. For ambient temperature, humidity, and pressure, each month was assigned a temperature, relative humidity, and barometric pressure from data available for that month for the years 2015 through 2020. Noisemap then determined and used the month with the weather values that produced the median results in terms of noise propagation effect, which in this case was the month of March (with the values noted in Table 2-1). Modeling of civil operations with AEDT software relied upon standard software weather conditions.

Modeling of civilian aircraft noise, using the AEDT software program, had already been completed in a prior NEM update projecting operations for 2024 using the FAA's AEDT software for civil operations (Wyle 2019). The results of the DoD's Noisemap and FAA's AEDT modeling were combined for all aircraft activity at the airport for both existing and proposed future conditions. The combined noise exposure is presented in terms of contours, i.e., which are lines of equal DNL value. DNL contours of 65 to 85 dB, presented in 5-dB increments, provide a graphical depiction of the aircraft noise environment in the vicinity of the airfield. In addition to the DNL plots, specific noise sensitive locations (schools, hospitals, places of worship, and residential neighborhoods) have been identified in the surrounding communities referred to as representative Points of Interest (POIs). Table 2-3 lists and Figure 2-2 presents the 38 selected representative POIs used for this study. Section 2.2 provides a discussion on the supplemental metric noise calculations performed for each POI.

Table 2-3 POIs in the Vicinity of BAF

Map ID	*Point Type*	*Named POI*[1]
MA-C-01	Census Tract Centroid	Tract 8121.01
MA-C-02	Census Tract Centroid	Tract 8128
MA-C-03	Census Tract Centroid	Tract 8125
MA-C-04	Census Tract Centroid	Tract 8124.01
MA-C-05	Census Tract Centroid	Tract 8129.01
MA-C-06	Census Tract Centroid	Tract 8127.02
MA-C-07	Census Tract Centroid	Tract 8127.01
MA-H-01	Healthcare Facility	Western Massachusetts Hospital
MA-H-02	Healthcare Facility	Baystate Noble Hospital
MA-R-01	Residential Area	Highway 202 and Jaeger Drive
MA-R-02	Residential Area	Highway 202 near Old Stage Road
MA-R-03	Residential Area	Palma Lane and Old Stage Road
MA-R-04	Residential Area	Buck Pond Road
MA-R-05	Residential Area	Rider Road
MA-R-06	Residential Area	Beccari Lane and Aimee Avenue
MA-R-07	Residential Area	Egleston Road and Highway 202
MA-R-08	Residential Area	E. Mountain Road and Ridge Trail Road
MA-R-09	Residential Area	Arbor Mobile Home Park
MA-R-10	Residential Area	Springdale Street and Grove Avenue
MA-R-11	Residential Area	Stephanie Lane
MA-R-12	Residential Area	Arch Road and Lockhouse Road
MA-R-13	Residential Area	Holyoke Road near Dry Bridge Road
MA-R-14	Residential Area	Cara Lane and Holyoke Road
MA-R-15	Residential Area	The Moseley Apartments
MA-R-16	Residential Area	Powermill Village Apartments

Map ID	*Point Type*	*Named POI*[1]
MA-S-01	School	White Oak School
MA-S-02	School	Roots Learning Center
MA-S-03	School	Southampton Road Elementary/Westfield Intermediate School
MA-S-04	School	Westfield High School
MA-S-05	School	Prospect Hill School
MA-S-06	School	Paper Mill Elementary School
MA-S-07	School	Growing Tree Learning Center
MA-S-08	School	Franklin Avenue Elementary School
MA-S-09	School	St. Mary's Elementary School and St. Mary's High School
MA-S-10	School	Westfield Technical Academy
MA-S-11	School	Fort Meadow Early Childhood Center
MA-S-12	School	Highland Elementary School
MA-S-13	School	Abner Gibbs Elementary/Westfield Middle School

Notes: [1]The census tracts represent neighborhoods surrounding BAF where noise sensitive locations (such as residences, schools, places of worship, etc. are likely to occur).

Legend: BAF = Westfield-Barnes Regional Airport; ID = Identification; POI = Point of Interest.

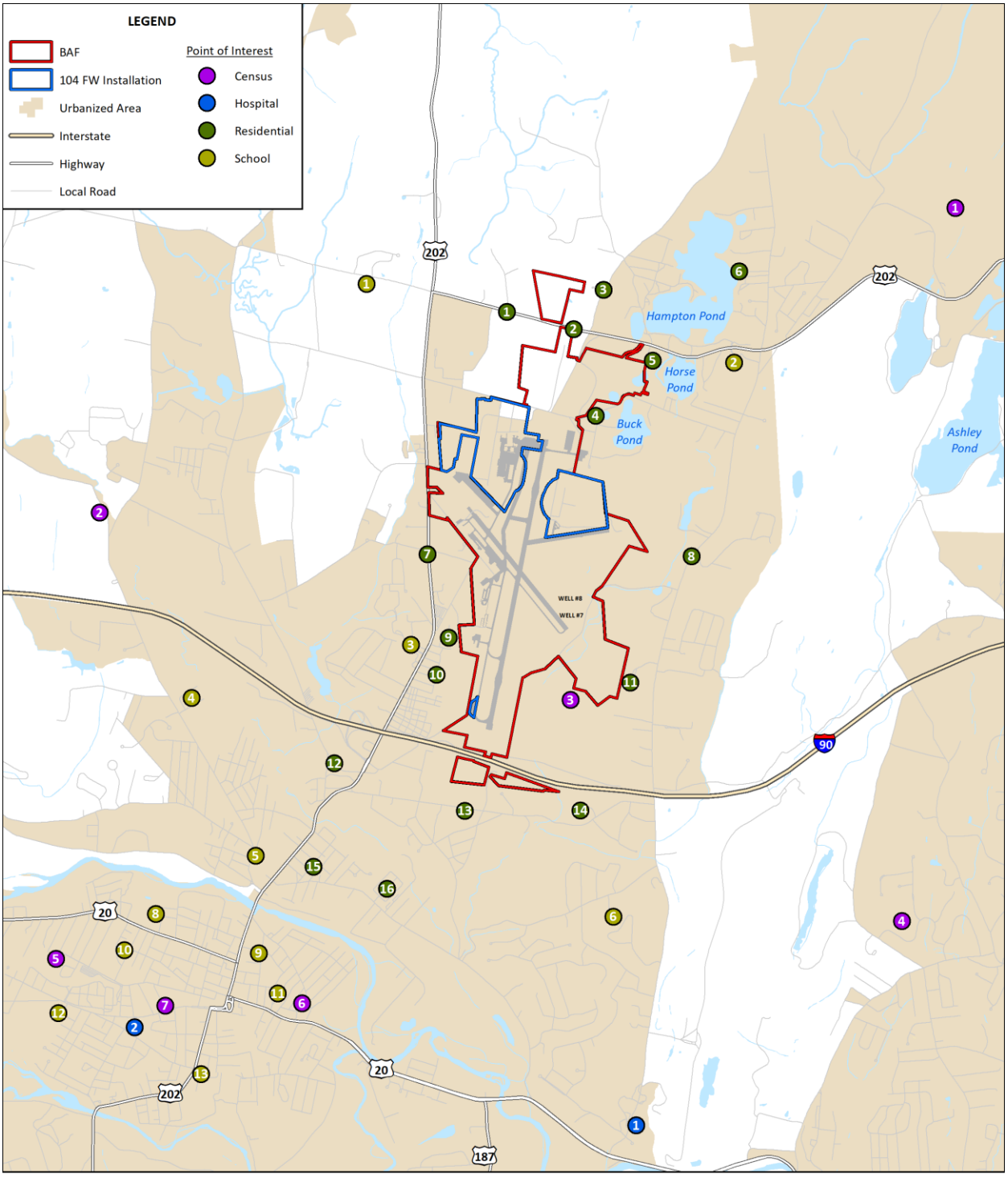

Figure 2-2 Representative POIs in the Vicinity of BAF

2.1.2 Special Use Airspace

In the SUA environment, the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) serves as the primary noise metric, with predicted sound levels based on the month with the most aircraft activity in each airspace unit to account for the sporadic nature of operations. Under DNWG guidance, L_{dnmr} is the U.S. Government standard for modeling and predicting the cumulative noise exposure and assessing community noise impacts in the SUA environment. L_{dnmr} is identical to the DNL except that an additional weighting is applied to account for the startle effect due to the quick increase in sound level created by aircraft operating at low altitudes and high rates of speed (over 400 knots). The weighting is based on how quickly the sound increases when heard by an observer on the ground, described as 'rise-time' rate, and ranges for 0 to up to 11 dB. Thus, DNL will always be equal to or lower than L_{dnmr} but DNL is also presented for FAA impact consideration under FAA Order 1050.1F.

If there are large variations in the distribution of airspace utilization from one month to the next, then L_{dnmr} would be based upon the month with the most aircraft activity in each airspace unit to account for the sporadic nature of operations. However, the airspace training considered in this study for the existing F-15C and proposed F-15EX and F-35A remains relatively consistent, so an average month of training forms the basis for the airspace noise analysis. Noise modeling in the airspace was accomplished by identifying the over-land airspace unit nearest noise sensitive receptors and assuming a 'worst-case' scenario with all ANG training events occurring within that airspace with typical airspace profiles appropriate for each aircraft type. This approach provides a conservative estimate of the greatest L_{dnmr} that could occur within the SUA. L_{dnmr} for a typical year would be less because a portion of training would occur in over-water training airspace where there would be no noise impacts to humans. Both the rise-time weighting and potential busy month modeling of operations applicable to L_{dnmr} result in calculated L_{dnmr} that will always be equal to or greater than DNL for the same activity.

Using the MRNMap model contained in the Noisemap software suite, noise modeling requires determining the use of each airspace unit and building each aircraft's flight profiles based on the aircraft's configuration (airspeed and power setting) and the amount of time spent at various altitudes throughout the airspace. With variation in the utilization of airspace by the 104 FW, this analysis conservatively assumed all 104 FW activity occurs in the over-land airspace where noise impacts to humans would be greatest, for all scenarios. The modeling details for airspace operation within the over-land airspace (altitude distributions, speeds, and power settings) was developed iteratively with a team primarily made up of representatives from BAF, the 104 FW, as well representatives from the NGB. The data were compiled in a validation package that was reviewed by and approved for use by BAF, 104 FW, and NGB team prior to modeling (NGB 2022). The ambient temperature, humidity, and pressure were assumed the same as at the airfield (see Table 2-1).

The software program, BOOMAP96, provides a method to estimate CDNL generated by supersonic flight operations in SUA. CDNL predicted from the BOOMAP96 software relies upon measured noise levels collected at ground level during Basic Flight Maneuvers within airspace with no minimum supersonic altitude restrictions. The airspace considered in this analysis imposes a minimum altitude of 10,000 feet mean sea level (MSL) for supersonic activity. Because BOOMAP96 does not provide user adjustment for minimum supersonic altitudes, the software predicted CDNL would be greater than the actual levels that would occur within airspace with altitude restrictions. Therefore, this study utilizes BOOMAP96 to calculate the relative change that would occur under each proposed action relative to the existing conditions.

2.2 ADDITIONAL (SUPPLEMENTAL) NOISE METRICS

While a cumulative metric, such as DNL is appropriate to predict the overall noise environment at airfields (and the airspace equivalent [L_{dnmr}] in the vicinity of SUA), a full description of noise impacts to noise sensitive locations requires additional metrics. The DoD expands upon DNL with the following supplemental metrics described in the DNWG guidelines (DNWG 2009a): The DAF did not consult with or seek FAA concurrence on the use for supplemental metrics used by the DAF for the potential effects of noise from aircraft operations.

- A measure of the greatest sound level generated by single aircraft events: Maximum Sound Level (L_{max}),
- A combination of the sound level and duration: Sound Exposure Level (SEL),
- Number of Events at or above a specified threshold (NA)
- Equivalent Sound Level (L_{eq}),
- Time Above a specified level (TA), and
- Probability of Awakening (PA).

NA, TA, and L_{eq} use a specified period of time that can include an average 24-hour day, DNL daytime, DNL nighttime, school day, or other time period appropriate for the analysis. Details on the use of these supplemental metrics in this study are described in the following sections.

2.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or L_{max}. L_{max} is the maximum level that occurs over one-eighth of a second and denoted as "fast" response on a sound level meter (American National Standards Institute [ANSI] 1988). L_{max} is used in this study for the calculation of numbers of events above, as described in Section 2.2.5 and 2.2.6, and to compare single-event noise levels between different aircraft types in Section 4.2.2. Although useful in determining when a noise event may interfere with conversation, TV or radio listening, or other common activities, L_{max} does not fully describe the noise because it does not account for how long the sound is heard.

2.2.2 Sound Exposure Level

SEL combines both the intensity of a sound and its duration by providing the sound level that would contain the same sound energy of an event if occurring over a 1 second period. This means that SEL does not represent a sound level that is heard directly at any given time. However, SEL provides a much better metric for comparison of aircraft flyovers than L_{max} because it allows normalization of disparate events to their 1 second energy average. SEL values are larger than those for L_{max} for the same event because aircraft noise events last more than a few seconds. Section 4.2.2 provides single-event SEL comparisons across different aircraft while operating in the airspace.

2.2.3 Equivalent Sound Level

The L_{eq} is a "cumulative" metric that combines a series of noise events over a period of time by averaging the sound energy. The time period specified for L_{eq} is typically provided along with the value and relates

to a type of activity and presented in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). An $L_{eq(8)}$ is used in this study to represent a typical school day occurring from 7 a.m. (0700) to 3 p.m. (1500).

2.2.4 Potential for Hearing Loss

People exposed to high noise environments over a long period of time are at an increased risk of experiencing permanent hearing loss. Hearing loss is generally interpreted as a decrease in the ear's sensitivity to perceived sound, which can be either temporary or permanent. Various governmental organizations, including the Occupational Safety and Health Administration, have identified noise thresholds varying from 70 to 85 dB L_{eq} to protect workers with the exposure assumption of 40 hours per week over a 40-year work lifetime.

Exposure to noise for people residing in areas adjacent to airfields is quite different from a work environment. When people are indoors, the sound levels experienced decrease due to building attenuation. Additionally, when people spend time away from home, the exposure to noise from the airfield in question is removed so the Occupational Safety and Health Administration standards would tend to overpredict the hearing loss risk. By definition, DNL is equal to or greater than L_{eq}, so the DoD selected a screening threshold of 80 dB DNL of residences to ensure a conservative approach to assessing the potential for hearing loss (DNWG 2012). If residences are identified within the 80 dB DNL, or greater, additional analysis of L_{eq} should be performed.

2.2.5 Non-School Speech Interference

Aircraft noise events can disrupt activities like conversation or watching television when indoor L_{max} exceeds 50 dB because word intelligibility decreases at that level (DNWG 2013a). This study determines the number of potential speech interfering events at non-school POIs (such as residential or hospital) during a 15-hour day (from 7 a.m. [0700] until 10 p.m. [2200]) and presents the average hourly number of events as NA.

2.2.6 Classroom Learning Interference

A noisy environment can adversely affect and interfere with classroom learning. Various governmental organizations have identified both L_{eq} and number of interfering events as suitable criteria for classroom impacts. Consistent with DoD recommendations, this study used an exterior L_{eq} of 60 dB (equivalent to 45 dB interior L_{eq} with windows open) as a screening criteria to determine schools at risk of classroom learning affects (DNWG 2009a). Locations that exceed this threshold have been further analyzed by counting the number of events per hour above an interior L_{max} of 50 dB, which equates to the highest permissible classroom level for speech intelligibility. The standard noise level reduction due to building attenuation of 15 dB for windows open and 25 dB for windows closed have been utilized to convert between exterior and interior sound levels. The duration, in minutes, that interior sound levels would exceed 50 dB has also been computed to provide an assessment of the relative time per day that students and teachers may be impacted.

2.2.7 Residential Sleep Disturbance

2.2.7.1 Background

Sleep disturbance can be caused by excessive noise, which can hinder people's ability to fall asleep or cause people to wake from sleep. A method for calculation of the PA from at least one event per night is described in ANSI/Acoustical Society of America (ASA) S12.9-2008/Part 6. The standard utilizes the estimated interior SEL caused by aircraft events along with the number of occurrences per night to calculate the PA from that event. The resulting PA estimates the percentage of the population that would be awakened at least once per night under the noise conditions assessed. For instance, 1 percent PA estimates that 1 percent of the population would be awakened. Multiple events can be combined to determine the PA for all events during a single night. ANSI recommends that only nighttime events occurring during the DNL nighttime with SELs between 50 and 100 dB should be used for this PA calculation. Data suggests that events below 50 dB do not contribute significantly to PA and the formula under-predicts PA for events over 100 dB. The DNWG for environmental impact analysis has endorsed this ANSI/ASA 2008 methodology (DNWG 2009b).

In addition to the ANSI/ASA 2008 methodology, the DNWG guidance identifies outdoor numbers of events (commonly abbreviated as NA) above an SEL of 90 dB as an additional criteria for sleep disturbance analysis:

> *Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise, although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open.*

As described in DNWG (2009b), comparison of exterior number of events above 90 dB SEL across multiple study scenarios allows for sleep disturbance impacts to be considered. This does make use of the same PA formula identified in ANSI/ASA 2008 but groups all events as either equal to 90 dB exterior SEL or below the threshold for consideration.

As of July 2018, the ANSI and ASA have withdrawn the 2008 standard, which formed the basis of much of the DNWG 2009b guidance:

> *The decision of Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6 implies that the method for calculating "at least one behavioral awakening per night" contained in the former Standard should no longer be relied upon for environmental impact assessment purposes. The Working Group believes that continued reliance on the 2008 Standard would lead to unreliable and difficult-to-interpret predictions of transportation-noise-induced sleep disturbance (ANSI/ASA 2018).*

Without a reliable and standardized method to compute PA, or updated guidance from DNWG, this study presents the sleep impact analysis utilizing the previous standard (ANSI/ASA 2008; DNWG 2009b) for environmental impact disclosure purposes. The reader is cautioned that the PA metric provides only a crude estimate because it cannot truly account for all variables that could affect a person's sleep. A comparison of the existing conditions and various Proposed Action scenario awakening percentages showing large

changes to PA could provide some insight on whether a particular action would be likely to increase or decrease sleep impacts. However, any additional conclusions may not be supportable.

3.0 EXISTING CONDITIONS

The following subsections detail the modeling data and the resultant noise exposure for the existing conditions at the airfield as well as within the SUA associated with 104 FW operations.

3.1 INSTALLATION/AIRPORT

3.1.1 Modeling Data

Between Fiscal Year (FY) 2014 and FY 2021, annual sorties for the 104 FW F-15C ranged from 1,726 to 2,080, which resulted in 2,810 to 3,541 annual flying hours, as detailed in Table 3-1, reflecting average annual sorties of nearly 1,900. Values in Table 3-1 include the 104 FW scheduled Alert scramble flights as well as typical training activity. Although much of the flying by the 104 FW occurs at their home location at BAF, nearly every year for a couple of weeks to several months annually, the 104 FW aircraft will leave BAF to train with other units at different airfields resulting in fewer flying operations at BAF than are shown in Table 3-1. For the purposes of impact analysis, all modeled scenarios consider the potential for the greatest potential impact or the 'worst' case (that is, if all flying activity were to occur at BAF during the year). Although the 104 FW's aging F-15C aircraft face maintenance issues, the existing conditions assumes the existing aircraft would continue to be maintained sufficiently to be flown at a similar rate as recent years. For the purposes of aircraft noise modeling, the 8-year average presented in Table 3-1 was rounded to 1,900 sorties for existing conditions.

Table 3-1 Annual 104 FW F-15C Flying Activity at BAF

	FY14	*FY15*	*FY16*	*FY17*	*FY18*	*FY19*	*FY20*	*FY21*	*Average*
Sorties	1,955	2,080	1,811	1,915	1,947	1,726	1,752	1,997	**1,898**
Hours	3,424	3,541	2,816	3,072	2,855	2,810	3,170	3,270	**3,120**
ASD (hours)	1.75	1.70	1.56	1.60	1.47	1.63	1.81	1.64	**1.65**

Legend: ASD = Average Sortie Duration in hours; BAF = Westfield-Barnes Regional Airport; FY = Fiscal Year.

Each sortie generates a departure and an arrival flight operation, all of which are assumed to occur at BAF for analysis. Additionally, the 104 FW conduct check flights where a closed pattern flight track is flown within the local airspace approximately three times per week. Assuming flying activity 50 weeks per year results in 150 closed pattern check flights flown at BAF. Because each closed pattern flight generates a departure and an arrival, the 150 check flights amount to 300 annual operations. Table 3-2 details based military annual arrivals, departures, and closed pattern operations under the existing conditions reflecting 4,100 total operations per year for the 104 FW. The day and night periods referenced in Table 3-2 refer to specific 'acoustic periods' applicable to the DNL metric used for airfield noise impact analysis and correspond to 7 a.m.–10 p.m. (0700–2200) for daytime and 10 p.m.–7 a.m. (2200–0700) for DNL nighttime.

The Army National Guard based at BAF operates six Blackhawk UH-60 and two Lakota UH-72 helicopters as part of their Air Ambulance mission under the 3-126 General Support Aviation Battalion. The unit flies approximately 1,500 hours per year with an average sortie duration of 2 hours generating roughly 12 UH-72 and 48 UH-60 sorties per month. Additionally, 10 to 15 sorties are flown at Camp Edwards per year. Departures only occur during the day period (0700–2200) but up to 20 percent of arrivals may occur during

the DNL nighttime period (2200–0700). Although Army helicopter closed pattern operations primarily occur at nearby Westover Air Reserve Base, one per month occurs at BAF typically to support hoist training exercises. Each closed pattern event generates two airfield operations resulting in 1,171 UH-60 and 293 UH-2 operations per year at BAF, as detailed in Table 3-2. Army National Guard operations at BAF would continue at the current tempo for the foreseeable future.

Table 3-2 FAA OPSNET Annual Airfield Operations at BAF

Organization	*Location*	*Category*	*2017*	*2018*	*2019*	*2020*	*3-Year average (2017-2019)*
Military	Based	Based Total	2,772	1,823	1,682	1,905	2,092
Military	Transient	Transient Total	3,714	3,402	3,526	3,457	3,547
Military Total			**6,486**	**5,225**	**5,208**	**5,362**	**5,640**
Civil	Based	Local Civil Total	14,925	15,834	17,260	21,206	16,006
Civil	Transient	*Air Carrier*	*25*	*23*	*10*	*8*	*19*
Civil	Transient	*Air Taxi*	*559*	*812*	*1014*	*698*	*795*
Civil	Transient	*General Aviation*	*18,742*	*19,121*	*19,289*	*18,650*	*19,051*
Civil	Transient	Transient Total	19,326	19,956	20,313	19,356	19,865
Civil Total			**34,251**	**35,790**	**37,573**	**40,562**	**35,871**
Grand Total			**40,737**	**41,015**	**42,781**	**45,924**	**41,511**

Legend: BAF = Westfield-Barnes Regional Airport; FAA = Federal Aviation Administration; OPSNET = Operations Network.

Hoist training comprises hover at altitudes of up to 300 feet AGL for up to 1 hour each month occurring in the grassy area north of the Army National Guard facility, as shown in Section 5.0. Because the NOISEMAP software utilized for this study does not directly model hovering operations, the hoist training is modeled as a small 'racetrack' pattern at the lowest available speed of 40 knots with altitudes varying between 10 and 300 feet AGL. Both the UH-60 and UH-72 hoist training were conservatively modeled using the larger UH-60 because UH-72 is not available in the NOISEMAP software.

The Federal Aviation Regulation Part 150 NEM Update for BAF represents the most recent full airfield study detailing all civil operations, which included 'existing' 2019 and projected 2024 noise contour results based upon data from 2015. As detailed in the Data Validation Package (NGB 2022), the Part 150 2024 NEM scenario comprised the following operational totals by category:

- Military Based: 6,748
- Military Transient: 1,194
- Air Carrier: 24
- Air Taxi and General Aviation: 34,529
- Total: 42,495

Although the projected Part 150 NEM 2024 scenario aligns with the timeline for the proposed actions considered in this analysis, given the impact of COVID-19 on civil air travel additional investigation into the Part 150 NEM 2024 data was required. The FAA tracks airport operations by category available to the public through the Operations Network (OPSNET). Table 3-2 summarizes these BAF OPSNET recorded operations for calendar years 2017 through 2020. With fluctuations year-to-year, a multi-year average generally provides a more reliable existing condition. Because 2020 was an atypical year due to COVID-19, the 3-year average has been defined as 2017–2019 resulting in a total of 5,640 military,

35,871 civil, and a grand total of 41,511 annual operations. Shortcomings of this FAA method of counting include the assigning of some local airfield-based operations to the 'Itinerant' category as transient and regularly undercounting multi-ship military operations because only one military aircraft flying together as a group must report their locations to the system that tabulates operations. The OPSNET data shows that the Part 150 NEM 2024 scenario still provides a consistent approximation of civil operations at BAF with a difference of approximately 3 percent between the two sources. Table 3-3 combines the Part 150 civil with the updated military operations to describe the existing conditions analyzed at BAF that is assumed to apply for the current year and through implementation of the Proposed Action alternatives beginning in 2025.

As detailed in the Data Validation Package, based F-15C aircraft utilize Runway 02 for 90 percent of departures to minimize aircraft noise to the more densely populated areas south of BAF while the remaining 10 percent of departures from Runway 20 (NGB 2022). With the same goal to minimize noise to populated areas, F-15C arrive to Runway 20 for 90 percent of non-break arrivals, overhead break arrivals, and visual flight rules closed patterns with the remaining operations occurring on Runway 02. For all aircraft operating at BAF, Table 3-4 includes the time-of-day bi-directional runway utilization, and Table 3-5 depicts the time-of-day runway and helipad heading utilization. Appendix A includes detailed military and civilian flight tracks grouped by type of operation and aircraft engine type and flight track utilization at BAF. The BAF airport manager and FAA air traffic controllers confirmed that the data presented within the Part 150 NEM 2024 scenario represents the best available data with regards to the following parameters: 1) operations frequency; 2) time-of-day operations; 3) fleet-mix; 4) runway/helipad distribution and utilization; and, 5) flight track locations.

Figure 3-1 represents the modeled static run-up profile locations. Consistent with the flight operations, maintenance run-up activities were modeled on an AAD basis. Table 3-6 presents the static run-up operations profiles for based military aircraft at BAF and Table 3-7 the civil aircraft jet static run-ups.

3.1.2 Noise Exposure

Sections 3.1.2.1 through 3.1.2.6 focus on DoD best practices for impact analysis, as summarized in DNWG guidance (DNWG 2009a). The existing DNL contours, DNL at noise sensitive locations (the FAA terminology corresponding generally to DoD POIs), acreage, population, and household affected by DNL also apply to FAA.

3.1.2.1 Day-Night Average Sound Level Contours and Point of Interest Levels

Figure 3-2 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the existing conditions at BAF overlaid on gradient mapping of DNL by color shading. Noise generated from aircraft operations at BAF occurs within and outside the airfield. Portions of the 65 dB DNL contour extend north of the airfield by 1,700 feet and 1,200 feet west. Due to the irregular shape of the airport boundary, portions of the 65 dB DNL extend to the south and to the east in some areas. The gradient shading shows how DNL noise exposure does not end at the plotted 65 dB DNL contour line, but instead continues beyond at reduced levels.

Table 3-3 BAF Existing Conditions – Average Annual Operations

Category[2]	*Sub-category*	*Representing Aircraft Types*	*Modeled Aircraft ID*	*Departure*		*Arrival*		*Closed Pattern*[1]		*Total*
				Day	*Night*	*Day*	*Night*	*Day*	*Night*	
Military Based	ANG	F-15C	F-15E (PW220)	1,890	10	1,890	10	300	0	4,100
	Army	UH72	OH-58D	576	0	460	116	19	0	1,171
		HH60	UH-60A	144	0	115	29	5	0	293
Military Transient	Heavy Cargo	C-5, C-17	C-5M	4	0	4	0	0	0	8
	Tanker	KC-135	KC-135R	4	0	4	0	0	0	8
	4-engine Turboprop	C-130	C-130J	58	2	58	2	1,052	0	1,172
	2-engine Turboprop	C-12	C-12	3	0	3	0	0	0	6
Civilian	Air Carrier	B737, RJ	737-700	11	1	11	1	0	0	24
	Air Taxi and GA Jet	G-450, G-550, CL60x	GIV	643	34	643	33	34	0	1,387
		Learjet 35/36	LEAR-35	637	34	637	33	0	0	1,341
	GA 2-engine turboprop or piston	Cessna 441, others	CESSNA-441	1,590	0	1,590	0	0	0	3,180
	GA 1-engine turboprop or piston	Cessna 172, others	GASEPF	6,133	6	6,133	6	16,327	16	28,621
Military Based Subtotal				2,610	10	2,465	155	324	0	5,564
Military Transient Subtotal				69	2	69	2	1,052	0	1,194
Air Carrier Subtotal				11	1	11	1	0	0	24
Air Taxi + GA Subtotal				9,003	74	9,003	72	16,361	16	34,529
Total				**11,693**	**87**	**11,548**	**230**	**17,737**	**16**	**41,311**

Notes: [1]Closed Patterns counted as two operations
[2]Military Based operations updated with input from operators in 2021; Military transients and Civilian operations consistent with Part 150 projected 2024 operations.
Legend: ANG = Air National Guard; BAF = Westfield-Barnes Regional Airport; GA = General Aviation; ID = Identification.

Table 3-4 Time of Day Bi-Directional Runway Utilization

Aircraft Category	*Sub-Category*	*Modeled Aircraft ID*	*Runway Pair*	*Departures*		*Arrivals*		*Closed Patterns*	
				Day	*Night*	*Day*	*Night*	*Day*	*Night*
Military Based	ANG	F-15E	02/20	100%	100%	100%	100%	100%	0%
			15/33	-	-	-	-	-	-
	Army	OH-58D	pad (100%)	see runway heading utilization table					
		UH60A	pad (100%)	see runway heading utilization table					
Military Transient	Heavy Cargo/ Tanker	C-5M, KC- 135R	02/20	100%	0%	100%	0%		
			15/33	-	-	-	-		
	4-engine Turboprop	C-130J	02/20	100%	100%	100%	100%	100%	-
			15/33*	-	-	-	-	-	-
	2-engine Turboprop	C-12	02/20	90%	0%	90%	0%		
			15/33	10%	0%	10%	0%		
Civilian	Air Carrier	737700	02/20	100%	100%	100%	100%		
			15/33	-	-	-	-		
	Air Taxi and GA	GIV,Lear 35	02/20	90%	90%	90%	90%		
			15/33	10%	10%	10%	10%		
	GA 2-engine turboprop or piston	Cessna 441	02/20	70%		70%			
			15/33	30%		30%			
	GA 1-engine turboprop or piston	GASEPF	02/20	55%	55%	55%	55%		
			15/33	45%	45%	45%	45%		

Legend: % = percent; ANG = Air National Guard; GA = General Aviation; ID = Identification.

Table 3-5 Time of Day Specific Runway and Helipad Heading Utilization

Aircraft Category	*Sub-Category*	*Modeled Aircraft ID*	*Runway Pair*	*Runway ID (or heading for helos)*	*Departures*		*Arrivals*		*Closed Patterns*	
					Day	*Night*	*Day*	*Night*	*Day*	*Night*
Military Based	ANG	F-15E	02/20	02	90%	90%	10%	10%	10%	
				20	10%	10%	90%	90%	90%	
	Army	OH-58D and UH60A	n/a	20 deg					25%	25%
				90 deg	50%	50%	30%	30%		
				150 deg	25%	25%	10%	10%	25%	25%
				180 deg	25%	25%				
				200 deg			30%	30%	25%	25%
				330 deg	0%	0%	30%	30%	25%	25%
Military Transient	Heavy Cargo/ Tanker	C-5M, KC-135R	02/20	02	60%		60%			
				20	40%		40%			
	4-engine Turboprop	C-130J	02/20	02	40%	40%	40%	40%	40%	
				20	60%	60%	60%	60%	60%	
			15/33[1]	15	0%		0%		5%	
				33	0%		0%		95%	
	2-engine Turboprop	C-12	02/20	02	50%		50%		50%	
				20	50%		50%		50%	
			15/33	15	50%		50%		50%	
				33	50%		50%		50%	
Civilian	Air Carrier	737700	02/20	02	60%	60%	60%	60%		
				20	40%	40%	40%	40%		
	Air Taxi and GA Jet	GIV, Lear35	02/20	02	35%	35%	35%	35%	35%	
				20	65%	65%	65%	65%	65%	
			15/33	15	10%	10%	10%	10%	10%	
				33	90%	90%	90%	90%	90%	
	GA 2-engine turboprop or piston	Cessna 441	02/20	02	40%		40%			
				20	60%		60%			
			15/33	15	20%		20%			
				33	80%		80%			
	GA 1-engine turboprop or piston	GASEPF	02/20	02	40%	40%	40%	40%	40%	40%
				20	60%	60%	60%	60%	60%	60%
			15/33	15	25%	25%	25%	25%	25%	25%
				33	75%	75%	75%	75%	75%	75%

Notes: [1]C-130 depart 33, overfly 02/20, land 33.
Legend: % = percent; ANG = Air National Guard; GA = General Aviation; ID = Identification.

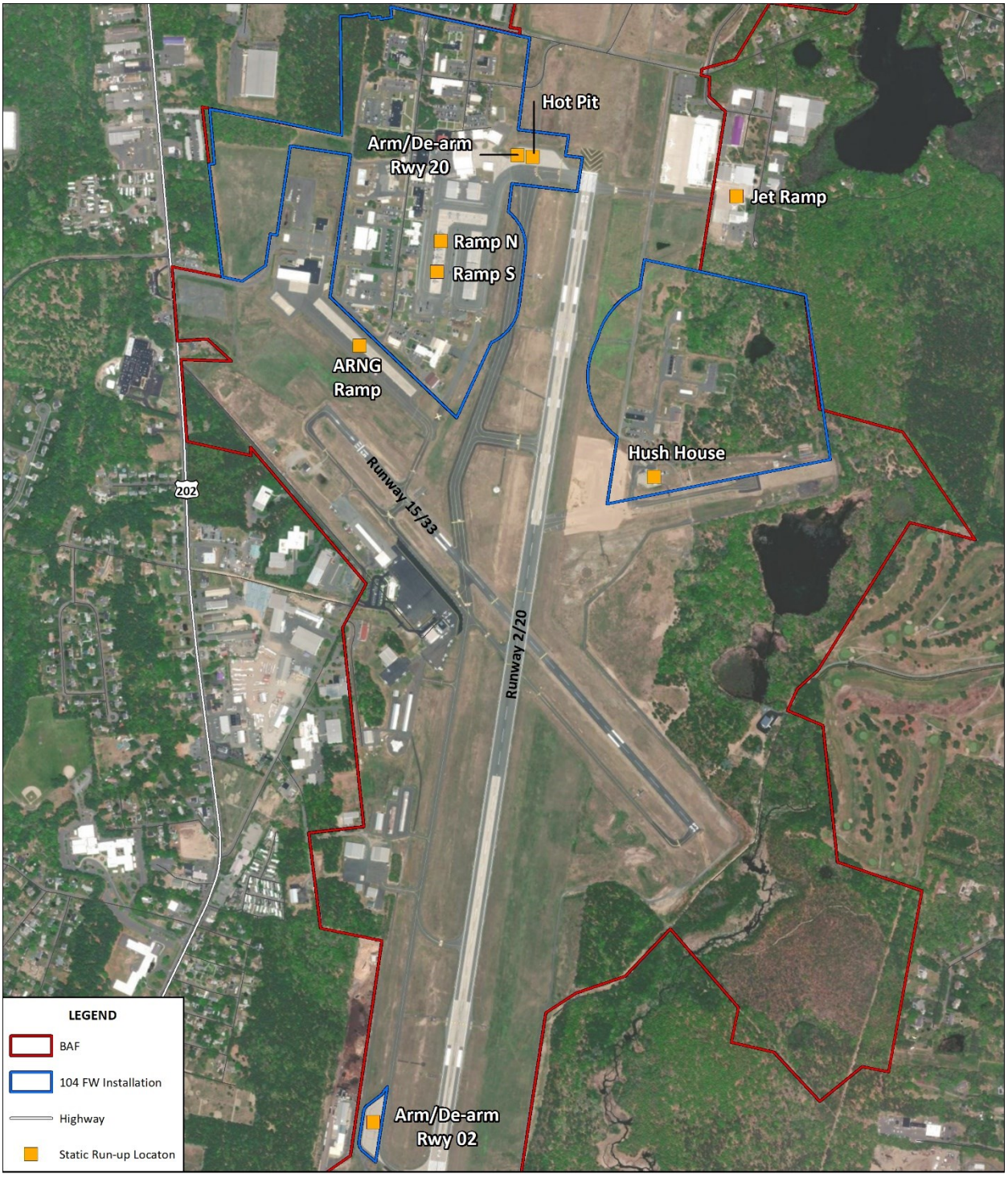

Figure 3-1 Modeled Static Run-Up Locations at BAF

Table 3-6 Ground and Maintenance Engine Operations for Based Military Aircraft at BAF

Aircraft	*Description*	*Pad*	*Heading*	*Power (%NC)*	*Num Engines*	*Duration*	*Annual Events*	*Day/Night Split*[1]
F-15C (modeled with F-15E PW220)[2]	Ramp Engine run	RampN / RampS	110	63% (idle)	1	9 mins	456	90% / 10%
			110	77%	1	7 seconds	456	90% / 10%
			110	80%	1	10 mins	46	90% / 10%
	Arm/De-Arm, Rwy 20	ARM-20	55	63% (idle)	2	5 mins	200	90% / 10%
	Arm/De-Arm, Rwy 20	ARM-02	110	63% (idle)	2	5 mins	200	90% / 10%
	Hush House Engine Runs[3]	HH	270	63%	1	40 mins	14	100% / 0%
				80%	1	10 mins		
				92% MIL	1	9 mins		
				AB	1	2 mins		
UH-60	Ground engine runs	ARNG Ramp	150	Ige Lite	1	20	58	90% / 10%
UH-72	Ground engine runs	ARNG Ramp	150	Ige Lite	1	20	14	90% / 10%

Notes: [1]Day = 0700–2200, Night = 2200–0700.
[2]F-15C maintenance operations to be replaced one-for-one by F-15EX under Proposed Scenarios 1 and 2.
[3]Updated to reflect annual average of 2017-2021 engine log.
Legend: % = percent; %NC = percent speed of the compressor stage; AB = afterburner; BAF = Westfield-Barnes Regional Airport; MIL = 'Military power', the greatest power setting without afterburner; ARNG = Army National Guard; Rwy = Runway.

Table 3-7 Ground and Maintenance Engine Operations for Based Civilian Aircraft at BAF

Aircraft	*Engine Type*	*Description*	*Pad*	*Heading*	*Power (LBS)*	*Num Engines*	*Duration*	*Annual Events*	*Day/Night Split*[1]
Gulfstream	(modeled with C-20; SPEYMK511-	G4 Maintenance 10800 sec check	Jet Ramp	200	500 LBS	1	90 mins	20	100%/0%
					2,000 LBS	1	60 mins	20	
					11,400 LBS	1	30 mins	20	
		G4 Maintenance 10800 sec check	Jet Ramp	200	500 LBS	1	90 mins	20	100%/0%
					2,000 LBS	1	60 mins		
					11,400 LBS	1	30 mins		
		GV &G550 Power Run	Jet Ramp	200	15,385 LBS	2	10 mins	24	100%/0%

Notes: [1]Day = 0700–2200, Night = 2200–0700.
Legend: % = percent; LBS=Pounds; Sec=seconds; Mins=minutes; BAF = Westfield-Barnes Regional Airport.

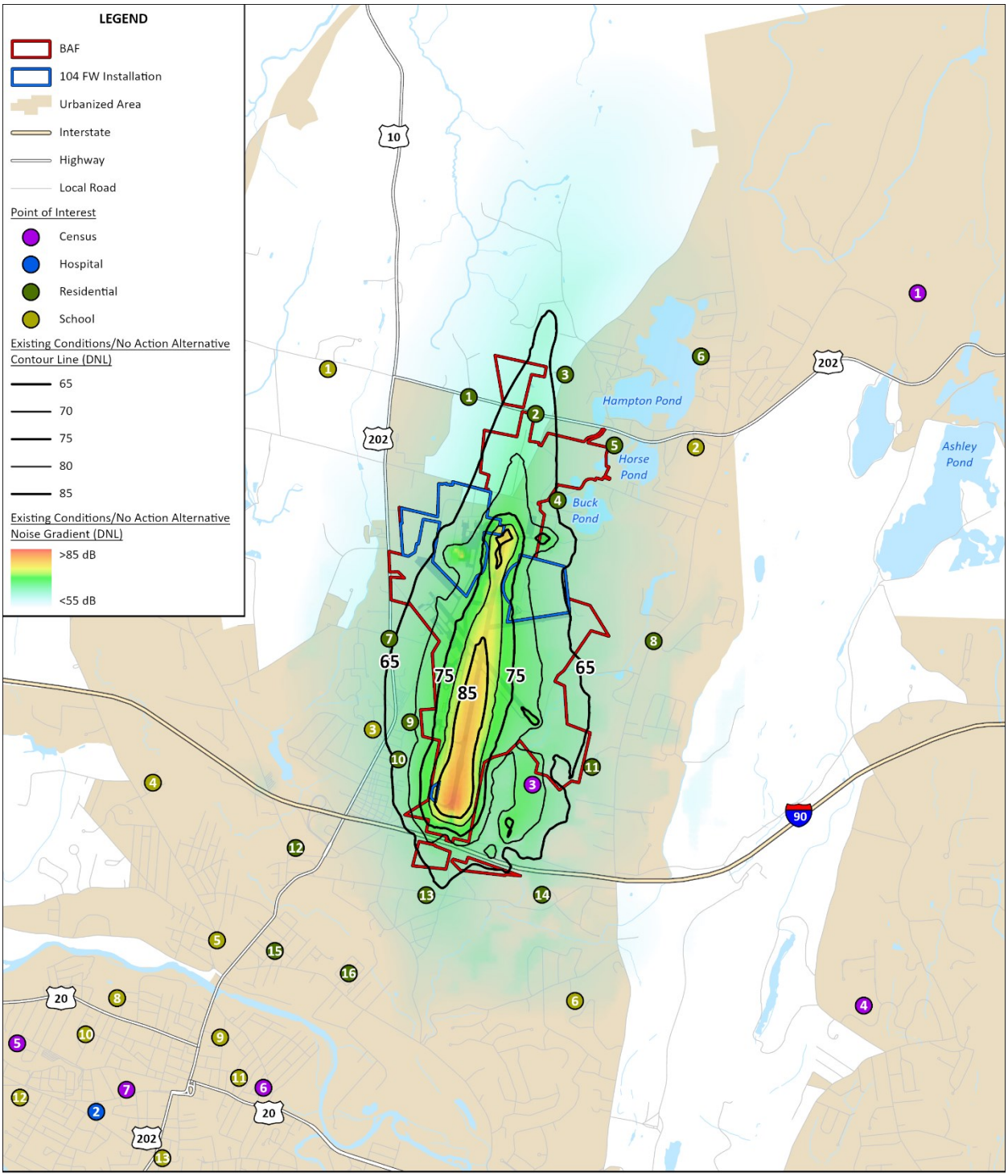

Figure 3-2 Current DNL Contours and Noise Gradients in the Vicinity of BAF

Table 3-8 shows the DNL values at each of the POIs under the baseline. Values range from 40 to 73 dB DNL. Five POIs are currently exposed to 65 dB DNL or greater, which is the DoD threshold for land use recommendations for noise sensitive land uses: MA-C-03 Census Tract 8125, MA-R-02 Highway 202 near Old Stage Road, MA-R-04 Buck Pond Road, MA-R-07 Arbor Mobile Home Park, and MA-R-10 Springdale Street and Grove Avenue. The greatest DNL of 73 dB occurs at the centroid point of MA-C-03, Census Tract 8125, which is located just east of BAF. However, due to the low population with Census Tract 8125, no residences are located this close to the airfield. Therefore, the DNL experienced by residents of this tract is less than presented in Table 3-8.

Table 3-8 Existing Conditions at POIs Noise Exposure in the Vicinity of BAF

Map ID	*Point Type*	*Named POI*[1]	*DNL*[2] *(dB)*
MA-C-01	Census Tract Centroid	Tract 8121.01	51
MA-C-02	Census Tract Centroid	Tract 8128	43
MA-C-03	Census Tract Centroid	Tract 8125	**73**
MA-C-04	Census Tract Centroid	Tract 8124.01	46
MA-C-05	Census Tract Centroid	Tract 8129.01	41
MA-C-06	Census Tract Centroid	Tract 8127.02	49
MA-C-07	Census Tract Centroid	Tract 8127.01	44
MA-H-01	Healthcare Facility	Western Massachusetts Hospital	44
MA-H-02	Healthcare Facility	Baystate Noble Hospital	43
MA-R-01	Residential Area	Highway 202 and Jaeger Drive	61
MA-R-02	Residential Area	Highway 202 near Old Stage Road	**68**
MA-R-03	Residential Area	Palma Lane and Old Stage Road	64
MA-R-04	Residential Area	Buck Pond Road	**65**
MA-R-05	Residential Area	Rider Road	60
MA-R-06	Residential Area	Beccari Lane and Aimee Avenue	56
MA-R-07	Residential Area	Egleston Road and Highway 202	64
MA-R-08	Residential Area	E. Mountain Road and Ridge Trail Road	58
MA-R-09	Residential Area	Arbor Mobile Home Park	**69**
MA-R-10	Residential Area	Springdale Street and Grove Avenue	**65**
MA-R-11	Residential Area	Stephanie Lane	62
MA-R-12	Residential Area	Arch Road and Lockhouse Road	53
MA-R-13	Residential Area	Holyoke Road near Dry Bridge Road	64
MA-R-14	Residential Area	Cara Lane and Holyoke Road	55
MA-R-15	Residential Area	The Moseley Apartments	49
MA-R-16	Residential Area	Powermill Village Apartments	52
MA-S-01	School	White Oak School	53
MA-S-02	School	Roots Learning Center	56
MA-S-03	School	Southampton Road Elementary/Westfield Intermediate School	63
MA-S-04	School	Westfield High School	48
MA-S-05	School	Prospect Hill School	47
MA-S-06	School	Paper Mill Elementary School	58
MA-S-07	School	Growing Tree Learning Center	40
MA-S-08	School	Franklin Avenue Elementary School	45
MA-S-09	School	St. Mary's Elementary School and St. Mary's High School	48
MA-S-10	School	Westfield Technical Academy	43
MA-S-11	School	Fort Meadow Early Childhood Center	48

Map ID	*Point Type*	*Named POI*[1]	*DNL*[2] *(dB)*
MA-S-12	School	Highland Elementary School	41
MA-S-13	School	Abner Gibbs Elementary/Westfield Middle School	45

Notes: [1]The census tracts represent neighborhoods surrounding BAF where noise sensitive locations (such as residences, schools, places of worship, etc. are likely to occur.
[2]Bold represents points exposed to DNL of 65 dB or greater.
Legend: BAF = Westfield-Barnes Regional Airport; dB = decibel; DNL = Day Night Average Sound Level; ID = Identification; POI = Point of Interest.

3.1.2.2 Acreage, Housing, and Population

Table 3-9 shows the acreage breakdown (excluding water bodies) within each noise contour band, resulting in a total of 574 acres off airport at BAF exposed to 65 dB DNL or greater for existing conditions. That off-airport acreage is comprised of 403 acres exposed to 65 to 70 dB DNL, 143 acres to 70 to 75 dB DNL, 27 acres to 75 to 80 dB DNL, and 1 acre to 80 to 85 dB DNL. No areas off airport are exposed to DNL greater than 85 dB under the existing conditions.

Table 3-9 BAF Existing Conditions – Noise Exposure Acreage

DNL Band (dB)	*Existing Conditions Acreage*		
	On Airport	*Off Airport*	*Total*
65–70	387	403	790
70–75	256	143	399
75–80	149	27	176
80–85	134	1	134
85+	107	0	107
Total >65dB	**1,033**	**574**	**1,607**

Legend: dB = decibel; DNL = Day-Night Average Sound Level.

The population and household analysis reviewed census block groups and included all households and population for each block group completely within each DNL contour band. Across all airfields analyzed, for block groups partially within a DNL contour band the number of households and population were scaled based upon the proportion of block group area within each DNL contour band from 65 to 80 dB because households in these areas are generally equally distributed throughout each block group. Households are counted manually for DNL bands of 80 dB and above because populations in these high noise areas are often not evenly distributed and 80 dB DNL is the threshold to screen for the potential for hearing loss analysis. Table 3-10 lists estimated households and population off base that are currently exposed to each DNL contour band under existing conditions. Currently, 76 households and 214 people are within the 65 to 70 dB DNL contour band. A total of 29 households and 88 people reside within the 70 to 75 dB DNL contour band and 4 households and 10 people occur within the 75 to 80 dB DNL contour band. The off-airport acreage exposed to 80 dB DNL contains only commercial or undeveloped land, so no households are affected.

Table 3-10 BAF Existing Conditions – Estimated Households and Population

DNL Band (dB)	*Existing Conditions*	
	Households	*Population*
65–70	76	214
70–75	29	88
75–80	4	10
80–85	0	0
85+	0	0
Totals	**109**	**312**

Legend: dB = decibel; DNL = Day Night Average Sound Level.

3.1.2.3 Classroom Learning Interference

Table 3-11 presents the classroom learning interference for schools S-01 through S-13 experienced under existing conditions. The table provides the same school metrics computed for all other POIs to cover any daycare facilities that could occur near other POIs, such as a daycare operated out of a personal residence. The school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior noise level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found classroom learning is affected (DNWG 2009a, 2013a). Existing conditions at BAF results in four schools at three POIs that are exposed to exterior $L_{eq(8hr)}$ greater than 60 dB: MA-S-02 Roots Learning Center, VA-S-03 Southampton Road Elementary and Westfield Intermediate (co-located), and VA-S-06 Paper Mill Elementary School. Additional school impact analysis involves determining the number of noise-generated speech interfering events per school day hour that exceed an interior L_{max} of 50 dB (equivalent to an exterior L_{max} of 65 dB for windows open). The number of classroom interfering events at all schools is estimated at an average of one per school day hour, as presented in Table 3-11. TA an interior level of 50 dB (equivalent to an exterior of 65 dB with windows open) varies from none at four schools, 1 to 2 minutes at five schools, and 4 minutes at four schools.

Table 3-11 BAF Existing Conditions - Classroom Learning Interference

ID	*Location[1]*	*Outdoor $L_{eq(8hr)}$ (dB)[2]*	*Number of Speech Interfering Events per School Day Hour[3]*	*Time above interior 50 dB per 8-hour school day (minutes)[3]*
MA-S-01	White Oak School	57	1	4
MA-S-02	Roots Learning Center	**60**	1	4
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	**67**	1	4
MA-S-04	Westfield High School	52	1	2
MA-S-05	Prospect Hill School	51	1	2
MA-S-06	Paper Mill Elementary School	**62**	1	4
MA-S-07	Growing Tree Learning Center	44	1	1
MA-S-08	Franklin Avenue Elementary School	49	1	2
MA-S-09	St. Mary's Elementary School and St. Mary's High School	52	1	2
MA-S-10	Westfield Technical Academy	47	1	0
MA-S-11	Fort Meadow Early Childhood Center	52	1	0
MA-S-12	Highland Elementary School	45	1	0

ID	*Location*[1]	*Outdoor $L_{eq(8hr)}$ (dB)*[2]	*Number of Speech Interfering Events per School Day Hour*[3]	*Time above interior 50 dB per 8-hour school day (minutes)*[3]
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	48	1	0

Notes: [1]Table presents the analysis for the school POIs, but results are provided for all POIs within the supplemental tables appendix because populated areas may include additional educational facilities (such as daycare operated out of a personal residence).
[2]Bold text represent schools exposed to exterior $L_{eq(8hr)}$ of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.
[3]Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with Noise Level Reduction of 15 dB due to building attenuation.
Legend: ANG = Air National Guard; BAF = Westfield-Barnes Regional Airport; dB = decibel; ID = Identification; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; NLR = Noise Level Reduction; POI = Point of Interest.

3.1.2.4 Non-school Speech Interference

In addition to speech interference analysis, this study considers the potential for aircraft noise to interfere with non-school speech at all POIs during the DNL daytime period. Table 3-12 presents the existing conditions for speech interference (non-school) based upon the numbers of events per average hour during the DNL daytime period for both windows open and windows closed conditions. The number of speech interfering events with windows open ranges from none at 4 POIs, one per average hour at 27 POIs, and up to three events per average hour at 7 POIs. With windows closed, 25 POIs experience no interfering events per average hour, one event per average hour at 11 POIs, and up to two events per average hour at 2 POIs. The greatest of two events per hour with windows closed occurs at MA-R-02 Highway 202 near Old Stage Road and MA-R-04 Buck Pond Road.

Table 3-12 BAF Existing Conditions – Non-school Speech Interference Events per Average Hour (Daytime)

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	1	0
MA-C-02	Tract 8128	0	0
MA-C-03	Tract 8125	2	1
MA-C-04	Tract 8124.01	1	0
MA-C-05	Tract 8129.01	1	0
MA-C-06	Tract 8127.02	1	0
MA-C-07	Tract 8127.01	1	0
MA-H-01	Western Massachusetts Hospital	1	0
MA-H-02	Baystate Noble Hospital	1	0
MA-R-01	Highway 202 and Jaeger Drive	1	1
MA-R-02	Highway 202 near Old Stage Road	3	2
MA-R-03	Palma Lane and Old Stage Road	2	1
MA-R-04	Buck Pond Road	2	2
MA-R-05	Rider Road	1	0
MA-R-06	Beccari Lane and Aimee Avenue	1	1
MA-R-07	Egleston Road and Highway 202	2	1
MA-R-08	E. Mountain Road and Ridge Trail Road	1	0
MA-R-09	Arbor Mobile Home Park	2	1

Map ID[1]	*Named POI*	*Windows Open*[2]	*Windows Closed*[3]
MA-R-10	Springdale Street and Grove Avenue	1	1
MA-R-11	Stephanie Lane	1	1
MA-R-12	Arch Road and Lockhouse Road	1	0
MA-R-13	Holyoke Road near Dry Bridge Road	3	1
MA-R-14	Cara Lane and Holyoke Road	1	0
MA-R-15	The Moseley Apartments	1	0
MA-R-16	Powermill Village Apartments	1	0
MA-S-01	White Oak School	1	1
MA-S-02	Roots Learning Center	1	1
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	1	0
MA-S-04	Westfield High School	1	0
MA-S-05	Prospect Hill School	0	0
MA-S-06	Paper Mill Elementary School	1	0
MA-S-07	Growing Tree Learning Center	1	0
MA-S-08	Franklin Avenue Elementary School	0	0
MA-S-09	St. Mary's Elementary School and St. Mary's High School	0	0
MA-S-10	Westfield Technical Academy	1	0
MA-S-11	Fort Meadow Early Childhood Center	1	0
MA-S-12	Highland Elementary School	1	0
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	1	0

Notes: [1]School POI included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.
Legend: BAF = Westfield-Barnes Regional Airport; ID = Identification; POI = Point of Interest.

3.1.2.5 Probability of Awakening

Analysis of the potential for sleep disturbance involves determining the number and SEL of DNL nighttime aircraft events to estimate the PA metric. As presented in Table 3-13, PA with windows open ranges from negligible at 24 POIs and 1 to 7 percent at 14 POIs. PA with windows closed is negligible at 26 POIs and 1 to 4 percent at 12 POIs. With minimal DNL nighttime operations by 104 FW F-15C (approximately 20 operations per year), nearly all of the PA results from civil jet operations.

Table 3-13 BAF Existing Conditions – Estimated Probability of Awakening

Map ID	*Named POI*[1]	*Windows Open*[2]	*Windows Closed*[3]
MA-C-01	Tract 8121.01	<1%	<1%
MA-C-02	Tract 8128	<1%	<1%
MA-C-03	Tract 8125	2%	1%
MA-C-04	Tract 8124.01	<1%	<1%
MA-C-05	Tract 8129.01	<1%	<1%
MA-C-06	Tract 8127.02	<1%	<1%
MA-C-07	Tract 8127.01	<1%	<1%
MA-H-01	Western Massachusetts Hospital	<1%	<1%
MA-H-02	Baystate Noble Hospital	<1%	<1%
MA-R-01	Highway 202 and Jaeger Drive	1%	1%
MA-R-02	Highway 202 near Old Stage Road	4%	3%
MA-R-03	Palma Lane and Old Stage Road	4%	2%
MA-R-04	Buck Pond Road	5%	3%
MA-R-05	Rider Road	1%	<1%

Map ID	*Named POI[1]*	*Windows Open[2]*	*Windows Closed[3]*
MA-R-06	Beccari Lane and Aimee Avenue	<1%	<1%
MA-R-07	Egleston Road and Highway 202	2%	1%
MA-R-08	E. Mountain Road and Ridge Trail Road	2%	1%
MA-R-09	Arbor Mobile Home Park	2%	1%
MA-R-10	Springdale Street and Grove Avenue	2%	1%
MA-R-11	Stephanie Lane	2%	1%
MA-R-12	Arch Road and Lockhouse Road	<1%	<1%
MA-R-13	Holyoke Road near Dry Bridge Road	7%	4%
MA-R-14	Cara Lane and Holyoke Road	<1%	<1%
MA-R-15	The Moseley Apartments	<1%	<1%
MA-R-16	Powermill Village Apartments	<1%	<1%
MA-S-01	White Oak School	<1%	<1%
MA-S-02	Roots Learning Center	1%	<1%
MA-S-03	Southampton Road Elementary/Westfield Intermediate School	2%	1%
MA-S-04	Westfield High School	<1%	<1%
MA-S-05	Prospect Hill School	<1%	<1%
MA-S-06	Paper Mill Elementary School	<1%	<1%
MA-S-07	Growing Tree Learning Center	<1%	<1%
MA-S-08	Franklin Avenue Elementary School	<1%	<1%
MA-S-09	St. Mary's Elementary School and St. Mary's High School	<1%	<1%
MA-S-10	Westfield Technical Academy	<1%	<1%
MA-S-11	Fort Meadow Early Childhood Center	<1%	<1%
MA-S-12	Highland Elementary School	<1%	<1%
MA-S-13	Abner Gibbs Elementary/Westfield Middle School	<1%	<1%

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.
Legend: < = less than; % = percent; BAF = Westfield-Barnes Regional Airport; ID = Identification; POI = Point of Interest.

3.1.2.6 Potential for Hearing Loss

DoD guidance prescribes analysis of the potential for hearing loss (PHL) due to elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to DNL of 80 dB or greater (DNWG 2013b). As presented in Tables 3-9 and 3-10, only 2 acres outside of BAF are exposed to 80 dB or greater DNL and no households or people residing in those areas. Figure 3-3 depicts the DNL 80 dB contour along with applicable $L_{eq(24hr)}$ contours for assessing the potential for hearing impacts. The off-airport acres exposed to 80 dB DNL and elevated $L_{eq(24hr)}$ are located west of BAF in an industrial use area primarily comprising a recycling center. Because no people reside in this area, no additional analysis is warranted for the existing conditions.

3.2 SPECIAL USE AIRSPACE

As depicted in Figure 1-2, the 104 FW utilizes both over-land and over-water airspace. The following section describes the modeling data and resulting noise exposure for both subsonic and supersonic operations.

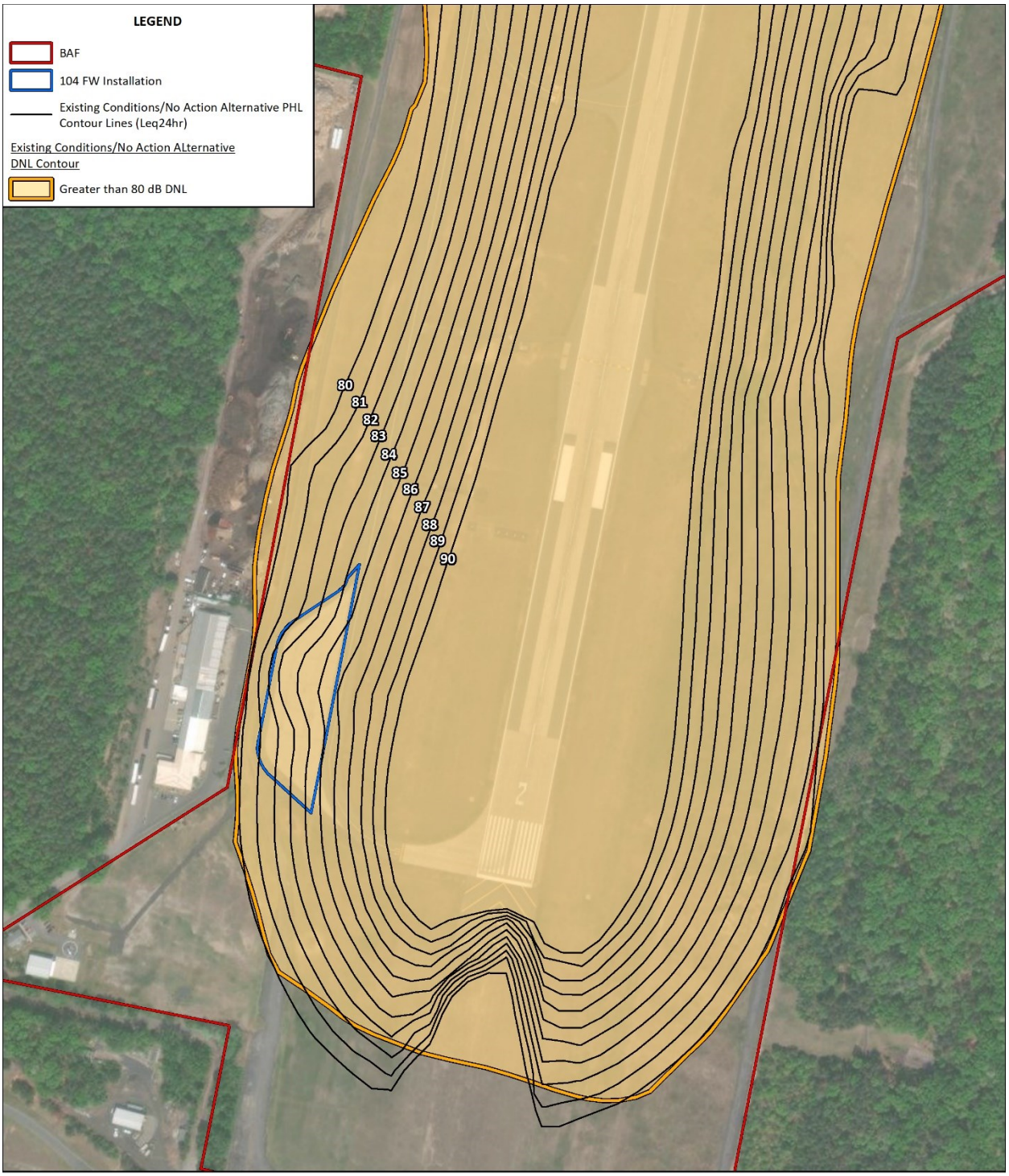

Figure 3-3 Current Potential for Hearing Loss in the Vicinity of BAF

3.2.1 Modeling Data (Subsonic)

F-15C currently utilize Warning Area (W-) 105 as the primary training area for 80 percent of their SUA operations and principal air-to-air training area due to its size and configuration, which allows supersonic flight above 10,000 feet MSL and is depicted in Figure 1-2. Infrared and Electromagnetic countermeasures are allowed, and electronic attack and protection techniques may be employed in W-105. The airspace is located a reasonable 20-minute flight (150 nautical miles to center point) from BAF, is available for exclusive use more than 95 percent of the time upon request, and is marginally impacted by weather. The airspace contains two air-to-air refueling tracks. This airspace is suitable for Offensive Counter Air-Suppression of Enemy Air Defenses (OCA-SEAD) (simulated), Offensive Counter Air (OCA)-Escort, Defensive Counter Air (DCA) 4-ship, Tactical Intercepts (TI) 4-ship, Air Combat Maneuvering (ACM) 4-ship, Basic Fighter Maneuvers (BFM) 2-ship, and Aircraft Handling Characteristics (AHC) single-ship missions.

The tertiary airspace accounting for the remaining 5 percent of the 104 FW training comprises the Yankee, Laser, Scotty, Condor Military Operations Areas (MOAs) (also known as the Viper MOA complex) and Air Traffic Control Assigned Airspace (ATCAA) located 10 minutes from BAF with a floor that varies from 7,000 feet MSL to Flight Level (FL) 180 and a ceiling of FL 600. Additional airspace within the 5 percent of activity includes Chugs MOA and ATCAA located just 7 minutes north of BAF available from 9,000 feet MSL to FL 220.

Because over-water ranges, like W-105A/G, are located far from land and people, there are no human impacts of noise due to military operations in over-water ranges, so this activity is not modeled.

3.2.2 Noise Exposure (Subsonic)

The 104 FW currently flies 1,900 annual sorties divided across these SUA, with 93 percent of time spent above 10,000 feet MSL. In most of the locations, the 104 FW sorties contribute L_{dnmr} less than 35 dB to noise levels experienced beneath the SUA 35 dB is the lowest noise level that can be produced by noise modeling software which returns less than 35 dB). For reference, an L_{dnmr} of 35 dB is consistent with ambient noise levels typically found in rural or remote areas with minimal or no human sources of noise (e.g., vehicle traffic, regular or low altitude aircraft flights).

Because airspace use can vary, this analysis considers the 'worst-case' condition where all 104 FW flying activity would occur in over-land airspace. Because the over-water training area W-105A/B is far from land, no amount of training there would generate significant noise impacts on land. Given these assumptions, noise levels generated by existing operations in over-land SUA are 40 dB L_{dnmr}. In terms of DNL, the existing activity also results in a maximum of DNL of less than 40 dB. The actual distribution of operations across multiple training areas makes the resulting noise much lower than this. However, those levels are too low to accurately assess given the lower noise limit of the modeling software.

3.2.3 Modeling Data (Supersonic)

The existing conditions operating areas for the supersonic operations by the 104 FW comprise the W-105A/B and Viper Complex. With W-105A/B airspace located 15 miles from land and supersonic flights limited to a minimum altitude of 10,000 feet MSL, human receptors are sufficiently far away to not be impacted by any amount of supersonic fighter activity there so would not be applicable under any scenario. Supersonic activity in the Viper Complex does occur over land but the minimal altitude for supersonic

events is 30,000 feet MSL to minimize or eliminate supersonic noise at ground level where human receptors could be impacted. Given the high altitudes in Viper Complex and lack of human receptors near the over-water ranges, this analysis compares the supersonic noise levels generated by each aircraft associated with all alternatives and determines the relative change that would occur.

3.2.4 Noise Exposure (Supersonic)

In 2008, the FAA final rule modified and established the current Restricted Areas and Other SUA, Adirondack (or "Viper") Airspace Complex used today (FAA 2008). The review found that supersonic activity did not generate noise issues at ground level, due to the minimum altitude of 30,000 feet MSL, and the lower altitude subsonic noise activity by aircraft like F-15C generated the primary noise concerns and potential for impacts to people. Section 4.2, *Special Use Airspace* discusses the proposed changes to aircraft operations within the existing Viper Complex and how noise levels due to supersonic would change relative to existing conditions.

4.0 PROPOSED ACTION ALTERNATIVES AND AFTERBURNER SCENARIOS

The following section details the modeling data and the resultant noise exposure for five afterburner scenarios, in which either the F-15EX or F-35A aircraft would replace the F-15C aircraft of the 104 FW at BAF, as described in Section 1.1. All other aircraft operations (other than the 104 FW) are assumed to remain unchanged from those described in Section 3.0, *Existing Conditions* for this analysis.

4.1 INSTALLATION

4.1.1 Modeling Data

Under this proposal, the 18 F-15C aircraft based at BAF would be replaced with either 21 F-15EX aircraft or 21 F-35A aircraft. For this analysis, two F-15EX afterburner scenarios and three F-35A afterburner scenarios have been modeled. Should either of these aircraft be based at BAF, it is most likely that the F-15EX would fly approximately 80 percent of the time using afterburner on take-off and the F-35A would fly approximately 5 percent of the time using afterburner on take-off. Though for the sake of a robust analysis, these varied afterburner scenarios have been analyzed. With a planned annual flying hour program of 5,250 for either F-15EX or F-35A and an assumed sortie duration matching current F-15C at 1.65 hours, the result would be 3,182 annual proposed sorties that would occur under all five analyzed proposed afterburner scenarios. Consistent with the existing conditions, some of these sorties would occur at other airfields but for a conservative analysis, it has been assumed that all sorties would occur at BAF.

Each F-15EX or F-35A sortie would generate a departure and arrival operation and the number of closed patterns is assumed to proportionally match the existing conditions F-15C closed patterns. Currently, F-15C generate 150 closed pattern events (or 300 operations) and F-15EX or F-35A would be assumed to perform a similar number, as summarized below:

- Annual Flying hours = 5,250
- Average Sortie Duration = 1.65 hours (to match average F-15C)
- Annual Sorties = 3,182
- Annual Operations = 6,866
    - Departures = 3,182

  - Arrivals = 3,182
  - Closed Patterns = 502 (proportional to existing F-15C rate)
- Day/night operations = Assumed same as existing F-15C (night = 10 p.m.–7 a.m. [2200–0700])
  - Depart at night = 0.5 percent (approximately 15 times per year)
  - Arrive at night = 0.5 percent (approximately 15 times per year)
  - Closed pattern at night = 0 percent

Table 4-1 details the modeled annual flight operations at BAF that would occur under any of the five proposed afterburner scenarios. Should either the F-15EX or the F-35A be based at BAF, that would eliminate all F-15C operations and would add 6,866 F-15EX or F-35A flight operations per year. All other aircraft operations would remain the same as described under the existing conditions.

4.1.1.1 Departures

The principal difference between the proposed aircraft afterburner scenarios involves the use of afterburner for departure operations. The follow describes the five scenarios considered in this analysis:

- F-15EX Scenario B = F-15EX afterburner use on 50 percent of departures
- F-15EX Scenario A = F-15EX afterburner use on 80 percent of departures (most likely)
- F-35A Scenario A = F-35A afterburner use on 5 percent of departures (most likely)
- F-35A Scenario B = F-35A afterburner use on 50 percent of departures
- F-35A Scenario C = F-35A afterburner use on 95 percent of departures

4.1.1.2 Arrivals and Closed Patterns

The F-15EX and F-35A proposed alternatives would follow the same arrival types at similar rates proportional to the existing F-15C, and would perform closed patterns at BAF only as required (primarily for Functional Check Flights.

4.1.1.3 DNL Nighttime (10 p.m.–7 a.m. [2200–0700]) Operations

DNL Nighttime operations at BAF would remain near zero for either F-15EX or F-35A proposed alternatives with DNL nighttime operations comprising 0.5 percent of departures and arrivals. All closed patterns would occur during the daytime period.

4.1.1.4 Runway Use

The proposed F-15EX and F-35A aircraft would utilize BAF runways at the same proportion as the existing conditions as the F-15C aircraft with 90 percent of departures occurring on Runway 02 and 90 percent of non-break arrivals, overhead break arrivals, and visual flight rules closed patterns occurring on Runway 20.

4.1.1.5 Maintenance or Static Operations

Tables 4-2 and 4-3 present the representative run-up operations profiles for the F-15EX and F-35A alternatives, respectively, that would replace the existing F-15C run-ups. Note that the run-up type operations for either F-15EX or F-35A would not change for the analyzed 'afterburner scenarios,' which only apply to departure flight operations. The other existing run-ups, such as Army helicopters, would continue as described under the existing conditions. Figure 3-1 identifies the locations modeled for existing run-up operations, which would be utilized under the proposed alternatives.

Table 4-1 Proposed Aircraft Operations for BAF

Category[2]	*Sub-category*	*Representing Aircraft Types*	*Modeled Aircraft ID*	*Departure*		*Arrival*		*Closed Pattern*[1]		*Total*
				Day	*Night*	*Day*	*Night*	*Day*	*Night*	
Military Based	ANG	F-15EX or F-35A	F-15EX (GE129)	3,167	15	3,167	15	502	0	6,866
		F-15C	F-15E (PW220)	0	0	0	0	0	0	0
	Army	UH-72	OH-58D	576	0	460	116	19	0	1,171
		HH-60	UH-60A	144	0	115	29	5	0	293
Military Transient	Heavy Cargo	C-5, C-17	C-5M	4	0	4	0	0	0	8
	Tanker	KC-135	KC-135R	4	0	4	0	0	0	8
	4-engine Turboprop	C-130	C-130J	58	2	58	2	1,052	0	1,172
	2-engine Turboprop	C-12	C-12	3	0	3	0	0	0	6
Civilian	Air Carrier	B737, RJ	737-700	11	1	11	1	0	0	24
	Air Taxi and GA Jet	G-450, G-550, CL60x	GIV	643	34	643	33	34	0	1,387
		Learjet 35/36	LEAR-35	637	34	637	33	0	0	1,341
	GA 2-engine turboprop or piston	Cessna 441, others	CESSNA -441	1,590	0	1,590	0	0	0	3,180
	GA 1-engine turboprop or piston	Cessna 172, others	GASEPF	6,133	6	6,133	6	16,327	16	28,621
Military Based Subtotal				3,887	15	3,742	160	526	0	8,330
Military Transient Subtotal				69	2	69	2	1,052	0	1,194
Air Carrier Subtotal				11	1	11	1	0	0	24
Air Taxi + GA Subtotal				9,003	74	9,003	72	16,361	16	34,529
Total				**12,970**	**92**	**12,825**	**235**	**17,939**	**16**	**44,077**

Notes: [1]Closed Patterns counted as two operations.
[2]Military Based operations updated with input from operators in 2021; Military transients and Civilian operations consistent with Part 150 projected 2024 operations.
Legend: ANG = Air National Guard; BAF = Westfield-Barnes Regional Airport; GA = General Aviation.

Table 4-2 F-15EX Scenarios Annual Maintenance and Ground Engine Runs

Aircraft	*Description*	*Pad*	*Heading*	*Power (%NC)*	*Num Engines*	*Duration*	*Annual Events*[4]	*Day/Night Split*[1]
F-15EX (modeled with F-15EX GE-129)[2]	Ramp Engine run	RampN / RampS	110	63% (idle)	1	9 mins	764	90% / 10%
			110	77%	1	7 seconds	764	90% / 10%
			110	80%	1	10 mins	77	90% / 10%
	Arm/De-Arm, Rwy 20	ARM-20	55	63% (idle)	2	5 mins	335	90% / 10%
	Arm/De-Arm, Rwy 20	ARM-02	110	63% (idle)	2	5 mins	335	90% / 10%
	Hush House Engine Runs[3]	HH	270	63%	1	40 mins	23	100% / 0%
				80%	1	10 mins		
				92% MIL	1	9 mins		
				AB	1	2 mins		
UH-60	Ground engine runs	ARNG Ramp	150	Ige Lite	1	20	97	90% / 10%
UH-72	Ground engine runs	ARNG Ramp	150	Ige Lite	1	20	23	90% / 10%

Notes: [1]Day = 0700–2200, Night = 2200–0700.
[2]F-15C maintenance operations would scale proportional to change in flight sorties for F-15EX.
[3]Updated to reflect annual average of 2017-2021 engine log.
[4]Maintenance and ground run-ups would be the same for both modeled F-15EX 'Afterburner' take-off scenarios.
Legend: % = percent; %NC = percent speed of the compressor stage; AB = afterburner; ARNG = Army National Guard

Table 4-3 F-35A Annual Maintenance and Ground Engine Runs

Aircraft	*Description*	*Pad*	*Heading*	*Power (%ETR)*	*Num Engines*	*Duration*	*Annual Events*[3]	*Day/Night Split*[1]
F-35A	BIT	RampN / RampS	110	10	1	5 mins	150	90% / 10%
			110	31	1	3 mins		
			110	10	1	5 mins		
	High Speed, Low Thrust	RampN / RampS	110	10	1	5 mins	50	90% / 10%
			110	10	1	3 mins		
			110	10	1	5 mins		
	Arm/De-Arm, Runway 20	ARM-20	55	15% (idle)	2	5 mins	200	90% / 10%
	Arm/De-Arm, Runway 20	ARM-02	110	15% (idle)	2	5 mins	200	90% / 10%
	Hush House Engine Runs	HH	270	15	1	32 mins	2	100% / 0%
				80	1	13 mins		
				90	1	7 mins		

Notes: [1]Day = 0700–2200, Night = 2200–0700.
[2]ETR = Engine Thrust Request.
[3]Maintenance and ground run-ups would be the same for all modeled F-35A 'Afterburner' take-off scenarios.
Legend: % = percent; %NC = percent speed of the compressor stage; BIT = Built in Test.

4.1.2 Noise Exposure

Sections 4.1.2.1 through 4.1.2.6 focus on DoD best practices for impact analysis at airfields, as summarized in DNWG guidance (DNWG 2009a). FAA Order 1050.1F impact analysis applicable to airfields is presented in Section 4.1.2.7.

4.1.2.1 Day-Night Average Sound Level (DNL) Contours and Point of Interest Levels

Figure 4-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-15EX 50 percent afterburner alternative at BAF. As with existing operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. As depicted in Figure 4-2, when compared with existing conditions, the F-15EX 50 percent afterburner alternative at BAF would result in an increase in the width of the DNL contours to the west and east due to the greater noise generated by the F-15EX, as compared to the F-15C, at the start of departure operations. The DNL contour size to the north would increase in length when compared to existing conditions due to the greater noise levels and increase in operations for the F-15EX.

Figure 4-3 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-15EX 80 percent afterburner alternative at BAF. As with existing operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. As depicted in Figure 4-4, when compared with existing conditions, the F-15EX 80 percent afterburner alternative at BAF would result in an increase in the width of the DNL contours to the west and east due to the greater noise generated by the F-15EX, as compared to the F-15C, at the start of departure operations. The reduction in contour size to the north would be due to the F-15EX climbing quicker than the F-15C so that the noise reaching the ground in these areas during departures would be reduced.

Although the two F-15EX afterburner scenarios would result in similar sizes and shapes of DNL contours, when compared with non-afterburner departures, afterburner departures create greater noise levels adjacent to the primary runway that would result in wider contours to the east and west of BAF. On the other hand, afterburner departures allow the aircraft to gain speed and altitude quicker which would result in a greater distance between the aircraft and the ground in areas along most departure corridors. This is the cause for the shorter length of the 65 dB DNL contour to the north of BAF for the 80 percent afterburner scenario when compared with the 50 percent afterburner scenario.

Figure 4-5 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A at BAF with 5 percent afterburner usage. As with existing operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. As depicted in Figure 4-6, when compared with existing conditions, the F-35A 5 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions except to the west where a slight reduction would occur. This increase in area exposed is the result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C. The slight decrease in DNL to the west occurs because the F-35A would use afterburner, the loudest engine power setting, less often (5 percent of take-offs) than the existing F-15C (80 percent of take-offs).

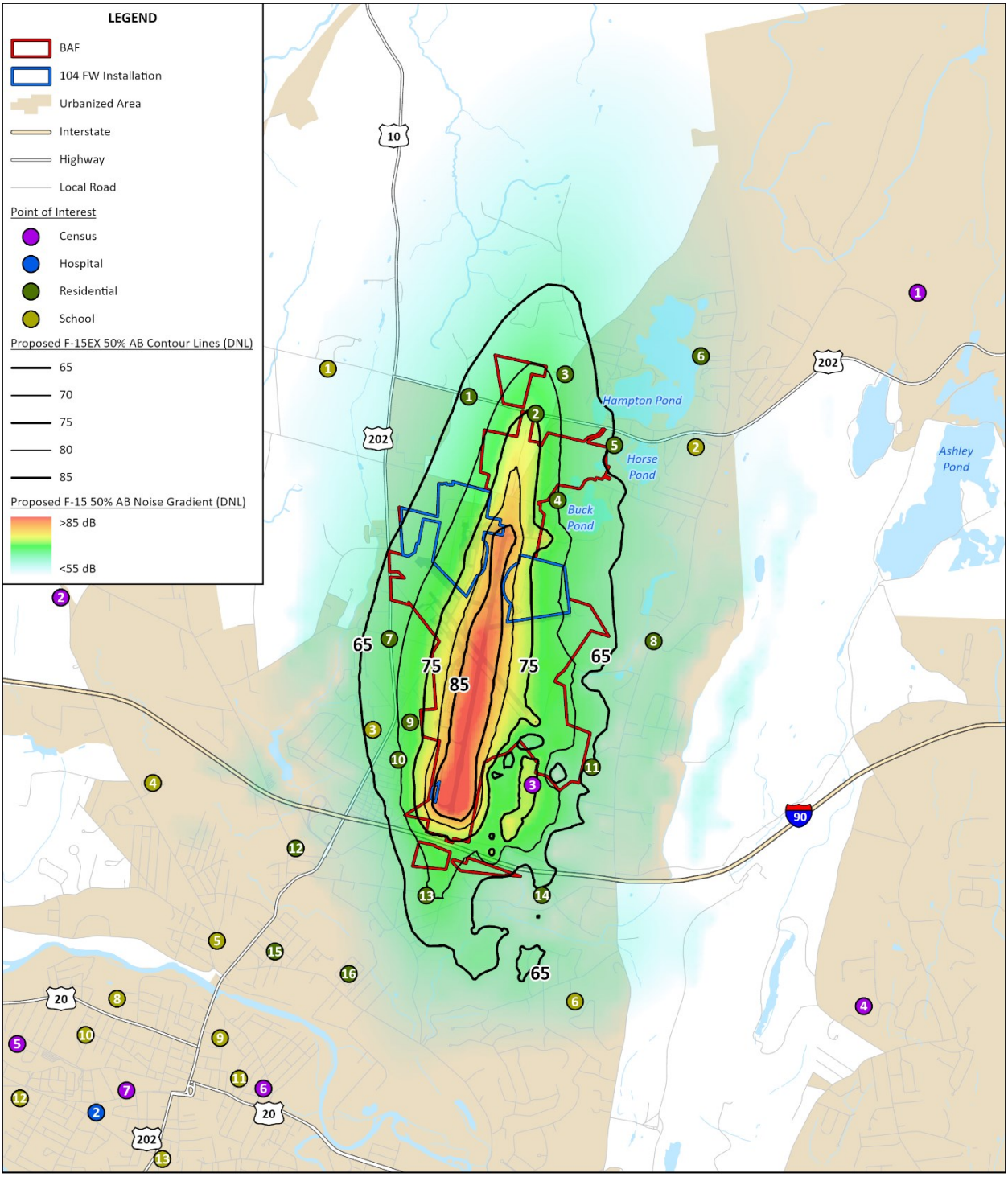

Figure 4-1 F-15EX 50 Percent Afterburner Scenario – DNL Contours and Gradient

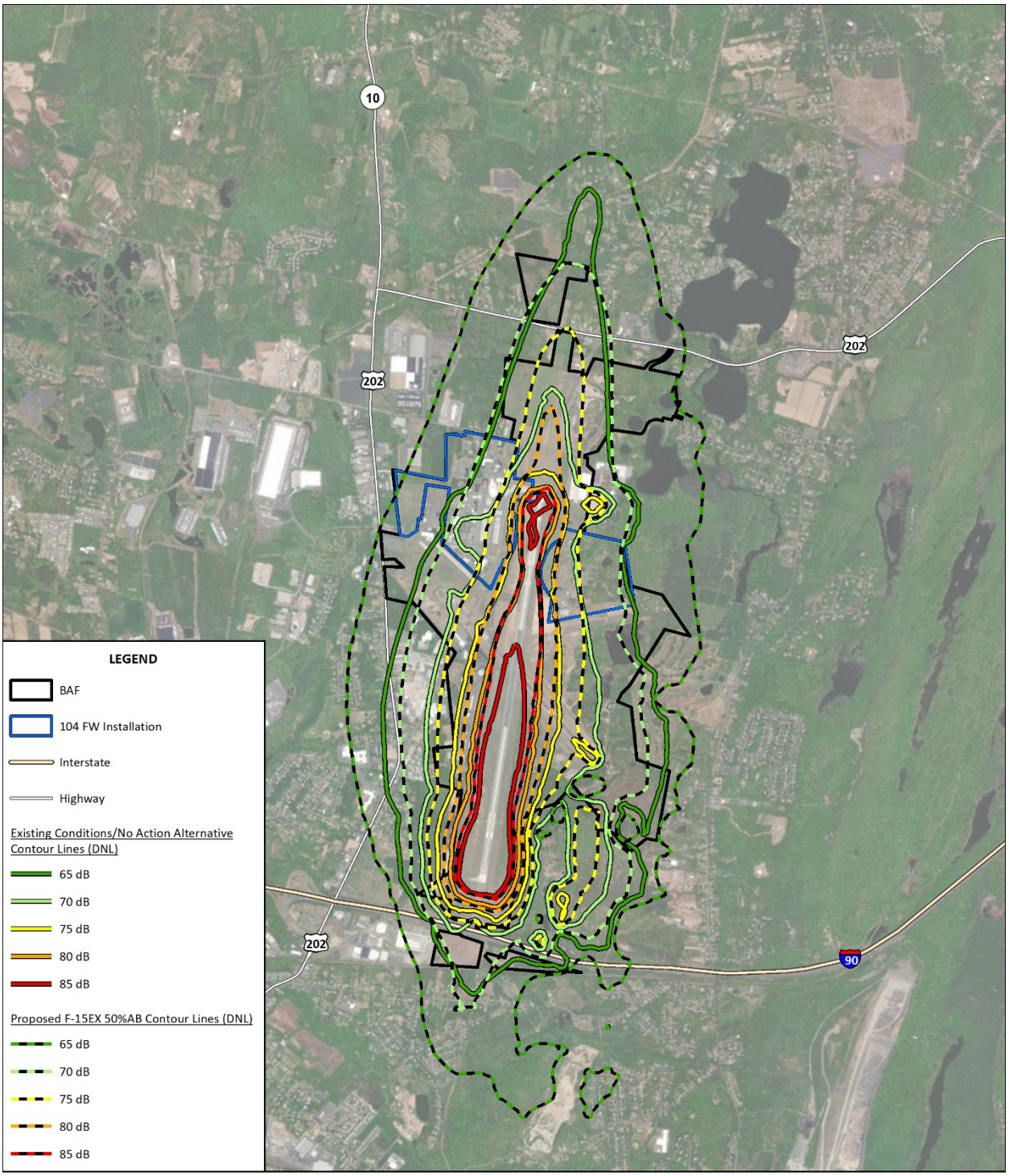

Figure 4-2 F-15EX 50 Percent Afterburner Scenario Comparison to Existing Conditions – DNL Contours

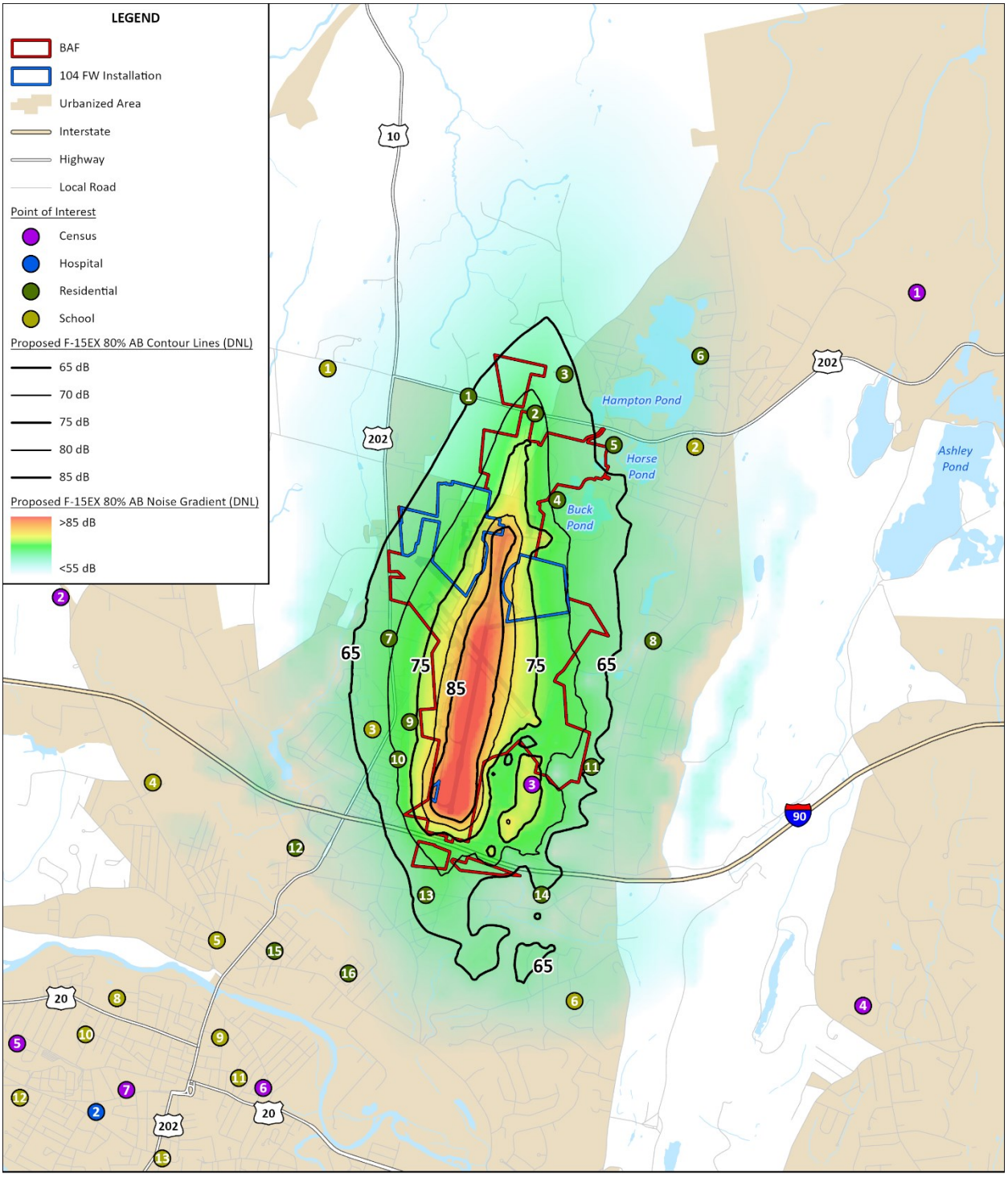

Figure 4-3 F-15EX 80 Percent Afterburner Scenario – DNL Contours and Gradient

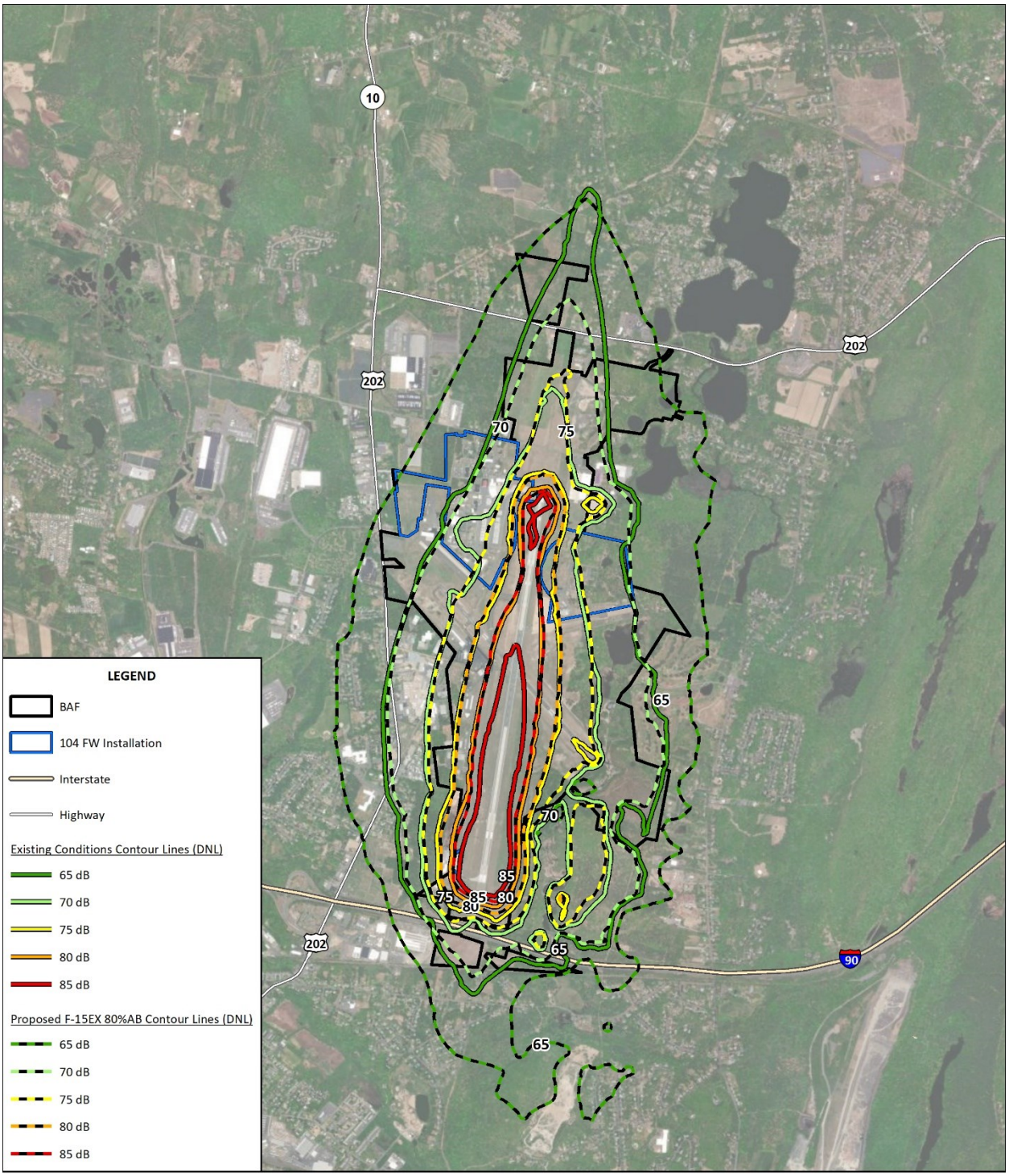

Figure 4-4 F-15EX 80 Percent Afterburner Scenario Comparison to Existing Conditions – DNL Contours

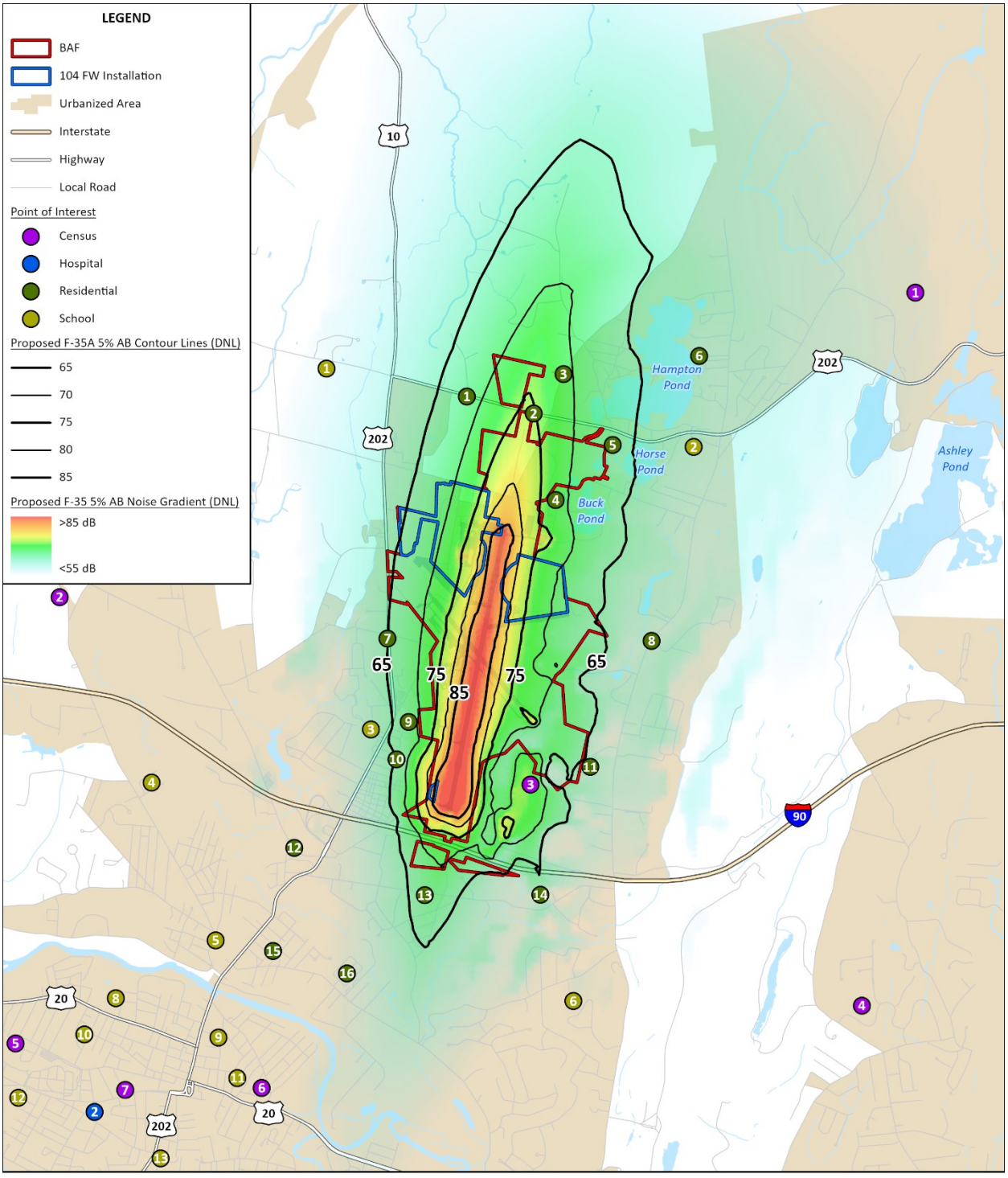

Figure 4-5 F-35A 5 Percent Afterburner Scenario – DNL Contours and Gradient

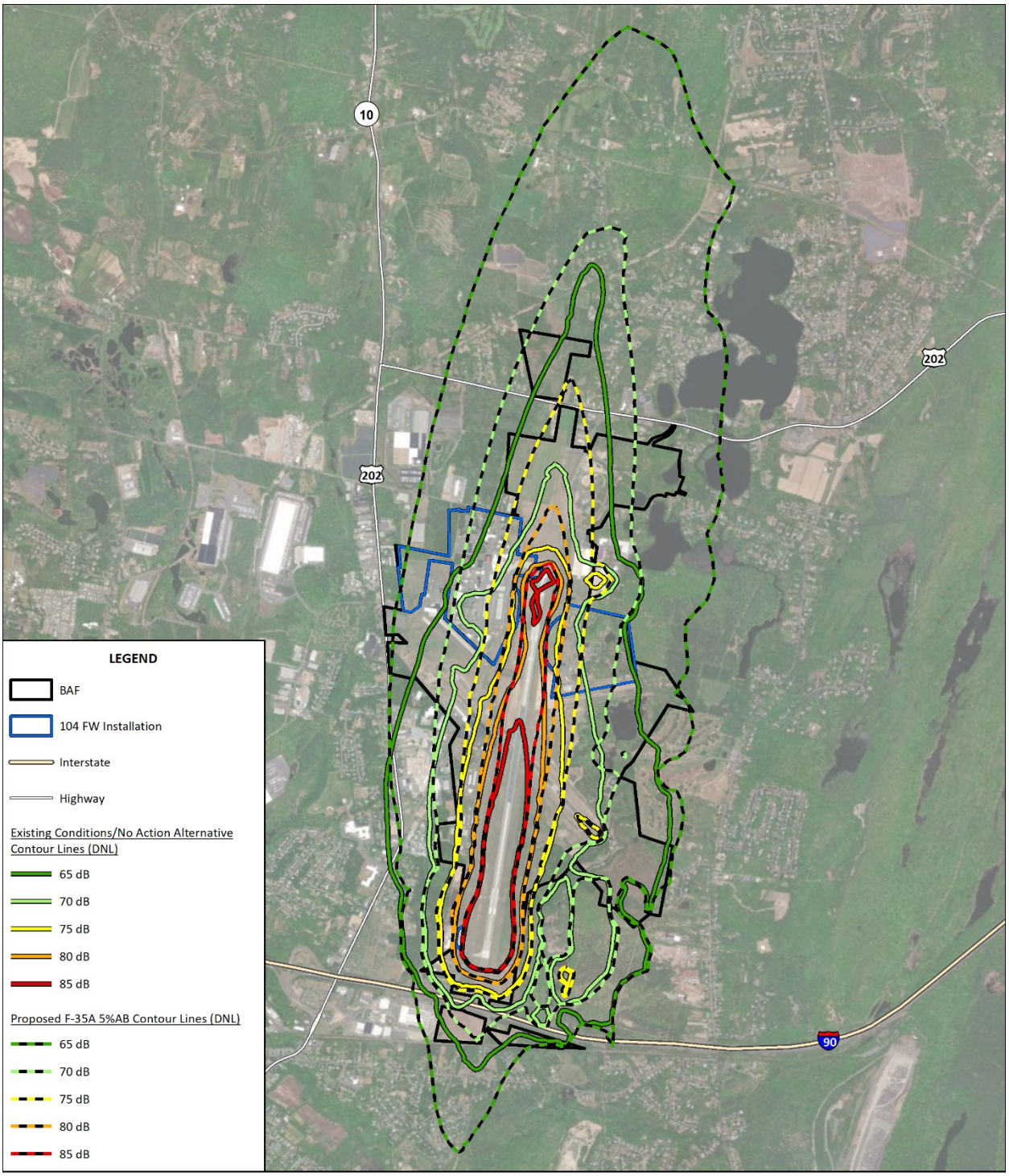

Figure 4-6 F-35A 5 Percent Afterburner Scenario Comparison to Existing Conditions – DNL Contours

Figure 4-7 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A 50 percent afterburner scenario at BAF. As with existing operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. As depicted in Figure 4-8, when compared with existing conditions, the F-35A 50 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions except to the west where a slight reduction would occur. This increase in area exposed is the result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C. The slight decrease in DNL to the west occurs because the F-35A would use afterburner, the loudest engine power setting, less often (50 percent of take-offs) than the existing F-15C (80 percent of take-offs).

Figure 4-9 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A 95 percent afterburner scenario at BAF. As with existing operations, noise generated by aircraft operations at BAF would occur within and outside of the airfield. As depicted in Figure 4-10, when compared with existing conditions, the F-35A 95 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions except to the west where a slight reduction would occur. This increase in area exposed is the result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C.

Although the three F-35A afterburner scenarios would result in similar sizes and shapes of DNL contours, when compared with non-afterburner departures, afterburner departures create greater noise levels adjacent to the primary runway that would result in wider contours to the east and west of BAF. On the other hand, afterburner departures allow the aircraft to gain speed and altitude quicker, which would result in a greater distance between the aircraft and the ground in areas along most departure corridors. This is the cause for the shorter length of the 65 dB DNL contour to the north of BAF for the 95 percent afterburner F-35A scenario when compared with the 50 or 5 percent afterburner F-35A scenarios.

Figure 4-11 presents a comparison of the 65 dB DNL contour that result from each of the five proposed scenarios to existing conditions. The three F-35A afterburner scenarios would result in very similar 65 dB DNL contours and would be larger to the north than either of the F-15EX scenarios. However, noise exposure due to F-35A would cover a similar area to the east and slight less area to the west when compared to the F-15EX. The following discussion analyzes representative POIs to compare noise levels between each of these scenarios in more detail.

Table 4-4 details the calculated DNL at all POIs for existing conditions and the five proposed alternatives and the numbers of POIs that would be exposed to relevant DNL thresholds of 65, 70, and 75 dB. The F-15EX 50 percent scenario would result in 12 POIs exposed to DNL of 65 dB or greater (an increase of 7 POIs), 5 POIs exposed to DNL of 70 dB or greater (an increase of 4 POIs), and 2 POIs exposed to DNL of 75 dB or greater (an increase of 2 POIs). The F-15EX 80 percent scenario would result in a smaller increase in DNL with 11 POIs exposed to DNL of 65 dB or greater (an increase of 6 POIs), 3 POIs exposed to DNL of 70 dB or greater (an increase of 2 POIs), and 1 POI exposed to DNL of 75 dB or greater (an increase of 1 POI).

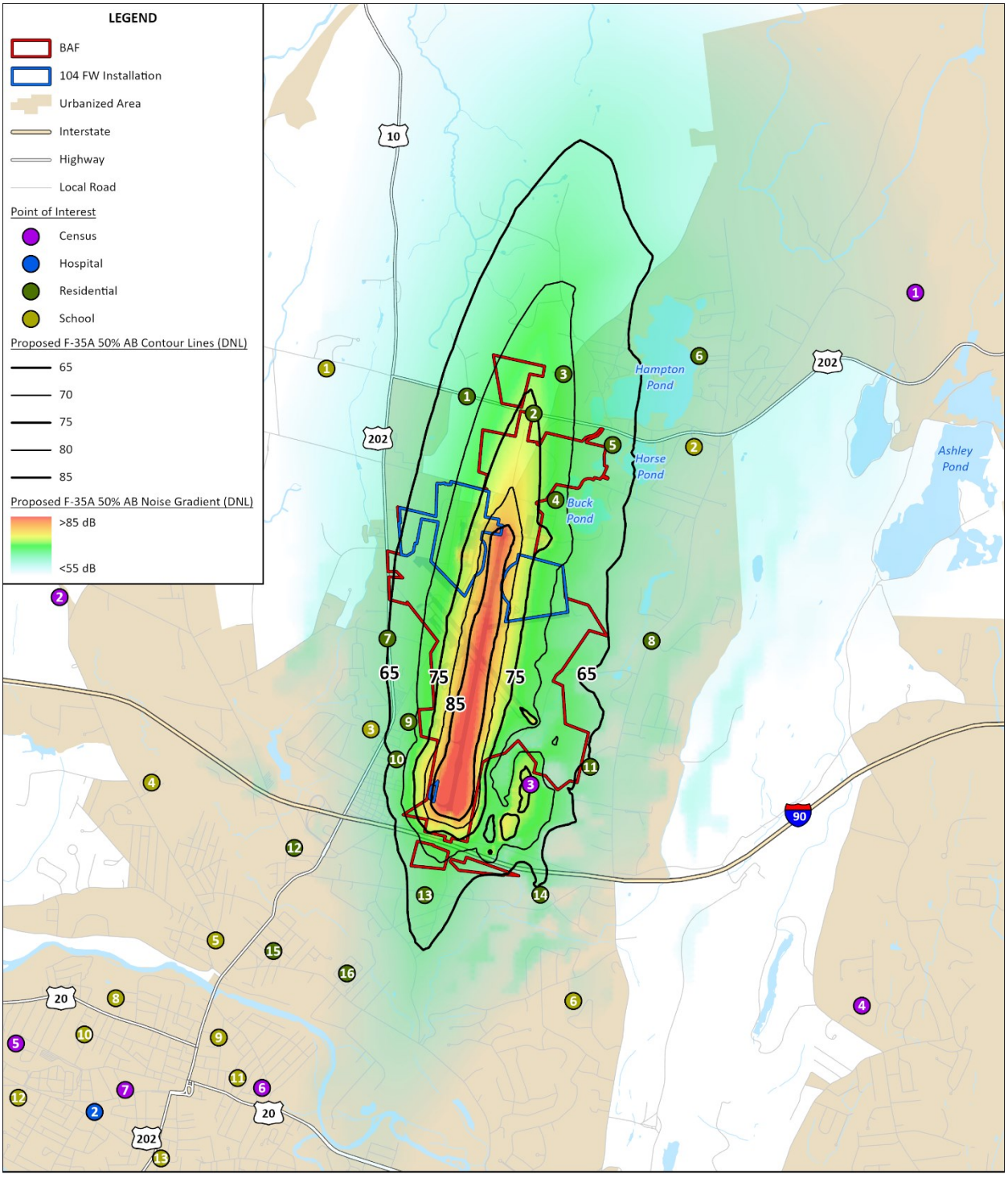

Figure 4-7 F-35A 50 Percent Afterburner Scenario – DNL Contours and Gradient

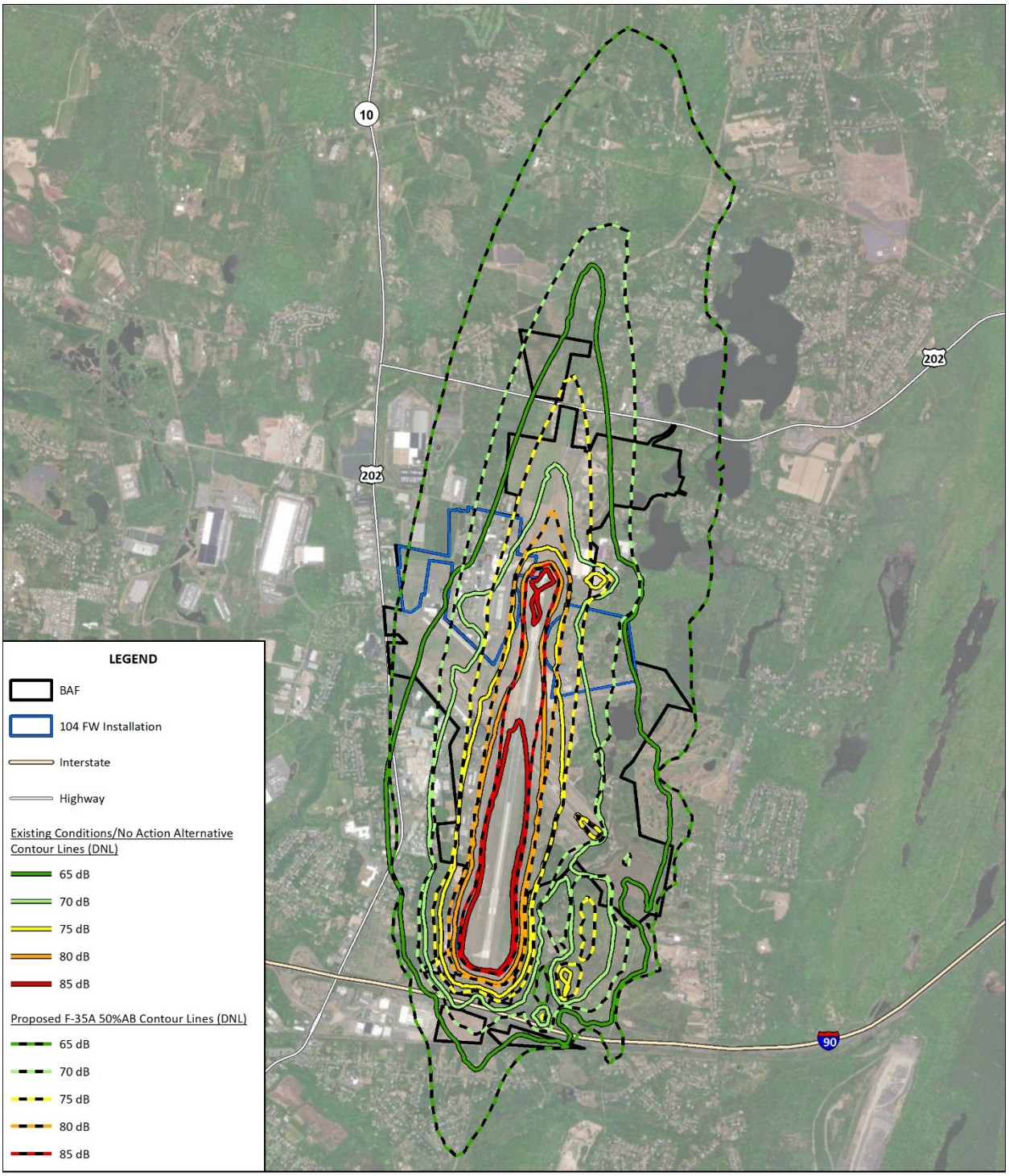

Figure 4-8 F-35A 50 Percent Afterburner Scenario Comparison to Existing Conditions – DNL Contours

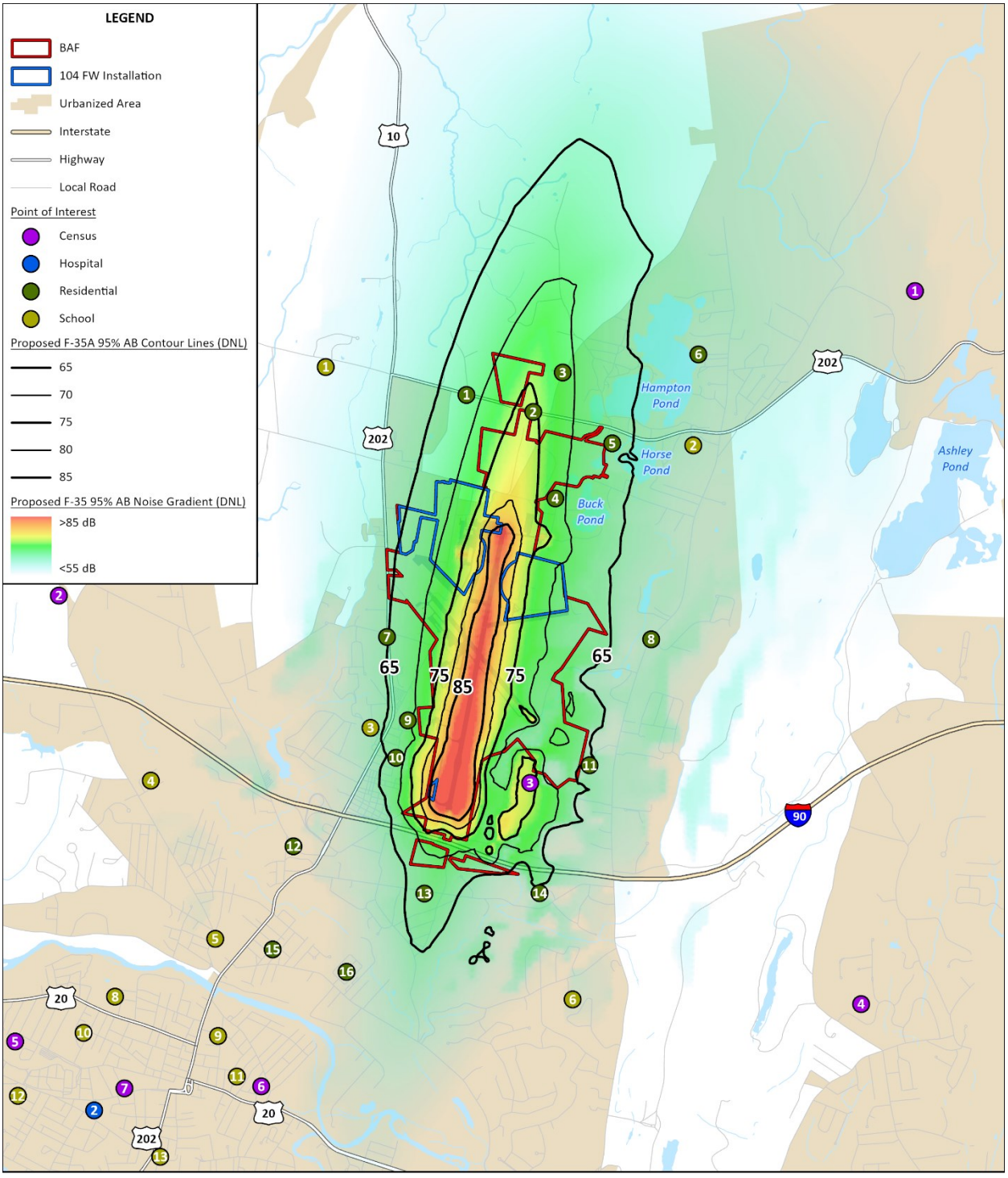

Figure 4-9 F-35A 95 Percent Afterburner Scenario – DNL Contours and Gradient

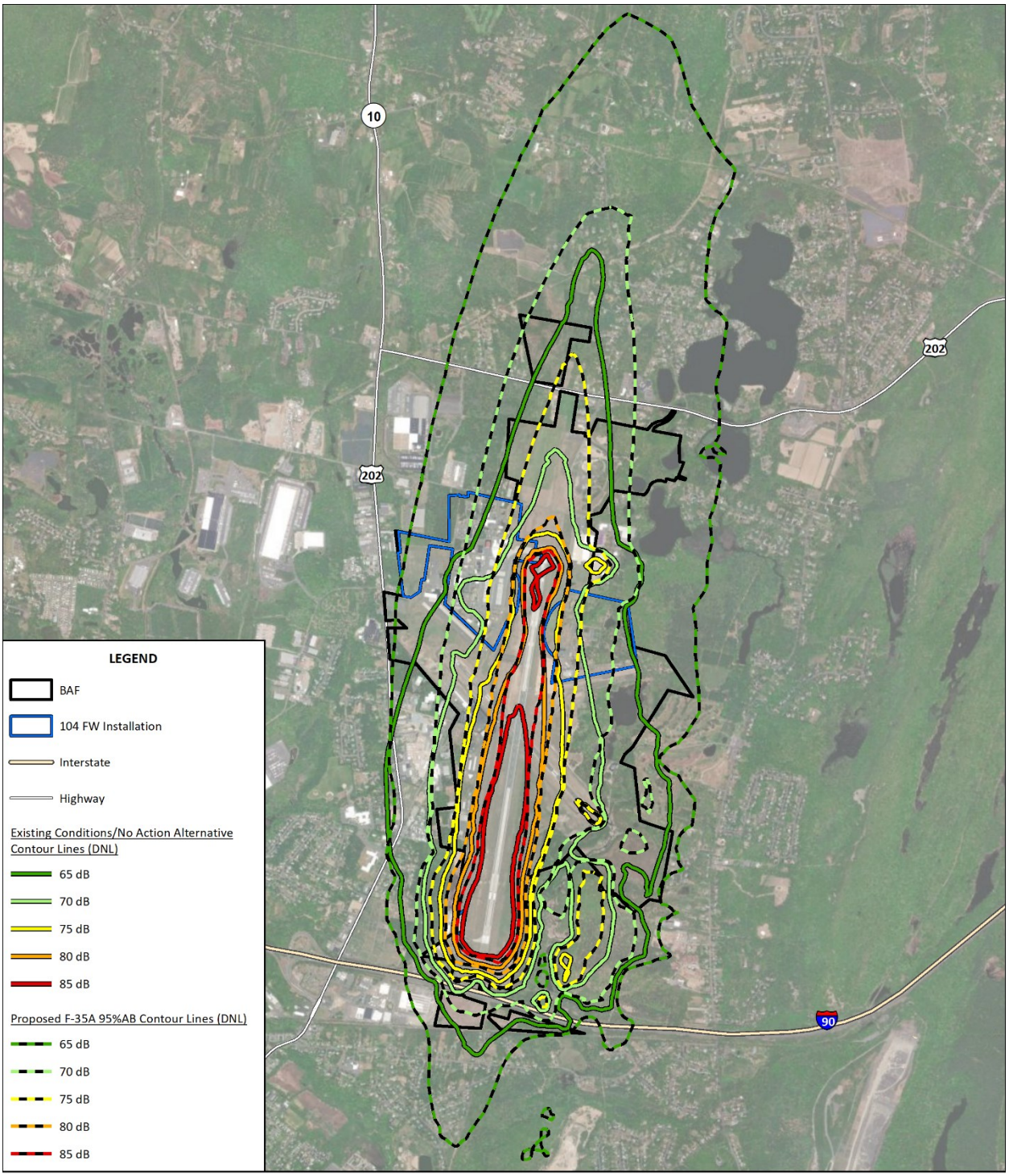

Figure 4-10 F-35A 95 Percent Afterburner Scenario Comparison to Existing Conditions – DNL Contours

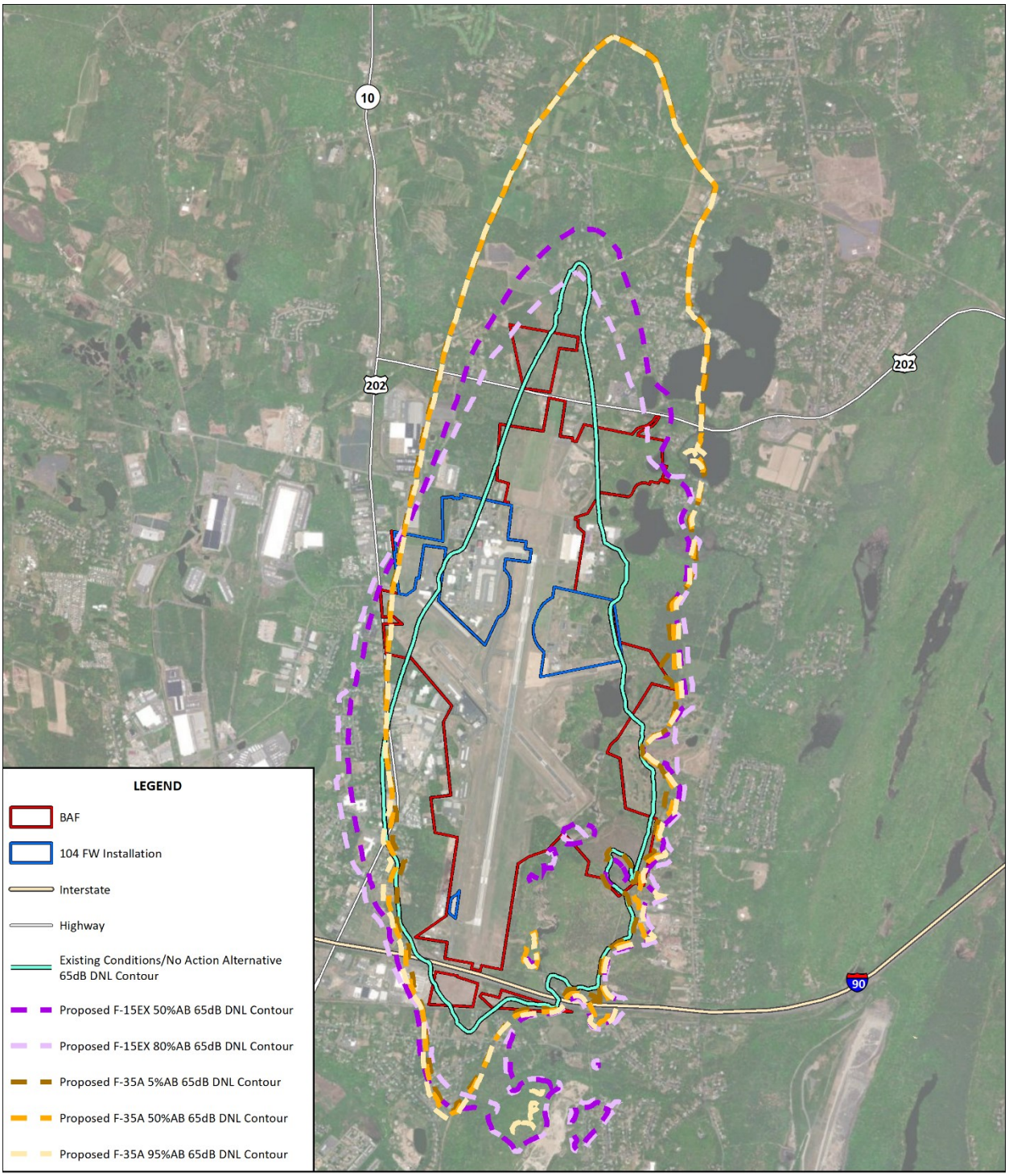

Figure 4-11 Comparison of 65 dB DNL Contours Across All Afterburner Scenarios

Table 4-4 DNL at POIs for all Afterburner Scenarios in the Vicinity of BAF

Map ID	*Named Point of Interest*	*Existing Conditions/ No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	51	52 (+1)	51 (0)	57 (+6)	57 (+6)	57 (+6)
BA-C-02	Tract 8128	43	45 (+2)	46 (+3)	46 (+3)	46 (+3)	47 (+4)
BA-C-03	Tract 8125	**73**	**76 (+3)**	**77 (+4)**	**74 (+1)**	**75 (+2)**	**76 (+3)**
BA-C-04	Tract 8124.01	46	46 (0)	46 (0)	51 (+5)	51 (+5)	51 (+5)
BA-C-05	Tract 8129.01	41	43 (+2)	44 (+3)	45 (+4)	46 (+5)	46 (+5)
BA-C-06	Tract 8127.02	49	50 (+1)	49 (0)	54 (+5)	54 (+5)	54 (+5)
BA-C-07	Tract 8127.01	44	46 (+2)	46 (+2)	48 (+4)	48 (+4)	48 (+4)
BA-H-01	Western Massachusetts Hospital	44	47 (+3)	47 (+3)	48 (+4)	48 (+4)	48 (+4)
BA-H-02	Baystate Noble Hospital	43	45 (+2)	45 (+2)	47 (+4)	47 (+4)	48 (+5)
BA-R-01	Highway 202 and Jaeger Drive	61	**66 (+5)**	**65 (+4)**	**68 (+7)**	**68 (+7)**	**68 (+7)**
BA-R-02	Highway 202 near Old Stage Road	**68**	**75 (+7)**	**72 (+4)**	**75 (+7)**	**76 (+8)**	**76 (+8)**
BA-R-03	Palma Ln and Old Stage Road	64	**68 (+4)**	**66 (+2)**	**71 (+7)**	**71 (+7)**	**71 (+7)**
BA-R-04	Buck Pond Road	**65**	**70 (+5)**	**69 (+4)**	**72 (+7)**	**72 (+7)**	**71 (+6)**
BA-R-05	Rider Road	60	**65 (+5)**	64 (+4)	**66 (+6)**	**67 (+7)**	**67 (+7)**
BA-R-06	Beccari Lane and Aimee Avenue	56	59 (+3)	58 (+2)	62 (+6)	62 (+6)	62 (+6)
BA-R-07	Egleston Road and Highway 202	64	**68 (+4)**	**69 (+5)**	**65 (+1)**	**65 (+1)**	**65 (+1)**
BA-R-08	E. Mountain Road and Ridge Trail Road	58	61 (+3)	62 (+4)	61 (+3)	61 (+3)	61 (+3)
BA-R-09	Klondike Avenue Trailer Park	**69**	**72 (+3)**	**73 (+4)**	**67 (-2)**	**67 (-2)**	**67 (-2)**
BA-R-10	Springdale Street and Grove Avenue	**65**	**68 (+3)**	**69 (+4)**	64 (-1)	64 (-1)	**65 (0)**
BA-R-11	Stephanie Lane	62	**65 (+3)**	**66 (+4)**	62 (0)	63 (+1)	64 (+2)
BA-R-12	Arch Road and Lockhouse Road	53	54 (+1)	54 (+1)	53 (0)	53 (0)	54 (+1)
BA-R-13	Holyoke Road near Dry Bridge Road	64	**70 (+6)**	**68 (+4)**	**67 (+3)**	**67 (+3)**	**67 (+3)**
BA-R-14	Cara Lane and Holyoke Road	55	59 (+4)	59 (+4)	56 (+1)	57 (+2)	57 (+2)
BA-R-15	The Moseley Apartments	49	52 (+3)	51 (+2)	52 (+3)	52 (+3)	52 (+3)
BA-R-16	Powermill Village Apartments	52	56 (+4)	55 (+3)	57 (+5)	57 (+5)	57 (+5)
BA-S-01	White Oak School	53	57 (+4)	57 (+4)	57 (+4)	57 (+4)	57 (+4)
BA-S-02	Roots Learning Center	56	59 (+3)	59 (+3)	62 (+6)	62 (+6)	62 (+6)
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	63	**66 (+3)**	**68 (+5)**	62 (-1)	63 (0)	63 (0)
BA-S-04	Westfield High School	48	49 (+1)	50 (+2)	48 (0)	49 (+1)	50 (+2)
BA-S-05	Prospect Hill School	47	49 (+2)	50 (+3)	51 (+4)	52 (+5)	52 (+5)
BA-S-06	Paper Mill Elementary School	58	62 (+4)	62 (+4)	56 (-2)	57 (-1)	58 (0)
BA-S-07	Growing Tree Learning Center	40	42 (+2)	42 (+2)	43 (+3)	43 (+3)	43 (+3)
BA-S-08	Franklin Avenue Elementary School	45	47 (+2)	47 (+2)	48 (+3)	48 (+3)	48 (+3)
BA-S-09	St. Mary's Elementary School	48	50 (+2)	50 (+2)	53 (+5)	53 (+5)	53 (+5)
BA-S-10	Westfield Technical Academy	43	45 (+2)	45 (+2)	47 (+4)	47 (+4)	47 (+4)
BA-S-11	Fort Meadow Early Childhood Center	48	49 (+1)	49 (+1)	53 (+5)	53 (+5)	53 (+5)
BA-S-12	Highland Elementary School	41	43 (+2)	44 (+3)	45 (+4)	45 (+4)	45 (+4)
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	45	47 (+2)	46 (+1)	49 (+4)	49 (+4)	49 (+4)

Legend: AB = afterburner; BAF = Westfield-Barnes Regional Airport; ID = Identification.

The F-35A 5 percent scenario would result in 9 POIs exposed to DNL of 65 dB or greater (an increase of 4 POIs), 4 POIs exposed to DNL of 70 dB or greater (an increase of 3 POIs), and 1 POI exposed to DNL of 75 dB or greater (an increase of 1 POI). The F-35A 50 percent scenario would result in the same number of POIs exposed to 65 and 70 dB levels, but the POIs exposed to 75 dB DNL would increase by one additional POI. The F-35A 95 percent scenario would result in 10 POIs exposed to DNL of 65 dB or greater (an increase of 5 POIs), 4 POIs exposed to DNL of 70 dB or greater (an increase of 3 POIs), and 2 POIs exposed to DNL of 75 dB or greater (an increase of 2 POIs).

Table 4-5 presents the change in DNL at each POI for each action alternative relative to the existing conditions/No Action Alternative along with a summary of the number of POIs experiencing a decrease, no change, or several magnitudes of increase. The F-15EX 50 percent scenario would result in one POI that would experience no change to DNL, 5 POIs that would experience an increase in DNL of 1 dB, 27 POIs that would experience an increase in DNL of 2 to 4 dB, and 5 POIs that would experience an increase in DNL of 5 dB or greater. The F-15EX 80 percent scenario would result in 3 POIs that would experience no change to DNL, 3 POIs that would experience an increase in DNL of 1 dB, 30 POIs that would experience an increase in DNL of 2 to 4 dB DNL, and 2 POIs that would experience an increase in DNL of 5 dB or greater.

Table 4-5 Change to DNL at POIs for all Afterburner Scenarios in the Vicinity of BAF

Condition	*Existing Conditions/ No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
Number of POIs exposed to 65 dB DNL or greater	5	12	11	9	9	10
Number of POIs exposed to 70 dB DNL or greater	1	5	3	4	4	4
Number of POIs exposed to 75 dB DNL or greater	0	2	1	1	2	2
Change to number of POIs exposed to 65 dB DNL		+7	+6	+4	+4	+5
Change to number of POIs exposed to 70 dB DNL		+4	+2	+3	+3	+3
Change to number of POIs exposed to 75 dB DNL		+2	+1	+1	+2	+2
Number of POIs with decrease of 1 dB or greater		0	0	4	3	1
Number of POIs with no change		1	3	3	2	3
Number of POIs with increase of 1 dB		5	3	3	3	2
Number of POIs with increase of 2 to 4 dB		27	30	15	15	16
Number of POIs with increase of 5 dB or greater		5	2	13	15	16

Legend: % = percent; AB = afterburner; BAF = Westfield-Barnes Regional Airport; dB = decibel; DNL = Day-Night Average Sound Level; POI = Point of Interest.

The F-35A 5 percent scenario would result in 7 POIs that would experience either a decrease or no change to DNL, 3 POIs that would experience an increase in DNL of 1 dB, 15 POIs that would experience an increase in DNL of 2 to 4 dB, and 13 POIs that would experience an increase in DNL of 5 dB or greater. The F-35A 50 percent scenario would result in 5 POIs that would experience either a decrease or no change to DNL, 3 POIs that would experience an increase in DNL of 1 dB, 15 POIs that would experience an increase in DNL of 2 to 4 dB, and 15 POIs that would experience an increase in DNL of 5 dB or greater. The F-35A 95 percent scenario would result in 4 POIs that would experience either a decrease or no change to DNL, 2 POIs that would experience an increase in DNL of 1 dB, 16 POIs that would experience an increase in DNL of 2 to 4 dB, and 16 POIs that would experience an increase in DNL of 5 dB or greater.

4.1.2.2 Acreage, Housing, and Population

Table 4-6 presents acreage for both on and off airport for all proposed alternatives and the change in acreage relative to existing conditions. Under the F-15EX 50 percent scenario, a total of 1,491 off-airport acres would be exposed to 65 dB DNL or greater, an increase of 917 acres from the existing conditions. The off-airport acreage would be composed of 1,030 acres exposed to 65 to 70 dB DNL (an increase of 627 acres), 360 acres exposed to 70 to 75 dB DNL (an increase of 217 acres), 90 acres exposed to 75 to 80 dB DNL (an increase of 63 acres), 10 acres exposed to 80 to 85 dB DNL (an increase of 10 acres). No areas off airport would be exposed to DNL greater than 85 dB under the F-15EX 50 percent scenario. Under the F-15EX 80 percent scenario, off-airport acreage would be similar to the F-15EX 50 percent scenario with 1,419 acres exposed to greater than 65 dB DNL or greater, an increase of 845 acres from the existing conditions. The off-airport acreage would be composed of 955 acres exposed to 65 to 70 dB DNL (an increase of 552 acres), 333 acres exposed to 70 to 75 dB DNL (an increase of 190 acres), 115 acres exposed to 75 to 80 dB DNL (an increase of 88 acres), 17 acres exposed to 80 to 85 dB DNL (an increase of 16 acres). No areas off airport would be exposed to DNL greater than 85 dB under the F-15EX 80 percent scenario.

Table 4-6 Acreage within DNL for All Afterburner Scenarios in the Vicinity of BAF

Scenario	*DNL (dB)*	*On Airport*	*Off Airport*	*Total*	*Change Relative to Existing Conditions/No Action Alternative*		
					On Airport	*Off Airport*	*Total*
F-15EX 50% AB	65–70	249	1030	1280	-138	+627	+489
	70–75	345	360	705	+89	+217	+306
	75–80	272	90	362	+123	+63	+186
	80–85	169	10	179	+35	+10	+45
	85+	200	0	200	+93	0	+93
	Total >65 dB	1235	1491	2726	+202	+917	+1119
F-15EX 80% AB	65–70	261	955	1215	-127	+552	+425
	70–75	349	333	682	+93	+190	+283
	75–80	247	115	362	+98	+88	+186
	80–85	155	17	172	+22	+16	+38
	85+	220	0	220	+113	0	+113
	Total >65 dB	1233	1419	2651	+199	+845	+1044
F-35A 5% AB	65–70	298	1394	1693	-89	+991	+902
	70–75	330	414	744	+74	+271	+345
	75–80	265	50	315	+116	+23	+139
	80–85	152	3	155	+19	+2	+21
	85+	173	0	173	+66	0	+66
	Total >65 dB	1219	1861	3080	+186	+1288	+1473
F-35A 50% AB	65–70	311	1401	1713	-76	+998	+922
	70–75	322	446	768	+66	+304	+369
	75–80	265	52	317	+116	+25	+141
	80–85	146	8	154	+12	+7	+19
	85+	181	0	181	+74	0	+74
	Total >65 dB	1225	1907	3132	+192	+1334	+1525

Scenario	*DNL (dB)*	*On Airport*	*Off Airport*	*Total*	*Change Relative to Existing Conditions/No Action Alternative*		
					On Airport	*Off Airport*	*Total*
F-35A 95% AB	65–70	314	1409	1723	-74	+1006	+933
	70–75	323	434	757	+67	+291	+358
	75–80	265	91	356	+116	+64	+179
	80–85	139	12	152	+6	+12	+17
	85+	186	0	186	+79	0	+79
	Total >65 dB	1227	1946	3173	+194	+1373	+1566

Legend: AB = afterburner; BAF = Westfield-Barnes Regional Airport; dB = decibel; DNL = Day-Night Average Sound Level.

Under the F-35A 5 percent scenario, off-airport acreage exposed to greater than 65 dB DNL would be 1,861, an increase of 1,288 from the existing conditions. The off-airport acreage would be composed of 1,394 acres exposed to 65 to 70 dB DNL (an increase of 991 acres), 414 acres exposed to 70 to 75 dB DNL (an increase of 271 acres), 50 acres exposed to 75 to 80 dB DNL (an increase of 23 acres), 3 acres exposed to 80 to 85 dB DNL (an increase of 2 acres). No areas off airport would be exposed to DNL greater than 85 dB under the F-35A 5 percent scenario.

Under the F-35A 50 percent scenario, off-airport acreage exposed to greater than 65 dB DNL would be 1,907, an increase of 1,334 from the existing conditions. The off-airport acreage would be composed of 1,401 acres exposed to 65 to 70 dB DNL (an increase of 998 acres), 446 acres exposed to 70 to 75 dB DNL (an increase of 304 acres), 52 acres exposed to 75 to 80 dB DNL (an increase of 25 acres), 8 acres exposed to 80 to 85 dB DNL (an increase of 7 acres). No areas off airport would be exposed to DNL greater than 85 dB under the F-35A 50 percent scenario.

Under the F-35A 95 percent scenario, off-airport acreage exposed to greater than 65 dB DNL would be 1,946 an increase of 1,373 from the existing conditions. The off-airport acreage would be composed of 1,409 acres exposed to 65 to 70 dB DNL (an increase of 1,006 acres), 434 acres exposed to 70 to 75 dB DNL (an increase of 291 acres), 91 acres exposed to 75 to 80 dB DNL (an increase of 64 acres), 12 acres exposed to 80 to 85 dB DNL (an increase of 12 acres). No areas off airport would be exposed to DNL greater than 85 dB under the F-35A 50 percent scenario.

Table 4-7 presents the acreage, households, and population estimations by DNL band for each proposed scenario at BAF for areas outside of the airport.

Table 4-7 Acreage, Households, and Estimated Population by DNL Contour in the Vicinity of BAF

Scenario	*DNL (dB)*	*Acreage*	*Households*	*Estimated Population*	*Change from Existing Conditions/No Action Alternative*		
					Acreage	*Households*	*Estimated Population*
F-15EX 50% A/B	65–70	1,030	235	659	+627	+159	+445
	70–75	360	66	190	+217	+37	+102
	75–80	90	18	52	+63	+14	+42
	80–85	10	0	0	+9	0	0
	85+	0	0	0	0	0	0
	Total	**1,491**	**319**	**901**	**+917**	**+210**	**+589**

Scenario	*DNL (dB)*	*Acreage*	*Households*	*Estimated Population*	*Change from Existing Conditions/No Action Alternative*		
					Acreage	*Households*	*Estimated Population*
F-15EX 80% AB	65–70	955	221	610	+552	+145	+396
	70–75	333	62	178	+190	+33	+91
	75–80	115	23	70	+88	+19	+60
	80–85	17	0	0	+16	0	0
	85+	0	0	0	0	0	0
	Total	**1,419**	**306**	**858**	**+845**	**+197**	**+547**
F-35A 5% AB	65–70	1,394	288	843	+991	+212	+628
	70–75	414	80	229	+271	+51	+141
	75–80	50	8	20	+23	+4	+10
	80–85	3	0	0	+2	0	0
	85+	0	0	0	0	0	0
	Total	**1,861**	**376**	**1,092**	**+1287**	**+267**	**+779**
F-35A 50% AB	65–70	1,401	290	848	+998	+214	+634
	70–75	446	88	256	+303	+59	+168
	75–80	52	7	18	+25	+3	+8
	80–85	8	0	0	+7	0	0
	85+	0	0	0	0	0	0
	Total	**1,907**	**385**	**1,122**	**+1333**	**+276**	**+810**
F-35A 95% AB	65–70	1,409	292	853	+1006	+216	+639
	70–75	434	84	242	+291	+55	+154
	75–80	91	18	54	+64	+14	+44
	80–85	12	0	0	+11	0	0
	85+	0	0	0	0	0	0
	Total	**1,946**	**394**	**1,149**	**+1372**	**+285**	**+837**

Legend: AB = afterburner; BAF = Westfield-Barnes Regional Airport; dB = decibel; DNL = Day-Night Average Sound Level.

Under the F-15EX 50 percent scenario, a total of 235 households and 659 people would be exposed to DNL of 65 to 70 dB, an increase of 159 households and 445 people. This increase would be due to the general increase in width of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-15EX engine. Table 4-7 reflects an increase of 37 additional households and 102 people that would be exposed to 70 to 75 dB DNL and 14 additional households and 42 additional people that would be exposed to 75 to 80 dB DNL under the F-15EX 50 percent scenario.

Under the F-15EX 80 percent scenario, a total of 221 households and 610 people would be exposed to DNL of 65 to 70 dB, an increase of 145 households and 396 people. This increase would be due to the general increase in width of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-15EX engine. Table 4-7 reflects an increase of 33 additional households and 91 people that would be exposed to 70 to 75 dB DNL and 19 additional households and 60 additional people that would be exposed to 75 to 80 dB DNL.

Under the F-35A 5 percent scenario, a total of 288 households and 843 people would be exposed to DNL of 65 to 70 dB, an increase of 212 households and 628 people. This increase would be due to the general increase in length of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-35A on departures. Table 4-7 reflects an increase of 51 additional households and 141 people that would be exposed to 70 to 75 dB DNL and 4 additional households and 10 additional people that would be exposed to 75 to 80 dB DNL under the F-35A 5 percent scenario.

Under the F-35A 50 percent scenario, a total of 290 households and 848 people would be exposed to DNL of 65 to 70 dB, an increase of 214 households and 634 people. This increase would be due to the general increase in length of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-35A on departures. Table 4-7 reflects an increase of 59 additional households and 168 people that would be exposed to 70 to 75 dB DNL and 3 additional households and 8 additional people that would be exposed to 75 to 80 dB DNL under the F-35A 50 percent scenario.

Under the F-35A 95 percent scenario, a total of 292 households and 853 people would be exposed to DNL of 65 to 70 dB, an increase of 216 households and 639 people. This increase would be due to the general increase in length of the 65 dB DNL contour caused by the increase in operations and the greater noise generated by the F-35A on departures. Table 4-7 reflects an increase of 55 additional households and 154 people that would be exposed to 70 to 75 dB DNL and 14 additional households and 44 additional people that would be exposed to 75 to 80 dB DNL under the F-35A 95 percent scenario.

4.1.2.3 Classroom Learning Interference

Although classroom learning interference analysis only applies to the 13 school POIs, Table 4-8 presents $L_{eq(8hr)}$ for all 38 POIs because smaller daycare centers and learning facilities may exist at or near residential areas that may find the information useful. Under all F-15EX and F-35A scenarios, the number of school type POIs exposed to greater than 60 dB $L_{eq(8hr)}$ would be 4, an increase of 1 POI from existing conditions.

Table 4-8 Classroom Screening Criteria ($L_{eq[8hr]}$) for POIs in the Vicinity of BAF

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	55	56 (+1)	55 (0)	61 (+6)	61 (+6)	61 (+6)
BA-C-02	Tract 8128	47	49 (+2)	50 (+3)	50 (+3)	50 (+3)	51 (+4)
BA-C-03	Tract 8125	**77**	**80 (+3)**	**81 (+4)**	**78 (+1)**	**79 (+2)**	**80 (+3)**
BA-C-04	Tract 8124.01	50	50 (0)	49 (-1)	55 (+5)	55 (+5)	56 (+6)
BA-C-05	Tract 8129.01	45	47 (+2)	47 (+2)	49 (+4)	49 (+4)	50 (+5)
BA-C-06	Tract 8127.02	53	54 (+1)	53 (0)	58 (+5)	58 (+5)	58 (+5)
BA-C-07	Tract 8127.01	48	50 (+2)	49 (+1)	52 (+4)	52 (+4)	52 (+4)
BA-H-01	Western Massachusetts Hospital	48	50 (+2)	50 (+2)	52 (+4)	52 (+4)	52 (+4)
BA-H-02	Baystate Noble Hospital	47	49 (+2)	49 (+2)	51 (+4)	51 (+4)	51 (+4)
BA-R-01	Highway 202 and Jaeger Drive	**65**	**70 (+5)**	**69 (+4)**	**72 (+7)**	**72 (+7)**	**72 (+7)**
BA-R-02	Highway 202 near Old Stage Road	**72**	**79 (+7)**	**76 (+4)**	**80 (+8)**	**80 (+8)**	**80 (+8)**
BA-R-03	Palma Lane and Old Stage Road	**68**	**72 (+4)**	**70 (+2)**	**75 (+7)**	**75 (+7)**	**75 (+7)**
BA-R-04	Buck Pond Road	**69**	**74 (+5)**	**73 (+4)**	**76 (+7)**	**76 (+7)**	**76 (+7)**
BA-R-05	Rider Road	**64**	**69 (+5)**	**68 (+4)**	**70 (+6)**	**71 (+7)**	**71 (+7)**
BA-R-06	Beccari Lane and Aimee Avenue	**60**	**63 (+3)**	**62 (+2)**	**66 (+6)**	**66 (+6)**	**66 (+6)**
BA-R-07	Egleston Road and Highway 202	**68**	**72 (+4)**	**73 (+5)**	**69 (+1)**	**69 (+1)**	**69 (+1)**
BA-R-08	E. Mountain Road and Ridge Trail Road	**62**	**65 (+3)**	**66 (+4)**	**65 (+3)**	**65 (+3)**	**65 (+3)**
BA-R-09	Klondike Avenue Trailer Park	**73**	**76 (+3)**	**78 (+5)**	**71 (-2)**	**71 (-2)**	**71 (-2)**
BA-R-10	Springdale Street and Grove Avenue	**69**	**72 (+3)**	**74 (+5)**	**68 (-1)**	**69 (0)**	**69 (0)**
BA-R-11	Stephanie Lane	**66**	**69 (+3)**	**70 (+4)**	**66 (0)**	**67 (+1)**	**68 (+2)**
BA-R-12	Arch Road and Lockhouse Road	57	58 (+1)	58 (+1)	57 (0)	57 (0)	58 (+1)
BA-R-13	Holyoke Road near Dry Bridge Road	**68**	**74 (+6)**	**72 (+4)**	**71 (+3)**	**71 (+3)**	**71 (+3)**
BA-R-14	Cara Lane and Holyoke Road	59	**63 (+4)**	**63 (+4)**	**60 (+1)**	**61 (+2)**	**61 (+2)**
BA-R-15	The Moseley Apartments	53	56 (+3)	55 (+2)	56 (+3)	56 (+3)	56 (+3)
BA-R-16	Powermill Village Apartments	56	**60 (+4)**	59 (+3)	**61 (+5)**	**61 (+5)**	**61 (+5)**

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-S-01	White Oak School	57	**61 (+4)**	**61 (+4)**	**61 (+4)**	**61 (+4)**	**61 (+4)**
BA-S-02	Roots Learning Center	**60**	**63 (+3)**	**63 (+3)**	**66 (+6)**	**66 (+6)**	**66 (+6)**
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	**67**	**70 (+3)**	**72 (+5)**	**66 (-1)**	**67 (0)**	**67 (0)**
BA-S-04	Westfield High School	52	53 (+1)	54 (+2)	52 (0)	53 (+1)	54 (+2)
BA-S-05	Prospect Hill School	51	53 (+2)	54 (+3)	55 (+4)	56 (+5)	57 (+6)
BA-S-06	Paper Mill Elementary School	**62**	**66 (+4)**	**66 (+4)**	**61 (-1)**	**61 (-1)**	**62 (0)**
BA-S-07	Growing Tree Learning Center	44	45 (+1)	45 (+1)	47 (+3)	47 (+3)	47 (+3)
BA-S-08	Franklin Avenue Elementary School	49	51 (+2)	51 (+2)	52 (+3)	52 (+3)	52 (+3)
BA-S-09	St. Mary's Elementary School	52	54 (+2)	54 (+2)	57 (+5)	57 (+5)	57 (+5)
BA-S-10	Westfield Technical Academy	47	49 (+2)	49 (+2)	51 (+4)	51 (+4)	51 (+4)
BA-S-11	Fort Meadow Early Childhood Center	52	53 (+1)	53 (+1)	57 (+5)	57 (+5)	57 (+5)
BA-S-12	Highland Elementary School	45	47 (+2)	47 (+2)	49 (+4)	49 (+4)	49 (+4)
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	48	50 (+2)	50 (+2)	53 (+5)	53 (+5)	53 (+5)
Number of School POIs greater than 60 dB $L_{eq(8hr)}$		3	4	4	4	4	4

Notes: [1]Global for table: assumes 90 percent of ANG daytime operations occur during the school day; Windows open condition with NLR of 15 dB due to building attenuation.
[2]Parenthetical number represents the change to $L_{eq(8hr)}$ relative to existing conditions.
Legend: ID = Identification.

Table 4-9 presents the average number of speech interfering events per school day hour from BAF aircraft operations. Both F-15EX scenarios would result in 1 additional event per hour at 2 school POIs and no change at the remaining 11 school POIs. All three F-35A scenarios would result in 1 additional event per hour at 3 school POIs, but the 5 percent scenario would result in 3 of the other school POIs experiencing a decrease of 1 event and both the 50 and 95 percent scenarios would result in 1 of the other school POIs experiencing a decrease of 1 event. The reason for the larger number of POIs that would experience a decrease for the F-35A 5 percent scenario would be because those POIs are located to the southeast of BAF in an area where the overall reduction in afterburner departures under this scenario (in favor of quieter military departures) would cause a more pronounced decrease in noise impacts.

Table 4-9 Classroom Speech Interfering Events per School Day Hour in the Vicinity of BAF

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	1	1 (0)	1 (0)	2 (+1)	2 (+1)	2 (+1)
BA-C-02	Tract 8128	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-C-03	Tract 8125	2	2 (0)	2 (0)	3 (+1)	3 (+1)	3 (+1)
BA-C-04	Tract 8124.01	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-C-05	Tract 8129.01	1	1 (0)	1 (0)	0 (-1)	1 (0)	1 (0)
BA-C-06	Tract 8127.02	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-C-07	Tract 8127.01	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-H-01	Western Massachusetts Hospital	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-H-02	Baystate Noble Hospital	1	1 (0)	1 (0)	0 (-1)	1 (0)	1 (0)
BA-R-01	Highway 202 and Jaeger Drive	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-02	Highway 202 near Old Stage Road	3	4 (+1)	4 (+1)	4 (+1)	4 (+1)	4 (+1)
BA-R-03	Palma Lane and Old Stage Road	2	3 (+1)	3 (+1)	3 (+1)	3 (+1)	3 (+1)

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-R-04	Buck Pond Road	2	3 (+1)	3 (+1)	3 (+1)	3 (+1)	3 (+1)
BA-R-05	Rider Road	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-06	Beccari Lane and Aimee Avenue	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-07	Egleston Road and Highway 202	2	2 (0)	2 (0)	3 (+1)	3 (+1)	3 (+1)
BA-R-08	E. Mountain Road and Ridge Trail Road	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-09	Klondike Avenue Trailer Park	2	2 (0)	2 (0)	2 (0)	2 (0)	2 (0)
BA-R-10	Springdale Street and Grove Avenue	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-11	Stephanie Lane	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-12	Arch Road and Lockhouse Road	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-R-13	Holyoke Road near Dry Bridge Road	3	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)
BA-R-14	Cara Lane and Holyoke Road	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-R-15	The Moseley Apartments	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-R-16	Powermill Village Apartments	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-S-01	White Oak School	1	1 (0)	1 (0)	2 (+1)	2 (+1)	2 (+1)
BA-S-02	Roots Learning Center	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	1	2 (+1)	2 (+1)	2 (+1)	2 (+1)	2 (+1)
BA-S-04	Westfield High School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-05	Prospect Hill School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-06	Paper Mill Elementary School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-07	Growing Tree Learning Center	1	1 (0)	1 (0)	0 (-1)	0 (-1)	0 (-1)
BA-S-08	Franklin Avenue Elementary School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-09	St. Mary's Elementary School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-10	Westfield Technical Academy	1	1 (0)	1 (0)	0 (-1)	1 (0)	1 (0)
BA-S-11	Fort Meadow Early Childhood Center	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
BA-S-12	Highland Elementary School	1	1 (0)	1 (0)	0 (-1)	1 (0)	1 (0)
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)

Notes: [1]Assumes 90 percent of ANG daytime operations occur during the school day; Windows open condition with NLR of 15 dB due to building attenuation.
[2]Parenthetical represents the change to average number of classroom speech interfering events per hour relative to existing conditions.

Legend: ID = Identification.

Table 4-10 presents the estimated time in minutes during an average school day that interior noise levels would be above an interior level of 50 dB. Under the F-15EX 50 percent scenario, 5 school POIs would experience no change to time above and 8 would experience an increase ranging from 1 to 3 additional minutes per average day. Under the F-15EX 80 percent scenario, 3 school POIs would experience no change to time above and 10 would experience an increase ranging from 1 to 5 additional minutes per average day. Under both the F-35A 5 and 50 percent scenarios, 3 school POIs would experience either no change or a decrease to time above and 10 would experience an increase ranging from 1 to 6 additional minutes per average day. Under the F-35A 95 percent scenario, 2 school POIs would experience either no change or a decrease to time above and 11 would experience an increase ranging from 1 to 6 additional minutes per average day.

Table 4-10 Classroom Time Above Interior 50 dB during 8-hour School Day in the Vicinity of BAF

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	4	4 (0)	4 (0)	8 (+4)	7 (+3)	7 (+3)
BA-C-02	Tract 8128	3	5 (+2)	6 (+3)	4 (+1)	4 (+1)	3 (0)
BA-C-03	Tract 8125	5	9 (+4)	11 (+6)	7 (+2)	7 (+2)	7 (+2)
BA-C-04	Tract 8124.01	3	4 (+1)	5 (+2)	7 (+4)	7 (+4)	7 (+4)
BA-C-05	Tract 8129.01	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA-C-06	Tract 8127.02	0	1 (+1)	1 (+1)	7 (+7)	6 (+6)	6 (+6)
BA-C-07	Tract 8127.01	0	0 (0)	0 (0)	2 (+2)	2 (+2)	2 (+2)
BA-H-01	Western Massachusetts Hospital	2	4 (+2)	4 (+2)	8 (+6)	7 (+5)	7 (+5)
BA-H-02	Baystate Noble Hospital	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA-R-01	Highway 202 and Jaeger Drive	7	12 (+5)	16 (+9)	8 (+1)	8 (+1)	8 (+1)
BA-R-02	Highway 202 near Old Stage Road	7	9 (+2)	10 (+3)	10 (+3)	10 (+3)	9 (+2)
BA-R-03	Palma Lane and Old Stage Road	5	8 (+3)	8 (+3)	8 (+3)	8 (+3)	8 (+3)
BA-R-04	Buck Pond Road	11	16 (+5)	18 (+7)	10 (-1)	11 (0)	11 (0)
BA-R-05	Rider Road	9	13 (+4)	15 (+6)	9 (0)	9 (0)	9 (0)
BA-R-06	Beccari Lane and Aimee Avenue	4	7 (+3)	9 (+5)	6 (+2)	6 (+2)	6 (+2)
BA-R-07	Egleston Road and Highway 202	5	7 (+2)	8 (+3)	4 (-1)	4 (-1)	5 (0)
BA-R-08	E. Mountain Road and Ridge Trail Road	5	8 (+3)	9 (+4)	11 (+6)	9 (+4)	7 (+2)
BA-R-09	Klondike Avenue Trailer Park	5	9 (+4)	11 (+6)	4 (-1)	4 (-1)	4 (-1)
BA-R-10	Springdale Street and Grove Avenue	5	9 (+4)	11 (+6)	5 (0)	7 (+2)	8 (+3)
BA-R-11	Stephanie Lane	5	8 (+3)	9 (+4)	4 (-1)	5 (0)	6 (+1)
BA-R-12	Arch Road and Lockhouse Road	2	5 (+3)	7 (+5)	8 (+6)	7 (+5)	6 (+4)
BA-R-13	Holyoke Road near Dry Bridge Road	6	5 (-1)	6 (0)	11 (+5)	10 (+4)	10 (+4)
BA-R-14	Cara Lane and Holyoke Road	6	8 (+2)	9 (+3)	9 (+3)	9 (+3)	9 (+3)
BA-R-15	The Moseley Apartments	2	4 (+2)	3 (+1)	8 (+6)	7 (+5)	7 (+5)
BA-R-16	Powermill Village Apartments	2	4 (+2)	3 (+1)	8 (+6)	8 (+6)	8 (+6)
BA-S-01	White Oak School	4	6 (+2)	8 (+4)	6 (+2)	6 (+2)	6 (+2)
BA-S-02	Roots Learning Center	4	7 (+3)	9 (+5)	6 (+2)	5 (+1)	5 (+1)
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	4	7 (+3)	9 (+5)	3 (-1)	4 (0)	5 (+1)
BA-S-04	Westfield High School	2	5 (+3)	7 (+5)	8 (+6)	6 (+4)	4 (+2)
BA-S-05	Prospect Hill School	2	5 (+3)	6 (+4)	8 (+6)	8 (+6)	8 (+6)
BA-S-06	Paper Mill Elementary School	4	6 (+2)	7 (+3)	8 (+4)	8 (+4)	8 (+4)
BA-S-07	Growing Tree Learning Center	1	1 (0)	1 (0)	0 (-1)	0 (-1)	0 (-1)
BA-S-08	Franklin Avenue Elementary School	2	3 (+1)	4 (+2)	5 (+3)	4 (+2)	4 (+2)
BA-S-09	St. Mary's Elementary School	2	4 (+2)	5 (+3)	7 (+5)	7 (+5)	6 (+4)
BA-S-10	Westfield Technical Academy	0	0 (0)	0 (0)	1 (+1)	1 (+1)	1 (+1)
BA-S-11	Fort Meadow Early Childhood Center	0	0 (0)	1 (+1)	6 (+6)	6 (+6)	6 (+6)
BA-S-12	Highland Elementary School	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	0	0 (0)	1 (+1)	4 (+4)	4 (+4)	3 (+3)

Notes: [1]Assumes 90 percent of ANG daytime operations occur during the school day;
Windows open condition with NLR of 15 dB due to building attenuation.
[2]Parenthetical represents the change to time above 50 dB, in minutes, relative to existing conditions.

Legend: dB = decibel; ID = Identification.

4.1.2.4 Non-school Speech Interference

Table 4-11 details the number of speech interfering events during the DNL daytime (7 a.m. to 10 p.m. [0700 to 2200]) per average day for both windows open and windows closed conditions. Under the F-15EX 50 percent scenario, the number of daytime events would be none at 7 POIs for windows open and none at 18 POIs for windows closed. Events would range from 1 to 3 at the remaining POIs for either condition. Under the F-15EX 80 percent scenario, the number of daytime events would be none at 13 POIs for windows closed. Events would range from 1 to 3 at the remaining POIs for either condition. Under the F-35A 5 percent scenario, the number of daytime events would be none at 5 POIs for windows open and none at 15 POIs for windows closed. Events would range from 1 to 4 at the remaining POIs for either condition. Under both the F-35A 50 and 95 percent scenarios, the number of daytime events would be none at 1 POI for windows open and none at 13 POIs for windows closed. Events would range from 1 to 4 at the remaining POIs for either condition.

Table 4-11 Non-School Speech Interfering Events per Day During DNL Daytime in the Vicinity of BAF

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	1 / 0	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
BA-C-02	Tract 8128	0 / 0	1 / 0	1 / 0	1 / 1	1 / 1	1 / 1
BA-C-03	Tract 8125	2 / 1	2 / 1	2 / 1	3 / 1	3 / 1	3 / 1
BA-C-04	Tract 8124.01	1 / 0	1 / 0	1 / 0	1 / 1	1 / 1	1 / 1
BA-C-05	Tract 8129.01	1 / 0	0 / 0	1 / 0	0 / 0	1 / 0	1 / 0
BA-C-06	Tract 8127.02	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0
BA-C-07	Tract 8127.01	1 / 0	0 / 0	1 / 0	1 / 0	1 / 0	1 / 0
BA-H-01	Western Massachusetts Hospital	1 / 0	1 / 0	1 / 0	1 / 1	1 / 1	1 / 1
BA-H-02	Baystate Noble Hospital	1 / 0	0 / 0	1 / 0	0 / 0	1 / 0	1 / 0
BA-R-01	Highway 202 and Jaeger Drive	1 / 1	1 / 1	1 / 1	2 / 2	2 / 2	2 / 2
BA-R-02	Highway 202 near Old Stage Road	3 / 2	3 / 2	3 / 2	4 / 2	4 / 2	4 / 2
BA-R-03	Palma Lane and Old Stage Road	2 / 1	2 / 1	2 / 1	3 / 2	3 / 2	3 / 2
BA-R-04	Buck Pond Road	2 / 2	2 / 2	2 / 2	3 / 2	3 / 2	3 / 2
BA-R-05	Rider Road	1 / 0	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-R-06	Beccari Lane and Aimee Avenue	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
BA-R-07	Egleston Road and Highway 202	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
BA-R-08	E. Mountain Road and Ridge Trail Road	1 / 0	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-R-09	Klondike Avenue Trailer Park	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
BA-R-10	Springdale Street and Grove Avenue	1 / 1	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-R-11	Stephanie Lane	1 / 1	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-R-12	Arch Road and Lockhouse Road	1 / 0	1 / 0	1 / 1	1 / 0	1 / 1	1 / 1
BA-R-13	Holyoke Road near Dry Bridge Road	3 / 1	3 / 1	3 / 1	4 / 2	4 / 2	4 / 2
BA-R-14	Cara Lane and Holyoke Road	1 / 0	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-R-15	The Moseley Apartments	1 / 0	1 / 0	1 / 1	1 / 0	1 / 0	1 / 0
BA-R-16	Powermill Village Apartments	1 / 0	1 / 1	1 / 1	1 / 0	1 / 1	1 / 1
BA-S-01	White Oak School	1 / 1	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-S-02	Roots Learning Center	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	1 / 0	1 / 1	1 / 1	2 / 1	2 / 1	2 / 1
BA-S-04	Westfield High School	1 / 0	1 / 0	1 / 1	1 / 1	1 / 1	1 / 1
BA-S-05	Prospect Hill School	0 / 0	1 / 0	1 / 1	1 / 0	1 / 0	1 / 0

ID	*Location*	*Existing Conditions /No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-S-06	Paper Mill Elementary School	1 / 0	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
BA-S-07	Growing Tree Learning Center	1 / 0	0 / 0	1 / 0	0 / 0	0 / 0	0 / 0
BA-S-08	Franklin Avenue Elementary School	0 / 0	0 / 0	1 / 0	1 / 0	1 / 0	1 / 0
BA-S-09	St. Mary's Elementary School	0 / 0	1 / 0	1 / 1	1 / 0	1 / 0	1 / 0
BA-S-10	Westfield Technical Academy	1 / 0	0 / 0	1 / 0	0 / 0	1 / 0	1 / 0
BA-S-11	Fort Meadow Early Childhood Center	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0
BA-S-12	Highland Elementary School	1 / 0	0 / 0	1 / 0	0 / 0	1 / 0	1 / 0
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0	1 / 0

Note: [1]Values represent events for conditions with windows open / windows closed,
Legend: ID = Identification.

4.1.2.5 Probability of Awakening

Table 4-12 presents the existing estimated PA and the change that would occur under each of the proposed scenarios. The F-15EX 50 percent scenario would result in a 1 percent increase in PA at 3 POIs for windows open and 1 POI for windows closed. The F-15EX 80 percent scenario would result in a 1 percent increase in PA at 1 POI for windows open and 3 POIs for windows closed. The F-35A 5 percent scenario would result in a 1 percent increase in PA at 3 POIs for windows open and 2 POIs for windows closed. The F-35A 50 percent scenario would result in a 1 percent increase in PA at 2 POIs for windows open and 3 POIs for windows closed. The F-35A 95 percent scenario would result in a 1 percent increase in PA at 3 POIs for windows open and 4 POIs for windows closed. The generally small increase in PA would be due to the small percent of 104 FW aircraft that would operate during the DNL nighttime.

Table 4-12 Estimated Change to Probability of Awakening Relative to Existing Conditions in the Vicinity of BAF

ID	*Location*	*Existing Conditions PA*	*Change Relative to Existing Conditions/ No Action Alternative*				
			F-15EX 50% AB	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-C-02	Tract 8128	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-C-03	Tract 8125	1% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-C-04	Tract 8124.01	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-C-05	Tract 8129.01	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-C-06	Tract 8127.02	<1% / <1%	+1 / +1	+1 / +1	+1 / +1	+1 / +1	+1 / +1
BA-C-07	Tract 8127.01	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-H-01	Western Massachusetts Hospital	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-H-02	Baystate Noble Hospital	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-01	Highway 202 and Jaeger Drive	1% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-02	Highway 202 near Old Stage Road	4% / 3%	+1 / 0	0 / +1	+1 / 0	0 / +1	+1 / 0
BA-R-03	Palma Lane and Old Stage Road	4% / 2%	0 / 0	0 / 0	0 / 0	0 / 0	0 / +1
BA-R-04	Buck Pond Road	5% / 3%	+1 / 0	0 / +1	+1 / 0	0 / +1	+1 / +1
BA-R-05	Rider Road	1 / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-06	Beccari Lane and Aimee Avenue	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-07	Egleston Road and Highway 202	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-08	E. Mountain Road and Ridge Trail Road	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-09	Klondike Avenue Trailer Park	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

ID	*Location*	*Existing Conditions PA*	*Change Relative to Existing Conditions/ No Action Alternative*				
			F-15EX 50% AB	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-R-10	Springdale Street and Grove Avenue	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-11	Stephanie Lane	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-12	Arch Road and Lockhouse Road	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-13	Holyoke Road near Dry Bridge Road	7% / 4%	0 / 0	0 / 0	0 / +1	+1 / 0	0 / +1
BA-R-14	Cara Lane and Holyoke Road	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-15	The Moseley Apartments	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-R-16	Powermill Village Apartments	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-01	White Oak School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-02	Roots Learning Center	1 / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	2% / 1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-04	Westfield High School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-05	Prospect Hill School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-06	Paper Mill Elementary School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-07	Growing Tree Learning Center	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-08	Franklin Avenue Elementary School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-09	St. Mary's Elementary School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-10	Westfield Technical Academy	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-11	Fort Meadow Early Childhood Center	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-12	Highland Elementary School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	<1% / <1%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
POIs with no change			35 / 37	37 / 35	35 / 36	36 / 35	35 / 34
POIs with increase of 1 percent or greater			3 / 1	1 / 3	3 / 2	2 / 3	3 / 4

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.

Legend: < = less than; BAF = Westfield-Barnes Regional Airport; ID = Identification; PA = Probability of Awakening.

4.1.2.6 Potential for Hearing Loss

Each of the proposed scenarios would result in off-airport acreage exposed to 80 dB DNL, the screening threshold for PHL. Therefore, Figures 4-12 through 4-16 present $L_{eq(24hr)}$ for each proposed scenario in 1 dB increments for areas within the 80 dB DNL screening area and outside of airport property to determine if any residents or people would be at risk of hearing loss. In each of the F-15EX and F-35A scenarios, the 80 dB DNL contours (and various levels of $L_{eq(24hr)}$) would extend beyond BAF property to the west and east adjacent to Runway 02/20 by several hundred feet. The land in these areas is either open space or industrial, which are compatible with these noise levels so no additional PHL analysis is applicable.

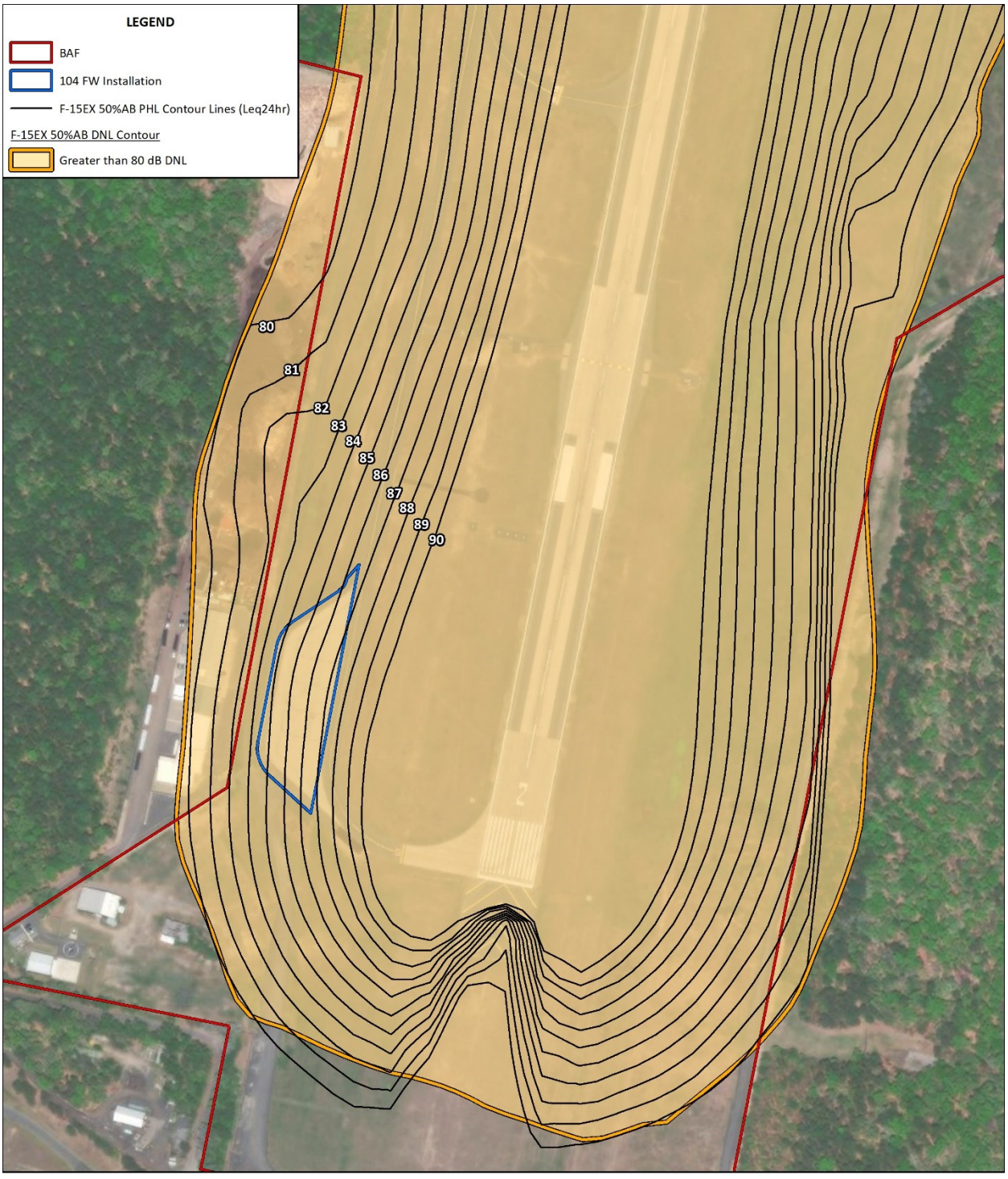

Figure 4-12 F-15EX 50 Percent Afterburner Scenario – Potential for Hearing Loss

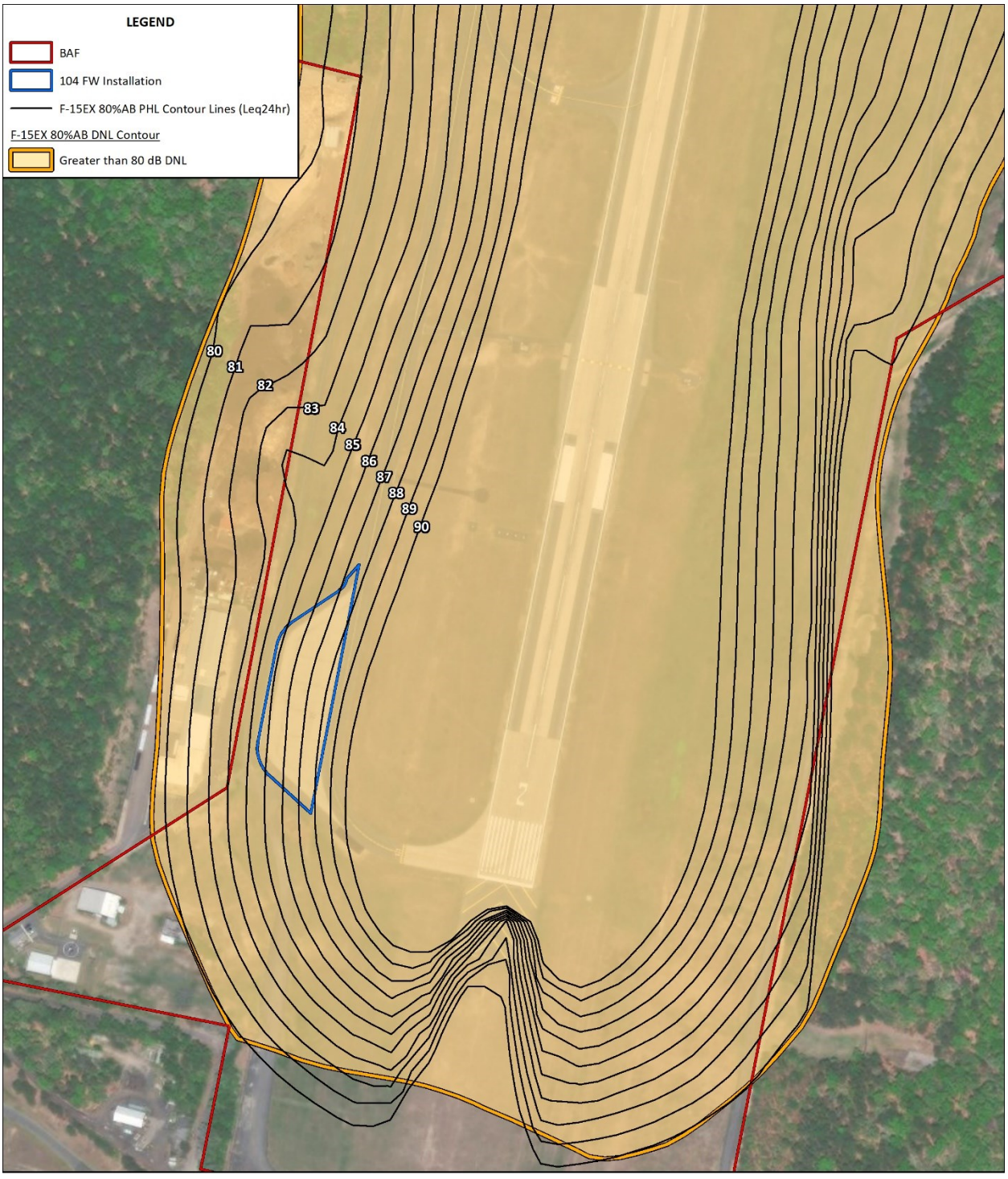

Figure 4-13 F-15EX 80 Percent Afterburner Scenario – Potential for Hearing Loss

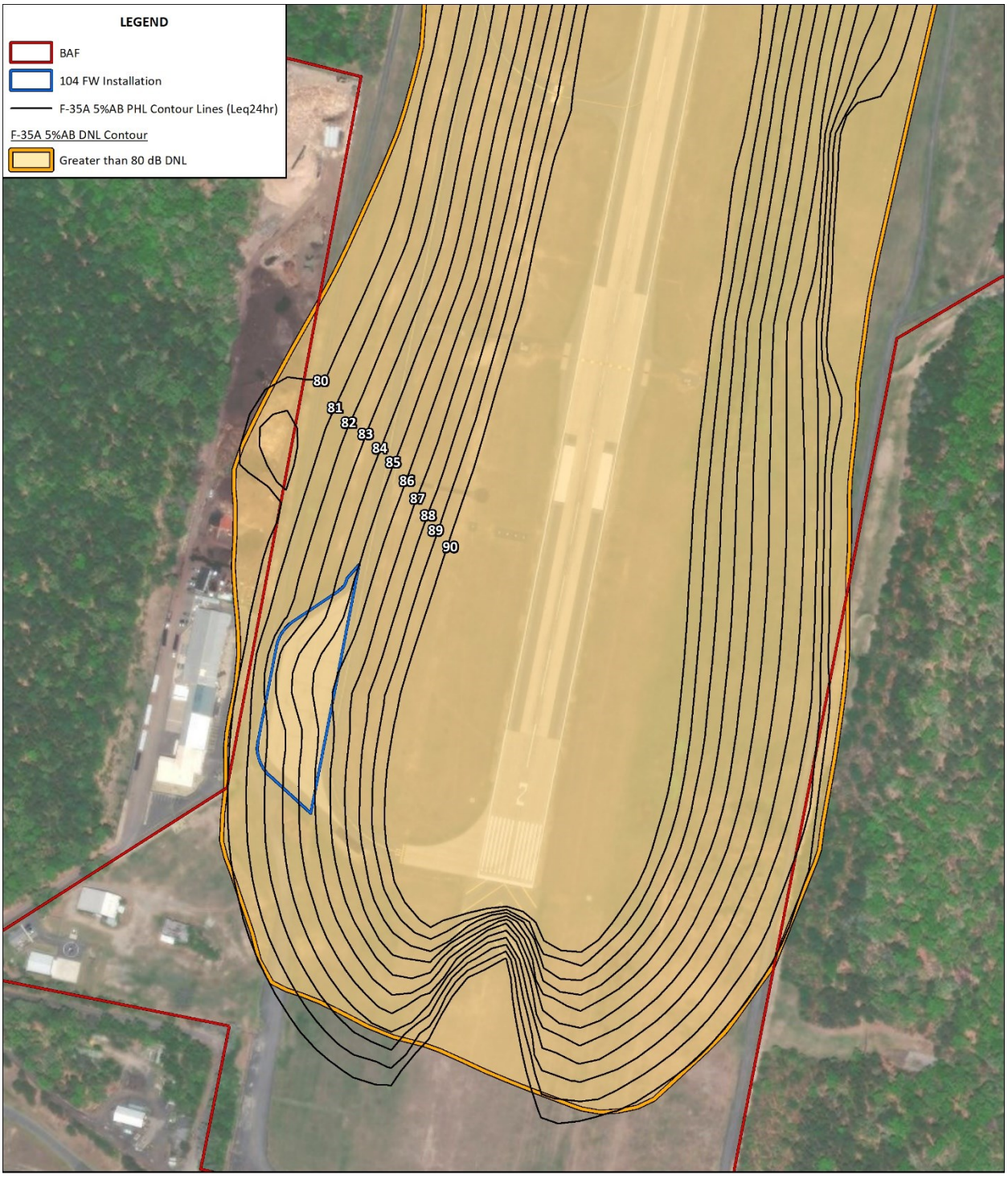

Figure 4-14 F-35A 5 Percent Afterburner Scenario – Potential for Hearing Loss

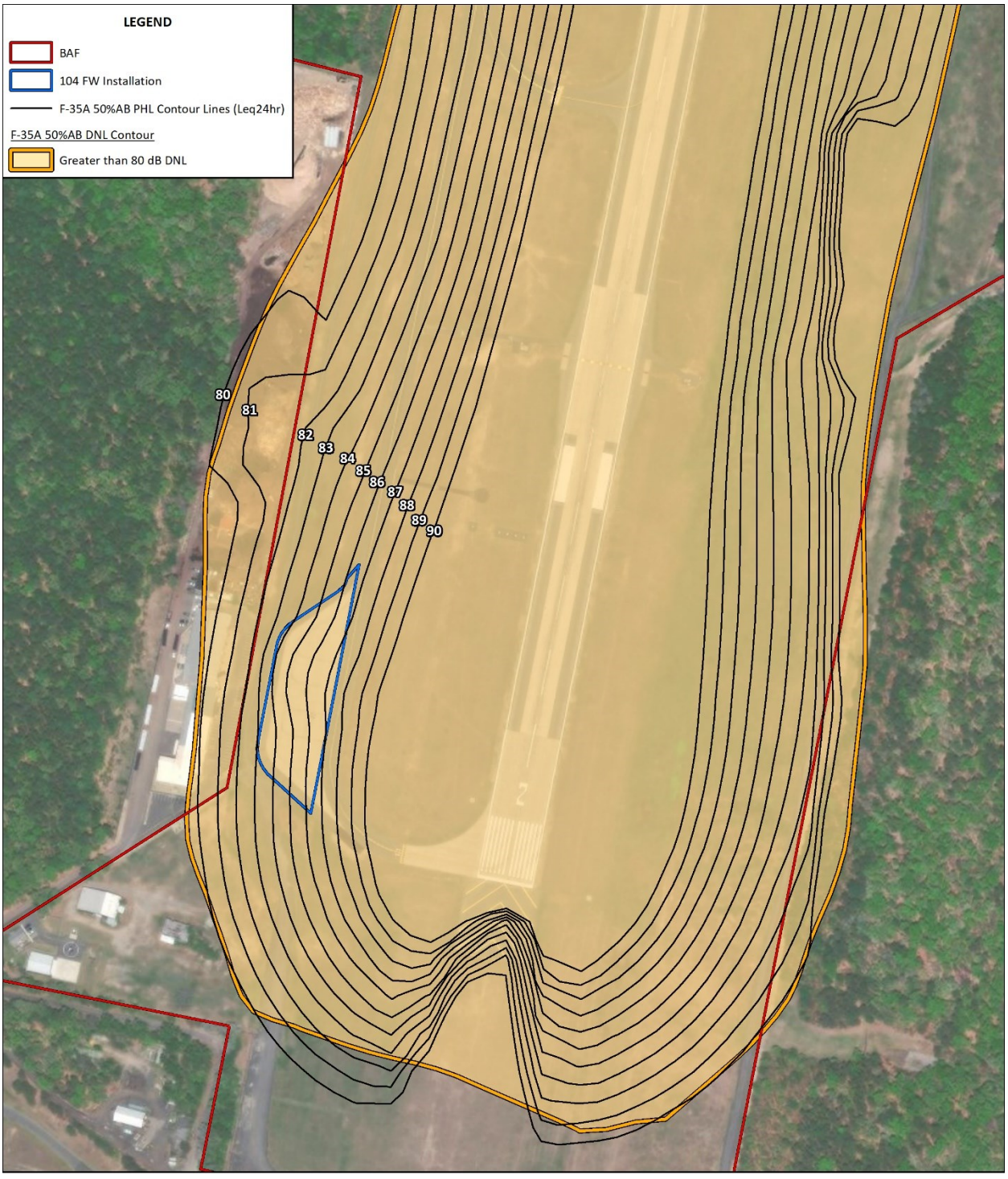

Figure 4-15 F-35A 50 Percent Afterburner Scenario – Potential for Hearing Loss

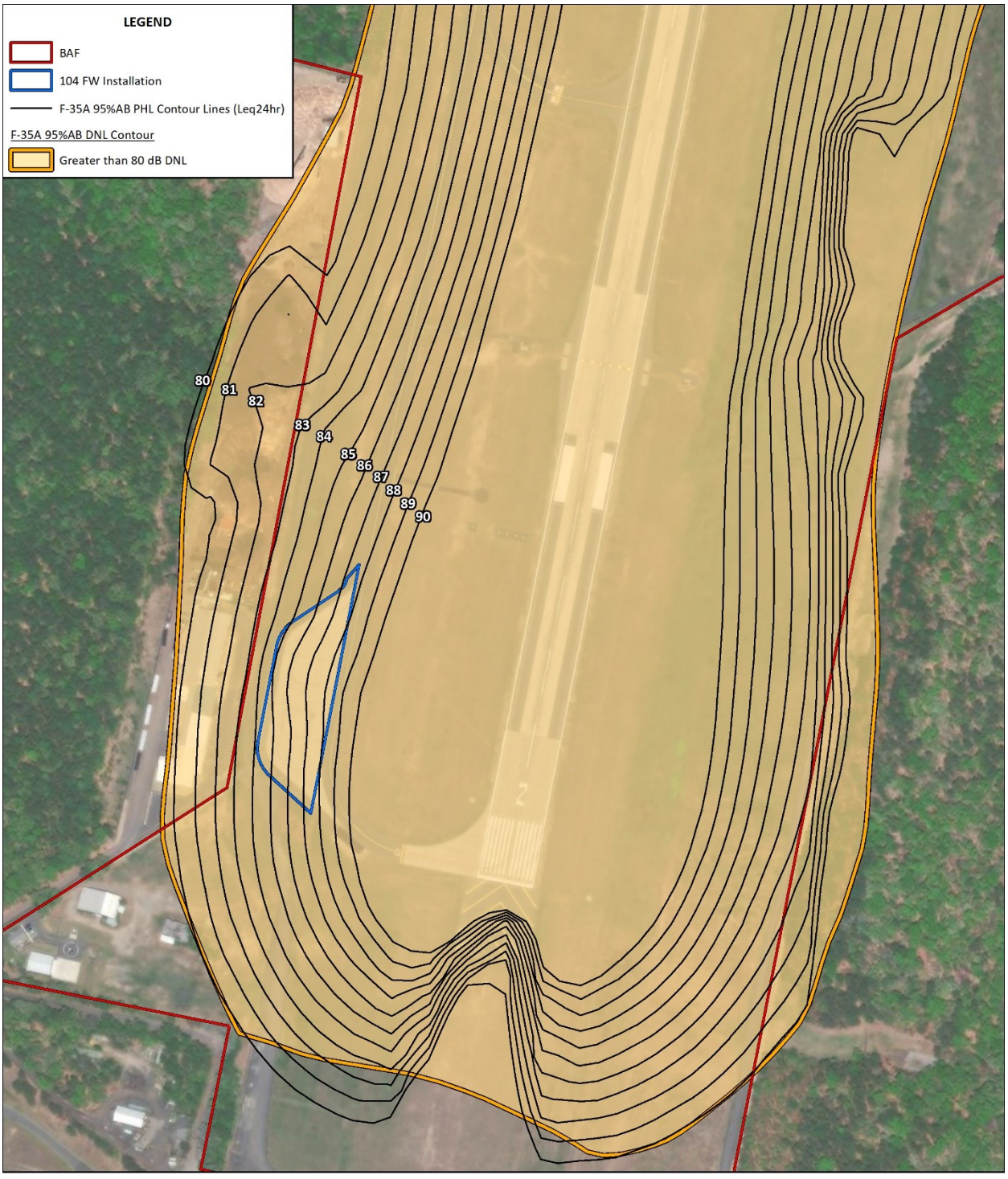

Figure 4-16 F-35A 95 Percent Afterburner Scenario – Potential for Hearing Loss

4.1.2.7 FAA Order 1050.1F Airfield Impact Analysis

Because the FAA, a cooperating agency, applies differing significance criteria for noise impact analysis, this section presents analysis results that support the two proposed alternatives presented in the EIS. FAA Order 1050.1F defines an action as significant if it "would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe." Additionally, FAA Order 1050.1F requires disclosure of noise sensitive areas that would be exposed "to aircraft noise at or above DNL 60 dB but below DNL 65 dB and are projected to experience a noise increase of DNL 3 dB or more, only when DNL 1.5 dB increases are documented within the DNL 65 dB contour." Figures 4-17 and 4-18 depict DNL differences at key thresholds according to FAA guidance described in FAA 1050.1F for each of the proposed scenarios. These results, along with Table 4-13, are included in this analysis to aid in significance determination under FAA criteria.

As shown in Figure 4-17, areas primarily to the east and west of BAF would experience increases in DNL greater than 1.5 dB that would be exposed to 65 dB DNL under the F-15EX 80 percent afterburner alternative at BAF. This would affect 10 noise sensitive locations (BA-R-02, BA-R-03, BA-R-04, BA-R-07, BA-R-09, BA-R-10, BA-R-11, BA-R-13, BA-C-03, and BA-S-03) that would be considered under FAA 1050.1F guidelines to experience a significant noise impact (a 1.5 dB increase to DNL for either currently exposed or newly exposed to DNL 65 dB). Five noise sensitive locations (BA-R-01, BA-R-05, BA-R-08, BA-R-14, BA-S-06) that would be exposed to DNL between 60 and 65 dB would experience reportable increases of 3 dB or greater in DNL from existing conditions.

As shown in Figure 4-18, areas to the north and south of BAF would experience increases in DNL greater than 1.5 dB that would be exposed to 65 dB DNL under the F-35A 5 percent afterburner alternative at BAF. This would affect 6 noise sensitive locations (BA-R-01, BA-R-02, BA-R-03, BA-R-04, BA-R-05, and BA-R-13) that would be considered under FAA 1050.1F guidelines to experience a significant noise impact. Three noise sensitive locations (BA-R-06, BA-R-08, and BA-S-02) that would be exposed to DNL between 60 and 65 dB would experience reportable increases of 3 dB or greater in DNL from existing conditions.

Because the residential POI, denoted with '-R-,' represent a neighborhood of multiple residential properties, Table 4-13 quantifies the acreage, households, and population that would be affected. A total of 1,389 acres, 304 households, and an estimated 852 people would be exposed to greater than 65 dB DNL under the F-15EX 80 percent alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the existing conditions, which the FAA criteria would classify as a significant impact. A total of 2,070 acres, 621 households, and an estimated 1,811 people would be exposed to DNL between 60 and 65 dB under the F-15EX 80 percent afterburner alternative while experiencing an increase of 3 dB or greater in DNL relative to the existing conditions, which the FAA criteria would classify as a reportable change in noise exposure.

A total of 2,283 acres, 429 households, and an estimated 1,212 people would be exposed to greater than 65 dB DNL under the F-35A 5 percent afterburner alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the existing conditions, which the FAA criteria would classify as a significant impact. A total of 3,143 acres, 885 households, and an estimated 2,406 people would be exposed to DNL between 60 and 65 dB under the F-35A alternative while experiencing an increase of 3 dB or greater in DNL relative to the existing conditions, which the FAA criteria would classify as a reportable change in noise exposure.

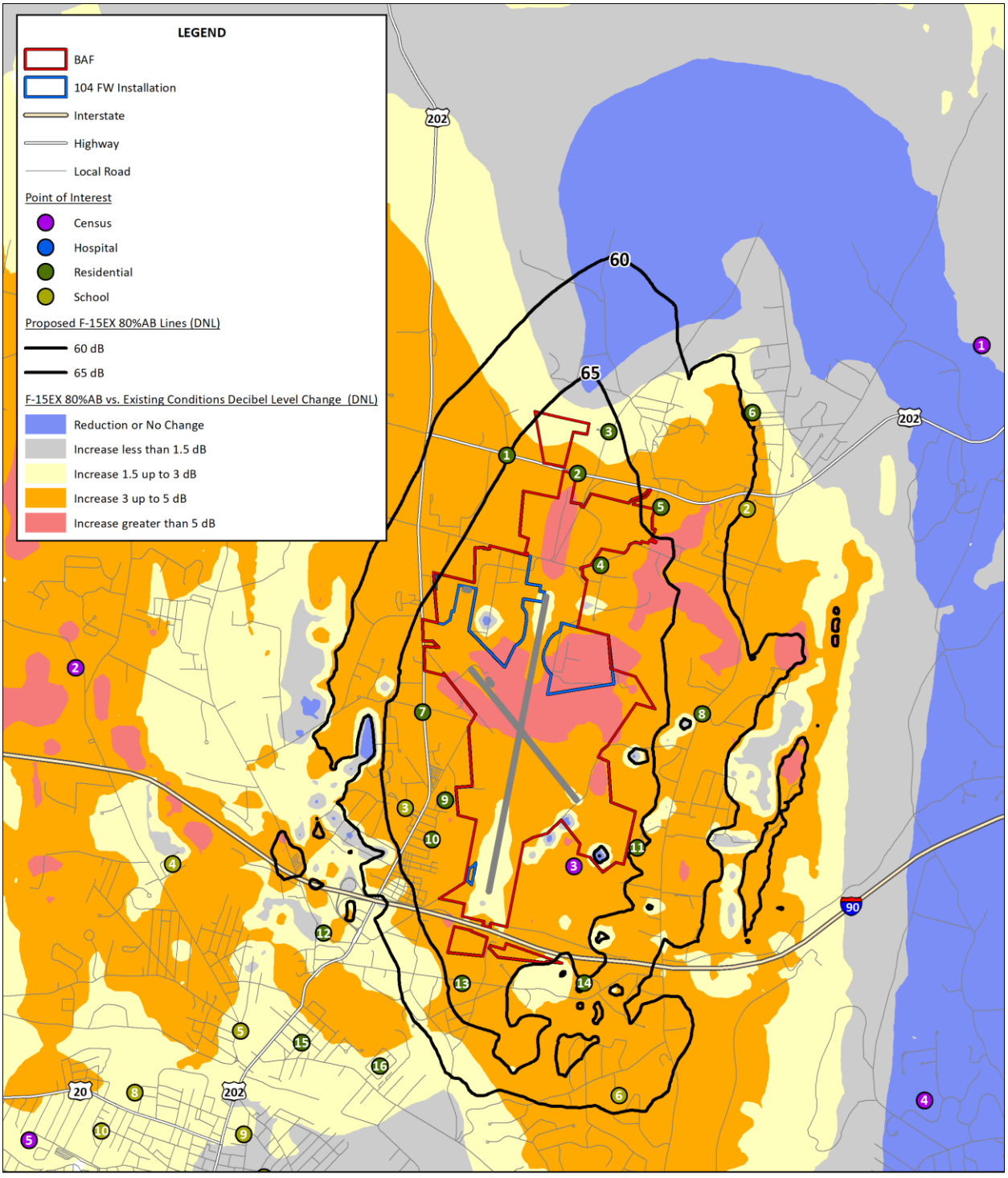

Figure 4-17 F-15EX 80 Percent Scenario Difference Contours Relative to Existing Conditions at BAF for FAA Analysis

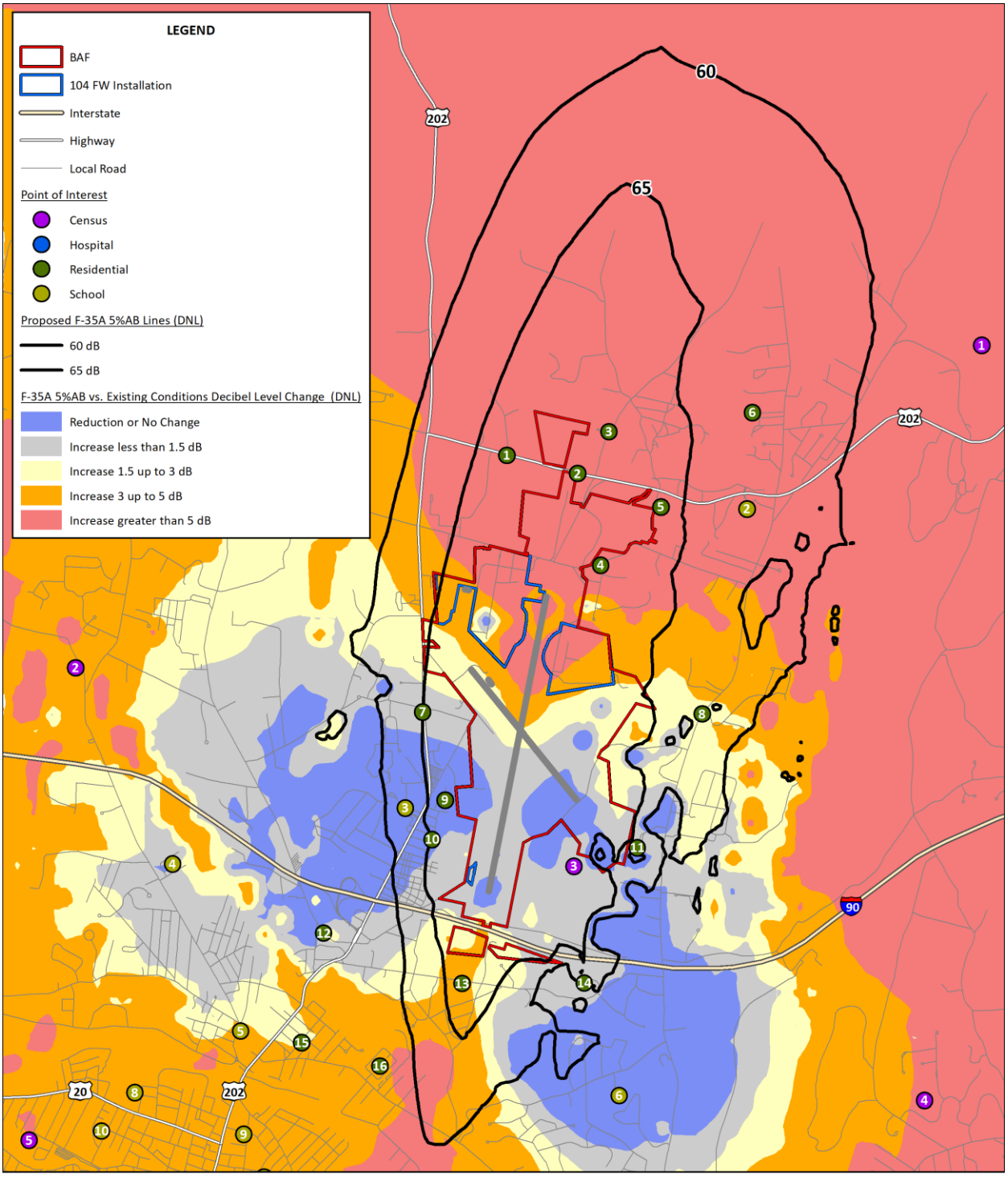

Figure 4-18 F-35A 5 Percent Scenario Difference Contours Relative to Existing Conditions at BAF for FAA Analysis

Table 4-13 FAA DNL Exposure Thresholds Affecting Acreage, Population, and Households Under Proposed Alternatives

Scenario	*FAA Classification*[1]	*Description*	*Acreage*	*Households*	*Population*
F-15EX 80% AB	Significant	+1.5 dB (or higher) Change within 65+ dB DNL	1,389	304	852
	Reportable	+3 dB (or higher) Change within 60–65 dB DNL	2,070	621	1,811
F-35A 5% AB	Significant	+1.5 dB (or higher) Change within 65+ dB DNL	2,283	429	1,212
	Reportable	+3 dB (or higher) Change within 60–65 dB DNL	3,143	885	2,406

Note: [1]FAA 1050.1F Desk *Reference* February 2020.
Legend: % = percent; dB = decibel; DNL = Day-Night Average Sound Level; FAA = Federal Aviation Administration.

4.2 SPECIAL USE AIRSPACE

The following section details the modeling data and the resultant noise exposure for the five proposed afterburner scenarios for aircraft training activity in the 104 FW associated airspace. Under the Proposed Action, either F-15EX or F-35A aircraft would replace the F-15C aircraft of the 104 FW. Because the two F-15EX and the three F-35A afterburner scenarios only differ by afterburner usage rates at BAF, the airspace conditions would be the same for each scenario of the same aircraft types so only one F-15EX and one F-35A condition has been analyzed. Other aircraft type operations would remain unchanged from those described in Section 3.0, *Baseline*.

4.2.1 Modeling Data (Subsonic)

The proposed F-15EX or F-35A aircraft would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, or ATCAA, nor would it alter their normal scheduled times of use. Since SUA scheduled activation times would not change from existing conditions, the impacts to the National Airspace System would be unaffected. Visual flight rules aircraft would still be allowed to exercise their right to transition through MOAs and instrument flight rules aircraft would not experience any extra flight plan deviations because the SUA activation times would remain the same. Air Traffic Control would continue to provide the required separation pertaining to specific aircraft and type in the SUA.

Under the F-15EX and F-35A alternatives, aircraft would conduct up to 3,182 annual sorties, an increase of 67 percent above the 1,900 currently flown by the F-15C. Since air-to-ground ordnance delivery would be impractical when operating from BAF, it is likely that some portion of the training syllabus would have to be flown from other bases. This analysis presents a 'worst-case' for noise impacts, assuming that the entire year of training would occur in the SUA currently used by the 104 FW, with no training deployments elsewhere to achieve training requirements.

The proportion of time for each sortie in the MOA spent between 500 feet AGL and 10,00 feet MSL would not change for either the F-15EX or F-35A aircraft when compared with the existing F-15C. Table 4-14 details the anticipated changes to altitude usage with the largest difference occurring above 18,000 feet MSL where aircraft noise reaching the ground would be negligible.

Table 4-14 Existing Conditions and Proposed MOA Use by Altitude

Altitude (feet)	*Existing Conditions Percentage Use F-15C*	*Proposed Percentage Use F-15EX*	*F-15EX Change from Existing Conditions*	*Proposed Percentage Use F-35A*	*F-35A Change from Existing Conditions*
500–3,000 AGL	1	1	0	1	0
3,000–5,000 AGL	1	1	0	1	0
5,000–10,000 MSL	5	5	0	5	0
10,000 MSL–18,000 MSL	36	38	+2	24	-12
18,000 MSL–30,000 MSL	17	30	+13	58	+41
Above 30,000	40	25	-15	11	-29

Legend: AGL = above ground level; MSL = mean sea level.

4.2.2 Noise Exposure (Subsonic)

Aircraft altitudes, speeds, and power settings vary while operating within the airspace based upon the training exercise. For comparison, Table 4-15 presents single-event noise levels in terms of SEL and L_{max} for the F-15C, F-15EX, and F-35A. In general, the F-15EX would be 2 to 3 dB greater in terms of SEL and 4 to 5 dB greater in L_{max} when compared to the F-15C at times when both aircraft would operate at military power and 400 knots. The F-35A would be 3 to 5 dB greater in terms of SEL and 6 to 8 dB greater in L_{max} when compared to the F-15C at times when both aircraft would operate at military power and 400 knots.

Table 4-15 SEL and L_{max} Comparison for Typical Military Airspace Profiles

Altitude (feet AGL)	*F-15C (PW-220)*		*F-15EX (GE-129)*		*F-35A (PW-100)*	
Metric	*SEL*	*L_{max}*	*SEL*	*L_{max}*	*SEL*	*L_{max}*
500	116	111	119	116	121	119
1,000	111	104	113	109	115	111
2,000	105	97	107	101	108	103
5,000	95	85	98	89	99	91
10,000	86	75	88	79	89	81

Note: All aircraft modeled at military power and 400 knots for comparison.
Legend: AGL = above ground level; L_{max} = Maximum Sound Level; SEL = Sound Exposure Level.
Source: NOISEMAP version 7.3.

Under the two F-15EX scenarios, the F-15EX would replace the existing F-15C. Based on the increase in sorties of 67 percent along with the greater SEL of the F-15EX, L_{dnmr} in each airspace that would be used by the F-15EX could increase up to 5 dB from the existing conditions. The result would be L_{dnmr} ranging from 45 dB on the upper end down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain relatively low. Additionally, the 104 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most aircraft sorties within the SUA would likely not be noticed by any casual observer. For FAA Order 1050.1F impact analysis, the F-15EX scenarios would correspond to DNL of 44 dB or less under the airspace, which would also equate to a 5 dB increase from existing conditions.

Under the three F-35A scenarios, the F-35A would replace the existing F-15C. Based on the increase in sorties of 67 percent along with the greater SEL of the F-35A, L_{dnmr} in each airspace that would be used by the F-35A could increase up to 7 dB above the existing conditions. The result would be L_{dnmr} ranging from 47 dB down to levels below the software's lower limit of prediction. Therefore, L_{dnmr} would remain

relatively low. Additionally, the 104 FW airspace training would remain primarily at higher altitudes (about 93 percent of time above 10,000 feet MSL), and most aircraft sorties within the SUA would likely not be noticed by any casual observer. For FAA Order 1050.1F impact analysis, the F-15EX scenarios would correspond to DNL of 46 dB or less under the airspace, which would as equate to a 7 dB increase from existing conditions.

4.2.3 Modeling Data (Supersonic)

Supersonic flight would primarily be associated with air combat training. Some of these training sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time, which creates a shock wave. Depending on the aircraft's altitude and the local atmospheric conditions, this shock wave can reach the ground, causing a "sonic boom." Higher altitudes and warmer surface temperatures can result in the sonic boom not reaching the surface of the earth. Lower altitudes for supersonic flight and higher speeds (higher Mach numbers) increase the likelihood and intensity of sonic booms.

Supersonic operations for both the F-15EX and F-35A would be in the same airspace as the existing F-15C, but the frequency of supersonic events would increase proportional to the overall increase in sorties. The altitudes and duration for each individual supersonic flight, for either the F-15EX or F-35A scenarios, is expected to remain similar to existing conditions.

4.2.4 Noise Exposure (Supersonic)

BOOMAP96 was developed to analyze supersonic aircraft activity within airspace with little to no limitations on minimum altitudes, which would not be applicable to airspace analyzed in this study with supersonic minimums of 10,000 and 30,000 feet MSL. However, the software can provide an accurate calculation of the relative or change to CDNL that would occur under a proposed action compared to existing conditions, as described below.

Under the F-15EX scenarios, the F-15EX would replace the F-15C for supersonic activity in both the W-105A/B over-water ranges and over-land Viper Complex. The frequency of supersonic activity in these areas would increase by 67 percent from the existing conditions, which would equate to an increase in CDNL of 2 to 3 dB. Although the magnitude of noise generated by each sonic boom depends upon the shape and size of the aircraft, the F-15EX and F-15C aircraft both share the same airframe and would operate similarly during supersonic operations so each supersonic noise event for the F-15EX would be the same as the existing F-15C. Therefore, the overall change to CDNL in W-105A/B and Viper Complex would be up to 3 dB greater than existing conditions due to the increase in supersonic sorties.

Under the F-35A scenarios, the F-35A would replace the F-15C for supersonic activity in both the W-105A/B over-water ranges and over-land Viper Complex. The frequency of supersonic activity in these areas would increase by 67 percent from the existing conditions, which would equate to an increase in CDNL of 2 to 3 dB. The magnitude of noise generated by each sonic boom depends upon the shape and size of the aircraft. Although BOOMAP96 does not include supersonic noise modeling data for the F-35A, noise data for a similar fifth generation fighter, the F-22, suggests that fifth generation fighters generate greater noise levels during supersonic activities than legacy aircraft, like F-15. Given that the dimensions of the F-35A are approximately 20 percent smaller than the F-22, noise levels due to the F-35A are estimated to fall between the F-22 and legacy aircraft like F-15. Using BOOMAP96, a midpoint value between the F-15 and F-22 would result in CDNL for the F-35A estimated to be approximately 4 to 5 dB

greater than the F-15C under existing conditions. Therefore, the overall change to CDNL in W-105A/B and Viper Complex under the F-35A scenarios would be up to 7 dB greater than existing conditions due to a combination of the increase in supersonic sorties and different aircraft characteristics of the F-35A.

5.0 NO ACTION ALTERNATIVE

Under the No Action Alternative, noise levels and exposure would be identical as described within Section 3.0, *Existing Conditions* for both BAF aircraft operations and SUA training. F-15C aircraft operations would remain at approximately 4,100 at BAF and 1,900 sorties would occur within SUA. Further, based military Army National Guard, military transient, and civilian operations are assumed to stay relatively constant to 2025 and beyond (the proposed beginning of implementation of the action alternatives).

6.0 CONCLUSION

Table 6-1 presents a quantitative summary of the potential noise impacts as identified by DoD criteria associated with either the F-15EX or F-35A aircraft beddown as compared to the existing conditions. Noise analysis results summarized in the table includes acreage and households/population impacted, number of POIs affected, number of school POIs affected, and PA by the two aircraft beddowns and their various potential afterburner usage, which the DoD takes into account when determining significant impacts. The DoD determination varies from the FAA determination of significance, where a significant impact would occur under the following FAA criteria: 1) noise sensitive land uses and population within the existing DNL 65+ dB footprint were subject to an increase in DNL of 1.5 dB or greater; 2) noise sensitive land uses and population would experience a DNL 1.5 dB or greater increase and be newly exposed to a DNL of 65 dB or greater; or, 3) noise sensitive land uses and population within the existing DNL 60–65 dB footprint were subject to an increase in DNL of 3.0 dB or greater. Table 6-2 highlights significant noise impacts utilizing FAA noise level criteria associated with either the F-15EX or F-35A aircraft beddown as compared to the existing conditions/No Action Alternative.

Table 6-1 Summary of Potential DoD Criteria Noise Impacts Associated with the F-15EX and F-35A Alternatives at BAF

Category	*Condition*	*Existing Conditions/ No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
DNL: Number of POIs	Exposed to >65 dB DNL	5	12 (+7)	11 (+6)	9 (+4)	9 (+4)	10 (+5)
	Exposed to >70 dB DNL	1	5 (+4)	3 (+2)	4 (+3)	4 (+3)	4 (+3)
	Exposed to >75 dB DNL	0	2 (+2)	1 (+1)	1 (+1)	2 (+2)	2 (+2)
	Decrease of 1 dB or greater		0	0	4	3	1
	No change		1	3	3	2	3
	Increase of 1 dB		5	3	3	3	2
	Increase of 2 to 4 dB		27	30	15	15	16
	Increase of 5 dB or greater		5	2	13	15	16
Off-Base Exposure	Acreage	574	1,491 (+917)	1,419 (+845)	1,861 (+1,287)	1,907 (+1,333)	1,946 (+1,372)
	Households	109	319 (+210)	306 (+197)	376 (+267)	385 (+276)	394 (+285)
	Estimated Population	312	901 (+589)	858 (+547)	1,092 (+779)	1,122 (+810)	1,149 (+837)
School, $L_{eq(8hr)}$: Number of School POIs	Greater than 60 dB $L_{eq(8hr)}$	3	4 (+1)	4 (+1)	4 (+1)	4 (+1)	4 (+1)
School, Numbers of Events per Average School Day Hour: Number of School POIs	With No Interfering Events	0	0 (0)	0 (0)	3 (+3)	1 (+1)	1 (+1)
	With 1 Interfering Event	13	11 (-2)	11 (-2)	7 (-6)	9 (-4)	9 (-4)
	With >1 Interfering Events	0	2 (+2)	2 (+2)	3 (+3)	3 (+3)	3 (+3)
School, Time Above Interior 50 dB for 8 Hour School Day: Number of School POIs	Duration of 5 min or less	13	9 (-4)	7 (-6)	6 (-7)	7 (-6)	8 (-5)
	Duration of >5–10 minutes	0	4 (+4)	6 (+6)	7 (+7)	6 (+6)	5 (+5)
	Duration of >10 minutes	0	0	0	0	0	0
Speech Interfering Events per Average Hour, Windows Open: Number of POIs	With No Events	4	7 (+3)	0 (-4)	5 (+1)	1 (-3)	1 (-3)
	With 1–2 Events	32	29 (-3)	36 (+4)	28 (-4)	32 (0)	32 (0)
	With >2 Events	2	2 (0)	2 (0)	5 (+3)	5 (+3)	5 (+3)
Speech Interfering Events per Average Hour, Windows Closed: Number of POIs	With No Events	25	18 (-7)	13 (-12)	15 (-10)	13 (-12)	13 (-12)
	With 1-2 Events	13	20 (+7)	25 (+12)	23 (+10)	25 (+12)	25 (+12)
	With >2 Events	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Probability of Awakening with Windows Open: Number of POIs	With <1% PA	24	23 (-1)	23 (-1)	23 (-1)	23 (-1)	23 (-1)
	With 1% to 10% PA	14	15 (+1)	15 (+1)	15 (+1)	15 (+1)	15 (+1)
Probability of Awakening with Windows Open: Number of POIs	With <1% PA	26	25 (-1)	25 (-1)	25 (-1)	25 (-1)	25 (-1)
	With 1% to 10% PA	12	13 (+1)	13 (+1)	13 (+1)	13 (+1)	13 (+1)

Notes: Parenthetical represents change from existing conditions.

Legend: % = percent; < = less than; > = greater than; BAF = Westfield-Barnes Regional Airport; dB = decibel; DNL = Day-Night Average Sound Level; DoD = Department of Defense.

Table 6-2 Change in DNL at POI and Significant Increases Associated with the F-15EX and F-35A Alternatives at BAF

Map ID	*Named Point of Interest*	*Existing Conditions/ No Action Alternative*	*F-15EX 50% AB*	*F-15EX 80% AB*	*F-35A 5% AB*	*F-35A 50% AB*	*F-35A 95% AB*
BA-C-01	Tract 8121.01	51	52 (+1)	51 (0)	57 (+6)	57 (+6)	57 (+6)
BA-C-02	Tract 8128	43	45 (+2)	46 (+3)	46 (+3)	46 (+3)	47 (+4)
BA-C-03	Tract 8125	**73**	**76 (+3)**	**77 (+4)**	**74 (+1)**	**75 (+2)**	**76 (+3)**
BA-C-04	Tract 8124.01	46	46 (0)	46 (0)	51 (+5)	51 (+5)	51 (+5)
BA-C-05	Tract 8129.01	41	43 (+2)	44 (+3)	45 (+4)	46 (+5)	46 (+5)
BA-C-06	Tract 8127.02	49	50 (+1)	49 (0)	54 (+5)	54 (+5)	54 (+5)
BA-C-07	Tract 8127.01	44	46 (+2)	46 (+2)	48 (+4)	48 (+4)	48 (+4)
BA-H-01	Western Massachusetts Hospital	44	47 (+3)	47 (+3)	48 (+4)	48 (+4)	48 (+4)
BA-H-02	Baystate Noble Hospital	43	45 (+2)	45 (+2)	47 (+4)	47 (+4)	48 (+5)
BA-R-01	Highway 202 and Jaeger Drive	61	**66 (+5)**	**65 (+4)**	**68 (+7)**	**68 (+7)**	**68 (+7)**
BA-R-02	Highway 202 near Old Stage Road	**68**	**75 (+7)**	**72 (+4)**	**75 (+7)**	**76 (+8)**	**76 (+8)**
BA-R-03	Palma Ln and Old Stage Road	64	**68 (+4)**	**66 (+2)**	**71 (+7)**	**71 (+7)**	**71 (+7)**
BA-R-04	Buck Pond Road	**65**	**70 (+5)**	**69 (+4)**	**72 (+7)**	**72 (+7)**	**71 (+6)**
BA-R-05	Rider Road	60	**65 (+5)**	64 (+4)	**66 (+6)**	**67 (+7)**	**67 (+7)**
BA-R-06	Beccari Lane and Aimee Avenue	56	59 (+3)	58 (+2)	62 (+6)	62 (+6)	62 (+6)
BA-R-07	Egleston Road and Highway 202	64	**68 (+4)**	**69 (+5)**	**65 (+1)**	**65 (+1)**	**65 (+1)**
BA-R-08	E. Mountain Road and Ridge Trail Road	58	61 (+3)	62 (+4)	61 (+3)	61 (+3)	61 (+3)
BA-R-09	Klondike Avenue Trailer Park	**69**	**72 (+3)**	**73 (+4)**	**67 (-2)**	**67 (-2)**	**67 (-2)**
BA-R-10	Springdale Street and Grove Avenue	**65**	**68 (+3)**	**69 (+4)**	64 (-1)	64 (-1)	**65 (0)**
BA-R-11	Stephanie Lane	62	**65 (+3)**	**66 (+4)**	62 (0)	63 (+1)	64 (+2)
BA-R-12	Arch Road and Lockhouse Road	53	54 (+1)	54 (+1)	53 (0)	53 (0)	54 (+1)
BA-R-13	Holyoke Road near Dry Bridge Road	64	**70 (+6)**	**68 (+4)**	**67 (+3)**	**67 (+3)**	**67 (+3)**
BA-R-14	Cara Lane and Holyoke Road	55	59 (+4)	59 (+4)	56 (+1)	57 (+2)	57 (+2)
BA-R-15	The Moseley Apartments	49	52 (+3)	51 (+2)	52 (+3)	52 (+3)	52 (+3)
BA-R-16	Powermill Village Apartments	52	56 (+4)	55 (+3)	57 (+5)	57 (+5)	57 (+5)
BA-S-01	White Oak School	53	57 (+4)	57 (+4)	57 (+4)	57 (+4)	57 (+4)
BA-S-02	Roots Learning Center	56	59 (+3)	59 (+3)	62 (+6)	62 (+6)	62 (+6)
BA-S-03	Southampton Rd Elementary/Westfield Intermediate School	63	**66 (+3)**	**68 (+5)**	62 (-1)	63 (0)	63 (0)
BA-S-04	Westfield High School	48	49 (+1)	50 (+2)	48 (0)	49 (+1)	50 (+2)
BA-S-05	Prospect Hill School	47	49 (+2)	50 (+3)	51 (+4)	52 (+5)	52 (+5)
BA-S-06	Paper Mill Elementary School	58	62 (+4)	62 (+4)	56 (-2)	57 (-1)	58 (0)
BA-S-07	Growing Tree Learning Center	40	42 (+2)	42 (+2)	43 (+3)	43 (+3)	43 (+3)
BA-S-08	Franklin Avenue Elementary School	45	47 (+2)	47 (+2)	48 (+3)	48 (+3)	48 (+3)
BA-S-09	St. Mary's Elementary School	48	50 (+2)	50 (+2)	53 (+5)	53 (+5)	53 (+5)
BA-S-10	Westfield Technical Academy	43	45 (+2)	45 (+2)	47 (+4)	47 (+4)	47 (+4)
BA-S-11	Fort Meadow Early Childhood Center	48	49 (+1)	49 (+1)	53 (+5)	53 (+5)	53 (+5)
BA-S-12	Highland Elementary School	41	43 (+2)	44 (+3)	45 (+4)	45 (+4)	45 (+4)
BA-S-13	Abner Gibbs Elementary/Westfield Middle School	45	47 (+2)	46 (+1)	49 (+4)	49 (+4)	49 (+4)

Notes: Parenthetical represents change from existing conditions; Bold highlighting represents FAA Order 1050.1F significant increases at noise sensitive locations.

Legend: BAF = Westfield-Barnes Regional Airport; DNL = Day-Night Average Sound Level; ID = Identification; POI = Point of Interest.

7.0 TERMINAL AREA FORECAST ANALYSIS

As described in Section 1.1, the NGB relied upon the 'best available information' at the time of preparing this analysis at the time of data collection in 2021 and 2022, which was a combination of civilian aircraft operations as modeled in prior NEM updates completed under 14 CFR Part 150 and average historical civilian operations levels from the FAA OPSNET. The 2022 TAF (published in 2023) presented new civil operations projections to 2025, that totaled 49,602 annual airfield operations. This data became available prior to the publication of this final noise study. Therefore, this section describes additional analysis of that recently released TAF civil data and the potential impacts associated with those operations as compared to the 2017 to 2019, 3-year average and previously published Part 150 2024 NEM operations utilized in Chapters 4.0 and 5.0 of this noise study. Additional details on the civil modeling, including fleet mix and stage length, are presented in Appendix A.

Table 7-1 Comparison of Modeled Civil Flight Operations at BAF for EIS (Part 150 NEM 2024 Average) and TAF (published in 2023)

Data Set		*EIS[2] Part 150 NEM 2024*	*TAF[1] (projection for 2025)*
Itinerant Operations	Air Carrier	24	24
	Air Taxi[3]	34,529	1,181
	General Aviation[3]		20,490
	Military	6,748	3,503
Local Operations	Civil[3]		22,726
	Military	1,194	1,678
Total Operations		42,495	49,602

Notes: [1]2022 TAF for 2025 Forecast Year prepared by FAA Office of Environment and Energy, Noise Division – November 6, 2023.
[2]As described in Section 3.1.1, the 2017–2019, 3-year average closely matched the published Part 150 NEM 2024 scenario operations, so the NEM 2024 was utilized without the need of scaling.
[3]The Part 150 NEM 2024 did not distinguish between local and itinerant operations.
Legend: BAF = Westfield-Barnes Regional Airport; EIS = Environmental Impact Statement; NEM = Noise Exposure Map; TAF = Terminal Area Forecast.
Source: FAA 2023.

Figures 7-1 through 7-3 depict the resulting DNL contours for the existing conditions and the proposed F-15EX and F-35A alternatives comparing the two sources of civil operations data. For all scenarios analyzed, the 65 dB DNL contour for the 2022 TAF 2025 forecast year would be approximately the same as the EIS analyzed conditions. Note that the contour lines are so similar in size and shape that it may be difficult to visually distinguish between the two data sets on these figures.

Table 7-2 presents the off-airport acreage and estimated total population impacted by 65 dB DNL or greater. With the 2022 TAF 2025 forecast year operations under existing conditions, a total of 577 off-airport acres would be exposed to 65 dB DNL or greater representing an increase of 2 acres from the 3-year average civil operations used in the noise study and associated EIS. The F-15EX alternative would result in 1,426 off-airport acres exposed to 65 dB with the 2022 TAF 2025 forecast year operations data, an increase of 7 acres calculated in the EIS based upon the 3-year average data. The F-35A alternative would result in 1,868 off-airport acres exposed to 65 dB with the 2022 TAF 2025 forecast year operations data, an increase of 6 acres calculated in the EIS based upon the 3-year average data.

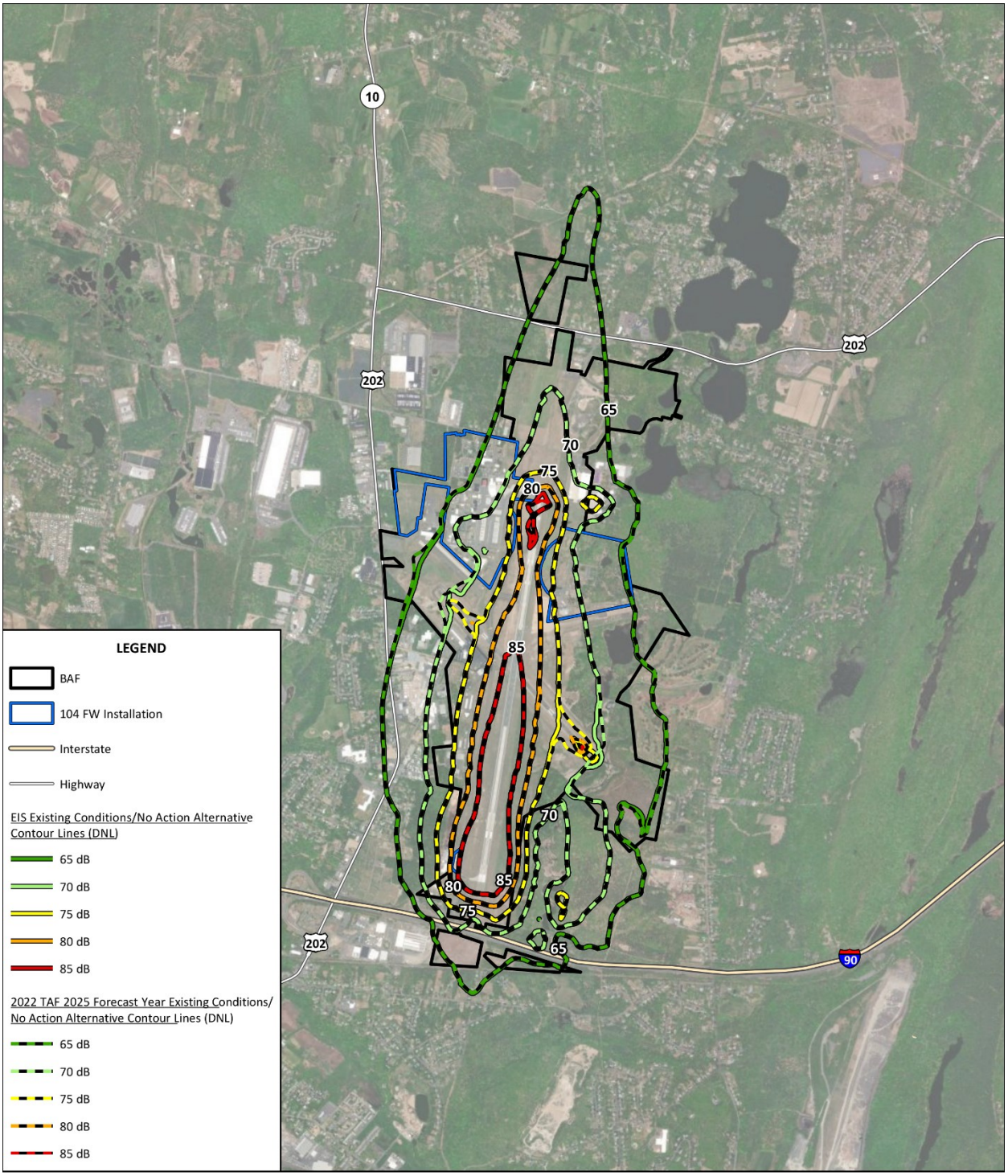

Figure 7-1 Existing Conditions DNL Contours – EIS versus 2022 TAF 2025 Forecast Year

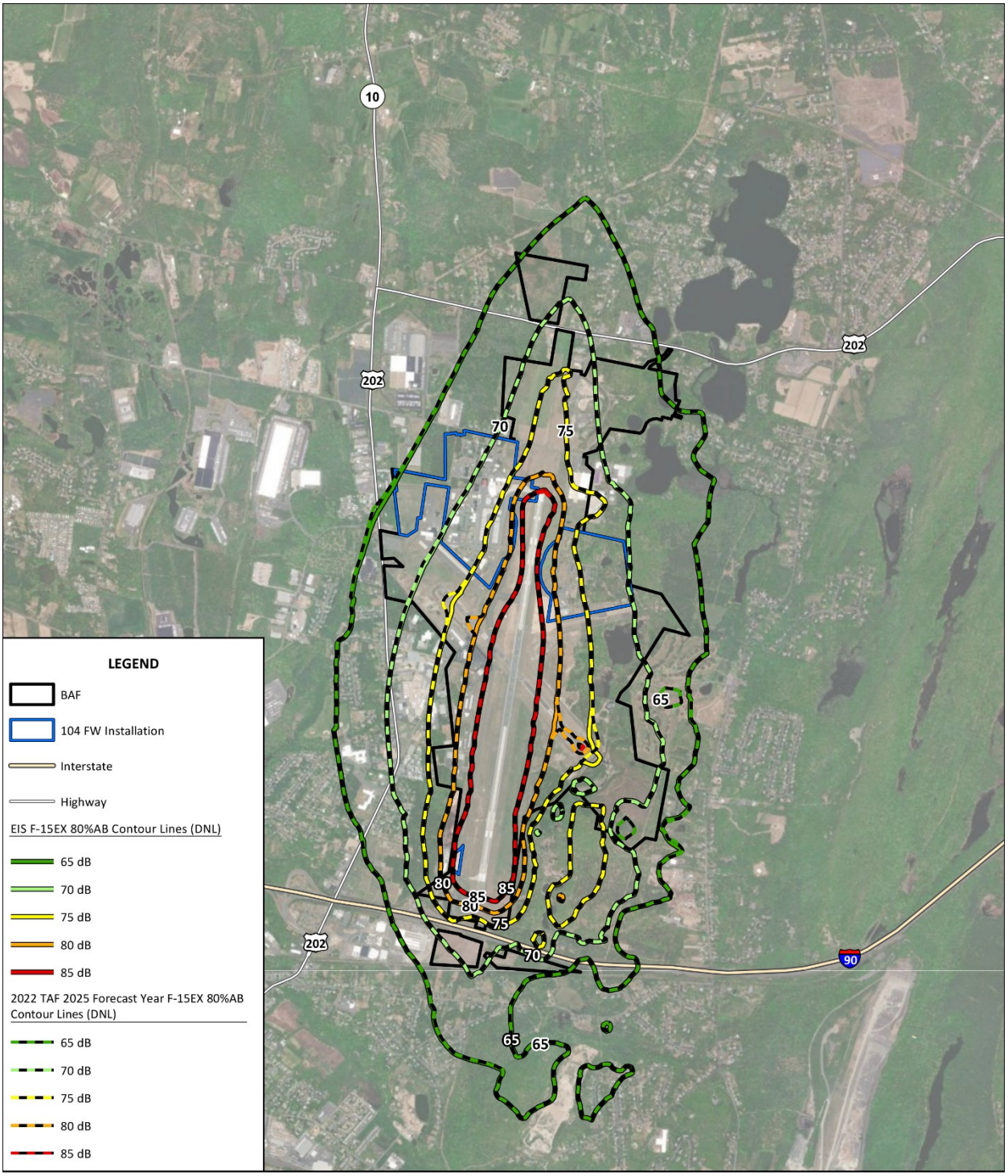

Figure 7-2 F-15EX 80 Percent Afterburner Scenario DNL Contours – EIS versus 2022 TAF 2025 Forecast Year

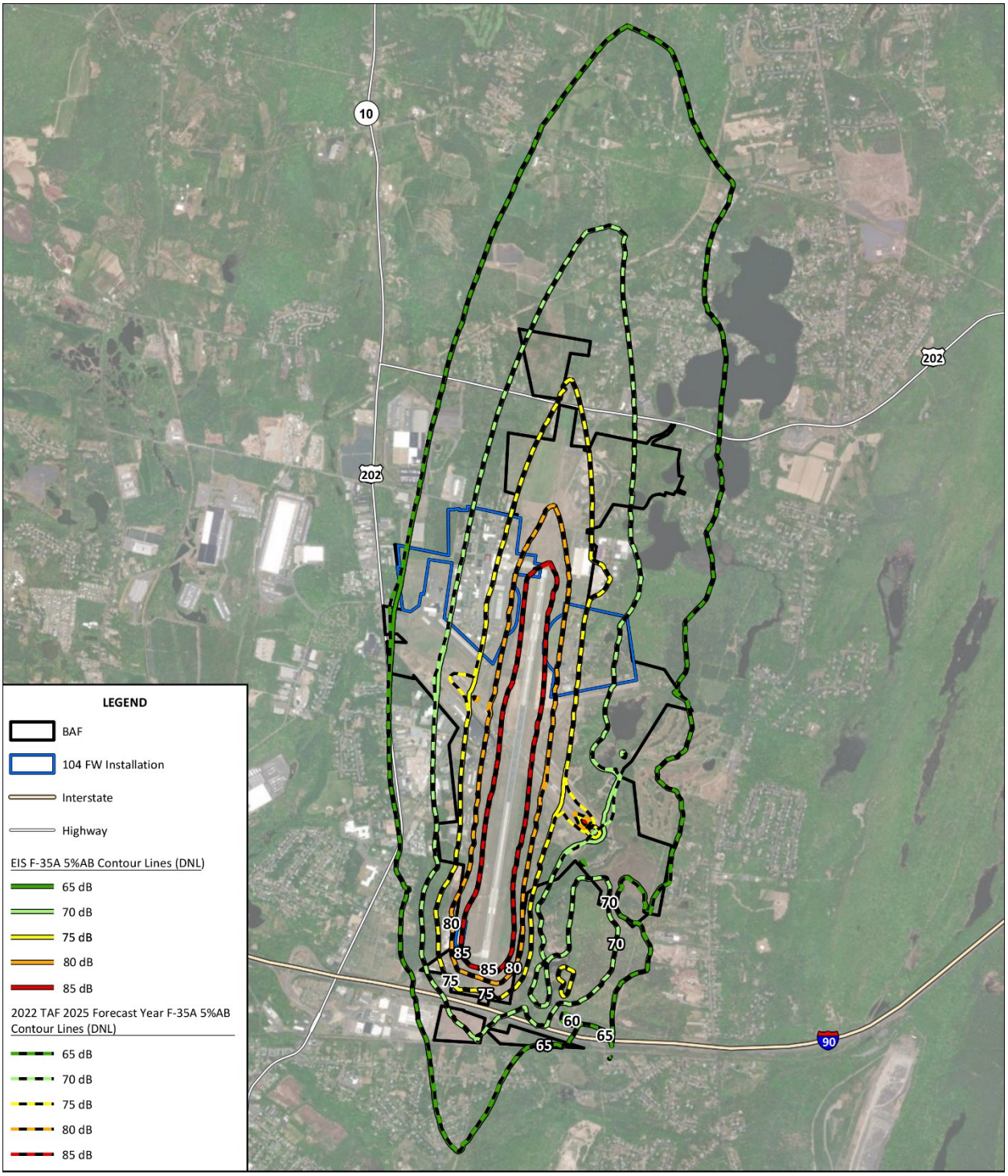

Figure 7-3 F-35EX 5 Percent Afterburner Scenario DNL Contours – EIS versus 2022 TAF 2025 Forecast Year

Table 7-2 2022 TAF 2025 Forecast Year Acreage and Estimated Population by DNL Contour in the Vicinity of BAF

Scenario	*DNL (dB)*	*TAF Off Airport Acreage*	*TAF Estimated Population*	*Difference from EIS Modeling Acreage*	*Difference from EIS Modeling Estimated Population*
Existing Conditions	65–70	406	216	+3	+2
	70–75	144	88	+1	0
	75–80	27	10	0	0
	80–85	1	0	0	0
	85+	0	0	0	0
	Total	**577**	**314**	**+4**	**+2**
F-15EX 80% A/B	65–70	960	614	+6	+4
	70–75	334	179	+1	+1
	75–80	115	70	0	0
	80–85	17	0	0	0
	85+	0	0	0	0
	Total	**1,426**	**863**	**+7**	**+5**
F-35A 5% A/B	65–70	1,399	845	+5	+2
	70–75	415	229	+1	0
	75–80	50	20	0	0
	80–85	3	0	0	0
	85+	0	0	0	0
	Total	**1,868**	**1,095**	**+6**	**+3**

Note: Totals may not add due to rounding.

Legend: % = percent; A/B = Afterburner; dB = decibel; DNL = Day-Night Average Sound Level; EIS = Environmental Impact Statemen; TAF = Terminal Area Forecast.

In terms of population affected by 65 dB DNL or greater, the 2022 TAF 2025 forecast year operations would result in 314 people under existing conditions, 863 people under the F-15EX alternative, and 1,095 people under the F-35A proposed alternative. The difference in estimated population for each of these scenarios when calculated with the 2022 TAF 2025 forecast year data ranges from two to five additional people when compared with the EIS-based 3-year average analysis.

The review of the 2022 TAF 2025 forecast year operations and resulting off-airport acres and exposed population shows only small differences between the EIS calculated impacts based upon the Part 150 NEM 2024 data (and review of the 2017–2019, 3-year average) and 2022 TAF 2025 forecast year data. Therefore, noise impacts and the conclusions based upon the 2022 FAA 2025 forecast year TAFs would not change from those currently presented in this EIS.

8.0 REFERENCES

AIRNAV. 2023. KBAF Westfield-Barnes Regional Airport, Westfield/Springfield, Massachusetts, USA. Transmitted Stantec-GS via the Internet (www.airnav.com/airport/KBAF) on 26 June 2023.

American National Standards Institute (ANSI). 1988. Quantities and Procedures for Description and Measurement of Environmental Sound. Part 1.

American National Standards Institute (ANSI)/Acoustical Society of America (ASA). 2008. Quantities and Procedures For Description And Measurement Of Environmental Sound S12.9-2008/Part 6.

American National Standards Institute (ANSI)/Acoustical Society of America (ASA). 2018. Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6 (A Technical Report prepared by ANSI-Accredited Standards Committee S12 and registered with ANSI). July.

Department of Defense Noise Working Group (DNWG). 2009a. *Technical Bulletin, Using Supplemental Noise Metrics and Analysis Tools*. March.

Department of Defense Noise Working Group (DNWG). 2009b. *Technical Bulletin: Sleep Disturbance from Aviation Noise*, December.

Department of Defense Noise Working Group (DNWG). 2012. *Technical Bulletin, Noise-Induced Hearing Impairment, Defense Noise Working Group*. December.

Department of Defense Noise Working Group (DNWG). 2013a. *Technical Bulletin: Speech Interference from Aviation Noise*. December.

Department of Defense Noise Working Group (DNWG). 2013b. *Noise – Induced Hearing Impairment Technical Bulletin.* December.

Department of the Navy. 2021. Real-Time Aircraft Sound Monitoring Final Report, Report to Congress. November 30. https://www.navfac.navy.mil/Business-Lines/Asset-Management/Products-and-Services/Aircraft-Sound-Monitoring/

Federal Aviation Administration (FAA). 2008. 14 CFR Part 73 [Docket No. FAA–2006–26192; Airspace Docket No. 06–ASO–11] RIN 2120–AA66 Modification and Establishment of Restricted Areas and Other Special Use Airspace, Adirondack Airspace Complex; Fort Drum, NY

Federal Aviation Administration (FAA). 2023. Terminal Area Forecast. Retrieved from https://taf.faa.gov/.

Federal Interagency Committee on Noise (FICON). 1978. Environmental Protection – Planning the Noise Environment. 15 June.

National Guard Bureau (NGB). 2022. Air National Guard F-15EX Eagle II & F-35A Operational Beddowns Environmental Impact Statement Final Noise Data Validation Package for the 104th Fighter Wing at Westfield-Barnes Regional Airport. July.

Wasmer Consulting. 2006. *BaseOps 7.3 User's Guide*, Fred Wasmer and Fiona Maunsell, Wasmer Consulting.

Wyle. 1998. *NMAP 7.0 User's Manual. Wyle Research Report WR98-13*, Czech and Plotkin. November.

Wyle. 2019. *Westfield Barnes Regional Airport 14 CFR Part 150 Noise Exposure Map Update.*

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Appendix A

Aircraft Modeling Details

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Military Flight Tracks

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Table A-1. Military Flight Track Utilization

Military Fixed Wing (F-15C / F-15EX / F-35A)				
Op Type	Runway	Track ID	Description	Utilization
Departure	02	02D1	Right turn to W-105	80%
		02D2	Northwest to Viper	15%
		02D3	North to Yankee/Laser/Scoty/Condor	5%
	20	20D1	to W-105	80%
		20D2	Right turn to Viper or Yankee/Laser/Scoty/Condor	20%
Break Arrival	02	02O01	1st Break at #s, Arrival to 20 from north	50%
		02O02	2nd Break 5-7 seconds later, Arrival to 20 from north	25%
		02O03	TAC Initial 1 nm abean, Arrival to 20 from north	25%
	20	20O01	1st Break at #s, Arrival to 20 from north	50%
		20O02	2nd Break 5-7 seconds later, Arrival to 20 from north	25%
		20O03	TAC Initial 1 nm abean, Arrival to 20 from north	25%
NonBreak Arrival	02	02A01	Viper or Yankee/Laser to 02 downwind	20%
		02A02	W-105 to 02	80%
	20	20A01	W-105 to 20 downwind	80%
		20A02	Viper to initial to 20	15%
		20A03	Yankee/Laser/Scoty/Condor, runway heading	5%
IFR Arrival	02	02A03	TACAN	100%
	20	20A03	ILS	100%
Closed Pattern	02	02C1	Left hand pattern Rwy 02	100%
	20	20C1	Left hand pattern Rwy 20	100%
Military Helicopter Track Use (UH-72 / HH-60)				
Departure	15	15HD1	depart to south	10%
		15HD2	depart to southeast	50%
	33	33HD1	depart to northwest	30%
		33HD2	depart to north	10%
Arrival	15	15HA1	arrive from northwest	30%
		15HA2	arrive from north	10%
	33	33HA1	arrive from south	10%
		33HA2	arrive from southeast	50%
Closed Pattern	N/A	HoistTrg	Closed pattern - flown over field near hanger	100%

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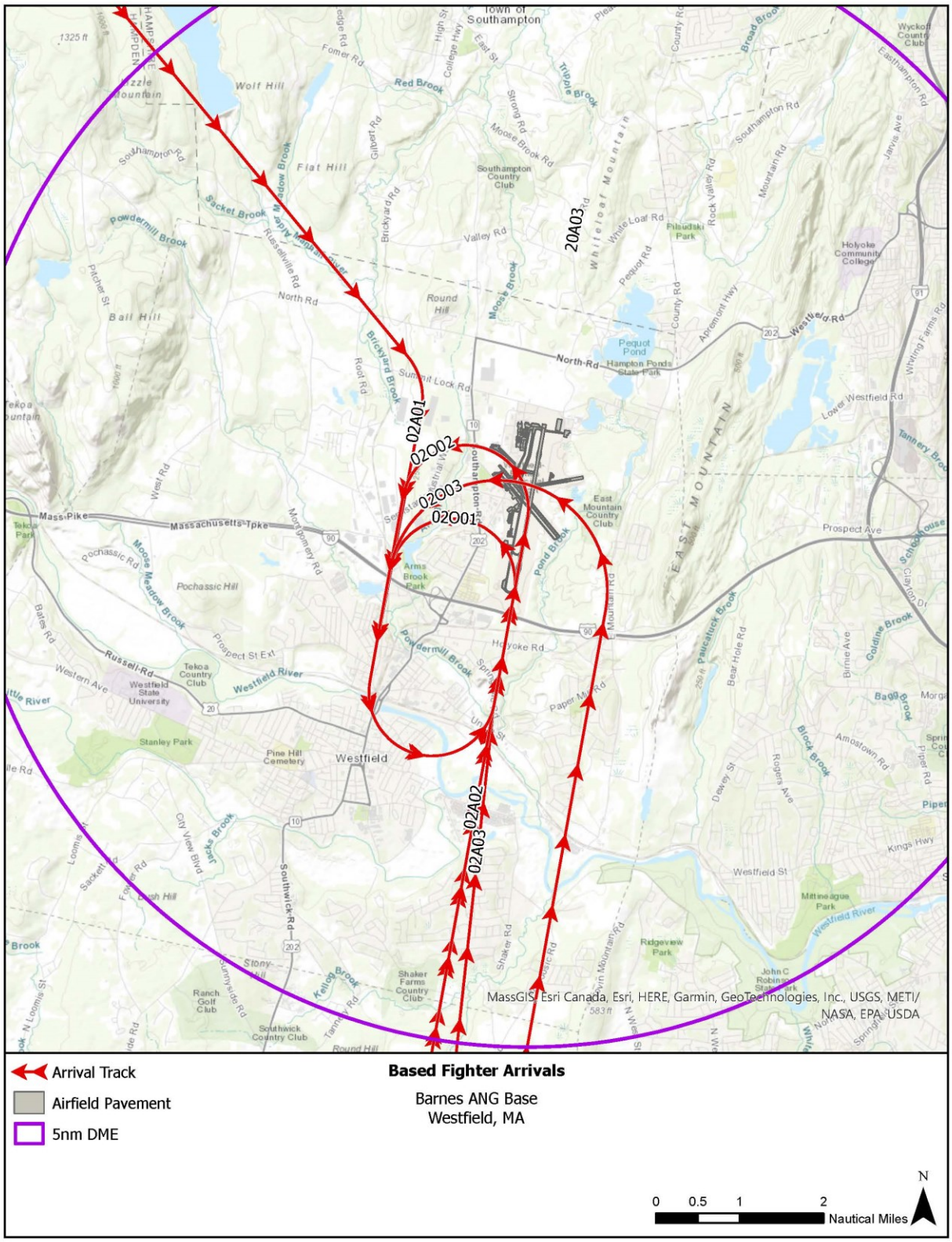
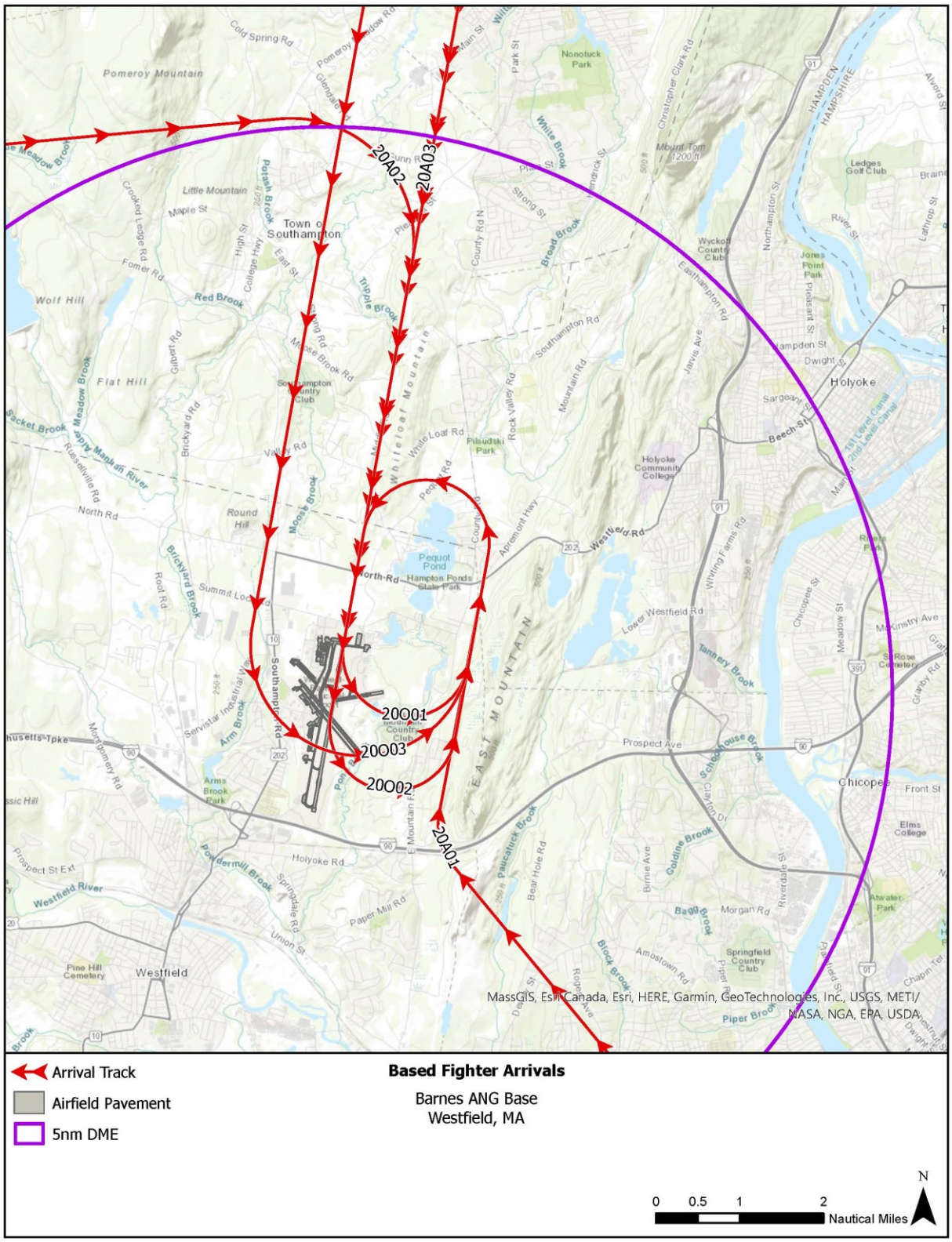

20A03
02A01
02O02
02O03
02O01
02A02
02A03
Town of Southampton
Westfield
Pochassic Hill
Ball Hill
Flat Hill
Wolf Hill
Round Hill
EAST MOUNTAIN
Mass Pike
Massachusetts Tpke
Westfield River
Powdermill Brook
Red Brook
Moose Brook
Pond Brook
Arms Brook Park
Stanley Park
Pine Hill Cemetery
Westfield State University
Tekoa Country Club
Southampton Country Club
East Mountain Country Club
Hampton Ponds State Park
Pequot Pond
Ranch Golf Club
Southwick Country Club
Shaker Farms Country Club
Ridgeview Park
Mittineague Park
Holyoke Community College
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
Arrival Track
Airfield Pavement
5nm DME
Based Fighter Arrivals
Barnes ANG Base
Westfield, MA
0 0.5 1 2
Nautical Miles
N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20A03
20O01
20O03
20O02
20A01
Arrival Track
Airfield Pavement
5nm DME
Based Fighter Arrivals
Barnes ANG Base
Westfield, MA
0 0.5 1 2
Nautical Miles
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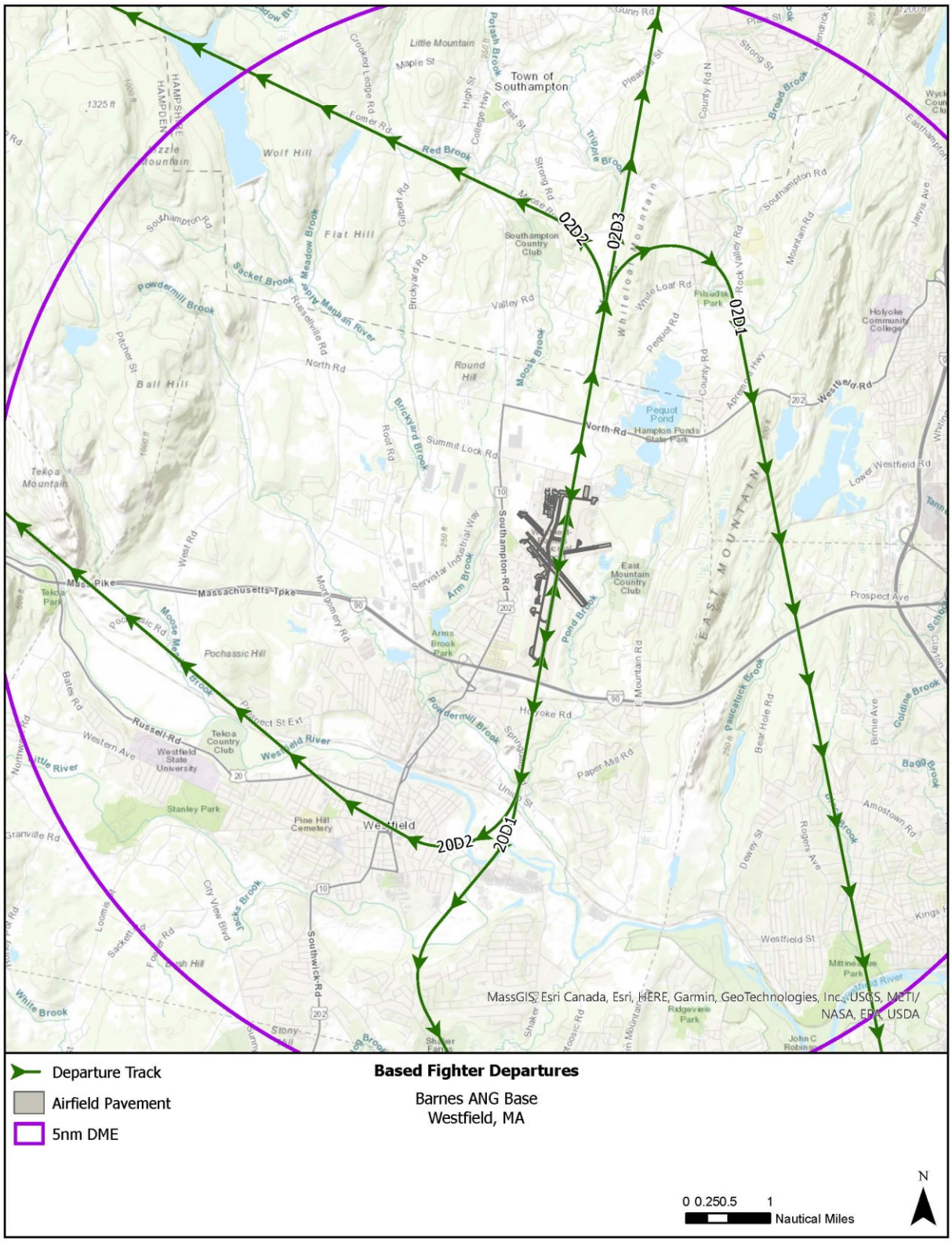
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, NGA, EPA, USDA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Town of Southampton
Westfield
Barnes ANG Base
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
Departure Track
Airfield Pavement
5nm DME
Based Fighter Departures
Barnes ANG Base
Westfield, MA
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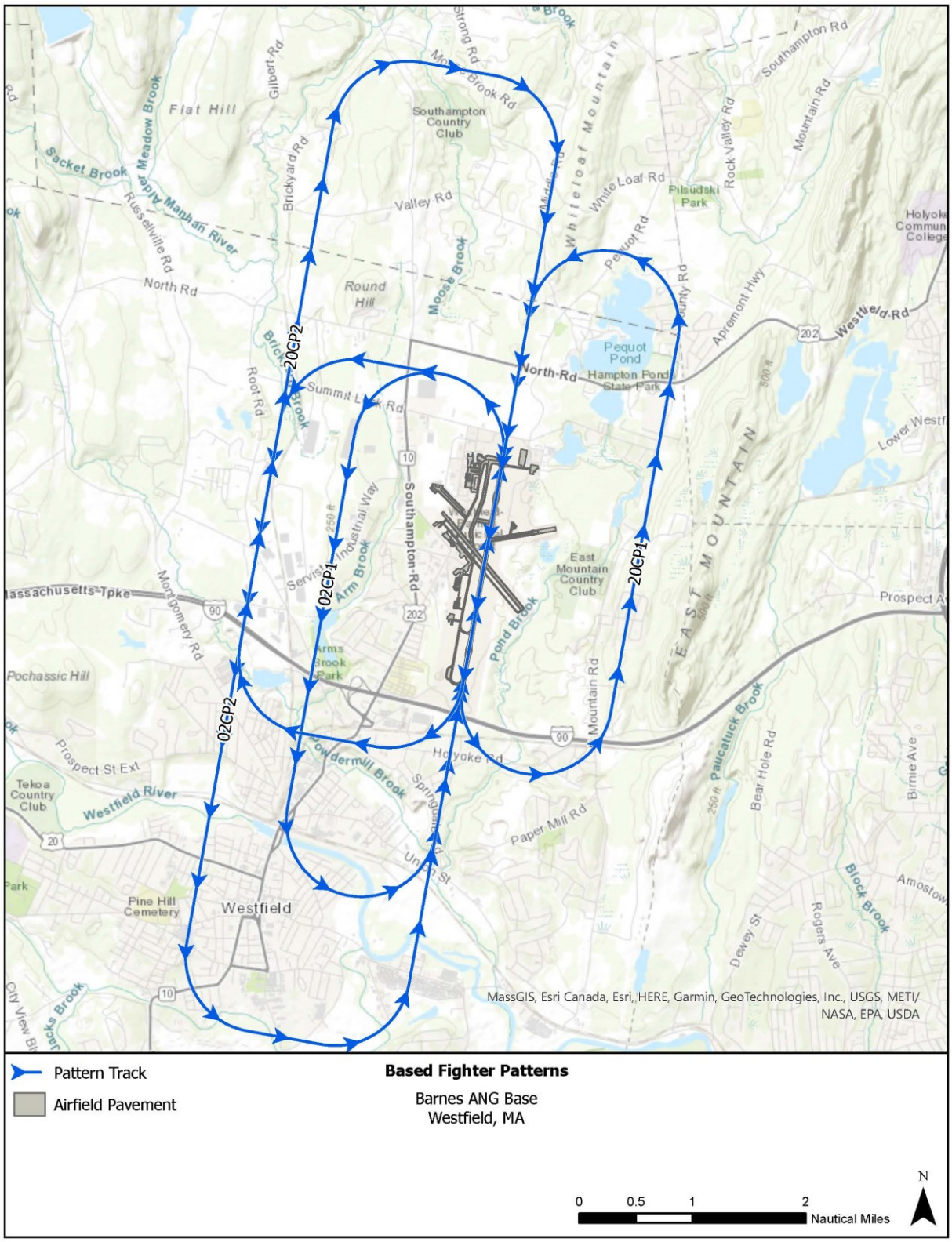
0 0.250.5 1
Nautical Miles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02CP1
02CP2
20CP1
Flat Hill
Round Hill
Pochassic Hill
Southampton Country Club
East Mountain Country Club
Pequot Pond
Hampton Pond State Park
Arms Brook Park
Tekoa Country Club
Pine Hill Cemetery
Westfield
Pilsudski Park
Holyoke Commun College
Lower Westf
Prospect A
Amostow
Gilbert Rd
Brickyard Rd
Strong Rd
Southampton Rd
Rock Valley Rd
Mountain Rd
White Loaf Rd
Pequot Rd
County Rd
Apremont Hwy
Westfield Rd
North Rd
Russellville Rd
Valley Rd
Root Rd
Summit Lane Rd
Industrial Way
Southampton Rd
Montgomery Rd
Massachusetts Tpke
Mountain Rd
Holyoke Rd
Paper Mill Rd
Prospect St Ext
Bear Hole Rd
Birnie Ave
Rogers Ave
Dewey St
Block Brook
Sacket Brook
Meadow Brook
Manhan River
Moose Brook
Arm Brook
Pond Brook
Powdermill Brook
Paucatuck Brook
Westfield River
Whiteloaf Mountain
EAST MOUNTAIN
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
Pattern Track
Airfield Pavement
Based Fighter Patterns
Barnes ANG Base
Westfield, MA
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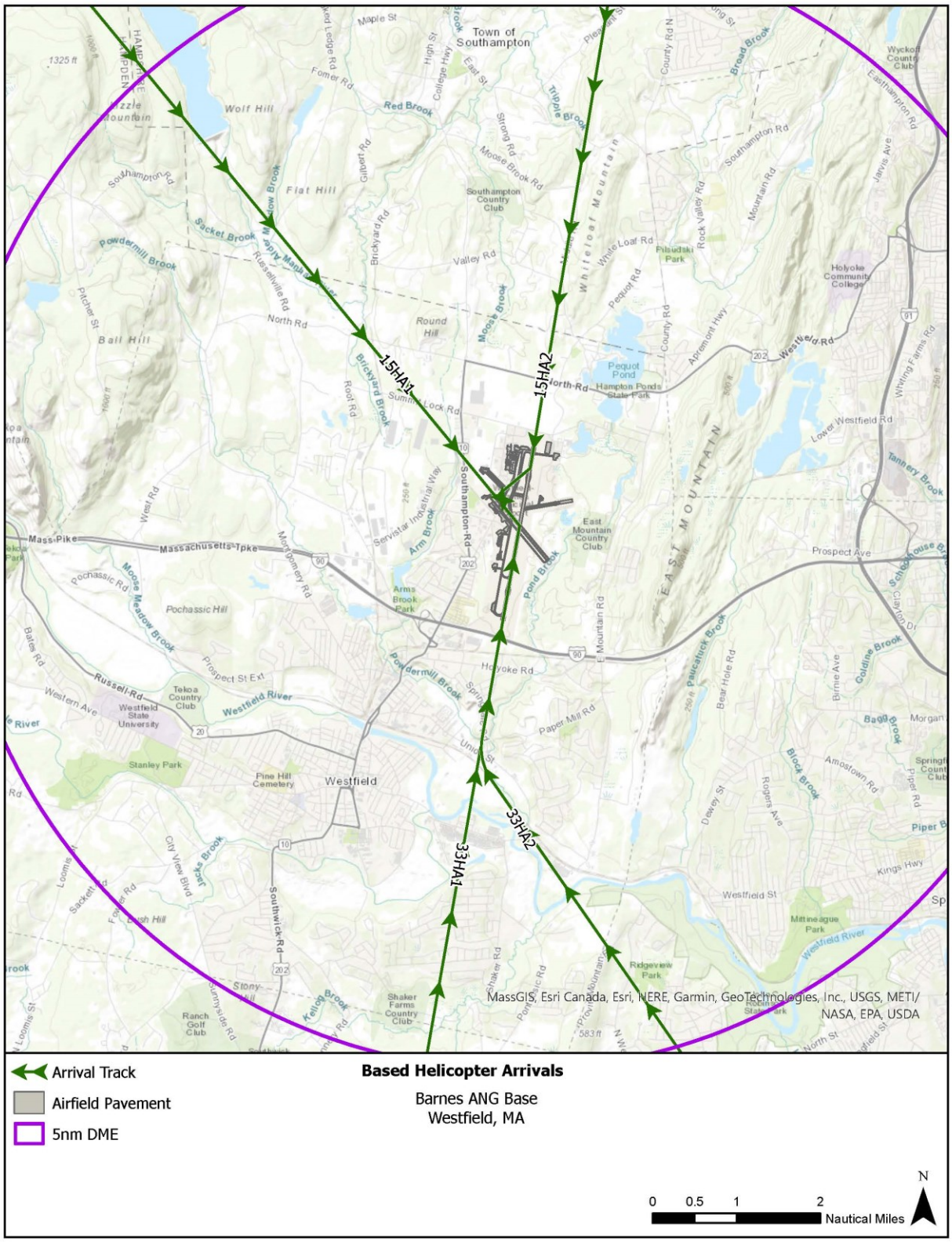
0.5
1
2
Nautical Miles
N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Westfield
Barnes ANG Base
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Arrival Track
Airfield Pavement
5nm DME
Based Helicopter Arrivals
Barnes ANG Base
Westfield, MA
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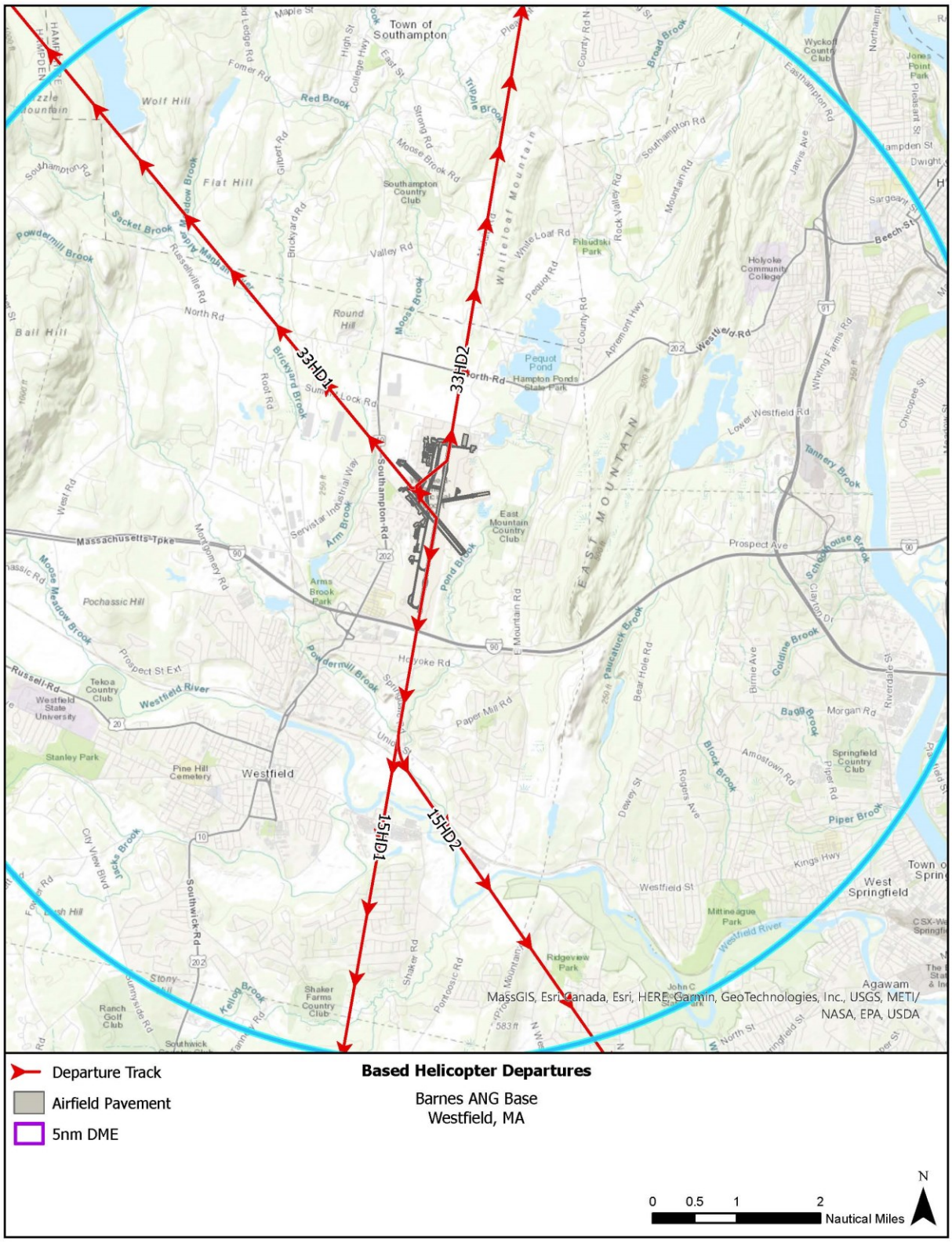
Nautical Miles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Town of Southampton
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West Springfield
Agawam
Massachusetts Turnpike
Westfield River
Pequot Pond
Hampton Ponds State Park
East Mountain Country Club
Holyoke Community College
Southampton Country Club
Tekoa Country Club
Springfield Country Club
Ranch Golf Club
Shaker Farms Country Club
Mittineague Park
Ridgeview Park
Arms Brook Park
Stanley Park
Pine Hill Cemetery
Hampton Ponds State Park
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
Departure Track
Airfield Pavement
5nm DME
Based Helicopter Departures
Barnes ANG Base
Westfield, MA
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0 0.5 1 2
Nautical Miles


HOISTTRG
MA ARNG Army
Aviation Support Hangar
Maxar, Microsoft
Pattern Track
Based Helicopter Patterns
Barnes ANG Base
Westfield, MA
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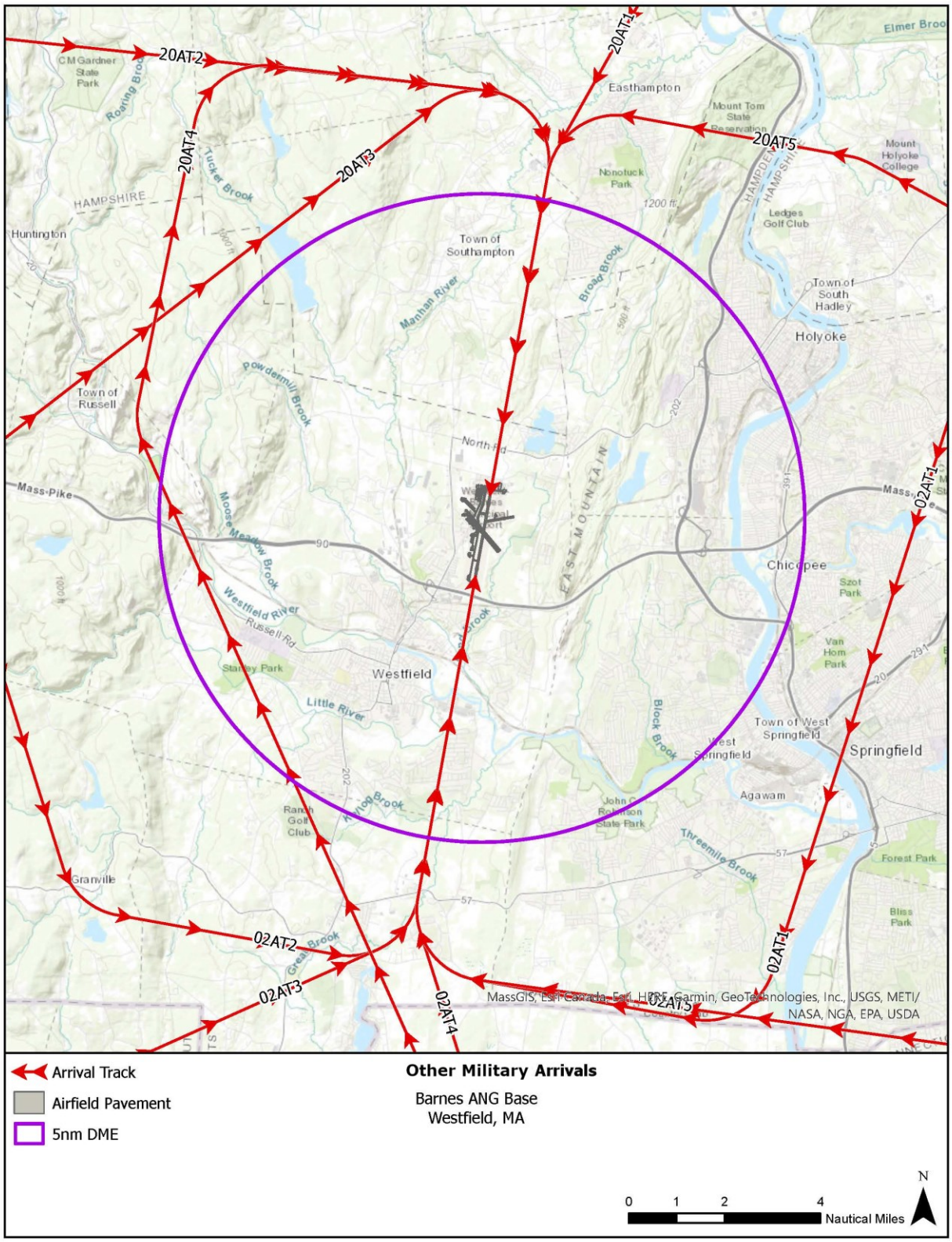
Feet
N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Airfield Pavement
5nm DME
Other Military Arrivals
Barnes ANG Base
Westfield, MA
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Nautical Miles
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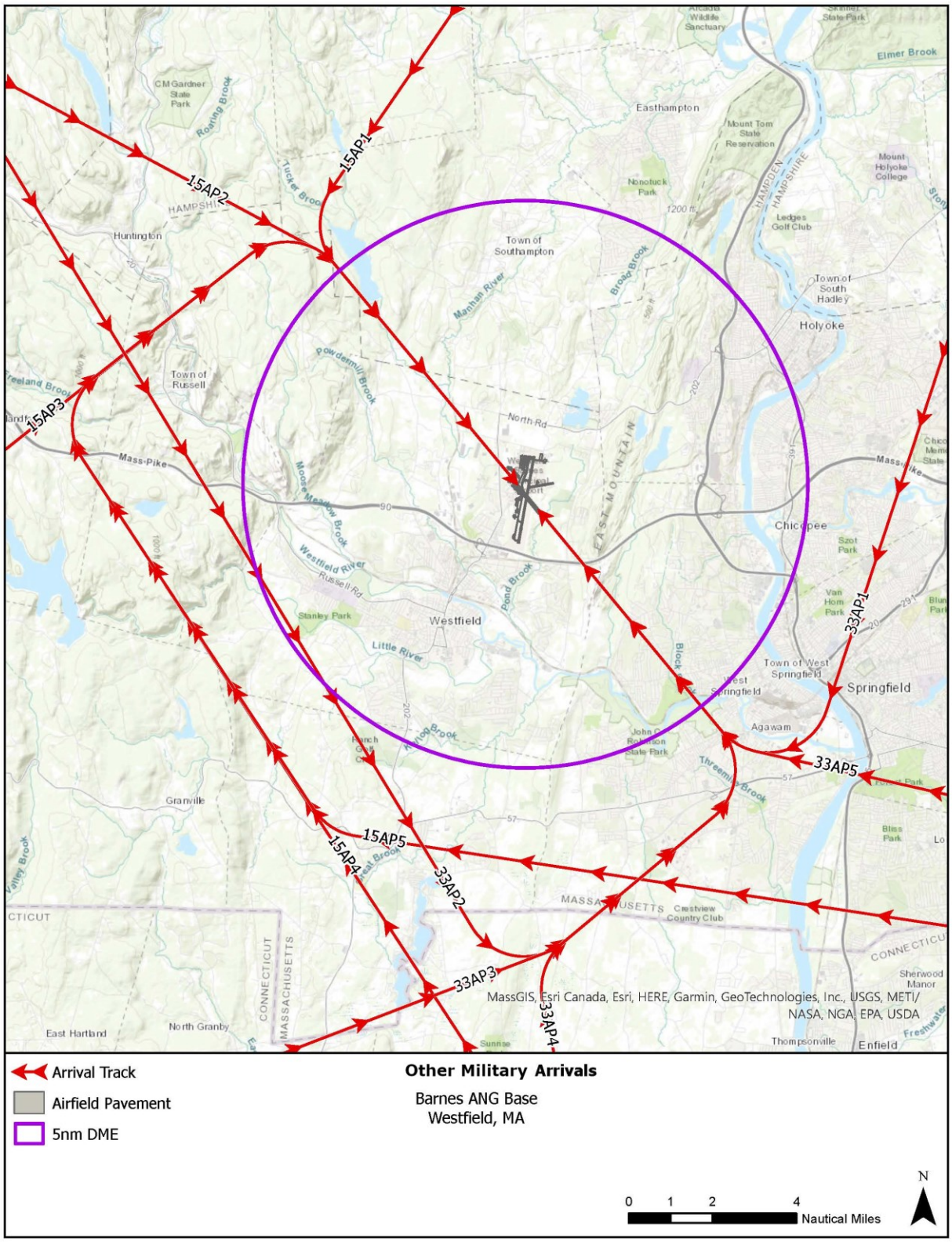
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, NGA, EPA, USDA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Huntington
Town of Southampton
Holyoke
Town of Russell
Chicopee
Westfield
Springfield
Granville
Agawam
Town of West Springfield
Town of South Hadley
Mount Tom State Reservation
Mount Holyoke College
Ledges Golf Club
Crestview Country Club
East Hartland
North Granby
Thompsonville
Enfield
Sherwood Manor
Mass Pike
North Rd
Russell Rd
Stanley Park
Little River
Westfield River
Powdermill Brook
Manhan River
Broad Brook
Pond Brook
Moose Meadow Brook
Log Brook
Elmer Brook
Roaring Brook
Tucker Brook
Freeland Brook
Valley Brook
EAST MOUNTAIN
HAMPDEN
HAMPSHIRE
CONNECTICUT
MASSACHUSETTS
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, NGA, EPA, USDA
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Westfield, MA
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Nautical Miles
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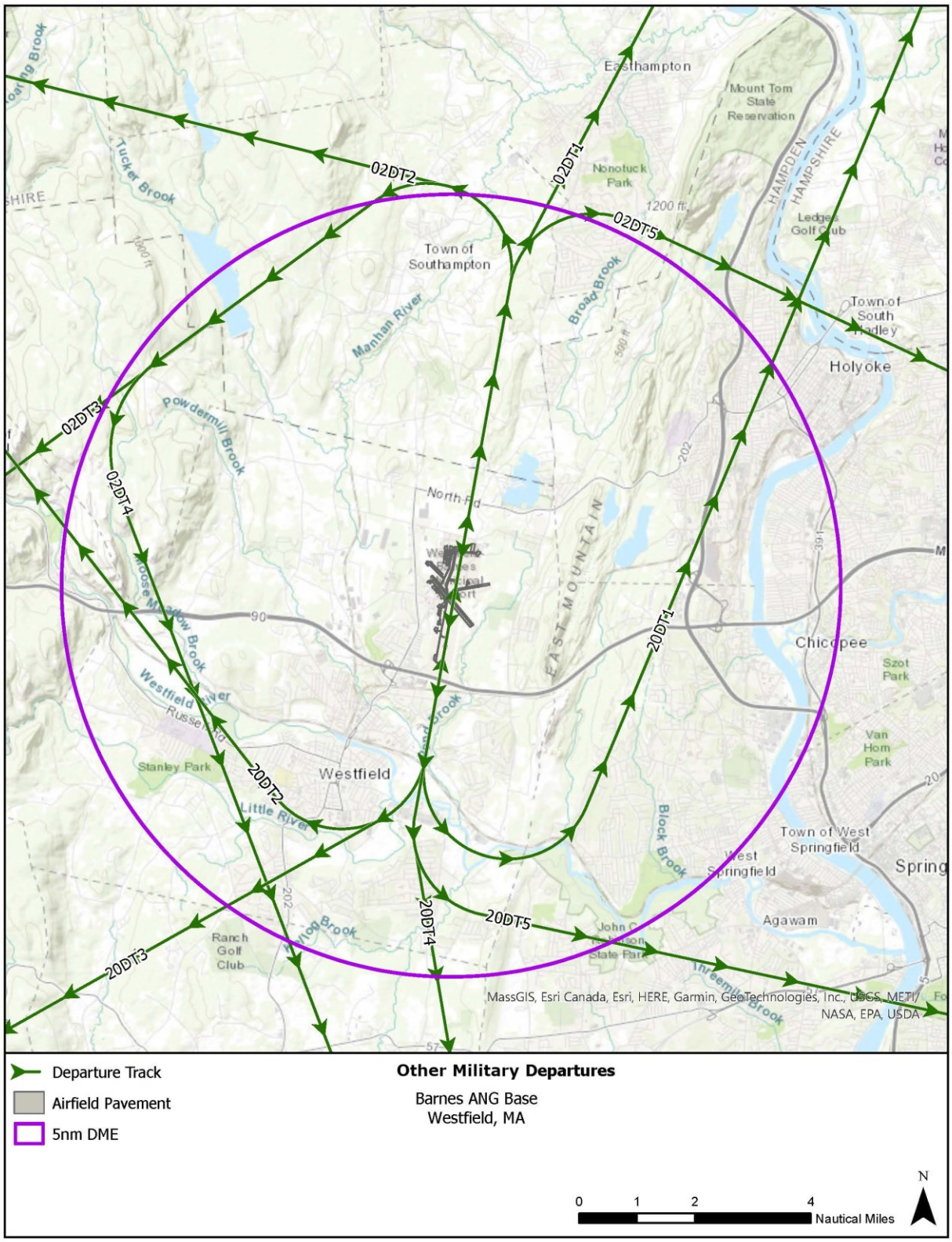
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02DT4
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20DT3
20DT4
20DT5
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Nonotuck Park
Ledges Golf Club
Town of Southampton
Broad Brook
Manhan River
Town of South Hadley
Holyoke
Powdermill Brook
North Rd
EAST MOUNTAIN
Chicopee
Szot Park
Van Horn Park
Westfield
Stanley Park
Little River
Block Brook
Town of West Springfield
West Springfield
Agawam
Ranch Golf Club
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
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5nm DME
Other Military Departures
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Westfield, MA
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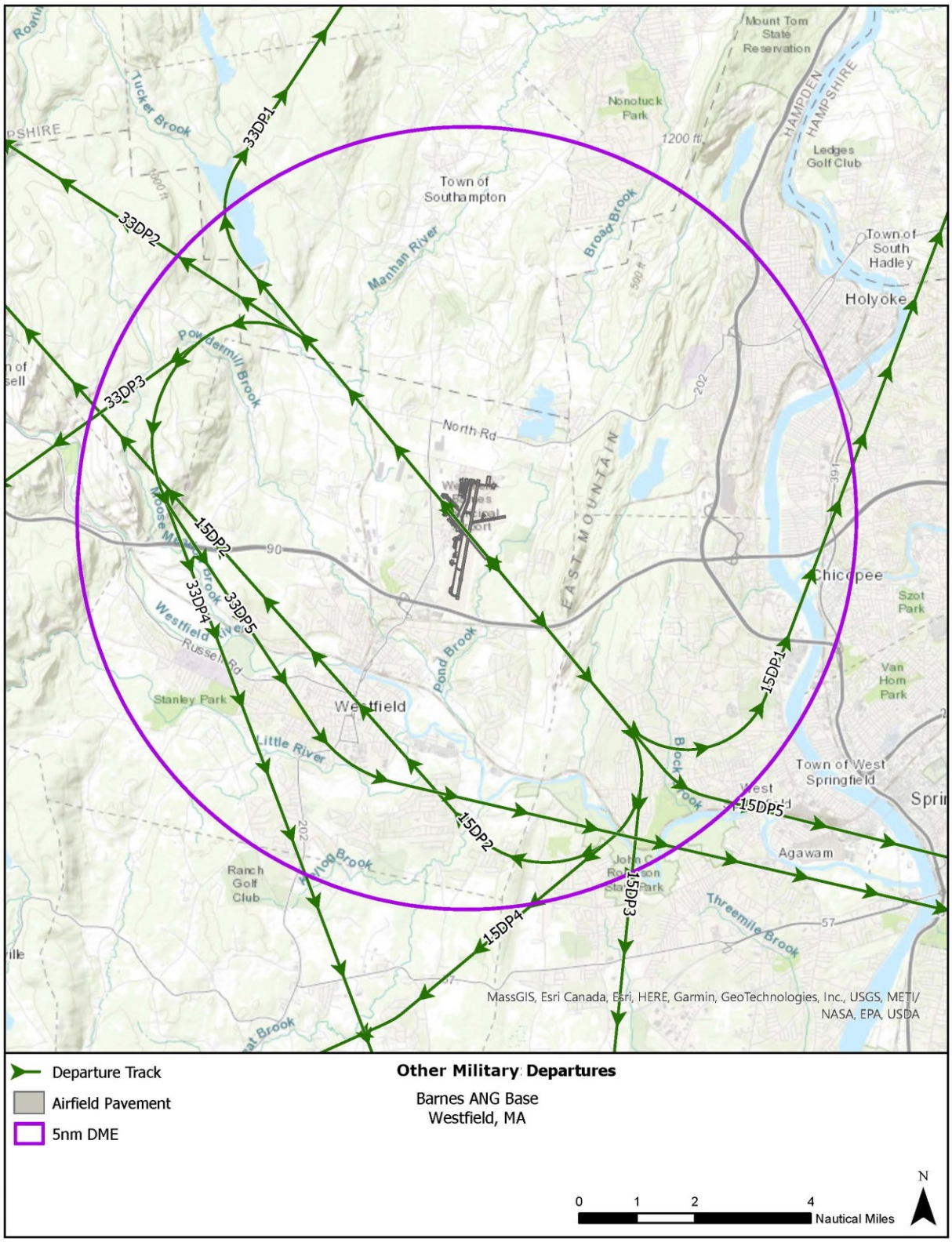
Nautical Miles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Ledges Golf Club
Town of Southampton
Manhan River
Broad Brook
Town of South Hadley
Holyoke
Powdermill Brook
North Rd
EAST MOUNTAIN
Chicopee
Szot Park
Van Horn Park
Westfield River
Russell Rd
Stanley Park
Westfield
Pond Brook
Little River
Town of West Springfield
Agawam
Ranch Golf Club
Threemile Brook
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
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Westfield, MA
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Nautical Miles
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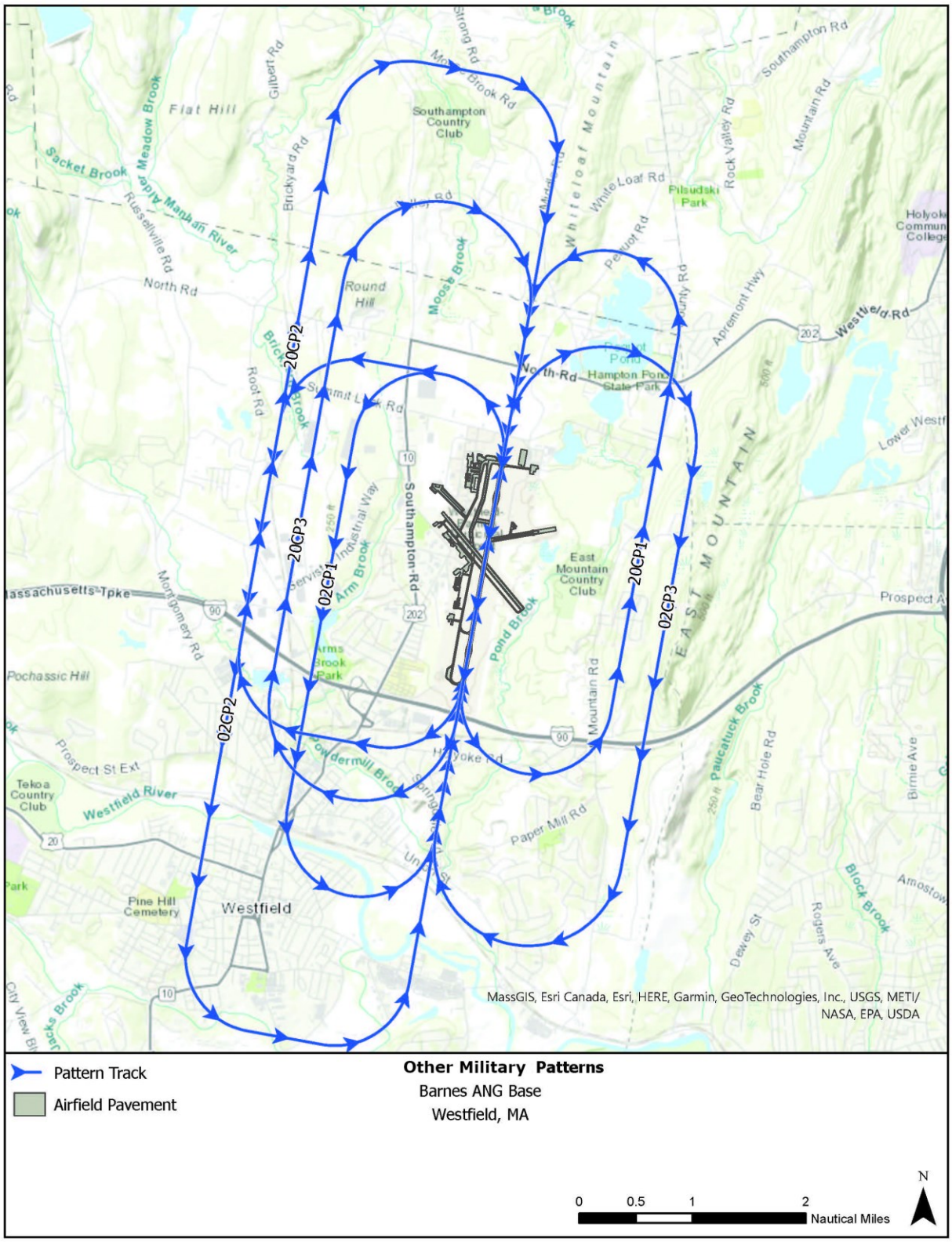
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Southampton Country Club
East Mountain Country Club
Hampton Pond State Park
Arms Brook Park
Tekoa Country Club
Pine Hill Cemetery
Westfield
Flat Hill
Round Hill
Pochassic Hill
EAST MOUNTAIN
Whiteleaf Mountain
Southampton Rd
Westfield Rd
Mountain Rd
Paper Mill Rd
Pond Brook
Arm Brook
Moose Brook
Powdermill Brook
Block Brook
Paucatuck Brook
Westfield River
Sacket Brook
Meadow Brook
Manhan River
Pilsudski Park
Holyoke Community College
Massachusetts Tpke
Prospect St Ext
Bear Hole Rd
Birnie Ave
Dewey St
Rogers Ave
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, EPA, USDA
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Airfield Pavement
Other Military Patterns
Barnes ANG Base
Westfield, MA
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Nautical Miles
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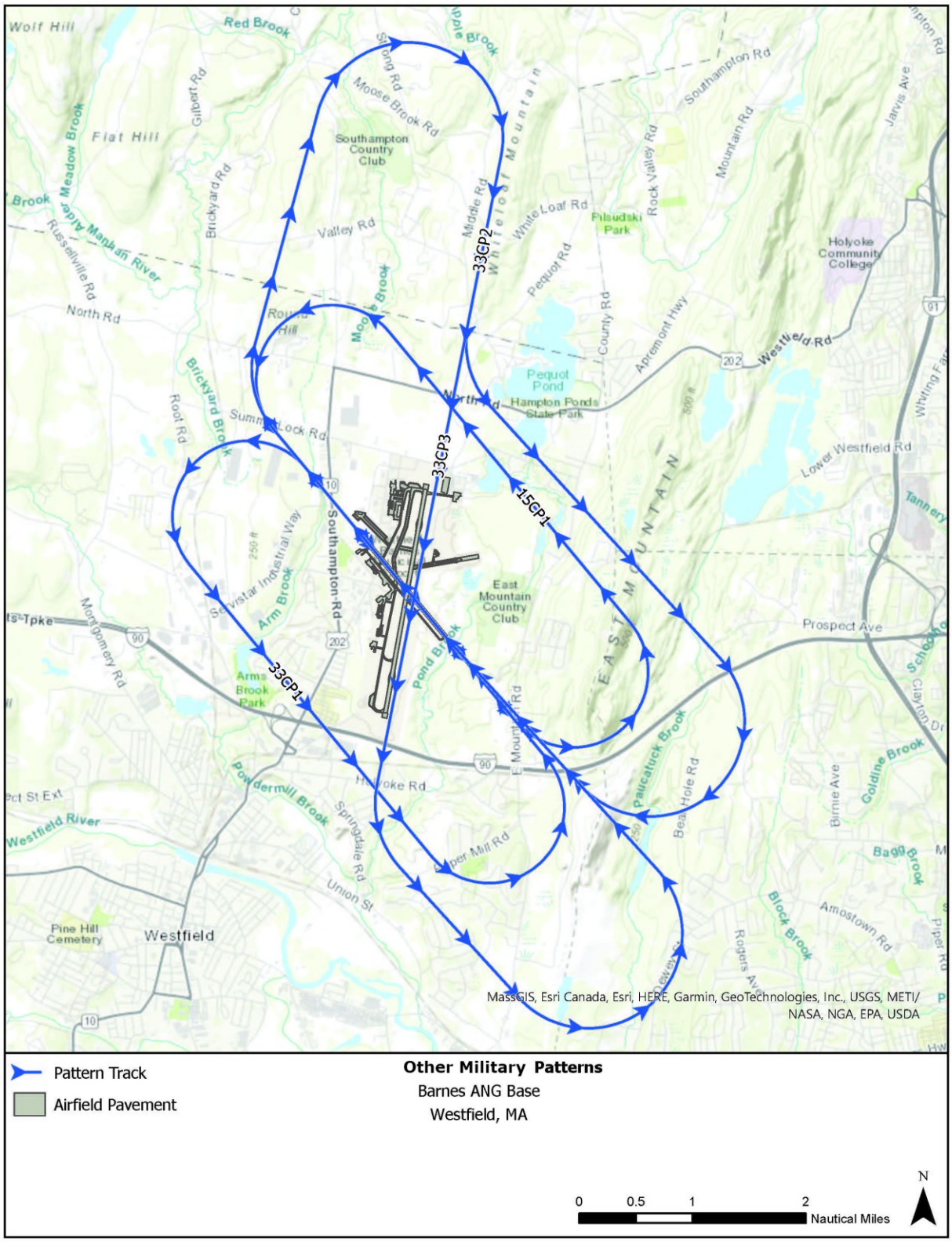
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Southampton Country Club
East Mountain Country Club
Hampton Ponds State Park
Pequot Pond
Arms Brook Park
Pilsudski Park
Holyoke Community College
Westfield
Pine Hill Cemetery
Red Brook
Flat Hill
Wolf Hill
Moose Brook Rd
Valley Rd
White Loaf Rd
Middle Rd
Southampton Rd
Mountain Rd
Rock Valley Rd
Jarvis Ave
Gilbert Rd
Brickyard Rd
Meadow Brook
Russellville Rd
North Rd
Root Rd
Summit Lock Rd
Brickyard Brook
Moose Brook
Pequot Rd
County Rd
Apremont Hwy
Westfield Rd
Lower Westfield Rd
Tannery
Southampton Rd
Arm Brook
Pond Brook
Montgomery Rd
Prospect Ave
Holyoke Rd
Upper Mill Rd
Springdale Rd
Union St
Powdermill Brook
Westfield River
Paucatuck Brook
Bear Hole Rd
Goldine Brook
Birnie Ave
Bagg Brook
Amostown Rd
Block Brook
Rogers Ave
Clayton Dr
Piper Rd
EAST MOUNTAIN
WHITE LOAF MOUNTAIN
MassGIS, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/ NASA, NGA, EPA, USDA
Pattern Track
Airfield Pavement
Other Military Patterns
Barnes ANG Base
Westfield, MA
0
0.5
1
2
Nautical Miles
N

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Representative Military Flight Profiles

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F-15C Flight Profile Maps

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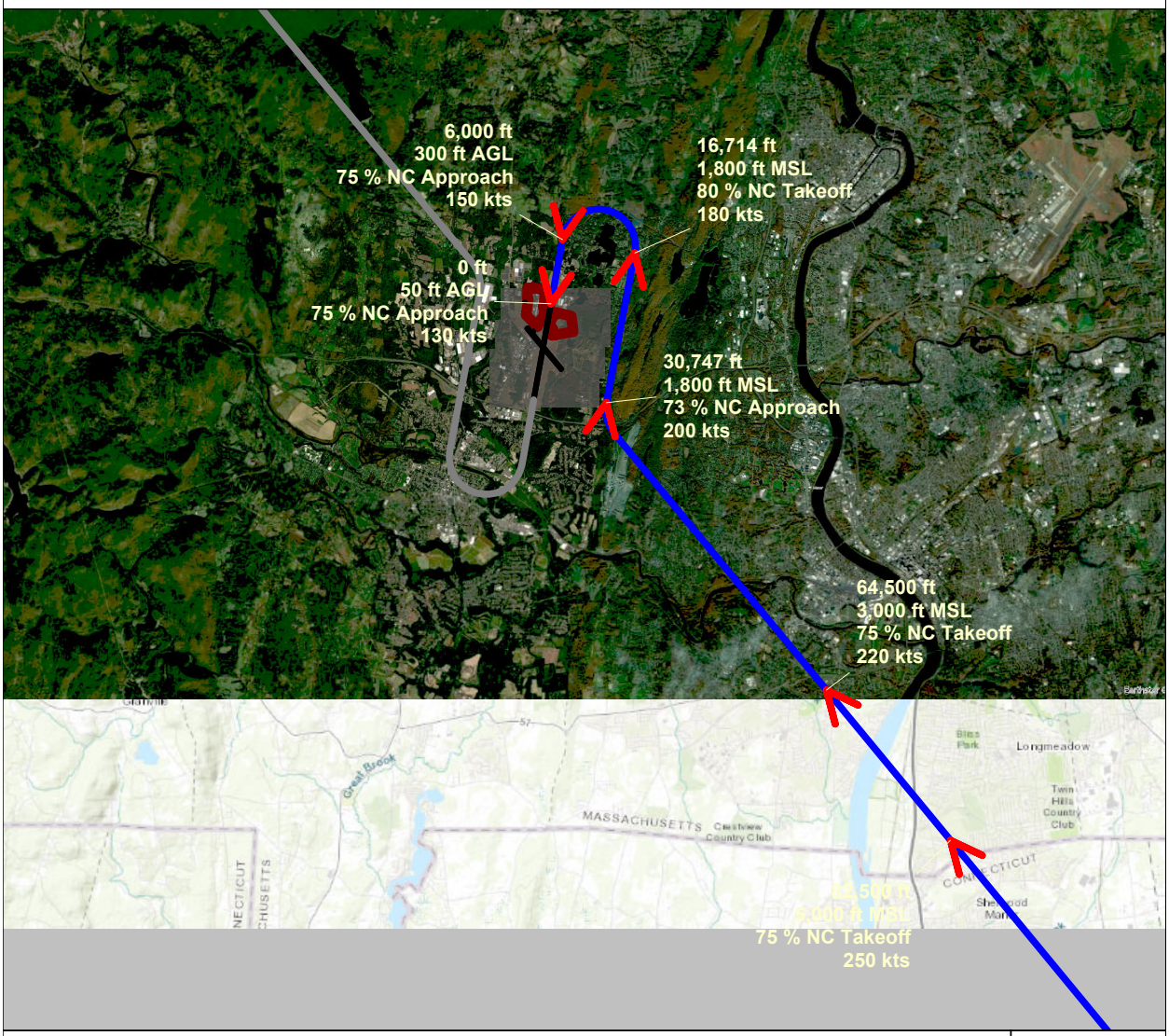
Flight Profile F15-A3

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	140,000	8,000 MSL	75 Takeoff	250	-3.0	-1300	136	
b	82,500	5,000 MSL	75 Takeoff	250	-6.3	-2600	45	
c	64,500	3,000 MSL	75 Takeoff	220	-2.0	-800	95	
d	30,747	1,800 MSL	73 Approach	200	0.0	0	44	
e	16,714	1,800 MSL	80 Takeoff	180	-6.5	-1900	38	Beyond approach extrap limit, using Takeoff
f	6,000	300 AGL	75 Approach	150	-2.4	-600	25	
g	0	50 AGL	75 Approach	130				



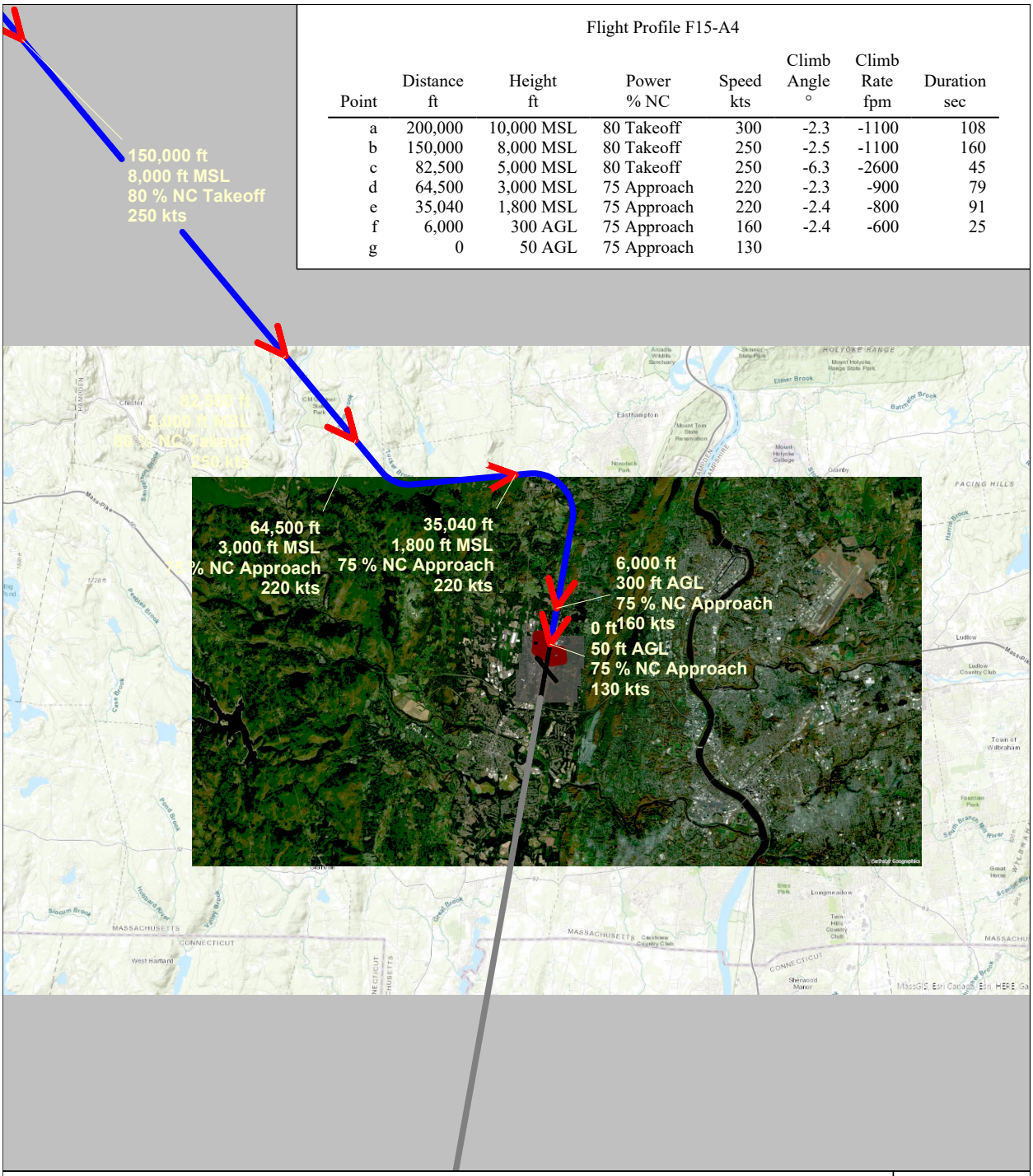
Aircraft: F15C (F100-PW-220) - Flight Profile F15-A3
VFR W-105 to 20 downwind
Flight Track: 20A01 - W-105 to 20 downwind

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:267,000 (1 inch = 22,300 feet)

Flight Profile F15-A4

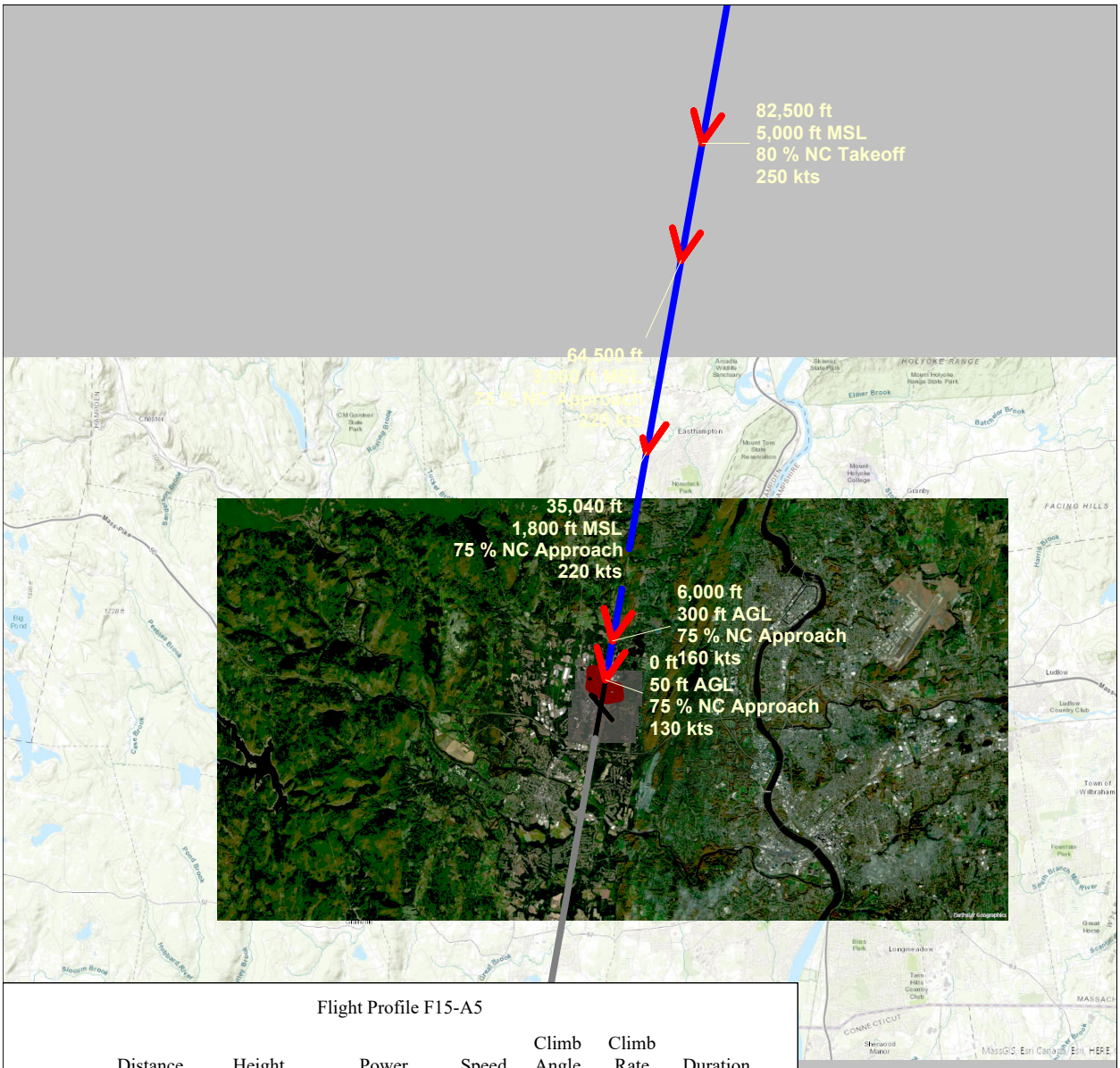
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,000 MSL	80 Takeoff	300	-2.3	-1100	108
b	150,000	8,000 MSL	80 Takeoff	250	-2.5	-1100	160
c	82,500	5,000 MSL	80 Takeoff	250	-6.3	-2600	45
d	64,500	3,000 MSL	75 Approach	220	-2.3	-900	79
e	35,040	1,800 MSL	75 Approach	220	-2.4	-800	91
f	6,000	300 AGL	75 Approach	160	-2.4	-600	25
g	0	50 AGL	75 Approach	130			



Aircraft: F15C (F100-PW-220) - Flight Profile F15-A4
VFR Viper to initial to 20
Flight Track: 20A02 - Viper to initial to Rwy 20

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000

Scale in Feet 1:422,000 (1 inch = 35,100 feet)



Flight Profile F15-A5

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,000 MSL	80 Takeoff	300	-2.3	-1100	108
b	150,000	8,000 MSL	80 Takeoff	250	-2.5	-1100	160
c	82,500	5,000 MSL	80 Takeoff	250	-6.3	-2600	45
d	64,500	3,000 MSL	75 Approach	220	-2.3	-900	79
e	35,040	1,800 MSL	75 Approach	220	-2.4	-800	91
f	6,000	300 AGL	75 Approach	160	-2.4	-600	25
g	0	50 AGL	75 Approach	130			

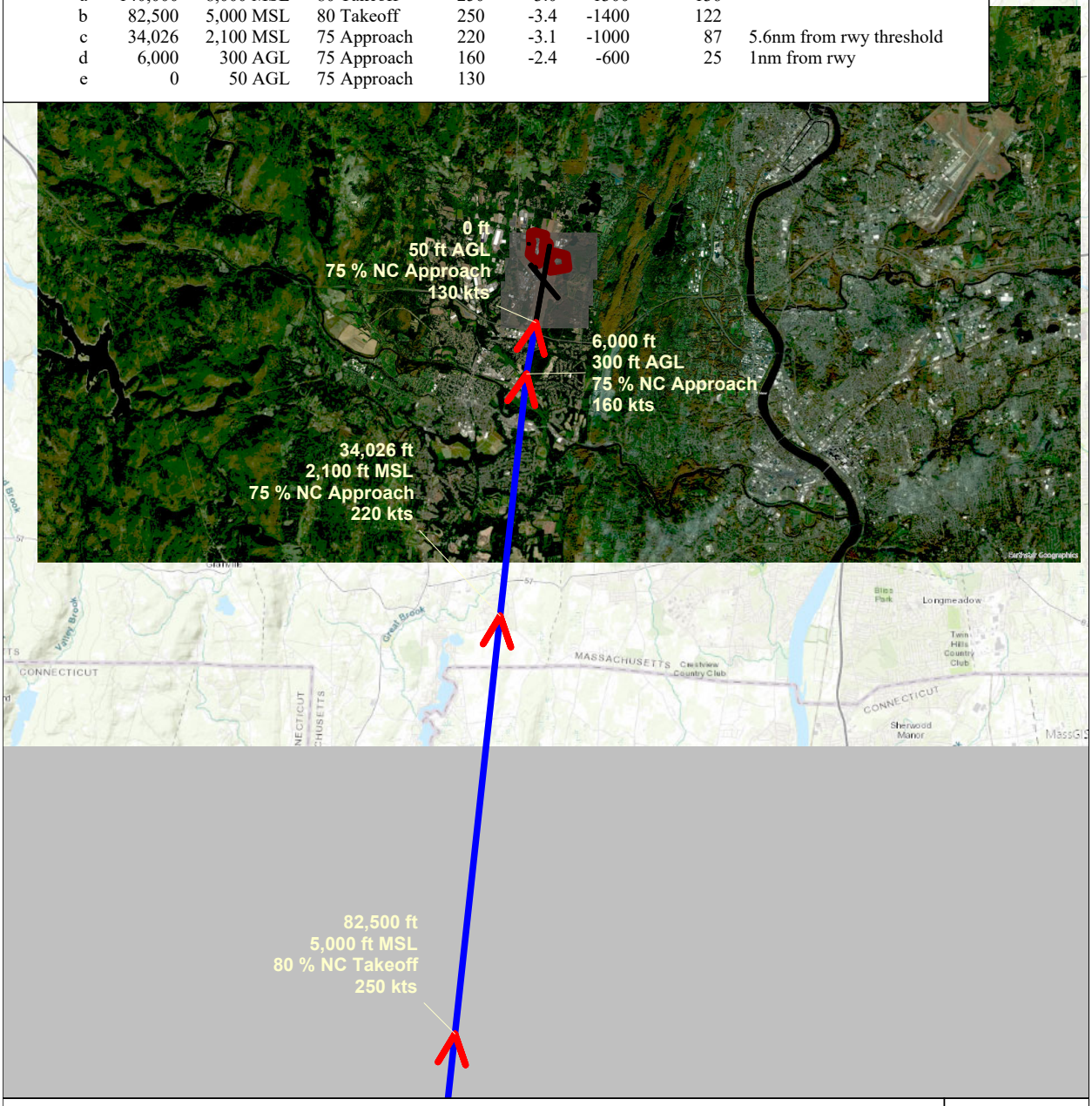
Aircraft: F15C (F100-PW-220) - Flight Profile F15-A5
VFR Yankee/Laser/Scoty/Condor, runway heading
Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000

Scale in Feet 1:422,000 (1 inch = 35,100 feet)

Flight Profile F15-A7

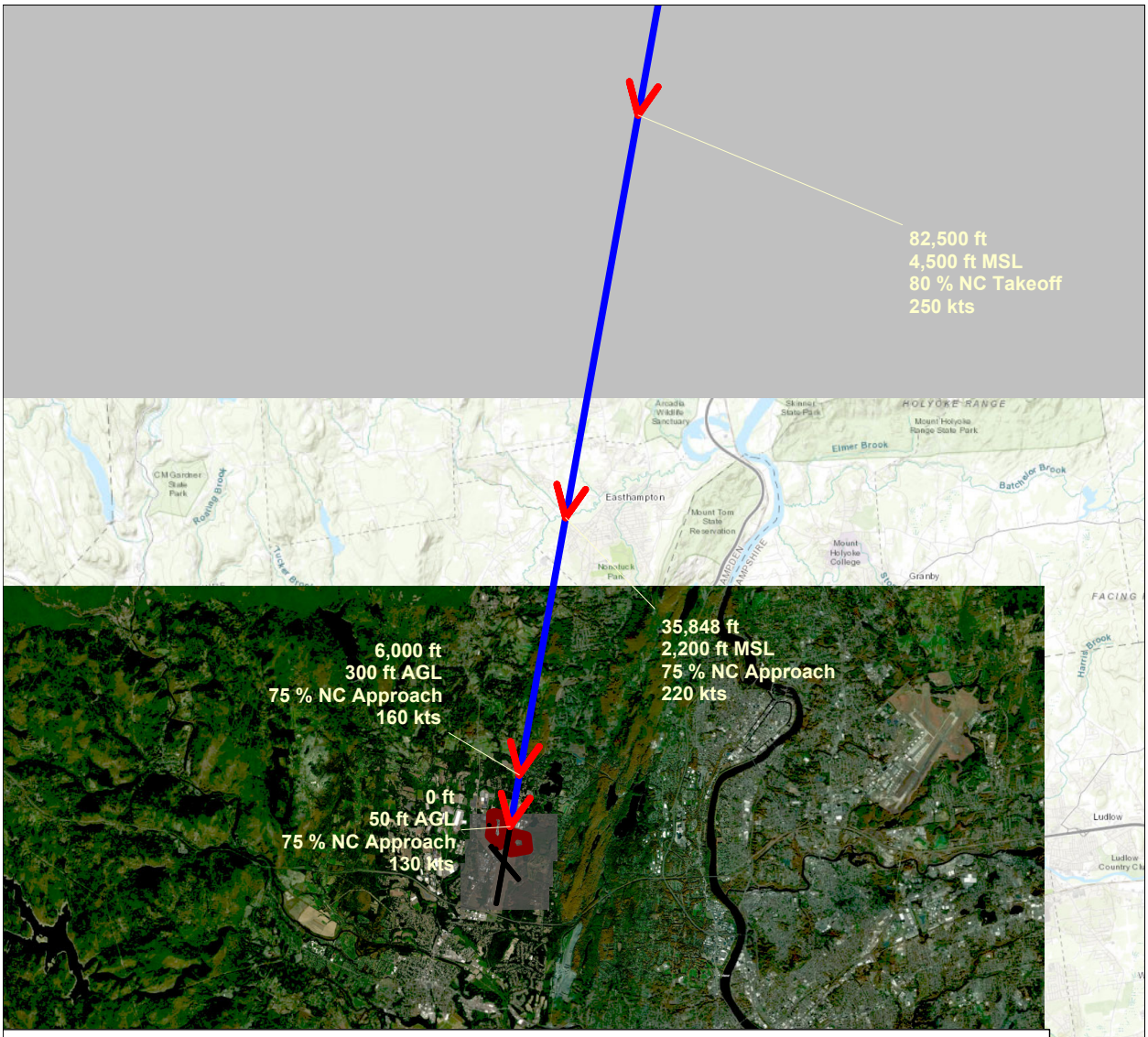
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	140,000	8,000 MSL	80 Takeoff	250	-3.0	-1300	136	
b	82,500	5,000 MSL	80 Takeoff	250	-3.4	-1400	122	
c	34,026	2,100 MSL	75 Approach	220	-3.1	-1000	87	5.6nm from rwy threshold
d	6,000	300 AGL	75 Approach	160	-2.4	-600	25	1nm from rwy
e	0	50 AGL	75 Approach	130				



Aircraft: F15C (F100-PW-220) - Flight Profile F15-A7
TACAN
Flight Track: 02A03 - TACAN

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

Scale in Feet 1:312,000 (1 inch = 26,000 feet)



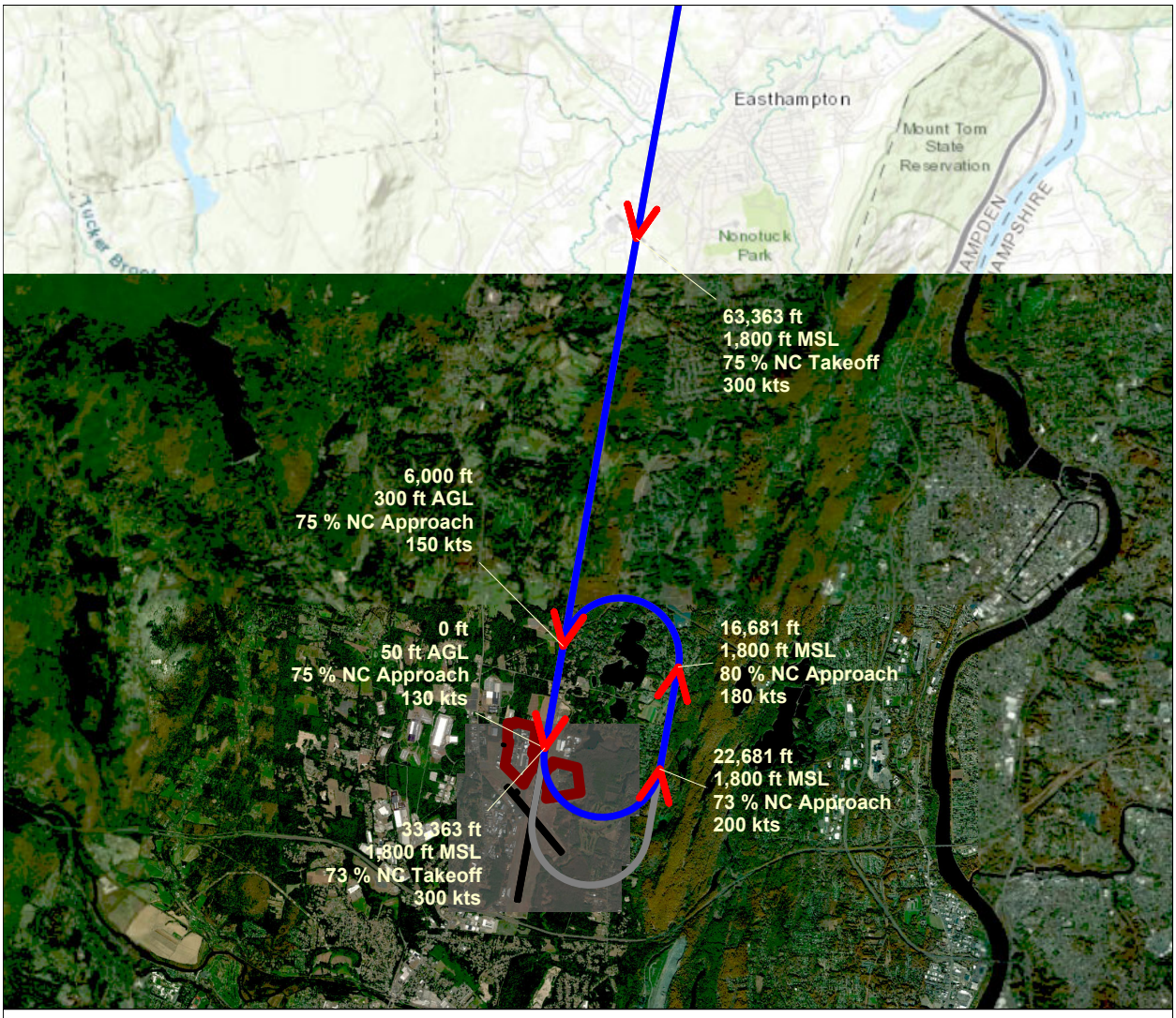
Flight Profile F15-A8

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	80 Takeoff	300	-2.3	-1100	108	
b	150,000	8,000 MSL	80 Takeoff	250	-3.0	-1300	160	
c	82,500	4,500 MSL	80 Takeoff	250	-2.8	-1200	118	
d	35,848	2,200 MSL	75 Approach	220	-3.1	-1100	93	5.9nm from rwy threshold
e	6,000	300 AGL	75 Approach	160	-2.4	-600	25	1nm from rwy
f	0	50 AGL	75 Approach	130				

Aircraft: F15C (F100-PW-220) - Flight Profile F15-A8
ILS
Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:326,000 (1 inch = 27,200 feet)



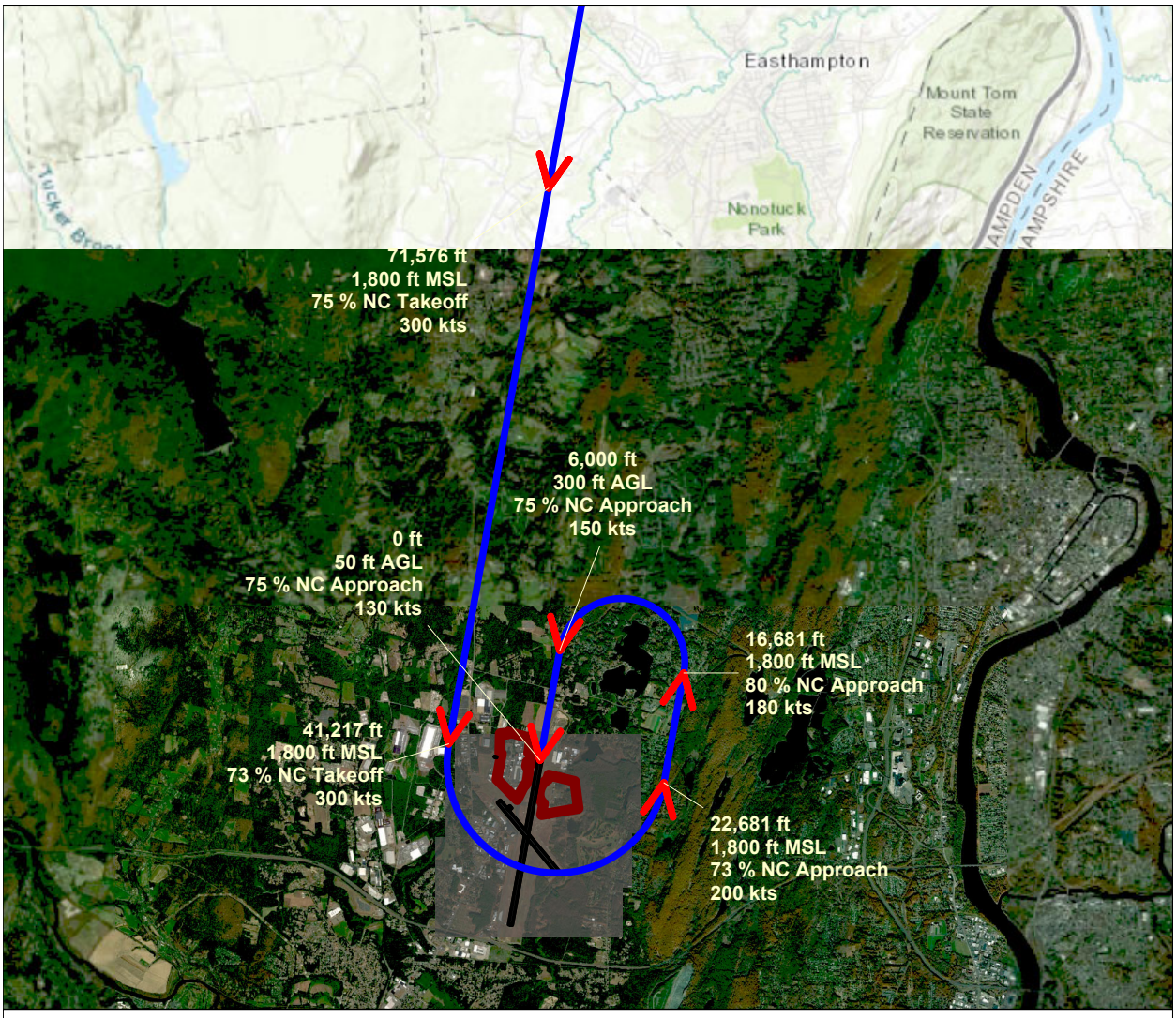
Flight Profile F15-O4

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	213,350	10,000 MSL	75 Takeoff	300	-2.9	-1500	197	
b	113,350	5,000 MSL	75 Takeoff	300	-3.7	-1900	99	
c	63,363	1,800 MSL	75 Takeoff	300	0.0	0	59	initial
d	33,363	1,800 MSL	73 Takeoff	300	0.0	0	25	Break pt
e	22,681	1,800 MSL	73 Approach	200	0.0	0	19	Start downwind, begin to drop gear
f	16,681	1,800 MSL	80 Approach	180	-6.6	-1900	38	End downwind, Beyond approach extrap lim
g	6,000	300 AGL	75 Approach	150	-2.4	-600	25	1nm final
h	0	50 AGL	75 Approach	130				

Aircraft: F15C (F100-PW-220) - Flight Profile F15-O4
1st ship break
Flight Track: 20O01 - 1st Break Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:169,000 (1 inch = 14,100 feet)



Flight Profile F15-O6

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	213,350	10,000 MSL	75 Takeoff	300	-3.1	-1700	182	
b	121,350	5,000 MSL	75 Takeoff	300	-3.7	-2000	98	
c	71,576	1,800 MSL	75 Takeoff	300	0.0	0	60	initial
d	41,217	1,800 MSL	73 Takeoff	300	0.0	0	44	Break pt abeam of first ship break at upwind
e	22,681	1,800 MSL	73 Approach	200	0.0	0	19	Start downwind, begin to drop gear
f	16,681	1,800 MSL	80 Approach	180	-6.6	-1900	38	End downwind, Beyond approach extrap lim
g	6,000	300 AGL	75 Approach	150	-2.4	-600	25	1nm final
h	0	50 AGL	75 Approach	130				

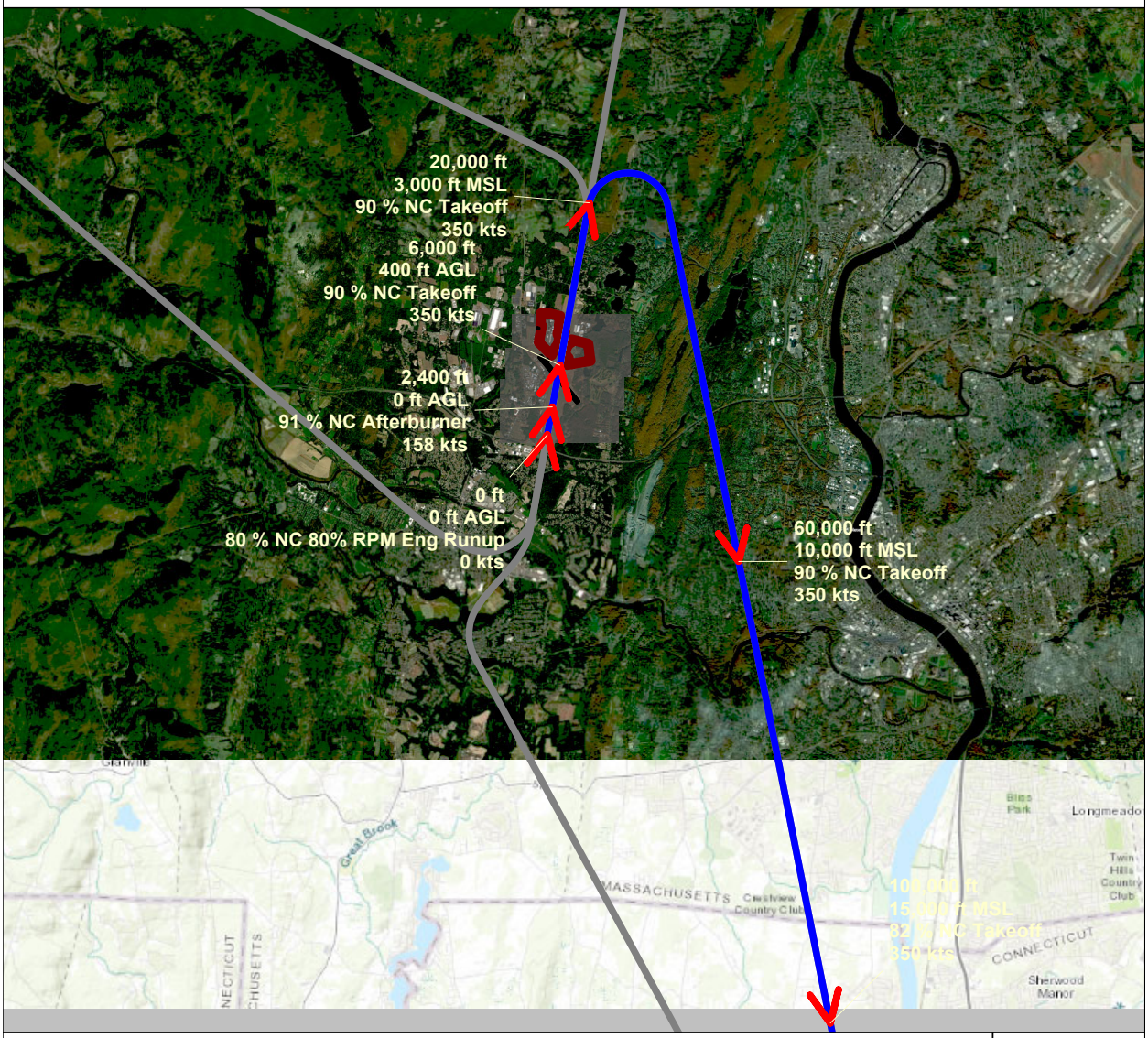
Aircraft: F15C (F100-PW-220) - Flight Profile F15-O6
TAC break
Flight Track: 20O03 - TAC Initial Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:157,000 (1 inch = 13,100 feet)

Flight Profile F15-D1A

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	80 80% RPM Eng Runup	0	0.0	0	18	
b	2,400	0 AGL	91 Afterburner	158	6.3	2900	8	
c	6,000	400 AGL	90 Takeoff	350	9.4	5900	24	
d	20,000	3,000 MSL	90 Takeoff	350	9.9	6200	68	Continue climb at 6000 fpm to a
e	60,000	10,000 MSL	90 Takeoff	350	7.1	4400	68	
f	100,000	15,000 MSL	82 Takeoff	350				



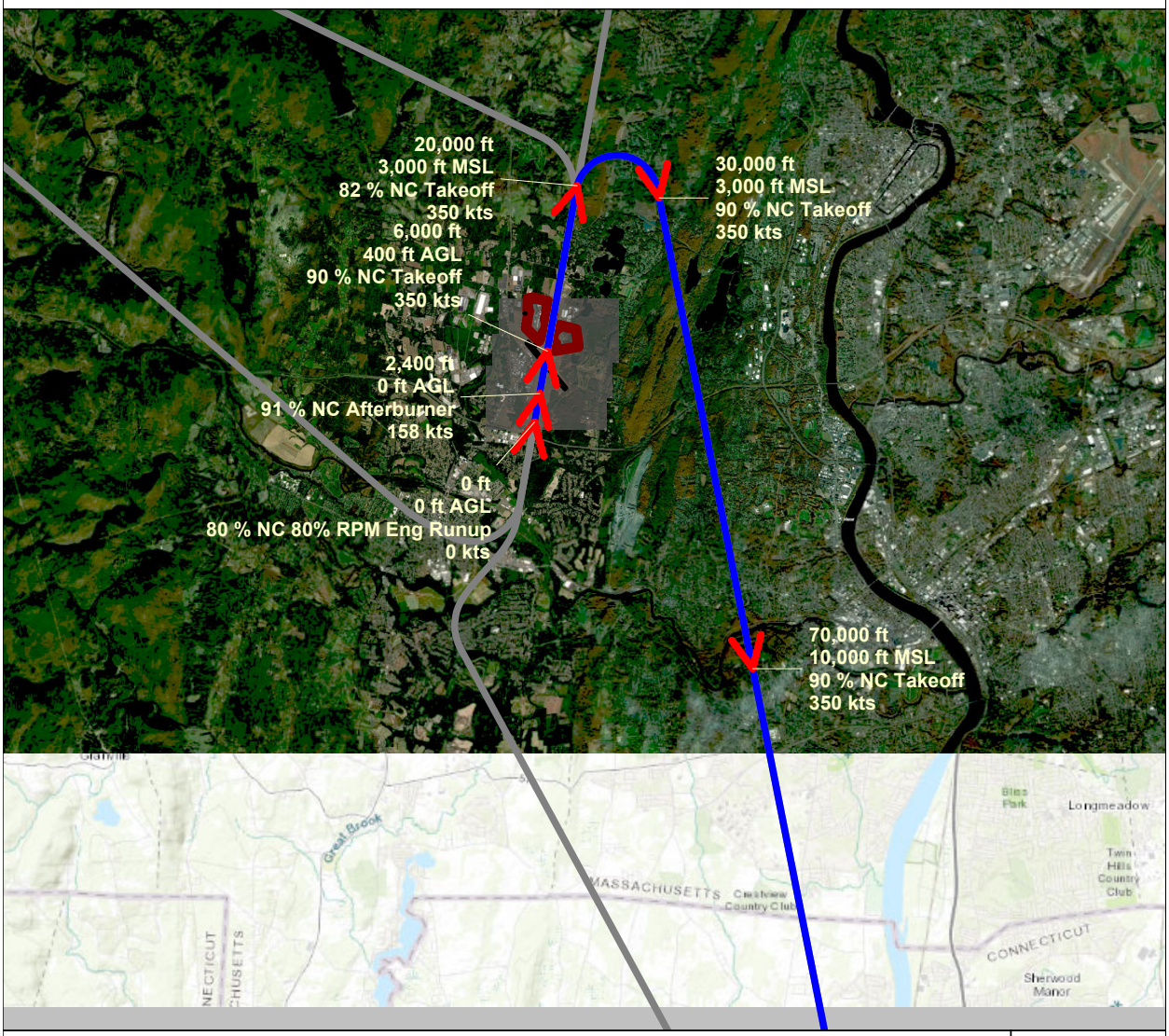
Aircraft: F15C (F100-PW-220) - Flight Profile F15-D1A
AB Departure cleared to climb
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:242,000 (1 inch = 20,200 feet)

Flight Profile F15-D1AH

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	80 80% RPM Eng Runup	0	0.0	0	18	
b	2,400	0 AGL	91 Afterburner	158	6.3	2900	8	
c	6,000	400 AGL	90 Takeoff	350	9.4	5900	24	
d	20,000	3,000 MSL	82 Takeoff	350	0.0	0	17	Limited to 3000 MSL until clea
e	30,000	3,000 MSL	90 Takeoff	350	9.9	6200	68	
f	70,000	10,000 MSL	90 Takeoff	350	7.1	4400	68	
g	110,000	15,000 MSL	82 Takeoff	350				



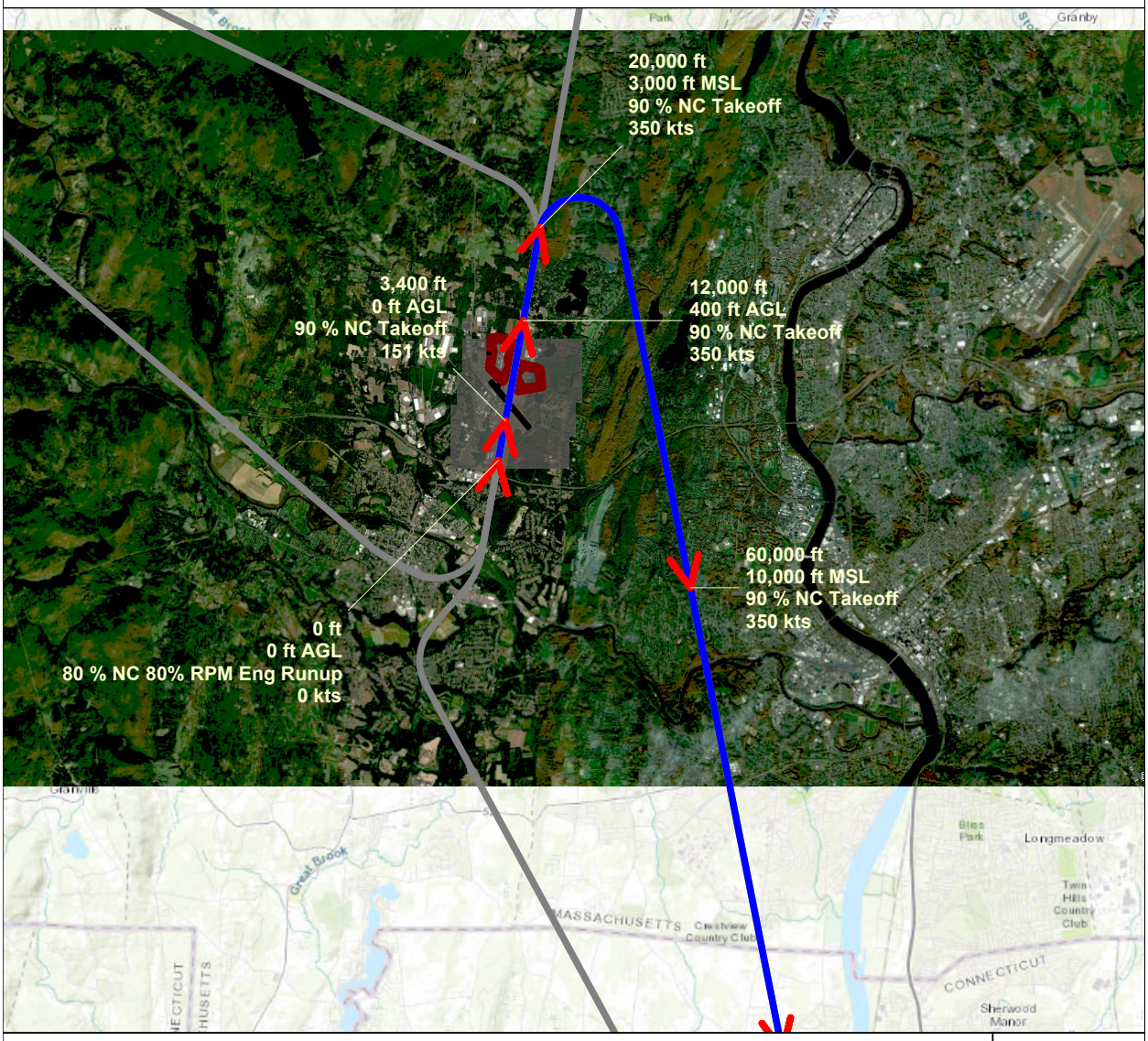
Aircraft: F15C (F100-PW-220) - Flight Profile F15-D1AH
AB Departure held at 3000 MSL
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:242,000 (1 inch = 20,200 feet)

Flight Profile F15-D1M

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	80 80% RPM Eng Runup	0	0.0	0	27	
b	3,400	0 AGL	90 Takeoff	151	2.7	1200	20	
c	12,000	400 AGL	90 Takeoff	350	16.2	10300	14	
d	20,000	3,000 MSL	90 Takeoff	350	9.9	6200	68	Continue climb at 6000 fpm to a
e	60,000	10,000 MSL	90 Takeoff	350	7.1	4400	68	
f	100,000	15,000 MSL	82 Takeoff	350				



Aircraft: F15C (F100-PW-220) - Flight Profile F15-D1M

Mil Departure cleared to climb

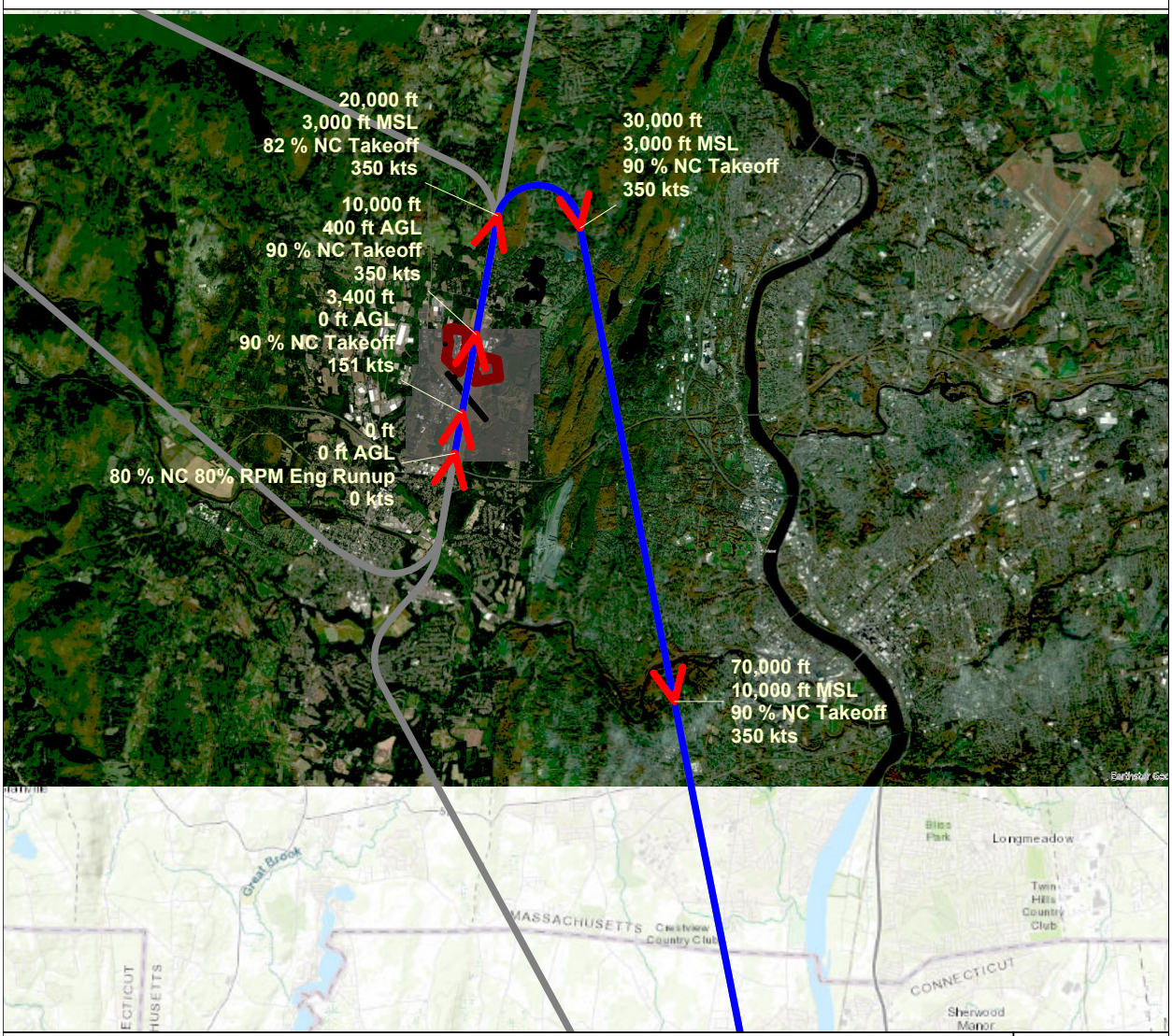
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:241,000 (1 inch = 20,100 feet)

Flight Profile F15-D1MH

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	80 80% RPM Eng Runup	0	0.0	0	27	
b	3,400	0 AGL	90 Takeoff	151	3.5	1500	16	
c	10,000	400 AGL	90 Takeoff	350	13.1	8300	17	
d	20,000	3,000 MSL	82 Takeoff	350	0.0	0	17	Limited to 3000 MSL until clea
e	30,000	3,000 MSL	90 Takeoff	350	9.9	6200	68	
f	70,000	10,000 MSL	90 Takeoff	350	7.1	4400	68	
g	110,000	15,000 MSL	82 Takeoff	350				



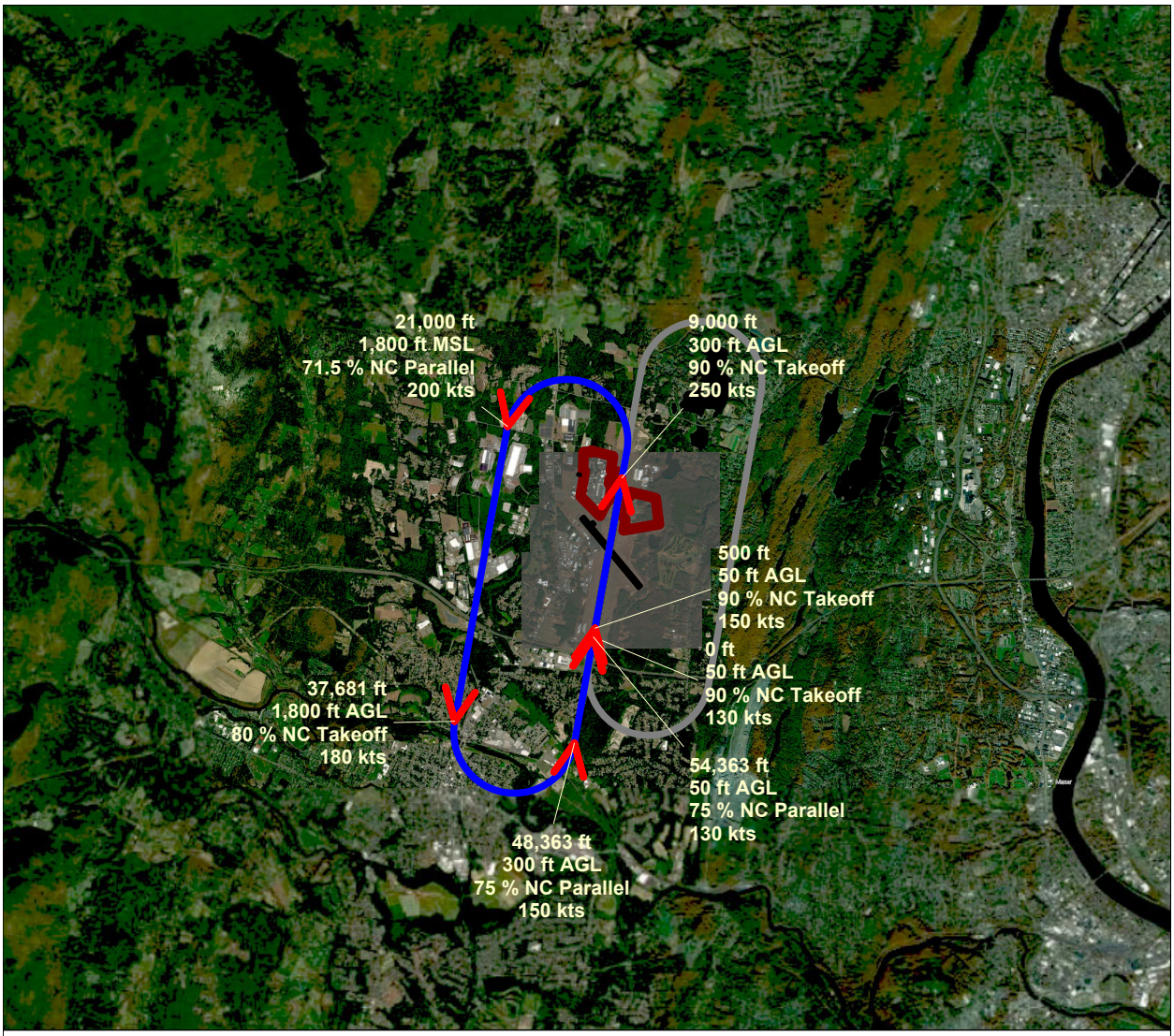
Aircraft: F15C (F100-PW-220) - Flight Profile F15-D1MH

Mil Departure held at 3000 MSL

Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:241,000 (1 inch = 20,100 feet)



Flight Profile F15-C1

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	90 Takeoff	130	0.0	0	2	
b	500	50 AGL	90 Takeoff	150	1.7	600	25	
c	9,000	300 AGL	90 Takeoff	250	5.8	2300	32	
d	21,000	1,800 MSL	71.5 Parallel	200	0.9	300	52	
e	37,681	1,800 AGL	80 Takeoff	180	-8.0	-2300	38	Beyond approach extrap limit, using Takeoff
f	48,363	300 AGL	75 Parallel	150	-2.4	-600	25	
g	54,363	50 AGL	75 Parallel	130				

Aircraft: F15C (F100-PW-220) - Flight Profile F15-C1

Check flight closed pattern

Flight Track: 02C1 - Standard closed pattern fighter

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:162,000 (1 inch = 13,500 feet)

F-15EX Flight Profile Maps

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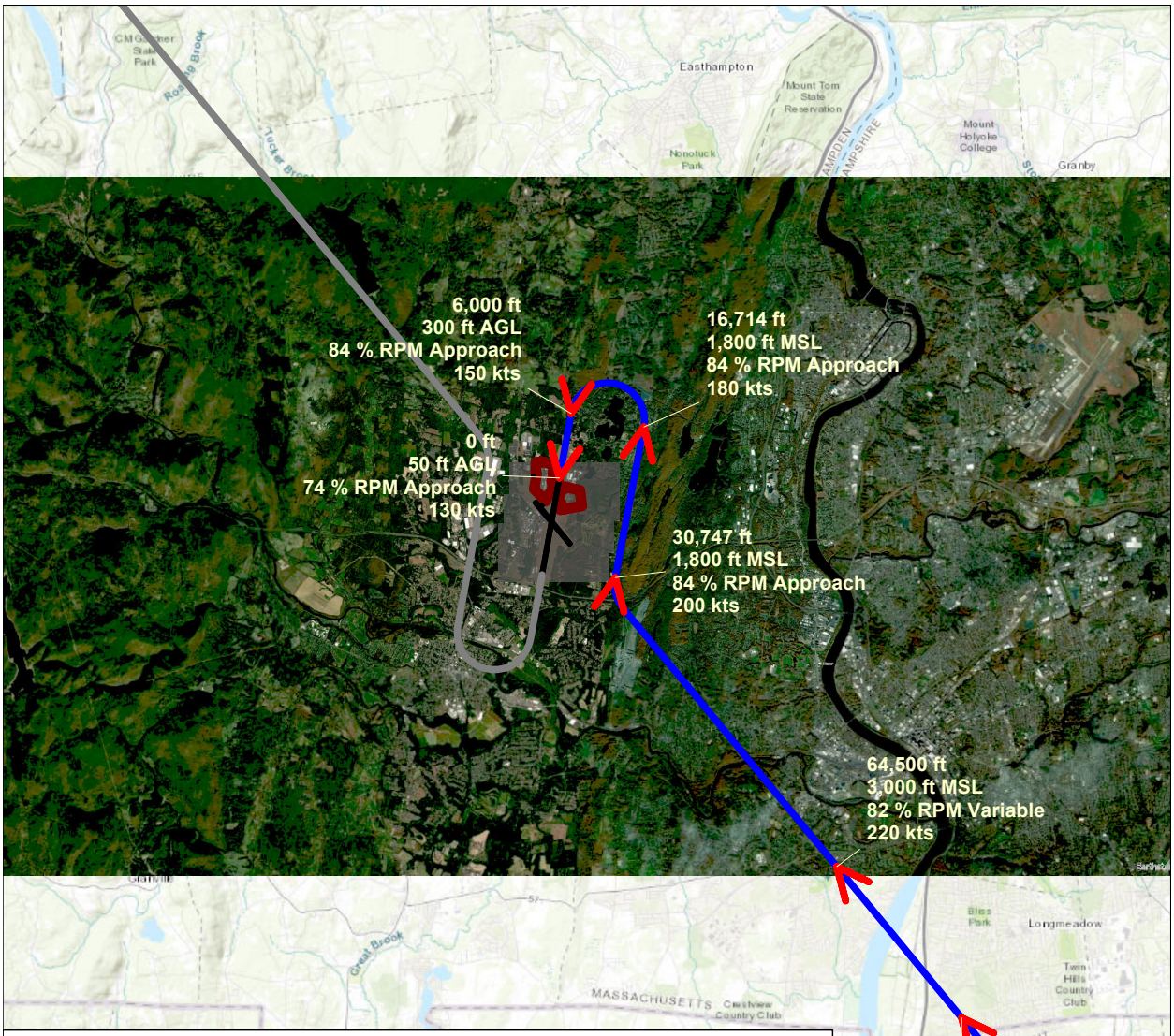


Flight Profile F15X-A3

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	140,000	8,000 MSL	74 Variable	250	-3.0	-1300	136
b	82,500	5,000 MSL	74 Variable	250	-6.3	-2600	45
c	64,500	3,000 MSL	82 Variable	220	-2.0	-800	95
d	30,747	1,800 MSL	84 Approach	200	0.0	0	44
e	16,714	1,800 MSL	84 Approach	180	-6.5	-1900	38
f	6,000	300 AGL	84 Approach	150	-2.4	-600	25
g	0	50 AGL	74 Approach	130			

Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-A3

VFR W-105 to 20 downwind

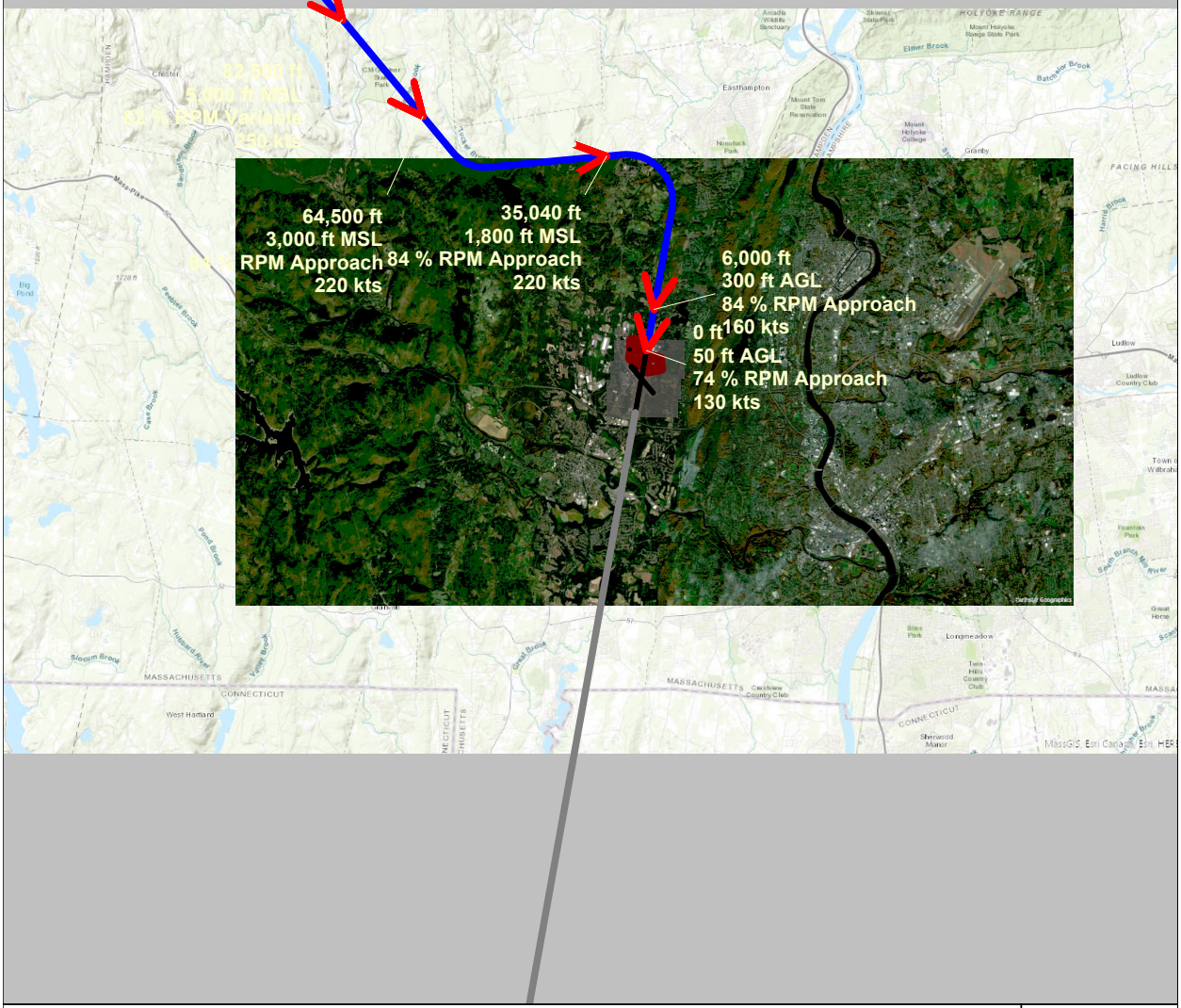
Flight Track: 20A01 - W-105 to 20 downwind

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:267,000 (1 inch = 22,200 feet)

Flight Profile F15X-A4

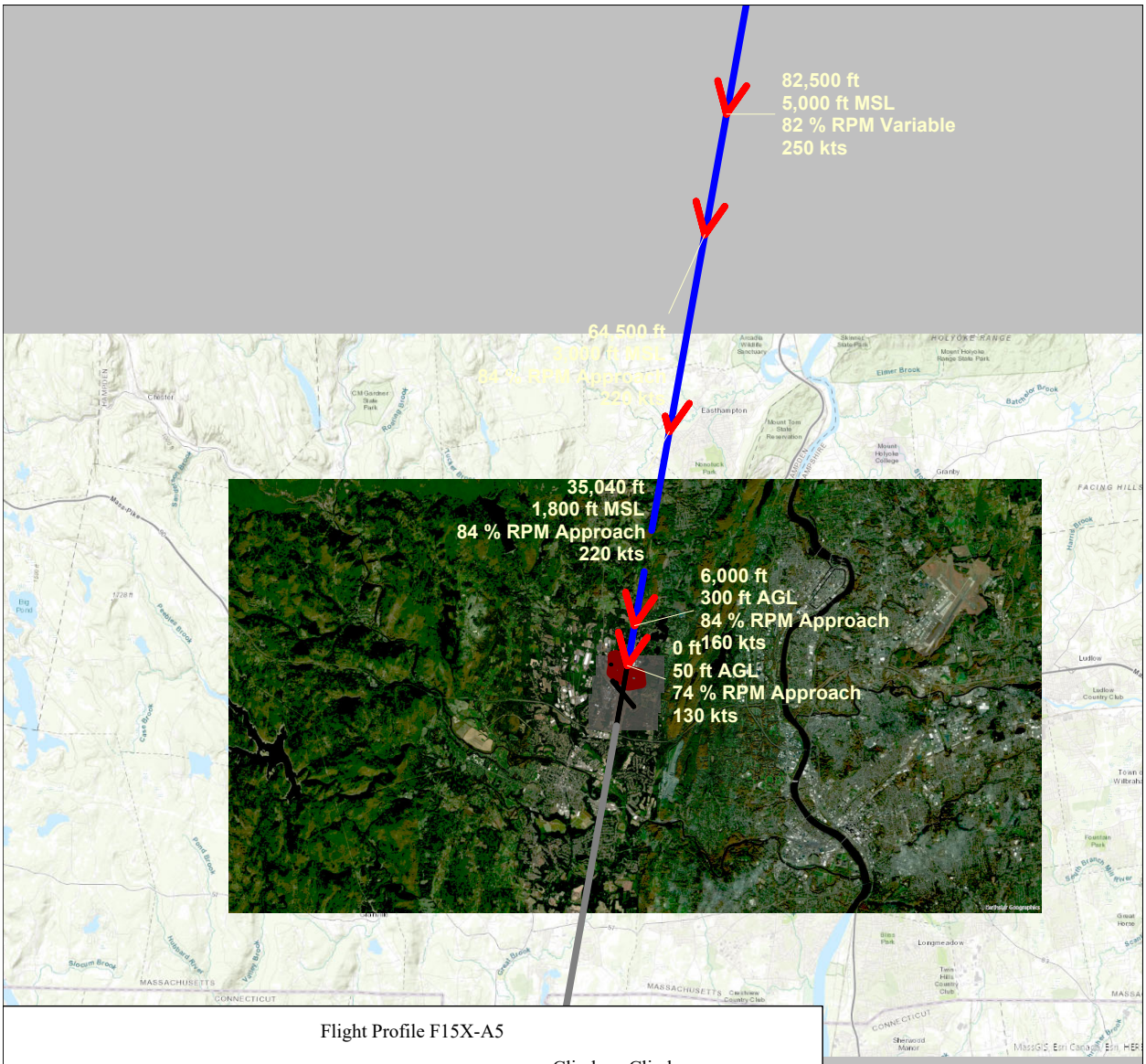
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,000 MSL	74 Variable	300	-2.3	-1100	108
b	150,000	8,000 MSL	74 Variable	250	-2.5	-1100	160
c	82,500	5,000 MSL	82 Variable	250	-6.3	-2600	45
d	64,500	3,000 MSL	84 Approach	220	-2.3	-900	79
e	35,040	1,800 MSL	84 Approach	220	-2.4	-800	91
f	6,000	300 AGL	84 Approach	160	-2.4	-600	25
g	0	50 AGL	74 Approach	130			



Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-A4
VFR Viper to initial to 20
Flight Track: 20A02 - Viper to initial to Rwy 20

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000

Scale in Feet 1:420,000 (1 inch = 35,000 feet)



Flight Profile F15X-A5

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,000 MSL	74 Variable	300	-2.3	-1100	108
b	150,000	8,000 MSL	74 Variable	250	-2.5	-1100	160
c	82,500	5,000 MSL	82 Variable	250	-6.3	-2600	45
d	64,500	3,000 MSL	84 Approach	220	-2.3	-900	79
e	35,040	1,800 MSL	84 Approach	220	-2.4	-800	91
f	6,000	300 AGL	84 Approach	160	-2.4	-600	25
g	0	50 AGL	74 Approach	130			

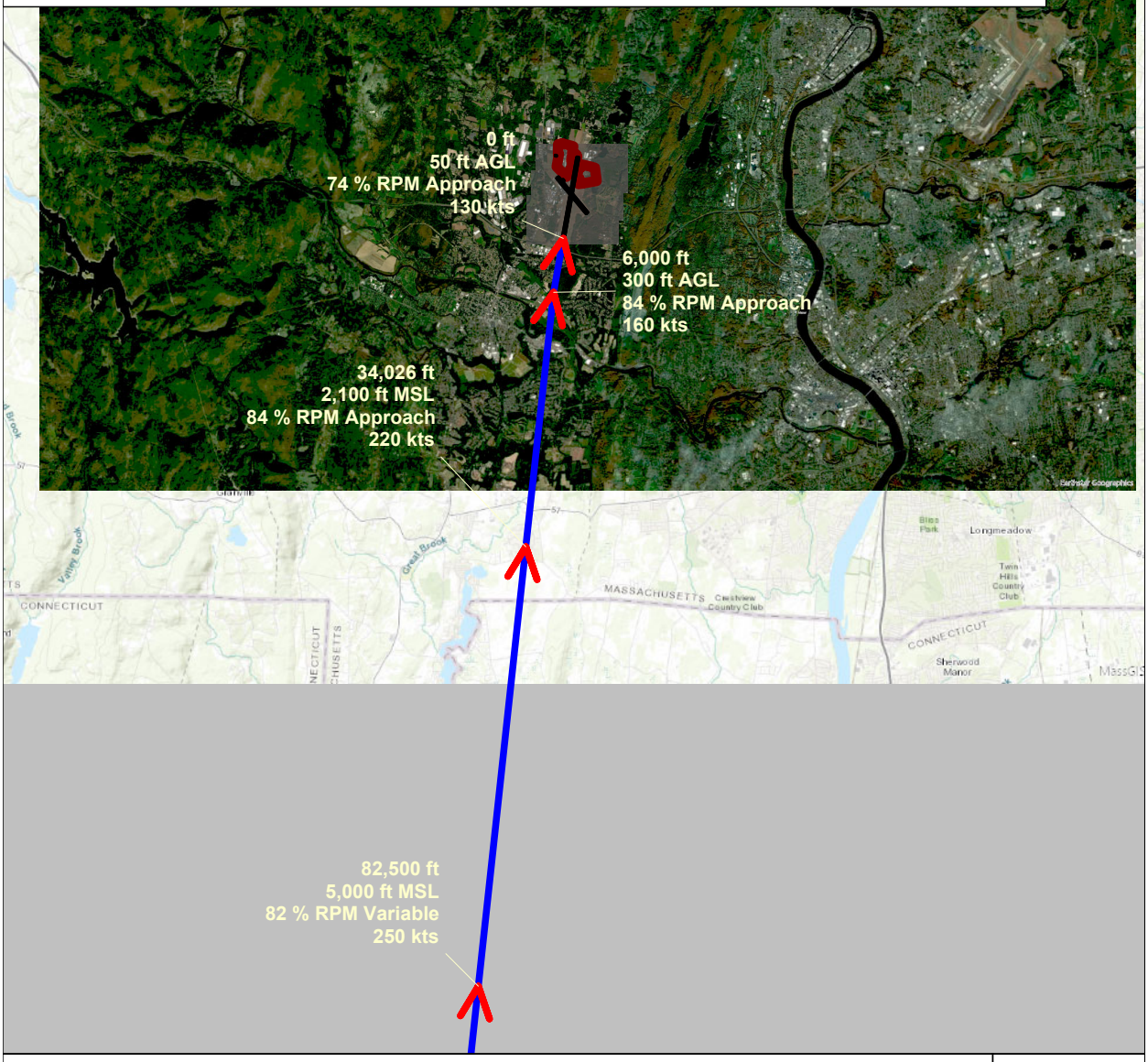
Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-A5
VFR Yankee/Laser/Scoty/Condor, runway heading
Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000

Scale in Feet 1:420,000 (1 inch = 35,000 feet)

Flight Profile F15X-A7

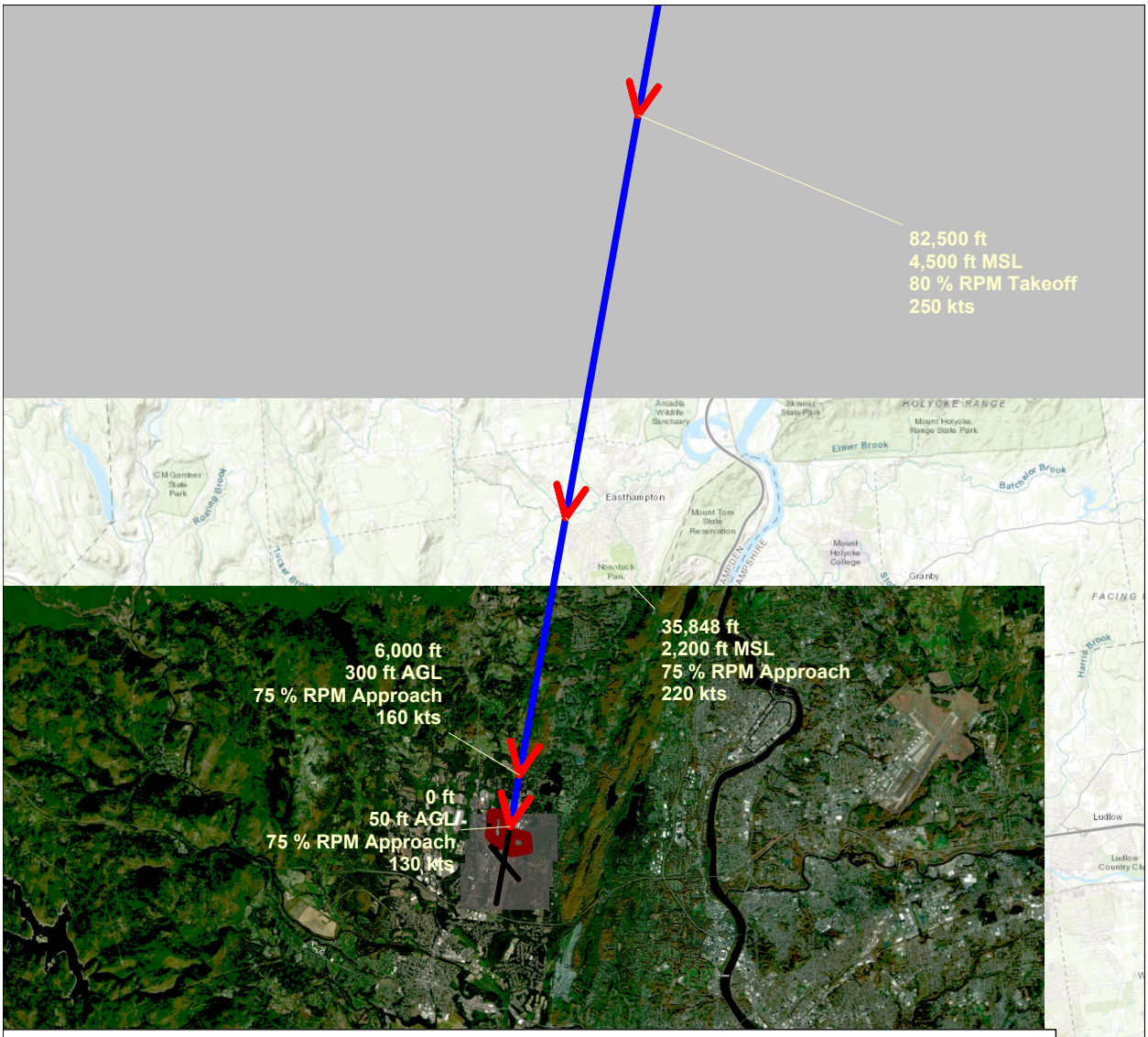
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	140,000	8,000 MSL	74 Variable	250	-3.0	-1300	136	
b	82,500	5,000 MSL	82 Variable	250	-3.4	-1400	122	
c	34,026	2,100 MSL	84 Approach	220	-3.1	-1000	87	5.6nm from rwy threshold
d	6,000	300 AGL	84 Approach	160	-2.4	-600	25	1nm from rwy
e	0	50 AGL	74 Approach	130				



Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-A7
TACAN
Flight Track: 02A03 - TACAN

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

Scale in Feet 1:312,000 (1 inch = 26,000 feet)



Flight Profile F15X-A8

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	80 Takeoff	300	-2.3	-1100	108	
b	150,000	8,000 MSL	80 Takeoff	250	-3.0	-1300	160	
c	82,500	4,500 MSL	80 Takeoff	250	-2.8	-1200	118	
d	35,848	2,200 MSL	75 Approach	220	-3.1	-1100	93	5.9nm from rwy threshold
e	6,000	300 AGL	75 Approach	160	-2.4	-600	25	1nm from rwy
f	0	50 AGL	75 Approach	130				

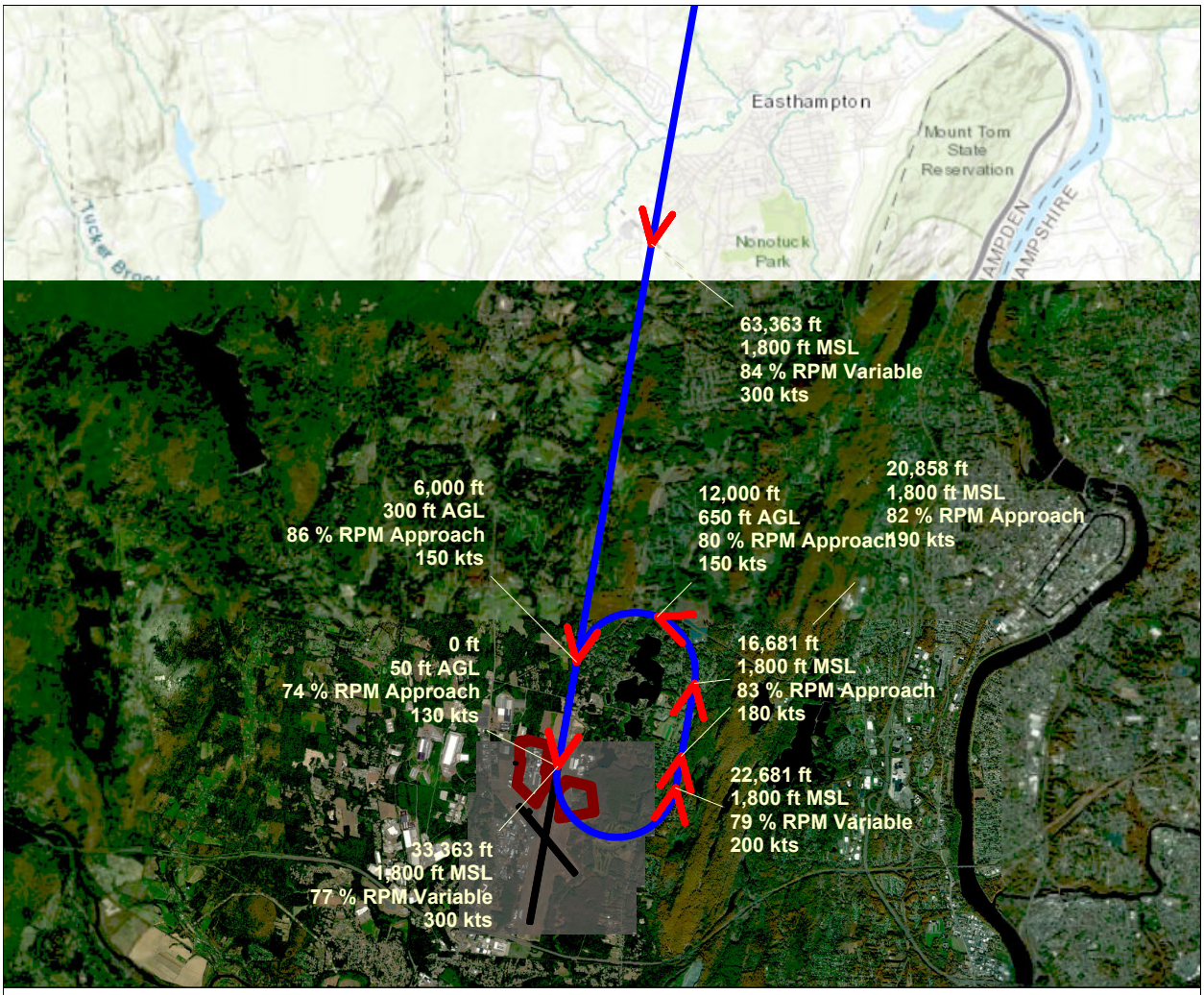
Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-A8

ILS

Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:326,000 (1 inch = 27,200 feet)



Flight Profile F15X-O4

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	213,350	10,000 MSL	74 Variable	300	-2.9	-1500	197	
b	113,350	5,000 MSL	74 Variable	300	-3.7	-1900	99	
c	63,363	1,800 MSL	84 Variable	300	0.0	0	59	initial
d	33,363	1,800 MSL	77 Variable	300	0.0	0	25	Break pt
e	22,681	1,800 MSL	79 Variable	200	0.0	0	6	Start downwind, begin to drop gear
f	20,858	1,800 MSL	82 Approach	190	0.0	0	13	mid downwind
g	16,681	1,800 MSL	83 Approach	180	-10.6	-3100	17	End downwind, Beyond approach extrap lir
h	12,000	650 AGL	80 Approach	150	-3.3	-900	24	crosswind
i	6,000	300 AGL	86 Approach	150	-2.4	-600	25	1nm final
j	0	50 AGL	74 Approach	130				

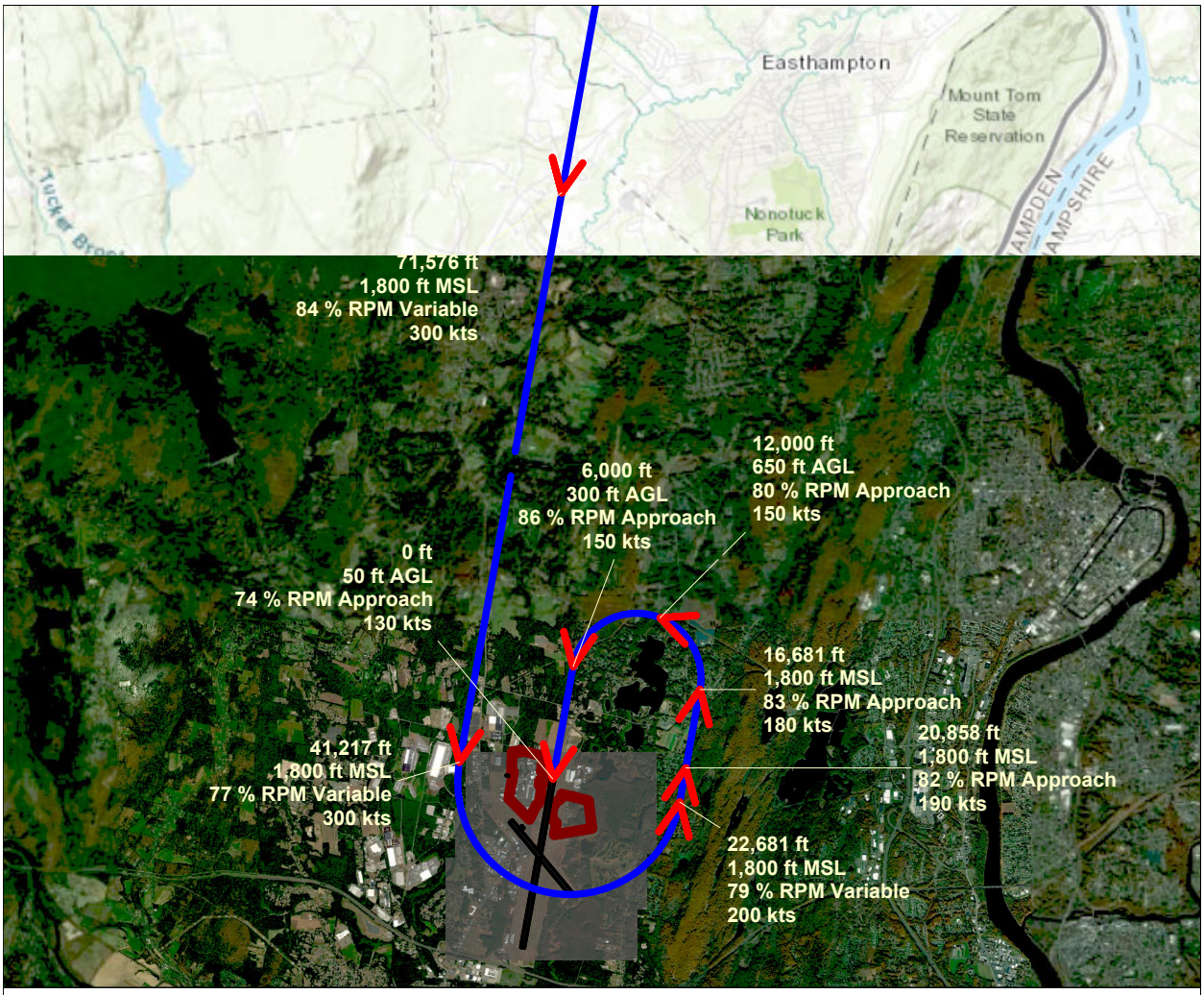
Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-O4

1st ship break

Flight Track: 20O01 - 1st Break Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:169,000 (1 inch = 14,100 feet)



Flight Profile F15X-O6

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	213,350	10,000 MSL	74 Variable	300	-3.1	-1700	182	
b	121,350	5,000 MSL	74 Variable	300	-3.7	-2000	98	
c	71,576	1,800 MSL	84 Variable	300	0.0	0	60	initial
d	41,217	1,800 MSL	77 Variable	300	0.0	0	44	Break pt abeam of first ship break at upwin
e	22,681	1,800 MSL	79 Variable	200	0.0	0	6	Start downwind, begin to drop gear
f	20,858	1,800 MSL	82 Approach	190	0.0	0	13	mid downwind
g	16,681	1,800 MSL	83 Approach	180	-10.6	-3100	17	End downwind, Beyond approach extrap lir
h	12,000	650 AGL	80 Approach	150	-3.3	-900	24	crosswind
i	6,000	300 AGL	86 Approach	150	-2.4	-600	25	1nm final
j	0	50 AGL	74 Approach	130				

Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-O6

TAC break

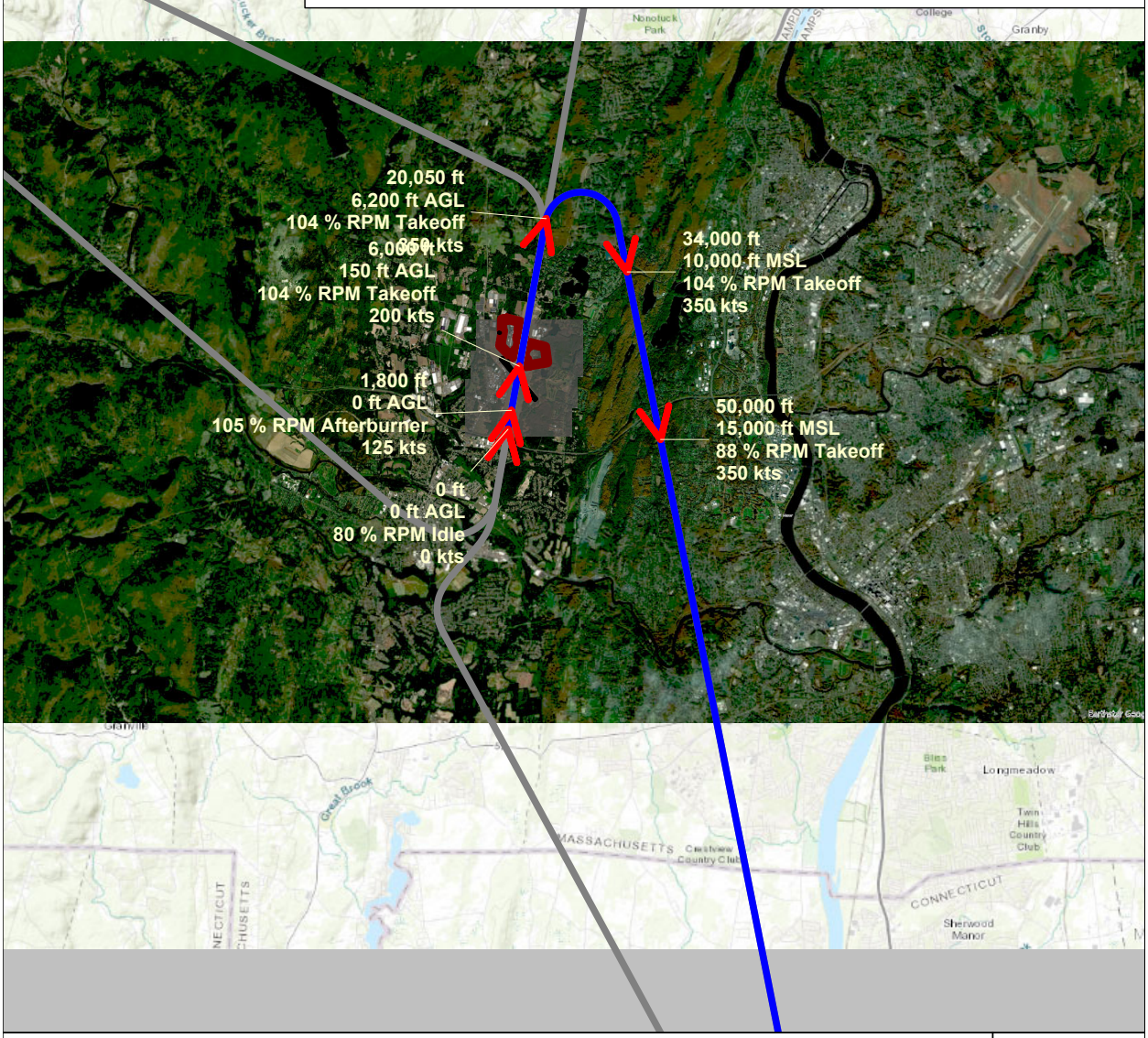
Flight Track: 20O03 - TAC Initial Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:157,000 (1 inch = 13,100 feet)

Flight Profile F15X-D1A

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	80 Idle	0	0.0	0	17
b	1,800	0 AGL	105 Afterburner	125	2.0	600	15
c	6,000	150 AGL	104 Takeoff	200	23.3	12000	30
d	20,050	6,200 AGL	104 Takeoff	350	14.2	9000	24
e	34,000	10,000 MSL	104 Takeoff	350	17.4	11100	27
f	50,000	15,000 MSL	88 Takeoff	350			



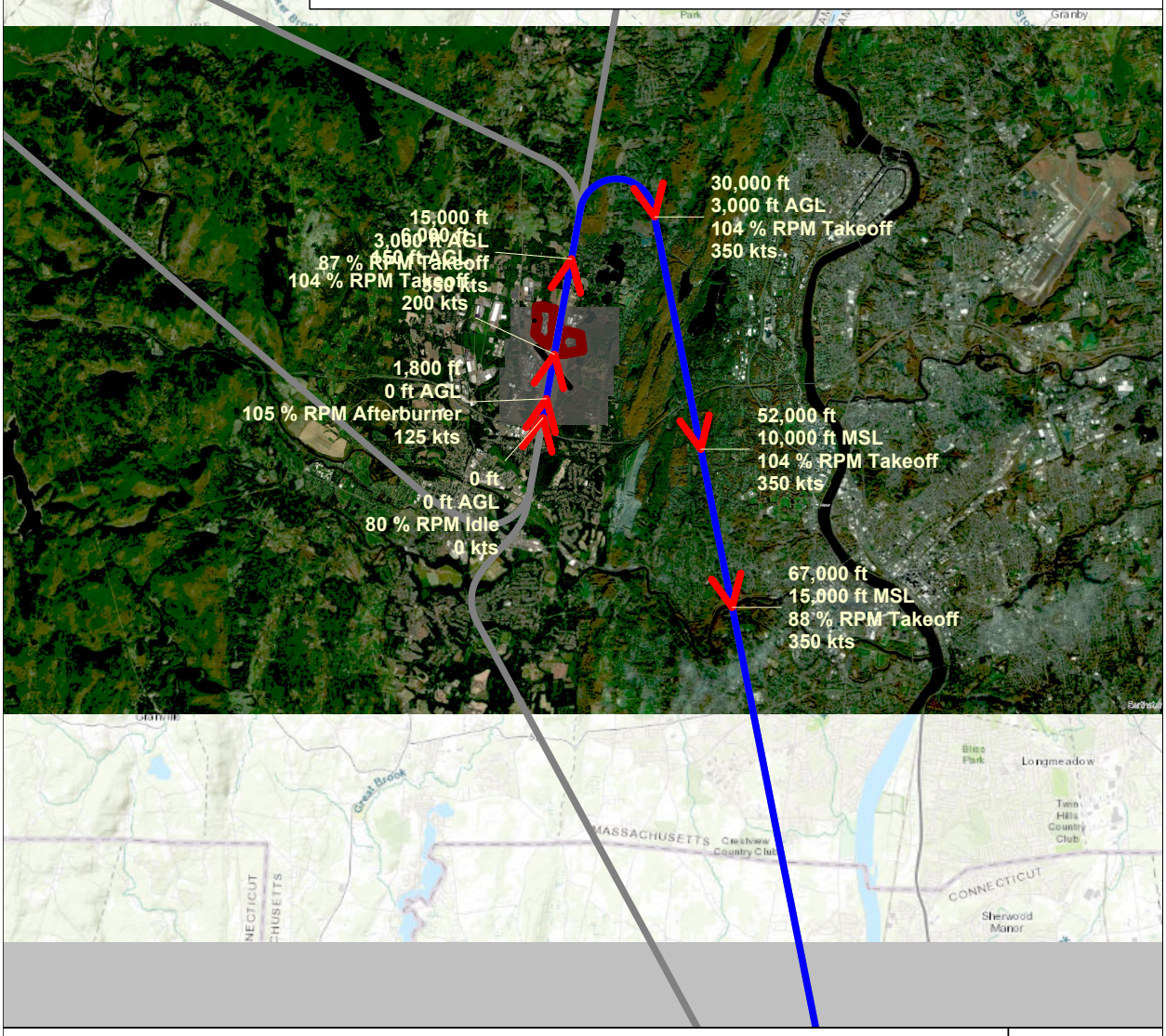
Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-D1A
AB Departure cleared to climb
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:267,000 (1 inch = 22,300 feet)

Flight Profile F15X-D1AH

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	80 Idle	0	0.0	0	17
b	1,800	0 AGL	105 Afterburner	125	2.0	600	15
c	6,000	150 AGL	104 Takeoff	200	17.6	8800	19
d	15,000	3,000 AGL	87 Takeoff	350	0.0	0	25
e	30,000	3,000 AGL	104 Takeoff	350	17.0	10800	37
f	52,000	10,000 MSL	104 Takeoff	350	18.4	11800	25
g	67,000	15,000 MSL	88 Takeoff	350			



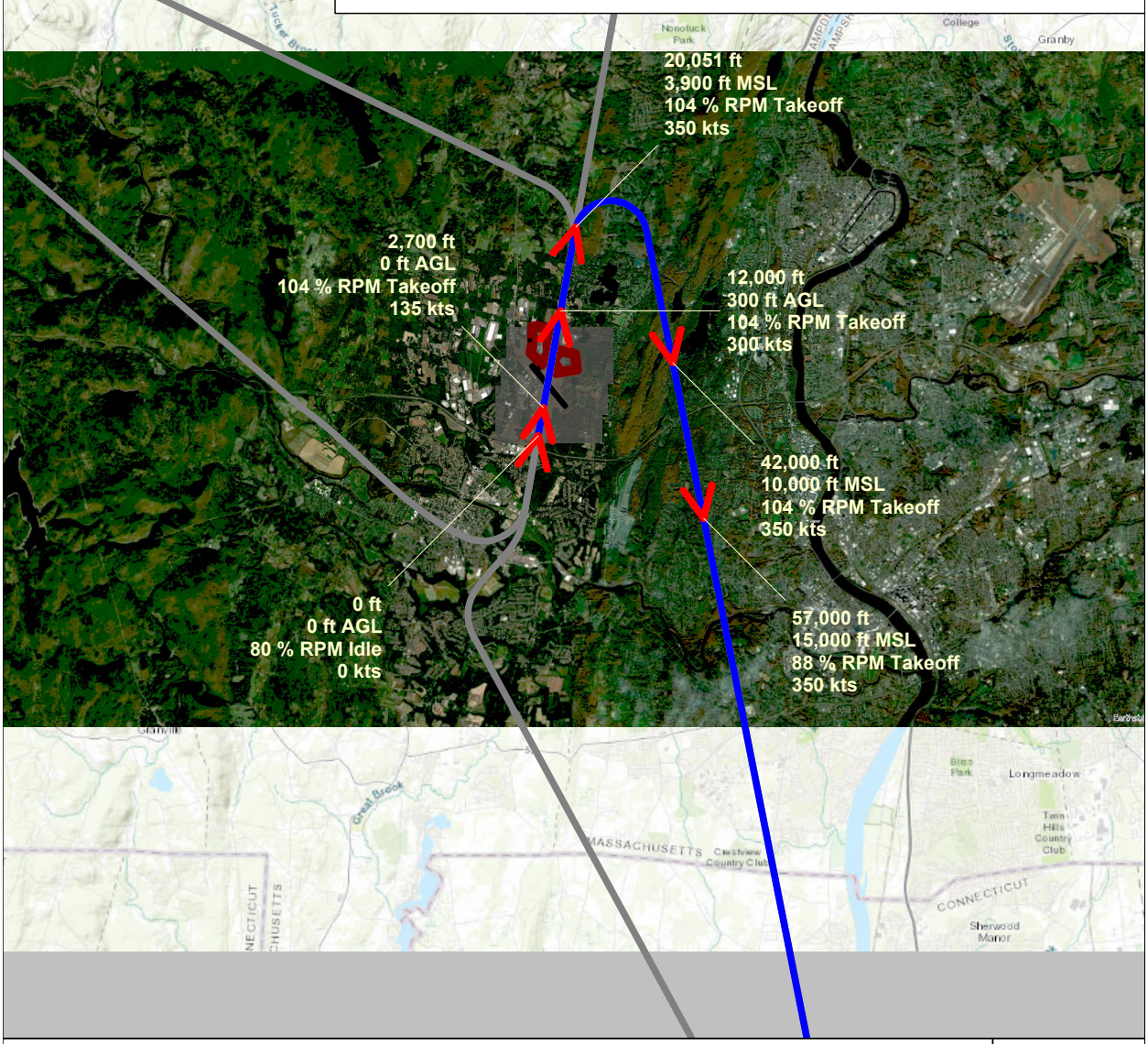
Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-D1AH
AB Departure held at 3000 MSL
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:269,000 (1 inch = 22,400 feet)

Flight Profile F15X-D1M

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	80 Idle	0	0.0	0	24
b	2,700	0 AGL	104 Takeoff	135	1.8	700	25
c	12,000	300 AGL	104 Takeoff	300	22.5	13600	15
d	20,051	3,900 MSL	104 Takeoff	350	15.5	9900	37
e	42,000	10,000 MSL	104 Takeoff	350	18.4	11800	25
f	57,000	15,000 MSL	88 Takeoff	350			



Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-D1M

Mil Departure cleared to climb

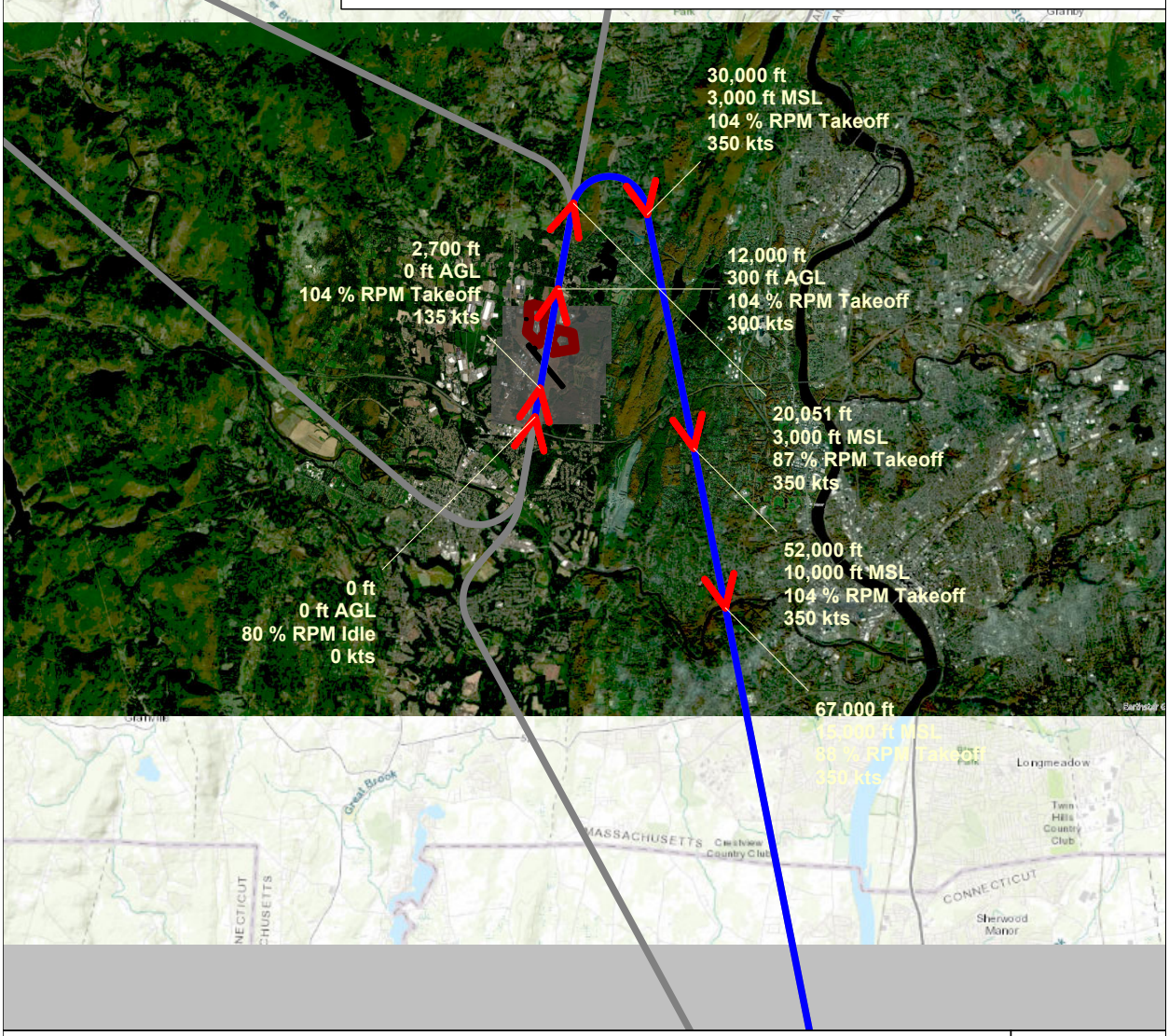
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:270,000 (1 inch = 22,500 feet)

Flight Profile F15X-D1MH

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	80 Idle	0	0.0	0	24
b	2,700	0 AGL	104 Takeoff	135	1.8	700	25
c	12,000	300 AGL	104 Takeoff	300	16.8	9900	15
d	20,051	3,000 MSL	87 Takeoff	350	0.0	0	17
e	30,000	3,000 MSL	104 Takeoff	350	17.7	11300	37
f	52,000	10,000 MSL	104 Takeoff	350	18.4	11800	25
g	67,000	15,000 MSL	88 Takeoff	350			



Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-D1MH

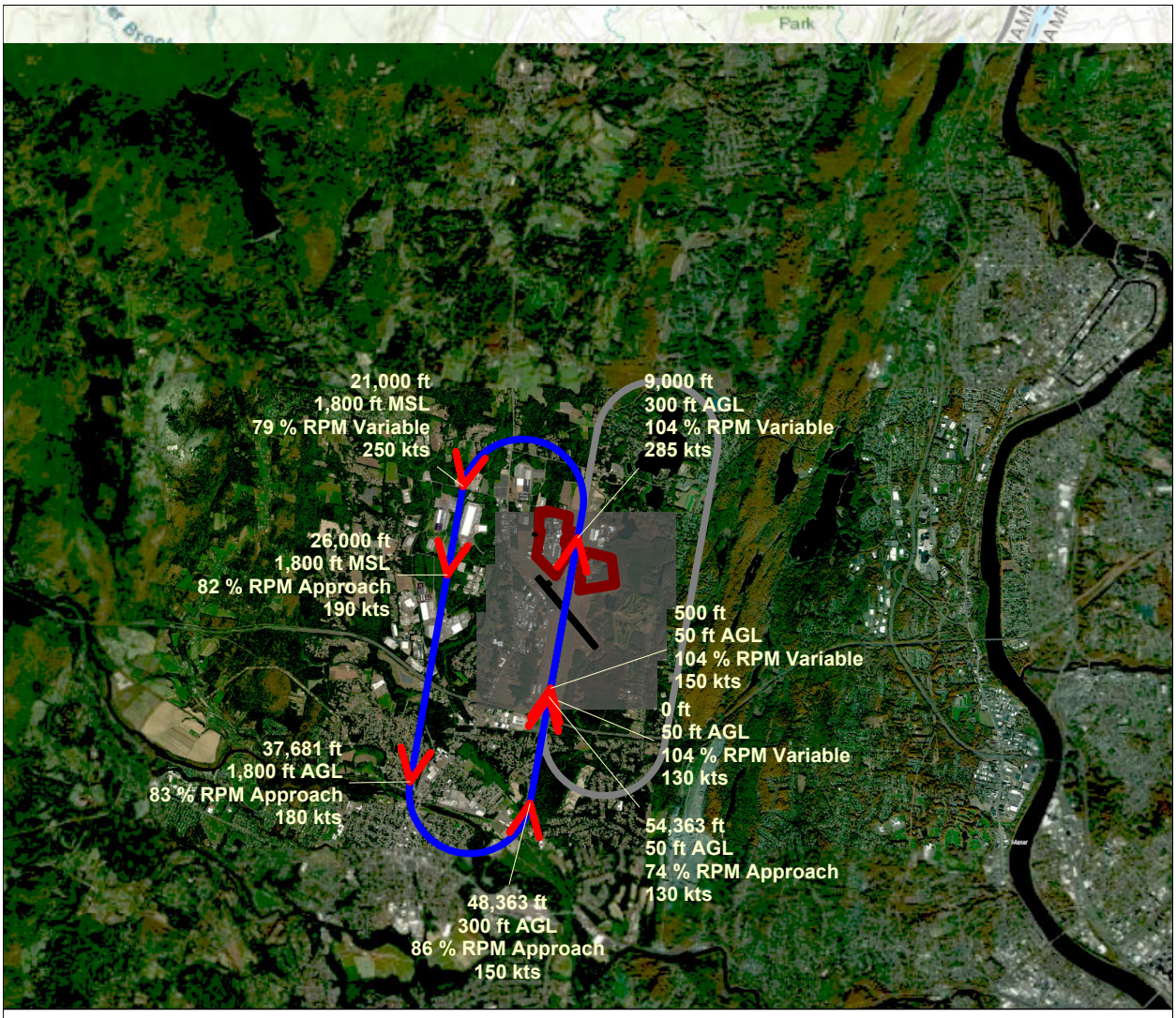
Mil Departure held at 3000 MSL

Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:268,000 (1 inch = 22,300 feet)

N



Flight Profile F15X-C1

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	104 Variable	130	0.0	0	2	
b	500	50 AGL	104 Variable	150	1.7	600	23	
c	9,000	300 AGL	104 Variable	285	5.8	2800	27	
d	21,000	1,800 MSL	79 Variable	250	0.0	0	13	
e	26,000	1,800 MSL	82 Approach	190	1.3	400	37	
f	37,681	1,800 AGL	83 Approach	180	-8.0	-2300	38	Beyond approach extrap limit, using Takeoff
g	48,363	300 AGL	86 Approach	150	-2.4	-600	25	
h	54,363	50 AGL	74 Approach	130				

Aircraft: F15EX (F110-GE-129) - Flight Profile F15X-C1

Check flight closed pattern

Flight Track: 02C1 - Standard closed pattern fighter

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:162,000 (1 inch = 13,500 feet)

F-35A Flight Profile Maps

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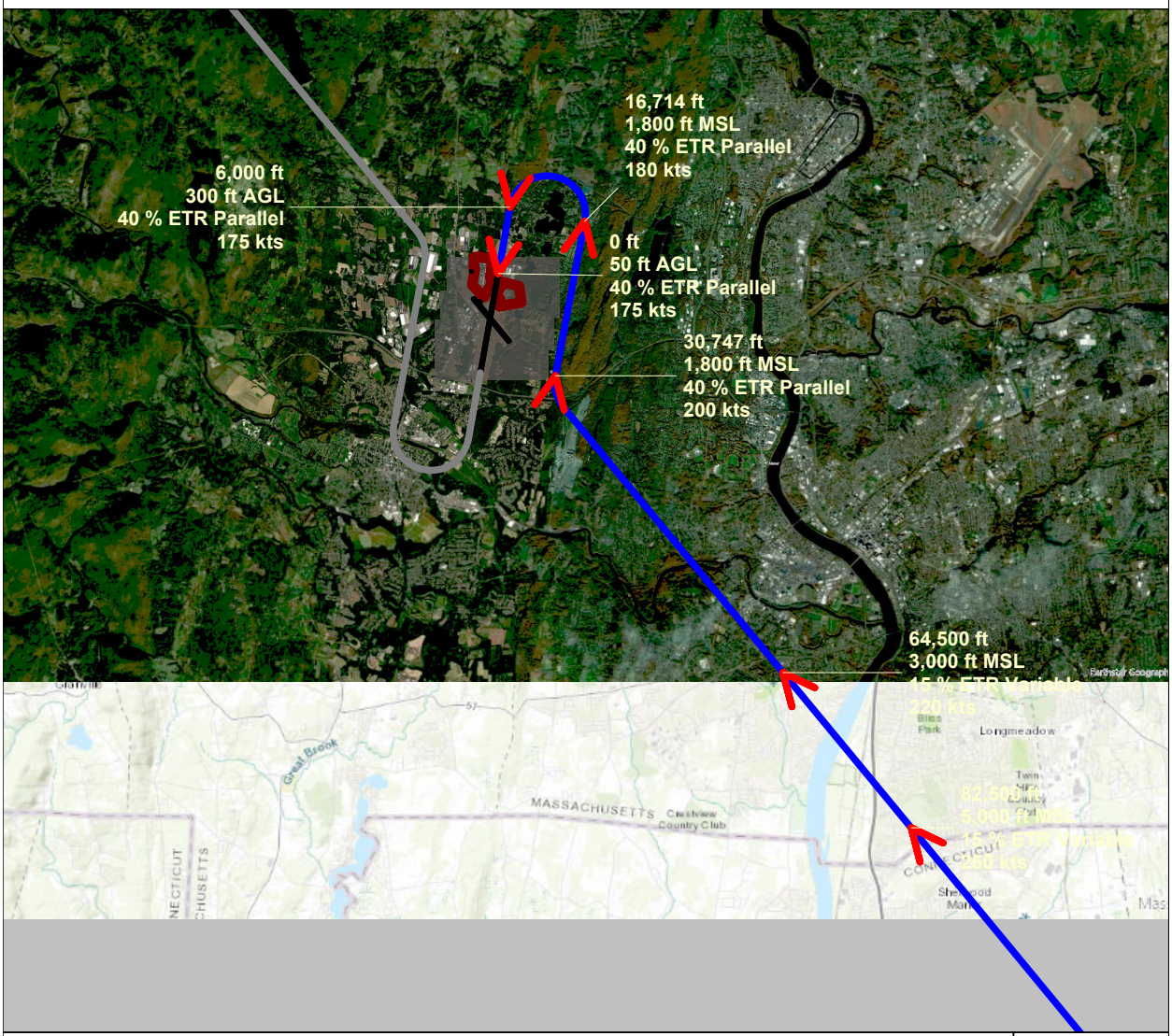
Flight Profile F35-A3

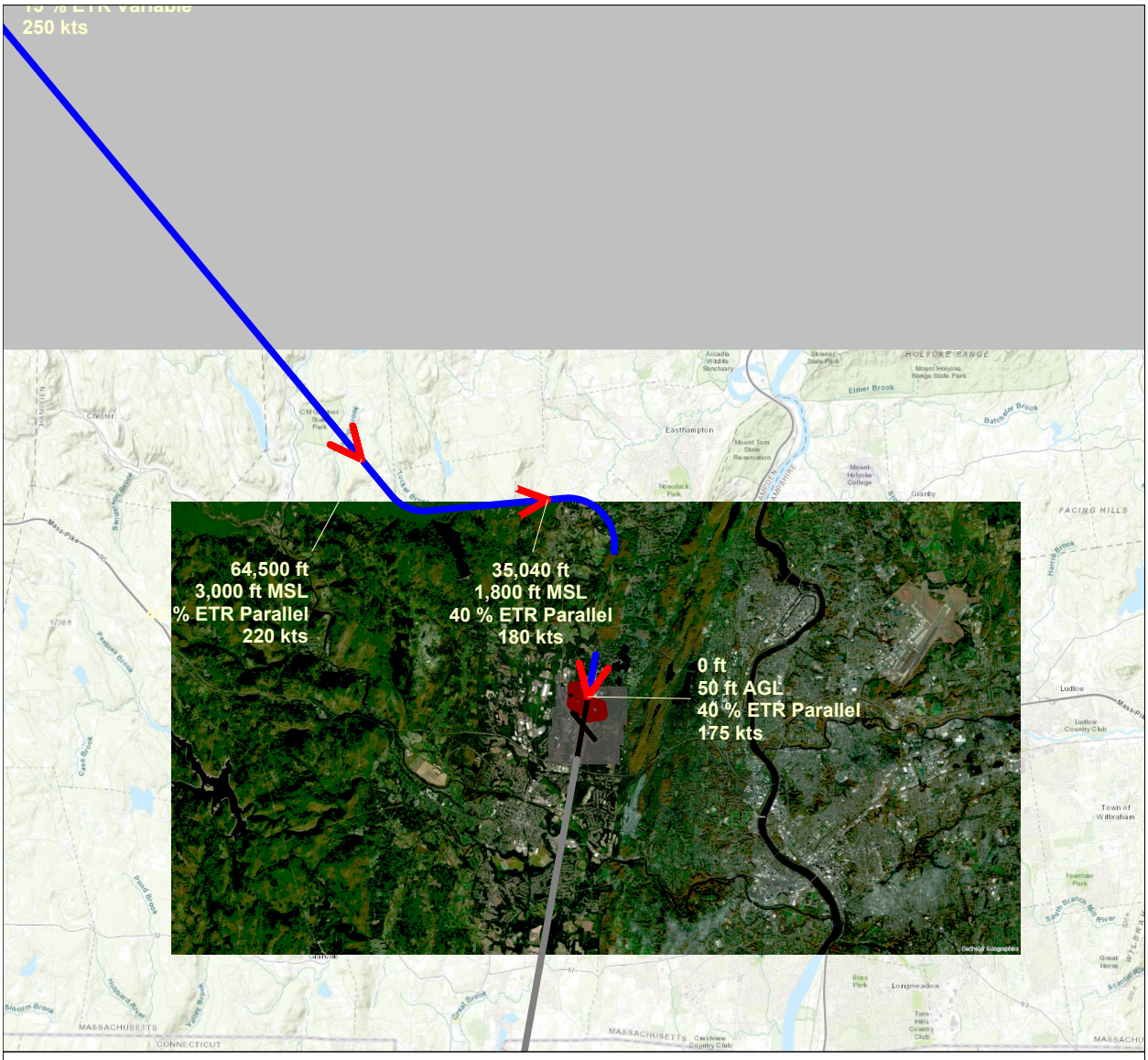
Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	140,000	8,000 MSL	15 Variable	250	-3.0	-1300	136	
b	82,500	5,000 MSL	15 Variable	250	-6.3	-2600	45	Begin descent from 10000 ft MSL, 350 kts; ap
c	64,500	3,000 MSL	15 Variable	220	-2.0	-800	95	300 kts
d	30,747	1,800 MSL	40 Parallel	200	0.0	0	44	begin downwind
e	16,714	1,800 MSL	40 Parallel	180	-6.5	-2100	36	end downwind
f	6,000	300 AGL	40 Parallel	175	-2.4	-700	20	begin final
g	0	50 AGL	40 Parallel	175				Assume cross threashold at 50 ft AGL



Aircraft: F35A (F-135-PW-100) - Flight Profile F35-A3
VFR W-105 to 20 downwind
Flight Track: 20A01 - W-105 to 20 downwind

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:259,000 (1 inch = 21,600 feet)



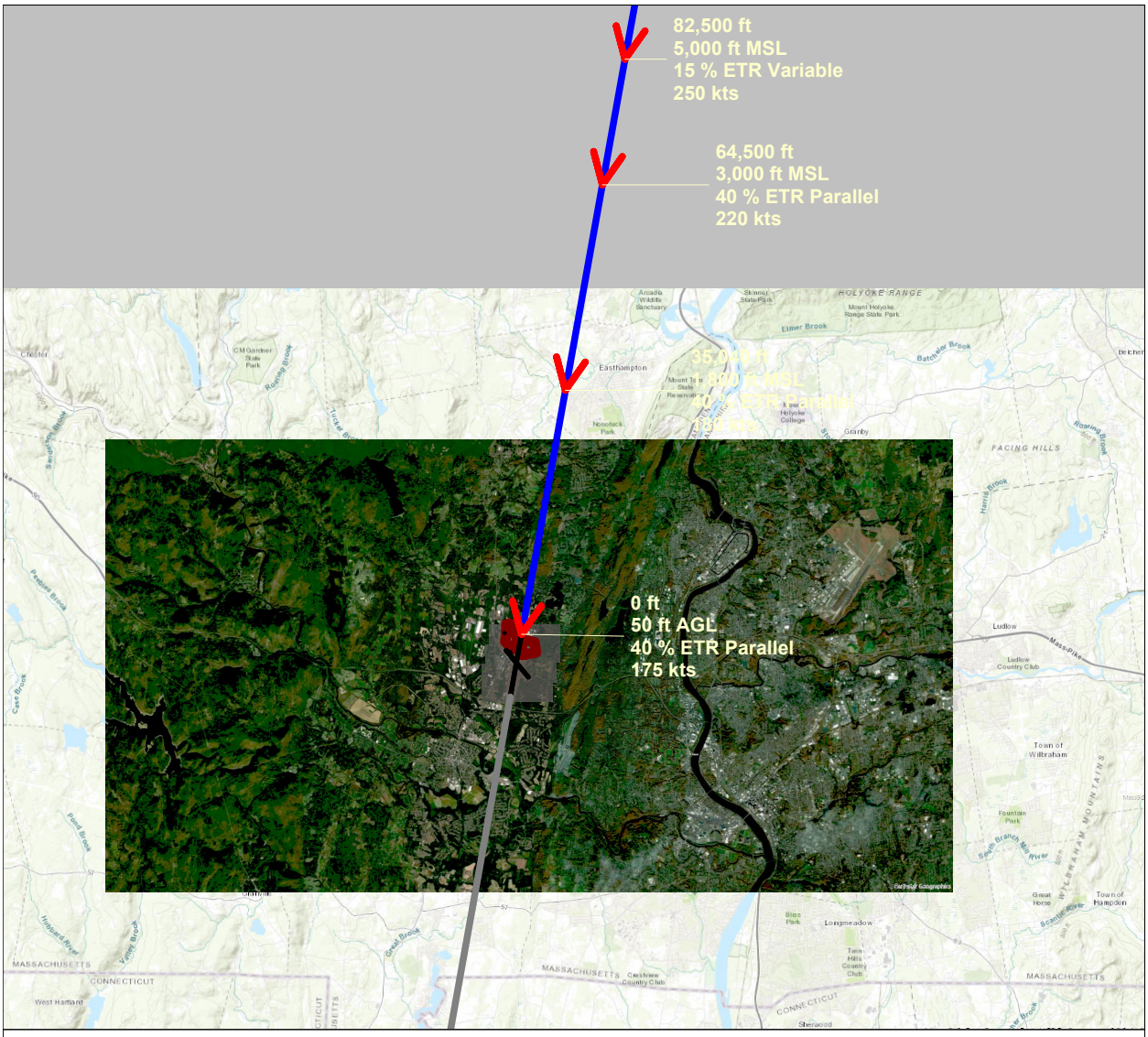
Flight Profile F35-A4

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	15 Variable	300	-2.3	-1100	108	
b	150,000	8,000 MSL	15 Variable	250	-3.3	-1400	216	Begin descent from 10000 ft MSL, 350 kts; a
c	64,500	3,000 MSL	40 Parallel	220	-2.3	-800	87	Gear down
d	35,040	1,800 MSL	40 Parallel	180	-2.4	-800	117	Initial Point
e	0	50 AGL	40 Parallel	175				Assume cross threashold at 50 ft AGL

Aircraft: F35A (F-135-PW-100) - Flight Profile F35-A4
VFR Viper to initial to 20
Flight Track: 20A02 - Viper to initial to Rwy 20

0 20,000 40,000 60,000 80,000 100,000 120,000

Scale in Feet 1:403,000 (1 inch = 33,600 feet)



Flight Profile F35-A5

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	15 Variable	300	-2.3	-1100	108	
b	150,000	8,000 MSL	15 Variable	250	-2.5	-1100	160	Begin descent from 10000 ft MSL, 350 kts; a
c	82,500	5,000 MSL	15 Variable	250	-6.3	-2600	45	Begin descent from 10000 ft MSL, 350 kts; a
d	64,500	3,000 MSL	40 Parallel	220	-2.3	-800	87	Gear down
e	35,040	1,800 MSL	40 Parallel	180	-2.4	-800	117	Initial Point
f	0	50 AGL	40 Parallel	175				Assume cross threashold at 50 ft AGL

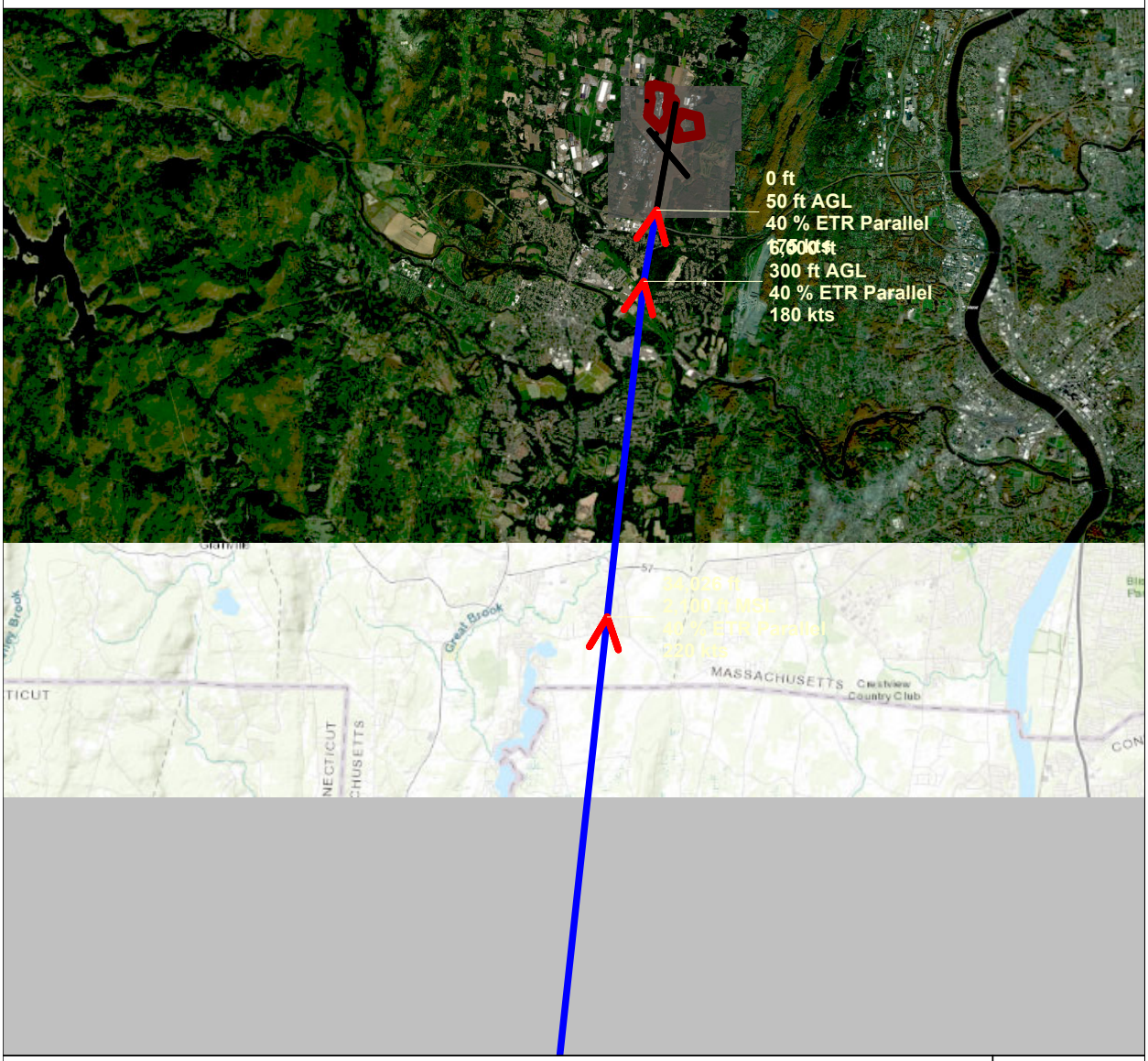
Aircraft: F35A (F-135-PW-100) - Flight Profile F35-A5
VFR Yankee/Laser/Scoty/Condor, runway heading
Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000 120,000

Scale in Feet 1:403,000 (1 inch = 33,600 feet)

Flight Profile F35-A7

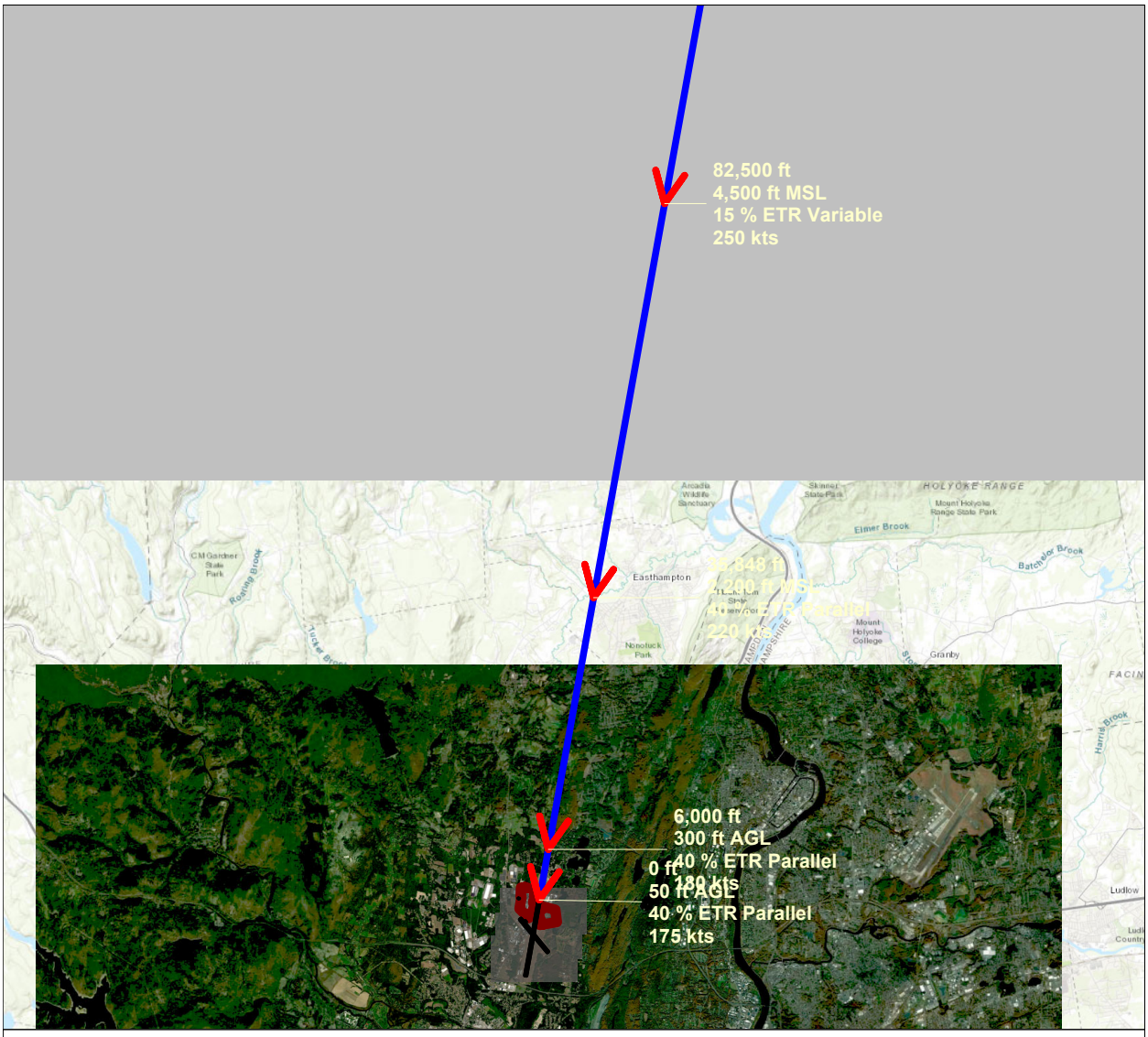
Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	140,000	8,000 MSL	15 Variable	250	-3.0	-1300	136	
b	82,500	5,000 MSL	15 Variable	250	-3.4	-1400	122	Begin descent from 10000 ft MSL, 350 kts; ap
c	34,026	2,100 MSL	40 Parallel	220	-3.1	-1100	83	5.6nm from rwy threshold
d	6,000	300 AGL	40 Parallel	180	-2.4	-700	20	1nm from rwy
e	0	50 AGL	40 Parallel	175				Assume cross threashold at 50 ft AGL



Aircraft: F35A (F-135-PW-100) - Flight Profile F35-A7
TACAN
Flight Track: 02A03 - TACAN

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:236,000 (1 inch = 19,700 feet)



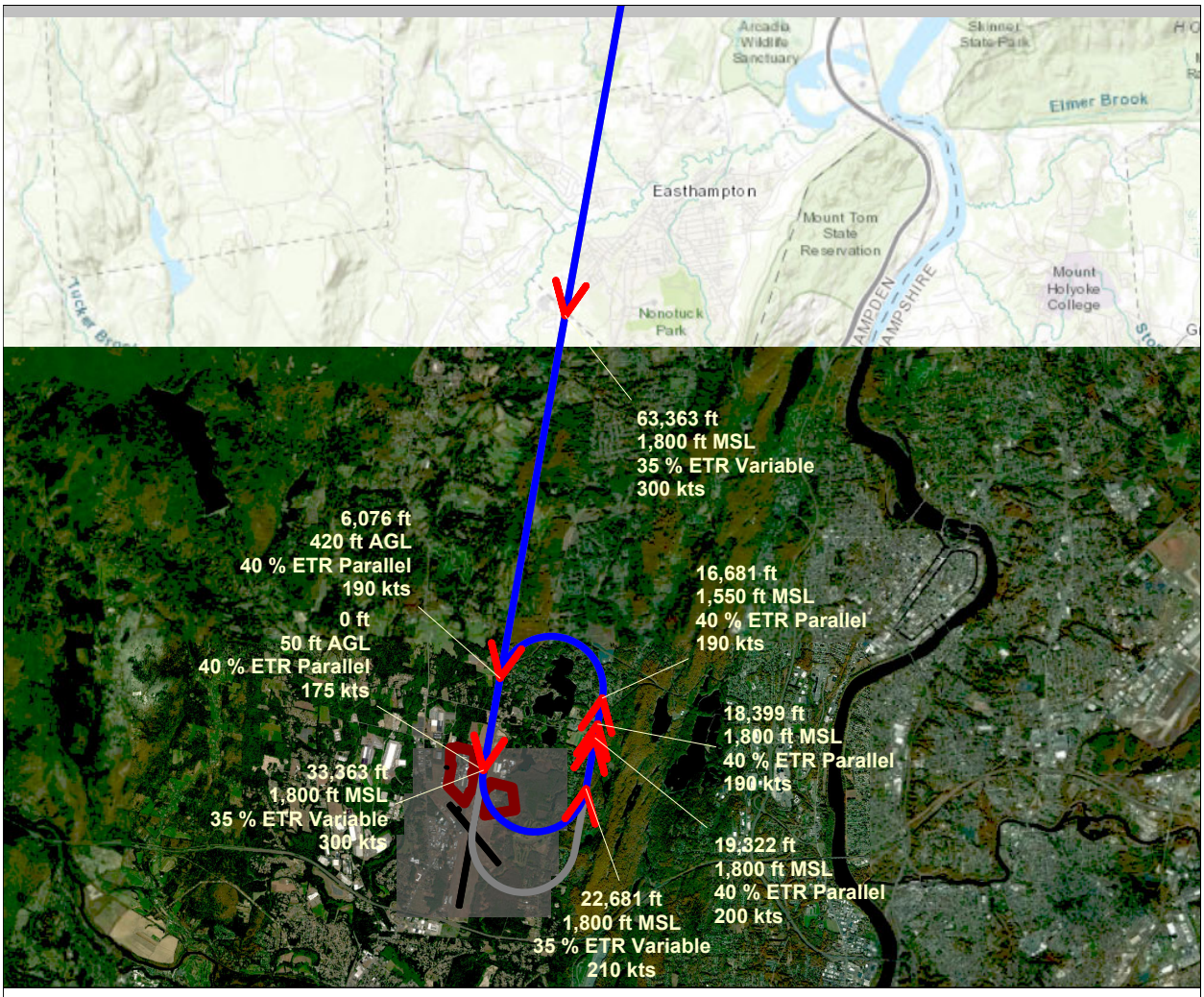
Flight Profile F35-A8

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	15 Variable	300	-2.3	-1100	108	
b	150,000	8,000 MSL	15 Variable	250	-3.0	-1300	160	Begin descent from 10000 ft MSL, 350 kts; a
c	82,500	4,500 MSL	15 Variable	250	-2.8	-1200	118	Begin descent from 10000 ft MSL, 350 kts; a
d	35,848	2,200 MSL	40 Parallel	220	-3.1	-1100	88	Gear down
e	6,000	300 AGL	40 Parallel	180	-2.4	-700	20	Initial Point
f	0	50 AGL	40 Parallel	175				Assume cross threashold at 50 ft AGL

Aircraft: F35A (F-135-PW-100) - Flight Profile F35-A8
ILS
Flight Track: 20A03 - ILS

0 20,000 40,000 60,000 80,000 100,000

Scale in Feet 1:333,000 (1 inch = 27,700 feet)



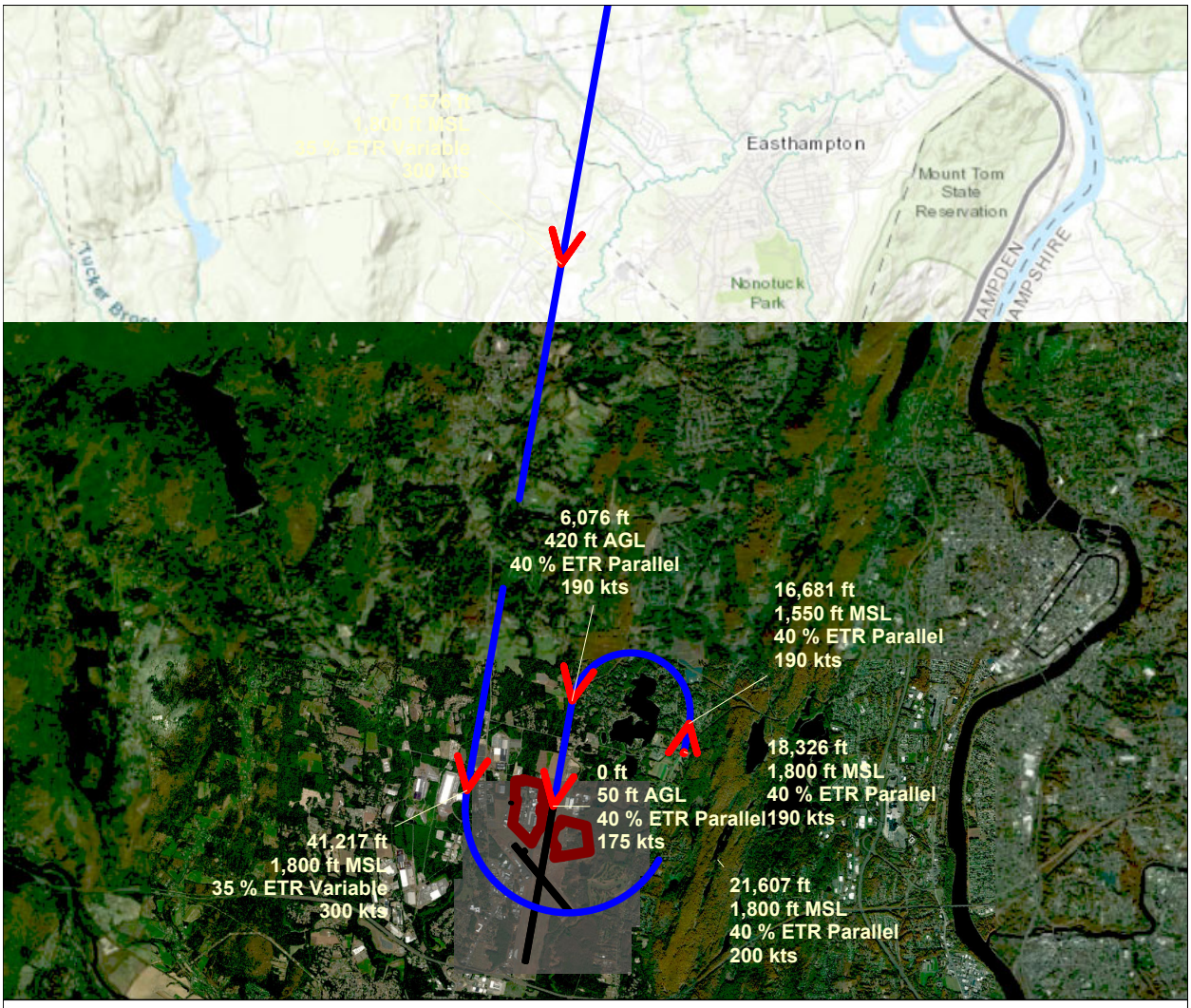
Flight Profile F35-O4

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	15 Variable	300	0.0	0	93	level at 10,000 ft MSL
b	153,134	10,000 MSL	15 Variable	300	-5.2	-2800	177	begin descent from 10,000 ft MSL; approx 20
c	63,363	1,800 MSL	35 Variable	300	0.0	0	59	Initial Point; level off at 1800 ft AGL; increas
d	33,363	1,800 MSL	35 Variable	300	0.0	0	25	begin break
e	22,681	1,800 MSL	35 Variable	210	0.0	0	10	wings level, begin downwind
f	19,322	1,800 MSL	40 Parallel	200	0.0	0	3	gear down; increase power
g	18,399	1,800 MSL	40 Parallel	190	-8.3	-2800	5	begin descent
h	16,681	1,550 MSL	40 Parallel	190	-4.6	-1600	33	end downwind
i	6,076	420 AGL	40 Parallel	190	-3.5	-1100	20	wings level, begin 1 nm final
j	0	50 AGL	40 Parallel	175				Assume cross threshold at 50 ft AGL

Aircraft: F35A (F-135-PW-100) - Flight Profile F35-O4
1st ship break
Flight Track: 20O01 - 1st Break Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:194,000 (1 inch = 16,200 feet)



Flight Profile F35-O6

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	10,000 MSL	15 Variable	300	0.0	0	93	level at 10,000 ft MSL
b	153,134	10,000 MSL	15 Variable	300	-5.7	-3100	161	begin descent from 10,000 ft MSL; approx 20
c	71,576	1,800 MSL	35 Variable	300	0.0	0	60	Initial Point; level off at 1800 ft AGL; increas
d	41,217	1,800 MSL	35 Variable	300	0.0	0	46	begin break
e	21,607	1,800 MSL	40 Parallel	200	0.0	0	10	gear down; increase power
f	18,326	1,800 MSL	40 Parallel	190	-8.6	-2900	5	begin descent
g	16,681	1,550 MSL	40 Parallel	190	-4.6	-1600	33	end downwind
h	6,076	420 AGL	40 Parallel	190	-3.5	-1100	20	wings level, begin 1 nm final
i	0	50 AGL	40 Parallel	175				Assume cross threshold at 50 ft AGL

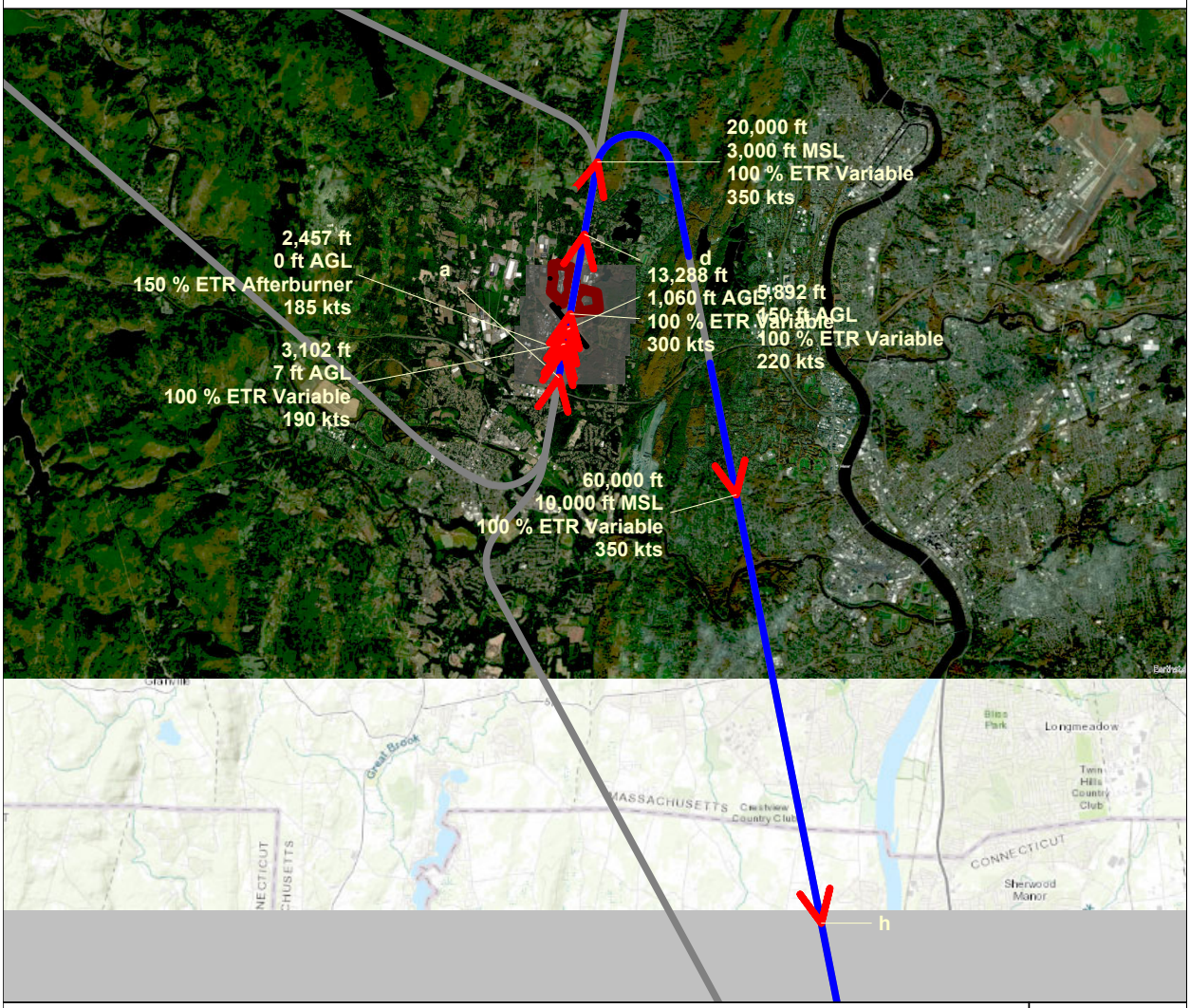
Aircraft: F35A (F-135-PW-100) - Flight Profile F35-O6
TAC break
Flight Track: 20O03 - TAC Initial Arrival to 20 from north

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:168,000 (1 inch = 14,000 feet)

Flight Profile F35-D1A

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	
a	0	0 AGL	50 Variable	0	0.0	0	16	Assume 1 second @ 50%ETR before bra
b	2,457	0 AGL	150 Afterburner	185	0.6	200	2	Rotate
c	3,102	7 AGL	100 Variable	190	1.8	600	4	Mil power
d	4,454	50 AGL	100 Variable	205	4.0	1500	4	
e	5,892	150 AGL	100 Variable	220	7.0	3200	17	Gear up
f	13,288	1,060 AGL	100 Variable	300	14.0	8200	12	
g	20,000	3,000 MSL	100 Variable	350	9.9	6200	68	
h	60,000	10,000 MSL	100 Variable	350	7.1	4400	68	Assumes continuous climb to 10,000 ft M
i	100,000	15,000 MSL	40 Variable	350				



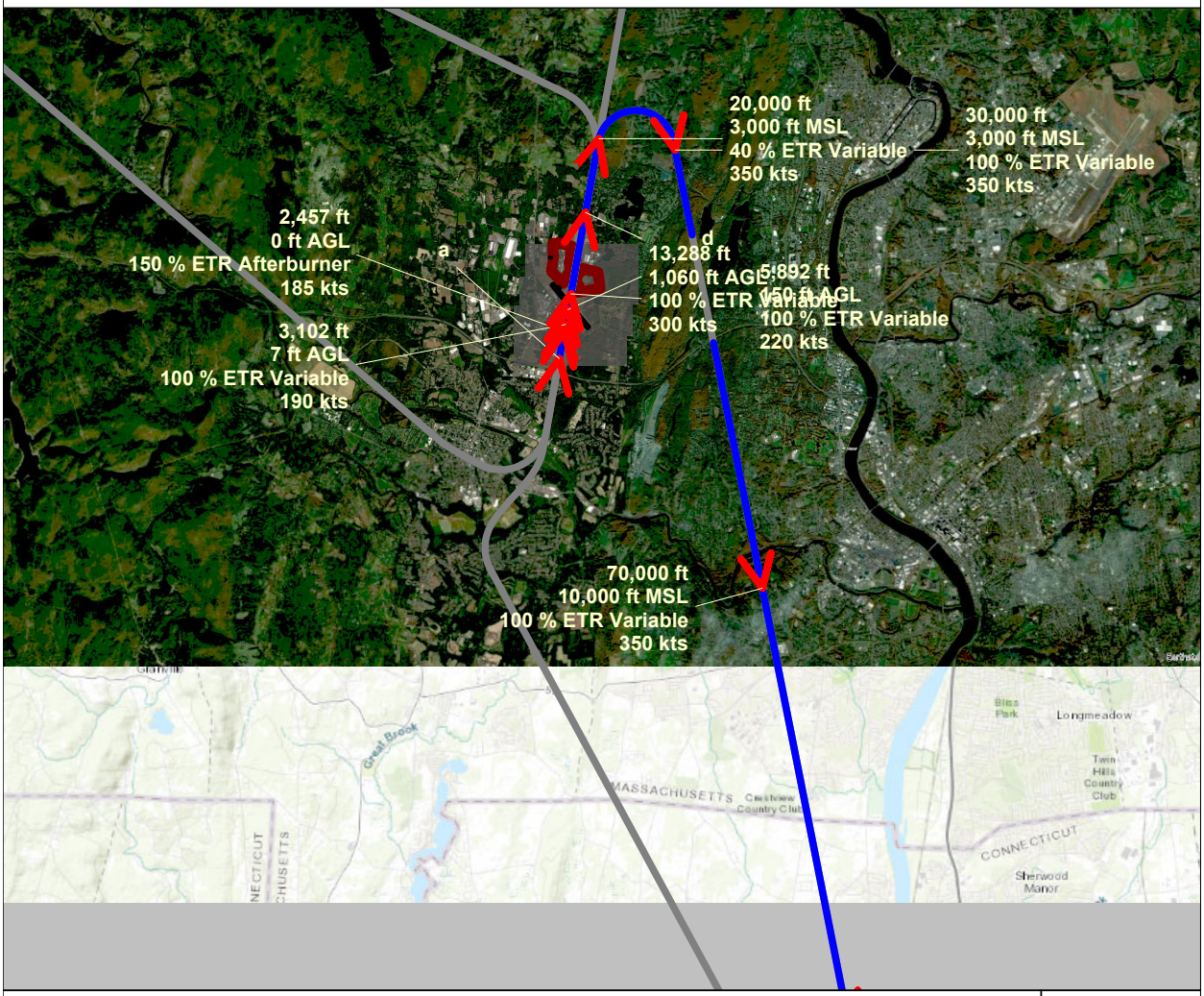
Aircraft: F35A (F-135-PW-100) - Flight Profile F35-D1A
AB takeoff, Mil Climb
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:270,000 (1 inch = 22,500 feet)

Flight Profile F35-D1AH

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	50 Variable	0	0.0	0	16	Assume 1 second @ 50%ETR before bra
b	2,457	0 AGL	150 Afterburner	185	0.6	200	2	Rotate
c	3,102	7 AGL	100 Variable	190	1.8	600	4	Mil power
d	4,454	50 AGL	100 Variable	205	4.0	1500	4	
e	5,892	150 AGL	100 Variable	220	7.0	3200	17	Gear up
f	13,288	1,060 AGL	100 Variable	300	14.0	8200	12	
g	20,000	3,000 MSL	40 Variable	350	0.0	0	17	
h	30,000	3,000 MSL	100 Variable	350	9.9	6200	68	
i	70,000	10,000 MSL	100 Variable	350	7.1	4400	68	
j	110,000	15,000 MSL	40 Variable	350				



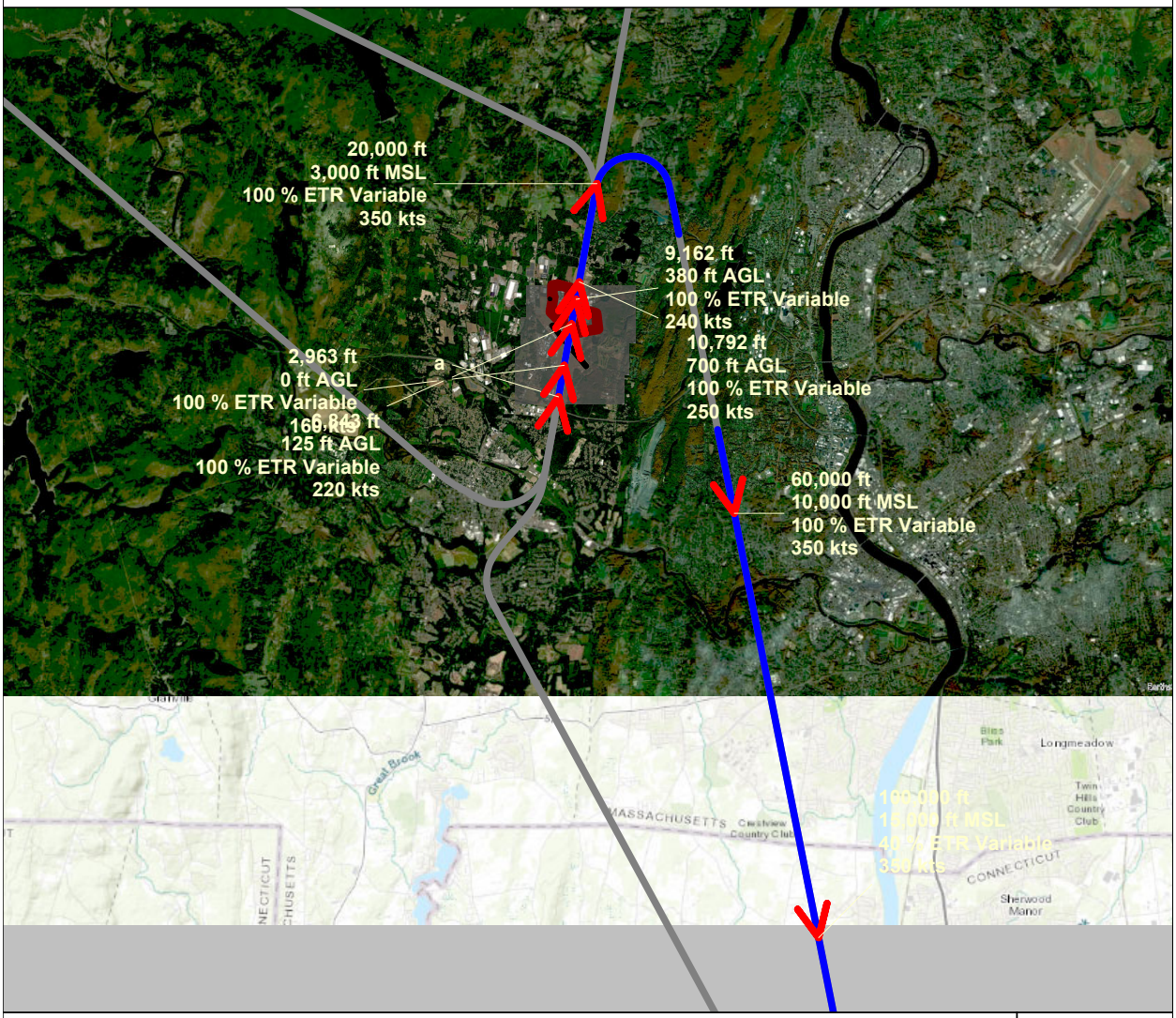
Aircraft: F35A (F-135-PW-100) - Flight Profile F35-D1AH
AB takeoff, held at 3000 MSL
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:268,000 (1 inch = 22,300 feet)

Flight Profile F35-D1M

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	N
a	0	0 AGL	50 Variable	0	0.0	0	22	Assume 1 second @ 50% ETR before brake
b	2,963	0 AGL	100 Variable	160	1.8	600	12	Rotate
c	6,843	125 AGL	100 Variable	220	6.3	2600	6	Gear up
d	9,162	380 AGL	100 Variable	240	11.1	4900	4	Speed slope change
e	10,792	700 AGL	100 Variable	250	12.4	6700	18	approx 7k fpm climb
f	20,000	3,000 MSL	100 Variable	350	9.9	6200	68	
g	60,000	10,000 MSL	100 Variable	350	7.1	4400	68	Assumes continuous climb to 10,000 ft MSL
h	100,000	15,000 MSL	40 Variable	350				



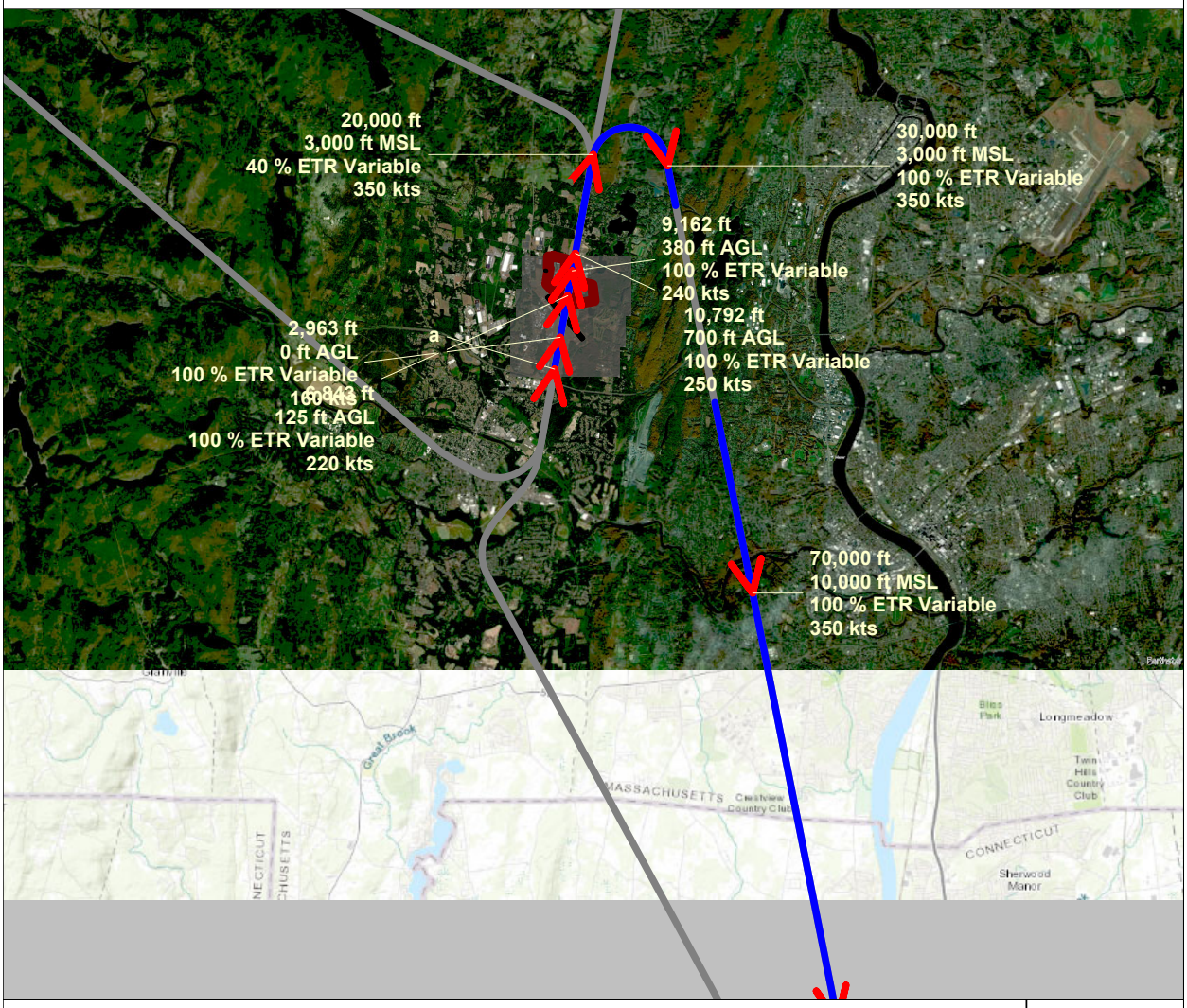
Aircraft: F35A (F-135-PW-100) - Flight Profile F35-D1M
Mil Takeoff, Mil Climb
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:270,000 (1 inch = 22,500 feet)

Flight Profile F35-D1MH

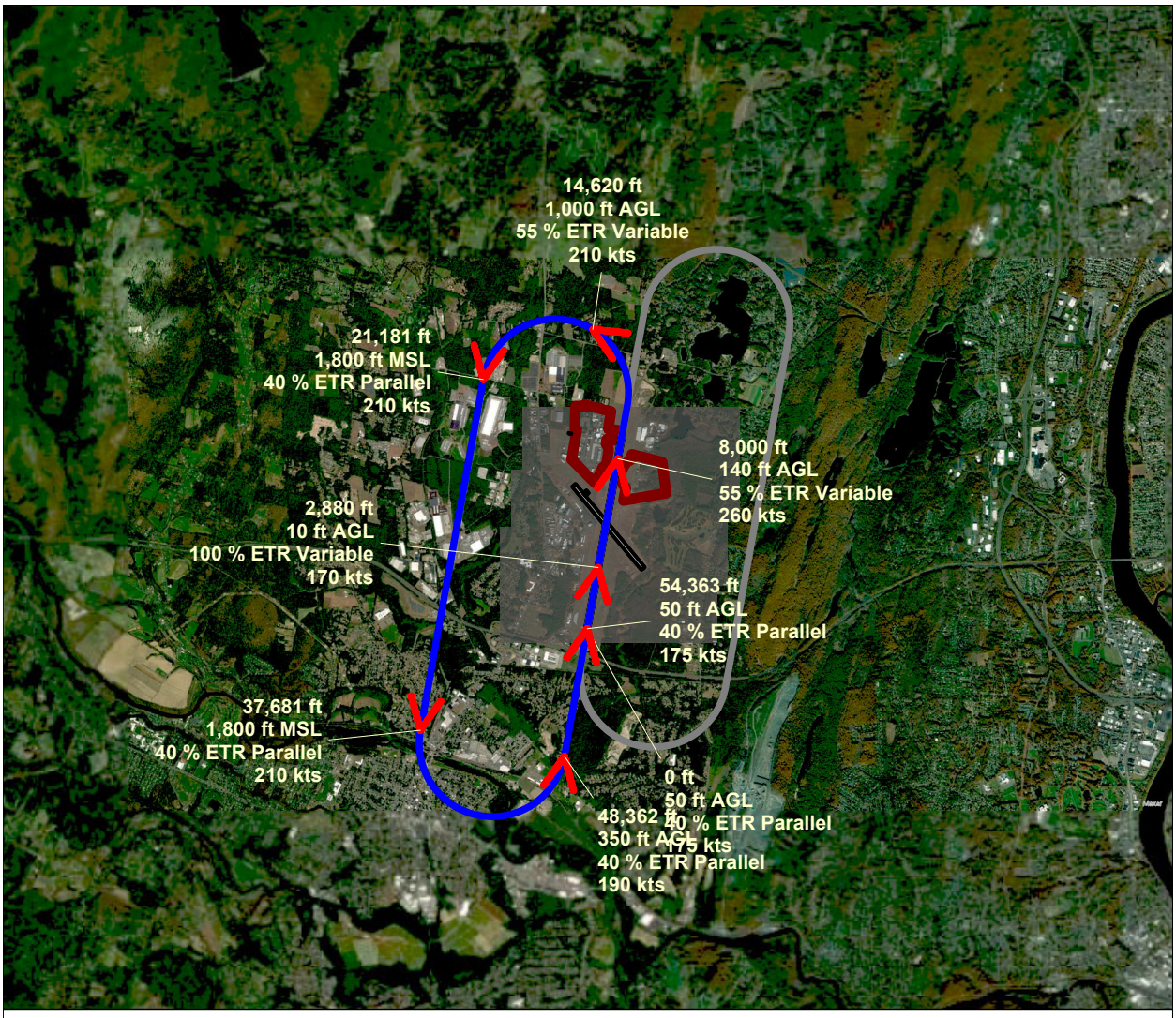
Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	50 Variable	0	0.0	0	22	Assume 1 second @ 50% ETR before brake
b	2,963	0 AGL	100 Variable	160	1.8	600	12	Rotate
c	6,843	125 AGL	100 Variable	220	6.3	2600	6	Gear up
d	9,162	380 AGL	100 Variable	240	11.1	4900	4	Speed slope change
e	10,792	700 AGL	100 Variable	250	12.4	6700	18	approx 7k fpm climb
f	20,000	3,000 MSL	40 Variable	350	0.0	0	17	
g	30,000	3,000 MSL	100 Variable	350	9.9	6200	68	
h	70,000	10,000 MSL	100 Variable	350	7.1	4400	68	
i	110,000	15,000 MSL	40 Variable	350				



Aircraft: F35A (F-135-PW-100) - Flight Profile F35-D1MH
Mil Takeoff, held at 3000 MSL
Flight Track: 02D1 - Turn right to W-105

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:270,000 (1 inch = 22,500 feet)



Flight Profile F35-C1

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	40 Parallel	175	-0.8	-200	10	Assume cross threshold at 50 ft AGL
b	2,880	10 AGL	100 Variable	170	1.5	600	14	low approach; no touch; use Variable due to li
c	8,000	140 AGL	55 Variable	260	7.4	3100	17	gear up; reduce power
d	14,620	1,000 AGL	55 Variable	210	4.6	1700	19	reach pattern altitude and speed
e	21,181	1,800 MSL	40 Parallel	210	0.0	0	47	gear down
f	37,681	1,800 MSL	40 Parallel	210	-6.3	-2200	32	begin descent
g	48,362	350 AGL	40 Parallel	190	-2.9	-900	19	wings level; 1nm final
h	54,363	50 AGL	40 Parallel	175				Assume cross threshold at 50 ft AGL

Aircraft: F35A (F-135-PW-100) - Flight Profile F35-C1

touch and go

Flight Track: 02C1 - Standard closed pattern fighter

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000

Scale in Feet 1:135,000 (1 inch = 11,300 feet)

Other Based Military Flight Profile Maps

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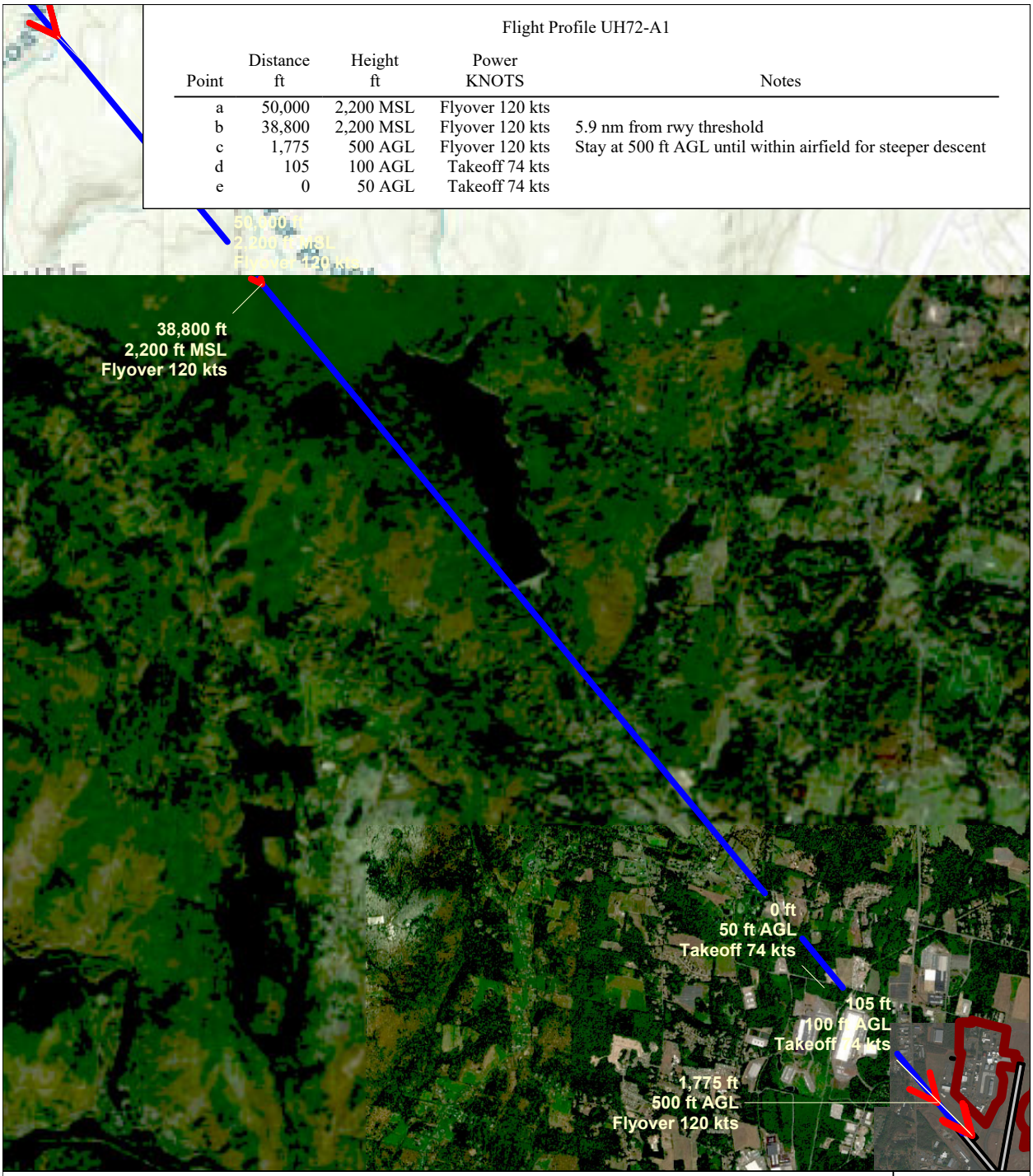
Flight Profile UH72-A1

Point	Distance ft	Height ft	Power KNOTS	Notes
a	50,000	2,200 MSL	Flyover 120 kts	
b	38,800	2,200 MSL	Flyover 120 kts	5.9 nm from rwy threshold
c	1,775	500 AGL	Flyover 120 kts	Stay at 500 ft AGL until within airfield for steeper descent
d	105	100 AGL	Takeoff 74 kts	
e	0	50 AGL	Takeoff 74 kts	



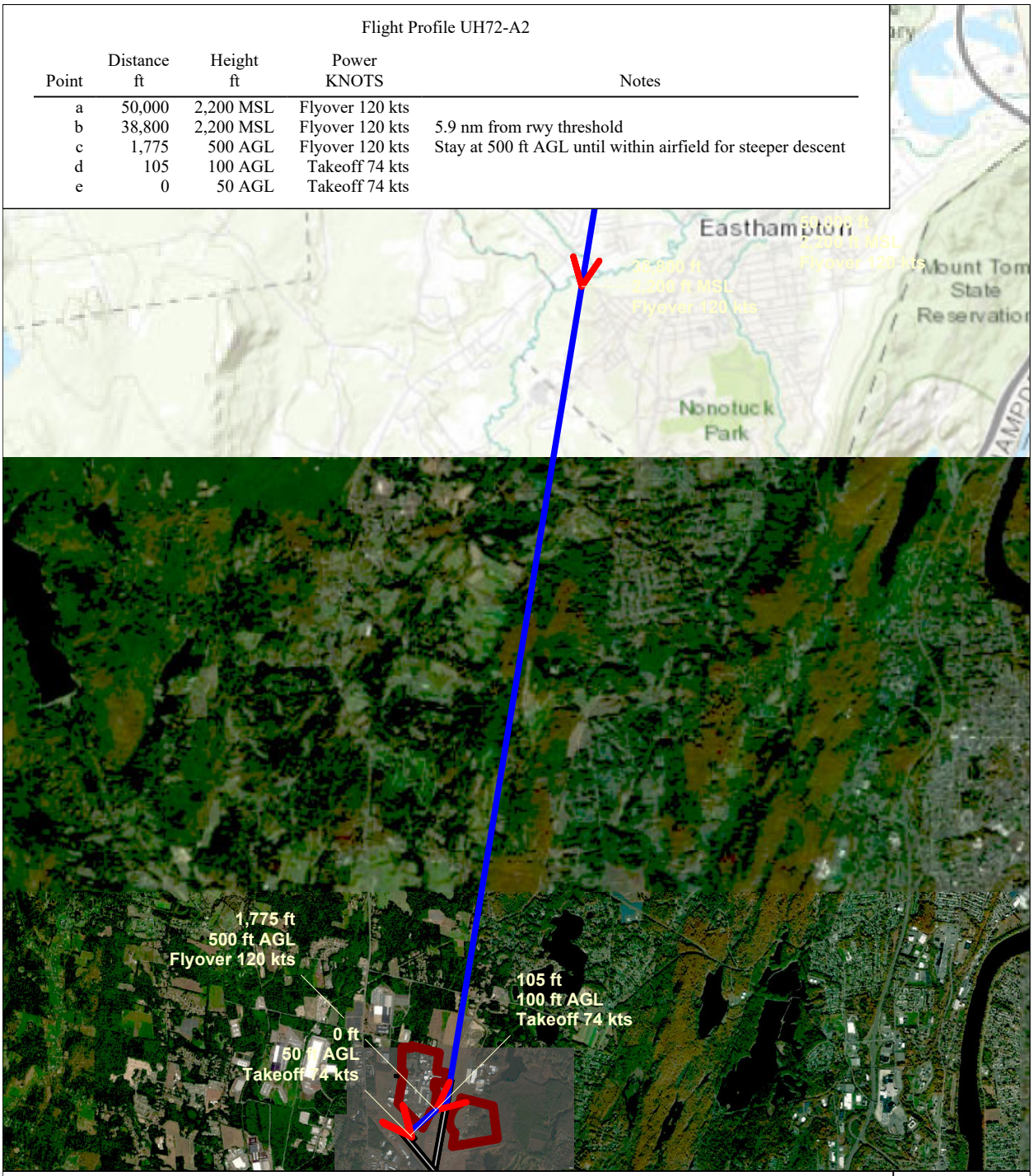
DAUPHIN SA365N (Arriel 1C) - Flight Profile UH72-A1
arrive from northwest
Flight Track: 15HA1 - Helicopter arrival to pad from northwest

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:89,400 (1 inch = 7,450 feet)

Flight Profile UH72-A2

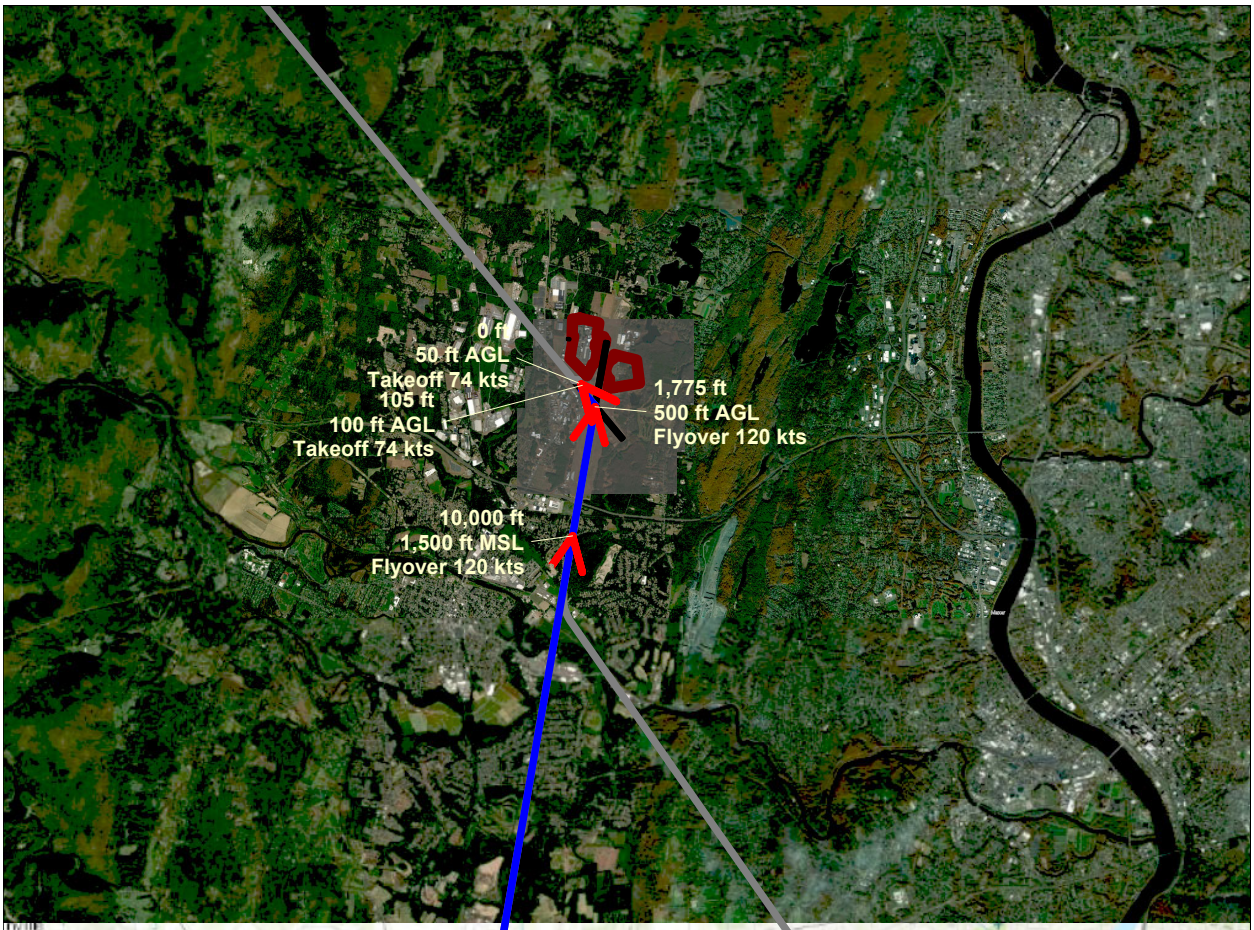
Point	Distance ft	Height ft	Power KNOTS	Notes
a	50,000	2,200 MSL	Flyover 120 kts	
b	38,800	2,200 MSL	Flyover 120 kts	5.9 nm from rwy threshold
c	1,775	500 AGL	Flyover 120 kts	Stay at 500 ft AGL until within airfield for steeper descent
d	105	100 AGL	Takeoff 74 kts	
e	0	50 AGL	Takeoff 74 kts	



DAUPHIN SA365N (Arriel 1C) - Flight Profile UH72-A2
arrive from north - ILS
Flight Track: 15HA2 - Helicopter arrival to pad from north

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:113,000 (1 inch = 9,430 feet)



Flight Profile UH72-A3

Point	Distance ft	Height ft	Power KNOTS
a	50,000	1,500 MSL	Flyover 120 kts
b	10,000	1,500 MSL	Flyover 120 kts
c	1,775	500 AGL	Flyover 120 kts
d	105	100 AGL	Takeoff 74 kts
e	0	50 AGL	Takeoff 74 kts

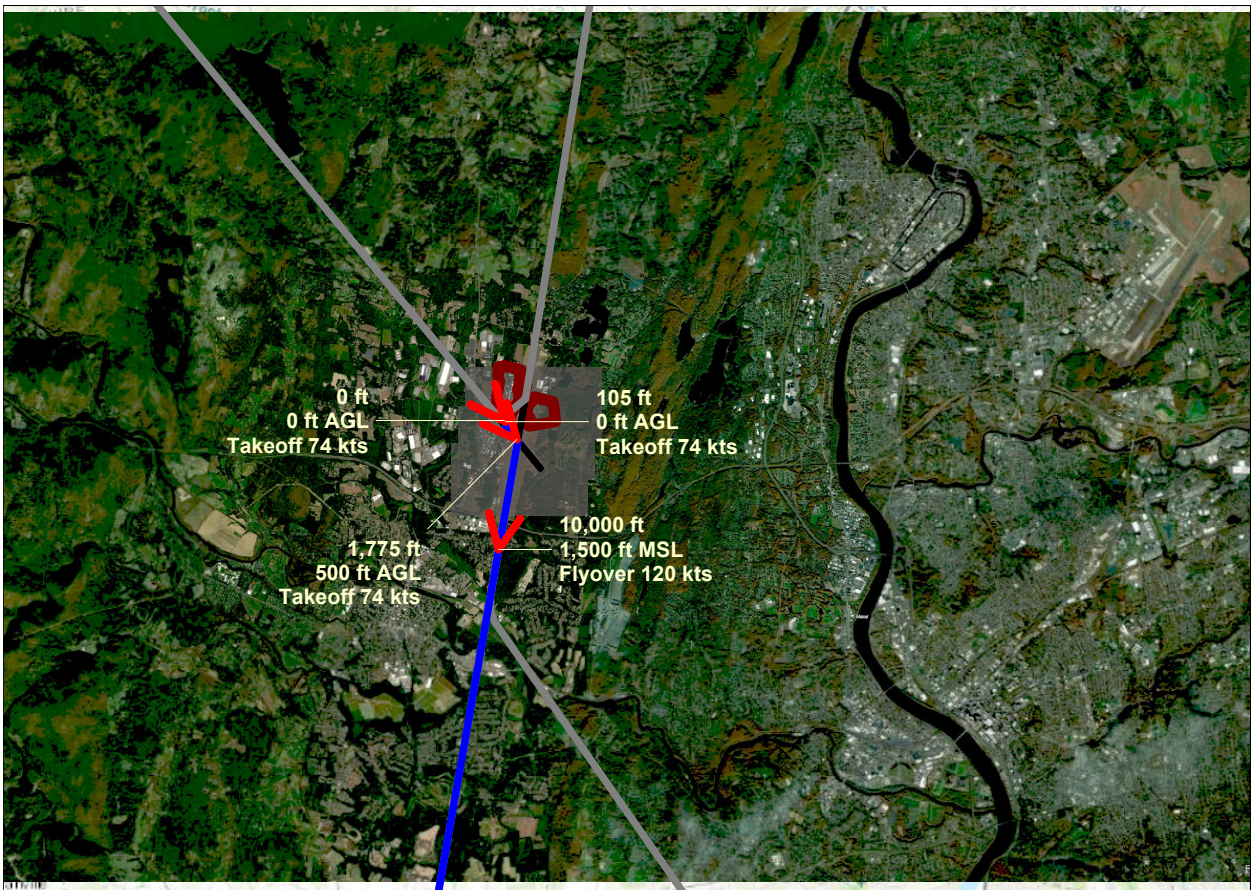
DAUPHIN SA365N (Arriel 1C) - Flight Profile UH72-A3

arrive from south

Flight Track: 33HA1 - Helicopter arrival from south

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:195,000 (1 inch = 16,300 feet)



Flight Profile UH72-D1

Point	Distance ft	Height ft	Power KNOTS
a	0	0 AGL	Takeoff 74 kts
b	105	0 AGL	Takeoff 74 kts
c	1,775	500 AGL	Takeoff 74 kts
d	10,000	1,500 MSL	Flyover 120 kts
e	50,000	1,500 MSL	Flyover 120 kts

DAUPHIN SA365N (Arriel 1C) - Flight Profile UH72-D1
depart to south
Flight Track: 15HD1 - Helicopter departure from pad out runway 20 heading - south

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

Scale in Feet 1:229,000 (1 inch = 19,100 feet)

Flight Profile UH60-A1

Point	Distance ft	Height ft	Power KNOTS	Notes
a	50,000	2,200 MSL	Lfo Load 140 kts	
b	38,800	2,200 MSL	Lfo Lite 140 kts	5.9 nm from rwy threshold
c	1,775	500 AGL	Lfo Lite 100 kts	Stay at 500 ft AGL until within airfield for steeper descent
d	105	100 AGL	Lfo Lite 70 kts	
e	0	50 AGL	Lnd Lite 40 kts	

UH60A (T700-CE-700) - Flight Profile UH60-A1

UH60 arrive from north - ILS

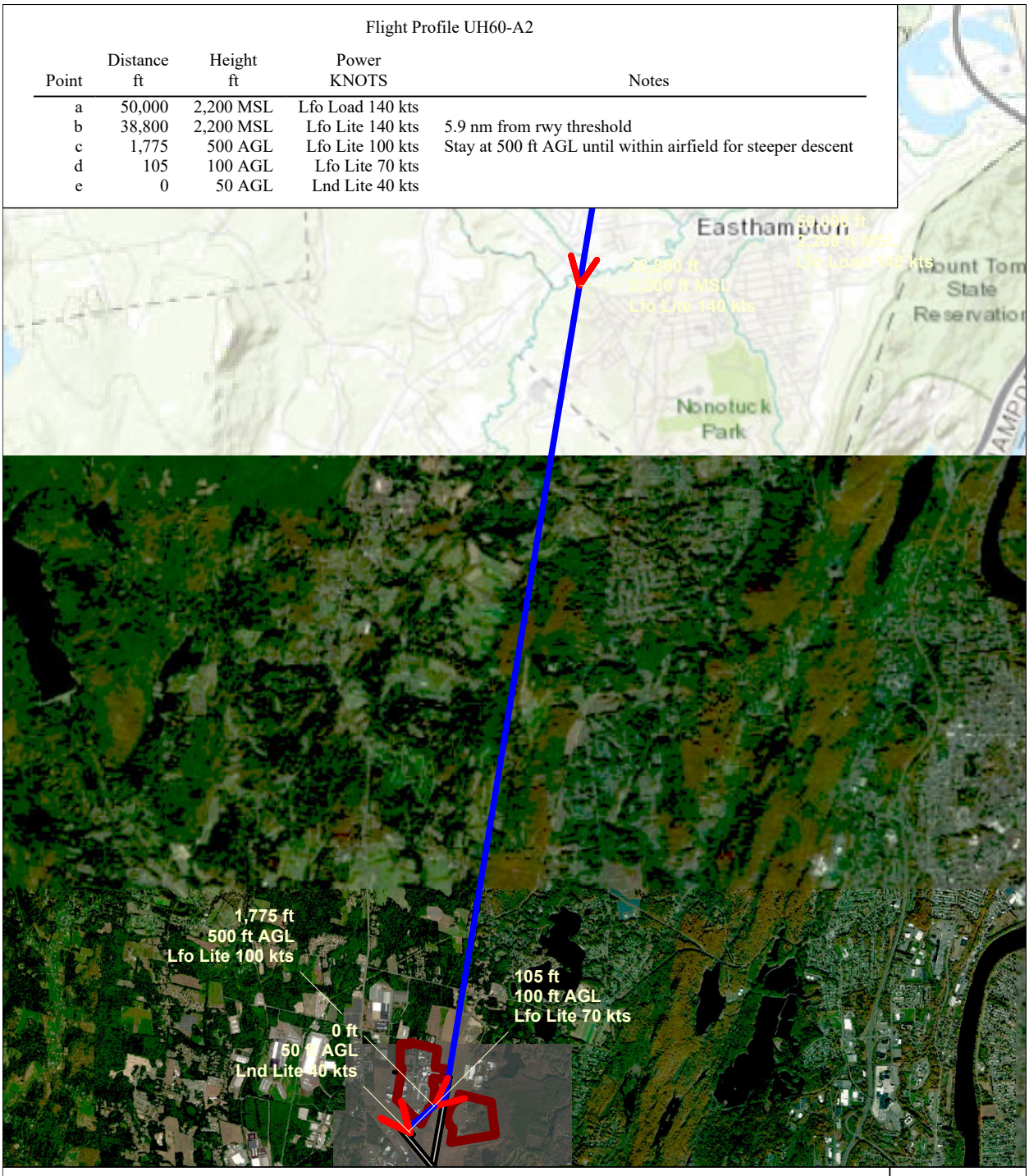
Flight Track: 15HA1 - Helicopter arrival to pad from northwest

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:89,400 (1 inch = 7,450 feet)

Flight Profile UH60-A2

Point	Distance ft	Height ft	Power KNOTS	Notes
a	50,000	2,200 MSL	Lfo Load 140 kts	
b	38,800	2,200 MSL	Lfo Lite 140 kts	5.9 nm from rwy threshold
c	1,775	500 AGL	Lfo Lite 100 kts	Stay at 500 ft AGL until within airfield for steeper descent
d	105	100 AGL	Lfo Lite 70 kts	
e	0	50 AGL	Lnd Lite 40 kts	



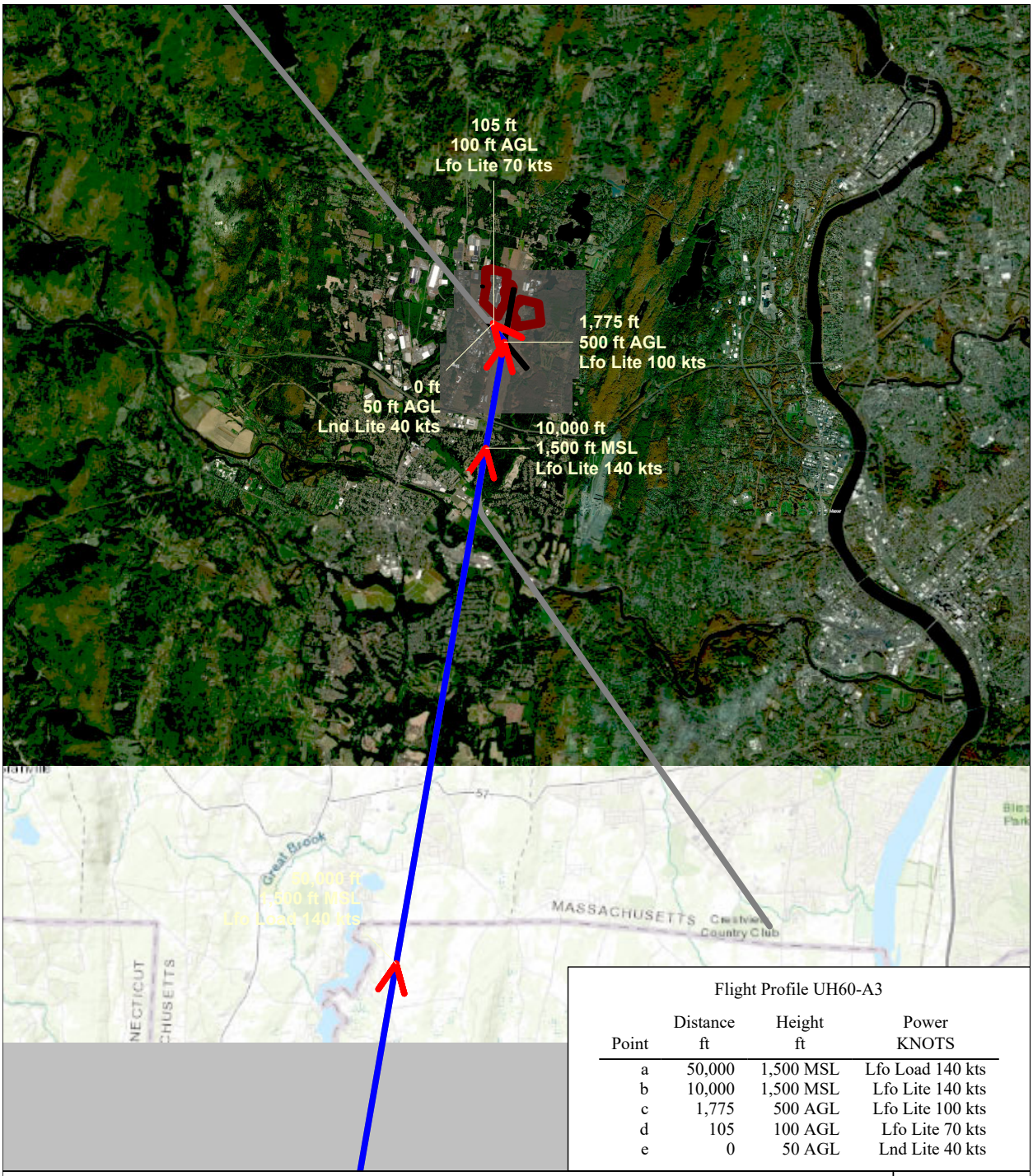
UH60A (T700-CE-700) - Flight Profile UH60-A2

UH60 arrive from north - ILS

Flight Track: 15HA2 - Helicopter arrival to pad from north

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:113,000 (1 inch = 9,430 feet)



Flight Profile UH60-A3

Point	Distance ft	Height ft	Power KNOTS
a	50,000	1,500 MSL	Lfo Load 140 kts
b	10,000	1,500 MSL	Lfo Lite 140 kts
c	1,775	500 AGL	Lfo Lite 100 kts
d	105	100 AGL	Lfo Lite 70 kts
e	0	50 AGL	Lnd Lite 40 kts

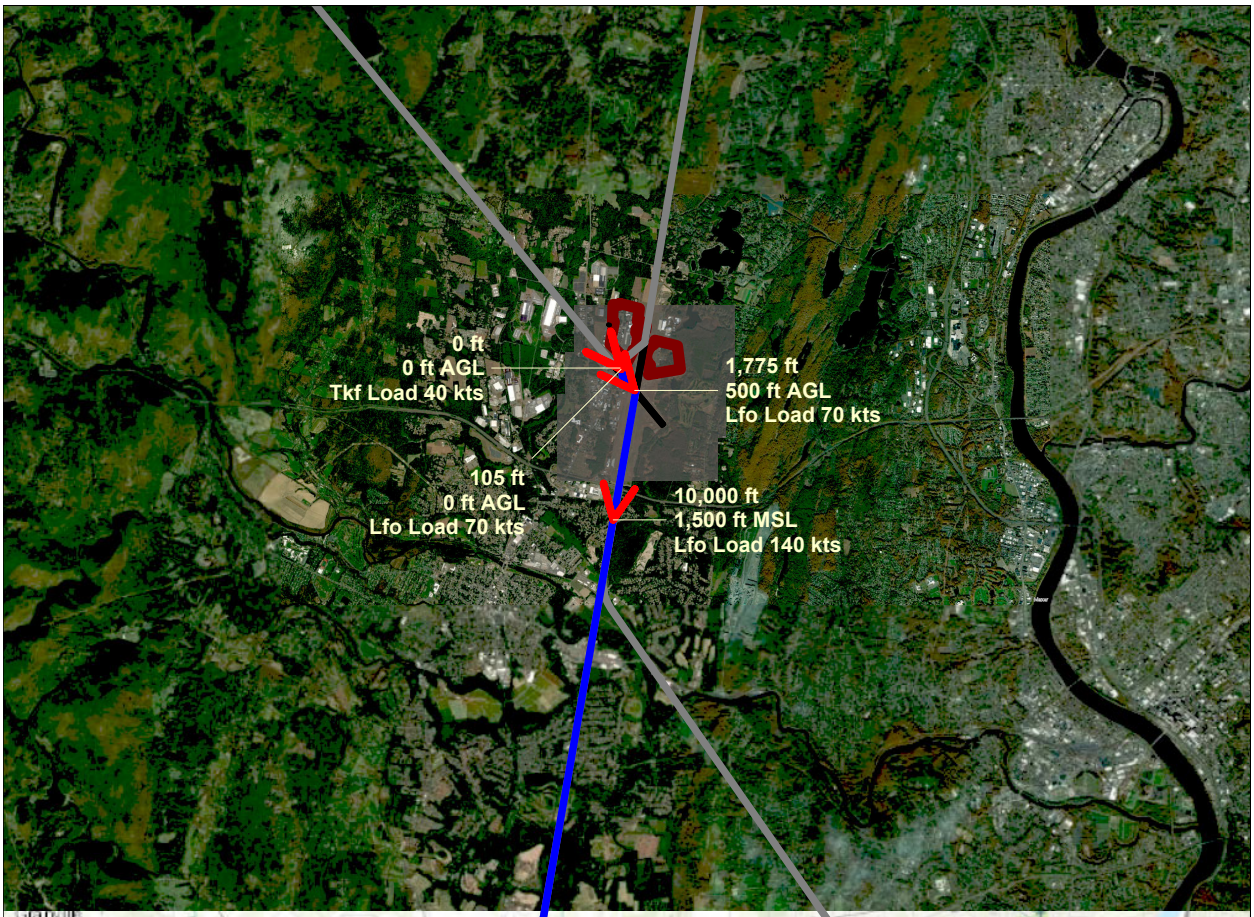
UH60A (T700-CE-700) - Flight Profile UH60-A3

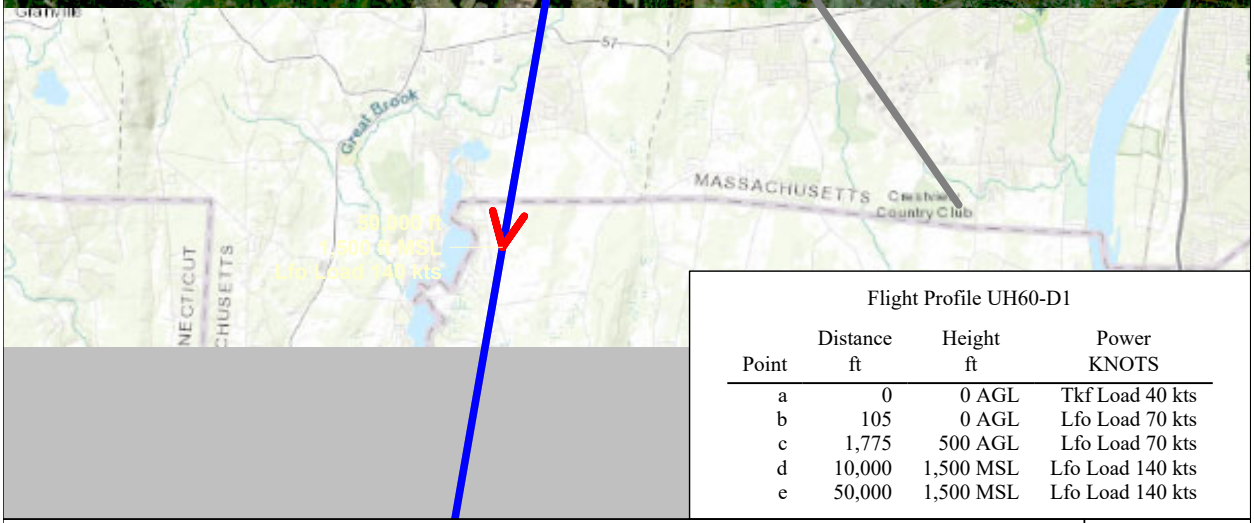
UH60 arrive from southeast

Flight Track: 33HA1 - Helicopter arrival from south

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:196,000 (1 inch = 16,300 feet)





Flight Profile UH60-D1

Point	Distance ft	Height ft	Power KNOTS
a	0	0 AGL	Tkf Load 40 kts
b	105	0 AGL	Lfo Load 70 kts
c	1,775	500 AGL	Lfo Load 70 kts
d	10,000	1,500 MSL	Lfo Load 140 kts
e	50,000	1,500 MSL	Lfo Load 140 kts

UH60A (T700-CE-700) - Flight Profile UH60-D1

UH60 depart to southeast

Flight Track: 15HD1 - Helicopter departure from pad out runway 20 heading - south

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:194,000 (1 inch = 16,200 feet)

Flight Profile H-hvr

Point	Distance ft	Height ft	Power KNOTS
a	0	0 AGL	Tkf Lite 40 kts
b	110	0 AGL	Tkf Lite 40 kts
c	220	100 AGL	Tkf Lite 40 kts
d	1,228	300 AGL	Tkf Lite 40 kts

UH60A (T700-CE-700) - Flight Profile H-hvr

H60/H72 pattern to approximate hoist training

Flight Track: HoistTrg

0 200 400 600 800 1,000 1,200 1,400 1,600 1,800

Scale in Feet 1:5,510 (1 inch = 459 feet)

N

Transient Military Flight Profile Maps

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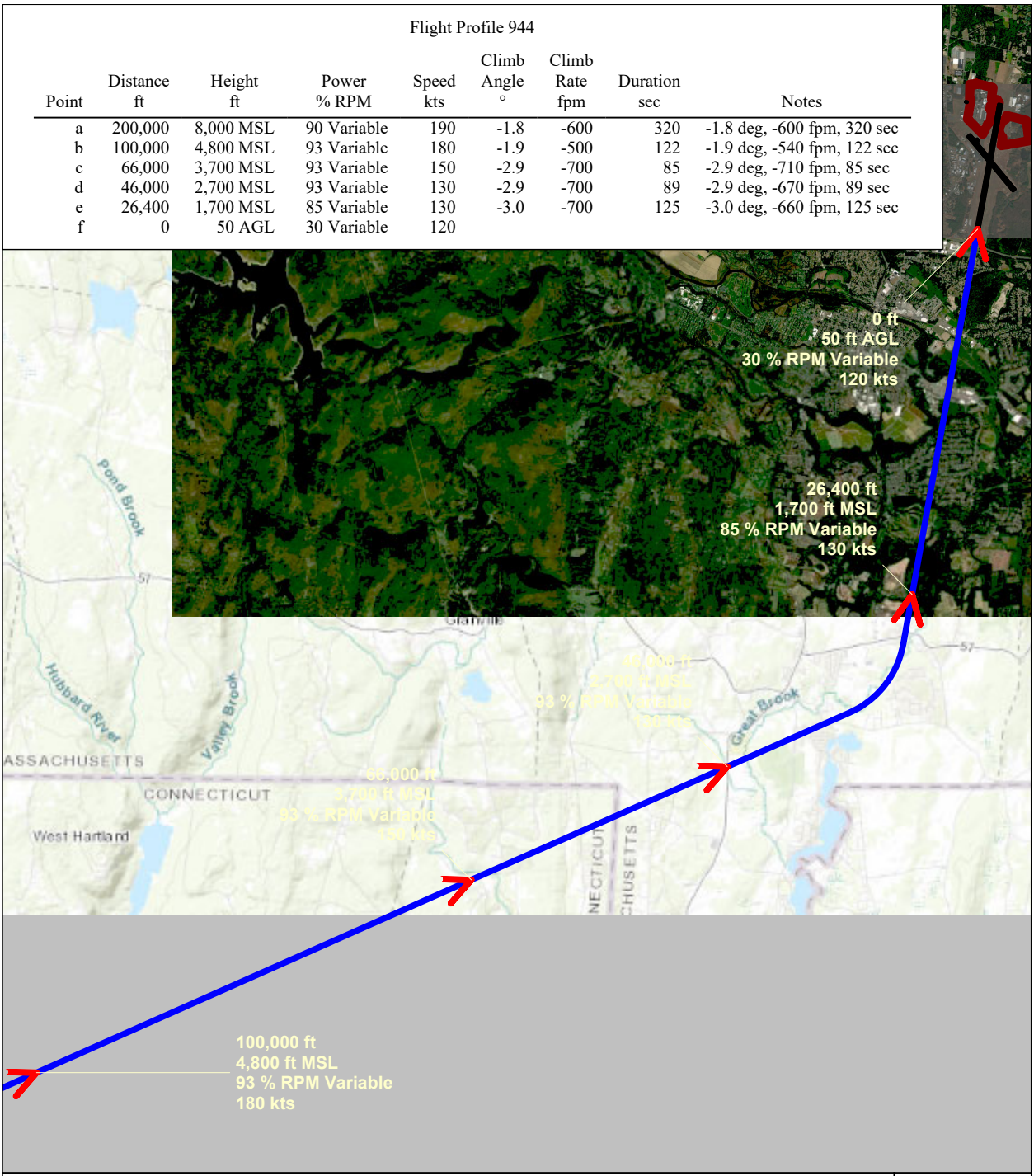
Flight Profile 944

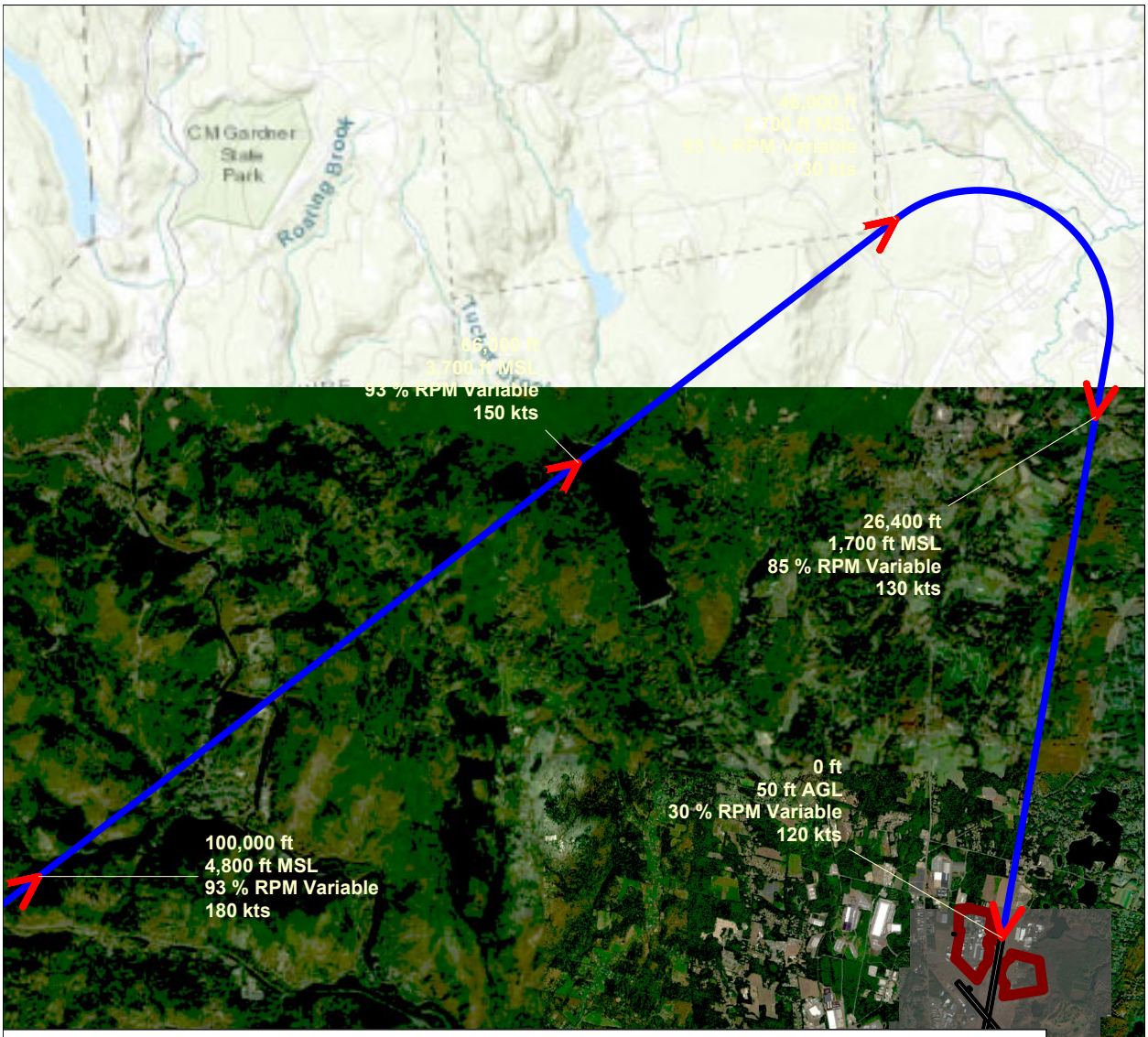
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	8,000 MSL	90 Variable	190	-1.8	-600	320	-1.8 deg, -600 fpm, 320 sec
b	100,000	4,800 MSL	93 Variable	180	-1.9	-500	122	-1.9 deg, -540 fpm, 122 sec
c	66,000	3,700 MSL	93 Variable	150	-2.9	-700	85	-2.9 deg, -710 fpm, 85 sec
d	46,000	2,700 MSL	93 Variable	130	-2.9	-700	89	-2.9 deg, -670 fpm, 89 sec
e	26,400	1,700 MSL	85 Variable	130	-3.0	-700	125	-3.0 deg, -660 fpm, 125 sec
f	0	50 AGL	30 Variable	120				



Transient C-12 (PT6A-38) - Flight Profile 944
Arrival from Pawling
Flight Track: 02AT3 - Arrival to 02 from Pawling - straigyht-in - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:183,000 (1 inch = 15,200 feet)



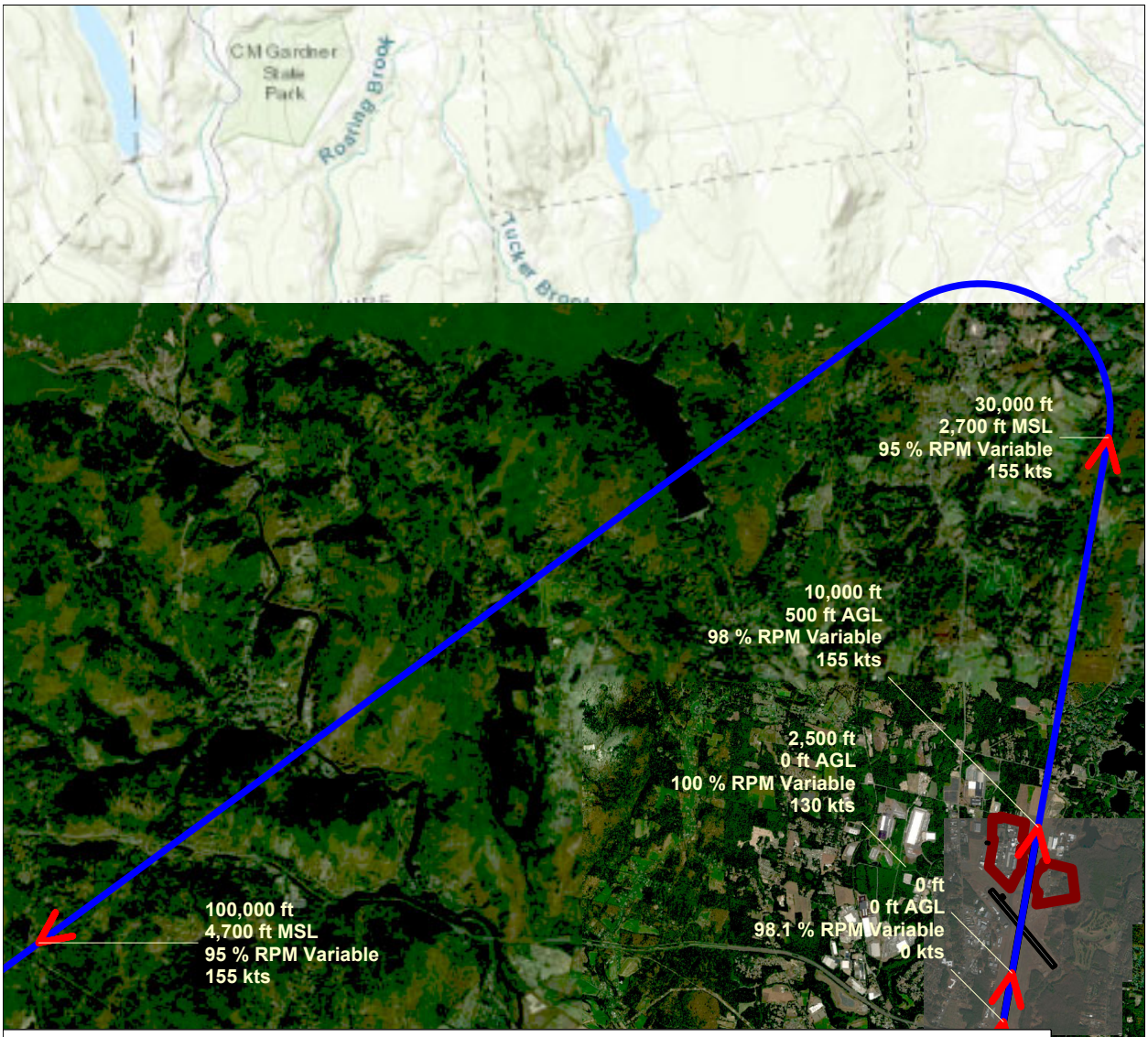
Flight Profile 953

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	8,000 MSL	90 Variable	190	-1.8	-600	320	-1.8 deg, -600 fpm, 320 sec
b	100,000	4,800 MSL	93 Variable	180	-1.9	-500	122	-1.9 deg, -540 fpm, 122 sec
c	66,000	3,700 MSL	93 Variable	150	-2.9	-700	85	-2.9 deg, -710 fpm, 85 sec
d	46,000	2,700 MSL	93 Variable	130	-2.9	-700	89	-2.9 deg, -670 fpm, 89 sec
e	26,400	1,700 MSL	85 Variable	130	-3.0	-700	125	-3.0 deg, -660 fpm, 125 sec
f	0	50 AGL	30 Variable	120				

Transient C-12 (PT6A-38) - Flight Profile 953
Arrival from Pawling
Flight Track: 20AT3 - Arrival to 20 from Pawling - straight-in - A10s, turbines (GG4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000

Scale in Feet 1:142,000 (1 inch = 11,900 feet)



Flight Profile 911

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	98.1 Variable	0	0.0	0	23	0.0 deg, 0 fpm, 23 sec
b	2,500	0 AGL	100 Variable	130	3.8	1000	31	3.8 deg, 960 fpm, 31 sec
c	10,000	500 AGL	98 Variable	155	5.5	1500	76	5.5 deg, 1510 fpm, 76 sec
d	30,000	2,700 MSL	95 Variable	155	1.6	400	268	1.6 deg, 450 fpm, 268 sec
e	100,000	4,700 MSL	95 Variable	155	3.0	800	382	3.0 deg, 830 fpm, 382 sec
f	200,000	10,000 MSL	95 Variable	155				

Transient C-12 (PT6A-38) - Flight Profile 911

Departure to Pawling

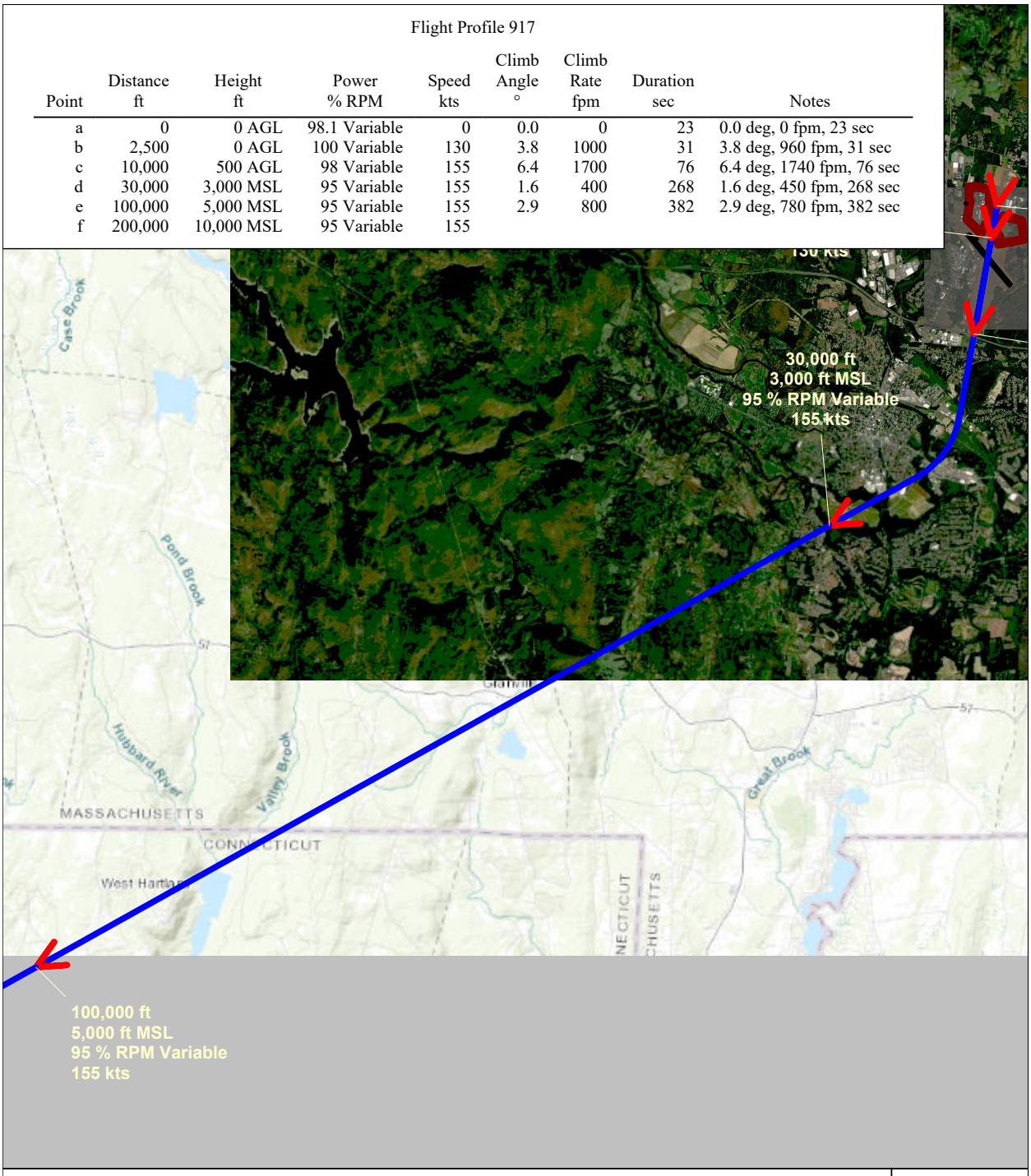
Flight Track: 02DT3 - Departure to Pawling from 02, turbines (G4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000

Scale in Feet 1:144,000 (1 inch = 12,000 feet)

Flight Profile 917

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	98.1 Variable	0	0.0	0	23	0.0 deg, 0 fpm, 23 sec
b	2,500	0 AGL	100 Variable	130	3.8	1000	31	3.8 deg, 960 fpm, 31 sec
c	10,000	500 AGL	98 Variable	155	6.4	1700	76	6.4 deg, 1740 fpm, 76 sec
d	30,000	3,000 MSL	95 Variable	155	1.6	400	268	1.6 deg, 450 fpm, 268 sec
e	100,000	5,000 MSL	95 Variable	155	2.9	800	382	2.9 deg, 780 fpm, 382 sec
f	200,000	10,000 MSL	95 Variable	155				



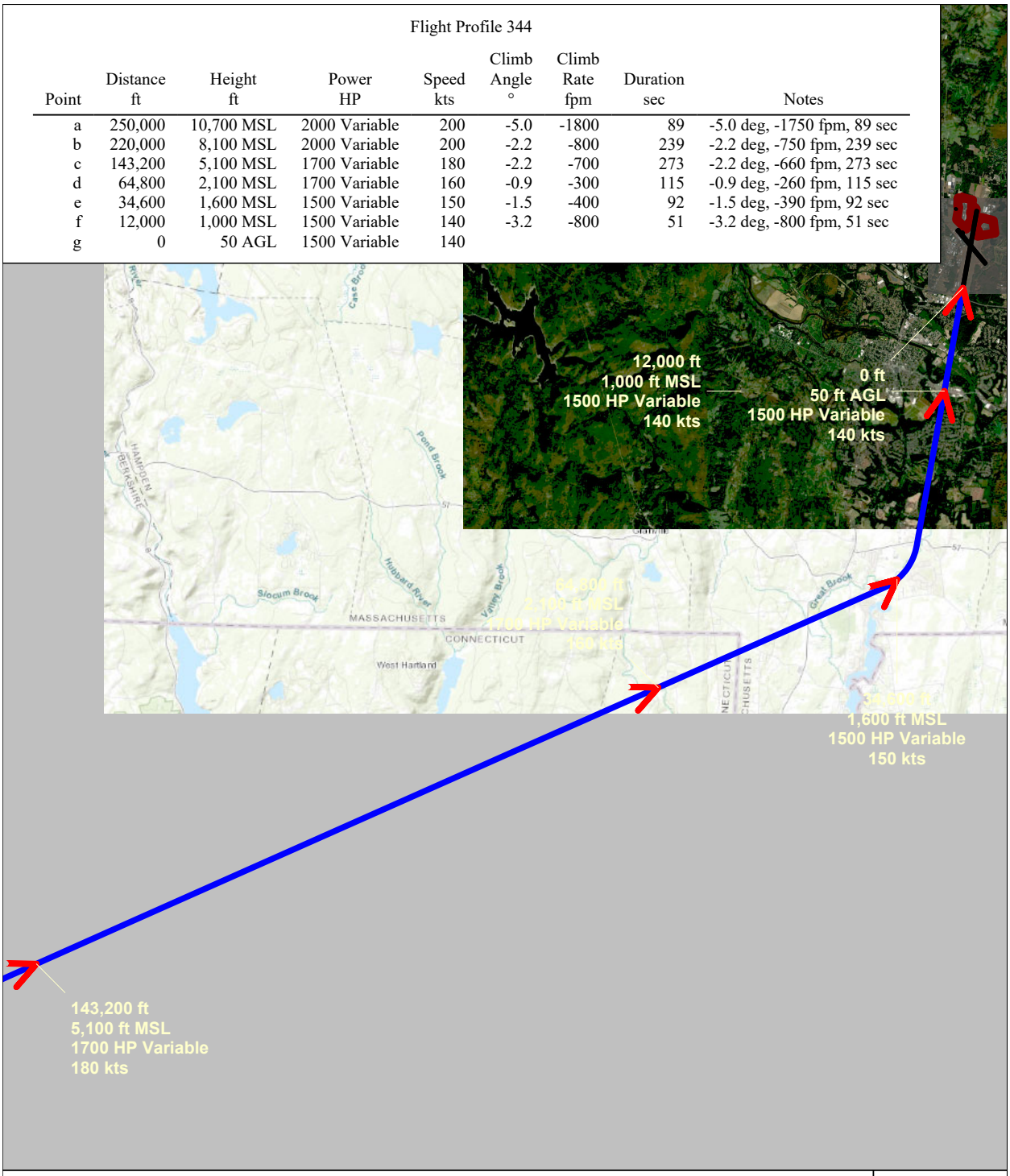
Transient C-12 (PT6A-38) - Flight Profile 917
Departure to Pawling
Flight Track: 20DT3 - Departure to Pawling - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:196,000 (1 inch = 16,400 feet)

Flight Profile 344

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	250,000	10,700 MSL	2000 Variable	200	-5.0	-1800	89	-5.0 deg, -1750 fpm, 89 sec
b	220,000	8,100 MSL	2000 Variable	200	-2.2	-800	239	-2.2 deg, -750 fpm, 239 sec
c	143,200	5,100 MSL	1700 Variable	180	-2.2	-700	273	-2.2 deg, -660 fpm, 273 sec
d	64,800	2,100 MSL	1700 Variable	160	-0.9	-300	115	-0.9 deg, -260 fpm, 115 sec
e	34,600	1,600 MSL	1500 Variable	150	-1.5	-400	92	-1.5 deg, -390 fpm, 92 sec
f	12,000	1,000 MSL	1500 Variable	140	-3.2	-800	51	-3.2 deg, -800 fpm, 51 sec
g	0	50 AGL	1500 Variable	140				

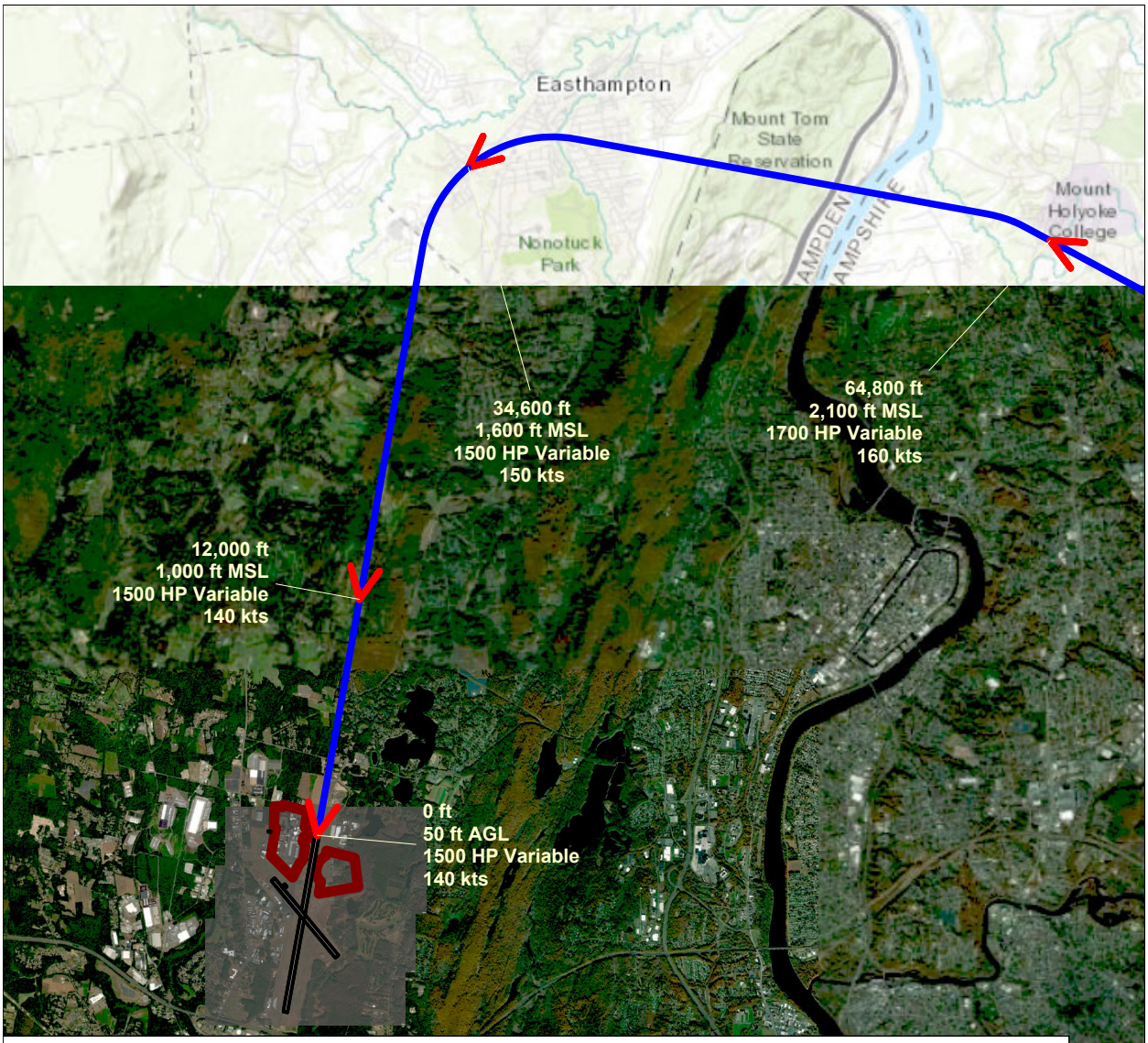


Transient C-130J (AE2100D3) - Flight Profile 344

Flight Track: 02AT3 - Arrival to 02 from Pawling - straigyht-in - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

Scale in Feet 1:287,000 (1 inch = 23,900 feet)



Flight Profile 357

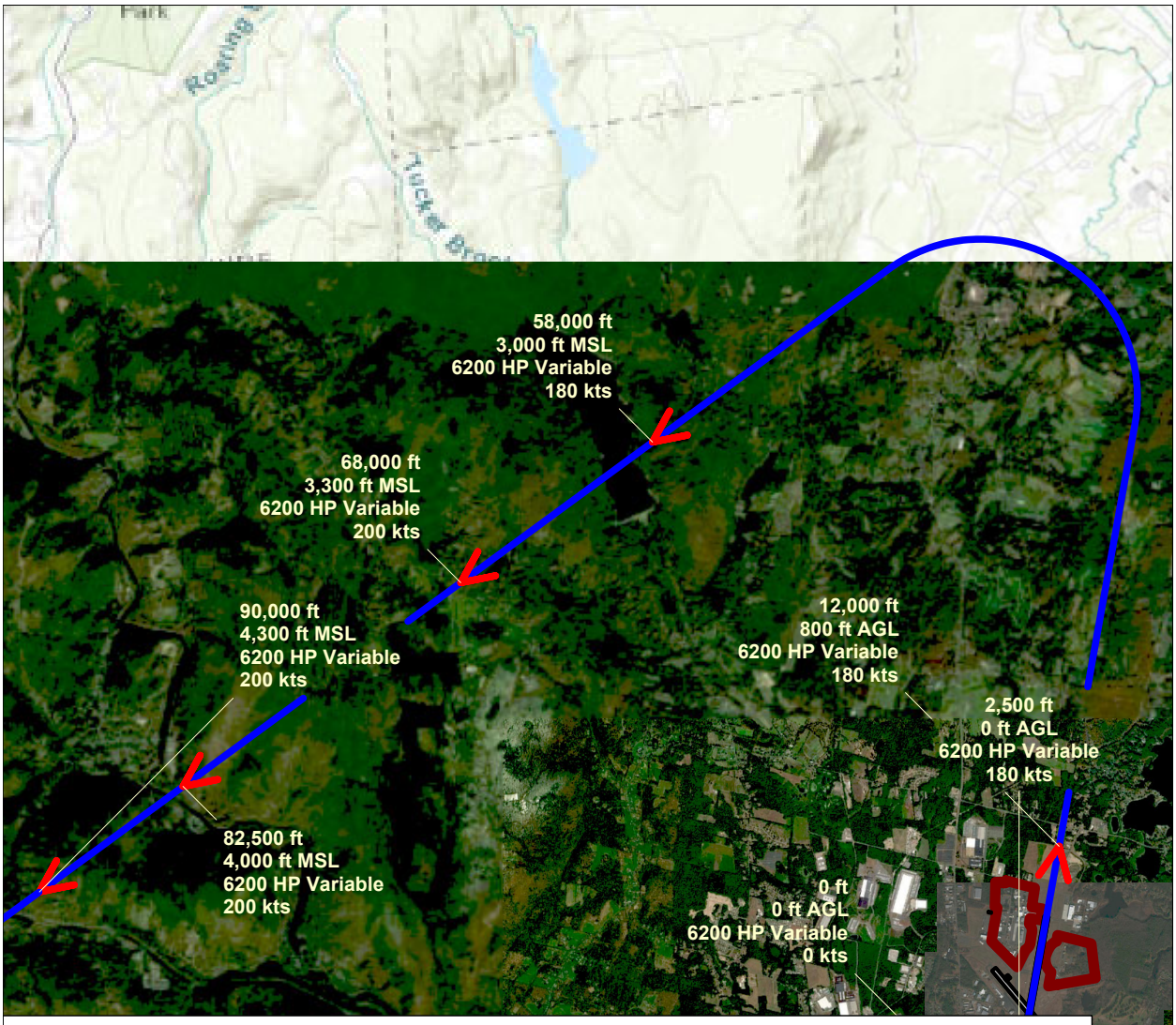
Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	250,000	10,700 MSL	2000 Variable	200	-5.0	-1800	89	-5.0 deg, -1750 fpm, 89 sec
b	220,000	8,100 MSL	2000 Variable	200	-2.2	-800	239	-2.2 deg, -750 fpm, 239 sec
c	143,200	5,100 MSL	1700 Variable	180	-2.2	-700	273	-2.2 deg, -660 fpm, 273 sec
d	64,800	2,100 MSL	1700 Variable	160	-0.9	-300	115	-0.9 deg, -260 fpm, 115 sec
e	34,600	1,600 MSL	1500 Variable	150	-1.5	-400	92	-1.5 deg, -390 fpm, 92 sec
f	12,000	1,000 MSL	1500 Variable	140	-3.2	-800	51	-3.2 deg, -800 fpm, 51 sec
g	0	50 AGL	1500 Variable	140				

Transient C-130J (AE2100D3) - Flight Profile 357

Flight Track: 20AT5 - Arrival from Putnam to 20, turbines (G4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000

Scale in Feet 1:143,000 (1 inch = 11,900 feet)



Flight Profile 311

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	6200 Variable	0	0.0	0	16	0.0 deg, 0 fpm, 16 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	2.4	800	151	2.4 deg, 760 fpm, 151 sec
d	58,000	3,000 MSL	6200 Variable	180	1.7	600	31	1.7 deg, 580 fpm, 31 sec
e	68,000	3,300 MSL	6200 Variable	200	2.8	1000	43	2.8 deg, 980 fpm, 43 sec
f	82,500	4,000 MSL	6200 Variable	200	2.3	800	22	2.3 deg, 810 fpm, 22 sec
g	90,000	4,300 MSL	6200 Variable	200	1.6	600	178	1.6 deg, 570 fpm, 178 sec
h	150,000	6,000 MSL	6200 Variable	200	4.6	1600	148	4.6 deg, 1620 fpm, 148 sec
i	200,000	10,000 MSL	6200 Variable	200				

Transient C-130J (AE2100D3) - Flight Profile 311

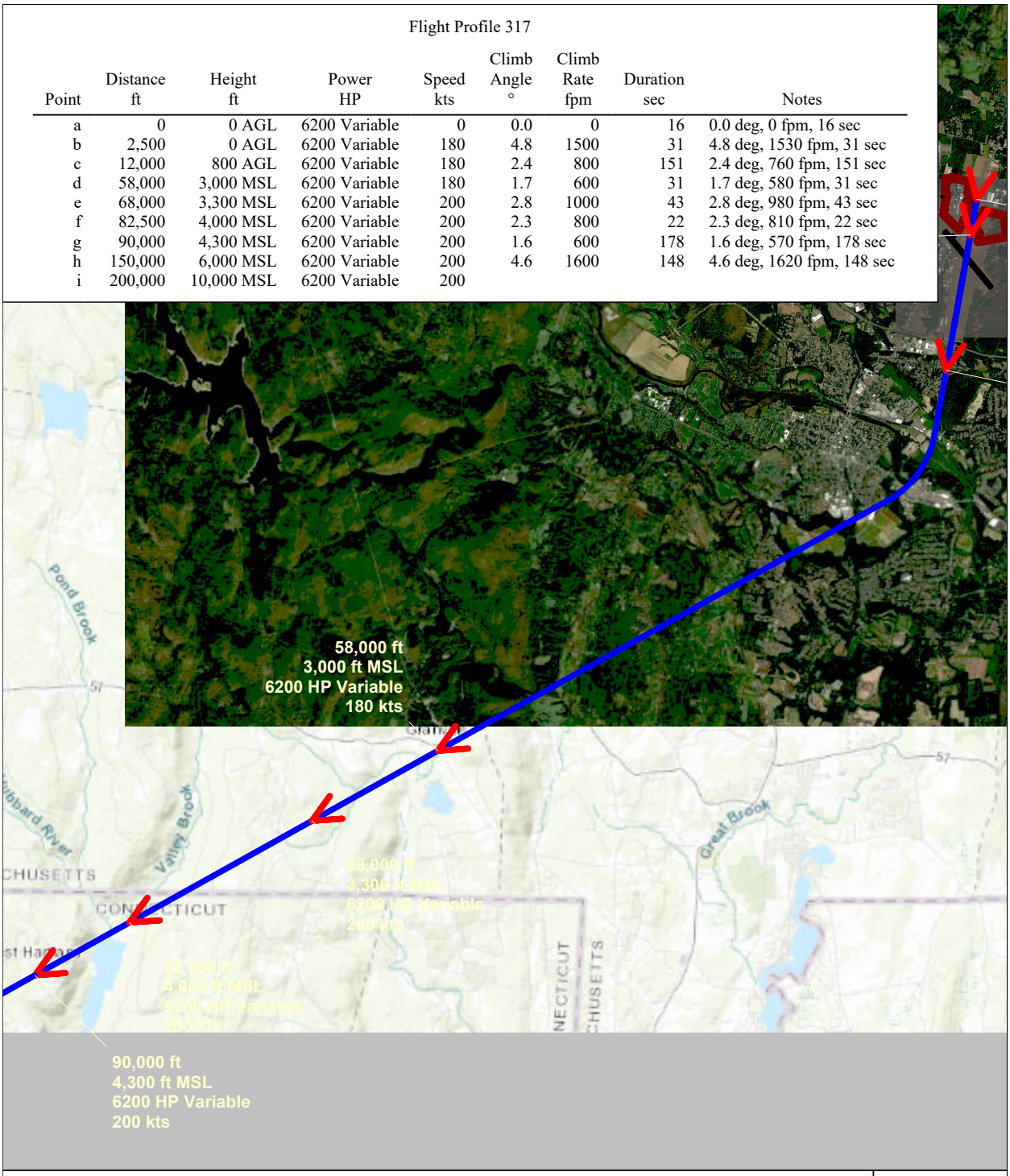
Flight Track: 02DT3 - Departure to Pawling from 02, turbines (G4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:123,000 (1 inch = 10,200 feet)

Flight Profile 317

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	6200 Variable	0	0.0	0	16	0.0 deg, 0 fpm, 16 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	2.4	800	151	2.4 deg, 760 fpm, 151 sec
d	58,000	3,000 MSL	6200 Variable	180	1.7	600	31	1.7 deg, 580 fpm, 31 sec
e	68,000	3,300 MSL	6200 Variable	200	2.8	1000	43	2.8 deg, 980 fpm, 43 sec
f	82,500	4,000 MSL	6200 Variable	200	2.3	800	22	2.3 deg, 810 fpm, 22 sec
g	90,000	4,300 MSL	6200 Variable	200	1.6	600	178	1.6 deg, 570 fpm, 178 sec
h	150,000	6,000 MSL	6200 Variable	200	4.6	1600	148	4.6 deg, 1620 fpm, 148 sec
i	200,000	10,000 MSL	6200 Variable	200				



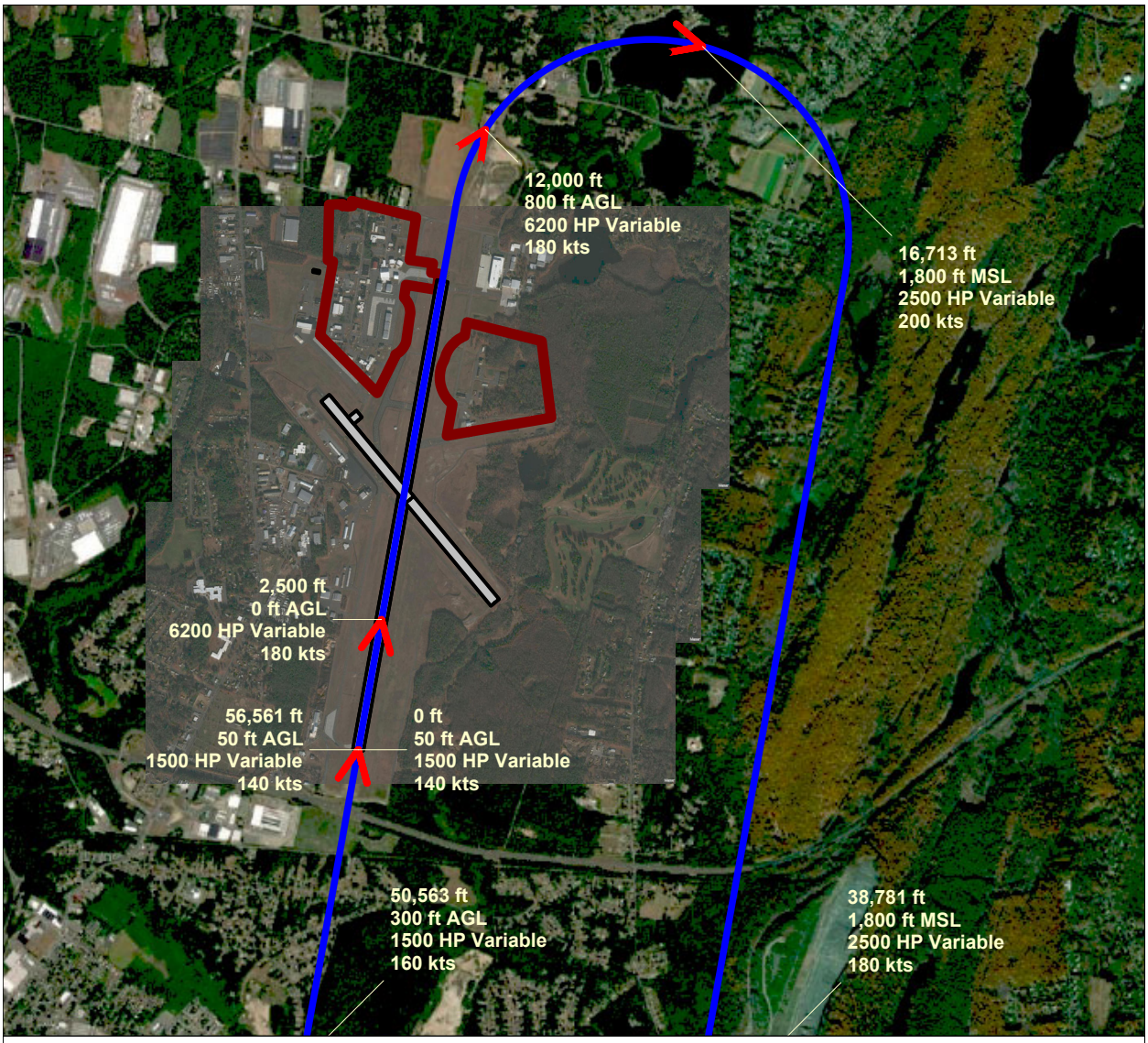
Transient C-130J (AE2100D3) - Flight Profile 317

Flight Track: 20DT3 - Departure to Pawling - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:173,000 (1 inch = 14,400 feet)

N



Flight Profile 403

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	1500 Variable	140	-1.1	-300	9	cross threshold, -1.1 deg, -320 fpm, 9 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	touch, 4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	8.8	3000	15	8.8 deg, 2940 fpm, 15 sec
d	16,713	1,800 MSL	2500 Variable	200	0.0	0	69	reach pattern altitude, 0.0 deg, 0 fpm, 69 sec
e	38,781	1,800 MSL	2500 Variable	180	-6.0	-1800	41	end downwind; begin descent, -6.0 deg, -179
f	50,563	300 AGL	1500 Variable	160	-2.4	-600	24	begin 1nm final, -2.4 deg, -630 fpm, 24 sec
g	56,561	50 AGL	1500 Variable	140				cross threshold

Transient C-130J (AE2100D3) - Flight Profile 403

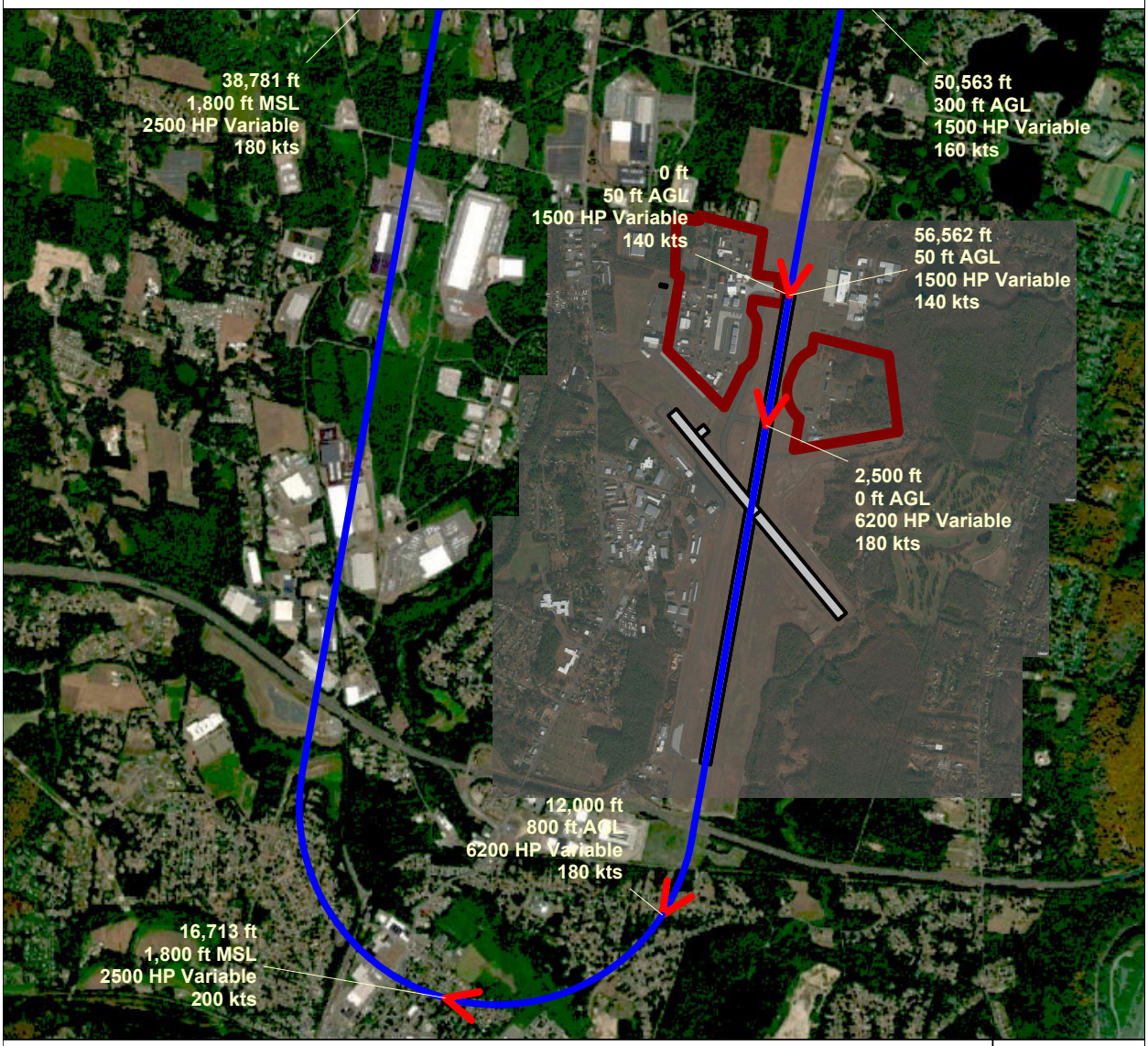
Flight Track: 02CP3 - Standard closed pattern (left) - C130

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:53,900 (1 inch = 4,490 feet)

Flight Profile 409

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	1500 Variable	140	-1.1	-300	9	cross threshold, -1.1 deg, -320 fpm, 9 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	touch, 4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	8.8	3000	15	8.8 deg, 2940 fpm, 15 sec
d	16,713	1,800 MSL	2500 Variable	200	0.0	0	69	reach pattern altitude, 0.0 deg, 0 fpm, 69 sec
e	38,781	1,800 MSL	2500 Variable	180	-6.0	-1800	41	end downwind; begin descent, -6.0 deg, -179
f	50,563	300 AGL	1500 Variable	160	-2.4	-600	24	begin 1nm final, -2.4 deg, -630 fpm, 24 sec
g	56,562	50 AGL	1500 Variable	140				cross threshold



Transient C-130J (AE2100D3) - Flight Profile 409

Flight Track: 20CP3 - Standard closed pattern (right) - C130

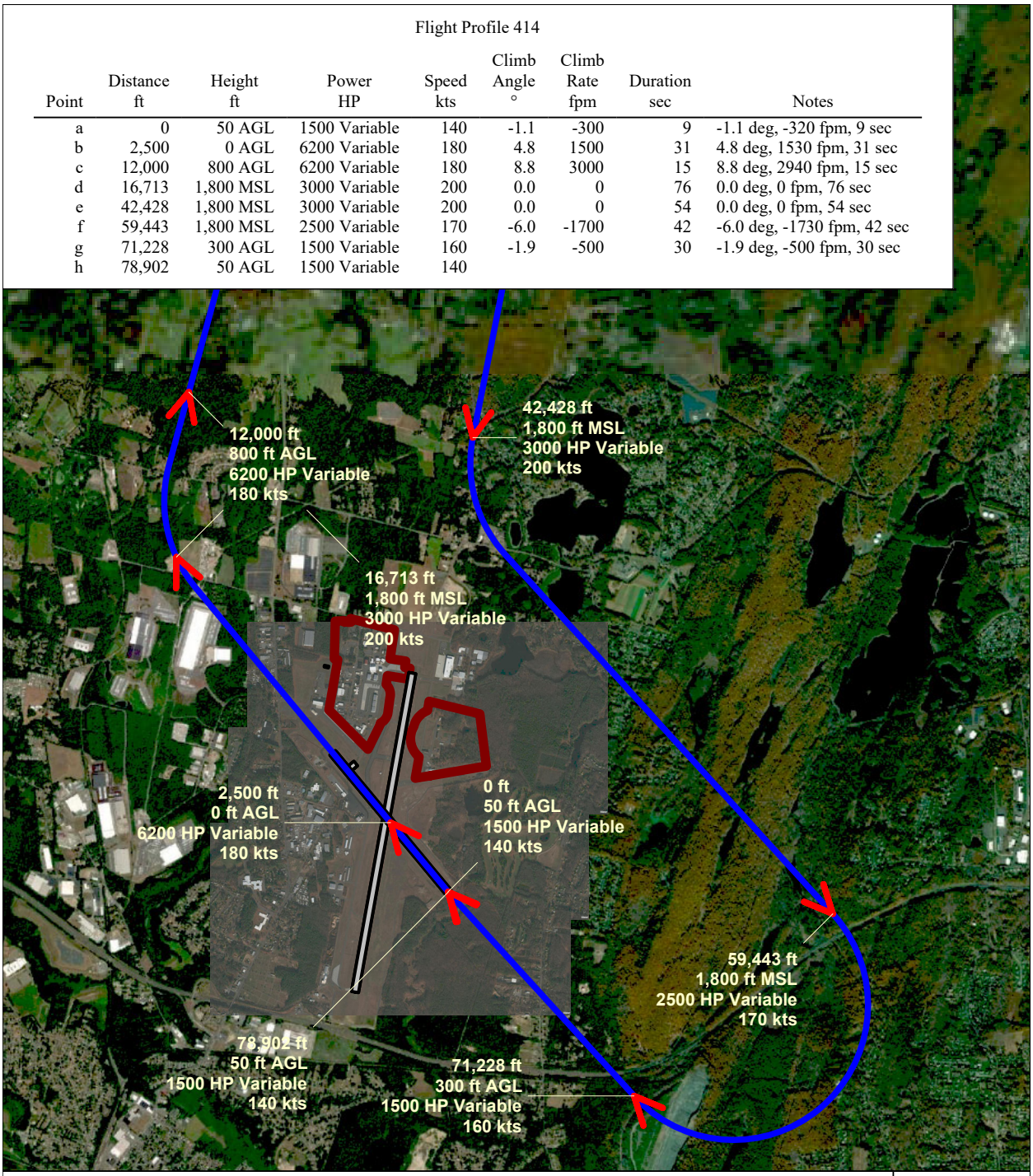
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:53,900 (1 inch = 4,490 feet)

N

Flight Profile 414

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	1500 Variable	140	-1.1	-300	9	-1.1 deg, -320 fpm, 9 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	8.8	3000	15	8.8 deg, 2940 fpm, 15 sec
d	16,713	1,800 MSL	3000 Variable	200	0.0	0	76	0.0 deg, 0 fpm, 76 sec
e	42,428	1,800 MSL	3000 Variable	200	0.0	0	54	0.0 deg, 0 fpm, 54 sec
f	59,443	1,800 MSL	2500 Variable	170	-6.0	-1700	42	-6.0 deg, -1730 fpm, 42 sec
g	71,228	300 AGL	1500 Variable	160	-1.9	-500	30	-1.9 deg, -500 fpm, 30 sec
h	78,902	50 AGL	1500 Variable	140				



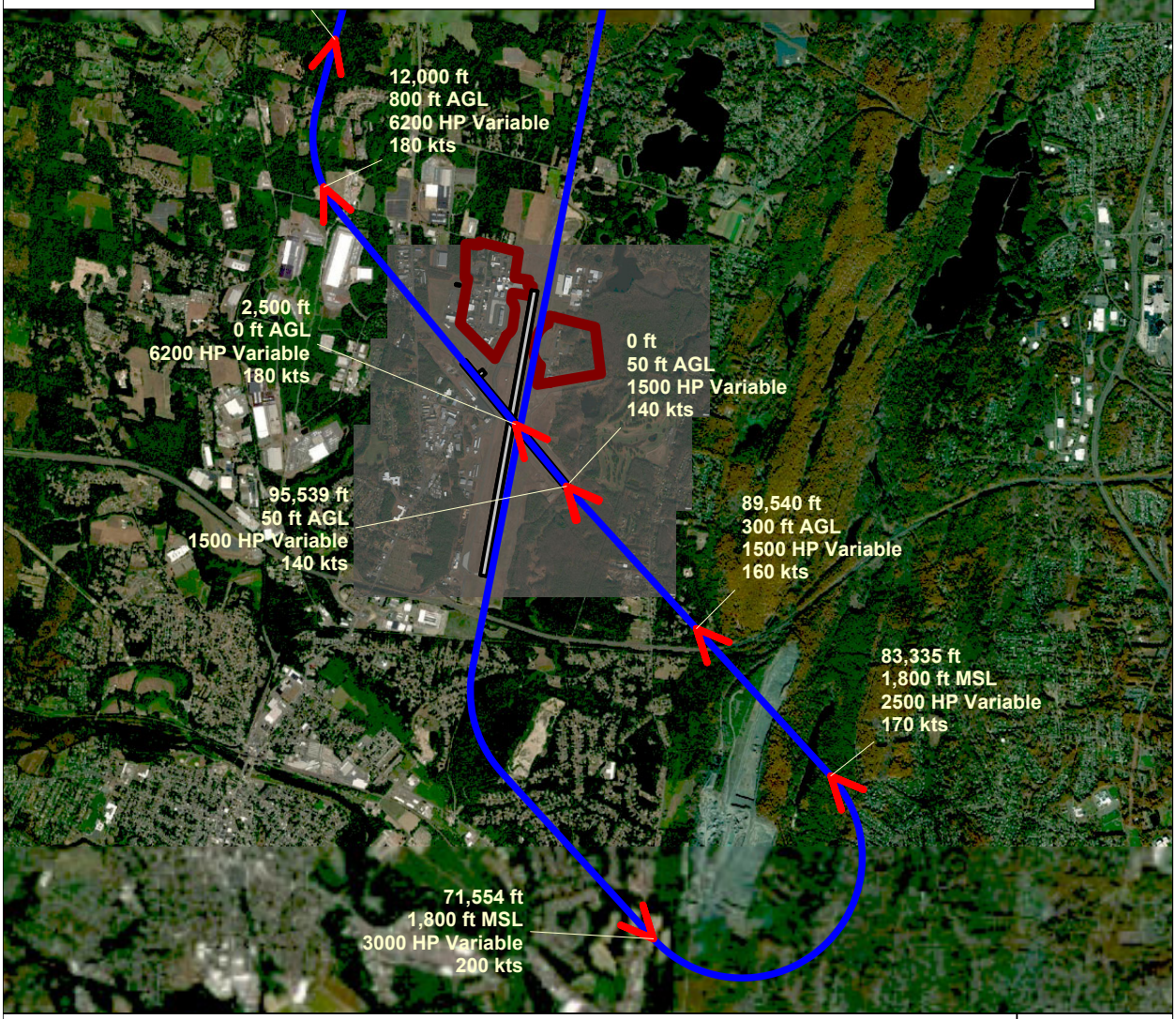
Transient C-130J (AE2100D3) - Flight Profile 414
right base
Flight Track: 33CP2 - Closed Pattern used by C130 transients - right base

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:71,200 (1 inch = 5,940 feet)

Flight Profile 415

Point	Distance ft	Height ft	Power HP	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	1500 Variable	140	-1.1	-300	9	-1.1 deg, -320 fpm, 9 sec
b	2,500	0 AGL	6200 Variable	180	4.8	1500	31	4.8 deg, 1530 fpm, 31 sec
c	12,000	800 AGL	6200 Variable	180	8.8	3000	15	8.8 deg, 2940 fpm, 15 sec
d	16,713	1,800 MSL	3000 Variable	200	0.0	0	162	0.0 deg, 0 fpm, 162 sec
e	71,554	1,800 MSL	3000 Variable	200	0.0	0	38	0.0 deg, 0 fpm, 38 sec
f	83,335	1,800 MSL	2500 Variable	170	-11.2	-3300	22	-11.2 deg, -3250 fpm, 22 sec
g	89,540	300 AGL	1500 Variable	160	-2.4	-600	24	-2.4 deg, -630 fpm, 24 sec
h	95,539	50 AGL	1500 Variable	140				



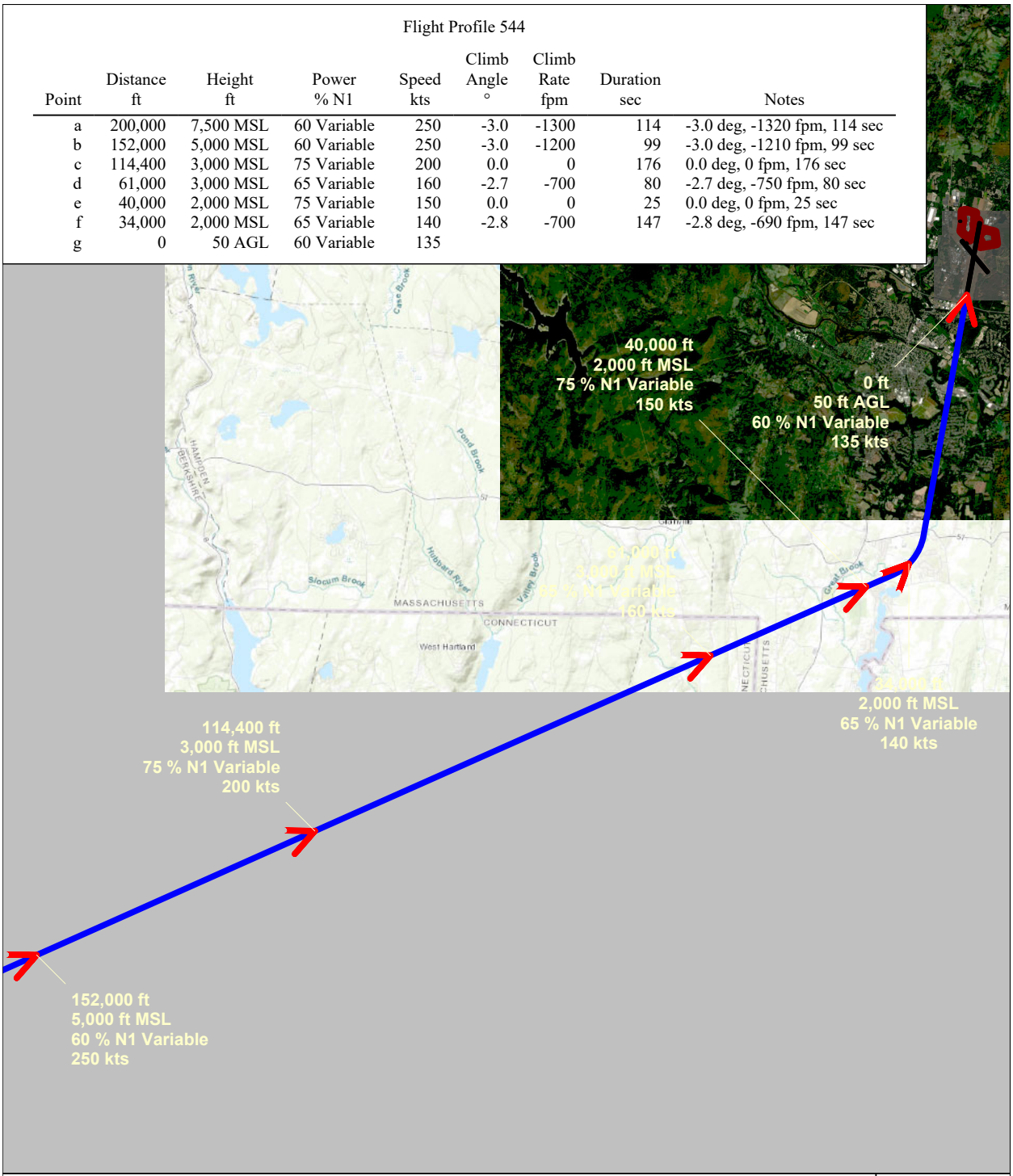
Transient C-130J (AE2100D3) - Flight Profile 415
left base
Flight Track: 33CP3 - Closed Pattern used by C130 transients -left base

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:90,700 (1 inch = 7,560 feet)

Flight Profile 544

Point	Distance ft	Height ft	Power % N1	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	7,500 MSL	60 Variable	250	-3.0	-1300	114	-3.0 deg, -1320 fpm, 114 sec
b	152,000	5,000 MSL	60 Variable	250	-3.0	-1200	99	-3.0 deg, -1210 fpm, 99 sec
c	114,400	3,000 MSL	75 Variable	200	0.0	0	176	0.0 deg, 0 fpm, 176 sec
d	61,000	3,000 MSL	65 Variable	160	-2.7	-700	80	-2.7 deg, -750 fpm, 80 sec
e	40,000	2,000 MSL	75 Variable	150	0.0	0	25	0.0 deg, 0 fpm, 25 sec
f	34,000	2,000 MSL	65 Variable	140	-2.8	-700	147	-2.8 deg, -690 fpm, 147 sec
g	0	50 AGL	60 Variable	135				

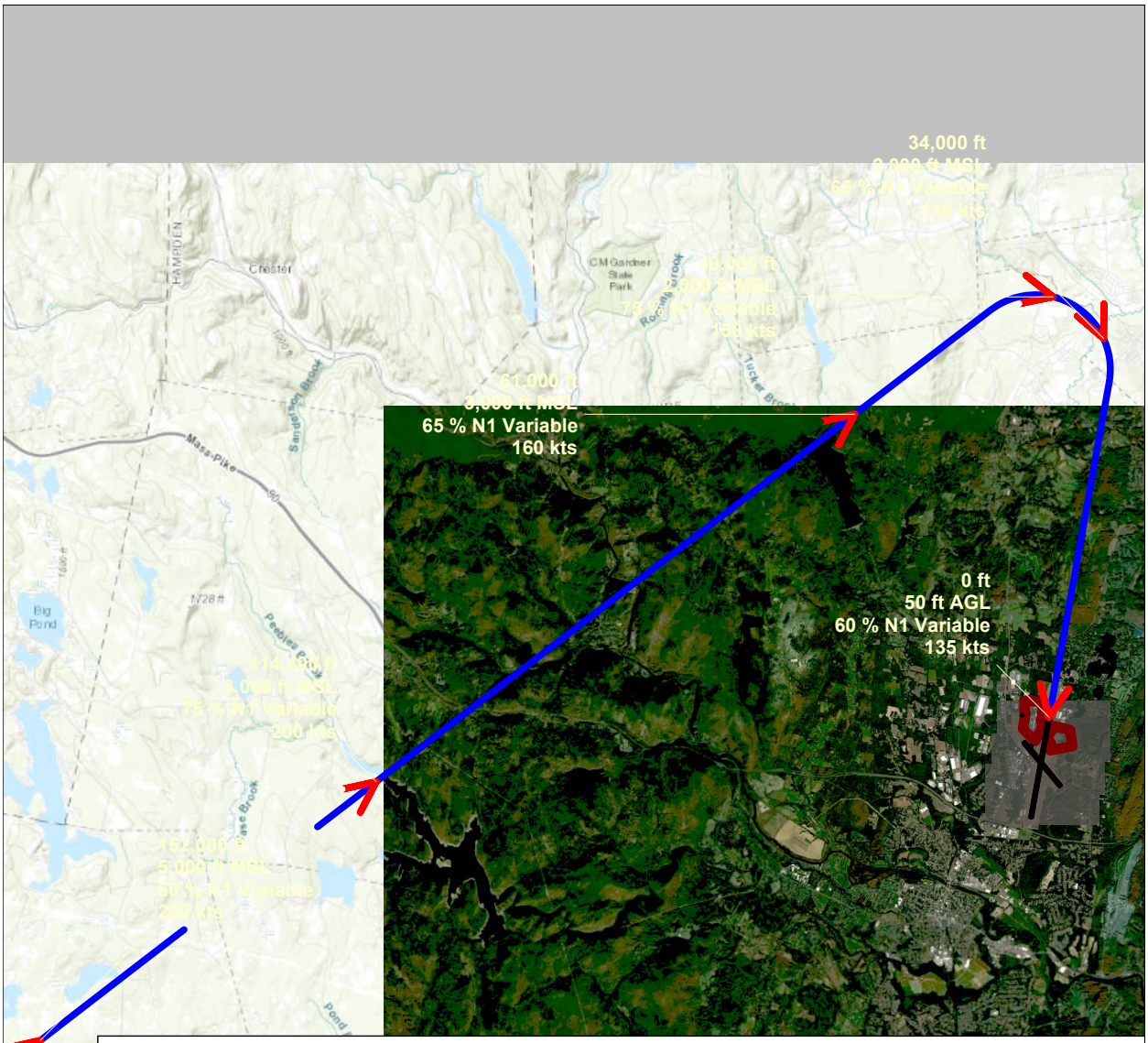


Transient C-5MX (CF6-80C2L1F) - Flight Profile 544

Flight Track: 02AT3 - Arrival to 02 from Pawling - straigyht-in - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

Scale in Feet 1:309,000 (1 inch = 25,700 feet)



Flight Profile 553

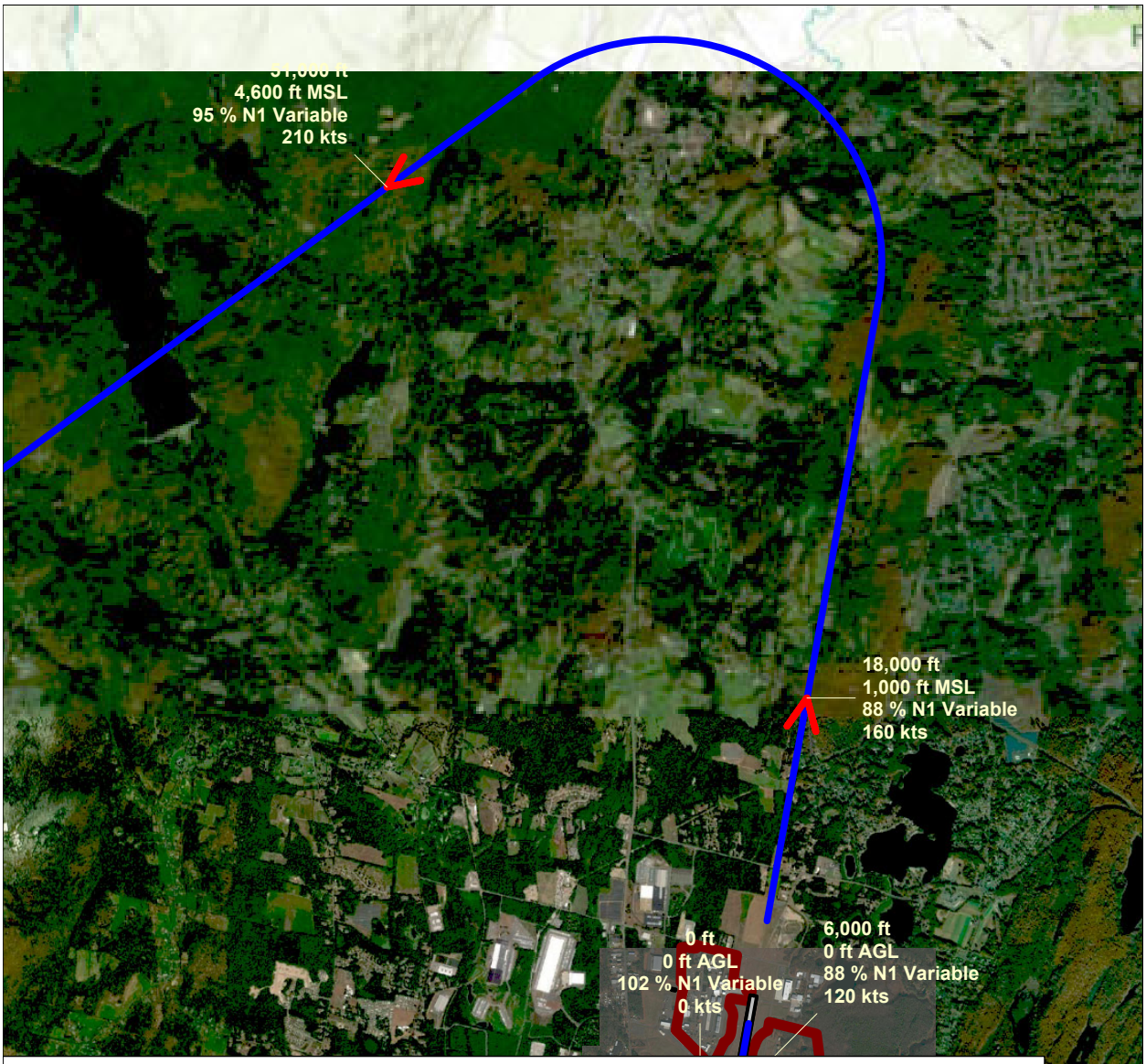
Point	Distance ft	Height ft	Power % N1	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	7,500 MSL	60 Variable	250	-3.0	-1300	114	-3.0 deg, -1320 fpm, 114 sec
b	152,000	5,000 MSL	60 Variable	250	-3.0	-1200	99	-3.0 deg, -1210 fpm, 99 sec
c	114,400	3,000 MSL	75 Variable	200	0.0	0	176	0.0 deg, 0 fpm, 176 sec
d	61,000	3,000 MSL	65 Variable	160	-2.7	-700	80	-2.7 deg, -750 fpm, 80 sec
e	40,000	2,000 MSL	75 Variable	150	0.0	0	25	0.0 deg, 0 fpm, 25 sec
f	34,000	2,000 MSL	65 Variable	140	-2.8	-700	147	-2.8 deg, -690 fpm, 147 sec
g	0	50 AGL	60 Variable	135				

Transient C-5MX (CF6-80C2L1F) - Flight Profile 553

Flight Track: 20AT3 - Arrival to 20 from Pawling - straight-in - A10s, turbines (GG4)

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:252,000 (1 inch = 21,000 feet)



Flight Profile 511

Point	Distance ft	Height ft	Power % N1	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	102 Variable	0	0.0	0	59	0.0 deg, 0 fpm, 59 sec
b	6,000	0 AGL	88 Variable	120	3.5	900	51	3.5 deg, 860 fpm, 51 sec
c	18,000	1,000 MSL	88 Variable	160	6.2	2000	106	6.2 deg, 2030 fpm, 106 sec
d	51,000	4,600 MSL	95 Variable	210	2.2	900	99	2.2 deg, 910 fpm, 99 sec
e	89,331	6,100 MSL	97 Variable	250	1.0	400	262	1.0 deg, 440 fpm, 262 sec
f	200,000	8,000 MSL	97 Variable	250				

Transient C-5MX (CF6-80C2L1F) - Flight Profile 511

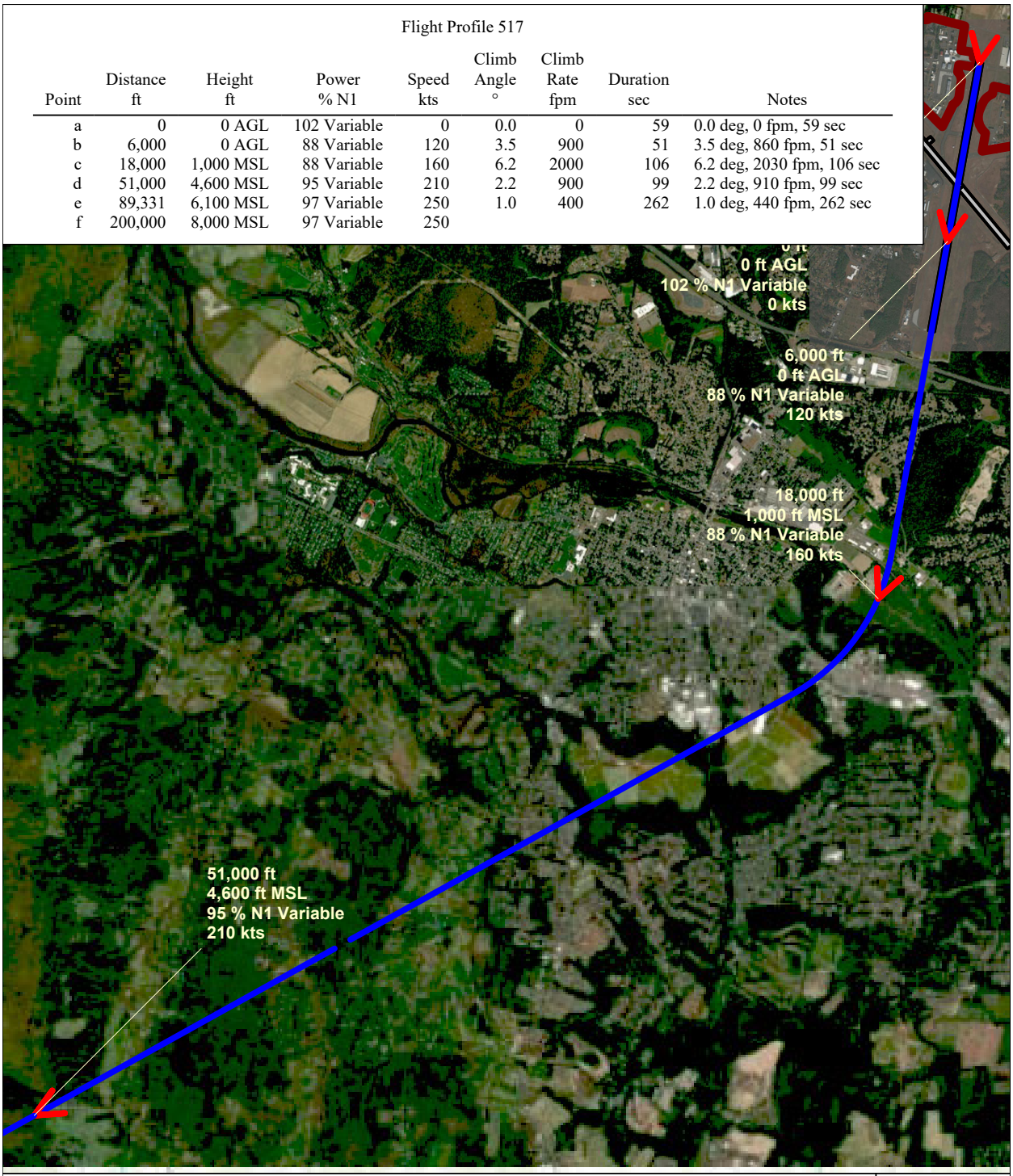
Flight Track: 02DT3 - Departure to Pawling from 02, turbines (G4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:84,700 (1 inch = 7,060 feet)

Flight Profile 517

Point	Distance ft	Height ft	Power % N1	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	102 Variable	0	0.0	0	59	0.0 deg, 0 fpm, 59 sec
b	6,000	0 AGL	88 Variable	120	3.5	900	51	3.5 deg, 860 fpm, 51 sec
c	18,000	1,000 MSL	88 Variable	160	6.2	2000	106	6.2 deg, 2030 fpm, 106 sec
d	51,000	4,600 MSL	95 Variable	210	2.2	900	99	2.2 deg, 910 fpm, 99 sec
e	89,331	6,100 MSL	97 Variable	250	1.0	400	262	1.0 deg, 440 fpm, 262 sec
f	200,000	8,000 MSL	97 Variable	250				



Transient C-5MX (CF6-80C2L1F) - Flight Profile 517
Flight Track: 20DT3 - Departure to Pawling - A10s, turbines (G4)

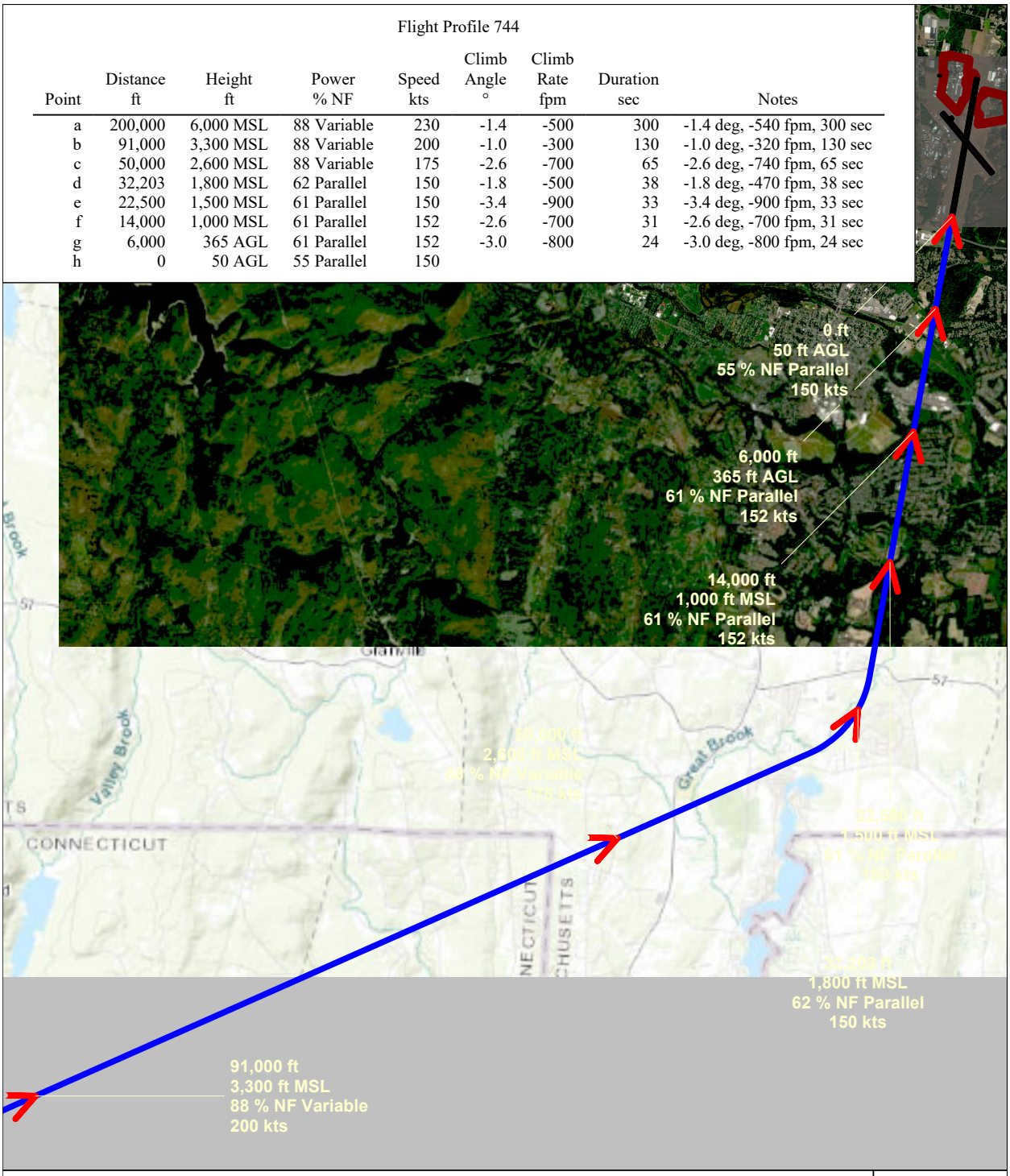
0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:82,900 (1 inch = 6,910 feet)

N

Flight Profile 744

Point	Distance ft	Height ft	Power % NF	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	6,000 MSL	88 Variable	230	-1.4	-500	300	-1.4 deg, -540 fpm, 300 sec
b	91,000	3,300 MSL	88 Variable	200	-1.0	-300	130	-1.0 deg, -320 fpm, 130 sec
c	50,000	2,600 MSL	88 Variable	175	-2.6	-700	65	-2.6 deg, -740 fpm, 65 sec
d	32,203	1,800 MSL	62 Parallel	150	-1.8	-500	38	-1.8 deg, -470 fpm, 38 sec
e	22,500	1,500 MSL	61 Parallel	150	-3.4	-900	33	-3.4 deg, -900 fpm, 33 sec
f	14,000	1,000 MSL	61 Parallel	152	-2.6	-700	31	-2.6 deg, -700 fpm, 31 sec
g	6,000	365 AGL	61 Parallel	152	-3.0	-800	24	-3.0 deg, -800 fpm, 24 sec
h	0	50 AGL	55 Parallel	150				



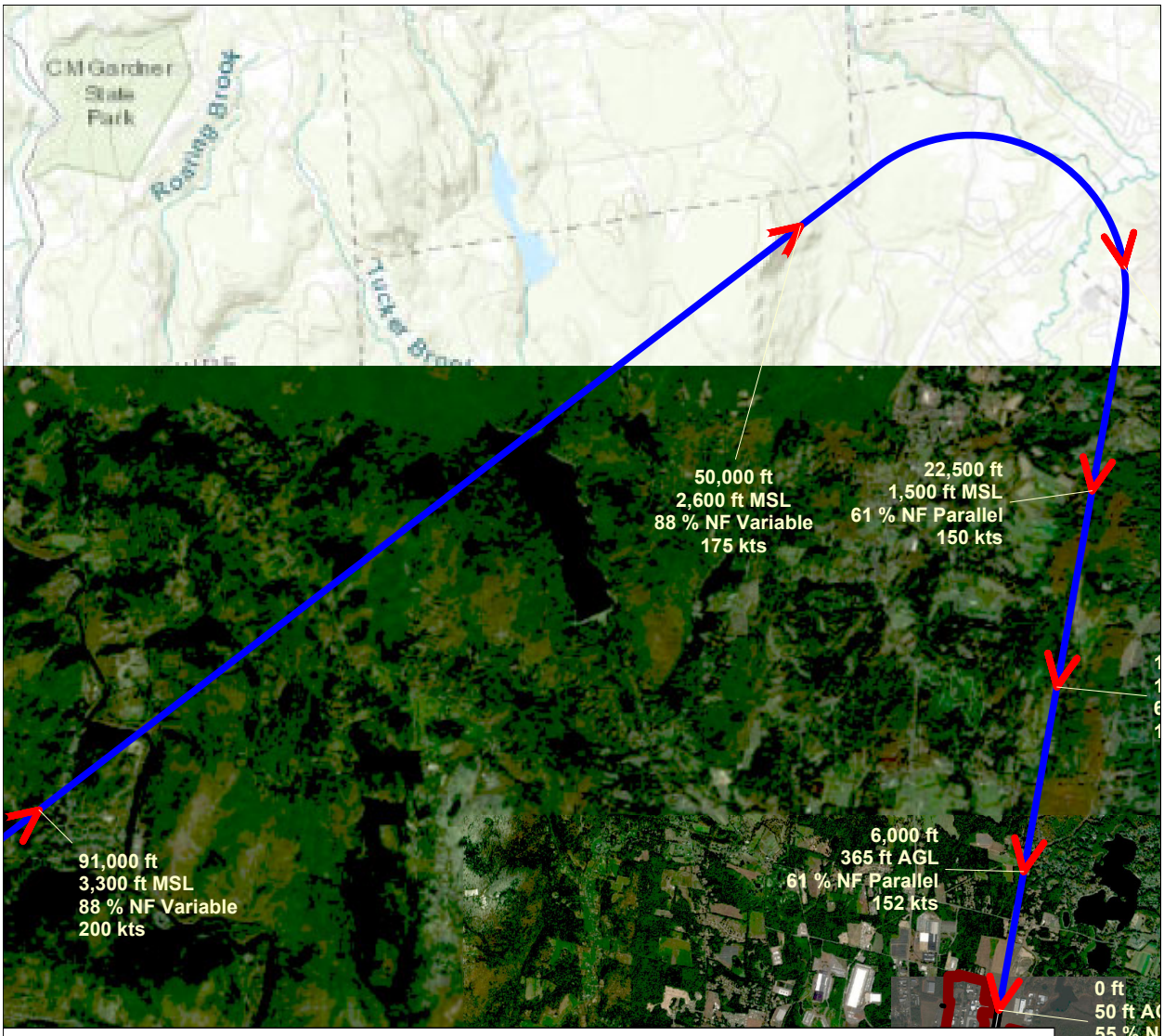
Transient KC-135R (F108-CF-100) - Flight Profile 744

Flight Track: 02AT3 - Arrival to 02 from Pawling - straigyht-in - A10s, turbines (G4)

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:161,000 (1 inch = 13,400 feet)

N



Flight Profile 753

Point	Distance ft	Height ft	Power % NF	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	6,000 MSL	88 Variable	230	-1.4	-500	300	-1.4 deg, -540 fpm, 300 sec
b	91,000	3,300 MSL	88 Variable	200	-1.0	-300	130	-1.0 deg, -320 fpm, 130 sec
c	50,000	2,600 MSL	88 Variable	175	-2.6	-700	65	-2.6 deg, -740 fpm, 65 sec
d	32,203	1,800 MSL	62 Parallel	150	-1.8	-500	38	-1.8 deg, -470 fpm, 38 sec
e	22,500	1,500 MSL	61 Parallel	150	-3.4	-900	33	-3.4 deg, -900 fpm, 33 sec
f	14,000	1,000 MSL	61 Parallel	152	-2.6	-700	31	-2.6 deg, -700 fpm, 31 sec
g	6,000	365 AGL	61 Parallel	152	-3.0	-800	24	-3.0 deg, -800 fpm, 24 sec
h	0	50 AGL	55 Parallel	150				

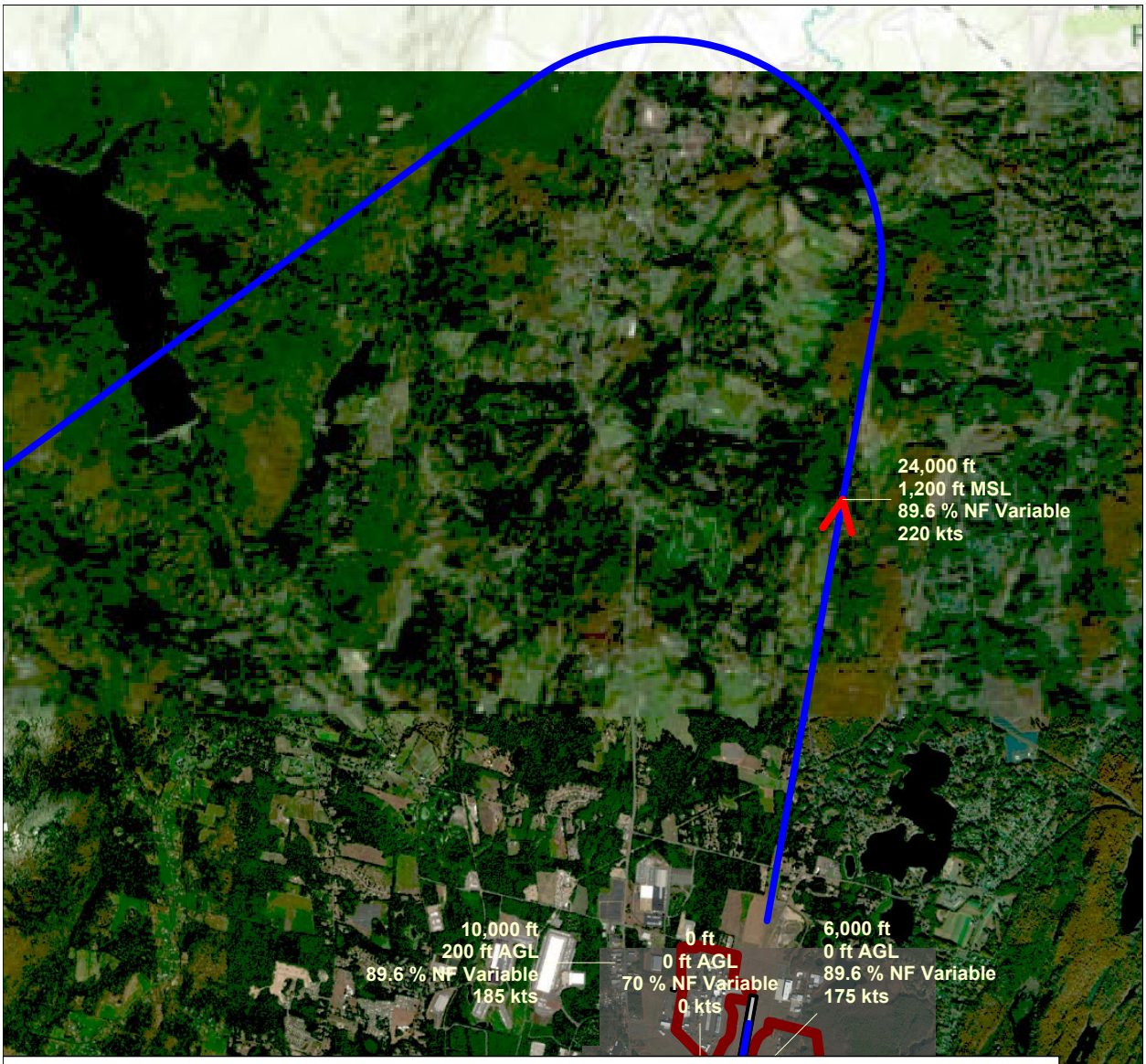
Transient KC-135R (F108-CF-100) - Flight Profile 753

Flight Track: 20AT3 - Arrival to 20 from Pawling - straight-in - A10s, turbines (GG4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:123,000 (1 inch = 10,300 feet)

N



Flight Profile 711

Point	Distance ft	Height ft	Power % NF	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	70 Variable	0	0.0	0	41	0.0 deg, 0 fpm, 41 sec
b	6,000	0 AGL	89.6 Variable	175	2.9	900	13	2.9 deg, 910 fpm, 13 sec
c	10,000	200 AGL	89.6 Variable	185	3.0	1100	41	3.0 deg, 1070 fpm, 41 sec
d	24,000	1,200 MSL	89.6 Variable	220	6.0	2500	212	6.0 deg, 2480 fpm, 212 sec
e	108,000	10,000 MSL	88 Variable	250	6.2	3000	198	6.2 deg, 3010 fpm, 198 sec
f	200,000	20,000 MSL	88 Variable	300				

Transient KC-135R (F108-CF-100) - Flight Profile 711

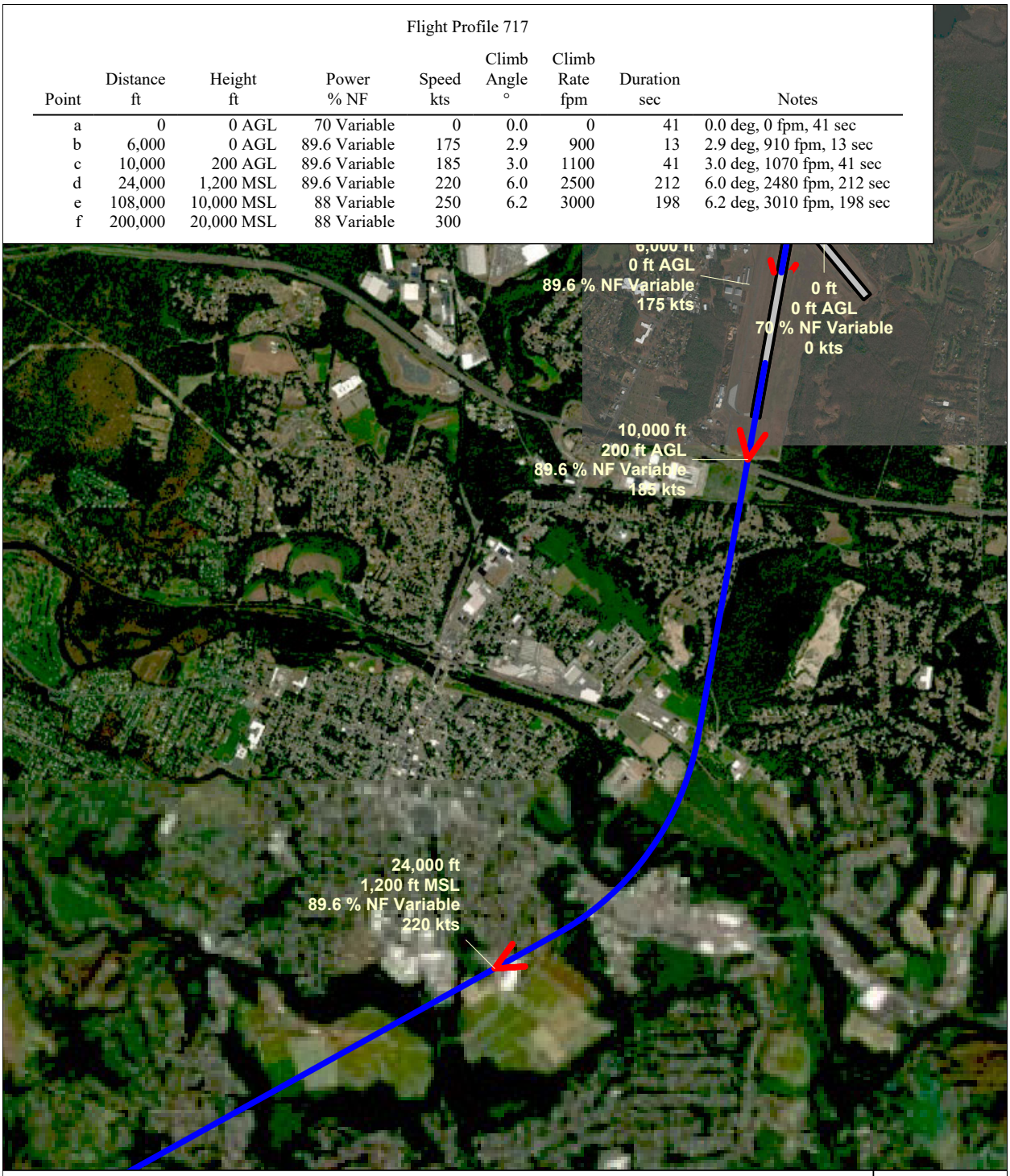
Flight Track: 02DT3 - Departure to Pawling from 02, turbines (G4)

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:84,700 (1 inch = 7,060 feet)

Flight Profile 717

Point	Distance ft	Height ft	Power % NF	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	0 AGL	70 Variable	0	0.0	0	41	0.0 deg, 0 fpm, 41 sec
b	6,000	0 AGL	89.6 Variable	175	2.9	900	13	2.9 deg, 910 fpm, 13 sec
c	10,000	200 AGL	89.6 Variable	185	3.0	1100	41	3.0 deg, 1070 fpm, 41 sec
d	24,000	1,200 MSL	89.6 Variable	220	6.0	2500	212	6.0 deg, 2480 fpm, 212 sec
e	108,000	10,000 MSL	88 Variable	250	6.2	3000	198	6.2 deg, 3010 fpm, 198 sec
f	200,000	20,000 MSL	88 Variable	300				



Transient KC-135R (F108-CF-100) - Flight Profile 717

Flight Track: 20DT3 - Departure to Pawling - A10s, turbines (G4)

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:58,100 (1 inch = 4,840 feet)

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Table A-2 Modeled Annual Civil Operations by Aircraft

Aircraft Type and Series	*FAA Tower Category*	*Modeled Aircraft ID*	*Arrival Day*	*Arrival Night*	*Arrival Total*	*Departure Day*	*Departure Night*	*Departure Total*	*Total*
Boeing 737-700 Series	Air Carrier	737700	23	2	26	23	2	26	51
Bombardier Learjet 35A/36A (C-21A)	Air Taxi	Lear35	1,356	70	1,426	1,356	72	1,429	2,855
Cessna 441 Conquest II	General Aviation	Cessna441	41	0	41	40		40	81
EADS Socata TB-9 Tampico	General Aviation	GASEPF	14,349	15	14,364	14,350	15	14,364	28,729
Gulfstream IV-SP	Air Taxi	GIV	1,356	62	1,419	1,356	62	1,419	2,837
Grand Total			**17,126**	**149**	**17,276**	**17,126**	**151**	**17,277**	**34,553**

Table A3 Civil Aircraft Modeled Departure Runway Utilization for All Scenarios

Aircraft Type and Series	*FAA Tower Category*	*Modeled Aircraft ID*	*2*	*15*	*20*	*33*
Boeing 737-700 Series	Air Carrier	737700	60%	0%	40%	0%
Bombardier Learjet 35A/36A (C-21A)	Air Taxi	Lear35	32%	1%	59%	9%
Cessna 441 Conquest II	General Aviation	Cessna441	28%	6%	42%	24%
EADS Socata TB-9 Tampico	General Aviation	GASEPF	22%	11%	33%	34%
Gulfstream IV-SP	Air Taxi	GIV	31%	1%	59%	9%
Grand Total			**24%**	**10%**	**37%**	**30%**

Note: Totals may not add due to rounding.

Table A4 Civil Aircraft Modeled Arrival Runway Utilization for All Scenarios

Aircraft Type and Series			*2*	*15*	*20*	*33*
Boeing 737-700 Series	Air Carrier	737700	60%	0%	40%	0%
Bombardier Learjet 35A/36A (C-21A)	Air Taxi	Lear35	31%	1%	59%	9%
Cessna 441 Conquest II	General Aviation	Cessna441	28%	6%	42%	24%
EADS Socata TB-9 Tampico	General Aviation	GASEPF	22%	11%	33%	34%
Gulfstream IV-SP	Air Taxi	GIV	31%	1%	59%	9%
Grand Total			**24%**	**10%**	**37%**	**30%**

Note: Totals may not add due to rounding.

Table A-5 TAF Analysis: BAF CY 2022 Fleet Mix

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
Air Carrier	176	737700	Boeing 737-600 Series, Boeing 737-700 Series, Antonov 148-100A, MC-21-200, Antonov 148-100B, Antonov 148-100E, SMR80, Airbus A220-100, Boeing 737-700 Freighter, Airbus A220-300, Boeing 737-700C, Bombardier CS100, Bombardier CS300, Boeing C-40	4.5%	0.0%	4.5%	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%
	1003	A320-211	Airbus A320-200 Series, Airbus A320-100 Series, COMAC C919	31.8%	18.2%	50.0%	27.3%	22.7%	50.0%	0.0%	0.0%	0.0%
	6586	737300	Boeing 737-300 Series, Boeing 737-300 Series Freighter	4.5%	0.0%	4.5%	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%
	6380	EMB190	Embraer ERJ190, Embraer ERJ190-LR, Embraer ERJ190-AR, RRJ95-LR, RRJ-95, Embraer 1000, ACAC ARJ-21-700, United Aircraft Corp (Sukhoi) Superjet 100 SBJ, United Aircraft Corp (Sukhoi) Superjet 100 95LR, Embraer ERJ190-E2, United Aircraft Corporation (Irkut) MC-21 -300	4.5%	0.0%	4.5%	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%
	2499	737800	Boeing 737-800 Series, Boeing Business Jet II, Boeing 737-900 Series, Boeing 737-900-ER, Boeing 737-800 Short Field Package-Next Gen, MC-21-300, Boeing Business Jet (BBJ), SMR100, BOEING 737-800 Poseidon, Boeing 737-800BCF	9.1%	0.0%	9.1%	9.1%	0.0%	9.1%	0.0%	0.0%	0.0%
	6588	737400	Boeing 737-400 Series, Boeing 737-400 Series Freighter	13.6%	4.5%	18.2%	18.2%	0.0%	18.2%	0.0%	0.0%	0.0%
	969	A319-131	Airbus A318-100 Series, Airbus A319-100 Series, Airbus A319-100 X/LR, Airbus A319CJ, Airbus A319-NEO	4.5%	0.0%	4.5%	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%
	2546	CRJ9-ER	Bombardier CRJ-700, Bombardier CRJ-700-ER, Bombardier CRJ-200-ER, Bombardier CRJ-100-LR, Bombardier CRJ-900-ER, Bombardier CRJ-900, Bombardier CRJ-100, Bombardier CRJ-1000	4.5%	0.0%	4.5%	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%
	Total			77.3%	22.7%	100.0%	77.3%	22.7%	100.0%	0.0%	0.0%	0.0%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
General Aviation	1196	BEC58P	Cessna 421 Piston, Britten-Norman BN-2 Islander, Britten-Norman BN-2A Series Mk III Trislander, Piper PA-31 Navajo, Rockwell Twin Commander 700, Cessna 337 Skymaster, Aerostar PA-60, Piper PA-23 Apache/Aztec, Piper PA-27 Aztec, Raytheon Beech Baron 58, Raytheon Beech 60 Duke, Cessna 310, Rockwell Twin Commander 500, Piper PA-34 Seneca, Rockwell Twin Commander 680, Cessna 340, Cessna 402, Cessna 404 Titan II, Cessna 414, Raytheon Beech 55 Baron, Beech 75 (FAS), Beech 95 (FAS), Beech E-55 (FAS), Beechcraft 56TC Baron (FAS), Beechcraft 76 Duchess, Beechcraft Queen Air 65/70/80 (FAS), Beechcraft Twin Bonanza (FAS), Cessna T303 Crusader (FAS), Cessna 320 (FAS), Cessna 335/340 (FAS), Tecnam P2012 Traveller, Cessna 401 (FAS), Cessna 401A (FAS), Cessna 401B (FAS), Cessna 411 (FAS), Cessna 411A (FAS), Beechcraft A56TC Baron (FAS), Rockwell Twin Commander 685, Rockwell Twin Commander 520, Rockwell Twin Commander 560	5.9%	0.1%	6.0%	5.7%	0.0%	5.7%	7.2%	0.0%	7.2%
	5345	CL600	Bombardier Challenger 600, Bombardier Challenger 300, Fokker (VFW) 614, Bombardier CRJ-100, Bombardier CRJ-200, Bombardier Challenger 604, Gulfstream G200, Bombardier CRJ-400, Bombardier CRJ-200-LR, Bombardier CRJ-200-ER, Bombardier CRJ-400-LR, Bombardier Challenger 605, Bombardier Challenger 850, Bombardier Challenger 601, Bombardier Challenger 350, Bombardier Challenger 650, Bombardier (Canadair) Challenger 800, Bombardier (Canadair) CRJ100PF Bulk Freighter, Bombardier (Canadair) CRJ200PF Bulk Freighter	4.8%	0.4%	5.2%	4.5%	0.5%	5.1%	0.0%	0.0%	0.0%
	6067	CNA525C	Cessna CitationJet CJ3 (Cessna 525B), Cessna CitationJet CJ4 (Cessna 525C), Cessna CitationJet CJ2 (Cessna 525A), Cessna CitationJet CJ/CJ1 (Cessna 525)	1.0%	0.1%	1.1%	0.9%	0.0%	1.0%	0.0%	0.0%	0.0%
	6062	CNA510	Honda HA-420 Hondajet, CESSNA CITATION 510, Embraer Phenom 100 (EMB-500), EPIC Victory, Cirrus Vision SF50 (FAS), Embraer Legacy 450 (EMB-545)	0.9%	0.1%	1.0%	1.0%	0.0%	1.0%	0.0%	0.0%	0.0%
	4198	CL601	Bombardier Challenger 601, Bombardier Challenger 602, Gulfstream G280, Bombardier Challenger 600, Bombardier (Canadair) CRJ200 ExecLiner, Bombardier (Canadair) CRJ200 328 Designs, Embraer Praetor 600	1.6%	0.0%	1.7%	1.8%	0.1%	1.8%	0.0%	0.0%	0.0%

FAA Tower Category	AEDT Equipment ID	AEDT ANP Type	Representative Aircraft	Departures			Arrivals			Local		
				Day	Night	Total	Day	Night	Total	Day	Night	Total
	4917	CNA55B	Cessna 550 Citation II, Cessna S550 Citation S/II, Cessna 551 Citation IISP, Cessna 552 T-47A, Raytheon Premier I, Aerospatiale SN 601 Corvette, Cessna 550 Citation Bravo, Embraer Phenom 300 (EMB-505), Embraer Legacy 650, Pilatus PC-24, Embraer Legacy 500 (EMB-550)	0.4%	0.0%	0.4%	0.5%	0.0%	0.5%	0.0%	0.0%	0.0%
	1262	CNA182	Cessna 182, Cessna Aircraft Company 180F, Cessna 182 R (FAS), Cessna 185 Skywagon	4.1%	0.1%	4.2%	3.8%	0.0%	3.9%	11.0%	0.0%	11.0%
	1265	CNA172	Lancair 360, Aviat Husky A1B, Cessna 172 Skyhawk, Raytheon Beech D17S Staggerwing, Rans S7S, American Champion Cibrata (FAS), American Champion Scout (FAS), Cessna 170 (FAS), Cessna 175 (FAS), Cessna 177 (FAS), Piper PA-22-150 (FAS), Piper Pacer (FAS)	15.0%	0.6%	15.6%	14.8%	0.8%	15.5%	20.3%	0.0%	20.3%
	6646	COMSEP	Cirrus SR20, 1985 1-ENG COMP, Cirrus SR22 Turbo (FAS), Cirrus SR22 (FAS)	8.6%	0.0%	8.6%	8.5%	0.0%	8.5%	10.3%	0.0%	10.3%
	6070	CNA560XL	Cessna 560 Citation Excel, Cessna 560 Citation XLS	1.6%	0.0%	1.6%	1.6%	0.0%	1.6%	0.0%	0.0%	0.0%
	3172	CNA206	Cessna 206, Comp Air Aviation Comp Air 10, Comp Air Aviation Comp Air 10 XLT	0.4%	0.0%	0.4%	0.3%	0.0%	0.3%	0.6%	0.0%	0.6%
	6119	CNA750	Cessna 750 Citation X, Dornier 328 Jet, Raytheon Hawker 4000 Horizon, Bombardier Learjet 60, CX 750 Citation X+, Dassault Falcon 2000-EX, Dassault Falcon 2000, Dassault Falcon 2000-LX, Embraer Praetor 500, Dassault Falcon 2000-DX	1.0%	0.0%	1.0%	0.9%	0.0%	1.0%	0.0%	0.0%	0.0%
	2580	CNA208	Pilatus PC-6 Porter, Piper PA46-TP Meridian, Pilatus PC-12, EADS Socata TBM-700, Cessna 208 Caravan, SOCATA TBM 850, DeHavilland DHC-3 Turbo Otter, EPIC LT/Dynasty, Extra EA-500, Quest Kodiak 100, Myasishchev M-101T, Pacific Aerospace P-750 XSTOL, DAHER TBM 900/930, DeHavilland DHC-2 Turbo Beaver, EMBRAER EMB-314 (FAS), Beechcraft T-6 Texan 2 (FAS), Socata TBM-9 (FAS), SCF Technoavia SM-92T	2.0%	0.0%	2.0%	2.1%	0.0%	2.1%	3.5%	0.0%	3.5%
	5461	G650ER	Gulfstream G650, Gulfstream G650ER	1.3%	0.0%	1.3%	1.3%	0.0%	1.3%	0.0%	0.0%	0.0%
	1925	GV	Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500, Gulfstream G550, Gulfstream V-SP, Gulfstream Aerospace Gulfstream G500 (G-7), Gulfstream G600	4.5%	0.2%	4.7%	4.5%	0.1%	4.7%	0.0%	0.0%	0.0%
	3043	CNA500	Cessna 500 Citation I, Cessna 501 Citation ISP	0.5%	0.0%	0.5%	0.6%	0.0%	0.6%	0.0%	0.0%	0.0%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
	1276	GASEPV	Maule MT-7-235, Ryan Navion B, Ryan Navion F, Piper PA-32 Cherokee Six, Boeing Stearman PT-17 / A75N1, Ryan ST3KR, Raytheon Beech Bonanza 36, Cessna 210 Centurion, ATI AT-802, ATI AT-502, ATI AT-502A, ATI AT-602, Helio U-10 Super Courier, Ayres S2R-T34 Turbo-Thrush, ATI AT-502B, Mooney M20-K, EADS Socata TB-10 Tobago, Spencer S-12 Air Car, Piper PA-24 Comanche, EADS Socata TB-20 Trinidad, DeHavilland DHC-2 Beaver, DeHavilland DHC-3 Otter, Piper PA46 (Piston), Beechcraft Bonanza 33 (FAS), Beechcraft Bonanza 35 (FAS), Beechcraft T-34 Mentor (FAS), Bellanca 8 Scout Super Decathlon (FAS), Bellanca Viking (FAS), Cessna 177 Cardinal RG (FAS), Cessna 180 (FAS), Cessna 190 (FAS), Cessna 195 (FAS), Cessna 205 (FAS), Cessna 207 (Turbo) Stationair (FAS), Cessna 210 Turbo (FAS), Cessna 400 (FAS), Columbia Aircraft Lancair (COL3/4 All Types) (FAS), Commander 114/115 (FAS), Diamond DA40, EAGLE DW-1 Eagle (FAS), Express 2000 (FAS), EXTRA EA-300 (FAS), GippsAero GA8 Airvan (FAS), Glasair (FAS), Lancair ES (FAS), Lancair Evolution (FAS), Lancair Legacy 2000 (FAS), Meyers Aero Commander 200 (FAS), Model 35 Bonanza (FAS), North American T-6 Texan (FAS), Piper PA-36 Pawnee Brave (FAS), Piper PA46 Malibu (FAS), Pitts Special S-1 (FAS), Vans RV10 (FAS), Vans RV6 (FAS), Vans RV-7, Vans RV8 (FAS), Vans RV9 (FAS), Zlin Aircraft Z 143 L	16.4%	0.0%	16.4%	17.3%	0.0%	17.3%	19.9%	0.0%	19.9%
	1318	FAL900EX	Dassault Falcon 50, Dassault Falcon 50-EX, Dassault Falcon 900, Dassault Falcon 900-B, Dassault Falcon 900-C, Dassault Falcon 900-EX, Falcon 900DX, Dassault Falcon 900-LX, Yakovlev 40 Codling	1.1%	0.0%	1.2%	1.0%	0.2%	1.2%	0.0%	0.0%	0.0%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
	1513	DHC6	BAE Jetstream 31, BAE Jetstream 32, BAE Jetstream 32-EP, Austrailia GAF N22/24 Nomad, SIAI-Marchetti SF-600 Canguro, CASA 212-200 Series, Raytheon Beech 18, Bombardier CL-415, Fairchild SA-227-AC Metro III, Xian Yunshuji Y-7, Embraer 312 Tucano, Grumman C-1 Trader, Fairchild Metro IVC, Embraer EMB110 Bandeirante, Israel IAI-201 Arava, Israel IAI-101 Arava, Neiva NE-821 Caraja, Harbin Y-12, Raytheon King Air 100, Raytheon King Air 90, Raytheon Beech 99, CASA 212-100 Series, Dornier 228-100 Series, Raytheon Super King Air 200, American Jet Hustler 400 A, DeHavilland DHC-6-300 Twin Otter, Reims-Cessna 406 Caravan II, DeHavilland DHC-6-100 Twin Otter, DeHavilland DHC-6-200 Twin Otter, Equator P-550 Turbo, Raytheon Super King Air 300, Ayres Turbo Thrush T-65, Dornier 128 Skyservant, Piaggio P-166, Raytheon Starship 2000, Rockwell Twin Commander 690, CASA 212-300 Series, Let 410, Let 410-UVP, Let 420 Tubolet, Mitsubishi MU-2, Fairchild SA-226-TC Metro II, Fairchild SA-227-AT Expeditor, Piaggio P.180 Avanti, Fairchild SA-26-T Merlin II, Grumman S-2E Tracker, Grumman G-21G Goose, C-26A, CASA 212-400 Series, Fairchild SA-226-T Merlin III, Shorts Skyvan SC7-3-1, Shorts Skyvan SC7-3-2, Shorts Skyvan SC7-3A-1, Antonov AN28 Cash, PZL M-28 Skytruck, Embraer EMB-121 Xingu, Evektor EV-55, Dornier Seastar CD-1/CD-2, Antonov An-2 MS, Antonov An-2 MS Freighter, Viking Air DHC-6-400 Guardian, CAIC China Aviation Industry Corp MA-60, CAIC China Aviation Industry Corp MA-600, SHERPA Sherpa K-650T, Grumman G-73 Mallard, Aero Commander 680 Turbo Commander, Gulfstream Gulfstream S-2T Marsh Airtanker	0.8%	0.0%	0.8%	0.8%	0.0%	0.8%	4.3%	0.0%	4.3%
	1921	GIV	Gulfstream G300, Gulfstream G350, Gulfstream G400, Gulfstream G450, Gulfstream IV-SP, Falcon 7X, Dassault Falcon 8X	1.8%	0.0%	1.8%	1.7%	0.1%	1.8%	0.0%	0.0%	0.0%
	6108	ECLIPSE500	Eclipse 500 / PW610F, Hawker Beechcraft Corp Beechjet 400A, SJ-30-1/-2/-2+, CIRRUS SF-50 Vision	0.7%	0.0%	0.7%	0.7%	0.0%	0.7%	0.0%	0.0%	0.0%
	6319	PA30	Vulcanair P.68, Piper PA-30 Twin Comanche, Diamond DA42 Twin Star, Diamond DA62, Piper PA44 (FAS), Piper PA-44-180 (FAS), Tecnam P2006T (FAS), Piper PA-44-180T (FAS)	0.5%	0.1%	0.6%	0.6%	0.1%	0.7%	0.8%	0.0%	0.8%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
	2102	GASEPF	Robin DR 400, Robin R 2160 Alpha Sport, Robin R 3000, EADS Socata TB-9 Tampico, Cessna 150 Series, Piper PA-28 Cherokee Series, Aero Commander (Single engine) (FAS), Aeronca 15 Sedan (FAS), Beech 23 Musketeer Sundowner (FAS), Beech 24 Musketeer Super Sierra (FAS), Beech 77 Skipper (FAS), Beechcraft Musketeer Model 19 (FAS), Cessna 140 (FAS), Cessna 152 (FAS), Cessna 162 (FAS), Cozy (FAS), Diamond DV-20 Katana (FAS), Diamond HK36 Super Dimona (FAS), GC1 Globe Swift (FAS), Grob G115A/B/C/D/E Bavarian (FAS), Grumman AA-5A/B (FAS), Gulfstream American GA-7 Cougar (FAS), Lancair 320 (FAS), Piper J-3 Cub (FAS), Piper PA-18-150 (FAS), Piper PA-38 Tomahawk (FAS), Sequoia Falco (FAS), Stinson (FAS), Vans RV12 (FAS), Vans RV3 (FAS), Vans RV4 (FAS), Velocity (FAS), Zenair CH-100/150/250 (FAS)	18.2%	0.5%	18.7%	18.0%	0.3%	18.3%	22.1%	0.0%	22.1%
	1976	IA1125	Israel IAI-1121 Commodore, Israel IAI-1123, Israel IAI-1124 Westwind I, Israel IAI-1124-A Westwind II, Israel IAI-1125 Astra, Gulfstream G100, Gulfstream G150, Israel IAI-1126 Galaxy, Rockwell 1121 Jet Commander, Rockwell 1121A Jet Commander-A, Rockwell 1121B Jet Commander-B	1.2%	0.0%	1.2%	1.1%	0.0%	1.2%	0.0%	0.0%	0.0%
	2014	LEAR35	Rockwell Sabreliner 65, Lockheed L-1329 Jetstar I, Lockheed L-1329 Jetstar II, Hawker HS-125 Series 1, Raytheon Hawker 1000, Hawker HS-125 Series 3, Hawker HS-125 Series 400, Hawker HS-125 Series 700, Raytheon Hawker 800, Dassault Falcon 100, Dassault Falcon 10, Hawker HS-125 Series 600, Bombardier Learjet 55, Bombardier Learjet 60, Bombardier Learjet 31, Bombardier Learjet 35, Bombardier Learjet 36, Bombardier Learjet 40, Bombardier Learjet 45, Bombardier Learjet 45-XR, Raytheon Hawker 900, Raytheon Hawker C-29A, Bombardier Learjet 35A/36A (C-21A), Hawker 900XP, Bombardier Learjet 70, Bombardier Learjet 75	0.4%	0.0%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	20	S70	Sikorsky SH-60 Sea Hawk, Sikorsky UH-60 Black Hawk, Sikorsky S-92	3.1%	0.0%	3.1%	3.1%	0.0%	3.1%	0.0%	0.0%	0.0%
	Total			97.7%	2.3%	100.0%	97.5%	2.5%	100.0%	100.0%	0.0%	100.0%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
Air Taxi	1196	BEC58P	Cessna 421 Piston, Britten-Norman BN-2 Islander, Britten-Norman BN-2A Series Mk III Trislander, Piper PA-31 Navajo, Rockwell Twin Commander 700, Cessna 337 Skymaster, Aerostar PA-60, Piper PA-23 Apache/Aztec, Piper PA-27 Aztec, Raytheon Beech Baron 58, Raytheon Beech 60 Duke, Cessna 310, Rockwell Twin Commander 500, Piper PA-34 Seneca, Rockwell Twin Commander 680, Cessna 340, Cessna 402, Cessna 404 Titan II, Cessna 414, Raytheon Beech 55 Baron, Beech 75 (FAS), Beech 95 (FAS), Beech E-55 (FAS), Beechcraft 56TC Baron (FAS), Beechcraft 76 Duchess, Beechcraft Queen Air 65/70/80 (FAS), Beechcraft Twin Bonanza (FAS), Cessna T303 Crusader (FAS), Cessna 320 (FAS), Cessna 335/340 (FAS), Tecnam P2012 Traveller, Cessna 401 (FAS), Cessna 401A (FAS), Cessna 401B (FAS), Cessna 411 (FAS), Cessna 411A (FAS), Beechcraft A56TC Baron (FAS), Rockwell Twin Commander 685, Rockwell Twin Commander 520, Rockwell Twin Commander 560	0.4%	0.0%	0.4%	0.5%	0.0%	0.5%	0.0%	0.0%	0.0%
	4198	CL601	Bombardier Challenger 601, Bombardier Challenger 602, Gulfstream G280, Bombardier Challenger 600, Bombardier (Canadair) CRJ200 ExecLiner, Bombardier (Canadair) CRJ200 328 Designs, Embraer Praetor 600	1.6%	0.0%	1.6%	1.6%	0.0%	1.6%	0.0%	0.0%	0.0%
	1780	BD-700-1A10	Bombardier Global Express, Bombardier Global 6000, Bombardier Global 7500, Bombardier Global 8000, Bombardier Global 6500	0.5%	0.0%	0.5%	0.5%	0.0%	0.5%	0.0%	0.0%	0.0%
	2580	CNA208	Pilatus PC-6 Porter, Piper PA46-TP Meridian, Pilatus PC-12, EADS Socata TBM-700, Cessna 208 Caravan, SOCATA TBM 850, DeHavilland DHC-3 Turbo Otter, EPIC LT/Dynasty, Extra EA-500, Quest Kodiak 100, Myasishchev M-101T, Pacific Aerospace P-750 XSTOL, DAHER TBM 900/930, DeHavilland DHC-2 Turbo Beaver, EMBRAER EMB-314 (FAS), Beechcraft T-6 Texan 2 (FAS), Socata TBM-9 (FAS), SCF Technoavia SM-92T	3.7%	0.0%	3.7%	3.7%	0.0%	3.7%	0.0%	0.0%	0.0%
	6386	CNA680	Cessna 680 Citation Sovereign, Cessna Citation Hemisphere, Cessna 680-A Citation Latitude, Cessna 700 Citation Longitude	5.7%	0.5%	6.2%	5.9%	0.4%	6.2%	0.0%	0.0%	0.0%
	1265	CNA172	Lancair 360, Aviat Husky A1B, Cessna 172 Skyhawk, Raytheon Beech D17S Staggerwing, Rans S7S, American Champion Cibrata (FAS), American Champion Scout (FAS), Cessna 170 (FAS), Cessna 175 (FAS), Cessna 177 (FAS), Piper PA-22-150 (FAS), Piper Pacer (FAS)	6.2%	0.0%	6.2%	5.1%	0.0%	5.1%	0.0%	0.0%	0.0%

FAA Tower Category	AEDT Equipment ID	AEDT ANP Type	Representative Aircraft	Departures			Arrivals			Local		
				Day	Night	Total	Day	Night	Total	Day	Night	Total
	2573	BD-700-1A11	Bombardier Global 5000, Bombardier Global 5500	3.2%	0.0%	3.2%	3.0%	0.2%	3.2%	0.0%	0.0%	0.0%
	6281	COMSEP	Cirrus SR20, 1985 1-ENG COMP, Cirrus SR22 Turbo (FAS), Cirrus SR22 (FAS)	0.9%	0.0%	0.9%	0.9%	0.0%	0.9%	0.0%	0.0%	0.0%
	1262	CNA182	Cessna 182, Cessna Aircraft Company 180F, Cessna 182 R (FAS), Cessna 185 Skywagon	17.5%	1.2%	18.7%	18.3%	1.9%	20.2%	0.0%	0.0%	0.0%
	5345	CL600	Bombardier Challenger 600, Bombardier Challenger 300, Fokker (VFW) 614, Bombardier CRJ-100, Bombardier CRJ-200, Bombardier Challenger 604, Gulfstream G200, Bombardier CRJ-400, Bombardier CRJ-200-LR, Bombardier CRJ-200-ER, Bombardier CRJ-400-LR, Bombardier Challenger 605, Bombardier Challenger 850, Bombardier Challenger 601, Bombardier Challenger 350, Bombardier Challenger 650, Bombardier (Canadair) Challenger 800, Bombardier (Canadair) CRJ100PF Bulk Freighter, Bombardier (Canadair) CRJ200PF Bulk Freighter	3.9%	0.2%	4.1%	3.9%	0.2%	4.1%	0.0%	0.0%	0.0%
	6062	CNA510	Honda HA-420 Hondajet, CESSNA CITATION 510, Embraer Phenom 100 (EMB-500), EPIC Victory, Cirrus Vision SF50 (FAS), Embraer Legacy 450 (EMB-545)	1.2%	0.0%	1.2%	1.2%	0.0%	1.2%	0.0%	0.0%	0.0%
	1710	EMB120	Embraer EMB120 Brasilia	1.7%	0.8%	2.5%	1.8%	0.7%	2.5%	0.0%	0.0%	0.0%
	6070	CNA560XL	Cessna 560 Citation Excel, Cessna 560 Citation XLS	1.4%	0.0%	1.4%	1.4%	0.0%	1.4%	0.0%	0.0%	0.0%
	6067	CNA525C	Cessna CitationJet CJ3 (Cessna 525B), Cessna CitationJet CJ4 (Cessna 525C), Cessna CitationJet CJ2 (Cessna 525A), Cessna CitationJet CJ/CJ1 (Cessna 525)	0.9%	0.0%	0.9%	0.9%	0.0%	0.9%	0.0%	0.0%	0.0%

FAA Tower Category	AEDT Equipment ID	AEDT ANP Type	Representative Aircraft	Departures			Arrivals			Local		
				Day	Night	Total	Day	Night	Total	Day	Night	Total
	1513	DHC6	BAE Jetstream 31, BAE Jetstream 32, BAE Jetstream 32-EP, Austrailia GAF N22/24 Nomad, SIAI-Marchetti SF-600 Canguro, CASA 212-200 Series, Raytheon Beech 18, Bombardier CL-415, Fairchild SA-227-AC Metro III, Xian Yunshuji Y-7, Embraer 312 Tucano, Grumman C-1 Trader, Fairchild Metro IVC, Embraer EMB110 Bandeirante, Israel IAI-201 Arava, Israel IAI-101 Arava, Neiva NE-821 Caraja, Harbin Y-12, Raytheon King Air 100, Raytheon King Air 90, Raytheon Beech 99, CASA 212-100 Series, Dornier 228-100 Series, Raytheon Super King Air 200, American Jet Hustler 400 A, DeHavilland DHC-6-300 Twin Otter, Reims-Cessna 406 Caravan II, DeHavilland DHC-6-100 Twin Otter, DeHavilland DHC-6-200 Twin Otter, Equator P-550 Turbo, Raytheon Super King Air 300, Ayres Turbo Thrush T-65, Dornier 128 Skyservant, Piaggio P-166, Raytheon Starship 2000, Rockwell Twin Commander 690, CASA 212-300 Series, Let 410, Let 410-UVP, Let 420 Tubolet, Mitsubishi MU-2, Fairchild SA-226-TC Metro II, Fairchild SA-227-AT Expeditor, Piaggio P.180 Avanti, Fairchild SA-26-T Merlin II, Grumman S-2E Tracker, Grumman G-21G Goose, C-26A, CASA 212-400 Series, Fairchild SA-226-T Merlin III, Shorts Skyvan SC7-3-1, Shorts Skyvan SC7-3-2, Shorts Skyvan SC7-3A-1, Antonov AN28 Cash, PZL M-28 Skytruck, Embraer EMB-121 Xingu, Evektor EV-55, Dornier Seastar CD-1/CD-2, Antonov An-2 MS, Antonov An-2 MS Freighter, Viking Air DHC-6-400 Guardian, CAIC China Aviation Industry Corp MA-60, CAIC China Aviation Industry Corp MA-600, SHERPA Sherpa K-650T, Grumman G-73 Mallard, Aero Commander 680 Turbo Commander, Gulfstream Gulfstream S-2T Marsh Airtanker	5.9%	0.4%	6.2%	6.1%	0.0%	6.1%	0.0%	0.0%	0.0%
	6119	CNA750	Cessna 750 Citation X, Dornier 328 Jet, Raytheon Hawker 4000 Horizon, Bombardier Learjet 60, CX 750 Citation X+, Dassault Falcon 2000-EX, Dassault Falcon 2000, Dassault Falcon 2000-LX, Embraer Praetor 500, Dassault Falcon 2000-DX	3.9%	0.4%	4.3%	4.3%	0.0%	4.3%	0.0%	0.0%	0.0%
	4917	CNA55B	Cessna 550 Citation II, Cessna S550 Citation S/II, Cessna 551 Citation IISP, Cessna 552 T-47A, Raytheon Premier I, Aerospatiale SN 601 Corvette, Cessna 550 Citation Bravo, Embraer Phenom 300 (EMB-505), Embraer Legacy 650, Pilatus PC-24, Embraer Legacy 500 (EMB-550)	4.3%	0.0%	4.3%	4.3%	0.0%	4.3%	0.0%	0.0%	0.0%
	5461	G650ER	Gulfstream G650, Gulfstream G650ER	5.0%	0.2%	5.2%	5.0%	0.2%	5.2%	0.0%	0.0%	0.0%

FAA Tower Category	AEDT Equipment ID	AEDT ANP Type	Representative Aircraft	Departures			Arrivals			Local		
				Day	Night	Total	Day	Night	Total	Day	Night	Total
	3045	CNA560E	Cessna 560 Citation Encore, Hawker Beechcraft Corp Beechjet 400A, Hawker Beechcraft Corp Beechjet 400T T-1A Jayhawk, Hawker Beechcraft Corp Nextant Aerospace 400NXT	0.4%	0.0%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	1276	GASEPV	Maule MT-7-235, Ryan Navion B, Ryan Navion F, Piper PA-32 Cherokee Six, Boeing Stearman PT-17 / A75N1, Ryan ST3KR, Raytheon Beech Bonanza 36, Cessna 210 Centurion, ATI AT-802, ATI AT-502, ATI AT-502A, ATI AT-602, Helio U-10 Super Courier, Ayres S2R-T34 Turbo-Thrush, ATI AT-502B, Mooney M20-K, EADS Socata TB-10 Tobago, Spencer S-12 Air Car, Piper PA-24 Comanche, EADS Socata TB-20 Trinidad, DeHavilland DHC-2 Beaver, DeHavilland DHC-3 Otter, Piper PA46 (Piston), Beechcraft Bonanza 33 (FAS), Beechcraft Bonanza 35 (FAS), Beechcraft T-34 Mentor (FAS), Bellanca 8 Scout Super Decathlon (FAS), Bellanca Viking (FAS), Cessna 177 Cardinal RG (FAS), Cessna 180 (FAS), Cessna 190 (FAS), Cessna 195 (FAS), Cessna 205 (FAS), Cessna 207 (Turbo) Stationair (FAS), Cessna 210 Turbo (FAS), Cessna 400 (FAS), Columbia Aircraft Lancair (COL3/4 All Types) (FAS), Commander 114/115 (FAS), Diamond DA40, EAGLE DW-1 Eagle (FAS), Express 2000 (FAS), EXTRA EA-300 (FAS), GippsAero GA8 Airvan (FAS), Glasair (FAS), Lancair ES (FAS), Lancair Evolution (FAS), Lancair Legacy 2000 (FAS), Meyers Aero Commander 200 (FAS), Model 35 Bonanza (FAS), North American T-6 Texan (FAS), Piper PA-36 Pawnee Brave (FAS), Piper PA46 Malibu (FAS), Pitts Special S-1 (FAS), Vans RV10 (FAS), Vans RV6 (FAS), Vans RV-7, Vans RV8 (FAS), Vans RV9 (FAS), Zlin Aircraft Z 143 L	1.8%	0.2%	2.0%	1.4%	0.0%	1.4%	0.0%	0.0%	0.0%
	1759	EMB14L	Embraer ERJ145-LR, Embraer ERJ145-ER, Embraer ERJ145-LU, Embraer ERJ145-EU, Embraer ERJ140-LR, Embraer ERJ145-MP	0.2%	0.2%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	1303	CNA560U	Cessna 560 Citation V, Cessna 560 Citation Ultra	0.4%	0.0%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	1921	GIV	Gulfstream G300, Gulfstream G350, Gulfstream G400, Gulfstream G450, Gulfstream IV-SP, Falcon 7X, Dassault Falcon 8X	10.1%	0.4%	10.5%	9.8%	0.7%	10.5%	0.0%	0.0%	0.0%
	1318	FAL900EX	Dassault Falcon 50, Dassault Falcon 50-EX, Dassault Falcon 900, Dassault Falcon 900-B, Dassault Falcon 900-C, Dassault Falcon 900-EX, Falcon 900DX, Dassault Falcon 900-LX, Yakovlev 40 Codling	0.7%	0.0%	0.7%	0.7%	0.0%	0.7%	0.0%	0.0%	0.0%

FAA Tower Category	*AEDT Equipment ID*	*AEDT ANP Type*	*Representative Aircraft*	*Departures*			*Arrivals*			*Local*		
				Day	*Night*	*Total*	*Day*	*Night*	*Total*	*Day*	*Night*	*Total*
	1925	GV	Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500, Gulfstream G550, Gulfstream V-SP, Gulfstream Aerospace Gulfstream G500 (G-7), Gulfstream G600	11.2%	0.0%	11.2%	10.5%	0.7%	11.2%	0.0%	0.0%	0.0%
	6319	PA30	Vulcanair P.68, Piper PA-30 Twin Comanche, Diamond DA42 Twin Star, Diamond DA62, Piper PA44 (FAS), Piper PA-44-180 (FAS), Tecnam P2006T (FAS), Piper PA-44-180T (FAS)	0.4%	0.0%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	6160	HS748A	Saab 2000, BAE Jetstream 61 ATP, ATR 72-200, Fokker F27-100 Series, Fokker F27-300 Series, Fokker F27-700 Series, Fokker F27-200 Series, Fokker F27-400 Series, Fokker F27-500 Series, Fokker F27-600 Series, Fokker F50, Fokker F60, Nord Transall C-160, Fokker F27 Friendship, Fairchild Hiller FH-227, Gulfstream I, Hawker HS748-1, Hawker HS748-2, Hawker HS748-2A, Hawker HS748-2B, NAMC YS-11-100 Series, NAMC YS-11A-200 Series, NAMC YS-11A-300 Series, NAMC YS-11A-400 Series, NAMC YS-11A-500 Series, NAMC YS-11A-600 Series, NAMC YS-11A-700 Series, DHC-5 Buffalo; C-8A; CC-115, Aeritalia G.222; C-27A, Antonov AN8	0.4%	0.0%	0.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	2014	LEAR35	Rockwell Sabreliner 65, Lockheed L-1329 Jetstar I, Lockheed L-1329 Jetstar II, Hawker HS-125 Series 1, Raytheon Hawker 1000, Hawker HS-125 Series 3, Hawker HS-125 Series 400, Hawker HS-125 Series 700, Raytheon Hawker 800, Dassault Falcon 100, Dassault Falcon 10, Hawker HS-125 Series 600, Bombardier Learjet 55, Bombardier Learjet 60, Bombardier Learjet 31, Bombardier Learjet 35, Bombardier Learjet 36, Bombardier Learjet 40, Bombardier Learjet 45, Bombardier Learjet 45-XR, Raytheon Hawker 900, Raytheon Hawker C-29A, Bombardier Learjet 35A/36A (C-21A), Hawker 900XP, Bombardier Learjet 70, Bombardier Learjet 75	1.8%	0.5%	2.3%	2.0%	0.4%	2.3%	0.0%	0.0%	0.0%
	Total			95.2%	4.8%	100.0%	94.7%	5.3%	100.0%	0.0%	0.0%	0.0%

Note: Prepared by FAA Office of Environment and Energy, Noise Division – November 6, 2023.
BAF Fleet Mix from FAA CY 2022 National Inventory by AEDT Equipment Type and FAA Tower Category.

Legend: AEDT = Aviation Environmental Design Tool; ANP = aircraft noise and performance; BAF = Westfield-Barnes Regional Airport; CY = calendar year; FAA = Federal Aviation Administration; ID = identification; TAF = Terminal Area Forecast.

Table A-6 TAF Analysis BAF CY 2022 Stage Length Distribution

AEDT Equipment ID	*AEDT ANP Type*	*Stage Length Distribution*														*Total*
		1		*2*		*3*		*4*		*5*		*6*		*7*		
		Day	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	*Day*	*Night*	
6586	737300	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6588	737400	50.0%	25.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
176	737700	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
2499	737800	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
969	A319-131	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1003	A320-211	36.4%	0.0%	18.2%	0.0%	18.2%	27.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1780	BD-700-1A10	36.9%	0.0%	53.9%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%	0.0%	0.0%	0.0%	100.0%
2573	BD-700-1A11	64.8%	0.0%	30.8%	0.0%	0.0%	0.0%	4.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1196	BEC58P	98.4%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
5345	CL600	90.6%	9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
4198	CL601	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1265	CNA172	96.3%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1262	CNA182	96.6%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
3172	CNA206	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
2580	CNA208	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
3043	CNA500	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6062	CNA510	91.1%	8.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6067	CNA525C	90.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
4917	CNA55B	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
3045	CNA560E	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1303	CNA560U	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6070	CNA560XL	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6386	CNA680	96.6%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6119	CNA750	98.2%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6281	COMSEP	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
2546	CRJ9-ER	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1513	DHC6	94.8%	5.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6108	ECLIPSE500	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1710	EMB120	69.2%	30.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1759	EMB14L	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6380	EMB190	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1318	FAL900EX	37.9%	4.0%	37.1%	0.0%	17.0%	0.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
5461	G650ER	82.4%	0.7%	9.5%	0.0%	0.0%	0.0%	3.4%	0.0%	0.7%	0.0%	3.4%	0.0%	0.0%	0.0%	100.0%
2102	GASEPF	97.1%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1276	GASEPV	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1921	GIV	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
1925	GV	97.2%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6160	HS748A	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

AEDT Equipment ID	AEDT ANP Type	Stage Length Distribution														Total
		1		2		3		4		5		6		7		
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
1976	IA1125	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
2014	LEAR35	94.6%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
6319	PA30	84.5%	15.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
20	S70	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

Note: Prepared by FAA Office of Environment and Energy, Noise Division – November 6, 2023.
BAF Departure Stage Length Distribution from FAA CY 2022 National Inventory by AEDT Equipment Type.

Legend: *Legend:* AEDT = Aviation Environmental Design Tool; ANP = aircraft noise and performance; BAF = Westfield-Barnes Regional Airport; CY = calendar year; FAA = Federal Aviation Administration; ID = identification; TAF = Terminal Area Forecast.

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Civil Flight Tracks

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Table A-7. Civil Flight Track Utilization Percentages For All Scenarios

Runway	*Track*	*Utilization*
15	15A1P	5.0%
15	15A2P	18.5%
15	15A3P	19.0%
15	15A4P	5.0%
15	15A5P	2.5%
15	15D1P	5.0%
15	15D2P	18.5%
15	15D3P	19.0%
15	15D4P	5.0%
15	15D5P	2.5%
Runway	*Track*	*Utilization*
02	02A1E	1.1%
02	02A1EP	6.2%
02	02A2	4.1%
02	02A3	4.2%
02	02A3P	23.4%
02	02A4P	6.2%
02	02A4T	1.3%
02	02A5P	3.1%
02	02A5T	0.5%
02	02D1	0.2%
02	02D1T	5.0%
02	02D2P	14.4%
02	02D2T	4.1%
02	02D3P	14.8%
02	02D3T	4.2%
02	02D4P	3.9%
02	02D4T	1.1%
02	02D5P	1.9%
02	02D5T	0.5%

Runway	*Track*	*Utilization*
33	33A1P	5.0%
33	33A2P	18.5%
33	33A3P	19.0%
33	33A4P	5.0%
33	33A5P	2.5%
33	33D1P	5.0%
33	33D2P	18.5%
33	33D3P	19.0%
33	33D4P	5.0%
33	33D5P	2.5%
Runway	*Track*	*Utilization*
20	20A1	4.4%
20	20A2	4.8%
20	20A2P	11.0%
20	20A3	4.9%
20	20A3P	18.6%
20	20A4P	3.0%
20	20A4T	1.3%
20	20A5P	1.5%
20	20A5T	0.6%
20	20D1L	5.0%
20	20D2	18.5%
20	20D3	19.0%
20	20D4	5.1%
20	20D5T	2.5%

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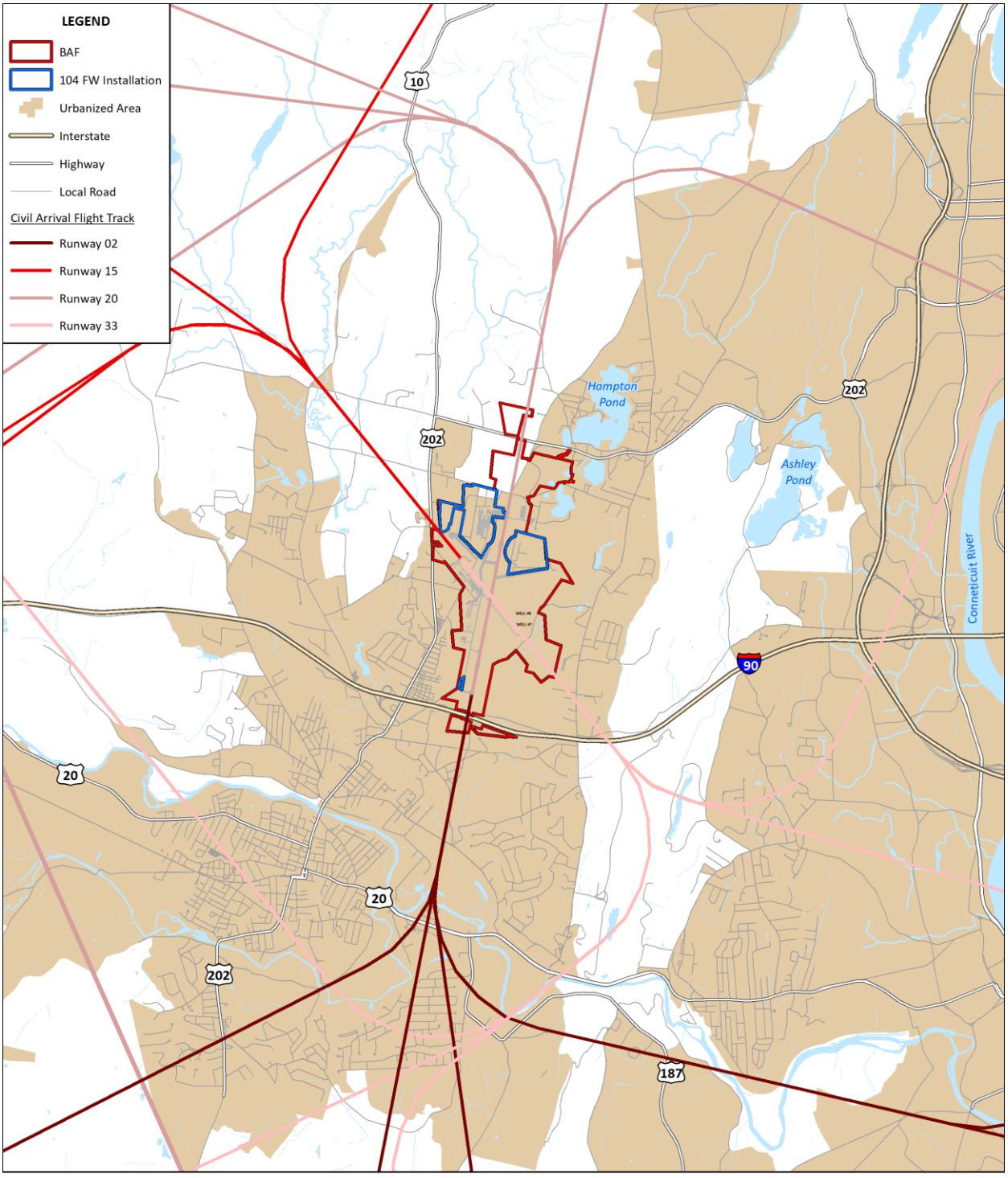
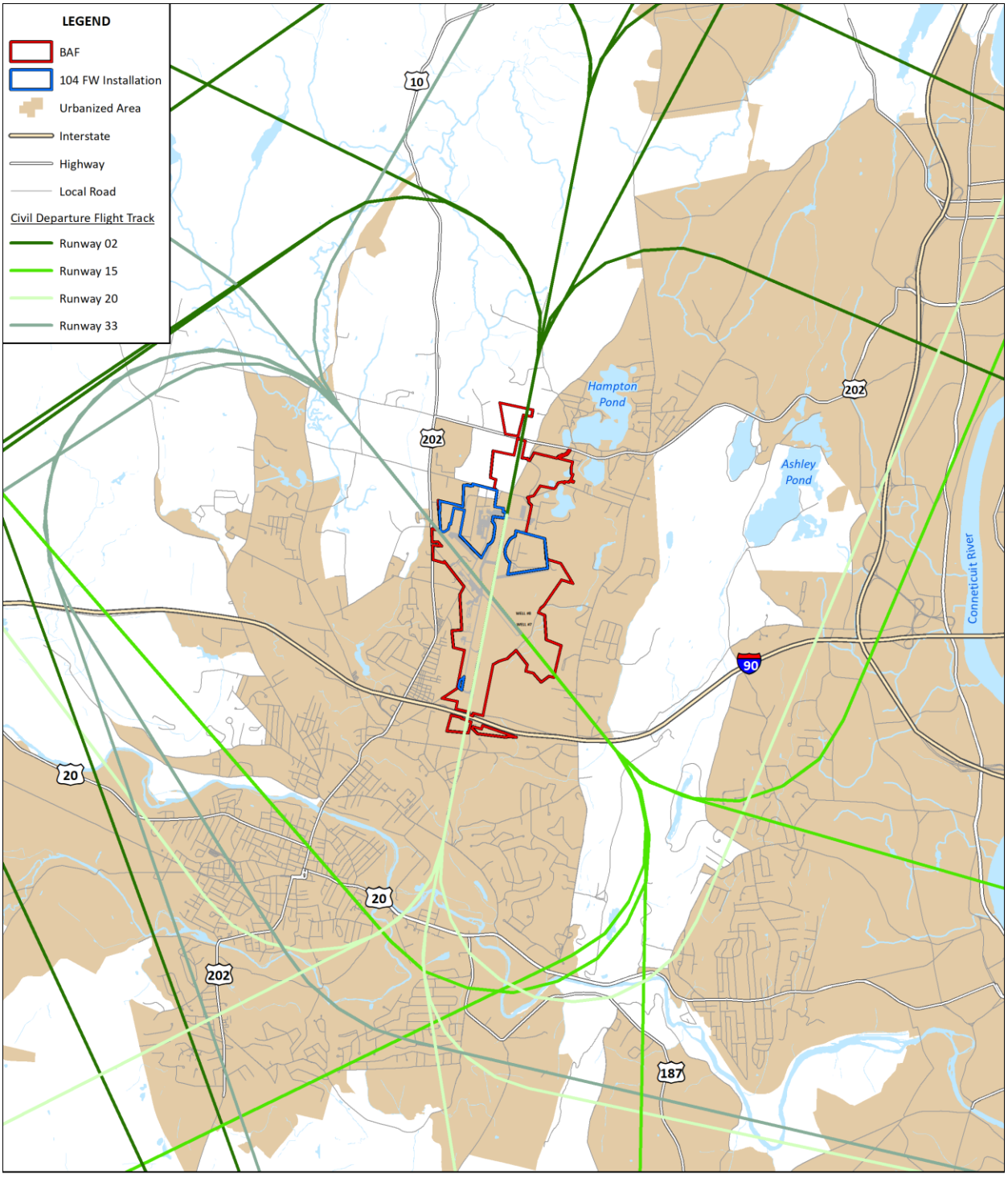

LEGEND
BAF
104 FW Installation
Urbanized Area
Interstate
Highway
Local Road
Civil Arrival Flight Track
Runway 02
Runway 15
Runway 20
Runway 33
10
202
Hampton Pond
Ashley Pond
Conneticuit River
90
20
187
0 Kilometers 1
0 Miles 1
Civil Arrival Flight Tracks at BAF
Source: ESRI 2022, MA ANG 2022



0 Kilometers 1

0 Miles 1

Civil Departure Flight Tracks at BAF

Source: ESRI 2022, MA ANG 2022