Manassas Regional Airport
Master Plan Update

Chapter 2A
Aviation Activity Forecast Amendment

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AVIATION ACTIVITY FORECAST AMENDMENT

2.1 INTRODUCTION

The Aviation Activity Forecast (the Forecast) for Manassas Regional Airport (HEF or the Airport) was completed and approved by the Federal Aviation Administration (FAA) in 2022 as part of the Master Plan process. In 2023 the HEF Board signed an agreement with a private airport operator to bring commercial passenger air service to HEF.

HEF has historically operated as a general aviation airport with no airline passenger commercial activity. Considering this major change in proposed activity it is necessary for HEF to update its recently approved forecasts by integrating commercial passenger service into the 20-year master plan planning period. Knowing future levels of activity from commercial passenger operations will allow HEF to determine the impact and needs they will have on current and future airport facilities.

Aviation activity forecasting is an analytical and subjective process providing future order of magnitude traffic level estimates. The methodology used in estimating future commercial passenger activity at HEF described in future sections of this document follows FAA guidance included in FAA's AC 150/5070-6B Airport Master Plans Chapter 7 and Forecasting Aviation Activity report from FAA's office of Aviation Policy and Plans (APO).

The updated forecast will focus only on adding commercial passenger enplanements and operations values to the previously approved FAA forecast numbers, shown in **Table 2A-1**, considering that previously forecasted values are trending closely with current numbers.

Per FAA guidance forecast will include projected activity levels for passenger enplanements and aircraft operations expected within the 20-year planning period from Fiscal Year (FY) 2021[1] to FY 2041 (the Forecast Period) The forecast will be presented in five and ten-year increments beginning with the base year FY 2021 outward to FY 2026, FY 2031, and FY 2041.

[1] 2021 is used as the base year in this analysis to remain consistent with the forecast created and approved by the FAA in 2022.

TABLE 2A-1 HEF 2022 FAA APPROVED FORECAST SUMMARY

					Compound Annual Growth Rates		
	Base Yr. Level	Base Yr.+5yrs.	Base Yr.+10yrs.	Base Yr.+20yrs.	Base Yr. to +5	Base Yr. to +10	Base Yr. to +20
	2021	2026	2031	2041	2026	2031	2041
Operations							
Itinerant							
Air carrier	1	5	5	5	37.97%	17.46%	8.38%
Commuter/air taxi	12,890	14,250	16,177	20,849	2.03%	2.30%	2.43%
General aviation	37,396	39,676	42,094	47,383	1.19%	1.19%	1.19%
Military	2,425	2,425	2,425	2,425	0.00%	0.00%	0.00%
Local							
General aviation	46,766	49,617	52,642	59,255	1.19%	1.19%	1.19%
Military	171	171	171	171	0.00%	0.00%	0.00%
TOTAL OPERATIONS	**99,649**	**106,144**	**113,514**	**130,088**	**1.27%**	**1.31%**	**1.34%**
Based Aircraft							
Single Engine	312	314	319	324	0.13%	0.22%	0.19%
Multi Engine	51	51	52	55	0.00%	0.19%	0.38%
Jet Engine	27	30	32	35	2.13%	1.71%	1.31%
Helicopter	18	18	18	20	0.00%	0.00%	0.53%
Other	2	2	2	2	0.00%	0.00%	0.00%
TOTAL	**410**	**415**	**423**	**436**	**0.24%**	**0.31%**	**0.31%**

2.2 HEF BACKGROUND

At a national level, the National Plan of Integrated Airport Systems (NPIAS) classifies HEF as a reliever airport. HEF acts as a reliever to Dulles International Airport (IAD) located 16 miles as the crow flies north of HEF and Ronald Reagan Washington National Airport (DCA) located 27 miles as the crow flies northeast of HEF. As a reliever HEF's main purpose is to relieve congestion at IAD and DCA though also offering a range of services to the general aviation community. In 2022 HEF had over 110,000 aircraft operations making it the busiest general aviation airport in Virginia.

2.3 FACTORS AFFECTING COMMERCIAL AVIATION DEMAND

Commercial aviation demand is impacted by a variety of key socioeconomic qualitative and quantitative factors and non-economic factors within the HEF service area.

2.3.1 HEF Catchment Area

The HEF catchment area (Catchment Area) is defined in Section 1.5 and includes the six immediate counties within proximity to the Airport including Prince William County/City of Manassas, Arlington County, Fairfax County, Fauquier County, Loudoun County, Stafford County. The following sections provide historic and forecast information of the key socioeconomic factors that have been identified as having the most impact in commercial passenger growth at HEF for the Catchment Area.

2.3.2 Key Socioeconomic Factors

There are numerous socioeconomic factors that contribute to the growth of commercial passenger service considering the many reasons that contribute to the decision of passengers traveling by air from a particular airport. Potential for growth in commercial passenger traffic can be quantified when statistically compared with relevant key local, state, and national socioeconomic indicators and trends. For example, as regional manufacturing expands, so does employment associated with the growth in industry and regional per capita income as well as the propensity of the regional population to travel. Similarly, establishing headquarters, national businesses, healthcare, and/or educational facilities can further drive the population, jobs, employment and associated income of the market area. The presence of businesses and industries within the region coupled with growth in population, employment, income, and manufactured goods provides a strong baseline for air service and its potential progression.

The 2023 Woods and Poole Economics, Inc. (W&P), economic and demographic data sets provide key socioeconomic data and forecasts key socioeconomic elements that commonly impact commercial air travel including: population, employment, personal income, and per capita personal income (PCPI) in the local region, statewide and nationally.

2.3.2.1 Population

Table 2A-2 shows the population size of the counties that are within the Catchment Area. The historical and forecasted population for the Catchment Area is broken out by county and compared to the entire Commonwealth of Virginia and the United States as a whole. As seen in the table, the Catchment Area is growing at a higher rate than the Commonwealth of Virginia and the United States at 1.2 percent throughout the Forecast Period.

TABLE 2A-2 HEF CATCHMENT AREA - POPULATION

	Population									
	Calendar Year	Prince William/ Manassas	Arlington	Fairfax	Fauquier	Loudoun	Stafford	Manassas Catchment Area	Virginia Total	U.S.
Historical	**2010**	458,846	209,319	1,121,203	65,433	315,486	129,857	2,300,144	8,024,004	309,327,089
	2015	512,915	228,227	1,164,303	69,264	374,119	141,534	2,490,362	8,390,283	321,753,440
	2020	542,643	238,799	1,187,410	72,990	422,669	157,746	2,622,257	8,636,471	331,511,512
Baseline	**2021**	545,052	233,574	1,180,582	74,022	428,435	161,584	2,623,249	8,657,365	332,031,554
Forecast	**2022**	546,288	233,574	1,177,752	74,664	432,085	163,380	2,627,743	8,683,619	333,287,557
	2023	555,561	236,005	1,187,370	75,283	443,870	166,319	2,664,408	8,754,269	335,546,979
+ 5 years	**2026**	583,909	241,948	1,215,815	77,170	480,838	175,457	2,775,137	8,967,442	342,320,505
+ 10 Years	**2031**	632,379	251,381	1,260,701	80,422	547,664	191,814	2,964,361	9,321,044	353,366,671
+ 15 years	**2036**	681,926	260,059	1,301,621	83,811	621,094	209,698	3,158,209	9,669,260	363,987,894
+ 20 years	**2041**	732,010	267,812	1,337,758	87,343	701,166	229,248	3,355,337	10,008,938	374,072,743
Compound Annual Growth Rate (CAGR)										
2010 - 2019		1.8%	1.4%	0.7%	1.2%	3.1%	2.0%	1.4%	0.8%	0.7%
2019 - 2020		0.8%	0.7%	-0.1%	0.3%	1.9%	2.0%	0.6%	0.4%	0.4%
2020 - 2022		0.3%	-1.1%	-0.4%	1.1%	1.1%	1.8%	0.1%	0.3%	0.3%
2022 - 2023		1.7%	1.0%	0.8%	0.8%	2.7%	1.8%	1.4%	0.8%	0.7%
2021 - 2041		1.5%	0.7%	0.6%	0.8%	2.5%	1.8%	1.2%	0.7%	0.6%

Source: Woods & Poole Economics, Inc; RS&H Analysis, 2023

2.3.2.2 Employment

Based on W&P data, the trades within the Catchment Area with the highest level of employment are federal, state, and local government, construction, healthcare, accommodations, and retail trade. In addition to the many governmental entities within the area, some of the top employers within the Catchment Area include Lockheed Martin, Nestle, Virginia Hospital, Amazon, Inova Health System, and Northrop Gruman. Being in close proximity to the Nation's capital makes the area more attractive to select individual trades. For example, accommodations rank high in employment because not only due to numerous lawmakers and business travelers commute frequently to this area, but it is also a major domestic and international tourist attraction due to its vast American history and cultural sites, architecture, museums and national memorials.

The employment history for the Prince William/Manassas County had a CAGR of 3.1 percent between CY 2010 thru CY 2019 which is almost twice as high as the remaining Catchment Area counties, the Commonwealth of Virginia as a whole, and the entire United States. Due to the COVID-19 Pandemic between CY 2019 and CY 2020, the employment rate within Prince William/Manassas County dropped to 0.6 percent, but not as much as the rest of the Catchment Area counties, the Commonwealth of Virginia, or the United States which saw a drop of -1.3 percent, -2.0 percent, and -3.1 percent, respectively during that same period.

The forecast indicates a strong return from the COVID-19 Pandemic with Prince William/Manassas County at a 3.9 percent growth rate between CY 2020 thru CY 2022 with the remaining catchment counties, following close behind.

Table 2A-3 depicts the historical and forecasted employment totals for the Catchment Area counties and the total Catchment Area.

TABLE 2A-3 HEF CATCHMENT AREA - EMPLOYMENT

	Employment				
	Calendar Year	Prince William/ Manassas	Catchment Area Counties Total	Virginia Total	U.S.
Historical	**2010**	194,470	1,498,252	4,743,187	172,901,666
	2015	228,558	1,926,935	5,060,281	190,325,771
	2020	256,562	1,767,312	5,224,995	195,301,627
Baseline	**2021**	265,492	1,815,399	5,350,770	201,142,587
Forecast	**2022**	276,762	1,898,972	5,540,070	208,286,623
	2023	282,502	1,941,085	5,635,851	211,873,718
+ 5 years	**2026**	303,065	2,044,240	5,899,838	221,286,830
+ 10 Years	**2031**	341,837	2,267,608	6,304,221	235,031,660
+ 15 years	**2036**	384,203	2,474,807	6,705,007	248,421,812
+ 20 years	**2041**	430,575	2,687,670	7,105,810	261,624,407
Compound Annual Growth Rate (CAGR)					
2010 - 2019		3.1%	2.0%	1.3%	1.7%
2019 - 2020		0.6%	-1.3%	-2.0%	-3.1%
2020 - 2022		3.9%	3.7%	3.0%	3.3%
2022 - 2023		2.1%	2.2%	1.7%	1.7%
2021 - 2041		2.4%	2.0%	1.4%	1.3%

Source: Woods & Poole Economics, Inc.; RS&H Analysis, 2023

2.3.2.3 Personal Income

Between CY 2010 thru CY 2019, the growth rate on personal income within the Prince William/Manassas County was 2.1 percent with the remaining Catchment Area counties at 2.5 percent. These growth rates were lower than the national trend which had a CAGR of 2.8 percent during the same time period.

Based on W&P data, throughout the Forecast Period, the personal income CAGR for Prince William/Manassas County is projected to be 3.2 percent which is higher than the remaining Catchment Area counties, the Commonwealth of Virginia, and the United States which are projected to have a CAGR of 2.9 percent, 2.3 percent, and 2.0 percent, respectively. This is a positive indicator for the area, as it suggests that individuals in the Prince William/Manassas area are likely to experience an increase in their personal income over the next two-decade period at a higher rate than the rest of the United States.

Table 2A-4 depicts the historical and forecast of total personal income rates for the Prince William/Manassas County, the remaining Catchment Area counties, the Commonwealth of Virginia as a whole, and the entire United States.

TABLE 2A-4 HEF CATCHMENT AREA – PERSONAL INCOME

	Personal Income in the 000's (In 2012 Dollars)				
	Year	**Prince William/ Manassas**	**Catchment Area Counties Total**	**Virginia Total**	**U.S.**
Historical	**2010**	$ 22,578,277	$ 148,908,794	$ 381,469,332	$ 13,145,590,848
	2015	$ 24,915,764	$ 168,011,760	$ 425,028,849	$ 15,207,371,341
	2020	$ 28,803,439	$ 191,691,281	$ 482,988,169	$ 17,825,517,052
Baseline	**2021**	$ 29,562,295	$ 194,913,454	$ 495,608,858	$ 18,412,493,489
Forecast	**2022**	$ 30,282,374	$ 204,682,432	$ 499,945,810	$ 18,166,519,026
	2023	$ 31,286,190	$ 210,930,106	$ 512,752,489	$ 18,563,688,896
+ 5 years	**2026**	$ 34,537,221	$ 230,494,199	$ 552,434,301	$ 19,851,596,580
+ 10 Years	**2031**	$ 40,670,659	$ 265,767,400	$ 622,556,549	$ 22,154,966,723
+ 15 years	**2036**	$ 47,664,167	$ 304,306,728	$ 697,591,238	$ 24,593,413,338
+ 20 years	**2041**	$ 55,618,547	$ 346,435,769	$ 777,865,958	$ 27,174,814,874
Compound Annual Growth Rate (CAGR)					
2010 - 2019		2.1%	2.5%	2.2%	2.8%
2019 - 2020		5.7%	3.1%	4.5%	5.5%
2020 - 2022		2.5%	3.3%	1.7%	1.0%
2022 - 2023		3.3%	3.1%	2.6%	2.2%
2021 - 2041		3.2%	2.9%	2.3%	2.0%

Source: Woods & Poole Economics, Inc.; RS&H Analysis, 2023

2.3.2.4 Per Capita Personal Income

Similar to total personal income, historically per capital personal income between CY 2010 through CY 2019 for Prince William/Manassas County was below the rest of the Catchment Area counties, the Commonwealth of Virginia, and the United States with a CAGR of just 0.3 percent.

During the Forecast Period between CY 2021 through CY 2041, the per capita personal income for Prince William/Manassas County is projected to trend on par with the remaining Catchment Area counties, but slightly higher than the Commonwealth of Virginia and the United States with a CAGR of 1.7 percent. Nevertheless, the projected growth rates for the per capita personal income in the Catchment Area and the Commonwealth of Virginia indicate a positive trend that could translate to higher standards of living for residents of the Commonwealth over the next two decades.

It is worth noting that changes in economic conditions, government policies, and other factors could impact the growth rates for per capita personal income in the HEF Catchment Area, the Commonwealth of Virginia, and the United States. Even so, the projected growth rates provide valuable insights into the potential trajectory of income growth in these regions. **Table 2A-5** depicts the historical and forecasted per capita personal income for the Prince William/Manassas County, the remaining Catchment Area counties, the Commonwealth of Virginia as a whole, and the entire United States.

TABLE 2A-5 HEF CATCHMENT AREA – PER CAPITA PERSONAL INCOME

	Per Capita Personal Income (In 2012 Dollars)				
	Year	Prince William/ Manassas	Catchment Area Counties Total	Virginia Total	U.S.
Historical	**2010**	$ 49,207	$ 64,739	$ 47,541	$ 42,497
	2015	$ 48,577	$ 67,114	$ 50,657	$ 47,264
	2020	$ 53,080	$ 73,102	$ 55,924	$ 53,770
Baseline	**2021**	$ 54,238	$ 74,302	$ 57,247	$ 55,454
Forecast	**2022**	$ 55,433	$ 77,880	$ 57,573	$ 54,507
	2023	$ 56,315	$ 79,166	$ 58,572	$ 55,324
+ 5 years	**2026**	$ 59,148	$ 83,057	$ 61,604	$ 57,991
+ 10 Years	**2031**	$ 64,314	$ 89,654	$ 66,790	$ 62,697
+ 15 years	**2036**	$ 69,896	$ 96,354	$ 72,145	$ 67,567
+ 20 years	**2041**	$ 75,981	$ 103,249	$ 77,717	$ 72,646
Compound Annual Growth Rate (CAGR)					
2010 - 2019		0.3%	1.1%	1.4%	2.1%
2019 - 2020		4.8%	2.5%	4.1%	5.1%
2020 - 2022		2.2%	3.2%	1.5%	0.7%
2022 - 2023		1.6%	1.7%	1.7%	1.5%
2021 - 2041		1.7%	1.7%	1.5%	1.4%

Source: Woods & Poole Economics, Inc.; RS&H Analysis, 2023

2.3.3 Oil and Jet Fuel Prices.

The association between jet fuel prices and aviation demand is complex and can be influenced by a range of economic, political, and environmental factors. Jet fuel price is a critical factor in the aviation industry because it has a significant impact on airlines' operating costs and profitability. The demand for aviation fuel is driven by the level of air travel and the size of active airline fleets. In general, jet fuel prices tend to fluctuate in response to global oil prices, geopolitical tensions, and market supply and demand conditions. At the start of the COVID-19 Pandemic in April 2020, when demand was at a record low, gasoline fuel prices reached a price of $1.03 per gallon.

Industry and economic changes across the world, such as the Russia-Ukraine War and the U.S.-Iran conflict related to the Israel-Hamas War, have caused instability in oil prices which saw a peak in CY 2022. Oil prices fell in CY 2023 and have remained stable into CY 2024 due to an increase in fuel production outside of OPEC countries such as the U.S. OPEC has announced that it will cut oil supply during the first quarter of 2024 which will likely trigger fuel prices to increase in the short-term.

When fuel prices are high, airlines often respond by reducing capacity or raising ticket prices to offset the increased costs. Conversely, when fuel prices are low, airlines may expand their operations or offer lower fares to attract more passengers.

Table 2A-6 depicts the forecast of oil and jet fuel prices during the Forecast Period. The forecast years included in the table are based on the FAA's most recent Aerospace Forecast published in May 2023 and consequently do not match the milestone years discussed throughout this document.

TABLE 2A-6 FORECAST – FUEL AND OIL PRICE

Comparison of Fuel and Oil Price Projections (2022 Dollars)			
Year	**U.S. Refiner's Acquisition Cost ($/Barrel) (a)**	**Crude Oil Prices ($/Barrel) (b)**	**Jet Fuel Prices ($/Gallon)**
2023	$84.29	$92.00	$2.71
2028	$89.68	$89.00	$2.50
2033	$98.57	$92.00	$2.48
2038	$104.30	$95.00	$2.37
2043	$112.70	$98.00	$2.29
CAGR 2023-2043	**1.5%**	**0.3%**	**-0.8%**

(a) Brent Spot Price (rounded)
(b) Monthly census of all U.S. refiners collecting the net acquisition costs and volumes of crude oil, both domestic and imported, on a corporate regional bases (not for individual refineries); data reported in 2023 FAA Aerospace Forecast
Source: U.S. Energy Information Administration; FAA Forecast 2023-2043

2.3.4 Average Airfares

As discussed in the previous section, volatile prices of oil and jet fuel eventually end up affecting the consumer, which in this case comes in the form of increased airfares. Airfare prices are volatile and can change by the minute due to travel demand, available capacity, seasonality, airlines' costs and other factors. After airfares dropped significantly in CY 2020 due to decreased demand caused by the COVID-19 Pandemic, demand for travel began rebounding in CY 2022 and returned to and/or surpassed pre-pandemic levels in mid-CY 2023 at many US airports. The increase in travel is a welcome trend for the

airline industry which struggled to maintain profits; however, the law of supply and demand affects the customer as more demand drives higher fuel prices. Around the US, airfares have risen recently, particularly over the past 18 months. Both the rising costs of aviation fuel and airline debt following the COVID-19 Pandemic shutdown have impacted average ticket prices causing them to steadily increase since the start of CY 2022. Airfare prices in the long-term, however, are expected to decrease domestically at a CAGR of 0.3 percent during the planning period when adjusted for inflation in 2023 dollar values **(Table 2A-7**Error! Reference source not found.**)**.

TABLE 2A-7 FORECAST – AVERAGE AIR FARES

Projected Domestic Fares (2023)			
Calendar Year	**FAA Adjusted Yield (cents) (a)**	**FAA Average Trip Length (b)**	**FAA Fare (dollars) ©**
2024	15.95	1,008	$160.77
2025	15.76	1,020	$160.75
2030	15.42	1,033	$159.28
2035	14.99	1,046	$156.79
2040	14.53	1,059	$153.87
2044	14.17	1,070	$151.62
CAGR 2024-2044	**-0.6%**	**0.3%**	**-0.3%**

(a) FAA forecast of domestic aviation activity; yield (extrapolated)
(b) FAA forecast of domestic aviation activity; average trip length in miles.
(c) FAA yield multiplied by average trip length and divided by 100.
Source: FAA Aerospace Forecast 2023-2043

DCA and IAD are large hub airports in close proximity to HEF. In addition, Richmond International Airport (RIC) has also been incorporated into the analysis due to the close proximity and easy access from the cities and counties in the ECA. RIC is served by numerous Ultra Low-Cost Carriers (ULCC) including Spirit Airlines (Spirit) and Breeze Airways (Breeze). For HEF to be successful in adding commercial passenger service, the passenger trends at these three airports will be analyzed throughout this document to understand the available potential.

Since HEF historically has not ever had commercial passenger traffic and due to it is in close proximity to major airports such as DCA, IAD an RIC it would be expected that new regular passenger traffic would be provided by ULCC which have generally provide similar startup service in similar markets throughout the United States. Startup service offered by ULCC such as Avelo Airlines (Avelo) and Breeze, in similar markets as HEF, is to offer lower fares than traditional legacy airlines with unbundled air fares making passengers responsible for costs such as seat assignments and onboard catering.

Table 2A-8 shows average airfare prices from 2021 to 2023 out of DCA and IAD, compared with Avelo's systemwide average airfare which are 60.0 and 70.0 percent lower. In terms of yield, which account for stage length, Avelo recorded 11.15 cents compared to an average of 11.99 cents at IAD and DCA or 7.0 percent lower.

TABLE 2A-8 HISTORICAL AVERAGE AIR FARE PRICES OF THE U.S., DCA, IAD, AND AVELO AIRLINES

Domestic – Historic Average Gross Air Fares					
Year	**DCA**	**IAD**	**DC Region Average**	**Avelo Airlines**	**% Difference Avelo/DC Region**
2021	$184.56	$218.04	$196.77	$54.47	-69.3%
2022	$222.47	$277.70	$239.74	$88.50	-60.1%
2023	$226.36	$271.32	$240.82	$89.33	-62.9%

Source: U.S. DOT T-100;
Compiled by RS&H, 2024

2.4 FORECAST OF COMMERCIAL PASSENGER SERVICES

Developing a forecast of commercial passenger services for an airport that currently does not have air carrier operations requires a different approach compared to those airports with existing passenger airline services. The first step was to develop a list of potential destinations from HEF with similar characteristics as those that are served as startup markets for ULCC and would be attractive to the residents of the Catchment Area and other neighboring counties and cities where commercial passengers would potentially originate when traveling from HEF. The additional counties and cities considered in what is defined as the Expanded Catchment Area (ECA) would include the counties/cities included in **Table 2A-9**.

TABLE 2A-9 HEF EXPANDED CATCHMENT AREA

Alexandria City
Arlington County
Clarke County
Culpeper County
Fairfax City
Fairfax County
Falls Church City
Fauquier County
Frederick County
Fredericksburg
Loudoun County
Madison County
Manassas City
Manassas Park
Prince William County
Rappahannock County
Spotsylvania County
Stafford County
Warren County
Winchester City

2.4.1 HEF Potential Airline Passenger Markets

When considering potential airline passenger markets from HEF, several factors come into play, including local demographics, nearby competing markets and attractions, business interests, and existing transportation infrastructure. Here are some potential passenger markets to consider:

- Tourism: This would include residents within the ECA traveling to tourist destinations on the East coast including Florida and North and South Carolina. It could also include tourists coming from other locations to visit the DC region, considering the wide array of tourist attractions including monuments, museums, and historical sites. Additionally, Virginia itself offers attractions such as

Shenandoah National Park, Charlottesville's wineries, and historical sites like Colonial Williamsburg, making leisure travel another potential market.

- Business Travel: Manassas Airport is situated within the Northern Virginia technology corridor, with many businesses and government contractors in the vicinity. Targeting business travelers for flights to key business destinations such as New York City, Boston, Chicago, Atlanta, and other major business hubs could be lucrative. The business travel market, however, would probably be composed of smaller companies that don't have dedicated agreements with the major airlines at IAD and DCA.

- Regional Connectivity: Offering flights to nearby regional airports within a few hundred miles could attract passengers looking for convenient connections to smaller cities and towns not served by major airports. Airlines considered for these services would include Cape Air and Southern Airways Express.

- College Student Travel: HEF is relatively close to several universities and colleges, including George Mason University. Providing flights catering to college students traveling to and from their hometowns or other college towns could be a viable market.

- Charter: Services to Caribbean destinations chartered by travel companies such as Apple Vacations could be attractive to residents of the Catchment Area and reduce the need for longer airport commutes and expensive car parking rates.

After reviewing numerous market factors and considering large network carriers such as American, low-cost carriers (LCC) including Southwest Airlines (Southwest) and JetBlue, ULCC's like Avelo, Allegiant and Breeze, and charter operators similar to Omni Air International, it was concluded that basing the forecast analysis on a ULCC model would be optimal given the Catchment Area's market saturation and highly diversified airline mix at IAD and DCA. The ULCC would have targeted consideration to leisure and tourism travel as a major component, government/military travel, student and charter travel as a less significant passenger components but none-the-less an important added segment to HEF's passenger profile.

We have assumed, based on operations of ULCC at similar markets to HEF that the majority of passengers would be O&D with minimal connectivity until the later years of the forecast as service and passenger preference at HEF matures. The large DC region metroplex has enough O&D passengers to satisfy ULCC break-even load factors without the need to rely on connecting passenger activity.

2.4.1.1 Potential Primary Markets

Potential primary markets were selected based on destinations serviced by ULCCs in key markets in the mid-Atlantic, Northeast, and Florida. These markets also have a strong passenger performance history from airports in the DC region. The Manassas market share percentages depict the number of passengers residing in HEF's Catchment Area. These market share percentages were observed to be particularly high to Florida destinations. Shown on **Table 2A-10**.

TABLE 2A-10 HEF PRIMARY MARKETS

City/State	Airport Code	Pax Per Day	Expanded Catchment Area	Manassas Market Share (%)
Orlando, FL	MCO	2,145.5	513.7	23.9%
Fort Lauderdale, FL	FLL	1,250.7	205.8	16.5%
Tampa, FL	TPA	985.1	140.8	14.3%
West Palm Beach, FL	PBI	510.2	108.3	21.2%
Fort Myers, FL	RSW	396.8	83.2	21.0%
Knoxville, TN	TYS	161.1	18.5	11.5%
Destin/Fort Walton, FL	VPS	103.5	21.3	20.6%
Lexington, KY	LEX	51.4	4.2	8.2%
Chattanooga, TN	CHA	46.9	5.1	10.9%
New, Haven, CT[2]	HVN	35.4	N/A	N/A

Source: US DOT O&D Survey; Airline Reporting Corporation (ARC 2023); RS&H Analysis, 2024

2.4.1.2 Potential Secondary Target Markets – No Non-Stop Service from DC Region

The secondary markets were selected based on the largest O&D city-pair markets in year ending 3rd quarter of 2023 (latest available) served from DCA, IAD, or RIC without nonstop service. Airlines observe these types of destinations in a study called a gap analysis. Most markets have non-stop services from a specific airport or region which historically have had optimal operational and financial results for the airline and are governed by the laws of supply and demand. Sometimes gaps occur in the analysis where a potential market is overlooked. **Table 2A-11** shows secondary markets selected for potential services to HEF based on a lack of non-stop service.

TABLE 2A-11 HEF SECONDARY MARKETS

City/State	Airport Code	Pax Per Day	Manassas Market Share	Manassas Market Share (%)
Panama City, FL	ECP	93.9	12.6	13.5%
Bozman, MT	BZN	84.7	15.8	18.6%
Daytona Beach, FL	DAB	39.4	11.4	29.0%
Springfield-Branson, MO	SGF	30.3	6.3	20.7%

Note: This table is derived from combining 2023 data from DCA, IAD, and RIC US DOT data

Source: US DOT O&D Survey; ARC 2023; RS&H Analysis, 2024

[2] Beginning July 12, 2024, Avelo will operate from HVN to IAD twice weekly.

2.4.1.3 Additional Florida Markets Considered – Existing Nonstop Service

Florida markets were researched in the HEF analysis as ULCCs tend to select markets with high tourism and considered vacation locations. Florida is a popular vacation destination because of its plentiful beaches, theme parks among other attractions. Florida is also home to many seasonal residents deemed "snowbirds" who travel to and from Florida during the winter months. In 2022, Florida received about 137.6 million visitors and 38 percent of those arrived by air.[3] Avelo currently serves 8 markets within Florida with Orlando International Airport (MCO) being one of their hubs or "focus cities".

Six additional Florida airports that already have nonstop service from RIC, DCA, or IAD were analyzed and are shown in **Table 2A-12.**

TABLE 2A-12 HEF FLORIDA MARKETS

City/State	Airport Code	Pax Per Day	Manassas Market Share	Manassas Market Share (%)
Fort Lauderdale, FL	FLL	1,803.5	201.0	11.1%
Jacksonville, FL	JAX	749.84	68.3	9.1%
Pensacola, FL	PNS	164.0	25.2	15.4%
Sarasota, FL	SRQ	423.29	41.5	9.8%
Key West, FL	EYW	101.43	29.8	29.3%
Tallahassee, FL	TLH	62.29	8.2	13.2%

Note: This table is derived from combining 2023 data from DCA, IAD, and RIC
Source: US DOT O&D Survey; ARC 2023; RS&H Analysis, 2024; RS&H Analysis, 2024

Even though the Florida markets considered are key to the analysis, it is important to note that recent market data indicates increased capacity and the reduction of average fares by all U.S. airlines have impacted ULCCs disproportionally. Despite the oversaturation of airline seat capacity to Florida markets, this approach remains the most viable market strategy for ULCC from HEF.

2.4.1.4 Potential International Markets

International markets such as Cancun (CUN), Punta Cana (PUJ) and Montego Bay (MBJ) were also considered during the analysis given some ULCCs provide service to these destinations through tour operators.

After careful consideration, the primary markets served by ULCC as seen in **Table 2A-10** were chosen for the purposes of creating a market analysis. The selected primary markets (Core Destinations) have a robust demand from the population residing in the ECA and represent a good balance of tourism and business/other travelers from the region.

[3] Research FAQ. (n.d.). https://www.visitflorida.org/resources/research/research-faq/

2.4.2 HEF Market Analysis/Forecast Methodology

To better understand the potential target group of passengers that would choose HEF as their airport gateway from the DC region, a market analysis was conducted using U.S. DOT data, the FAA Terminal Area Forecast (TAF) and Airline Reporting Corporation (ARC) market locator data which will be discussed later in this section. The first step was to look at all enplaned passengers from IAD, DCA and RIC projected by the TAF from Federal Fiscal Year (FFY) 2022 through FFY 2041 matching the timeframe for the Forecast Period. The next step was to isolate all Origin & Destination (O&D) passengers from the DC region to single out only those passengers that started and ended their travel in IAD, DCA or RIC. To analyze the O&D percentage from the DC region, a historical trend of annual O&D percentages was pulled from the U.S. DOT T-100 database and U.S. DOT airline O&D survey (DB1B) from 2010 to 2023[4]. The annual historical O&D passengers were divided by the total enplaned passenger to calculate total DC region O&D passengers as can be seen in **Table 2A-13.**

TABLE 2A-13 DC REGION HISTORICAL O&D PASSENGER PERCENT, 2010 - 2023

IAD, DCA and RIC			
Year	**O&D Enplaned Passengers**	**Total Enplaned Passengers**	**Total O&D Percent**
2010	12,293,412	21,679,502	56.7%
2011	12,309,381	21,659,659	56.8%
2012	12,265,380	21,763,232	56.4%
2013	12,335,823	21,874,461	56.4%
2014	12,866,807	22,029,048	58.4%
2015	14,187,209	23,231,737	61.1%
2016	14,729,786	23,680,452	62.2%
2017	15,216,353	24,171,586	63.0%
2018	15,478,596	24,834,325	62.3%
2019	15,813,635	25,443,508	62.2%
2020	5,198,761	8,276,398	62.8%
2021	9,489,506	15,302,992	62.0%
2022	14,067,676	23,569,134	59.7%
2023	16,012,348	26,576,949	60.2%
2010 -2023 Average:			**60.0%**

Source: US DOT T-100; US DOT O&D Survey

For the historical trend, an average O&D passenger percentage was calculated at 60.0 percent. The trend included the anomalous COVID-19 Pandemic years of 2021 and 2022 which were included in the average percent calculation as not to ignore irregular exogenous events or economic shocks that will likely occur again within the Forecast Period. As the historical O&D percent of enplaned passengers is very stable in

[4] For U.S. DOT O&D survey, 4 quarters Year Ending 3rd Quarter were used (latest available data).

the DC region airports, the 60.0 percent was applied to total TAF enplaned passengers and kept flat throughout the Forecast Period as can be seen in **Table 2A-14**.

TABLE 2A-14 TOTAL DC REGION O&D ENPLANEMENT FORECAST, 2021 - 2041

		2024 FAA TAF					
		IAD	DCA	RIC	TOTAL	O&D Percent	Total DC Region O&D Enplanements
Actual	2021	7,097,977	6,680,270	1,564,892	15,302,992	62.0%	9,489,506
	2022	10,112,551	11,496,552	2,009,677	23,569,134	59.7%	14,067,676
	2023	11,987,683	12,283,716	2,362,937	26,576,949	60.2%	16,012,348
Forecast	2024	12,887,960	12,260,183	2,527,131	27,675,274	60.0%	16,605,164
	2025	13,453,196	12,471,839	2,633,997	28,559,032	60.0%	17,135,419
	2026	13,809,967	12,657,817	2,681,025	29,148,809	60.0%	17,489,285
	2027	14,149,798	12,817,003	2,733,307	29,700,108	60.00%	17,820,065
	2028	14,494,027	12,969,275	2,787,840	30,251,142	60.0%	18,150,685
	2029	14,830,088	13,121,182	2,837,037	30,788,307	60.0%	18,472,984
	2030	15,166,234	13,274,155	2,887,977	31,328,366	60.0%	18,797,020
	2031	15,499,893	13,427,327	2,936,215	31,863,435	60.0%	19,118,061
	2032	15,835,229	13,558,627	2,988,338	32,382,194	60.0%	19,429,316
	2033	16,170,153	13,689,886	3,038,510	32,898,549	60.0%	19,739,129
	2034	16,503,738	13,819,066	3,088,457	33,411,261	60.0%	20,046,757
	2035	16,843,245	13,944,530	3,139,583	33,927,358	60.0%	20,356,415
	2036	17,189,786	14,066,468	3,194,224	34,450,478	60.0%	20,670,287
	2037	17,537,690	14,184,461	3,250,529	34,972,680	60.0%	20,983,608
	2038	17,886,917	14,298,889	3,308,383	35,494,189	60.0%	21,296,513
	2039	18,241,148	14,410,157	3,367,164	36,018,469	60.0%	21,611,081
	2040	18,600,688	14,515,059	3,429,086	36,544,833	60.0%	21,926,900
	2041	18,954,817	14,615,299	3,488,905	37,059,021	60.0%	22,235,413
CAGR 2023 - 2041		**2.6%**	**1.0%**	**2.2%**	**1.9%**		**1.8%**

Source: FAA TAF; US DOT O&D Survey

The next step was to continue to segregate the DC region O&D passengers to only those passengers traveling to the Core Destinations. For that purpose, U.S. DOT T-100 data was used to calculate the percentage of DC region O&D passenger traveling only to the Core Destinations. It was estimated that the O&D from the DC region to the Core Destinations ranged between 13.0 percent to 14.0 percent of total DC region passengers. The O&D to Core Destination was then projected for the Forecast Period from 2023 to 2041 and grown at the same rate as total DC region O&D passengers, 1.8 percent. See **Table 2A-15.**

TABLE 2A-15 TOTAL DC REGION O&D TO CORE DESTINATIONS, 2021 - 2041

		O&D DC Region to Core Destinations	Percent DC Region to Core Dest/DC Region Total O&D
Actual	2021	1,312,760	14%
	2022	1,926,417	14%
	2023	2,115,274	13%
Forecast	2024	2,324,723	14%
	2025	2,398,959	14%
	2026	2,448,500	14%
	2027	2,494,809	14%
	2028	2,541,096	14%
	2029	2,586,218	14%
	2030	2,631,583	14%
	2031	2,676,529	14%
	2032	2,720,104	14%
	2033	2,763,478	14%
	2034	2,806,546	14%
	2035	2,849,898	14%
	2036	2,893,840	14%
	2037	2,937,705	14%
	2038	2,981,512	14%
	2039	3,025,551	14%
	2040	3,069,766	14%
	2041	3,112,958	14%
CAGR 2023 - 2041		**2.2%**	

Source: FAA TAF; US DOT O&D Survey

The last step in the identification of target passengers who could potentially use HEF as a gateway airport was to isolate DC region O&D passengers to the Core Destinations to those living in the ECA as defined in Section 1.4. The market analysis considered all the city pairs that were booked by passengers to the Core Destinations residing in the ECA. This data collection included the use of market locator data sourced from the Airline Reporting Corporation (ARC) for 2023. ARC is the clearing house for most airline tickets

purchased with credit cards in the U.S. and almost all carriers process their ticket sales via ARC. Credit cards are the most common form of payment for air travel today. Data based on the billing address of credit cards used to purchase airline tickets is a reliable source of information about the distribution of air travel demand in the HEF ECA. The credit card transaction analysis detailed the local originating demand that would most effectively be served from HEF. The ARC data was analyzed and the number of passengers per day each way (PDEW) was calculated for the Core Destinations.

The analysis further took the total O&D passenger numbers from the ECA passengers to the Core Destinations and grew them by 2.0 percent from 2023 thru 2041 as seen in **Table 2A-16**. The growth rate was selected because it represents the employment growth in the Catchment Area as seen in **Table 2A-4**. **Table 2A-17** summarizes the HEF Market Analysis from 2022 thru 2041.

TABLE 2A-16 TOTAL CATCHMENT AREA PASSENGERS TO CORE DESTINATIONS PER DAY EACH WAY

Year	2023 ARC Data to Core Destinations	Percent ARC ECA/DC Region O&D to Core Dest	Passengers Per Day Each Way (PDEW)
Actual 2023	401,838	19.0%	1,101
Forecast 2024	409,875	17.6%	1,123
2025	418,072	17.4%	1,145
2026	426,434	17.4%	1,168
2027	434,962	17.4%	1,192
2028	443,662	17.5%	1,216
2029	452,535	17.5%	1,240
2030	461,586	17.5%	1,265
2031	470,817	17.6%	1,290
2032	480,234	17.7%	1,316
2033	489,838	17.7%	1,342
2034	499,635	17.8%	1,369
2035	509,628	17.9%	1,396
2036	519,820	18.0%	1,424
2037	530,217	18.0%	1,453
2038	540,821	18.1%	1,482
2039	551,637	18.2%	1,511
2040	562,670	18.3%	1,542
2041	573,924	18.4%	1,572
CAGR 2023 - 2041	**2.0%**		**2.0%**

Source: ARC 2023

TABLE 2A-17 SUMMARY OF HEF MARKET ANALYSIS, 2022-2041

	HEF Market Analysis							
	Year	DC Region Enplanements	DC Region O&D %	DC Region O&D	Core Destinations	DC Region/ Core %	ECA Pax to Core Destinations	HEF catchment / Core %
	2022	23,569,134	60%	14,067,676	1,926,417	14%	n/a	n/a
Forecast	2023	26,576,949	60%	16,012,348	2,115,274	13%	401,838	19%
+ 5 years	2026	29,148,809	60%	17,489,285	2,448,500	14%	426,434	17%
+ 10 Years	2031	31,863,435	60%	19,118,061	2,676,529	14%	470,817	18%
+ 15 years	2036	34,450,478	60%	20,670,287	2,893,840	14%	519,820	18%
+ 20 years	2041	37,059,021	60%	22,235,413	3,112,958	14%	573,924	18%
CAGR 2023 - 2041		2.1%		2.3%	2.3%		1.7%	

Source: US DOT T-100; US DOT O&D Survey (DB1B); ARC 2023

2.4.3 Forecast of PDEW and Daily Departures

Once the number of O&D enplaned passengers from the ECA were calculated, further analysis was conducted to pinpoint how many of those travelers would potentially choose HEF as their gateway airport. The first step was to look at PDEW from the ECA and estimate how many departures would that equal to if the Airport captured 100.0 percent of those passengers. By taking the forecast PDEW for the ECA and dividing them by average capacity of Avelo Boeing 737-800 (189 seats) and Boeing 737-700 (149 seats) aircraft, multiplied by a representative ULCC load factor (79.0 percent), the estimate would equal approximately 8.2 daily departures in 2025 and growing to approximately 11.8 departures in 2041. See **Table 2A-18.**

TABLE 2A-18 FORECAST TOTAL DAILY DEPARTURES WITH 100% CAPTURE OF EXPANDED CATCHMENT AREA PASSENGERS

Year	Passengers Per Day Each Way (PDEW)	Avelo 737-700/800 Blended Seat Capacity	Avelo Average Load Factor (%)	Daily Departures
2023	1,101	169	79.0%	8.2
2024	1,123	169	79.0%	8.4
2025	1,145	169	79.0%	8.6
2026	1,168	169	79.0%	8.8
2027	1,192	169	79.0%	8.9
2028	1,216	169	79.0%	9.1
2029	1,240	169	79.0%	9.3
2030	1,265	169	79.0%	9.5
2031	1,290	169	79.0%	9.7
2032	1,316	169	79.0%	9.9
2033	1,342	169	79.0%	10.1
2034	1,369	169	79.0%	10.3
2035	1,396	169	79.0%	10.5
2036	1,424	169	79.0%	10.7
2037	1,453	169	79.0%	10.9
2038	1,482	169	79.0%	11.1
2039	1,511	169	79.0%	11.3
2040	1,542	169	79.0%	11.5
2041	1,572	169	79.0%	11.8

Source: ARC 2023; Avelo

Note: Avelo seat capacity is based on average of Avelo fleet of 737-700 and 737-800.

Since not all passengers from the ECA will fly from HEF to the Core Destinations based on air carrier product preferences, airline mileage membership loyalty and other intangible factors, a further estimation was prepared to further refine how many PDEW HEF could conceivably be captured from the ECA.

For this approach, the analysis further narrowed-down the data at the zip code level to only the communities within a 15-to-20-mile proximity to Manassas (ECA Subset) flying to Core Destinations in 2023. Those communities are listed in **Table 2A-19**.

TABLE 2A-19 ECA SUBSET COMMUNITIES WITH 15-20 MILE PROXIMITY TO MANASSAS

ALDIE	FRONT ROYAL	PARIS
BEALETON	GAINESVILLE	PURCELLVILLE
BRISTOW	HAMILTON	QUANTICO
BROAD RUN	HAYMARKET	SPOTSYLVANIA
BRUNSWICK	LORTON	THE PLAINS
CENTREVILLE	MANASSAS	WARRENTON
CULPEPER	MIDDLEBURG	WINCHESTER
DELAPLANE	MIDDLETOWN	WOODBRIDGE
DUMFRIES	MIDLAND	WOODVILLE
FREDERICK	NEW MARKET	
FREDERICKSBURG	OCCOQUAN	

Source: ARC 2023

It was calculated that the ECA Subset represented 31.0 percent of PDEW from the ECA to the Core Destinations. To further refine the analysis, a study was conducted to determine the number of departures that ULCCs typically operate from airports from which they launch service[5]. The study focused on new markets for Allegiant from January 2003 to March 2023, Avelo from April 2021[6] to March 2023, and Breeze from July 2021[7] to March 2023. Of the 320 markets in which these airlines launched services during the aforementioned time periods, the average number of daily departures was 0.7, equivalent to 4.6 weekly departures. These ULCC new market operational patterns are similar to what would be expected at HEF for their initial service in 2025.

Based on a historical analysis of ULCC business models related to new airport and market startup patterns, a 0.7 daily departures metric was selected for the first year of operations at HEF. This would represent approximately an 8.7 percent market share captured from the ECA to the Core Destinations. Based on the historical analysis of passenger growth on ULCC's at markets like HEF, it was projected that HEF will continue to experience a flat 8.7 percent market share of the ECA through 2041. A PDEW growth rate of 2.0 percent was selected based on W&P Catchment Area employment growth rate as seen on Table 1-3. Employment growth was selected as the key economic driver in forecasting passenger enplanements considering the direct impact that employment has on non-essential spending associated with leisure travel.

Based on this metric, daily departures at HEF are projected to grow from 0.7 daily departures in 2025 to 1.0 daily departures in 2041. See Table 2A-20. To support the limited growth in daily departures throughout the Forecast Period, an analysis was undertaken to look at the average departures per day in the 82 markets served by Allegiant in the past 10-years[8] (2014 -2023) where they have had consistent service excluding their operational bases of AZA, Orlando Sanford International Airport (SFB), Las Vegas Harry Reid International Airport (LAS) and St. Pete-Clearwater International Airport (PIE). It was concluded

[5] Study conducted using USDOT T-100 data via Diio Mi.

[6] Month in which Avelo started operations.

[7] Month in which Breeze started operations.

[8] Analysis conducted using USDOT T-100 data via Diio Mi.

that Allegiant averaged approximately 1.0 daily departure indicating that even after long-term services at an airport, ULCCs such as Allegiant do not have a long-term trend of high increases in frequencies.

TABLE 2A-20 FORECAST OF HEF PDEW AND DAILY DEPARTURES

Year	Passengers Per Day Each Way (PDEW)	% of Pax Captured by HEF	Passengers Per Day Each Way (PDEW) from HEF	Daily Departures from HEF
2023	1,101	n/a	n/a	0.0
2024	1,123	n/a	n/a	0.0
2025	1,145	8.7%	99.7	0.7
2026	1,168	8.7%	101.6	0.8
2027	1,192	8.7%	103.7	0.8
2028	1,216	8.7%	105.7	0.8
2029	1,240	8.7%	107.9	0.8
2030	1,265	8.7%	110.0	0.8
2031	1,290	8.7%	112.2	0.8
2032	1,316	8.7%	114.5	0.9
2033	1,342	8.7%	116.8	0.9
2034	1,369	8.7%	119.1	0.9
2035	1,396	8.7%	121.5	0.9
2036	1,424	8.7%	123.9	0.9
2037	1,453	8.7%	126.4	0.9
2038	1,482	8.7%	128.9	1.0
2039	1,511	8.7%	131.5	1.0
2040	1,542	8.7%	134.1	1.0
2041	1,572	8.7%	136.8	1.0

Source: ARC 2023; RS&H Analysis

The forecast of PDEW were further annualized through the Forecast Period. Overall, enplanements at HEF grow from 36,372 in 2025 to 49,931 equating to a CAGR of 2.0 percent throughout the Forecast Period. A comparison with the "Prorated Forecast 2024 – 2030" published in January 2024 and developed by Avports, LLC (AvPorts), the operator selected by HEF to assist them in the development of commercial passenger market, is included as part of this analysis. See **Table 2A-21**.

TABLE 2A-21 HEF ENPLANEMENTS FORECAST

Year	HEF Enplanements	Avports Enplanements
2025	36,372	585,000
2026	37,100	788,000
2027	37,842	843,000
2028	38,599	974,000
2029	39,371	1,096,000
2030	40,158	1,183,000
2031	40,961	
2032	41,780	
2033	42,616	
2034	43,468	
2035	44,338	
2036	45,224	
2037	46,129	
2038	47,051	
2039	47,992	
2040	48,952	
2041	49,931	
CAGR		
2025 - 2030	2.0%	15.1%
2025 - 2041	2.0%	n/a

Source: RS&H Analysis; Avports

2.4.4 Forecast of Operations

To calculate operations at HEF, the total enplaned passenger forecast was combined with a projection of average load factors and average seat per departure in a mathematical formula to derive a forecast of scheduled passenger operations. As previously discussed, an average load factor was used representative of a ULCC load factor in 2023 equal to 79.0 percent. A proxy average seats per departure was calculated using the average capacity of Avelo Boeing 737-800 with 189-seats and Avelo Boeing 737-700 with 149 seats (average of 169 seats) and left flat throughout the Forecast Period.

The mathematical formula expressed below is used to calculate total annual operations at HEF.

$$\frac{Enplanements}{(Avg\ Load\ Factors)(Avg\ Seats\ per\ Departure)}(2) = Operations$$

Passenger aircraft operations at HEF are projected to increase from 545 in 2025 to approximately 748 in 2041. This produces a CAGR of 2.0 percent over the Forecast Period.

TABLE 2A-22 HEF OPERATIONS FORECAST

Year	RS&H Operations	Avports Operations
2025	545	4,000
2026	556	5,500
2027	567	6,100
2028	578	7,100
2029	590	8,100
2030	602	8,800
2031	614	
2032	626	
2033	638	
2034	651	
2035	664	
2036	677	
2037	691	
2038	705	
2039	719	
2040	733	
2041	748	
CAGR		
2025 - 2030	2.0%	17.1%
2025 - 2041	2.0%	n/a

Source: RS&H Analysis; Avports

2.4.5 Avelo LOI Scenario

In addition to the baseline scenario, the forecast model created for HEF also addressed an alternative forecast scenario of annual enplaned passengers and operations over the Forecast Period based on the number of daily flights as stated in the Letter of Intent (LOI) from Avelo to Avports dated February 14, 2024 (The Avelo LOI Scenario). The Avelo LOI Scenario assumes Avelo starting operations at HEF with up to 3 daily departures in May 2025 and up to 10 daily departures by December 2025 as stated in the LOI. In addition, the LOI states that Avelo will operate a mix of Boeing 737-700 and Boeing 737-800 aircraft with a maximum capacity of 189 passengers. Using the number of departures as stated in the LOI and growing them by 2.0 percent per year throughout the Forecast Period based on the W&P employment growth in the Catchment Area, the Avelo LOI scenario projects 3,088 operations in 2025 growing to 4,239 operations in 2041. As per the LOI, the Avelo LOI Scenario assumes a mix of Boeing 737-700 and Boeing 737-800 aircraft with an average ASPD of 169 seats based on current Avelo seat configurations for those two aircraft and kept flat throughout the Forecast Period. Using an 81.9 percent load factor (average load factor of Avelo to Florida markets in 2023) also kept flat throughout the Forecast Period, the Avelo LOI scenario projects 213,077 enplanements in 2025 growing to 293,272 enplanements in 2041 at a CAGR of 2.0 percent. See **Table 2A-23**.

TABLE 2A-23 HEF FORECAST OF ENPLANEMENTS AND OPERATIONS – BASELINE, AVELO LOI SCENARIO

Year	BASELINE		AVELO LOI SCENARIO	
	Enplanements	Operations	Enplanements	Operations
2025	36,372	545	213,707	3,088
2026	37,100	556	505,200	7,300
2027	37,842	567	515,304	7,446
2028	38,599	578	525,610	7,595
2029	39,371	590	536,122	7,747
2030	40,158	602	546,845	7,902
2031	40,961	614	557,782	8,060
2032	41,780	626	568,937	8,221
2033	42,616	638	580,316	8,385
2034	43,468	651	591,922	8,553
2035	44,338	664	603,761	8,724
2036	45,224	677	615,836	8,899
2037	46,129	691	628,153	9,077
2038	47,051	705	640,716	9,258
2039	47,992	719	653,530	9,443
2040	48,952	733	666,601	9,632
2041	49,931	748	679,933	9,825
CAGR				
2025-2030	2.0%	2.0%	20.7%	20.7%
2030-2035	2.0%	2.0%	2.0%	2.0%
2035-2041	2.0%	2.0%	2.0%	2.0%
2025 – 2041	2.0%	2.0%	7.5%	7.5%

Source: RS&H Analysis; USDOT T-100; Avelo LOI, February 13, 2024.

2.5 CRITICAL AIRCRAFT IDENTIFICATION

The FAA requires identification of existing and future critical/design aircraft for airport planning purposes. The term critical aircraft and design aircraft can be used interchangeably. The critical aircraft is the most demanding aircraft, or grouping of aircraft, using the airport regularly. Regular use is specifically defined in AC 150/5000-17, Critical Aircraft and Regular Use Determination, as 500 total annual operations, not counting touch-and-go landings.

Three parameters are used to classify the critical aircraft: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). The AAC, depicted by a letter, relates to aircraft landing speeds. The ADG, depicted by a Roman numeral, relates to airplane wingspan and tail height. The TDG, classified by number, relates to the outer-to-outer main gear width and the distance between the cockpit and main gear. These parameters serve as the basis for design and construction of airport infrastructure. An accurate critical aircraft determination helps ensure facilities are developed to meet the proper needs of each portion of the airport.

The 2022 HEF Master Plan forecast identified the airport's critical aircraft as a C-III. Since there was not a single aircraft type that met the FAA requirements of "regular use", the determination was made by grouping aircraft with similar operational performance and/or physical dimensions with the Gulfstream V making up nearly half of those operations.

Based on the updated forecast for HEF that includes commercial service, an updated critical aircraft was determined for Runway 16L/34R, the main runway at HEF. The parallel runway, 16R/34L would not be able to accommodate commercial service operations operated by existing ULCC and therefore is not considered in the critical aircraft determination update. The most demanding aircraft used by existing ULCCs in the United States, including Avelo is the Boeing 737-800, ergo the future critical aircraft for Runway 16L/34R is a Boeing 737-800 (D-III) which is anticipated to have over 500 annual operations by 2025. See **Table 2A-24.**

TABLE 2A-24 HEF CRITICAL AIRCRAFT DETERMINATION

AAC/ADG	Representative Aircraft	TDG
D-III	Boeing 737-800	3

2.6 HEF TOTAL OPERATIONS COMPARED TO THE FAA TAF

The FAA has oversight responsibility to review and approve aviation forecast developed in conjunction with airport planning studies. FAA must approve sponsor forecasts before they can be used to prepare facility requirements in a master plan or before going forward with an environmental document that requires a forecast. The FAA uses a 10.0 percent threshold for the first 5 years and a 15.0 percent threshold for the subsequent 5-year period as a rule-of-thumb for accepting non-FAA forecasts as the basis for planning and environmental studies. If these stated thresholds are exceeded, the FAA Region office in which the airport is located, will forward the forecasts to FAA headquarters for review.

After developing the forecast of commercial passenger operations for HEF, total aircraft operations were consolidated by activity type (air carrier/air taxi, general aviation, and military) for comparison purposes with the FFY 2024 FAA TAF, the latest available TAF document produced and published by the FAA in January 2024. The results show HEF's forecast of total operations is within the 10.0 percent and 15.0 percent thresholds. See **Table 2A-25**.

TABLE 2A-25
BASE CASE FORECAST COMPARISON WITH FAA TAF 2024

	2021		2026		2031		2041	
Category	**Base Case**	**TAF 2024**	**Base Case**	**TAF 2024**	**Base Case**	**TAF 2024**	**Base Case**	**TAF 2024**
Air Carrier & Air Taxi Operations	12,891	12,890	14,806	17,696	16,791	19,444	21,597	23,464
GA & Local GA Operations	84,162	84,162	89,293	84,986	94,736	86,650	106,638	90,153
Military Operations	2,596	2,050	2,596	2,050	2,596	2,050	2,596	2,050
Total Operations	99,649	99,649	106,854	104,732	114,744	108,144	131,985	115,667
GA Based Aircraft	410	372	415	397	424	422	436	472
Comparison with FAA TAF 2024 (percent different)								
Air Carrier & Air Taxi Operations	0.00%		16.3%		13.7%		8.0%	
GA & Local GA Operations	0.00%		5.1%		9.3%		18.3%	
Military Operations	0.00%		26.6%		26.6%		26.6%	
Total Operations	0.00%		2.0%		6.1%		14.1%	
GA Based Aircraft	0.00%		4.5%		0.5%		-7.6%	

Source: RS&H, 2022; FAA TAF, 2024

TABLE 2A-26
AVIATION FORECASTS SUMMARY

	Base Yr. Level	Base Yr.+5yrs.	Base Yr.+10yrs.	Base Yr.+20yrs.	Compound Annual Growth Rate		
					Base Yr. to +5	Base Yr. to +10	Base Yr. to +20
	2021	2026	2031	2041	2026	2031	2041
Enplanements	**N/A**	**37,100**	**40,961**	**49,931**	**720.0%**	**189.0%**	**72.0%**
Operations							
Itinerant							
Air carrier	1	556	614	741	254.0%	90.0%	39.0%
Commuter/air taxi	12,890	14,250	16,177	20,849	2.0%	2.3%	2.4%
General aviation	37,396	39,676	42,094	47,383	1.2%	1.2%	1.2%
Military	2,425	2,425	2,425	2,425	0.00%	0.00%	0.00%
Local							
General aviation	46,766	49,617	52,642	59,255	1.2%	1.2%	1.2%
Military	171	171	171	171	0.00%	0.00%	0.00%
TOTAL OPERATIONS	**99,649**	**106,695**	**114,123**	**130,824**	**1.38%**	**1.37%**	**1.37%**
Based Aircraft							
Single Engine	312	314	319	324	0.13%	0.22%	0.19%
Multi Engine	51	51	52	55	0.00%	0.19%	0.38%
Jet Engine	27	30	32	35	2.13%	1.71%	1.31%
Helicopter	18	18	18	20	0.00%	0.00%	0.53%
Other	2	2	2	2	0.00%	0.00%	0.00%
TOTAL	**410**	**415**	**423**	**436**	**0.24%**	**0.31%**	**0.31%**

Source: RS&H Analysis, 2022-2024; FAA TAF, 2024

APPENDIX A

2.1 BENCHMARKING AIRPORTS WITH ULTRA LOW-COST CARRIER (ULCC) SERVICE

Since HEF historically hasn't had commercial passenger traffic benchmarking airports that added ULCC service with a similar operational background to HEF, such as being in close proximity to a large-hub airport, is an effective way to gain a high-level insight into measures of added capacity and departures. However, it is important to note that each airport is unique in how commercial air traffic evolves as there is no unique formula for determining how passenger traffic will grow when compared to these benchmark airports. Each airport operates in its own geographic area, supported or burdened by its own policies, political environments, and/or other forms of limitations/requirements. The main objective in looking at these airports is to observe behavioral patterns from benchmarking metrics that are associated with growth patterns of daily departures and available seats at each airport based on the addition of ULCC service. Though these comparable airports may have other mainline full-service airlines, this section focuses on the impacts of the integration of ULCC service at these facilities.

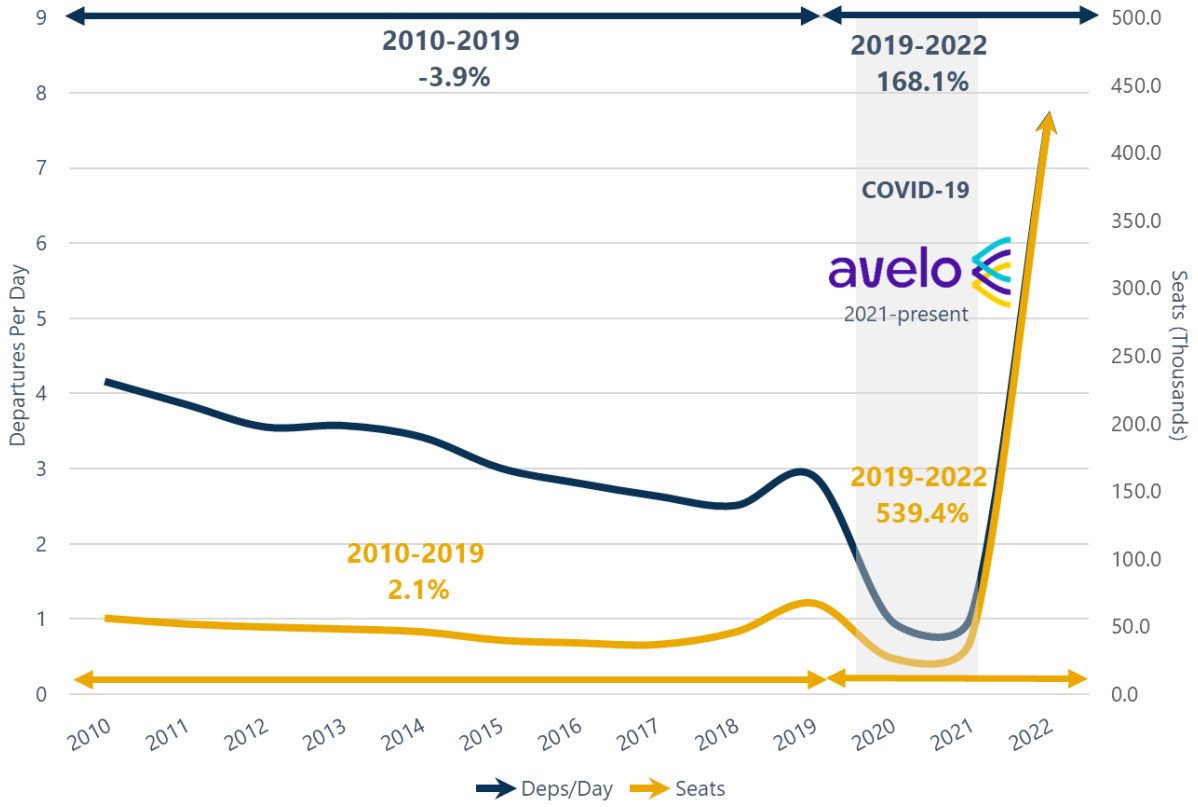
2.1.1 Tweed-New Haven Regional Airport (HVN)

HVN is defined as a non-hub primary service airport in the NPIAS which means it serves less than 0.05 percent of all passengers in the U.S. HVN is one of two commercial service airports in the state of Connecticut, the other being Bradley International Airport (BDL) which is located in the center of the state and serves the capital city of Hartford.

As can be seen in Error! Reference source not found., daily departures and available seats at HVN were on a downward trend with the exception of CY 2019 when American Airlines (American) increased service that year. American, like most airlines at HVN, decreased service in CY 2020 and CY 2021 due the COVID-19 Pandemic. American eventually ceased service at HVN in CY 2021. Avelo began service at HVN in CY 2021 and increased service significantly in CY 2022, ultimately establishing a hub at the airport. Daily departures and available seats increased to record levels at HVN with the introduction of Avelo, as seen in Error! Reference source not found.. Avelo initiated service at HVN to three destinations in CY 2021 and expanded to 17 destinations within two years, including Puerto Rico. Based on U.S. DOT T-100 data, load factors have also been the highest experienced by HVN with the introduction of Avelo, at 80.0 percent.

Between CY 2010 and CY 2019, prior to ULCC service, departures per day had a CAGR of -3.9 percent while available seats increased at a CAGR of 2.1 percent. Since Avelo began service in CY 2021, departures per day increased by 168.1 percent and available seats increased by 539.4 percent.

FIGURE 2A-1 HVN DEPARTURES PER DAY AND AVAILABLE SEATS



Source: DOT T-100; RS&H Analysis, 2023

2.1.2 Phoenix-Mesa Gateway Airport (AZA)

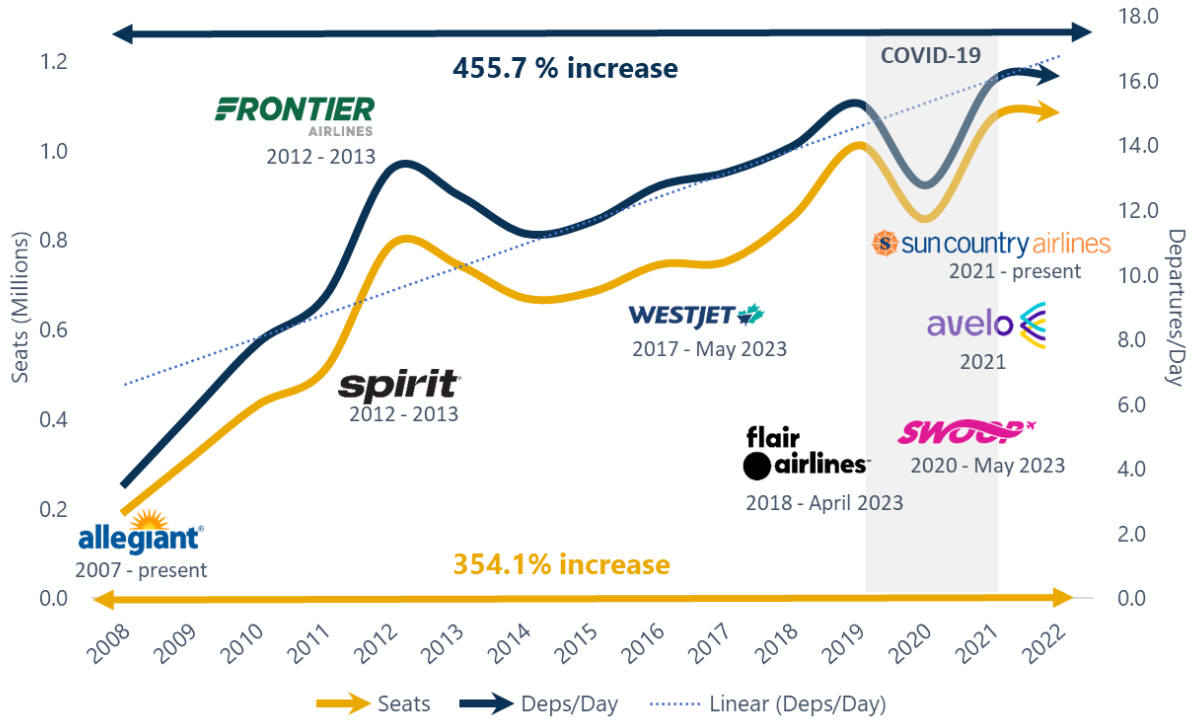
AZA is defined as a small-hub primary service airport in the NPIAS which means it accounts for 0.05 percent to 0.25 percent of total U.S. passengers. AZA is located approximately 20 miles southeast of Phoenix Sky Harbor Airport (PHX), a primary large-hub airport. Formally known as Williams Air Force Base, AZA began serving commercial passenger traffic in CY 2007 as a reliever airport to PHX.

As can be seen in Error! Reference source not found.**,** daily departures and available seats at AZA have fluctuated due to airlines entering/exiting the market, increasing/decreasing service, and/or up gauging aircraft. Allegiant Airlines (Allegiant) began service in CY 2007 and was the first airline to offer commercial passenger service at AZA[9]. AZA is currently one of Allegiant's focus cities. There was a significant increase in both departures per day and available seats from CY 2011 thru CY 2012 as a result of an increase in departures and destinations by Allegiant in addition to Spirit Airlines (Spirit) and Frontier Airlines (Frontier) entering the market with a combined 800 additional annual flights. Similar to the rest of the world, commercial passenger service decreased during the COVID-19 Pandemic. Enplanements and operations at AZA recovered quickly and surpassed pre COVID-19 Pandemic enplanement levels in CY 2022 due to

[9]Terminal Modernization | Phoenix-Mesa Gateway Airport. (n.d.). https://www.gatewayairport.com/terminalmodernization#:~:text=Since%20the%20start%20of%20commercial,nearly%20two%20million%20passengers%20annually.

quite a significant service increase by Allegiant and Swoop Airlines (Swoop), a Canadian based ULCC. With Canadian carriers WestJet, Swoop and Flair Airlines suspending service in CY 2023, AZA currently has 2 ULCC operators, Allegiant and Sun Country Airlines (Sun Country). Many ULCC airlines have initiated and ceased services at AZA, however, with Allegiant as an airline partner, AZA's seat capacity increased 354.1 percent from CY 2008 thru CY 2022 while daily departures increased by 455.7 percent in the same time period.

FIGURE 2A-2 AZA DEPARTURES PER DAY AND AVAILABLE SEATS



Source: DOT T-100; RS&H Analysis, 2023

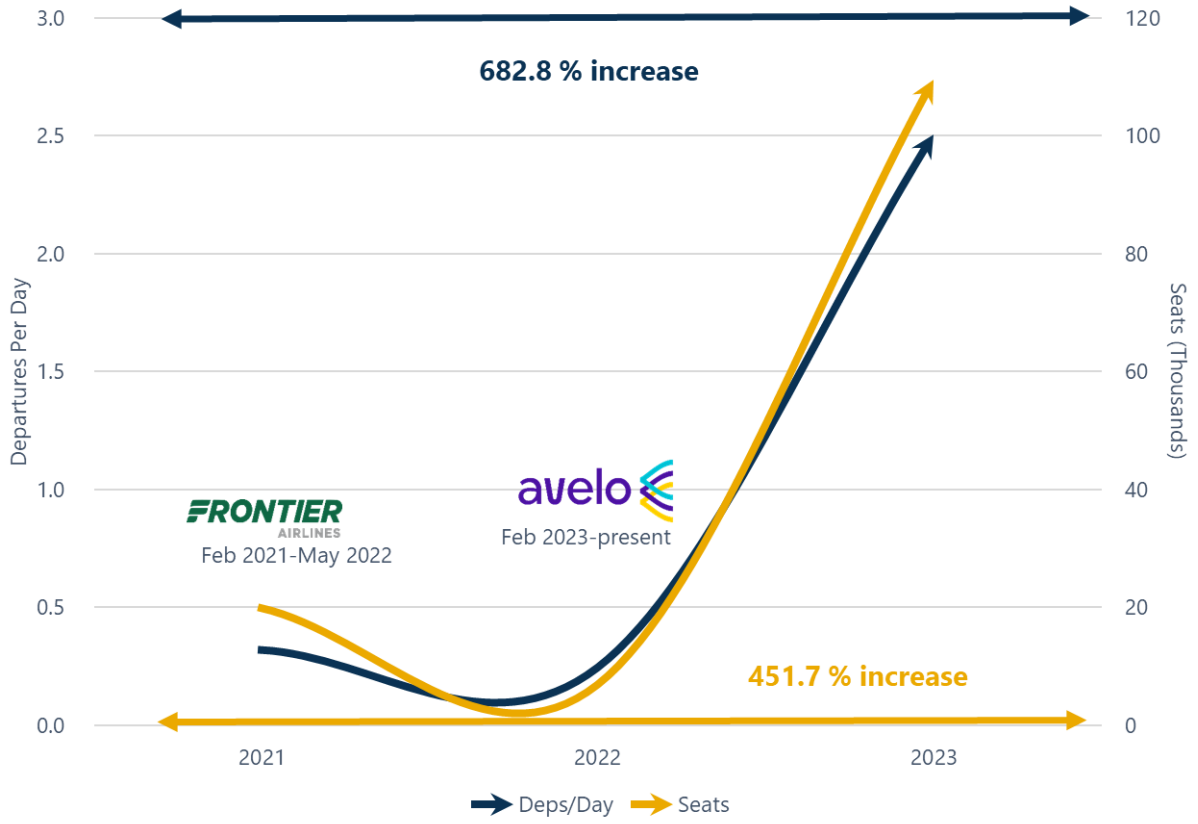
2.1.3 Wilmington Airport (ILG)

ILG opened for commercial service in 1947 and is classified as a non-hub primary service airport by the NPIAS. It is located 35 miles southwest of Philadelphia International Airport (PHL) and is the base for the Delaware Air National Guard.

Frontier served ILG between CY 2013 and CY 2015 and returned from CY 2021 through CY 2022. Avelo announced plans to serve ILG in FY 2022 and began service in February 2023 to 10 markets with over 600 annual flights as of September 2023. Between May 2022 and February 2023, there was no commercial passenger service available at ILG. Once Avelo began service, from CY 2021 thru September 2023[10], departures per day at ILG increased by 682.8 percent while available seats increased by 451.7. See **Figure 2A-3** Error! Reference source not found.**.**

[10] DOT T-100 data only has data up to September 2023. 2023 data was used for ILG because that is when the ULCC service began to grow.

FIGURE 2A-3 ILG DEPARTURES PER DAY AND AVAILABLE SEATS



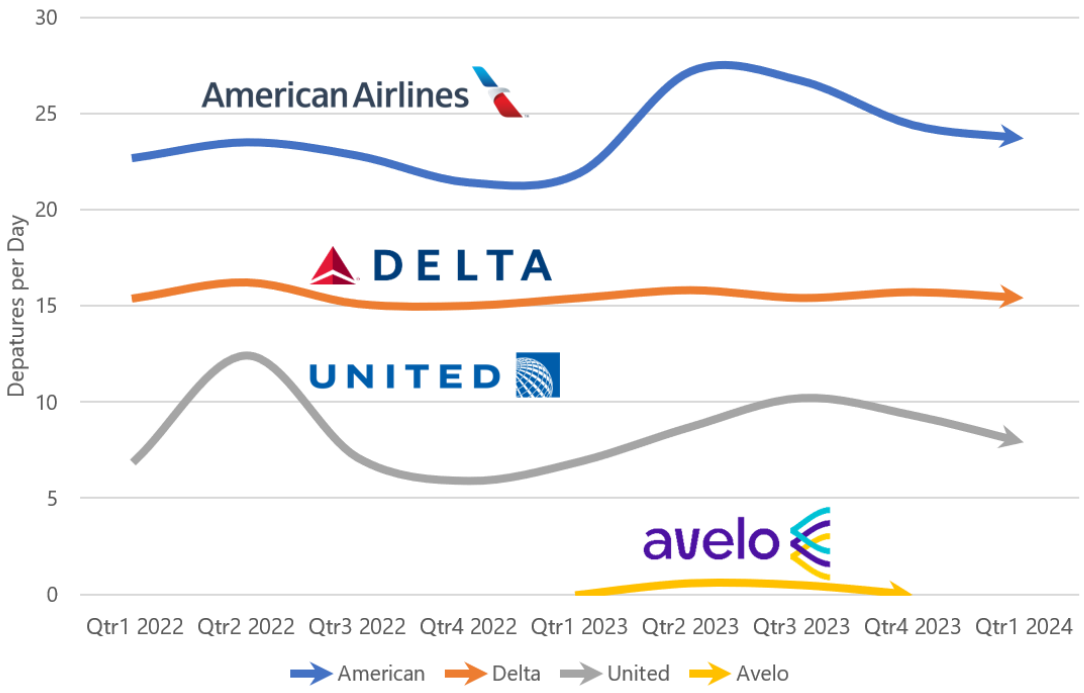
Source: DOT T-100; RS&H Analysis, 2023

2.1.4 Charlottesville-Albemarle Airport (CHO)

CHO welcomed its first commercial airline service, operated by Piedmont Airlines in 1955. CHO is classified as a non-hub primary service airport by the NPIAS. Throughout its history CHO has played a pivotal role in serving the transportation needs of Central Virginia. It is located 66 miles northeast of Richmond, the capital of the Commonwealth.

CHO historically operated services to large connecting hubs concentrating on a core of corporate travel activity with high yields. Avelo entered the market in May 2023 with two weekly services to MCO as an alternative to the network carriers. Avelo withdrew service in August 2023 after only five month of service achieving an average load factor of 60.3 percent. In addition to CHO, from the period between July 2023 and March 2024 Avelo left a further five markets where they operated twice weekly. Those markets included Mobile International Airport (BFM), Colorado Springs Airport (COS), Dayton International Airport (DAY), Chicago Midway Airport (MDW), and Memphis International Airport (MEM). Avelo also left Melbourne Orlando International Airport (MLB) where they operated 18 monthly departures.

FIGURE 2A-4 CHO DEPARTURES PER DAY



Source: DOT T-100; RS&H Analysis, 2023

2.1.5 Summary

The ULCC business model, which offers fewer services and amenities than the legacy airline model, is rapidly expanding in the U.S, however, it's growth has slowed due to market saturation in some areas (such as Florida) and financial underperformance of two key ULCC airlines. The ULCC business model proved successful in Europe with airlines such as Ryanair which ranked as the third largest carrier in the world in terms of passengers carried[11] in CY 2022 and largest airline in the world by market capitalization ($29.6 billion) in CY 2023[12]. The benchmarked airports in this report demonstrate the positive effect ULCC's have at non and small-hubs when initiating service.

[11] Flight Global, December 2023

[12] Companies Market Cap, 2023