Chapter 2
Forecasts

An important factor in facility planning is estimating the demand that can be reasonably expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal facilities, etc.). In airport master planning, this involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for Kerrville-Kerr County Airport (ERV) will primarily consider based aircraft, aircraft operations, peak activity periods, and critical aircraft.

The Texas Department of Transportation (TxDOT) Aviation Division has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. TxDOT will review individual airport forecasts with the objective of comparing them to the FAA *Terminal Area Forecast* (TAF) for ERV.

When reviewing a sponsor's forecast (from the master plan), TxDOT must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. According to the Federal Aviation Administration (FAA), forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

The forecast process for an airport master plan consists of a series of basic steps that vary in complexity, depending on the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and documentation and evaluation of the results. FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, outlines the following seven standard steps involved in the forecast process.

1. **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.

2. **Review Previous Airport Forecasts**: May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.

3. **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.

4. **Select Forecast Methods**: Several appropriate methodologies and techniques are available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.

5. **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate them for reasonableness.

6. **Summarize and Document Results**: Provide supporting text and tables, as necessary.

7. **Compare Forecast Results with the FAA's TAF**: Based aircraft and total operations are considered consistent with the TAF if they meet one of the following criteria:
   - Forecasts differ by less than 10 percent in the five-year forecast period and less than 15 percent in the 10-year forecast period;
   - Forecasts do not affect the timing or scale of an airport project; or
   - Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems.*

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty; therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for the airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historical activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

The forecasts for this master plan will utilize a base year of 2024 with a long-range forecast out to 2044.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information that can be used by state and local authorities, the aviation industry, and the public. At the time this chapter was prepared, the most recent edition was *FAA Aerospace Forecast – Fiscal Years* (FY) *2024-2044*. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is a brief synopsis of highlights from the FAA's national general aviation forecasts. A summary of the FAA's forecasts is also shown on **Exhibit 2A**.

NATIONAL GENERAL AVIATION TRENDS

The long-term outlook for general aviation is promising, as growth at the high end of the segment (more sophisticated aircraft such as business jets, turboprops, and helicopters) offsets continuing retirements at the traditional low end (piston-powered aircraft). The active general aviation fleet is forecast to remain relatively stable between 2024 and 2044, increasing by just 0.4 percent. While steady growth in both gross domestic product (GDP) and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period.

The FAA forecasts the fleet mix and hours flown for single-engine piston (SEP) aircraft; multi-engine piston (MEP) aircraft; turboprops; business jets; piston and turbine helicopters; and light sport, experimental, and other aircraft (e.g., gliders and balloons). The FAA forecasts active aircraft, not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category. **Table 2A** shows the primary general aviation demand indicators, as forecast by the FAA.

TABLE 2A | FAA General Aviation Forecast

Demand Indicator	2024	2044	CAGR
General Aviation Fleet			
Total Fixed-Wing Piston	136,485	130,790	-0.2%
Total Fixed-Wing Turbine	27,905	41,580	2.0%
Total Helicopters	10,090	14,025	1.7%
Total Other (experimental, light sport, etc.)	35,625	42,580	0.9%
Total GA Fleet	**210,105**	**228,975**	**0.4%**
General Aviation Operations			
Local	15,900,404	17,570,920	0.5%
Itinerant	15,125,333	16,568,634	0.5%
Total General Aviation Operations	**31,025,737**	**34,139,554**	**0.5%**
CAGR = compound annual growth rate (2024-2044)			

Source: FAA Aerospace Forecast – FY 2024-2044

FAA forecasts of total operations are based on activity at control towers across the United States and are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 31.0 million in 2024 to 34.1 million in 2044, with an average increase of 0.5 percent per year as growth in turbine, rotorcraft, and experimental hours offsets a decline in fixed-wing piston hours. This includes annual growth rates of 0.5 percent for both local and itinerant general aviation operations.

BUSINESS JET OPERATIONAL TRENDS

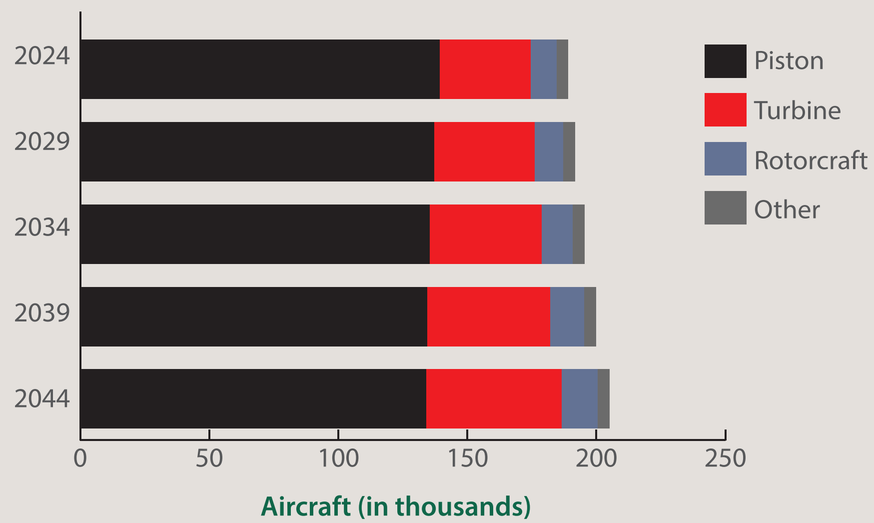
General aviation airports are often hubs of diverse activity, though they frequently experience a predominance of piston-powered aircraft. These aircraft, including single-engine and light twin-engine aircraft, comprise most of the based aircraft and operations at general aviation airports. Their routine activities include everything from local flights and flight training to recreational flying and short-haul travel. Piston-powered aircraft are generally more numerous and engage in more frequent, shorter operations, which contributes to a busy and vibrant atmosphere at general aviation airports.

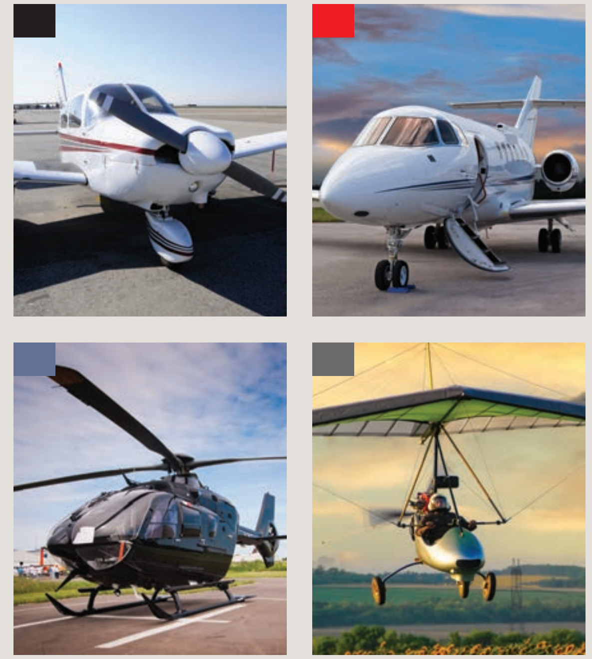
In contrast, business jets are less numerous and conduct fewer operations overall but are physically demanding in a different way. Business jets require more space for their operations due to their larger size and need for longer runways. Their arrival and departure can place greater demands on airport infrastructure, such as requiring more intensive ground handling, fueling, and maintenance services. The operational impact of business jets requires increased coordination with ground support services and infrastructure support (larger hangars, apron/taxilanes, fuel loads), making their presence felt more prominently, even if they operate less frequently than their piston-powered counterparts. At general aviation airports with higher amounts of jet traffic, such as ERV, business jets drive the critical aircraft discussion. For this reason, additional focus is placed on national business jet trends to help understand growth patterns and how they might impact future operations at ERV.

Since the early 2000s, business jet operational trends have evolved significantly, driven by advancements in technology, changing economic conditions, and shifts in travel preferences. Progress in aircraft technology has led to the development of business jets with greater range and performance capabilities. Newer models can cover longer distances non-stop, reducing the need for intermediate stops. Ultra-long-range business jets, such as the Gulfstream G700/G800, Bombardier Global 7500, and Boeing Business Jet (BBJ), have ranges over 7,000 nautical miles (nm) and are experiencing growing demand from corporations and high-net-worth individuals who seek more flexibility and range (traveling longer distances). Fuel efficiency improvements and operating cost reductions are focal points; modern business jets are designed with more efficient engines and aerodynamic enhancements that lower fuel consumption and operational expenses. Some of the most fuel-efficient business jet models include the Embraer Phenom 300, Pilatus PC-24, Cessna Citation XLS, and Learjet 75.

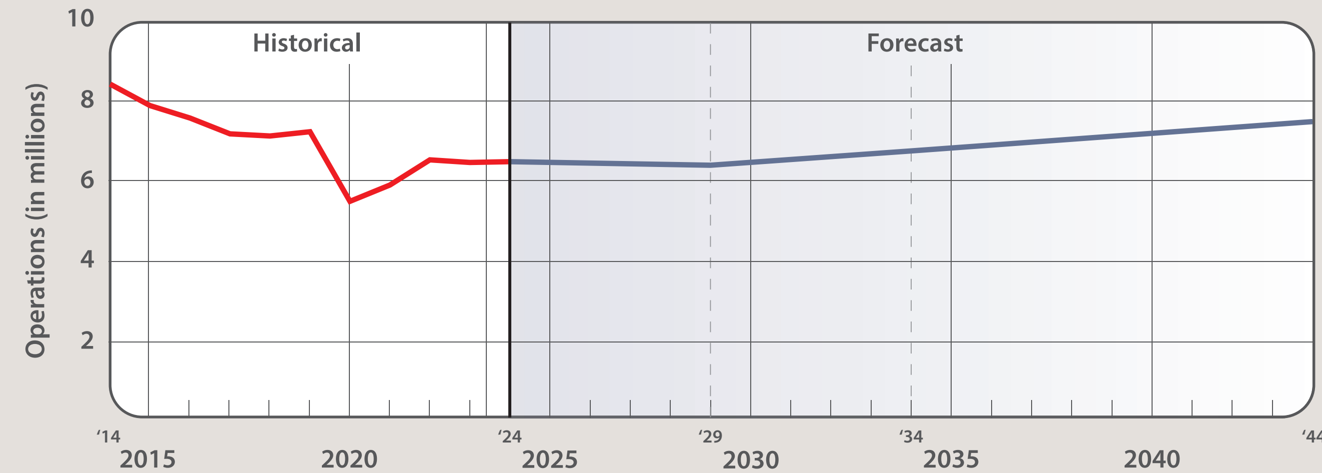
The FAA's Traffic Flow Management System Counts (TFMSC) database captures an operation when a pilot files a flight plan and/or when a flight is detected by the National Airspace System, usually via radar. As shown in **Table 2B**, the top 15 business jets with the most operations in 2023 are led by two of the most efficient business jets, the Embraer Phenom 300 and the Cessna Citation Excel/XLS. Of the top 15 business jets, 10 have experienced declining growth rates over the past five years, reflecting a shift in operations to newer models.

U.S. Active General Aviation Aircraft

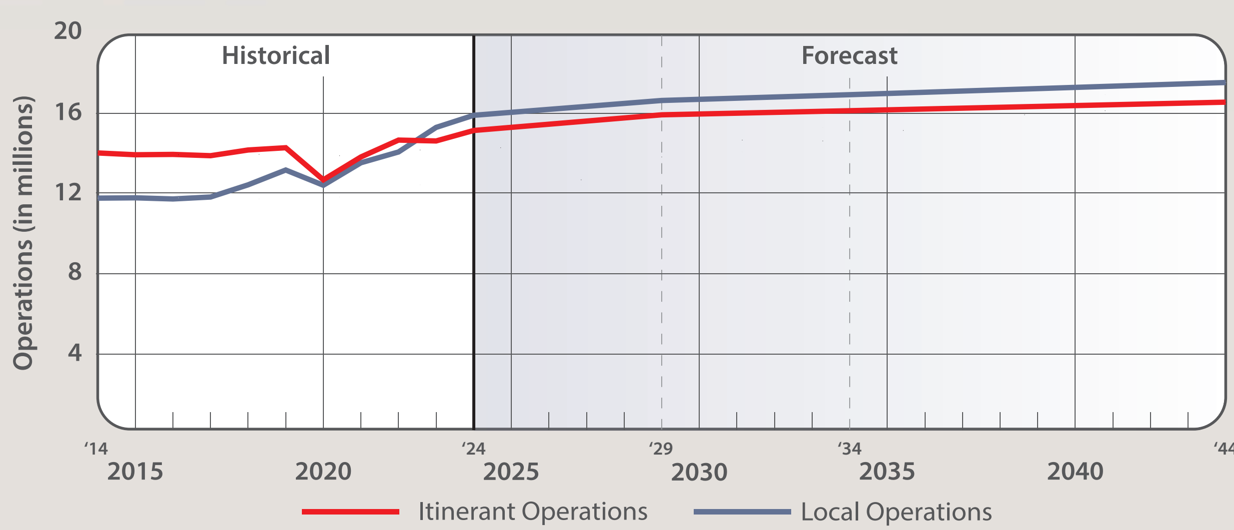




U.S. Air Taxi Operations

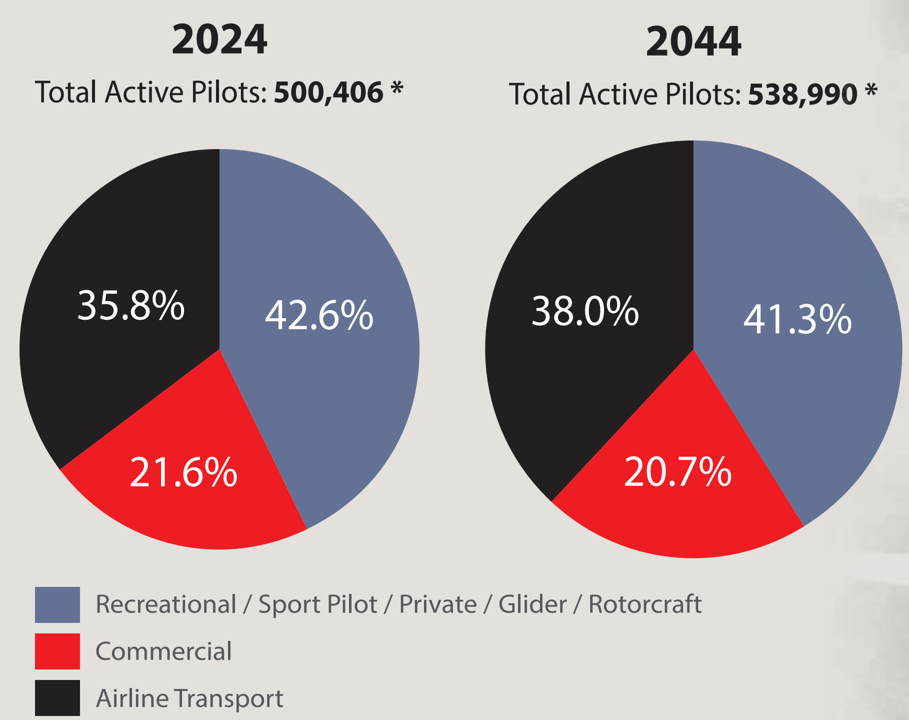


U.S. General Aviation Operations



Source: FAA Aerospace Forecasts – Fiscal Years 2024-2044 (April 2024)

Active Pilots By Certificate



Excludes Student Pilot Certificates

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TABLE 2B | 2023 Top 15 Busiest Business Jets by Operations

Aircraft Type	OPERATIONS						2018-2023 CAGR
	2018	2019	2020	2021	2022	2023	
E55P - Embraer Phenom 300	221,701	247,960	213,923	335,646	354,249	364,473	10.5%
C56X - Cessna Excel/XLS	355,740	340,406	242,977	357,612	380,367	348,189	-0.4%
C68A - Cessna Citation Latitude	97,497	150,649	133,150	229,559	252,954	280,900	23.6%
CL35 - Bombardier Challenger 350	123,317	143,688	140,716	217,882	235,031	247,682	15.0%
C25B - Cessna Citation CJ3	130,723	146,270	125,983	179,269	193,852	205,414	9.5%
BE40 - Raytheon/Beech Beechjet 400/T-1	250,126	239,224	209,219	244,373	234,904	200,351	-4.3%
H25B - BAe HS 125/700-800/Hawker 800	217,294	205,703	158,778	240,801	229,572	199,945	-1.7%
C560 - Cessna Citation V/Ultra/Encore	216,556	208,845	170,545	228,409	219,329	197,453	-1.8%
CL60 - Bombardier Challenger 600/601/604	194,437	185,781	131,174	193,995	202,902	191,198	-0.3%
GLF4 - Gulfstream IV/G400	181,856	177,559	133,027	202,549	196,146	175,076	-0.8%
CL30 - Bombardier (Canadair) Challenger 300	200,083	200,584	127,629	172,303	169,523	162,637	-4.1%
C525 - Cessna CitationJet/CJ1	165,117	156,999	124,413	166,026	166,923	152,938	-1.5%
F2TH - Dassault Falcon 2000	149,611	141,059	90,177	131,785	149,210	142,460	-1.0%
C680 - Cessna Citation Sovereign	150,583	148,348	101,731	151,397	158,480	137,455	-1.8%
GLF5 - Gulfstream V/G500	135,211	133,554	89,818	127,765	150,344	136,674	0.2%
CAGR = compound annual growth rate							

Source: FAA TFMSC

Table 2C lists the business jets with the fastest operational growth rates over the past five years. These aircraft represent newer models, such as the Cessna Citation Longitude and Latitude (newest Cessna models), the Gulfstream G500 and Bombardier Global 7500 (ultra-long-range aircraft), and the Cirrus Vision SF50 (Vision Jet) and HondaJet (light business jets).

TABLE 2C | Top 15 Fastest Operational Growth Business Jets

Aircraft Type	OPERATIONS						2018-2023 CAGR
	2018	2019	2020	2021	2022	2023	
C700 - Cessna Citation Longitude	2,332	2,204	8,484	29,044	51,928	69,941	97.4%
GA5C - G-7 Gulfstream G500	1,510	5,080	6,464	13,900	17,868	26,823	77.8%
GL7T - Bombardier Global 7500	1,166	1,356	3,351	8,808	15,338	20,687	77.7%
SF50 - Cirrus Vision SF50	13,460	25,240	36,700	62,547	82,853	98,641	48.9%
HDJT - Honda HA-420 HondaJet	17,228	24,899	27,295	48,402	67,416	61,344	28.9%
E545 - Embraer EMB-545 Legacy 450	28,530	39,244	39,788	62,344	71,203	82,852	23.8%
C68A - Cessna Citation Latitude	97,497	150,649	133,150	229,559	252,954	280,900	23.6%
C25M - Cessna Citation M2	18,586	25,696	25,778	38,670	49,915	52,380	23.0%
FA8X - Dassault Falcon 8X	2,906	3,572	2,503	4,146	7,052	7,028	19.3%
E550 - Embraer Legacy 500	19,573	26,790	20,039	30,973	36,636	42,614	16.8%
CL35 - Bombardier Challenger 350	123,317	143,688	140,716	217,882	235,031	247,682	15.0%
GLF6 - Gulfstream G650	43,657	52,603	37,724	55,534	73,457	79,797	12.8%
E55P - Embraer Phenom 300	221,701	247,960	213,923	335,646	354,249	364,473	10.5%
G280 - Gulfstream G280	49,906	64,222	42,360	66,010	79,495	79,726	9.8%
C25B - Cessna Citation CJ3	130,723	146,270	125,983	179,269	193,852	205,414	9.5%
CAGR = compound annual growth rate							

Source: FAA TFMSC

Table 2D provides a five-year breakdown of business jet operations by aircraft reference code (ARC). These data show that the B-II and C-II categories account for over 66 percent of total business jet operations in 2023. The highest growth categories are the A-I (small/efficient jet) and B-III (ultra-long-range jet) categories.

The A-I category has grown at a compound annual growth rate (CAGR) of 48.9 percent and is represented by a single aircraft, the Cirrus Vision SF50. The B-III category has a CAGR of 21.0 percent and is primarily comprised of the Dassault Falcon F7X and 8X and the Bombardier Global 7500.

TABLE 2D | National Business Jet Operations by ARC

Aircraft Reference Code (ARC) / Example Aircraft	OPERATIONS						2018-2023 CAGR
	2018	2019	2020	2021	2022	2023	
A-I / Cirrus Vision SF50	13,460	25,240	36,700	62,547	82,853	98,641	48.9%
B-I / Beechjet 400	783,248	751,782	619,231	788,859	805,071	719,046	-1.7%
C-I / Learjet 45	398,732	368,053	292,293	397,439	385,763	335,301	-3.4%
B-II / Phenom 300	1,598,020	1,653,404	1,298,810	1,926,275	2,018,435	1,970,766	4.3%
C-II / Challenger 300	1,439,252	1,429,196	1,054,897	1,560,040	1,634,500	1,554,406	1.6%
D-II / Gulfstream G400	181,856	177,559	133,027	202,549	196,146	175,076	-0.8%
B-III / Falcon F7X	37,790	46,527	39,367	64,736	87,139	97,955	21.0%
C-III / Global Express	161,970	178,013	128,218	195,516	234,013	249,602	9.0%
D-III / Gulfstream G500	135,211	133,554	89,818	127,765	150,344	136,674	0.2%
CAGR = compound annual growth rate							

Source: FAA TFMSC

RISKS TO THE FORECAST

While the FAA is confident that its forecasts for aviation demand and activity can be reached, these forecasts are dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic introduced a new risk, and although the industry has rebounded, the threat of future global health emergencies and potential economic fallout remains.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation. The service area is primarily defined by evaluating the locations of competing airports and their capabilities, services, and relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. ERV is classified in the *National Plan of Integrated Airport Systems* (NPIAS) as a general aviation national airport, meaning that its main purpose is to serve general aviation operators, including high levels of jet and multiengine propeller aircraft, within the broader regional area.

The service area for an airport is a geographic region from which an airport can be expected to attract the largest share of its activity. The definition of the service area can then be used to identify other factors, such as socioeconomic and demographic trends, that influence aviation demand at an airport. Aviation demand will also be impacted by the proximity and strength of aviation services offered at competing airports, as well as the local and regional surface transportation network.

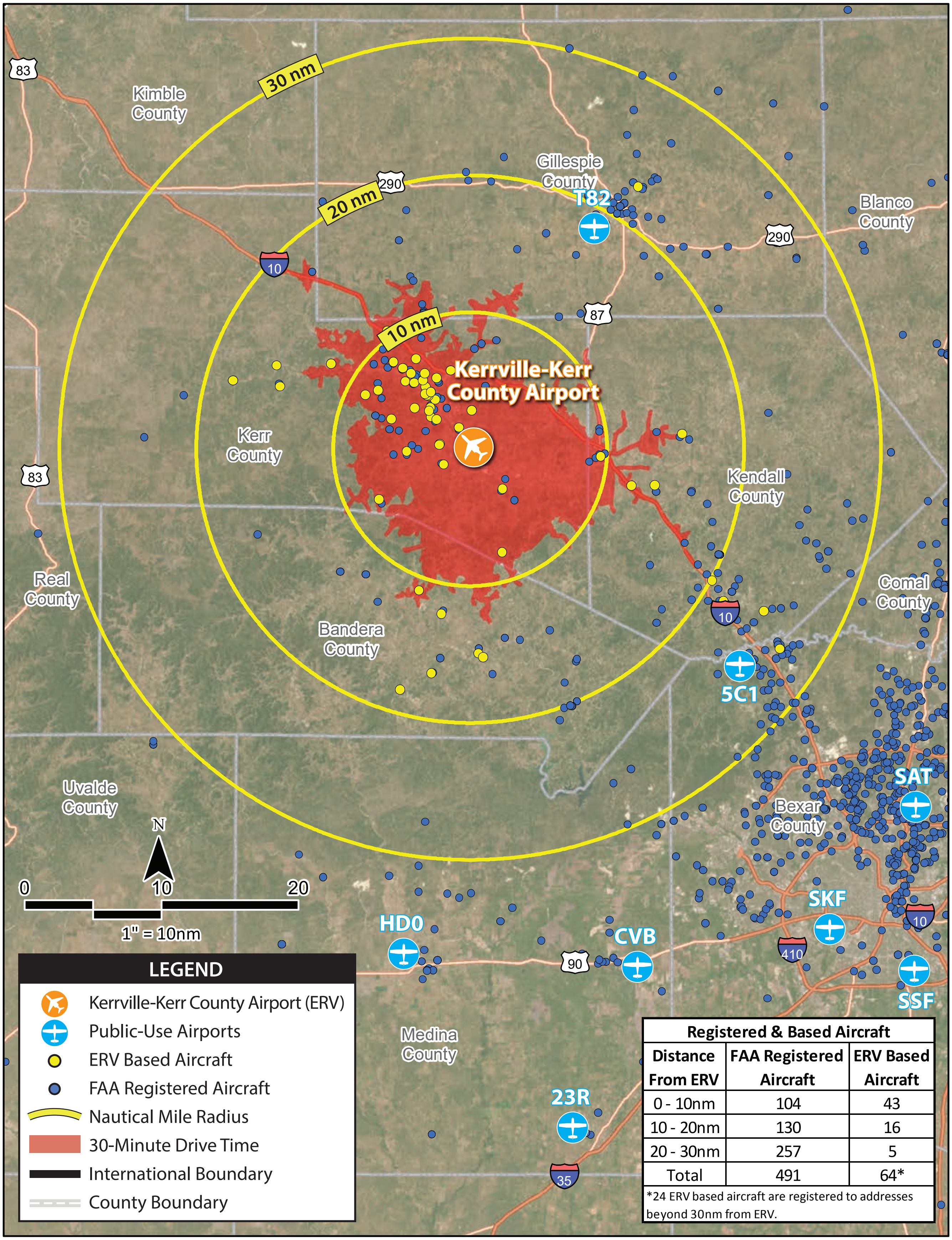
As in any business enterprise, the more attractive the facility is in terms of services and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of its service area. If facilities and services are adequate and/or competitive, some level of aviation activity might be attracted to an airport from more distant locales.

As a rule, a general aviation airport's service area can extend for approximately 30 nautical miles (nm). There are only two public-use airports with at least one paved runway within a 30-nm radius of ERV: Gillespie County Airport (T82) and Boerne Stage Airfield (5C1). Gillespie County Airport is included in the NPIAS as a general aviation regional airport and Boerne Stage Airfield is a non-NPIAS (private but open to public use) airport. Both airports have shorter primary runways, at just over 5,000 feet, and only Gillespie County Airport has published instrument approaches available with 1-mile minimums, which matches the minimums available at ERV.

When evaluating the GA service area, two primary demand segments must be considered: based aircraft and itinerant operations. An airport's ability to attract based aircraft is an important factor when defining the service area, as proximity is a consideration for most aircraft owners. Aircraft owners typically choose to base at airports that are close to their homes or businesses. **Exhibit 2B** depicts a radius of 10, 20, and 30 nautical miles from ERV extending beyond Kerr County and into several neighboring counties. The 30-minute drive time from ERV also shows that the reach from the airport extends into Kendall and Bandera Counties and the southern portion of Gillespie County. Registered aircraft in the region and aircraft based at ERV are also shown on the exhibit, with large clusters of registered aircraft located around the City of Kerrville, near Fredericksburg, and near the San Antonio metropolitan area. Registered aircraft within the service area can provide a correlation to based aircraft levels; however, it is not uncommon for some aircraft to be registered in a particular county but be based at an airport outside the county, or vice versa. In total, there are 491 registered aircraft within a 30-nm radius of ERV (which extends into 11 regional counties) and over 20 percent of those are within 10 nm of ERV. The airport has an FAA-validated based aircraft count of 88 aircraft, almost 72 percent of which are attributed to addresses within 30 nm of the airport. This map indicates that ERV's based aircraft service area primarily consists of Kerr County but also includes Bandera County and Kendall County. Registered aircraft in Gillespie County are more likely to choose Gillespie County Airport due to its convenience, and aircraft owners closer to San Antonio have several public-use airports that would be more convenient.

The second demand segment to consider is itinerant operations. These operations are performed by aircraft that arrive from outside the airport area and land at ERV or depart from ERV to fly to other airports. In most cases, pilots will use airports nearer their intended destinations; however, this is dependent on the airport's ability to accommodate aircraft operators in terms of the facilities and services available. As a result, airports with better facilities and services are more likely to attract a larger portion of the region's itinerant operations.

When compared to other public-use airports in the region, ERV offers a typical array of general aviation services and amenities, including fueling services, aircraft maintenance and repairs, ground handling, passenger and crew services, flight planning and support, aircraft storage and tiedowns, and administrative support. From a location standpoint, ERV is a convenient option for travelers to the Texas Hill Country. Because it boasts the longest runway in the region, ERV attracts significant itinerant traffic, including a variety of business jets.



Registered & Based Aircraft

Distance From ERV	FAA Registered Aircraft	ERV Based Aircraft
0 - 10nm	104	43
10 - 20nm	130	16
20 - 30nm	257	5
Total	491	64*

*24 ERV based aircraft are registered to addresses beyond 30nm from ERV.

Based on this discussion, ERV's primary service area for the purposes of this study includes Kerr, Kendall, and Bandera Counties. As of 2024, the three-county primary service area contains 341 registered aircraft.

SERVICE AREA SOCIOECONOMICS

The socioeconomic characteristics of an airport's service area can provide valuable information from which an understanding of the dynamics of growth near that airport can be derived. This information is crucial in determining aviation demand level requirements, as most aviation demand is directly related to the socioeconomic conditions of the surrounding region. Statistical analysis of population, employment, income, and gross regional product (GRP) trends outline the economic strength of a region and can help determine the ability of the area to sustain a strong economy in the future. Socioeconomic data utilized in the development of new based aircraft and operations forecasts for ERV include historical and projected population, employment, per capita personal income (PCPI), and GRP data from Woods & Poole Economics, Inc. 10 years of historical data and projections through 2044 for the service area are summarized in **Table 2E**.

TABLE 2E | Socioeconomic Information

	POPULATION				EMPLOYMENT			
	Kerr County	Bandera County	Kendall County	Total Service Area	Kerr County	Bandera County	Kendall County	Total Service Area
Historical								
2014	50,207	19,663	37,014	106,884	30,612	7,963	27,618	66,193
2015	50,806	19,793	38,242	108,841	30,876	7,947	29,132	67,955
2016	51,353	20,044	39,777	111,174	31,233	8,061	29,344	68,638
2017	51,757	20,332	41,280	113,369	31,390	8,375	29,873	69,638
2018	52,210	20,553	42,461	115,224	32,015	8,652	30,487	71,154
2019	52,273	20,613	43,790	116,676	31,878	8,667	31,570	72,115
2020	52,693	20,998	44,539	118,230	31,572	8,838	31,872	72,282
2021	53,175	21,528	46,861	121,564	32,534	9,275	34,113	75,922
2022	53,784	22,120	49,019	124,923	33,890	9,806	36,657	80,353
2023	53,915	22,637	50,537	127,089	34,357	9,908	37,481	81,746
2024	54,288	22,739	51,350	128,377	34,790	9,999	38,333	83,122
Forecast								
2029	56,191	23,261	55,684	135,136	36,881	10,435	43,050	90,366
2034	58,163	23,807	60,490	142,460	39,011	10,870	48,399	98,280
2044	62,323	24,975	71,710	159,008	43,658	11,777	60,806	116,241
CAGRs								
2014-2024	0.8%	1.5%	3.3%	1.8%	1.3%	2.3%	3.3%	2.3%
2024-2044	0.7%	0.5%	1.7%	1.1%	1.1%	0.8%	2.3%	1.7%

(Continues)

TABLE 2E | Socioeconomic Information (continued)

	INCOME (2017 DOLLARS)				GRP (MILLIONS OF 2017 DOLLARS)			
	Kerr County	Bandera County	Kendall County	Service Area Avg.	Kerr County	Bandera County	Kendall County	Total Service Area
Historical								
2014	$48,043	$45,807	$81,736	$58,529	$1,773	$368	$1,610	$3,751
2015	$47,899	$46,213	$84,577	$59,563	$1,875	$382	$1,768	$4,025
2016	$47,001	$46,379	$87,042	$60,141	$1,851	$381	$1,895	$4,126
2017	$49,473	$47,094	$88,123	$61,563	$1,916	$374	$2,002	$4,293
2018	$50,148	$48,736	$85,322	$61,402	$2,048	$391	$2,141	$4,580
2019	$51,726	$51,394	$87,243	$63,454	$2,166	$419	$2,246	$4,831
2020	$55,723	$52,728	$97,668	$68,706	$2,212	$440	$2,168	$4,820
2021	$57,598	$53,760	$93,608	$68,322	$2,303	$443	$2,316	$5,062
2022	$55,278	$51,067	$91,697	$66,014	$2,357	$453	$2,425	$5,235
2023	$57,618	$51,732	$89,537	$66,296	$2,395	$459	$2,488	$5,343
2024	$58,677	$52,588	$91,345	$67,537	$2,431	$465	$2,553	$5,449
Forecast								
2029	$64,111	$56,997	$100,809	$73,972	$2,602	$491	$2,916	$6,008
2034	$69,908	$61,650	$110,929	$80,829	$2,776	$516	$3,330	$6,622
2044	$82,623	$71,744	$132,546	$95,638	$3,153	$570	$4,304	$8,027
CAGRs								
2014-2024	2.0%	1.4%	1.1%	1.4%	3.2%	2.4%	4.7%	3.8%
2024-2044	1.7%	1.6%	1.9%	1.8%	1.3%	1.0%	2.6%	2.0%
CAGR = compound annual growth rate								

Source: Woods & Poole Economics, Inc., 2024

FORECASTING APPROACH

The development of aviation forecasts involves both analytical processes and expert judgment. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth; however, the judgment of the forecast analyst, which is based on professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trendline/time-series projections, correlation/regression analysis, and market share analysis. The forecast analyst may elect not to use certain techniques, based on the accuracy of the forecasts produced using other methods.

Trendline/time-series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical data and then extending them into the future, a basic trendline projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in the same manner as in the past. As broad as this assumption may be, the trendline projection serves as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of the direct relationship between two separate sets of historical data. If there is a reasonable correlation between the data sets, further evaluation using regression analysis may be employed. Regression analysis measures statistical relationships between dependent and independent variables, thereby yielding a correlation coefficient. The correlation coefficient (Pearson's r) measures association between the changes in the dependent variable and the independent variable(s). If the r^2 value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value less than 0.95 may be used, but with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of the airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined, providing an expected market share for the future. These shares are then multiplied by the forecasts for the larger geographical area to produce a market share projection. This method has the same limitations as trendline projections but can be used to check the validity of other forecasting techniques.

Forecasts age, and the farther a forecast is from the base year, the less reliable it may become, particularly due to changing local and national conditions; nevertheless, the FAA requires that a 20-year forecast be developed for long-range airport planning to assess and preserve options for future facility needs. Facility and financial planning usually require at least a 10-year view because it often takes more than five years to complete a major facility development program; however, it is important to use forecasts that do not overestimate revenue-generating capabilities or understate the demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy has had a direct impact on the level of aviation activity. Recessionary periods have been closely followed by declines in aviation activity; nevertheless, trends emerge over time and provide the basis for airport planning.

Future facility requirements, such as hangar, apron, and terminal needs, are derived from projections of various aviation demand indicators. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, as well as analyzing the most current aviation trends, forecasts are presented for the following aviation demand indicators:

- Based aircraft
- Based aircraft fleet mix
- General aviation operations
- Air taxi and military operations
- Operational peaks

PREVIOUS FORECASTS

Consideration is given to any recently completed forecasts of aviation demand for the airport. For ERV, the recently prepared forecasts reviewed are those in the FAA *Terminal Area Forecast* (TAF), prepared in January 2024, and the most recent airport master plan, which was completed in 2013.

On an annual basis, the FAA publishes the TAF for each airport included in the NPIAS. The TAF is a generalized forecast of airport activity that is used by the FAA primarily for internal planning purposes. It is available to airports and consultants to use as a baseline projection and is an important point of comparison when developing local forecasts.

The 2013 *Kerrville/Kerr County Airport–Louis Schreiner Field Airport Master Plan* is now 11 years old and was prepared prior to the COVID-19 pandemic. Since that time, methodologies for counting based aircraft and tracking operations have changed; while the baseline figures may be different, it is still valuable to consider previous master plan considerations and growth rates. **Table 2F** presents the 2024 TAF and 2013 master plan projections compared to actual data for ERV.

TABLE 2F | Previous Forecasts

Year	BASED AIRCRAFT		TOTAL OPERATIONS	
	FAA TAF	ERV MP 2013	FAA TAF	ERV MP 2013
2009	168	166	59,800	60,600
2010	166	169	59,800	62,582
2011	148	173	59,800	64,629
2012	149	176	59,800	66,744
2013	149	180	59,800	68,927
2014	140	183	59,800	71,182
2015	136	187	59,800	73,510
2016	137	191	59,800	75,917
2017	127	194	52,136	78,403
2018	127	198	52,136	80,970
2019	89	202	52,136	83,622
2020	87	206	52,136	86,360
2021	86	210	52,136	89,189
2022	78	215	53,351	92,110
2023	83	219	53,351	95,127
2024	85	223	54,597	98,242
2025	87	228	55,871	101,460
2026	89	233	57,173	104,790
2027	91	237	58,506	108,230
2028	93	242	59,869	111,782
2029	95	247	61,264	115,451
2030	98	252	62,693	119,240
2031	100	257	64,156	123,154
2032	102	262	65,652	127,196
2033	104	268	67,184	131,371
2034	106	273	68,751	135,682
2035	109	279	70,354	140,136
2036	112	284	71,995	144,735
2037	115	290	73,674	149,486
2038	118	296	75,392	154,392
2039	121	302	77,151	159,460
2040	124	308	78,951	164,693
2041	127	314	80,792	170,099
2042	130	320	82,675	175,682
2043	133	327	84,604	181,448
2044	136	334	86,577	187,404
2024-2044 CAGR	**2.4%**	**2.0%**	**2.3%**	**3.3%**

The 2013 master plan utilized a base year of 2009 with projections for 2015, 2020, 2025, and 2030. All other years included in the table have been interpolated or extrapolated.

Sources: FAA TAF, January 2024; Kerrville/Kerr County Airport–Louis Schreiner Field Airport Master Plan (ERV MP), 2013

BASED AIRCRAFT AND OPERATIONS FORECASTS

The number of based aircraft and operations are the most basic indicators of aviation demand. By first developing a forecast of based aircraft for the airport, other demand indicators can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations. An initial forecast of registered aircraft is developed and is used as one data point to arrive at a based aircraft forecast for the airport. To determine the types and sizes of facilities that should be planned to accommodate activity at ERV, certain elements must be forecasted. These indicators of demand include based aircraft, aircraft fleet mix, and annual operations.

BASED AIRCRAFT FORECAST

Forecasts of based aircraft may directly influence needed facilities and applicable design standards. The needed facilities may include hangars, aprons, taxilanes, etc. The applicable design standards may include separation distances and object clearing surfaces. The sizes and types of based aircraft are also an important consideration; the addition of numerous small aircraft may have no effect on design standards, while the addition of a few larger business jets can have a substantial impact on applicable design standards.

Because of the numerous variables known to influence aviation demand, several separate forecasts of based aircraft are developed. Each forecast is then examined for practicality and any outliers are discarded or given less weight. Collectively, the remaining forecasts will create a planning envelope. A single planning forecast is then selected for use in developing facility needs for the airport. The selected forecast of based aircraft can be one of the forecasts developed, based on the experience and judgment of the forecaster, or it can be a blend of the forecasts.

Based Aircraft Inventory

Documentation of the historical number of based aircraft at the airport has been somewhat intermittent. The FAA did not require airports to report based aircraft numbers until recently, with the establishment of a based aircraft inventory in which it is possible to cross-reference based aircraft claimed by one airport with other airports. The FAA now utilizes this inventory as a baseline for determining how many and what type(s) of aircraft are based at any individual airport. Based aircraft levels factor into the formulation of asset classifications within the NPIAS and apply only to airports included in the NPIAS. This database evolves daily as aircraft are added or removed. It is the responsibility of the sponsor (owner) of each airport to input based aircraft information into the FAA database (www.basedaircraft.com).

Airport staff have undertaken and submitted a comprehensive physical count to the FAA for validation. The most recent validation of based aircraft at ERV identified 88 validated based aircraft. Of the validated based aircraft, there are 59 single-engine piston aircraft, two multi-engine piston aircraft, four turboprop aircraft, 18 business jets, and five helicopters.

REGISTERED AIRCRAFT FORECASTS

Aircraft ownership trends for the primary service area (Kerr, Bandera, and Kendall Counties) typically dictate based aircraft trends for an airport. As such, a forecast of registered aircraft for the primary service area has been developed for use as an input to the subsequent based aircraft forecast.

Table 2G presents the historical registered aircraft for the service area counties over the past 10 years. These figures are derived from the FAA aircraft registration database, which categorizes aircraft registrations by county based on the zip codes of aircraft owners. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in the county but be based at an airport outside the county, or vice versa.

TABLE 2G | Historical Registered Aircraft – Kerr, Bandera, and Kendall Counties

Year	Kerr County	Bandera County	Kendall County	Total Service Area Registrations
2014	126	68	152	346
2015	131	66	149	346
2016	124	62	152	338
2017	116	58	155	329
2018	110	54	153	317
2019	95	51	159	305
2020	106	48	166	320
2021	104	47	169	320
2022	108	49	163	320
2023	120	49	165	334
2024	122	47	172	341
10-Year CAGR	**-0.3%**	**-3.6%**	**1.2%**	**-0.1%**
5-Year CAGR	**5.1%**	**-1.6%**	**1.6%**	**2.3%**

Source: FAA Aircraft Registration Database

The registered aircraft in the service area show a varying trend over the last several years, with registrations declining from 2014 to 2019 then steadily growing over the past five years. Registrations in 2024 are now at the highest level since 2015 and show a strong 2.3 percent CAGR trend.

Although there are no recently prepared forecasts for the service area counties regarding registered aircraft, one was prepared for this study using market share, ratio, and historical growth rate projection methods. Several regression forecasts were also considered, which examined the correlation of registered aircraft (dependent variable) with the service area population, employment, income, and GRP. **Table 2H** details the results of this analysis.

TABLE 2H | Regression Analysis

Independent Variable	r^2
Time-Series	0.102
Population	0.076
Employment	0.022
Income	0.168
Gross Regional Product	0.169

Source: Coffman Associates analysis

None of the regressions produced a correlation over 0.20; this is well below 0.90, which is the threshold that indicates a reliable predictive value. Because of the low predictive value of the regressions, they have been excluded from consideration.

Trendline/Historical Growth Rate Projection

Utilizing the last 10 years of registered aircraft data, a trendline projection was prepared, which predicted 297 registered aircraft by 2044 (-0.7% CAGR). A five-year trend was also prepared, which reflected the more recent trend of registered aircraft growth. The five-year trendline projection resulted in 466 registered aircraft by 2044 (1.6% CAGR). Over the last five years, the number of registered aircraft in the service area has had a CAGR of 2.3 percent. By applying this CAGR to the current number of registered aircraft, a forecast emerges that results in 533 registered aircraft by 2044.

Market Share of Texas Based Aircraft

Market share projections consider the ratio of service area registered aircraft to the total number of based aircraft in the State of Texas, both historically and forecasted by the FAA. A market share projection was prepared due to the expected growth in based aircraft numbers at the state level, as opposed to the general declining historical trend of national registrations. The service area count of 341 registered aircraft in 2024 represents approximately 2.58 percent of all based aircraft in Texas. If the service area maintained this market share, it would result in 422 aircraft by 2044 (1.1% CAGR). An additional growth forecast was prepared based on an increasing market share scenario in which the service area returns to a 10-year high of 2.92 percent market share. This results in a total service area aircraft count of 477 by 2044 (1.7% CAGR). **Table 2J** shows the market share of the service area compared to Texas totals.

TABLE 2J | Registered Aircraft Projections – Market Share of Texas Based Aircraft

Year	Registered Aircraft	Texas Based Aircraft	Service Area Market Share %
2014	346	12,279	2.82%
2015	346	11,865	2.92%
2016	338	13,065	2.59%
2017	329	12,416	2.65%
2018	317	12,920	2.45%
2019	305	11,968	2.55%
2020	320	11,600	2.76%
2021	320	11,977	2.67%
2022	320	12,937	2.47%
2023	334	13,080	2.55%
2024	341	13,208	2.58%
2019-2024 CAGR	**2.3%**	**2.0%**	–
2014-2024 CAGR	**-0.1%**	**0.7%**	–
Constant Market Share			
2029	359	13,902	2.58%
2034	378	14,648	2.58%
2044	422	16,353	2.58%
2024-2044 CAGR	**1.1%**	**1.1%**	–
Increasing Market Share			
2029	371	13,902	2.67%
2034	403	14,648	2.75%
2044	477	16,353	2.92%
2024-2044 CAGR	**1.7%**	**1.1%**	–

Sources: Texas TAF, January 2024; Coffman Associates analysis

Ratio of Registered Aircraft to Population

The number of registered aircraft in an area often fluctuates based on population trends. As of 2024, the service area has 2.7 registered aircraft per 1,000 residents. Over the past five years, this ratio has remained fairly static, averaging 2.6 registered aircraft per 1,000 residents. Two projections have been prepared: one based on maintaining the current ratio over the forecast period, and another projecting an increasing ratio that returns to the 10-year historical high of 3.2. Maintaining the current ratio (2.7) through 2044 results in 422 registered aircraft (1.1% CAGR, which matches the CAGR for the constant market share of Texas based aircraft). The increasing ratio projection results in 515 registered aircraft by 2044 (2.1% CAGR).

Registered Aircraft Forecast Summary

Table 2K summarizes the seven registered aircraft forecasts for the ERV primary service area. Overall, registrations show a growth trend since the COVID-19 pandemic, and there is no indication that this trend will shift. Service area socioeconomic data projections show growth, and the overall state market for aircraft is strong. This is reflected by the state CAGR of 1.1 percent, which is significantly higher than the 0.4 percent CAGR projected nationally for active general aviation aircraft. It is important for the forecast to be realistic, and it is likely that the service area's five-year growth rate will moderate over the next 20 years, accounting for unforeseen economic downturns and risks. For this reason, the increasing market share projection with a CAGR of 1.7 percent is viewed as the most realistic scenario. This forecast carries forward the historical growth trend at a more modest rate than the projection of an increase in aircraft per 1,000 people or the five-year growth rate. The increasing market share projection closely resembles the five-year trendline projection, which has a CAGR of 1.6 percent, giving it more historical validity. The selected registered aircraft forecast results in 371 registered aircraft in 2029, 403 in 2034, and 477 in 2044.

TABLE 2K | Registered Aircraft Forecast Summary

Projection	2029	2034	2044	CAGR 2024-2044
5-Year Trendline	371	402	466	1.6%
5-Year Growth Rate	381	426	533	2.3%
10-Year Trendline	316	309	297	-0.7%
Constant % of TX Based Aircraft	359	378	422	1.1%
Increasing % of TX Based Aircraft	**371**	**403**	**477**	**1.7%**
Constant Aircraft/1,000 Population	359	378	422	1.1%
Increasing Aircraft/1,000 Population	379	420	515	2.1%

Boldface indicates selected forecast.
CAGR = compound annual growth rate

Source: Coffman Associates analysis

Based Aircraft Market Share of Registered Aircraft Forecast

Utilizing the forecast of registered aircraft in ERV's primary service area, a market share forecast of based aircraft at ERV has been developed. In 2024, the 88 based aircraft at ERV represented 25.81 percent of the aircraft registered in the service area. By maintaining this market share as a constant through the planning years, a forecast emerges resulting in 123 based aircraft by 2044 (1.7% CAGR). An increasing market share projection, which assumes a return to the airport's maximum five-year market share of 30.49 percent, results in 145 based aircraft by 2044 (2.5% CAGR). **Table 2L** presents the two market share projections.

TABLE 2L | Based Aircraft Market Share of Registered Aircraft Forecast

Year	ERV Based Aircraft	Service Area Registered Aircraft	ERV Market Share %
2019	93	305	30.49%
2020	87	320	27.19%
2021	93	320	29.06%
2022	84	320	26.25%
2023	92	334	27.54%
2024	88	341	25.81%
CAGR	**-1.1%**	**2.3%**	–
Constant Market Share			
2029	96	371	25.81%
2034	104	403	25.81%
2044	123	477	25.81%
CAGR	**1.7%**	**1.7%**	–
Increasing Market Share			
2029	100	371	26.98%
2034	113	403	28.15%
2044	145	477	30.49%
CAGR	**2.5%**	**1.7%**	–
CAGR = compound annual growth rate			

Sources: basedaircraft.com; ERV records; Coffman Associates analysis

Growth Rate Projections

According to based aircraft records, ERV's count has fluctuated but declined slightly in the last five years, from 93 based aircraft in 2019 to 88 in 2024 (-0.9% CAGR). Assuming ERV maintains this growth rate over the course of the forecast period, the declining forecast yields a based aircraft count of 71 by 2044.

Given that registered aircraft within the state and service area are projected to grow over the planning period, a growth rate projection utilizing the state's 20-year CAGR of 1.1 percent has also been considered. When the 20-year CAGR is applied to ERV based aircraft, a forecast emerges that yields 109 based aircraft by 2044.

Socioeconomic Growth Projections

Based aircraft growth is often related to population and economic activity in the service area. For this reason, based aircraft projections tied to the projected service area CAGRs for population (1.1%), employment (1.7%), income (1.8%), and GRP (2.0%) were also prepared. Applying these CAGRs results in 109 based aircraft for population, 123 for employment, 125 for income, and 130 for GRP by 2044.

Regression Analysis

Several forecasts were prepared utilizing five years of historical based aircraft data and the regression model. Correlations were examined utilizing independent variables, including population, employment, income, and GRP, as well as a time-series regression. None of the regressions produced a strong correlation; the r^2 values produced were between 0.02 and 0.06. As described previously, correlation values over 0.90 indicate good predictive reliability. Because none of the regressions produced a correlation value over 0.90, the regression forecasts have been excluded from consideration.

Selected Based Aircraft Forecast

Selecting a based aircraft forecast ultimately falls on the judgment of the forecast analyst. The selected forecast should be reasonable and based on a sound methodology. The methodology presented in this analysis first examines the history of aircraft ownership in the service area (Kerr, Bander, and Kendall Counties). Utilizing the selected registered aircraft projection, a market share analysis was conducted based on maintaining a constant market share and an increasing market share over the forecast period. Additional projections considered the FAA TAF projection for based aircraft growth in the state, maintaining ERV's five-year growth rate, and growth rates based on key socioeconomic indicators (population, employment, income, and GRP). These seven projections are summarized in **Table 2M**.

TABLE 2M | Based Aircraft Forecast Summary

Projection	2024	2029	2034	2044	CAGR 2024-2044
ERV 2024 TAF	85	95	106	136	2.4%
Constant Market Share	88	96	104	123	1.7%
Increasing Market Share	**88**	**100**	**113**	**145**	**2.5%**
5-Year Growth Rate	88	83	79	71	-1.1%
State TAF Growth Rate	88	93	98	109	1.1%
Service Area Population Growth Rate	88	93	98	109	1.1%
Service Area Employment Growth Rate	88	96	104	123	1.7%
Service Area Income Growth Rate	88	96	105	125	1.8%
Service Area GRP Growth Rate	88	97	107	130	2.0%

Boldface indicates selected forecast.
CAGR = compound annual growth rate

Sources: FAA TAF; basedaircraft.com; Coffman Associates analysis

Future aircraft basing at the airport will depend on several factors, including the state of the economy, fuel costs, available facilities, competing airports, and hangar development potential. Forecasts assume a reasonably stable and growing economy, as well as reasonable development of airport facilities necessary to accommodate aviation demand. ERV will not experience significant based aircraft growth unless new hangar facilities are constructed. Competing airports will play a role in deciding demand; however, ERV should fare well in this competition, as ERV is served by a runway system capable of handling most general aviation aircraft and is experiencing additional demand for based aircraft hangars.

Consideration must also be given to the current and future aviation conditions at the airport. ERV provides an array of aviation services and will continue to be favored by aviation operators due to its location and accessibility to Texas Hill Country, as well as its available facilities. It is important to note that hangar developments to accommodate new based jets are in the planning stage and the airport maintains a hangar waiting list of 44 individuals, which further indicates existing demand potential; the waiting list includes one jet owner, and all but five individuals on the list already own and operate aircraft.

The potential for available hangar space is not the only factor in future based aircraft levels. Economic conditions within the service area are projected to increase at strong rates, which will support aviation and based aircraft growth. **The increasing market share projection has been selected as the preferred forecast.** The selected forecast, which results in 145 based aircraft by 2044, is reasonably optimistic and assumes ERV can continue to gain a market share of registered aircraft in the service area with expanded facilities. It also assumes continued economic growth in the local area will drive demand for more based aircraft.

Exhibit 2C presents the nine based aircraft forecasts that comprise the planning envelope.

BASED AIRCRAFT FLEET MIX FORECAST

It is important to understand the current and projected based aircraft fleet mix at an airport to ensure the planning of proper facilities. For example, the addition of one or several larger turboprop or business jet aircraft to the airfield could have a significant impact on the separation requirements and various obstacle clearing surfaces.

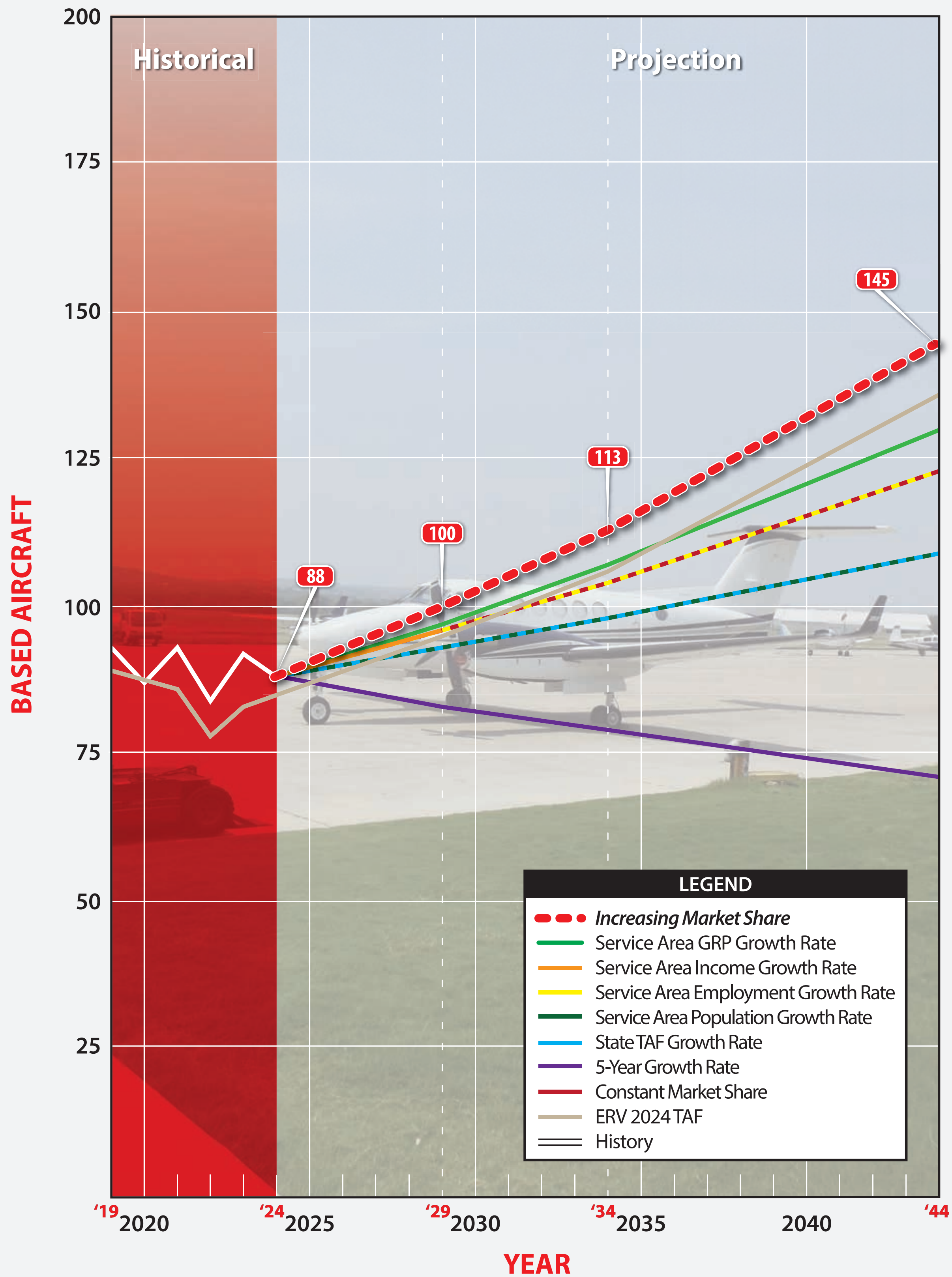
The current based aircraft fleet mix consists of 59 single-engine piston aircraft, two multi-engine piston aircraft, four turboprop aircraft, 18 jets, and five helicopters. As a general aviation airport with a significant level of both small aircraft and business jet activities, ERV should continue to have a diverse fleet mix, including small single-engine pistons, turbine-powered aircraft, and helicopters. The forecasted growth trends in the ERV based aircraft fleet mix take FAA projections of the national general aviation fleet mix into consideration. Growth is anticipated to occur within the more sophisticated categories, including the turboprop, jet, and helicopter categories, consistent with national aviation trends. **Table 2N** presents the forecasted fleet mix for based aircraft at ERV.

TABLE 2N | Based Aircraft Fleet Mix

Aircraft Type	2024	%	2029	%	2034	%	2044	%
SEP	59	67.0%	65	65.0%	72	63.7%	93	64.1%
MEP	2	2.3%	2	2.0%	2	1.8%	1	0.7%
Turboprop	4	4.5%	5	5.0%	6	5.3%	9	6.2%
Jet	18	20.5%	22	22.0%	25	22.1%	31	21.4%
Helicopter	5	5.7%	6	6.0%	7	6.2%	9	6.2%
Glider/Other	0	0.0%	0	0.0%	1	0.9%	2	1.4%
Total	**88**	**100%**	**100**	**100%**	**113**	**100%**	**145**	**100%**

SEP = single-engine piston
MEP = multi-engine piston

Sources: FAA Based Aircraft Registry; Coffman Associates analysis



Source: FAA TAF; basedaircraft.com; Coffman Associates analysis

OPERATIONS FORECASTS

Operations at ERV are classified as general aviation (GA), air taxi, or military. GA operations include a wide range of activities, from recreational use and flight training to business and corporate uses. Air taxi operations are those conducted by aircraft operating under Title 14 Code of Federal Regulations (CFR) Part 135, otherwise known as for-hire or on-demand activity. Military operations are those conducted by various branches of the U.S. military. Air carrier operations are an additional category of operations that are conducted by large aircraft with 60 or more passenger seats. Air carrier flights are very infrequent at ERV and are not included as part of the operations forecast.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of an airport or executes simulated approaches or touch-and-go operations at an airport. Local operations are generally characterized by training activity. Itinerant operations are those performed by aircraft with specific origins or destinations away from an airport. Typically, itinerant operations increase with business and commercial use because business aircraft are primarily used to transport passengers between locations.

Because ERV is not equipped with an airport traffic control tower (ATCT), precise historical operational (takeoff and landing) counts are not available; however, ERV has contracted with Virtower, an air traffic management system, to provide operational data collected by utilizing automatic dependent surveillance-broadcast (ADS-B) technology. Virtower began providing operational data to ERV in July 2023. Based on the most recent 12-month period ending July 2024, ERV's total baseline operation count is 44,874 operations. Among those 44,874 operations, 10,334 (approximately 23 percent) were touch-and-go (local) operations; therefore, itinerant operations comprise the majority (77 percent) of operations at ERV. The FAA TAF for ERV provides historical operational estimates for years prior to the utilization of Virtower; however, these are only estimates and are not supported by a data collection process. The FAA TAF estimates are included in **Table 2P** for informational purposes but should not be considered an accurate accounting of operations at ERV from 2019 through 2023.

For air taxi operations, the FAA's TFMSC database indicates that there were 1,164 total air taxi operations at ERV during the 12-month period ending July 2024. The TFMSC also reports that there were 62 total military operations at ERV over the same period. There are no data suggesting any of the military operations are local operations; therefore, it is assumed they were all itinerant. These data establish an operational baseline for the generation of forecasts. The FAA TAF reports no air carrier, air taxi, or military operations at ERV over this period. TFMSC data for the years 2019 to 2024 have been utilized to establish historical operations levels for military and air taxi operators at ERV.

It should be noted that the FAA's forecast of air taxi operations nationwide trends lower in the short term and returns to growth after 2028 due to ongoing changes to the scheduled airline aircraft fleet mix. Airlines are transitioning away from 50-seat regional jets, which are counted under the air taxi category, to larger jets with seating capacities of 60 seats or more, which are counted under the air carrier category. This airline fleet mix transition should have no impact on unscheduled ERV air taxi operations.

A summary of historical operations data for ERV is shown in **Table 2P**. Because the 2024 baseline data are supported by actual ADS-B data, this is considered an accurate account of airport operations, whereas 2019 through 2023 counts are estimated.

TABLE 2P | Historical Operations Data

Year	ITINERANT					LOCAL			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	
2019	0	748	40,000	43	40,791	12,136	0	12,136	52,927
2020	0	540	40,000	63	40,603	12,136	0	12,136	52,739
2021	0	780	40,000	46	40,826	12,136	0	12,136	52,962
2022	0	939	40,933	24	41,896	12,418	0	12,418	54,314
2023	0	1,128	40,933	32	42,093	12,418	0	12,418	54,511
2024*	0	1,164	33,314	62	34,540	10,334	0	10,334	44,874

*2024 data represent a 12-month period ending July 2024.
2019-2023 general aviation operations are estimates only and are not supported by a data collection process.
Sources: Virtower data, 2024; FAA TFMSC (air carrier, air taxi, and military operations); FAA TAF (GA operations), 2019-2023

Market Share Projections

Market share analysis compares known historical and forecast data points to arrive at a trend for the unknown variable (ERV operations). The first forecast compares the current market share of GA (itinerant and local) and air taxi operations at the airport to the FAA TAF for operations in Texas.

In 2024, ERV accounted for 1.38 percent of itinerant GA operations in Texas; 0.35 percent of Texas local GA operations; and 0.25 percent of Texas air taxi operations. By carrying these percentages forward through the planning horizon, a constant market share forecast emerges; **Table 2Q** shows the results. The constant market share is considered a low-range projection, as it is anticipated with based aircraft growth; each operational segment should experience growth beyond maintaining a constant share.

TABLE 2Q | Operations Market Share Projections

	GA ITINERANT			GA LOCAL			AIR TAXI		
Year	ERV	Texas	ERV Market %	ERV	Texas	ERV Market %	ERV	Texas	ERV Market %
2019	40,000 (est.)	2,219,465	1.80%	12,136 (est.)	2,603,526	0.47%	748	478,806	0.16%
2020	40,000 (est.)	2,117,858	1.89%	12,136 (est.)	2,571,668	0.47%	540	415,581	0.13%
2021	40,000 (est.)	2,173,905	1.84%	12,136 (est.)	2,572,044	0.47%	780	503,330	0.15%
2022	40,933 (est.)	2,338,821	1.75%	12,418 (est.)	2,710,202	0.46%	939	526,587	0.18%
2023	40,933 (est.)	2,390,236	1.71%	12,418 (est.)	2,861,285	0.43%	1,128	466,078	0.24%
2024*	33,314	2,421,991	1.38%	10,334	2,922,850	0.35%	1,164	457,101	0.25%
CAGR[1]	N/A	1.8%	–	N/A	2.3%	–	9.2%	-0.9%	–
Constant Market Share – Low Range									
2029	34,800	2,533,465	1.38%	10,780	3,050,406	0.35%	1,060	415,322	0.25%
2034	35,600	2,588,499	1.38%	11,040	3,123,590	0.35%	1,100	433,102	0.25%
2044	37,300	2,710,927	1.38%	11,620	3,286,859	0.35%	1,200	471,778	0.25%
CAGR[2]	0.57%	0.57%	–	0.59%	0.59%	–	0.15%	0.16%	–
Increasing Market Share – Mid Range									
2029	35,600	2,533,465	1.41%	11,100	3,050,406	0.37%	1,100	415,322	0.27%
2034	37,200	2,588,499	1.44%	11,800	3,123,590	0.38%	1,200	433,102	0.28%
2044	40,700	2,710,927	1.50%	13,100	3,286,859	0.40%	1,400	471,778	0.30%
CAGR[2]	1.01%	0.57%	–	1.19%	0.59%	–	0.93%	0.16%	–

(Continues)

TABLE 2Q | Operations Market Share Projections (continued)

	GA ITINERANT			GA LOCAL			AIR TAXI		
Year	**ERV**	**Texas**	**ERV Market %**	**ERV**	**Texas**	**ERV Market %**	**ERV**	**Texas**	**ERV Market %**
Increasing Market Share – High Range									
2029	**38,800**	2,533,465	1.53%	**11,900**	3,050,406	0.39%	**1,300**	415,322	0.32%
2034	**43,700**	2,588,499	1.69%	**13,300**	3,123,590	0.43%	**1,600**	433,102	0.38%
2044	**54,200**	2,710,927	2.00%	**16,400**	3,286,859	0.50%	**2,400**	471,778	0.50%
CAGR[2]	**2.46%**	0.57%	–	**2.34%**	0.59%	–	**3.68%**	0.16%	–
2024 FAA TAF – ERV									
2029	47,003	2,533,465	1.86%	14,261	3,050,406	0.47%	0	415,322	0.00%
2034	52,747	2,588,499	2.04%	16,004	3,123,590	0.51%	0	433,102	0.00%
2044	66,425	2,710,927	2.45%	20,152	3,286,859	0.61%	0	471,778	0.00%
CAGR[2]	3.51%	0.57%	–	3.40%	0.59%	–	–	0.16%	–

*2024 data represent a 12-month period ending July 2024.
Boldface indicates selected forecast.
CAGR = compound annual growth rate: [1]2019-2024; [2]2024-2044
N/A = not available

Sources: FAA TAF (Texas operations); Virtower data, 2024; FAA TFMSC (air taxi operations); FAA TAF (ERV GA operations), 2019-2023; Coffman Associates analysis

A mid-range increasing market share projection was prepared that increases ERV's market share of itinerant GA operations to 1.50 percent, reflecting growth to recent estimates of 40,500 annual operations. ERV's 2044 market share of local GA operations is taken to 0.40 percent, and the 2044 market share of air taxi operations is taken to 0.30 percent, both of which reflect marginal market share increases. The results of the mid-range projections are also shown in **Table 2Q**.

High-range increasing market share projections were also prepared, which consider the potential for operations to exceed the estimated market shares of the past five years. The resulting projections take ERV's 2044 market shares to 2.00 percent (itinerant GA), 0.50 percent (local GA), and 0.50 percent (air taxi). The results of the high-range projections are shown in **Table 2Q**.

The FAA's TAF projections for ERV are also shown for comparison to the market share projections. It should be noted that the TAF utilizes estimated operations counts as a baseline for 2024; these counts are 41,889 for itinerant GA operations and 12,708 for local operations. These estimates are 22.8 percent and 20.6 percent higher, respectively, than the actual Virtower counts. From a CAGR standpoint, the FAA TAF projects itinerant and local GA operations at ERV to grow at a 2.3 percent CAGR, which is similar to what is shown in the high-range market share forecast. The FAA TAF does not project any air taxi operations at ERV over the planning period; however, this contradicts the FAA's TFMSC data, which report air taxi operations occurring at ERV, as discussed previously.

Regression Analysis

Development of regressions requires reliable historical data so that correlations between dependent and independent variables can be examined. Because ERV does not have reliable historical operational data, as all data prior to 2024 are estimates, regression analysis cannot be used; therefore, regressions are not included in the operations forecast analysis.

General Aviation and Air Taxi Operations Forecast Summary

When reliable historical operational trends are unavailable to predict future activity, an approach that considers a variety of forward-looking factors must be used to select an operations forecast. Market trends indicate that GA and air taxi operations will continue to grow in the State of Texas. More people are traveling to Texas for business and recreation and many travel by air. Airlines are developing new programs to grow the next generation of pilots, which has led to the establishment of new flight schools and flight training programs. A flight school at ERV is already planning an expansion that will double the number of its training aircraft (from three to six) by the end of 2024.

ERV management is committed to developing new facilities and services to maintain ERV's position as the best choice for airport services in Texas Hill Country. Socioeconomic indicators suggest ERV's service area will continue to thrive over the planning period, bringing new business opportunities and potential users and tenants. As discussed in the based aircraft section, there is strong demand for new based aircraft at ERV, including several business jets, which would support operational growth across the GA and air taxi categories. For these reasons, the high-range increasing market share projections of itinerant GA, local GA, and air taxi operations have been selected. These projections reflect similar growth rates to what is shown in the current TAF for ERV and reflect a reasonable growth range that considers the development potential of the airport. **Exhibit 2D** graphically represents the operations projections that comprise the planning envelope.

Military Operations Forecast

Military aircraft can (and do) utilize civilian airports across the country, including ERV; however, it is inherently difficult to project future military operations due to their national security nature and the fact that missions can change without notice, so it is typical for the FAA to use a flat-line number for military operations. For this planning study, military operations at ERV are projected to remain near the five-year average of 46 annual itinerant operations.

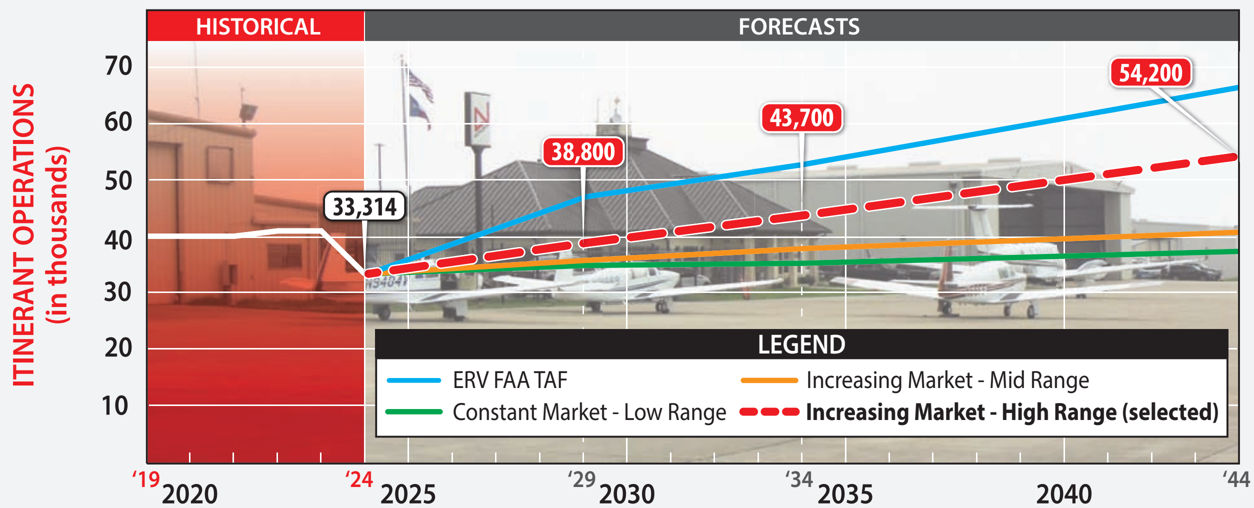
Total Operations Forecast Summary

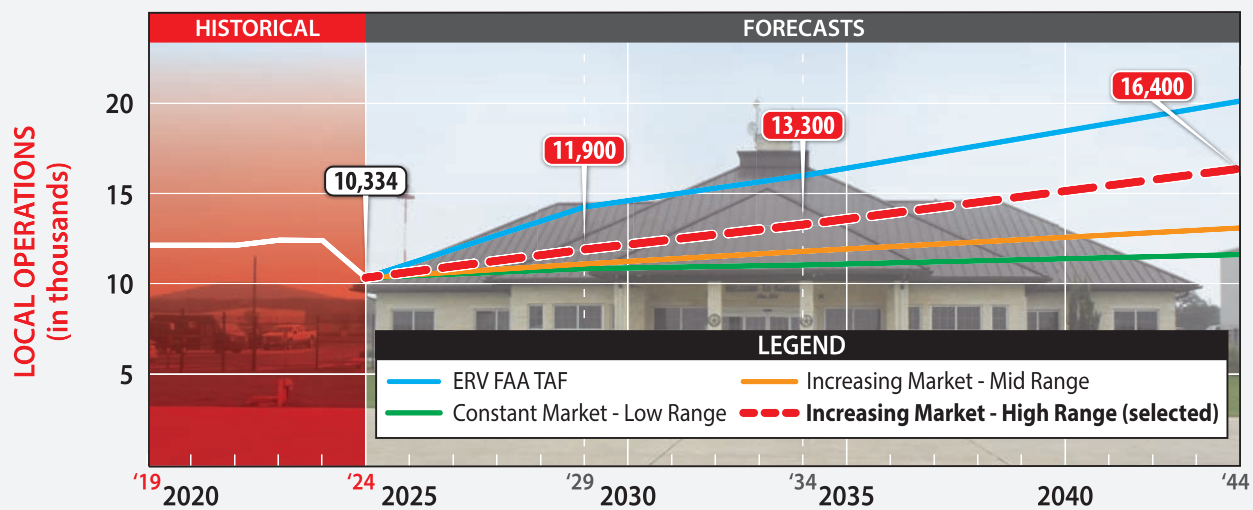
Table 2R presents the summary of the selected operations forecasts. The summary table details the culmination of each selected operations forecast. Over the planning horizon, total operations at ERV are projected to grow from 44,874 in 2024 to 73,046 by 2044 with a CAGR of 2.5 percent.

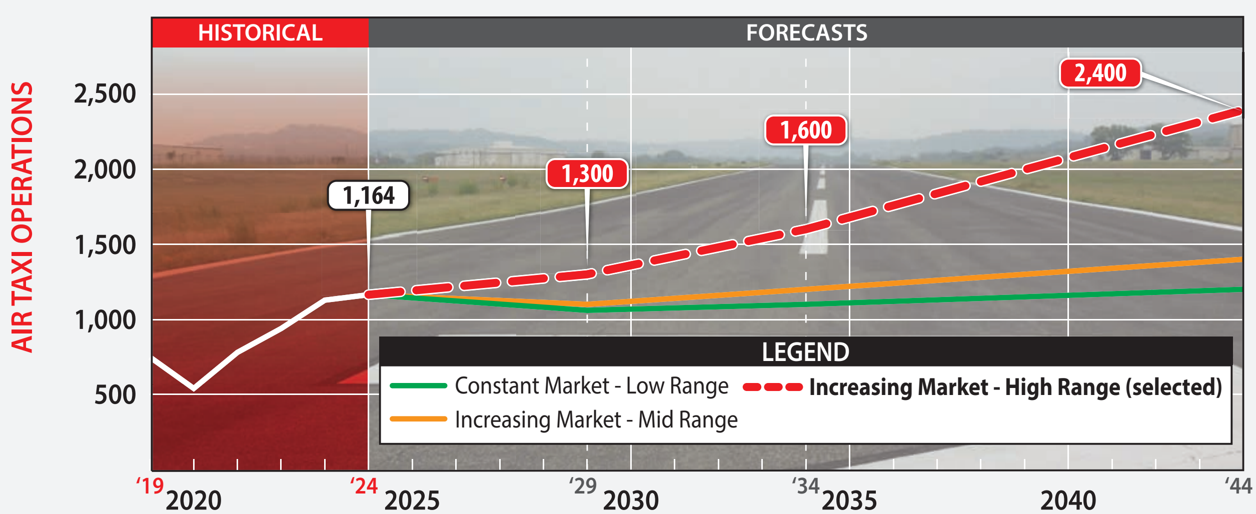
TABLE 2R | Total Operations Forecast Summary

Year	ITINERANT					LOCAL			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Subtotal	General Aviation	Military	Subtotal	
2024*	0	1,164	33,314	62	34,540	10,334	0	10,334	44,874
2029	0	1,300	38,800	46	40,146	11,900	0	11,900	52,046
2034	0	1,600	43,700	46	45,346	13,300	0	13,300	58,646
2044	0	2,400	54,200	46	56,646	16,400	0	16,400	73,046
CAGR	**0**	**3.7%**	**2.5%**	**-1.5%**	**2.5%**	**2.3%**	**0.0%**	**2.3%**	**2.5%**

*Baseline represents a 12-month period ending July 2024.
CAGR = compound annual growth rate
Source: Coffman Associates analysis


HISTORICAL
FORECASTS
ITINERANT OPERATIONS
(in thousands)
70
60
50
40
30
20
10
54,200
43,700
38,800
33,314
LEGEND
ERV FAA TAF
Increasing Market - Mid Range
Constant Market - Low Range
Increasing Market - High Range (selected)
'19
2020
'24
2025
'29
2030
'34
2035
2040
'44


HISTORICAL
FORECASTS
LOCAL OPERATIONS
(in thousands)
20
15
10
5
16,400
13,300
11,900
10,334
LEGEND
ERV FAA TAF
Increasing Market - Mid Range
Constant Market - Low Range
Increasing Market - High Range (selected)
'19
2020
'24
2025
'29
2030
'34
2035
2040
'44


HISTORICAL
FORECASTS
AIR TAXI OPERATIONS
2,500
2,000
1,500
1,000
500
2,400
1,600
1,300
1,164
LEGEND
Constant Market - Low Range
Increasing Market - High Range (selected)
Increasing Market - Mid Range
'19
2020
'24
2025
'29
2030
'34
2035
2040
'44

Peak Period Forecasts

Peaking characteristics play an important role in determining airport capacity and facility requirements. The Virtower data collected over the 12-month period ending July 2024 have been examined to identify peaking periods. The peaking periods used to develop facility requirements are described as follows.

- *Peak Month* | The peak month for the baseline year was June 2024, which contained 12.5 percent of the year's operations. Carrying the 12.5 percent peak month forward through the forecast period results in a peak month of 9,138 by 2044.

- *Design Day* | Design day is calculated by dividing the peak month by the number of days of the month. Because June was the peak month, the design day is calculated as the peak month divided by 30.

- *Busy Day* | Busy day is calculated by averaging the busiest day each week during the peak month. In this case, the busiest day each week during the month of June 2024 represented approximately 25.9 percent of the weeks' total operations.

- *Design Hour* | Design hour is calculated by identifying the average hourly operations during design days. Calculations excluded overnight hours (between 11:00 p.m. and 7:00 a.m.), which would skew down the design hour. The design hour of June 2024 represented 6.3 percent of design day operations.

Peak period projections based on the baseline calculations are included in **Table 2S**.

TABLE 2S | Peak Period Forecasts

	2024	2029	2034	2044
Annual Operations	44,874	52,046	58,646	73,046
Peak Month	5,614	6,511	7,337	9,138
Design Day	187	217	245	305
Busy Day	339	393	444	552
Design Hour	12	14	15	19

Source: Coffman Associates analysis

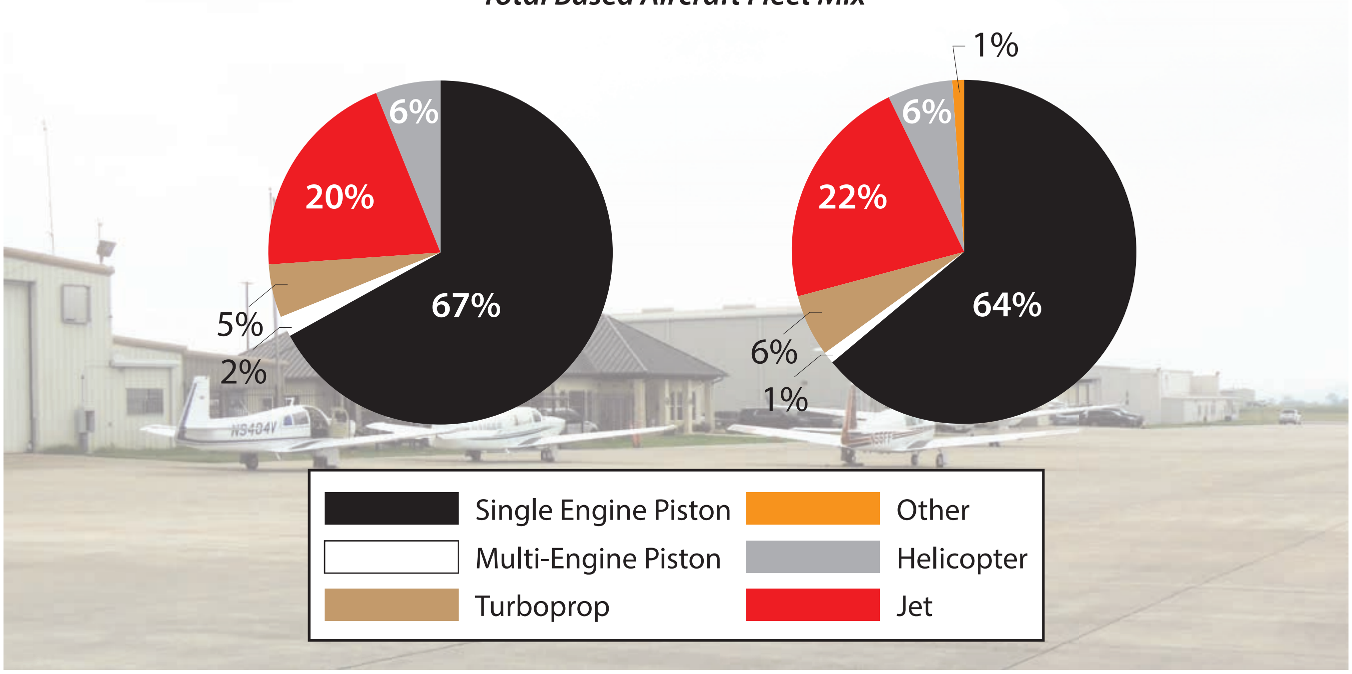
FORECAST SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period. **Exhibit 2E** presents a summary of the aviation forecasts prepared in this chapter. The base year for these forecasts is 2024 with a 20-year planning horizon to 2044. The primary aviation demand indicators are based aircraft and operations. The number of based aircraft at ERV is forecast to increase from 88 in 2024 to 145 by 2044 (2.5% CAGR). Total operations at ERV are forecast to increase from 44,874 in 2024 to 73,046 by 2044 (2.5% CAGR).

	2024	2029	2034	2044	CAGR
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	0	0	0	0	N/A
Air Taxi	1,164	1,300	1,600	2,400	3.7%
General Aviation	33,314	38,800	43,700	54,200	2.5%
Military	62	46	46	46	-1.5%
Total Itinerant	***34,540***	***40,146***	***45,346***	***56,646***	***2.5%***
Local					
General Aviation	10,334	11,900	13,300	16,400	2.3%
Military	0	0	0	0	N/A
Total Local Subtotal	***10,334***	***11,900***	***13,300***	***16,400***	***2.3%***
TOTAL ANNUAL OPERATIONS	**44,874**	**52,046**	**58,646**	**73,046**	**2.5%**
OPERATIONAL PEAKING CHARACTERISTICS					
Peak Month	5,614	6,511	7,337	9,138	2.5%
Design Day	187	217	245	305	2.5%
Busy Day	339	393	444	552	2.5%
Design Hour	12	14	15	19	2.3%
BASED AIRCRAFT					
Single Engine Piston	59	65	72	93	2.3%
Multi-Engine Piston	2	2	2	1	-3.4%
Turboprop	4	5	6	9	4.1%
Jet	18	22	25	31	2.8%
Helicopter	5	6	7	9	3.0%
Glider/Other	0	0	1	2	N/A
TOTAL BASED AIRCRAFT	**88**	**100**	**113**	**145**	**2.5%**

N/A - Not Applicable *CAGR* - Compound annual growth rate

Total Based Aircraft Fleet Mix



Source - Coffman Associates analysis

Projections of aviation demand will be influenced by unforeseen factors and events in the future; therefore, it is not reasonable to assume future demand will follow the exact projection line, but forecasts of aviation demand tend to fall within the planning envelope over time. The forecasts developed for this master planning effort are considered reasonable for planning purposes. The need for additional facilities will be based on these forecasts; however, if demand does not materialize as projected, the implementation of facility construction can be slower. Likewise, if demand exceeds these forecasts, the airport may accelerate construction of new facilities.

FORECAST COMPARISON TO THE FAA TAF

Historically, forecasts have been submitted to the FAA to be evaluated and compared to the TAF. The FAA has preferred that forecasts differ by less than 10 percent in the five-year period and less than 15 percent in the 10-year period. Where the forecasts differ, supporting documentation has been necessary to justify the difference.

TABLE 2T | Comparison of Master Plan Forecasts to FAA TAF

	2024	2029	2034	2044	CAGR
Total Operations					
Master Plan Forecast	44,874	52,046	58,646	73,046	2.5%
TAF	54,597	61,264	68,751	86,577	2.3%
% Difference from TAF	**19.5%**	**16.3%**	**15.9%**	**17.0%**	**–**
Adjusted FAA TAF	44,874	50,356	56,508	71,159	2.3%
% Difference from Adjusted TAF	**0.0%**	**3.3%**	**3.7%**	**2.6%**	**–**
Based Aircraft					
Master Plan Forecast	88	100	113	145	2.5%
TAF	85	95	106	136	2.4%
% Difference from TAF	**3.5%**	**5.1%**	**6.4%**	**6.4%**	**–**

Table 2T presents a summary of the selected forecasts and a comparison to the FAA TAF for ERV. The master plan operations forecast is outside the FAA-established tolerance in the five- and 10-year periods, but only because the baseline count (as established by Virtower data) is 19.5 percent lower than the FAA TAF baseline count. If the TAF baseline were adjusted to match Virtower operational data, the master plan forecasts would be well within TAF tolerances in the five- and 10-year periods.

In terms of based aircraft, the master plan forecast is within TAF tolerances in both the five- and 10-year periods.

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements, such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that currently use or are expected to use an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or a composite aircraft that represents a collection of aircraft with similar characteristics. The critical aircraft is classified by three parameters: aircraft approach category (AAC), airplane design group (ADG), and taxiway design group (TDG).

FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2F**.

Aircraft Approach Category (AAC) | The AAC is a grouping of aircraft based on a reference landing speed (V_{REF}), if specified. If V_{REF} is not specified, it is based on 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are values established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards will be. The AAC is depicted by a letter (A through E) and relates to aircraft approach speed (operational characteristics). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

Airplane Design Group (ADG) | The ADG is depicted by a Roman numeral (I through VI) and is a classification of aircraft that relates to aircraft wingspan or tail height (physical characteristics). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free area (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG) | The TDG is a classification of airplanes based on outer-to-outer main gear width (MGW) and cockpit to main gear (CMG) distance. The TDG relates to the undercarriage dimensions of the critical aircraft and is classified by an alphanumeric system (1A, 1B, 2A, 2B, 3, 4, 5, 6, and 7). The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and (in some cases) the separation distance between parallel taxiways/taxilanes. Other taxiway elements – such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances – are determined solely based on the wingspan (ADG) of the critical aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards, based on expected use.

The reverse side of **Exhibit 2F** summarizes the classifications of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC A and B, and ADG I and II. Business jets typically fall in AAC B and C, while the larger commercial aircraft will fall in AAC C and D.

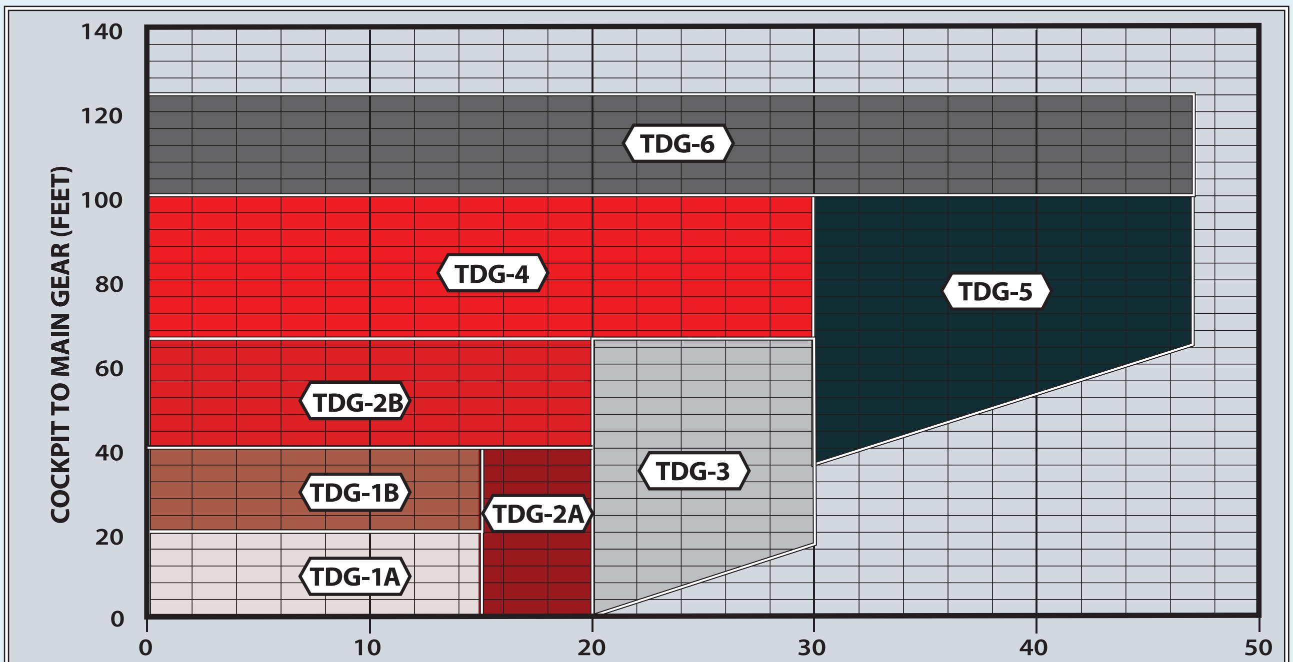
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	79-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13B, Airport Design

Exhibit 2F
AIRCRAFT CLASSIFICATION PARAMETERS

A-I

Aircraft	TDG
Beech Bonanza	**1A**
Cessna 150, 172	1A
Piper Comanche, Seneca	1A

B-I

Aircraft	TDG
Eclipse 500	1A
Beech Baron 55/58	1A
Beech King Air 100	1A
Cessna 425	**2A**
Cessna Citation M2 (525)	1A
Cessna Citation 1(500)	1A
Embraer Phenom 100	1A

A/B-II *12,500 lbs. or less*

Aircraft	TDG
Beech Super King Air 200	**2A**
Beech King Air 90	1A
Cessna 441 Conquest	1A
Cessna Citation CJ2	2A
Pilatus PC-12	2

B-II *over 12,500 lbs.*

Aircraft	TDG
Beech Super King Air 350	2A
Cessna Citation CJ3(525B)	**2A**
Cessna Citation CJ4 (525C)	1B
Cessna Citation Latitude	1B
Embraer Phenom 300	1B
Falcon 20	1B
Pilatus PC-24	2A

A/B-III

Aircraft	TDG
Bombardier Dash 8	3
Bombardier Global 7500	**2B**
Falcon 7X, 8X	2A

C/D-I

Aircraft	TDG
Lear 35, 40, 45, 55, **60XR**	**1B**
F-16	1A

C/D-II

Aircraft	TDG
Challenger 600/604	1B
Cessna Citation III, VI,VII, X	1B
Embraer Legacy 135/140	2B
Gulfstream IV (D-II)	2A
Gulfstream G280	1B
Lear 70, 75	1B
Falcon 50, **900**, 2000	**2A**
Hawker 800XP, 4000	1B

C/D-III *less than 150,000 lbs.*

Aircraft	TDG
Gulfstream V	2B
Gulfstream 550, 600, **650**	**2B**
Global 5000, 6000	2B

C/D-III *over 150,000 lbs.*

Aircraft	TDG
Airbus A319, A320, A321	3
Boeing 737-800, 900	**3**
MD-83, 88	4

C/D-IV

Aircraft	TDG
Airbus A300	5
Boeing 757-200	4
Boeing 767-300, **400**	**5**
MD-11	6

C/D-V

Aircraft	TDG
Airbus A330-200, 300	5
Airbus A340-500, 600	6
Boeing 747-100 - 400	5
Boeing 777-300	6
Boeing 787-8, 9	**5**

Note: Aircraft pictured is identified in bold type.

Exhibit 2F continued
AIRCRAFT REFERENCE CODES

AIRPORT AND RUNWAY CLASSIFICATIONS

Along with the aircraft classifications defined previously, airport and runway classifications are used to determine the appropriate FAA design standards to which the airfield facilities should be designed and built.

Runway Design Code (RDC) | The RDC is a code that signifies the design standards to which the runway should be built. The RDC is based on planned development and has no operational component. The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a runway. The RDC provides the information needed to determine certain applicable design standards. The first component, the AAC, is depicted by a letter and relates to aircraft approach speed (operational characteristics). The second component, the ADG, is depicted by a Roman numeral and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the currently published[1] instrument approach visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component is labeled "VIS" for runways that are designed for visual approach use only.

Approach Reference Code (APRC) | The APRC is a code that signifies the current operational capabilities of a runway and associated parallel taxiway in regard to landing operations. The APRC has the same three components as the RDC: AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions in which no special operating procedures are necessary, as opposed to the RDC, which is based on planned development and has no operational component. The APRC for a runway is established based on the minimum runway-to-taxiway centerline separation.

Departure Reference Code (DPRC) | The DPRC is a code that signifies the current operational capabilities of a runway and associated parallel taxiway in regard to takeoff operations. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC but has two components: AAC and ADG. A runway may have more than one DPRC, depending on the parallel taxiway separation distance.

Airport Reference Code (ARC) | The ARC is an airport designation that signifies the airport's highest RDC minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The current airport layout plan (ALP) for ERV identifies the existing ARCs as C-II for Runway 12-30 and A-I for Runway 3-21.

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[1] Instrument approach procedures are published in the FAA's Instrument Flight Procedures Information Gateway at https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/.

CRITICAL AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that currently use or are expected to use an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft or a composite aircraft that represents a collection of aircraft classified by the three parameters: AAC, ADG, and TDG.

The first consideration is the safe operation of aircraft that are likely to use an airport. Any operation of an aircraft that exceeds the design criteria of an airport may result in a lesser safety margin; however, it is not the usual practice to base the design of an airport on an aircraft that uses the airport infrequently.

The critical aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that makes regular use of the airport. Regular use is 500 annual operations, excluding touch-and-go operations. Planning for future aircraft use is important because the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short-term development does not preclude the reasonable long-range potential needs of the airport.

According to FAA AC 150/5300-13B, *Airport Design*, "airport designs based only on aircraft currently using the airport can severely limit the airport's ability to accommodate future operations of more demanding aircraft. Conversely, it is not practical or economical to base airport design on aircraft that will not realistically use the airport." Selection of the current and future critical aircraft must be practical in nature and supported by current data and realistic projections.

AIRPORT DESIGN AIRCRAFT

Three elements are used to classify the airport design aircraft: AAC, ADG, and TDG. The AAC and ADG are examined first, followed by the TDG. The FAA's *Aircraft Characteristics Database*[2] (most recently updated in October 2023) is the source for data pertaining to an aircraft's designated AAC, ADG, and TDG.

The FAA's TFMSC database includes documentation of commercial (air carrier and air taxi), general aviation, and military aircraft traffic. Due to factors such as incomplete flight plans, limited radar coverage, and VFR operations, TFMSC data do not account for all aircraft activity at an airport by a given aircraft type; however, the TFMSC provides an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. According to TFMSC data for ERV, operations conducted by aircraft with an AAC/ADG of C-II have exceeded 500 annual operations at ERV for each of the past five years, except 2020; the decline is likely attributable to the COVID-19 pandemic. As such, **the historical operational activity indicates ERV's existing ARC is C-II**.

[2] FAA Aircraft Characteristics Database can be accessed at https://www.faa.gov/airports/engineering/aircraft_char_database.

Of the 756 operations conducted by ARC C-II aircraft in 2024 (12-month period ending May 2024), the most frequent aircraft operating at ERV are the Falcon 900, Cessna Citation X, Challenger 600, and Gulfstream G280, each of which is based at ERV. The Falcon 900 has the greatest number of operations within the C-II category and is identified as ERV's existing critical aircraft.

To determine ERV's future ARC, annual operations by ARC were forecasted through 2044 using a growth rate forecast based on industry growth trends within each ARC category. Historical and forecast operations by ARC are depicted in **Table 2U**. Operations levels within the higher C-III and D-II/III categories are anticipated to increase, but likely not to levels that will exceed the threshold of 500 annual operations. A Gulfstream G650 (ARC C-III aircraft) has been based at ERV, but its activity averages 110 annual operations over the past five years; therefore, ERV's future critical aircraft remains within the C-II category and is identified as the Falcon 900.

TABLE 2U | Historical and Forecast Operations by Airport Reference Code

Year	B-I	B-II	B-III	C-I	C-II	C-III	D-II	D-III
Historical								
2019	820	1,260	4	160	512	12	12	76
2020	652	1,074	14	100	468	18	12	108
2021	808	1,416	34	146	650	4	26	136
2022	588	1,668	26	82	628	8	20	108
2023	646	1,752	32	92	714	6	28	102
2024*	728	1,716	54	90	756	10	20	128
CAGR	**-2.4%**	**6.4%**	**68.3%**	**-10.9%**	**8.1%**	**-3.6%**	**10.8%**	**11.0%**
Forecast								
2029	668	2,118	75	76	818	15	30	140
2034	613	2,614	100	64	886	24	50	175
2044	517	3,983	150	45	1,038	56	90	225
CAGR	**-1.7%**	**4.3%**	**5.2%**	**-3.4%**	**1.6%**	**9.0%**	**7.8%**	**2.9%**

*2024 data represent a 12-month period ending May 2024.
A-I and A-II are not shown, as smaller/slower aircraft are unlikely to impact critical design aircraft.
C-IV through C-V and D-IV and above are not shown due to no activity at ERV.

Sources: FAA TFMSC; Coffman Associates analysis

TAXIWAY DESIGN GROUP

The TFMSC also provides a breakdown of aircraft operations by TDG. According to ERV operations data (presented in **Table 2V**), the highest TDG that exceeds the threshold of 500 annual operations in 2024 is TDG 2A, which is represented by the Beechcraft Super King Air 200/300/350, the Cessna Citation CJ3, and the Falcon 900. As such, TDG 2A is considered the existing TDG critical design aircraft for taxiway planning purposes.

Operations within TDG 3 have increased significantly over the past five years as air cargo activities conducted by Berry Aviation – which utilizes the Embraer Brasilia EMB-120 and DHC Dash 8 turboprop aircraft – have grown; however, with only approximately 100 annual operations by Berry Aviation and these aircraft at ERV in the past year, there is no indication that they will increase to exceed 500 annual operations, so TDG 2A is projected to remain the airport's critical group for taxiway planning.

TABLE 2V | ERV Operations by Taxiway Design Group

TDG	2019	2020	2021	2022	2023	2024*	CAGR
1A	2,000	1,725	1,912	1,794	1,990	2,108	1.1%
1B	951	862	1,182	1,291	1,420	1,388	7.9%
2	119	87	110	101	108	135	2.6%
2A	1,341	922	1,216	1,203	1,317	1,228	-1.7%
2B	88	87	96	94	66	105	3.6%
3	47	27	60	61	111	196	33.1%
4	0	43	58	21	43	44	N/A

*2024 data represent a 12-month period ending May 2024.

Source: FAA TFMSC data

RUNWAY DESIGN CODE

The RDC relates to specific FAA design standards that should be met in relation to a runway. The RDC takes the AAC, ADG, and the RVR into consideration. In most cases, the critical design aircraft will also be the RDC for the primary runway.

The current runway design at ERV for primary Runway 12-30 should meet the overall airport design aircraft, which has been identified as the Falcon 900, a C-II and TDG 2A aircraft. The runway has a global positioning system (GPS)-based approach with vertical guidance (APV) and a localizer non-precision instrument approach with visibility minimums as low as 1-mile. The RVR value assigned to a runway with 1-mile minimums is 5000; therefore, **the applicable existing and ultimate RDC for Runway 12-30 is C-II-5000**. The APRC for Runway 12-30, which has a minimum runway/taxiway separation distance of 400 feet, is established as D/IV/4000 & D/V/4000. The DPRC is the same as the APRC with the RVR component removed.

Crosswind Runway 3-21 has historically been designed to ARC A-I standards and has circling-only instrument approaches with visibility minimums of 1-mile. The primary runway provides greater than 95 percent crosswind coverage at 10.5 knots. As a result, the crosswind runway design is only justified to A/B-I design standards; therefore, **the existing and ultimate RDC for Runway 3-21 is A/B-I-5000**. The critical aircraft for the crosswind runway is identified as the Cessna 425 Corsair turboprop aircraft, which is the most physically demanding A/B-I and TDG 2A aircraft operating at the airport on a frequent basis. The APRC for Runway 3-21, which has a minimum runway/taxiway separation distance of 200 feet, is B/I(Small)/4000. The DPRC is the same as the APRC with the RVR component removed.

CRITICAL AIRCRAFT SUMMARY

Table 2W summarizes the current and future runway classifications.

TABLE 2W | Airport and Runway Classifications

	Runway 12-30	Runway 3-21
Airport Reference Code (ARC)	C-II	A/B-I
Critical Aircraft	Falcon 900	Cessna 425 Corsair
Runway Design Code (RDC)	C-II-5000	A/B-I-5000
Taxiway Design Group (TDG)	2A	2A
Approach Reference Code (APRC)	D/IV/4000 D/V/4000	B/I(Small)/4000
Departure Reference Code (DPRC)	D/IV D/V	B/I(Small)
APRC and DPRC data can be found in FAA AC 150/5300-13B, Appendix L, Tables L-1 and L-2.		

Source: FAA AC 150/5300-13B, Airport Design

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Total based aircraft are forecast to grow from the current count of 88 to 145 by 2044. Operations are forecast to grow from 44,874 in 2024 to 73,046 by 2044. This projected growth is driven by the FAA’s positive outlook for GA activity nationwide, as well as positive socioeconomic outlooks for the region.

The critical aircraft for the airport was determined by examining the FAA TFMSC database of flight plans. The existing and ultimate critical aircraft for the primary runway is described as C-II, with the Falcon 900 as the representative aircraft. For crosswind Runway 3-21, the ARC is A/B-I, with the Cessna 425 Corsair turboprop aircraft as the representative aircraft.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be carried forward to the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements.