

Forecasts of Aviation Activity

Introduction

This is the second chapter in the Master Plan Update document. The first chapter identified the existing airport facilities, as well as physical conditions on and surrounding the airport. The next step in the process of planning for an airport facility is to determine the need for new or expanded facilities, which is to be reasonably expected over the specified planning period. At Paine Field, this involves the development of a set of forecasts that defines potential future aviation demand. As in most airport planning studies, forecasts are based on “unconstrained demand” (market demand) derived in part from actual and forecast population data, along with other factors. At this early stage in the planning process, it is necessary to utilize this theoretical “unconstrained demand” in order to provide a basis for developing various operational demand scenarios, without regard to site specific physical or environmental constraints; the identification and analysis of facility options for various operational demand scenarios then follows. Various alternatives can subsequently be developed to accommodate these facility options. Recognizing the myriad of constraints that will influence these alternatives, Snohomish County will be provided with a rational basis to select the appropriate alternative for airport development. Conditions on the airport and in the area surrounding the airport will influence the type and volume of aviation activity which can be reasonably accommodated.

Aviation activity forecasting generally commences by utilizing the present time as an initial point, supplemented with historical trends obtained from previous year's activity and recorded information. This data has evolved from a comprehensive examination of historical airport records from airport personnel and a review of the following documents, *Paine Field Airport Master Plan and Noise Study Update (1995)*, *Puget Sound Regional Council: Regional Airport System Plan (1999)*, *FAA Terminal Area Forecasts (1990-2015)*, and the *FAA Aviation Forecasts Fiscal Years 2000-2011*. These documents were prepared in different years, making the base year data quite variable, and emphasizing the

need for establishing a well-defined and well-documented set of base information from which to project future aviation activity trends.

Prior to an examination of current and future activity levels at the airport, there are several conditions and assumptions that should be noted, which form the basis or foundation for the development of the forecasts contained herein. The following statements cover a wide variety of physical, operational, and socioeconomic considerations, and include, although not necessarily in order of importance or priority:

- **Weather Conditions.** Existing weather data (i.e., visibility, ceiling and wind conditions) for Paine Field were available for analysis from the National Oceanic and Atmospheric Administration (NOAA). With the exception of very few days annually, the airport is not adversely affected by poor weather conditions. Visual Flight Rules (VFR) meteorological conditions are experienced approximately 89.1% of the time annually; therefore, aircraft can operate at the airport on a regular basis throughout the year, with limited interruption due to weather. The potential negative impact of poor weather conditions on the operational capability of the airport is documented in the next chapter of this document. This information will be analyzed and evaluated in later chapters regarding the identification of potential instrument approach facility enhancements and the preparation of development alternatives for their implementation.
- **Airport/Community Location and Proximity.** Paine Field is situated six miles southwest of the Everett Central Business District (CBD) and twenty miles north of downtown Seattle. Breathtaking views of the Cascade Mountain Range to the east and the Olympic Mountain Range to the west help to define the bucolic setting and popularity of Paine Field with many aviators across the country, as well as with surrounding neighboring residents. The airport serves as an economic magnet to the region of the state, supporting approximately 30,000 jobs. Vehicular access to the airport is provided by Interstate 5 (I-5), State Road 99 (SR 99), State Road 526 (SR 526/Boeing Freeway), State Road 525 (SR 525/Mukilteo Speedway) and existing roads - Airport Road and 128th St. S.W., which link the airport to both, I-5 and SR 99.
- **Regional Socioeconomic Conditions.** The existing socioeconomic condition of a particular region has historically impacted aviation activity within that area. The two primary socioeconomic indicators, which are often analyzed in the forecast of aviation activity, are population and employment statistics. According to the latest population data prepared by the Washington State Office of Financial Management (OFM), the estimated population in 2000 for the City of Everett totaled 95,000 residents. This compares to the 1990 population for Everett of 69,961, an increase of 35.8%. The year 2010 (the most current data available) population projections

for Everett are expected to reach a total of 125,000, reflecting an average annual growth rate of 2.5%. This compares to a projected average annual growth of 1.6% for Snohomish County, 1.0% for the Puget Sound Region, and 1.2% for the State of Washington. The OFM estimates that employment for Snohomish County and the State of Washington for the year 1999 is 213,600 and 3.1 million respectively. Employment is projected to increase to 303,405 and 3.97 million, representing a respective 1.7% and 1.2% average annual growth rate. In addition, as referenced by the OFM and PSRC, estimated per capita income in 1998 for Snohomish County was \$27,015, for the State of Washington was \$28,719, and for the United States was \$27,203. Per capita income for the State of Washington is projected to be \$34,458, a 33.9% increase, and for the United States it is projected to be \$32,857, a 36.8% increase. Per capita income is currently unavailable for Snohomish County.

- **Community Support.** Paine Field generally benefits from the support of the surrounding cities and county governments, as well as local industry and residents. The airport is recognized as a vital county asset, which contributes to the stability and the future of the area's economy. The support for the airport is tempered over the concern of aircraft noise from both the residents near the airport and the representatives they elect. The overall position of the county is one of continued growth and development, with special focus on the impetus that the airport provides to maintain and attract additional economic and aviation-related development to the region.

It should be noted that Snohomish County adopted a “General Aviation” role for Paine Field in a Mediated Role Determination process in 1978/79, which will continue to affect the accommodation of various aviation activities at the airport. This General Aviation roles objective is to retain and enhance light aircraft general aviation as the dominant aeronautical activity at Paine Field while encouraging the continuation and expansion of aircraft related industries, business and corporate aviation, public service aviation, air taxi and commuter service, and discouraging expansion beyond 1978 levels of supplemental/charter air passenger service (per 14 CFR Part 121 SFAR 38-2 pp6), large transport crew training operations, air cargo and military aviation, while remaining compliant with the covenants in deeds and grants of the United States government.

Additionally, many of the surrounding county communities and much of the Puget Sound region benefit from the close proximity of a regional general/industrial aviation facility and, in turn, provide an economic base that can attract additional based aircraft, as well as industrial/business development to the airport.

- **Facilities Potential.** Paine Field currently serves a vital service role to the economy of western Washington. It is one of several airport facilities within the regional

service area with adequate runway length to accommodate the operation of air carrier aircraft. In addition, the airport can accommodate the operation of large business jet aircraft, which need runway lengths greater than available at many of the region's other general aviation airports.

- **Negative or Neutral Factors.** As a general comment, the airport has very few negative factors and is in an enviable position due to its many positive features and conditions. However, there are some factors that can and do have a negative impact on the airport and that must be considered in the planning process. The first issue is the overall condition of the general aviation industry in the United States, which, since 1978, had been in a significant recession until the mid 1990s. The FAA has identified several factors that have contributed to this prolonged downturn. These include three economic recessions, two fuel crises, the enactment of the Airline Deregulation Act of 1978, the repeal of the GI Bill, and the repeal of the investment tax credit. Secondly, due to the substantial areas of owner occupied single family residential development around the airport, airport expansion is constrained from both a physical and operational standpoint.

However, there are a number of bright spots having a positive impact in certain segments of the general aviation industry. They include the passage of the long-awaited General Aviation Revitalization Act of 1994, which provides an eighteen-year limit on product liability lawsuits against general aviation aircraft and component manufacturers. As a result of this legislation, there is renewed interest and optimism among US aircraft manufacturers, who are either re-entering the single engine aircraft market after several years absence, or are increasing future production schedules to meet expected renewed demand. The growth in the amateur-built aircraft market, and the strength of the used aircraft market, indicate that demand for inexpensive personal aircraft is increasing. Increased general aviation instrument operations at FAA towered airports, and general aviation aircraft handled at FAA en route centers point to continued growth of users of more sophisticated general aviation aircraft. Additionally, operations at non-towered US airports have increased, supporting the belief held by many that much of general aviation has been forced out of many towered airports because of the increased commercial air carrier activity.

Historical Airport Activity

A tabulation of Paine Field's historical aviation activity since 1990 is presented in Table B1, entitled *HISTORICAL AVIATION ACTIVITY, 1990-2000*. This table presents the number of passenger enplanements and four categories of operations, plus total operations.

Local FAA Air Traffic Control personnel tabulate aircraft activity data during the time the tower is operational, currently 7 a.m. to 9 p.m. Operations occurring between 9 p.m. and 7 a.m. are not included, and are assumed to add approximately 5%. Forecast information is intended to reflect operations occurring during the time the tower is operational (from 7 a.m. to 9 p.m.).

Table B1
HISTORICAL AVIATION ACTIVITY, 1990-2000
Paine Field Master Plan Update

Year	Passenger Enplanements ¹	Large Transport Aircraft Operations	Air Taxi Operations	General Aviation Operations	Military Operations	Total Operations	Instrument Operations ²
1990	88	3,623	1,392	144,943	5,586	155,544	21,840
1991	314	3,308	1,516	152,330	5,929	163,083	22,016
1992	8	3,096	1,416	167,605	5,893	178,010	18,592
1993	155	2,837	1,464	187,215	5,307	196,823	21,092
1994	80	2,860	1,327	184,639	5,844	194,670	20,876
1995	0	3,653	2,070	153,584	5,426	164,824	20,679
1996	65	3,322	3,282	148,308	4,164	159,076	18,436
1997	209	3,679	2,884	174,891	1,911	183,365	19,827
1998	26	3,987	3,508	183,543	1,574	192,612	28,882
1999	0	4,011	4,131	194,801	2,464	205,407	32,187
2000	0	3,443	3,886	203,925	2,037	213,291	23,256

Source: Operations information provided by airport staff.

¹ FAA Terminal Area Forecast Report.

² Instrument Operations are not an additive element with regard to total operations.

- *Passenger Enplanements.* The passenger enplanements listed in the previous table are only those which occurred on military and charter flights. There is currently no scheduled airline passenger service provided to Paine Field.
- *Large Transport Aircraft Operations.* As counted by airport traffic control tower (ATCT) personnel in recent years, operations in this category (classified as Air Carrier by ATCT) include all aircraft capable of carrying over sixty passengers, including those aircraft used for cargo purposes, such as wide-body aircraft utilized by UPS, and using a three letter company designator (regardless of whether or not they actually are being utilized for passenger service). For the most part, these are made up of aircraft operating into or out of The Boeing Company or Goodrich.
- *Air Taxi Operations.* Operations in this class are made up of aircraft capable of seating less than 60 passengers, which are being utilized for passenger or air freight service and which use a three letter company designator or "Tango" (this is a definition used by ATCT personnel to classify aircraft operations. For planning purposes, air taxi operations will be included as part of the general aviation forecasts. Please refer to the Appendix for data from the Save Our Communities organization regarding the various possible definitions of air taxi, commuter, and regional airlines). At Paine Field, this category of operations is primarily made up of air freight operations with some non-scheduled passenger aircraft operations. As previously noted, there is currently no scheduled passenger airline service at Paine Field. However, in 1997, Horizon Airlines evaluated initiating service between Paine Field and Portland, OR with the thirty-seven seat DHC8-200 aircraft. Horizon ultimately decided to meet the projected growth in this market by increasing the size of their aircraft on the Seattle-Portland route from the DHC8 -200 to the seventy seat DHC8Q-400 and the fifty seat Canadair Regional Jet (CRJ200).
- *General Aviation Operations.* Historically, the number of general aviation operations has been directly tied to economic conditions. Nationally, there was an upward trend in the number of general aviation operations during the 1990s. This was due primarily to the great economic condition experienced for a majority of the country and a decrease in the price of fuel. These national trends are reflected at Paine Field during the last four years, where the number of general aviation operations has increased. This reflects the strength of the local/regional economy and the strength of the demand for general aviation facilities in the Seattle Metropolitan area.
- *Instrument Operations.* Instrument operations have remained relatively flat through the 1990s, with a slight increase in the last few years. Instrument aircraft

operations are those operations conducted by aircraft filing an IFR flight plan operating in the vicinity of Paine Field.

- *Military Operations.* The number of military operations at the airport has declined since the last Master Plan. The U.S. Army Aviation Support Facility located on Paine Field was responsible for a majority of the operations. However, in September 1996, this squadron relocated from Paine Field to Fort Lewis reducing the number of military operations conducted at the airport. Currently, the primary military use is related to C-9 and C-12 aircraft, supporting the Everett based aircraft carrier – U.S.S Lincoln, which regularly visit the field picking up or delivering sailors and their equipment, as well as EA-6Bs stationed at Whidbey Island Naval Air Station (NAS). It is projected that the demand for military operational activity at the airport will remain at this present level through the planning period.

Unconstrained Passenger Enplanement Demand Forecast

The projection of demand for passenger service; i.e., enplaned or boarding passengers at an airport, is an important part of the forecasting effort. In essence, passenger service projections form the cornerstone for formulating projections of air carrier/commuter aircraft operations. This task is more difficult at Paine Field because there is little history of passenger service on which to build a forecast. However, because of the population located in the vicinity of the airport, the driving time to Seattle-Tacoma International Airport (SEA-TAC), and the forecast population growth of the region, it can be reasonably assumed that some level of unconstrained demand exists for passenger service at Paine Field.

Passenger Service Demand Forecast Methodology

The methodology used to determine demand for passenger service at Paine Field involved determining an existing *domestic originating passenger to population* (PAX^{do}/POP) ratio for Seattle-Tacoma International Airport, then relating that ratio to the various population levels likely to be served by Paine Field if passenger service were available. Because of the existence of the most accurate and consistent population data and operational data for SEA-TAC, calendar year 1999 was chosen as the base year for determining the PAX^{do}/POP ratio. For this calculation, the area considered as the service area for SEA-TAC was a ten-county area in northwest Washington, consisting of Snohomish, King, Pierce, Skagit, Thurston, Grays Harbor, Mason, Kitsap, Island, and Lewis counties (this service area is consistent with the "market-shed" served by SEA-TAC as defined in the *Flight Plan Project* published in 1992 by the Puget Sound Air

Transportation Committee, with the exception that Whatcom County was included in the *Flight Plan Project*).

Through the 1990s, SEA-TAC experienced tremendous growth in terms of both passenger and cargo levels. Annual operations have increased from 355,077 in 1990 to 433,660 in 1999, representing a twenty-two percent increase. Additionally, passenger levels (domestic and international) increased seventy-five percent through these same years. In addition to a robust 16.4% growth in population within the SEA-TAC service area during the 1990s, the PAX^{do}/POP (8,608,553 enplanements/3,739,722 population) ratio for SEA-TAC increased to 2.30 in 1999 (2.30 domestic originating passengers annually for each person living within the defined service area). This is higher than the ratio used in the 1995 *Master Plan (MP)*, which was based on the PAX^{do}/POP (4,895,840 enplanements/3,211,757 population) ratio of 1.52 experienced at SEA-TAC in 1990. If only regional destinations, those within the 500-mile circle are considered (e.g., Bellingham, Vancouver, B.C., Port Angeles, Portland, Missoula, Butte, Kalispell, Helena, Yakima, Spokane, Pasco, Eugene, Boise, Pullman, and Sun Valley), the 1999 PAX^{do}/POP ratio is 0.22 (828,160 enplanements/3,739,722 population). This is an increase from SEA-TAC's 1990 regional PAX^{do}/POP ratio of 0.17 (538,865 enplanements/3,211,757 population) as used in the 1995 MP.

With these ratios as a basis, four scenarios for unconstrained enplanement demand at Paine Field were formulated. This methodology uses the PAX^{do}/POP ratio and census tract or county population projections for the defined service areas to determine enplanement demand forecasts. Snohomish County, the U.S. Census Bureau, and the Puget Sound Regional Council provided census tract population projections. In addition, estimated 1999 census information and population projections from the U.S. Census Bureau were utilized for all counties within the service area. The population projections provided by these entities are estimated to the year 2020. Because the forecasts are a twenty-year time frame, a trend projection based on historical data was used to determine the year 2021 population. In all scenarios, the PAX^{do}/POP ratios remain the same throughout the forecasting period.

1. *National Service Low Range*. This scenario considers the provision of passenger service at Paine Field with both national and regional destinations available (similar to the domestic service destinations presently served by aircraft operating at SEA-TAC). In this scenario, it is projected that passengers will only be captured from a service area within a thirty minute drive time of Paine Field (a map estimating the thirty minute driving distance from the airport was provided by the Snohomish County Public Works Department). The time of day for the model was based on the p.m. peak time frame of 4:30 p.m. to 5:30 p.m., which is consistent with the modeling approach used in the 1995 MP. The area is illustrated in the following figure, entitled *PAINÉ FIELD SERVICE AREA - THIRTY MINUTE DRIVE TIME*. It is realized that passengers are likely to be captured

from beyond the thirty minute area; however, this relatively small area was utilized to represent the minimum area from which Paine Field might attract passengers. As can be noted in the following table, entitled *UNCONSTRAINED ENPLANEMENT DEMAND FORECAST, 2001-2021*, the national low forecast indicates a passenger demand of 769,646 in 2001 increasing to 996,180 by the year 2021. This compares with the 1995 MP forecast demand of 553,000 in 2014 (the last year provided in that planning study). The increased demand over that projected in the 1995 MP is due primarily to a higher PAX^{do}/POP ratio and to a lesser extent, due to the population increase within the low range service area.

2. *National Service High Range.* This scenario considers the same national service defined above, with a larger service area. The service area for the high range scenarios is increased to include all of Snohomish, Skagit and Island counties, in addition to those portions of King county within a thirty minute drive of Paine Field. Passenger demand for this scenario is 1,137,263 in 2001 and is forecast to increase to 1,562,219 by 2021. The 1995 MP forecast demand was 895,000 by the year 2014. As stated above, this increase is primarily due to a higher PAX^{do}/POP ratio.
3. *Regional Service Low Range.* This scenario considers the same service area as Scenario 1 (thirty minute drive time) with the provision of only regional passenger service. For the most part, regional service is defined as providing service only to destinations within 500 miles (e.g., Bellingham, Vancouver, B.C., Port Angeles, Portland, Missoula, Butte, Kalispell, Helena, Yakima, Spokane, Pasco, Eugene, Boise, Pullman, Kelowna, Victoria, and Sun Valley), on aircraft seating less than 60 passengers (e.g., DHC-6, DHC-7, DHC8-200/300, EMB-120, Fokker F-27, etc.), although regional jets (EMB-135/145, CRJ-200, BAe-146, Fokker F-28, and larger turboprops such as the DHC8Q-400) are now being utilized in the United States (including SEA-TAC). This is consistent with the regional service type of aircraft and destinations presently operating at SEA-TAC. This scenario postulates a passenger demand of 117,929 and is forecast to increase to 152,640 by 2021. This compares with the 1995 MP of 96,000 by the year 2014. The increased demand is primarily due to a larger service area within the thirty minute drive area.
4. *Regional Service High Range.* As with the preceding scenario, only regional service is considered; however, the service area is increased to include all of Snohomish, Skagit and Island counties, in addition to those portions of King county within a thirty minute drive of Paine Field. This scenario estimates a passenger demand of 174,257 in 2001, increasing to 239,371 by the year 2021. This compares with the 1995 MP forecast of 155,000 by the year 2014. Again, this increase is due to a higher PAX^{do}/POP ratio and a larger thirty minute drive time area.

Although these forecasts are considered to be unconstrained, one long-term constraint has been factored in. If Paine Field provides commercial passenger service, this service would supplement that which is currently provided at SEA-TAC. The type of services offered at "supplemental" airports is an important consideration in determining the number of enplaned passengers that will be captured in a certain market. Passengers will tend to choose the airport with the most convenient schedule, widest range of destinations and lowest price combination, even if there is a longer ground trip required to get to the airport. The best selection of airline schedules for longer stage length trips and those to very small regional markets will only be available at the region's primary airport (SEA-TAC). Therefore, it is estimated that passenger demand at Paine Field would consist of no more than 50% of the medium- to long-haul stage length domestic market (trips of over 500 miles), and only 85% of the short-haul regional market. This assumption is consistent with assumptions made in *Flight Plan* during the forecasting process for that project and has been confirmed (to the degree possible) with passenger data available from SEA-TAC.

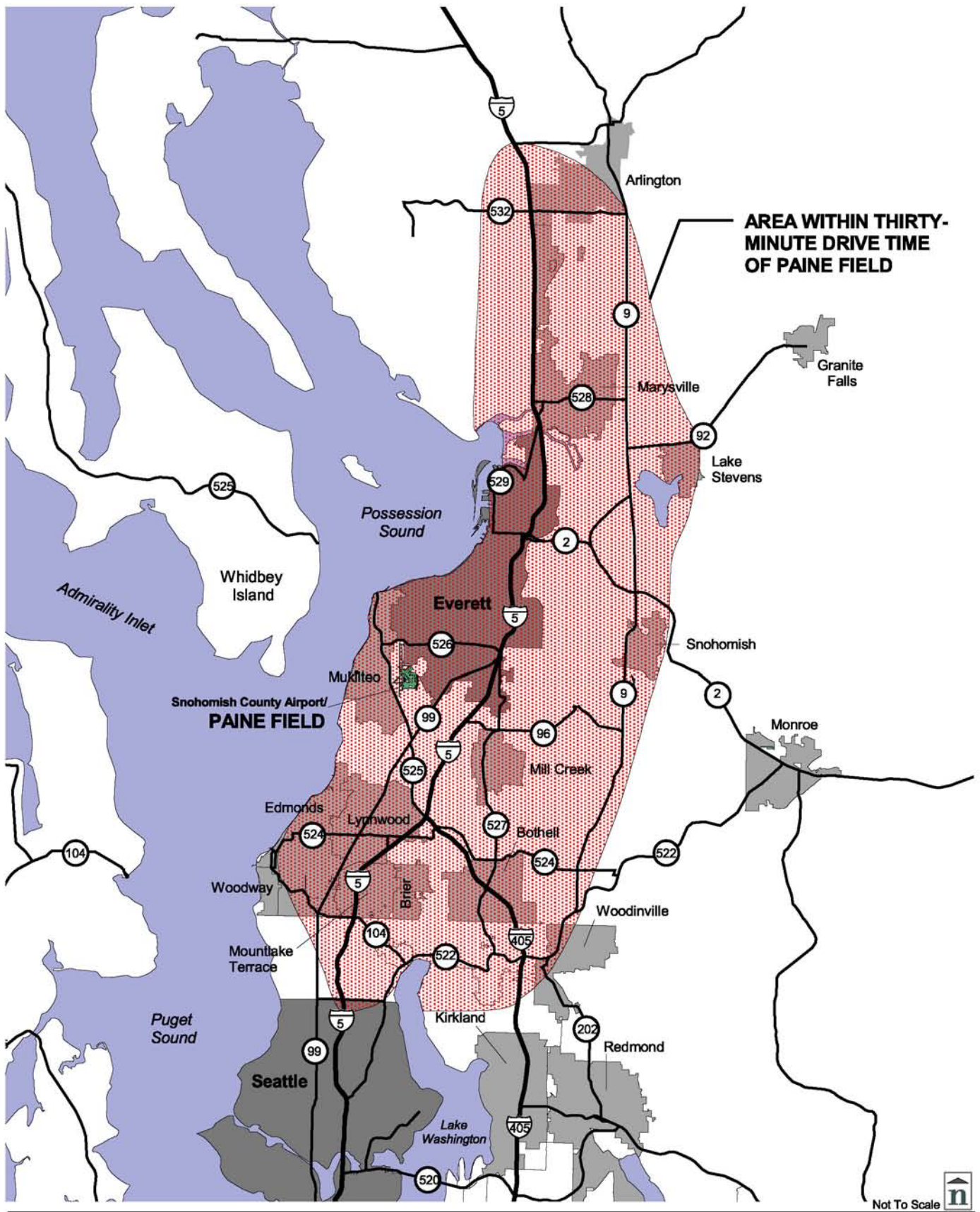


Figure B1 Paine Field Service Area -
Thirty-Minute Drive Time

The unconstrained forecasts do not consider what happens in a new market. In other words, the forecasts do not consider the fact that when a new service is offered it will take some time for that market to mature and reach its full potential. The forecasts are only intended as a measure of demand within the market area.

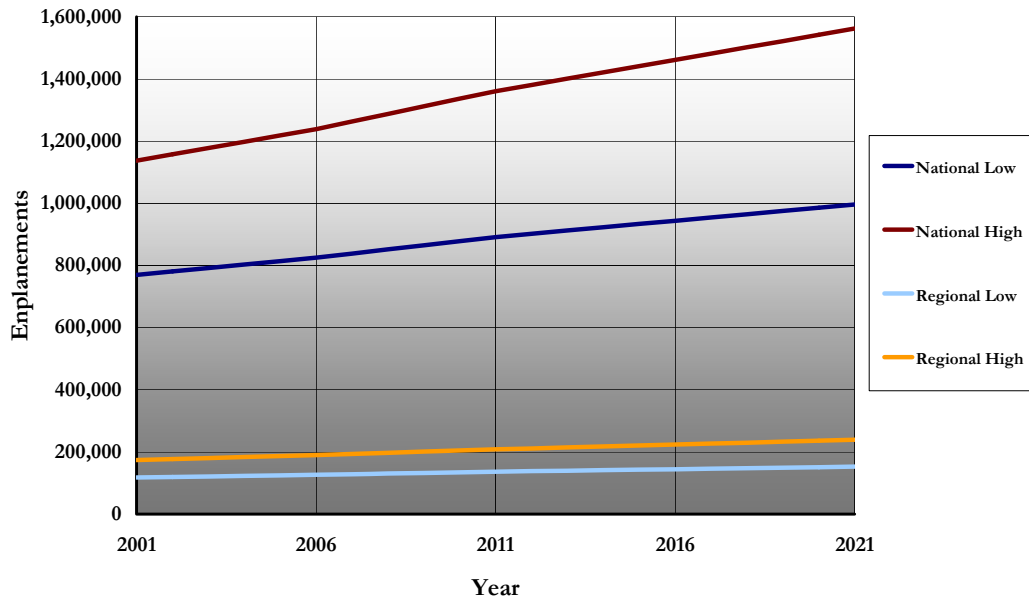
Enplanement forecasts are presented in the following table, entitled *UNCONSTRAINED ENPLANEMENT DEMAND FORECAST, 2001-2021*. The columns include data from: *Flight Plan* (Puget Sound Air Transportation Committee, 1992) and four scenarios for enplanement projections. A graphic presentation of the enplanement demand forecast is provided in the following figure, entitled *UNCONSTRAINED ENPLANEMENT DEMAND FORECAST SCENARIOS*.

Table B2
UNCONSTRAINED ENPLANEMENT DEMAND FORECAST, 2001-2021
Paine Field Master Plan Update

Year	Flight Plan	Scenario 1 National Service Low Range	Scenario 2 National Service High Range	Scenario 3 Regional Service Low Range	Scenario 4 Regional Service High Range
2001	---	769,646	1,137,263	117,929	174,257
2002	---	780,736	1,157,593	119,628	177,372
2003	---	791,826	1,177,922	121,328	180,487
2004	1,070,000	802,916	1,198,252	123,027	183,602
2005	---	814,006	1,218,581	124,726	186,717
2006	---	825,096	1,238,910	126,425	189,832
2009	1,220,000	865,019	1,312,096	132,543	201,046
2011	---	891,634	1,360,887	136,621	208,522
2014	1,430,000	922,998	1,421,287	141,426	217,777
2016	---	943,907	1,461,553	144,630	223,946
2021	---	996,180	1,562,219	152,640	239,371

Flight Plan Interpolated from Alternate #14, The Flight Plan Project, Draft Final Report and Final Environmental Impact Statement, 1992, Puget Sound Regional Council.
National Service Forecast with Airport served by national and regional air carriers.
Regional Service Forecast with Airport served by regional air carriers only.
Low Range Enplanements captured only from area within 30 minute drive time.
High Range Enplanements captured from area within 30 minute drive time and from all of Snohomish, Skagit and Island counties.

Figure B2
UNCONSTRAINED ENPLANEMENT DEMAND FORECAST SCENARIOS
Paine Field Master Plan Update



Unconstrained Air Carrier/Commuter Operations Demand Forecast

The next step in the forecasting process is to project the demand for Air Carrier/Commuter aircraft operations, using the forecast of enplanements as a basis. This process normally involves the evaluation of the type of passenger aircraft that have served the airport in the past and a projection of the type that will serve the airport in the future. With the type of passenger aircraft known, average seating capacity and load factors can be formulated, which then can be equated to a quantity of aircraft operations that will be needed to accommodate forecast enplanement demand.

While the trend of commuter airlines is leaning towards the use of larger regional jets (50-70 seats) and turboprops, it is not necessarily the case that all regional carriers will provide service with larger aircraft. From an operational standpoint, Paine Field's

market size may not necessitate the use of the larger 70-seat aircraft. As a result of contract negotiations with pilot unions, most airlines have adopted a “pilot contract agreement”, precluding pilots of regional carriers from operating aircraft with more than 60 seats. As more and more airlines strive for higher load factors and more profitability, it is inevitable that a certain number of existing and/or newly implemented routes will be relinquished to regional carriers. This pilot contract agreement is not necessarily an issue for Horizon Airlines, which has ordered fourteen 70-seat Canadair CRJ-700s and fifteen 70-seat DeHavilland DHC8Q-400 turboprop aircraft.

Because the airport has no scheduled passenger service at this time, historic data on aircraft type and seating capacity cannot be used as a basis for future projections; therefore, assumptions regarding national trends as identified in *FAA Aviation Forecasts Fiscal Years 2000-2011* have been utilized as the foundation on which to build the forecast of Air Carrier/Commuter aircraft operations. Per the *FAA Aviation Forecast Fiscal Years 2000-2011*, and for purposes of this forecast documentation, Air Carrier is defined as an airline providing scheduled passenger service with aircraft larger than 60 seats, and Commuter/Regional is being defined as an airline primarily providing scheduled passenger service with aircraft a maximum of 60 seats. This is also consistent with current FAA Air Traffic counting criteria (air carrier vs. air taxi). Please refer to the Appendix for data from the Save Our Communities organization regarding the various possible definitions of air taxi, commuter, and regional airlines.

It is assumed in the forecast calculations that commuter/regional aircraft will provide service only to destinations within 500 miles and will primarily utilize aircraft seating less than 60 passengers (e.g. DHC-6, DHC-7, DHC-8-200/300, EMB-120, BAe 146, Fokker F-27, etc.). Also included in the commuter/regional aircraft fleet are several regional jet types (e.g., EMB-135/145, CRJ-200, Fokker F-28, etc.), which are now being utilized in numerous markets in the United States (including SEA-TAC) for short-haul destinations. The "less than 60 passenger" assumption relating to commuter/regional aircraft will only be utilized in the demand forecasts section of this document. Analysis related to noise and facility needs require more refined aircraft type determinations.

The assumptions used relating to air carrier aircraft operations include:

- Domestic air carrier aircraft had an average seating capacity of 149.7 in 1999, which is less than the FAA forecasted in the early 1990s. The FAA projects this to gradually increase to 158.5 in 2011. Because air carrier operations at Paine Field would primarily be focused on shorter stage length trips, the *Paine Field Master Plan Update* forecasts are based on the average seating capacity of air carrier aircraft remaining at 147 through the end of the planning period (the combined average seating capacity of the B-737-300, the MD-80, and the Boeing next generation aircraft, B-737-700/800/900).

- Domestic air carriers achieved a 69.8 percent load factor in 1999, significantly more than the FAA forecasted in the early 1990's. This forecast uses the new projected load factors of 69.3 percent for 2000, decreasing to 68.3 percent in 2002, increasing to 69.5 percent in 2005 and 70.0 percent in the years 2006-2011. Beyond the year 2011, the forecasts will continue to be based on a load factor of 70.0 percent for air carrier aircraft.

The assumptions used relating to commuter/regional aircraft operations include:

- FAA indicates that commuter/regional aircraft average seating capacity grew from 22.9 in 1992 to 36.0 in 1999 and is projected to grow to 44.3 in 2011 (a 2.1% annual growth rate). This reflects the introduction of many larger aircraft, including regional jets into the market. Beyond the year 2011, the forecasts are based on the average commuter/regional aircraft seating capacity remaining at 44.3. (This growth of aircraft seating capacity is the impetus for the reduction of operations depicted in the following figure, entitled *UNCONSTRAINED AIR CARRIER & COMMUTER OPERATIONS DEMAND FORECAST SCENARIOS*).
- FAA indicates that the average commuter/regional load factor was 48.3 in 1992, increased to 57.6 percent in 1999, and is forecast to grow to 61.6 in 2011. Beyond the year 2011, the forecasts are based on a load factor remaining at 61.6 percent for commuter/regional aircraft.

It may be of interest to note that in the 1995 MP, domestic air carriers had an average seating capacity of 151.1, while achieving a 62.6% load factor, and regional carriers had an average seating capacity of 22.9, while achieving a 48.3% load factor. Operations demand forecast is presented below in the following table, entitled *UNCONSTRAINED AIR CARRIER & COMMUTER OPERATIONS DEMAND FORECAST, 2001-2021*. In addition to the four forecast scenarios, the following table also presents forecasts from the *Flight Plan*.

Table B3
**UNCONSTRAINED AIR CARRIER & COMMUTER OPERATIONS DEMAND
 FORECAST, 2001-2021**

Paine Field Master Plan Update

Year	Flight Plan	Scenario 1 National Service Low Range	Scenario 2 National Service High Range	Scenario 3 Regional Service Low Range	Scenario 4 Regional Service High Range
2001	---	23,893	35,305	11,005	16,261
2002	---	24,042	35,647	10,873	16,121
2003	---	23,985	35,680	10,745	15,984
2004	33,760	24,185	36,093	10,759	16,057
2005	---	24,128	36,121	10,635	15,921
2006	---	24,094	36,178	10,514	15,788
2009	35,460	24,489	37,145	10,252	15,551
2011	---	24,934	38,057	10,259	15,659
2014	35,400	25,811	39,746	10,620	16,354
2016	---	26,396	40,872	10,861	16,817
2021	---	27,858	43,687	11,462	17,975

Flight Plan Interpolated from Alternate #14, The Flight Plan Project, Draft Final Report and Final Environmental Impact Statement, 1992, Puget Sound Regional Council.

National Service Forecast with Airport served by national and regional air carriers.

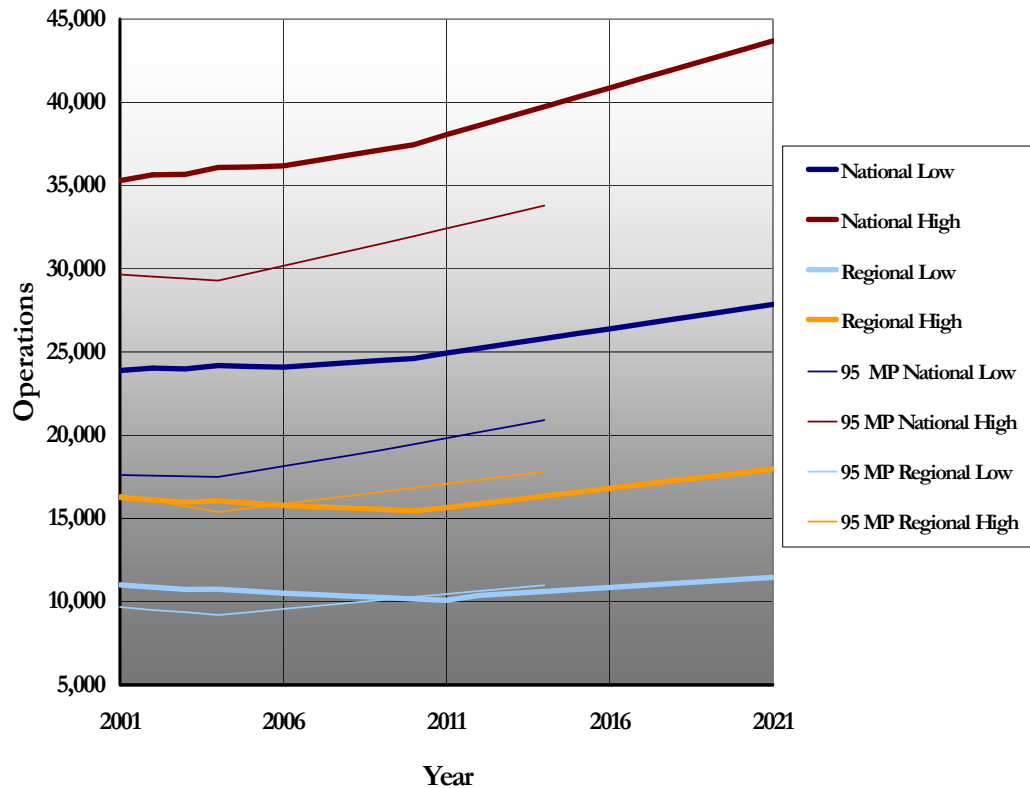
Regional Service Forecast with Airport served by regional air carriers only.

Low Range Enplanements captured only from area within 30 minute drive time.

High Range Enplanements captured from area within 30 minute drive time and from all of Snohomish, Skagit, and Island counties.

Note: Although passenger enplanement demand is forecast to increase, the number of commercial service operations is forecast to remain stable or increase only slightly because of increasing seating capacity of aircraft and increasing load factors (see assumptions in text above).

Figure B3
UNCONSTRAINED AIR CARRIER & COMMUTER OPERATIONS
DEMAND FORECAST SCENARIOS
Paine Field Master Plan Update



Decrease in operations from 2010-2011 for the MP Update is reflective of an increase in average seats per aircraft from 36 to 44.3.

Manufacturing/Maintenance Large Transport Activity

There are currently two aviation manufacturing/maintenance organizations located at Paine Field, the Boeing Company and Goodrich. Large transport jet aircraft flight operations associated with these businesses (utilizing the same aircraft types as those used for "air carrier" passenger and freight activity) are conducted at Paine Field; however, because these operations are not related to commercial passenger service, they

have not been taken into consideration in the table above. Existing and projected flight operations at the airport associated with these two companies are presented in the following table entitled, *MANUFACTURING/MAINTENANCE LARGE TRANSPORT AIRCRAFT ACTIVITY FORECAST*. The types of aircraft expected to be operating at Paine Field by the Boeing Company include the B-737, B-747, B-757, B-767 and B-777. In addition to these aircraft, flight operations forecast for Goodrich also include the B-727, along with the MD-80 and DC-10 aircraft. Boeing is currently evaluating the option of relocating their B-737 and B-757 aircraft assembly operation from Renton to Paine Field. According to the *FAA Terminal Area Forecasts*, there were approximately 378 air carrier operations conducted at Renton Municipal Airport. These additional operations could be expected at Paine Field if the Boeing relocation were to come to fruition. Additionally, this number could also grow if the B-737/B-757 operations from Boeing Field/King County International Airport were also transferred to Paine Field.

Table B4
**MANUFACTURING/MAINTENANCE LARGE TRANSPORT
 AIRCRAFT ACTIVITY FORECAST**
Paine Field Master Plan Update

Year	Master Plan Forecast
2000 ¹	3,443
2001	3,500
2002	6,000
2003	6,000
2004	6,000
2005	6,000
2006	6,000
2011	6,000
2016	6,000
2021	6,000

¹ Actual

Unconstrained Military Aircraft Operations Forecast

Military aircraft have historically utilized Paine Field. In years past, the U.S. Army Aviation Support Facility located on Paine Field was responsible for a majority of the operations. However, in September 1996, this squadron relocated from Paine Field to Fort Lewis reducing the number of military operations conducted at the airport. Currently, the primary military use is related to C-9 and C-12 aircraft, supporting the Everett based aircraft carrier – U.S.S. Lincoln, which regularly visits the field picking up or delivering sailors and their equipment, as well as EA-6Bs stationed at Whidbey Island Naval Air Station (NAS). Therefore, due to a lack of information associated with projecting an increase or decrease of military activity, it is projected that the demand for military operational activity at Paine Field will remain at existing levels through the end of the planning period. The following table, entitled *UNCONSTRAINED MILITARY OPERATIONS FORECAST, 2000-2021*, indicates the anticipated number of military operations during the planning period. The FAA's *Terminal Area Forecasts* have been included for comparison with the projections resulting from this study.

Table B5
**UNCONSTRAINED MILITARY OPERATIONS
 FORECAST, 2000-2021**
Paine Field Master Plan Update

Year	Terminal Area Forecast ²	Master Plan Forecast
2000 ¹	1,919	2,037 ¹
2001	1,919	2,000
2002	1,919	2,000
2003	1,919	2,000
2004	1,919	2,000
2005	1,919	2,000
2006	1,919	2,000
2011	1,919	2,000
2016	1,919	2,000
2021	1,919	2,000

¹ Actual

² Terminal Area Forecasts Fiscal Years 1995-2015, FAA

General Aviation Operations Forecast

General aviation operations at Paine Field have historically been affected by fluctuations in the regional and national economy. This is reflected in the overall decrease in training and private use of aircraft during periods of economic decline. Although more of the general aviation fleet is now used for business purposes than it was ten or more years ago, the economy continues to affect total general aviation operations.

During the past ten years, the annual number of general aviation operations at Paine Field reached a high in 2000 with approximately 203,925 operations. The lowest number of annual general aviation operations was recorded in 1990, with 144,943 operations. It should also be noted that during the past decade, the number of general aviation operations at Paine Field has consistently increased, with only slight declines noted in 1994, 1995, and 1996. As discussed previously, growth in general aviation operations nationally has been inhibited during the 1980s and early 1990s by the high operating and ownership costs of aircraft.

FAA Aviation Forecasts Fiscal Years, 2000-2011, indicates that nationally, general aviation hours flown are expected to increase at an annual rate of approximately 2.1% until the year 2011. A projection based on a 2.1% annual increase in the number of general aviation operations is presented in the "Low Forecast" column of the following table. Turbine powered general aviation aircraft use is projected by the FAA to increase at a 4.9% annual growth rate between 2000 and 2011. Paine Field experiences a significant amount of turboprop and business jet activity. A projection based on 4.9% annual growth is presented in the High Forecast column below.

Construction of one corporate hangar capable of accommodating two aircraft, as well as permit approval for an additional eleven corporate units is currently in progress. Because of the large number of individuals on the airport's hangar waiting list (approximately 115), the airport is proceeding with a development process that could potentially add up to 100 additional T-hangar units by the year 2006. Interviews with businesses providing flight training on the airport indicate that significant growth in flight training activity at Paine Field is likely during the next few years. Due to the closing of Martha Lake Airport, coupled with the construction of new hangar space and flight training optimism, the selected forecast for general aviation operation demand is based on a more rapid growth rate in the first years of the planning period. This growth rate is tempered in later years (particularly due to the relatively flat historic trend in general aviation operations at the airport).

Another factor that supports a forecast of significant growth in general aviation activity during the first few years of the planning period is the historical and forecast population growth rate. The U.S. Census Bureau reports Snohomish County population grew from

465,628 people in 1990 to 606,024 in 2000. That is a 30.2% growth compared to the U.S. average of 13.1%, making Snohomish County the 38th fastest growing county in the U.S. and the fastest growing county in the Central Puget Sound Region. In 1999, the Puget Sound Regional Council forecast Snohomish County population to grow by 138,399 (23%) between 2000 and 2010 and by 112,198 between 2010 and 2020. So, it is not unreasonable that growth in general aviation operations and based aircraft would increase at a faster rate during the first few years of the planning period, while tapering off during the later years. Therefore, a 4.9% annual growth rate was used in years 2001-2006 and a 1.5% annual growth rate was used for forecast years 2007-2021.

Table B6
GENERAL AVIATION OPERATIONS FORECAST, 2000-2021
Paine Field Master Plan Update

Year	TAF	1995 MP	TP	Low Forecast	High Forecast	Selected Forecast
2000 ⁽¹⁾	191,824	---	203,925 ¹	203,925 ¹	203,925 ¹	203,925 ¹
2001	195,503	---	196,987	208,207	213,917	213,399
2002	199,258	---	201,092	212,580	224,399	224,399
2003	203,089	---	205,198	217,044	235,395	235,395
2004	206,999	223,000	209,304	221,602	246,929	246,929
2005	210,988	---	213,409	226,256	259,029	259,029
2006	215,060	---	217,515	231,007	271,721	271,721
2011	236,703	---	238,044	256,303	345,144	292,721
2014	250,783	256,000	250,361	250,494	398,407	306,092
2015	255,670	---	254,467	254,201	417,929	310,683
2016	---	---	258,572	284,369	438,408	315,343
2021	---	---	279,101	315,508	556,872	339,714

Source: ¹ Actual (includes Air Taxi operations)
TAF: Terminal Area Forecasts Fiscal Years 1990-2015, FAA
TP: Trend Projection Using General Aviation Annual Operations in years 1990-2000 as basis.

Air Cargo Activity Forecast

Historically, airmail and airfreight activity has occurred at Paine Field to a limited degree. These air cargo operations have been conducted at the airport with small air taxi type aircraft (prop aircraft with the capability of seating less than sixty passengers). This includes a scheduled mail route (by Methow Airlines), which transports mail from the regional postal facility in Everett to the San Juan Islands and a number of aircraft hauling checks (AMERIFLIGHT). Operations related to air cargo activity at the airport have been counted under the "Air Taxi" category of operations in Airport Traffic Control Tower data. In 2000, there were 3,886 operations recorded as "Air Taxi", which also included some non-scheduled passenger aircraft operations in addition to air freight operations.

Although significant demand for air cargo operations at Paine Field may be present, air cargo activity at the airport is likely to be limited. Factors contributing to this assumption relate to the County's 1978/1979 Mediated Role Determination to discourage increases in air freight activity at Paine Field and, due to the location of Paine Field (northern region of the Metropolitan area away from the "centroid" of Metropolitan collection areas), cargo operators will be less inclined to utilize Paine Field because of its lack of "centralized" geography. Because air cargo companies operating at SEA-TAC and Boeing Field would benefit from this "centralized" location, it can be assumed that they will prefer to remain in their current locations.

Due to the construction at SEA-TAC over the next several years with the North End Aviation Terminal (NEAT), which will displace approximately 40% of the SEA-TAC cargo hardstands and the lack of adequate developable areas at Boeing Field, the ability to accommodate cargo operations at its current level will be reduced. As a result, cargo operators may have to temporarily relocate to alternate airports within the region. For this planning effort, it is assumed that, if there is a demand for cargo operations at Paine Field, it is likely to be only temporary, until the cargo use area at SEA-TAC is re-established when (and if) the Port of Seattle moves forward with construction of the South Aviation Support Area (SASA) at SEA-TAC.

Operations Forecast By Aircraft Type

Now that total numbers of aircraft operations have been projected, the next step in the forecasting process is to detail the various types of aircraft that will operate at the airport. The following table, entitled *SUMMARY OF OPERATIONS DEMAND FORECAST BY AIRCRAFT TYPE, 2000-2021*, presents that detail.

As can be noted, total annual operations are anticipated to increase during the planning period. The forecasts indicate that total annual operational demand is expected to

Table B7
SUMMARY OF OPERATIONS DEMAND FORECAST BY AIRCRAFT TYPE, 2000-2021
Paine Field Master Plan Update

Operations By Type	2000¹	2006	2011	2016	2021
<i>Industrial Air Carrier</i>					
Jet	3,443	6,000	6,000	6,000	6,000
<i>Military</i>					
	2,037	2,000	2,000	2,000	2,000
<i>General Aviation</i>					
Single Engine Piston	176,731	228,241	242,961	258,583	275,154
Multi-Engine Piston	16,620	21,470	22,830	24,280	25,820
Turboprop	6,230	9,510	11,710	14,190	16,990
Business Jet	6,230	9,510	11,710	14,190	16,990
Helicopter	2,080	2,990	3,510	4,100	4,760
<i>Instrument²</i>	28,256	37,650	40,773	43,898	47,002
TOTAL WITHOUT COMMERCIAL PASSENGER AIRCRAFT					
	213,371	279,721	300,721	323,343	347,714
<i>Passenger Air Carrier/Commuter</i>					
<i>Scenario 1 (National Low)</i>					
Jet	---	24,094	24,934	26,396	27,858
Turboprop	---	17,259	19,804	20,965	22,127
<i>Scenario 2 (National High)</i>					
Jet	---	6,835	5,130	5,431	5,731
Turboprop	---	36,178	38,057	40,872	43,687
Jet	---	25,915	30,227	32,463	34,699
Turboprop	---	10,263	7,830	8,409	8,988
<i>Scenario 3 (Regional Low)</i>					
Jet	---	10,514	10,259	10,861	11,462
Turboprop	---	3,679	5,129	5,430	5,731
<i>Scenario 4 (Regional High)</i>					
Jet	---	15,788	15,659	16,817	17,975
Turboprop	---	5,525	7,829	8,408	8,987
TOTAL ANNUAL OPERATIONS					
SCENARIO 1 (National Low)	213,371	303,815	325,655	349,739	375,572
SCENARIO 2 (National High)	213,371	315,899	338,778	364,215	391,401
SCENARIO 3 (Regional Low)	213,371	290,235	310,980	334,204	359,176
SCENARIO 4 (Regional High)	213,371	295,509	316,380	340,160	365,689

Source: Barnard Dunkelberg & Co.

¹ Existing

² Instrument operations are not an additive element with regard to total operations.

increase by approximately 78% with the highest scenario (Scenario 2), and by approximately 71% with the lowest scenario (Scenario 3) by the year 2021.

The largest increase in operational demand is expected in the General Aviation category, with demand for approximately 130,000 additional operations during the 20-year planning period. General aviation operational demand is expected to grow most rapidly with the turboprop, jet, and helicopter types of aircraft. Industrial Air Carrier demand is expected to grow somewhat, with all of the activity being related to large air carrier jets. Military activity is expected to remain at its current level and will continue to be made up primarily of C-9 and EA-6B operations.

Passenger aircraft operational demand is presented in the four scenarios, which have been previously discussed. Within the passenger aircraft category, the split between jet and turboprop aircraft varies depending on forecast year and scenario. The *FAA AEROSPACE OPERATIONS, FISCAL YEARS 2000-2011*, states that 15.3% of the current national commuter/regional fleet accounts for regional jets, and the remaining 84.7% accounts for turboprops. The FAA forecasts these figures to become a 50/50 split by the year 2011. In Scenario 1 and Scenario 2, demand for air carrier jet aircraft operations represents approximately 65% of the total demand for passenger aircraft operations at the airport in 2021. In Scenario 3 and Scenario 4, projections of jet aircraft for the year 2006 were calculated using the difference of the current percentage and the forecast percentage (34.7%), and projections for the remaining years were calculated with the even percentage split of 50/50. As stated previously, it is assumed in the forecast calculations that commuter/regional aircraft will be aircraft seating less than 60 passengers; however, regional jets are now being utilized in several markets in the United States (including SEA-TAC) for short-haul destinations and could be present in the commuter/regional aircraft fleet at Paine Field.

Instrument Operations

As described earlier, instrument aircraft operations are those operations conducted by aircraft filing an IFR flight plan operating in the vicinity of Paine Field. Instrument operations forecasts, shown in the following table, *INSTRUMENT OPERATIONS*, are taken from, or extrapolated from the TAF Forecast produced by the FAA for Paine Field. As a note, instrument operations are not an additive element with regard to total operations conducted at the airport.

Table B8
INSTRUMENT OPERATIONS
Paine Field Master Plan Update

Year	Instrument Operations
	Forecast ²
2000 ¹	28,256
2001	34,627
2002	35,224
2003	35,824
2004	36,429
2005	37,037
2006	37,650
2011	40,773
2016	43,898
2021	47,002

Source: ¹ Actual

² Master Plan Update instrument operations were taken from the FAA Terminal Area Forecasts, Fiscal Years, 1995-2015.

Based Aircraft Forecast

General Aviation Based Aircraft

The number of general aviation aircraft that can be expected to be based at an airport facility is dependent upon several factors, such as airport communication practices, aircraft maintenance facilities, airport operator's services, airport proximity and access, and similar factors. In an effort to plan for the proper number and size of future aircraft storage areas, it is important to forecast the number of general aviation based aircraft.

The number and type of aircraft anticipated to be based at an airport are vital components in developing the plan for the airport. Depending on the potential market and forecast, the airport will tailor the plan in response to anticipated demand. Generally, there is a relationship between aviation activity and based aircraft, stated in terms of operations per based aircraft (OPBA). Sometimes, a trend can be established from historical information of operations and based aircraft. The national trend has been changing with more aircraft being used for business purposes and less for pleasure flying. This impacts the OPBA in that business aircraft are usually flown more often than pleasure aircraft. In 2000, the OPBA at Paine Field was approximately 429, above the

average OPBA of 358 for the past ten years. It is expected that the number of operations per based aircraft will increase at the airport as more aircraft based there are used for business purposes.

The following table, entitled *UNCONSTRAINED GENERAL AVIATION BASED AIRCRAFT FORECAST, 2000-2021*, presents the forecasts for the next twenty-year period. For information and comparison purposes, also noted are the projections based on the FAA forecast, which indicates that the active general aviation fleet is expected to grow at an annual rate of 1.4 %. Because of new hangar units, which will be completed in 2001 and 2002, the airport is expected to increase its based aircraft fleet significantly in the near-term. The forecast for the Paine Field Master Plan Update is based on a rate of growth higher than that which is expected nationally during the early years of the 20-year planning period, with that rate of growth tapering off during the latter years.

The airport has received proposals for long-term commercial development of the lower elevation section of airport property west of Runway 16R/34L, between Runway 11 and Taxiway K-5. This area was designated in the 1995 and subsequent Airport Layout Plans for Aviation compatible commercial/industrial development. This forecast has included an additional analysis of based aircraft demand through the year 2051 to confirm that area will not be needed to accommodate airport storage facilities. Using the same average annual percentage increase used in this MP Update of 1.4%, this analysis derived a projection of 980 based aircraft by the year 2051. This projection would equate to a demand for approximately 66 acres of aircraft storage (hangar and apron). Even this long-term projection of demand can be accommodated with the areas of the airport that are at, or close to, runway elevation grade. Thus, the need for a large area of the west side to accommodate future general aviation based aircraft storage is forecast to be minimal.

Table B9
**UNCONSTRAINED GENERAL AVIATION BASED
 AIRCRAFT FORECAST, 2000-2021**

Paine Field Master Plan Update

Year	Puget Sound, 2001 Regional Airport System Plan	FAA Forecast	Master Plan Forecast
2000	---	480	479 ¹
2001	---	489	490
2005	542	---	550
2006	---	525	564
2010	575	---	590
2011	---	559	597
2015	605	587	622
2016	---	---	629
2020	639	---	643
2021	---	---	646

Source: Barnard Dunkelberg & Co.

¹ Actual.

The number of based aircraft at Paine Field is expected to increase by approximately 30% during the twenty-year planning period. The mix of based aircraft for incremental periods throughout the planning period is shown in the following table, entitled *GENERAL AVIATION BASED AIRCRAFT FLEET MIX, 2000-2051*. The percentage of business jets, multi-engine (including turboprops), and helicopters is expected to increase as a part of the total based aircraft population at the airport. This is in line, first of all, with overall trends in general aviation, but even more importantly, parallels the industrial, economic development and growth expectations and projections characteristic to Paine Field. By the end of the planning period, single engine aircraft are anticipated to comprise approximately 80.3% of the total based aircraft at Paine Field, with approximately 8.7% being multi-engine piston, 3.4% being turbine prop aircraft, approximately 5.1% being business jet aircraft, and approximately 2.5% being helicopters.

Table B10
GENERAL AVIATION BASED AIRCRAFT FLEET MIX, 2000-2051
Paine Field Master Plan Update

Aircraft Type	2000 ¹	2006	2011	2016	2021	2051 ²
Single Engine	418	481	501	518	519	788
Multi-Engine	45	50	53	55	56	85
Turbo Prop	6	14	15	18	22	33
Jet	6	12	18	25	33	50
Helicopter	4	7	10	13	16	24
TOTAL	479	564	597	629	646	980

Source: ¹ Actual

² FAA does not require Master Plans to forecast this year.

Summary

Paine Field will continue to be the primary general aviation and industrial aviation airport serving Snohomish County and the northern portion of the Seattle Metropolitan area. In addition, the forecasts indicate that, to some degree, there is unconstrained demand for commercial passenger service at an airport in the vicinity of Paine Field. As described in The Puget Sound Regional Council’s (PSRC) Metropolitan Transportation Plan, *Destination 2030*, “the region will meet its long-term commercial air transportation needs consistent with the Regional Council’s General Assembly action in 1996. *Destination 2030* continues prior actions to include plans for a third runway at SEA-TAC Airport, with additional noise reduction measures, implementation measures, and monitoring steps”. Additionally, the most notable change in the Master Plan Update, as compared with the previous Master Plan, is that due to the increase in population and the number of originating passenger trips, a larger PAX^{do}/POP ratio has been applied to the national and regional enplanement and operation scenarios.

The primary purpose of a master planning document is to formulate a program to accommodate a reasonable projection of anticipated aviation activity demand. Although this “reasonable level of demand” will be used as a basis for long-term facility planning in the master plan update, no facilities will be built until actual demand occurs. In other words, market forces drive facility development, not forecasts.

The following illustration, entitled *OPERATIONS DEMAND FORECAST SUMMARY, 2000-2021*, and following table, entitled *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2000-2021*, summarize the forecasts of aviation activity that have been presented in this

chapter. As stated previously, the forecasts presented in this chapter are based on "unconstrained demand", without regard to site-specific physical or environmental constraints. It is realized that conditions on the airport and in the area surrounding the airport will influence the type and quantity of aviation activity that can be reasonably accommodated. The next steps in the master planning process are to identify the capacity of existing airport facilities and to convert forecasts of aviation activity into facility requirements. In order to identify a reasonable and feasible facility development plan, an analysis is also necessary which compares the physical needs of various alternatives to available development potentials through an opportunities/constraints process.

Figure B4
OPERATIONS DEMAND FORECAST SUMMARY, 2001-2021
Paine Field Master Plan Update

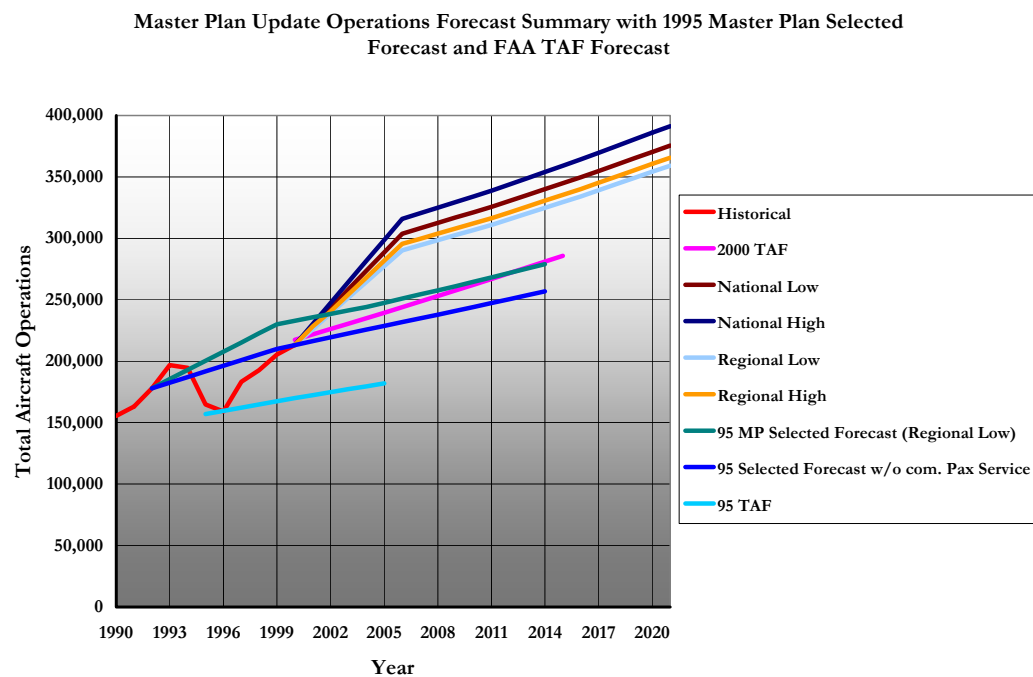


Table B11
SUMMARY OF AVIATION ACTIVITY FORECASTS, 2000-2021
Paine Field Master Plan Update

Operations	2000 ¹	2006	2011	2016	2021
Air Carrier/Commuter					
Scenario 1 (National Low)	---	24,094	24,934	26,396	27,858
Scenario 2 (National High)	---	36,178	38,057	40,872	43,687
Scenario 3 (Regional Low)	---	10,514	10,259	10,861	11,462
Scenario 4 (Regional High)	---	15,788	15,659	16,817	17,975
Other Jet Transport	3,443	6,000	6,000	6,000	6,000
Military	2,037	2,000	2,000	2,000	2,000
General Aviation	207,891	271,721	292,721	315,343	339,714
Instrument ²	28,256	37,650	40,773	43,898	47,002
Total Annual Operations					
Scenario 1	213,371	303,815	325,655	349,739	375,572
Scenario 2	213,371	315,899	338,778	364,215	391,401
Scenario 3	213,371	290,235	310,980	334,204	359,176
Scenario 4	213,371	295,509	316,380	340,160	365,689
Passenger Enplanements					
Scenario 1	---	825,096	891,634	943,907	996,180
Scenario 2	---	1,238,910	1,360,887	1,461,553	1,562,219
Scenario 3	---	126,425	136,621	144,630	152,640
Scenario 4	---	189,832	208,522	223,946	239,371
Based Aircraft					
Single Engine	418	481	501	518	519
Multi-Engine	45	50	53	55	56
Turboprop	6	14	15	18	22
Business Jet	2	12	18	25	33
Helicopter	4	7	10	13	16
TOTAL BASED AIRCRAFT	475	564	597	629	646

Source: ¹ Actual

² Instrument Operations are not an additive element with regard to total operations.

Adopted Forecast

Up to this point four different scenarios of unconstrained commercial passenger demand have been provided. On July 25, 2001, the Snohomish County Council adopted the regional-low forecast scenario for use in this Airport Master Plan Update. A copy of the motion adopting the forecasts is provided in the Appendix. The regional-low forecast for passenger enplanements (boardings) is the lowest of the four scenarios and is based on the assumption that, if actual demand occurs, the airport is most likely to accommodate passengers from a limited geographic area surrounding the airport (a thirty minute drive time), and that routes flown out of the airport will have a regional focus (within a 500-mile range).

It is recognized that the passenger enplanement projections are based on an unconstrained forecasting model. Market constraints exist which are likely to limit demand, especially for commercial passenger facilities at Paine Field. Although a plan for the development of Paine Field has been prepared using the adopted forecast as a basis, construction of facilities should only begin when an appropriate level of actual demand is experienced or eminent.

Some of the underlying reasons considered in arriving at the adopted forecast include:

- The forecasting of aviation activity at an airport is not an exact science and realized numbers are likely to be higher or lower than those that have been predicted. Therefore, facilities should be constructed only to accommodate actual demand, not forecast demand. This Master Plan Update study does not include a market feasibility study for commercial passenger service at Paine Field.

An airport master plan is intended to be a document that is updated when development influences change significantly. In fact, the FAA anticipates that at an airport of this nature, an airport master plan should be updated approximately every five years. If demand is realized for larger passenger facilities, it should trigger another planning effort for Paine Field.

- The area identified for the development of passenger facilities at Paine Field is in the vicinity of the existing terminal/airport administrative offices. This area of the airport exhibits the best landside and airside access qualities related to those required for commercial passenger service facilities. Exact location recommendations will be dependent on the level of demand experienced. Passenger facilities and size of these facilities will be examined in detail in subsequent chapters.

- Because of the narrow shape of the airport's west side, it is inappropriate to program a parallel taxiway on the west side of Runway 16R/34L. Without a parallel taxiway, the west side area is inappropriate for an aviation activity intensive function such as flight training or a passenger terminal.
- In consideration of the additional analysis of future based aircraft demand for the lower elevation central portion of the west side of Runway 16R/34L (between Taxiway K-5 and Runway 11 beyond 950 feet west of Runway 16R/34L centerline) will not be needed for aircraft storage facilities within the next fifty years.
- Scenarios 3 and 4 (regional low and regional high) forecasts are consistent with the 1978/79 Mediated Role Determination defined for Paine Field (although the forecasts do not specifically limit passenger aircraft types or sizes).
- The on-airport roadway system, along with the roadway system surrounding Paine Field, is constrained in its ability to accommodate additional vehicular traffic. Of the considered Scenarios, passenger traffic related to Scenario 3 will least impact the regional roadway system.