Chapter 3.0 – Airport Role and Forecasts

The purpose of the Chapter is to guide the development of the Airport consistent with current and future needs. Due to the cyclical nature of the economy, aviation forecasts are developed to reflect operational activity levels on a growth curve in five, ten, and twenty year periods. While a single line is often used to express the anticipated growth, it is important to state that actual growth may fluctuate within a range both below and above this line. Forecasts are prepared in terms of a base case, as well as a medium range and high range forecast. This format helps understand the airports needs under varying conditions and therefore is less sensitive to a specific change in an airport or industry condition. It is also effective where the historical data is more difficult to assemble for various reasons. An essential point to remember is that forecasts serve only as guidelines, and planning must remain flexible around those guidelines to be responsive to a dynamic environment.

The systematic development of aviation activity forecasts involves both analytical and judgmental processes. Mathematical relationships are tested to establish statistical logic rationale for projected growth. In cases where accurate and reliable historical data is limited or in some cases unavailable, professional judgment based on aviation experience and knowledge is essential to the final subjective determination of the recommended forecast.

This overall forecast process takes advantage of draft Rhode Island Airport System Plan (RIASP) forecast data and additional information obtained during this study. This information is used to review the forecasts and is compared to the data collected in the Inventory task. Based on the analysis of this data, as well as the review of additional information collected through surveys and interviews, an effort was completed to determine whether the RIASP is a reasonable basis for developing facility requirements for the SFZ/AMPU. A parallel study effort that looked at improving the instrument approach capability of the Airport is presented in Chapter 2. The results of which are analyzed in Chapter 5.

Currently, North Central State Airport's role within the RIASP is a general aviation / reliever airport. SFZ only accommodates general aviation activity; this includes small single engine aircraft used in flight training and recreational flying to small business aircraft. It is one of two reliever airports in the RI airport system. The other is Quonset State Airport in North Kingston. The role of a reliever as defined by FAA is to encourage general aviation activity to utilize a GA airport in lieu of a primary commercial service airport, in this case T. F. Green, as an alternative landing area. In serving as a reliever the FAA places a higher priority on the development needs of the airport.

It should be noted that these are forecasts of future airport demand, not necessarily of actual future airport activity. Forecasts of demand are developed without considering potential airport capacity constraints. In later tasks however, the impact of potential capacity constraints to airport activity are assessed in addition to outside factors such as environmental concerns.

3.1 Forecast Methodologies and Data

Choosing the appropriate forecasting methodology is as important as developing forecasting scenarios to properly plan for the future. The general approach that is often used to develop forecasts is identification of specific historical relationships between state/facility specific aviation operational and based aircraft data. Historical data at smaller airports without air traffic control towers is less reliable than airports with control towers. Consequently, it is difficult to produce accurate quantitative forecasts. Forecast scenarios

developed for SFZ considered the historical operational data but rely largely upon expert judgment. It is important to emphasize the fact that aviation forecasting is not an "exact science", so experienced aviation judgment and practical considerations ultimately influence the level of detail and effort required to establish a reasonable forecast and the development of decisions that result from them.

This methodology results in more qualitative forecasts which for facilities like SFZ actually tend to be more reasonable and realistic. A qualitative forecast will give an explanation, understanding, or interpretation of current airport conditions and also explain why future development scenarios are justifiable. Forecasting scenarios for SFZ were developed by examining the meaningful and symbolic content of qualitative data and coupling it with available historical data. In addition to the previously stated forecasting methods, another key reference for the process is The Federal Aviation Advisory Circular 150/5070-6B, Airport Master Plans, which outlines the six standard steps in the forecasting process. They are:

- Identifying aviation activity measures;
- Reviewing previous airport forecasts;
- Gathering the various types of data;
- Selecting the forecasting methodology;
- Applying the forecast methods and evaluate the results; and
- Comparing the forecast results with the FAA's Terminal Area Forecast.

To ensure accuracy and uniformity, the FAA has outlined several acceptable forecasting methodologies that should be included in forecasting efforts. The type of selected methodology should be representative of the airport's unique characteristics and the validity of the historical data. Some common forecasting methodologies include:

- Regression analysis – A statistical technique that ties aviation demand to economic measures. Regression analysis should be restricted to relatively simple models with independent variables for which reliable forecasts are available.

- Trend analysis and extrapolation – Typically the historical pattern of an activity and projects this trend into the future. This approach is useful where unusual local conditions differentiate the study airport from other airports in the region.

- Market share analysis or ration analysis – This technique assumes a top-down relationship between national, regional, and local forecasts. Local forecasts are a market share percentage of regional forecasts, which are a market share percentage of national forecasts. Historical market shares are calculated and used as a basis for projecting future market shares.

- Smoothing – A statistical technique applied to historical data, given greater weight to the latest trend and conditions at the airport; it can be effective in generating short-term forecasts.

- Expert Judgment – This effort simply looks to utilize a combination of the methods presented above, but applies a level of expert judgment from local, regional, and national aviation industry knowledge.

Considering historical airport data inaccuracies, the forecast methodology for this effort will incorporate Trend Analysis, Market Share Analysis, Expert Judgment. It will also be guided by the Rhode Island State Airport System Plan forecasts.

Over the life of a forecast, unanticipated events such as a downturn in the economy, fuel prices, acts of terrorism, and in recent years, various airborne disease outbreaks (e.g. Avian Flu, Severe Acute Respiratory Syndrome (SARS), etc.) may impact the anticipated activity levels at the airport. It is critical that SFZ consistently review the developed forecast to determine how unanticipated events influence the need for new or expanded facilities. As a part of the forecasting effort, this SFZ Master Plan Update forecasts were developed using:

- Historical operations and based aircraft data (FAA Form 5010 data);
- RIAC Business Strategy Plan (2007)
- Federal Aviation Administration Aerospace Forecasts FY 2007-2027;
- SFZ Airport Layout Plan Update (2001);
- Federal Aviation Administration Terminal Area Forecasts (FAA TAF); and
- Rhode Island Airport System Plan (RIASP) draft August 2008.

Where airport activity is projected to reach certain levels the forecasts must be approved by FAA. Because SFZ exceeds the FAA criteria (over 100 based aircraft) the forecast must be approved by FAA prior to proceeding to the Facility Requirements analysis. The FAA reviews the forecast to ensure that an acceptable forecast analysis was utilized and the projections are consistent will the FAA annual Terminal Area Forecast (TAF).

3.1.1 Airport Service Area

The airports within Rhode Island's air transportation system contribute to the state's transportation and economic needs at varying levels. For the purpose of evaluating reasonable estimates of future aviation activity it is essential to consider two major forecast elements, the type of activity, and the annual level of activity. These elements contribute to the establishment of an airport's market area. The market area served by SFZ is designated as the "airport service area". The airport service area is defined by its proximity to other airports serving the general aviation needs of the community. Aviation demand corresponds with local and regional growth trends as it relates to the socio-economic characteristics, and other factors that influence the demand for airport services. Aviation activity levels result from the interaction of demand and supply factors. Industry practices use various methods to determine an airport's market area. In addition to the airports located in Rhode Island, it is important to point out that North Central Airport is not only competing for business with other airports in Rhode Island but also in Connecticut and Massachusetts. There are approximately ten airports in both states that have a potential to impact the operations at SFZ.

In determining which airport would have the greatest impact on SFZ, seven airports were selected utilizing RIAC's 2007 Business Strategy Plan. The plan identified several airports within a 50 statute mile radius of North Central as being a part of the general aviation market or service area for the Airport. Table 3.1 below identifies the airports in the service area described in the Plan. In addition to the airport names, the table lists specific operational data and facility characteristics which play a key part of attracting customers to a facility within the service area. North Central State Airport serves a fairly large region which includes western Connecticut, south-central and southeastern Massachusetts, half of Providence County including

the cities of Pawtucket and Woonsocket; and southwestern Norfolk County including Attleboro, and a good portion of Kent and Bristol Counties.

Information on the airport service area also determined through FAA 5010 data as well as research on airport websites. In addition, information was obtained from the airport user survey conducted as part of this Master Plan which is described later in this section. Figure 3.1 below provides a graphical representation of a number of of airports within the region that have an impact on SFZ and its operations. Within the 25 and 50 mile radius are airports that have similar aviation activity and provide comparable facilities and services to those offered at SFZ. A 25 and 50-statute mile radius is used to estimate an approximate ground travel time of 30 and 60 minutes respectively.

Table 3.1
GA Airport Market Surrounding SFZ

Airport Name	Longest Runway (feet)	Distance from SFZ (miles)	Instrument Approach Procedures	Based Aircraft	% of Total	Annual GA Operations	% of Total	Local GA Operations	% of Total	Local Ops per Based
Theodore Francis Green State Airport (PVD)	7,166 x 150	20	14	71	11%	27,058	7%	3,134	1%	44
Mansfield Municipal Airport (1B9)	3,500 x 75	23	2	117	18%	55,000	14%	35,000	17%	299
Quonset State Airport (OQU)	7504 x 150	29	6	25	4%	14,100	4%	11,000	5%	440
Danielson Airport (5B3)	2,700 x 75	31	1	44	7%	24,040	6%	17,200	8%	391
Tauton Municipal Airport (TAN)	3,500 x 75	40	1	109	17%	110,000	29%	50,000	24%	459
Southbridge Municipal Airport (3B0)	3,501 x 75	46	2	35	5%	50,700	13%	30,500	14%	871
Plymouth Municipal Airport (PYM)	4,349 x 75	50	2	132	20%	75,000	20%	50,000	24%	379
North Central State Airport	5,000 x 100	-	5	116	18%	27,181	7%	14,789	7%	127
			Totals:	649	100%	383,079	100%	211,623	100%	326

** Data does not include Military Based Aircraft, Military Operations or Air Carrier Operations. Source: FAA 5010 data, AirNAV, and consultant calculations.*

Figure 3.1
North Central State Airport Service Area

Rhode Island Airport Corporation

The airport data specific for the facilities in the SFZ airport service area as identified in Table 3.1 above, was obtained from published FAA 5010 Airport Master Record and further analyzed for market share and operational comparison purposes. The evaluation of this data which was dated July 2008, revealed 115 based aircraft at SFZ, however, more accurate data obtained directly from the Airport gives the based aircraft number of 116. For the purpose of this study, the more accurate number of 116 based aircraft will be used to develop the forecast scenarios that result from various assumptions and calculations within this section.

North Central's based aircraft number of 116 has the third largest based aircraft number out of the seven other airports within the identified service area. The remaining airports reported the following based aircraft numbers to the FAA; T.F. Green with 71 (primary commercial airport), Mansfield Municipal with 117, Quonset State Airport with 25, Danielson with 44, Taunton Municipal with 109, Southbridge Municipal with 35, and Plymouth Municipal Airport with 132.

The number of operations per based aircraft is one indicator to determine future activity at an airport. While this methodology for determination of future activity is not always accurate, it does provide a sound basis for estimating future activity at the airport. Understanding the market area established for the purposes of this study as identified above, SFZ holds 18% of the based aircraft market, 7% of Annual GA operations, and 7% of local GA Operations. While SFZ is comparable to Mansfield Airport for having 18% of the based aircraft in the service area, on average SFZ produced only 127 local operations per based aircraft (OPBA), considerably less than the average of 326 of the seven other airports reviewed. The fact that SFZ has the third largest number of based aircraft but is fifth in the number of annual operations is an indicator that SFZ may have an opportunity to compete for additional market share for these aircraft. This will be addressed later in the forecast assumptions.

3.1.2 General Aviation

General Aviation (GA) is one of two major categories of civil aviation. GA is defined as the operation of civilian aircraft for purposes other than commercial passenger transport, including personal, business, and instructional flying and excludes aircraft that are the military. GA provides vital services to individuals, families, churches, hospitals, colleges, small businesses, and thousands of communities throughout America. In addition, GA also provides advantages to the personal and business traveler with direct access to over 5,000 public use airports in the United States. Due to GA's popularity, the majority of the world's air traffic is classified as GA operations. Specific trends related to GA activity are identified in terms of the number of manufacturer shipments, changes in active fleet mix and utilization of GA aircraft. It should be noted that the GA aircraft population has the ability to be served by the smallest piston aircraft to a large jet.

3.1.2.1 National, State and Local Trends

The aviation industry is rapidly changing on National, State, and local levels. These trends may increase the demand for infrastructure improvements or the addition of runways, taxiways, aircraft parking aprons, and terminal facilities. This trend has not always been the case in the recent history of general aviation. Prior to August of 1994, there was no time limitation on product liability for GA aircraft manufacturers. As a result, manufacturers were required to seek broader liability insurance policies, which led to increased insurance premiums and ultimately drove up the cost of new aircraft. Due to the high purchase price of new aircraft, GA aircraft deliveries significantly decreased. In August of 1994, Congress enacted the General Aviation Revitalization Act, which established an 18-year Statute of Repose in the manufacture of all GA

industry aircraft and their components, in terms of liability. This change has led to several advances in the development of fixed-wing aircraft including:

- New GA aircraft manufacturers entering the marketplace;
- Construction of new aircraft manufacturing facilities;
- Expansion of existing manufacturing facilities; and
- Increased expenditures on research and development of aircraft and avionics to make flying safer and easier to learn.

As a result, GA manufacturers experienced increased aircraft deliveries, flight safety, and popularity. The positive trends associated with the GA industry as a result of this Congressional Act are anticipated to last well into the future.

3.1.2.2 FAA Active GA and Air Taxi Forecasts

Another significant indicator as to the strength of the aviation industry, more specifically evaluating the increase or decline of operations over a period of time is through the evaluation of active general aviation and air taxi forecasts. The information used to evaluate the industry is the FAA's Aerospace Forecast, which provides a source of information that details a variety of forecasts for the aviation industry. The FAA develops this forecast annually and the information contained within is associated with economic activity, commercial aviation, air cargo, commercial space transportation, and general aviation to indicate aviation demand and activity. The FAA publishes this data to indicate industry trends and help guide the organization to adjust aviation policy accordingly.

In recent years the FAA has included a new classification of aircraft titled "Sport Aircraft", which was not included in earlier FAA registry counts. This classification was created in 2005 and the forecast assumes that registration of over 13,500 aircraft by 2017 will occur for the 12-year period. The FAA defines the sport aircraft classification as an aircraft with a maximum gross takeoff weight of less than 1,320 pounds for aircraft designed to operate from land; a maximum airspeed in level flight of 120 knots; either one or two seats; a fixed pitch or ground adjustable propeller; and a single reciprocating engine. An example of an aircraft in this classification of aircraft includes the Piper Cub, a popular small, light, single engine aircraft built in the late 1930's through the late 1940's.

Table 3.2
2008 FAA U.S. Active General Aviation and Air Taxi Aircraft Forecast

Year	Piston		Turbine		Rotorcraft					
	Single Engine	Multi-engine	Turbo Prop	Turbo Jet	Piston	Turbine	Experimental	Sport Aircraft	Other	General Aviation
2008	144,220	18,385	8,300	12,000	3,970	6,245	24,785	3,800	6,450	228,155
2010	144,015	18,055	8,565	14,220	4,725	6,575	26,285	5,600	6,510	234,550
2015	145,620	17,245	9,310	19,845	6,255	7,290	29,760	10,500	6,460	252,285
2020	150,035	16,455	10,110	24,900	7,295	7,915	32,625	13,200	6,405	268,940
2025	157,400	15,650	10,820	29,515	8,295	8,560	35,200	14,700	6,360	286,500
2026	158,187	15,517	10,972	31,008	8,647	8,708	35,887	16,000	6,359	289,982
2027	158,987	15,386	11,126	32,577	9,015	8,859	36,586	17,415	6,358	293,506
AAG	0.5%	-0.9%	1.5%	5.1%	4.2%	1.6%	2.0%	7.9%	-0.1%	1.3%

* Source: FAA General Aviation and Air Taxi Activity (and Avionics) Surveys and Consultant Calculations.
Note: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

As indicated in Table 3.2 above, there are nine classifications of aircraft included in the forecast. The classifications consist of single and multi engine piston aircraft; turbo prop and turbo jet turbine aircraft; piston and turbine rotorcraft; experimental aircraft; sport aircraft; and other aircraft. The table evaluates the growth of each classification over a 2 year period with a resulting average annual growth rate (AAG) for each classification. One of the key indicators as to the growth of aviation is the AAG of the active general aviation fleet which is forecast to increase at an average annual rate of 1.3% over the next 20 years. The most significant growth is projected to occur in the sport aircraft classification with an increase of 7.9% followed by the fixed wing turbo jet classification at 5.1%. The anticipated growth from 2008 to 2027 in the fixed wing turbo jet numbers would effectively triple the fleet over the forecasting period. Piston type aircraft (single/multi-engine) are anticipated to experience negligible growth; however, turbine aircraft (fixed-wing and rotorcraft) are anticipated to increase by 3.2% annually over the forecasting period. The result of this evaluation would indicate a steady increase in aviation activity into the future.

3.1.2.3 State of Rhode Island Terminal Area Forecast

On an annual basis, the FAA updates and publishes a Terminal Area Forecast (TAF) to include air carrier, air taxi/commuter, general aviation, and military operations at various airports. The purpose of the TAF is to provide the aviation community with data that indicates aviation demand at U.S. airports. The activity forecasts are prepared for all towered and non-towered airports and include both itinerant and local operations. The TAF is available for all regions under the control of the FAA, including specific states, regions, or airports. For non-towered airports such as North Central State, data for the TAF is solely obtained based on FAA Form 5010 data for activity levels (estimated by FAA inspectors and/or state and local airport officials). Generally, operations levels are held constant unless otherwise specified by a local or regional FAA official. It is for this reason that the TAF for SFZ is carried forward from the last reported year's activity levels. Therefore, this master plan update forecast effort for SFZ will utilize the TAF for the State of Rhode Island which gives an estimated general aviation growth rate throughout the state and is more representative of the condition of aviation in the State of Rhode Island rather than utilizing the TAF for SFZ. This is a normal practice for smaller general aviation airports similar to SFZ.

Evaluation of the TAF for the State of Rhode Island indicates the total general aviation operations for the State will experience a moderate increase of 0.08% annually from 2007 to 2027 as indicated in Table 3.3 below. The forecast also shows that based aircraft will decrease by an average of 0.05% annually resulting in a decrease from 347 to 344 based aircraft over that same time period. Typically, a decrease in the number of based aircraft would tend to have the same impact on the total number of annual operations. Given the less than 1% growth in annual operations, the - 0.05% of based aircraft, both numbers represent a fairly small deviation from one another and show no significant impact to the demand on the State aviation system. Overall, the TAF has forecasted GA operations to grow minimally within the State of Rhode Island. Most notably, the total instrument operations have the largest growth rate at 1.5% annually.

Table 3.3
2007 FAA Terminal Area Forecast - State of Rhode Island

Year	Itinerant GA Operations	Local GA Operations	Total GA Operations	Total Inst. Operations	Based Aircraft
2007	52,153	61,210	113,363	221,847	347
2012	52,610	61,221	113,830	245,373	346
2017	53,066	61,231	114,297	268,899	345
2027	53,980	61,252	115,232	315,950	344
AAG	0.17%	0.003%	0.08%	1.5%	-0.05%

Note: AAG = Average Annual Growth Rate for the State of Rhode Island, Source: FAA Terminal Area Forecast and Consultant

3.1.2.4 Rhode Island State Airport System Plan (RIASP)

The Rhode Island Guide Plan, Element 640[1] Airport System Plan contains a strategic policy plan for the six state owned commercial and general aviation airports. The purpose of the plan is to look forward to the year 2021 to ensure Rhode Island maintains an airport system that can meet the State's long term air transportation and economic needs. This document contains vital statistics and information which can be used to evaluate and further compare the results of the various forecasting methods.

Table 3.4 below identifies all five general aviation airports in the Rhode Island State Airport System. The forecast represents airport operations over a 20 year period from 2001 to 2021. As evidenced by the tables projections, North Central State Airport is projected to maintain between 63.83% and 63.93% of the total operations for all of the State administered airports (excluding T.F. Green). North Central's annual operations numbers are significantly higher than the other airports. Since the RIASP looks at historical data going back to 2001 and forecasts to the year 2021, the historical information from 2001 to 2007 can be evaluated to determine the soundness of the forecasting methodology used in the RIASP. Table 3.5 in the Activity Forecast section evaluates historical growth from 1998 to 2007. The overall growth for this period shows a decrease of 2.2% in average annual growth ending with the 2007 operations activity at 27,181 operations, less than half of 66,900 operations projected in the RIASP.

Table 3.4
General Aviation Projections 2001-2021- RIASP

Airport	Actual 2001	2006	2011	2021
Block Island	9,674	10,000	10,800	12,300
Newport	12,485	12,800	13,800	15,700
North Central	65,000	66,900	72,000	81,700
Quonset	7,927	8,200	8,800	10,000
Westerly	6,585	6,800	7,300	8,300
State Total (excluding T.F. Green)	101,671	104,700	112,700	128,000
SFZ Operations as a % of Total	63.93%	63.90%	63.89%	63.83%
Percent Change	-n/a-	0.03%	0.01%	0.06%

Source: Rhode Island Guide Plan, August 2008

[1] Element 640 - ASP is currently (draft Aug 2008) in the process of being evaluated for adoption as part of the Rhode Island Guide Plan.

3.1.2.5 Other Outside Influences

New aircraft technology can profoundly impact aviation operations. The new aircraft technology that is of interest with regard to the SFZ Master Plan Update is the introduction of the very light jet or VLJ. These new aircraft are currently being developed by several manufacturers and are small, relatively inexpensive to own and operate, and are designed to operate at airports with capabilities less than typical air carrier airports. One of these VLJ's is the Eclipse Aviation 500 Jet, shown here. The six-passenger aircraft uses state-of-the-art technology in its manufacturing process to provide enhanced performance and reduced operational costs in comparison to conventional corporate jets.

Eclipse Aviation 500 Jet
Source: www.eclipse.com

Of all the VLJ currently in development, the Eclipse 500 is the first jet certified by the FAA. Production of the Eclipse began in 2007. In some cases, these airplanes will replace older business jets of similar capacity, and in other cases, the VLJ may replace older turboprop aircraft. While less expensive than other jets (assuming the current cost estimate is maintained), the close to $1.0 million price tag will generally limit potential owners to those who already fly jets or turboprops. Charter operators may use the airplane, but again this will generally be to replace the existing fleet.

In recent months there have been some financial setbacks for the manufacturer of the Eclipse 500 resulting in bankruptcy, but a group of owners purchased the assets in 2009 and are still operating. This should have no bearing on the long term positive impact that VLJ will have on the State and National aviation systems. The need for economical and fuel efficient aircraft, specifically small jets will continue to be an important part of the general aviation industry in the future.

3.1.3 Summary of Growth Rates and Preferred Methodology

In review of the general aviation trends, Rhode Island State Airport System Plan, and Rhode Island State TAF, the results show minimal growth at North Central State Airport and in some cases point to a decrease in aircraft activity and airport usage. The forecasts based on a regional or local level shows slow growth. On a national level, the aviation industry seems to be growing at a steady pace with operations increasing year after year and projecting to do so on into the future.

As previously discussed, the key factors for developing a GA forecast include understanding the trends associated with an airport's based aircraft and local/itinerant operations. Limitations based on the accuracy of the operational data discourages the use regression analysis type forecasting methodologies. While SFZ has the greatest number of based aircraft it has one on the lowest operational counts per based aircraft out of all the airports studied.

It is for these reasons that it was determined that the preferred forecasting methodology would be based on a trend analysis of based aircraft and operations, expert judgment in satisfying latent demand, an extensive evaluation of key factors that influence aviation activity at SFZ, including existing airport conditions and

services, peak period aircraft operations, and the potential to improve the precision approach capabilities of the Airport.

3.2 Demand Factors

The annual activity forecasts at North Central State Airport are derived from the number of based aircraft, an evaluation of the average number of operations per based aircraft, and input from Airport users and RIAC staff. Future airport demand is driven by many factors, including the local and regional economy, competing airports, and new and emerging technologies. For the purposes of this Study, analyses of the following were performed to gain insight into the demand factors affecting SFZ:

- Based aircraft owner survey;
- Transient aircraft owner survey; and
- Business community interviews.

3.2.1 Based Aircraft Owner Survey

An airport user survey was developed to identify user needs and concerns with respect to SFZ facilities and operations. A copy of the survey can be found in the Appendix. The surveys were sent to 100 based aircraft owners at SFZ. 34 owners completed and returned the survey.

The survey focused on obtaining based aircraft owner's feedback regarding primary factors in choosing SFZ as a home base for their aircraft, their current and planned aviation activity, typical destination airports, and likes/dislikes of SFZ in general. With the exception of one twin piston engine aircraft owner, all respondents were owners of single engine aircraft such as the popular Cessna 172, Piper Cherokee PA 28, or aircraft with similar performance capabilities. All of the respondents expect to keep operating the same aircraft in the near future, four of which are evaluating the possibly of changing the type or model of the aircraft they currently base at SFZ. One single engine aircraft owner is considering upgrading to a light twin engine aircraft, and the other may consider basing an experimental or seaplane aircraft either in lieu of, or in addition to, their current based aircraft.

Nineteen of the 34 respondents considered basing their aircraft at another airport mainly due to the lack of FBO facilities, hangar space, overall cost, and lack of an ILS at SFZ. Specific likes and dislikes of SFZ were consistent with the overwhelming issue at the airport being the lack of hangar space, no restaurant, and the availability of automobile parking. The most frequent positive responses were the good taxiways and runways, helpful and courteous staff, and overall condition of the facility.

In determining flight operations, 20 of the 34 respondents perform 20 flight operations or less per month at SFZ whereas the other 14 respondents perform between 21 and 60 flight operations per month. Twenty-four of the 34 plan to maintain their same level of operations per month; while 9 plan to increase their number of operations. One respondent plans to decrease his/her number of operations due to the sale of the airplane.

3.2.2 Transient Airport User Survey

A second survey was developed and placed at the airport to evaluate the needs and concerns of transient users. A copy of the survey can be found in the Appendix. The surveys were placed in the Landmark

terminal area from August 22 through October 7, 2008. Only four surveys were completed by transient aircraft operators. The small number of responses could be the result of limited transient activity due to inclement weather, higher fuel prices, and/or seasonal aviation activity trends during the survey period.

The type of transient activity ranged from that of a single engine Cessna 172 flying in daily for business to a Falcon DA900 EX with 12 passengers conducting charter operations. Other transient activity obtained as a result of the survey included that of a pilot with no passengers in a PA 28 stopping in for a visit, and a Cessna Citation Ultra corporate jet dropping off three passengers for business. Overwhelmingly, the primary reason for using SFZ as a destination airport was convenience.

One of the four aircraft landing at SFZ makes the trip daily, the rest of the transient operators who completed the survey were experiencing their first visit to SFZ. One of the four survey respondents indicated that the FBO needed a better flight planning area while two of the four requested a precision approach. Transient operators rated the quality of airfield pavement, lighting, and navigational equipment, as average. When asked to compare the number of services, quality of services and terminal/apron security to other destination airports users once again mostly rated these areas excellent.

Transient users who completed the survey originated their flights from cities including: Nashville International Airport (TN), New Bedford Regional Airport, and Statesville Regional Airport (NC).

In summary, the following identifies areas to be further analyzed in this Master Plan effort. They include:

- Improved approach capability;
- Hangar space;
- Auto parking;
- Improved flight planning facilities; and
- A restaurant.

3.2.3 Business Community Interviews

To determine the local business climate and the extent to which local businesses may have an impact on future use of the Airport, an interview was conducted with the North Rhode Island Chamber of Commerce (NRICC). The interview highlighted current business related activity in the local area as well as identifying future growth in businesses and revealed some valuable information that can be applied to forecasting and development scenarios.

While the NRICC was aware of the Airport facilities, there was a feeling that there could be increased involvement by the local chamber members in the activities at the Airport. This involvement could increase the profile of the Airport with local colleges and summer camps, investment firms, as well as area resort users/owners. It was indicated that some of these users are utilizing their own corporate type aircraft, or charter companies to visit the local area.

The NRICC viewed the Airport as a valuable asset to the Region and as well as revealing that some of the future activities of the local business landscape may require the services of a general aviation facility such as North Central State Airport. In recent months there has been some activity in the local area that could have a positive impact on the future use of the Airport. A few examples of the activity include:

Economic Activity- A large financial firm which houses a call and administrative processing center has a significant campus with one of the largest collective office spaces in the State of Rhode Island. There is currently a move to open additional space and a new division that is said to be geared towards the accounts of higher end clients. These higher end account holders may have use for the types of aviation services that North Central State Airport provides. The new division is also was reported as providing over 1,000 additional jobs in the region which, depending on the level of disposable income by the employees, could increase the general aviation use at the Airport.

Local Development- New development projects in the area have the potential to attract and cater to businesses in the Smithfield community. There are some urban planning projects being discussed which could potentially create small communities within the larger community which have the potential to draw home buyers and attract business that want a "local feel" to the area in which they operate. Most of this development is on Route 116 with easy access to Interstate 295 and ultimately I-95. This ease of access will also attract residents and businesses with an interest utilizing various modes of transportation. In addition to residential projects there have been reports to the Chamber of interest in constructing a hotel adjacent to Interstate 295 as well as further development of office buildings in the same area adding to the residential and industrial type setting in the 295 corridor.

Local University- in addition to financial and local development, a local university which is purported to have one of the top business schools in the country, is in the process of developing the campus and its academic offerings. The creation of new dormitories and a U.S.-China Institute which opened on campus to enhance academic and business programs with Chinese academic institutions and foster trade between U.S. companies and China which is currently experiencing dramatic growth in its economy. These programs will assist the school in further building on its reputation in business and help attract students and other businesses to the area.

3.3 Activity Forecasts

Activity forecasts of the Master Plan represent a range of annual aviation activity that SFZ may experience through 2027. The forecasted activity levels are presented in five, ten, and twenty year periods.

Operational forecasting provides the basis for evaluating the type of facilities needed to meet demand. By comparing the existing facilities at the Airport with the facilities needed to meet this future demand, timely and cost effective improvements can be planned. The Federal Aviation Administration Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), dated December 4, 2000, declares that forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflect the current conditions at the airport;
- Supported by information in the study; and
- Provide an adequate justification for the airport planning and development.

The forecasts presented in this section reflect an analysis conducted on historical and forecasted data representative of both the airport and various regional, state, and local indicators. The analysis was conducted to determine the number of based aircraft and the airport's total operations.

3.3.1 Historical Activity Review

Reviewing historical figures and examining the outside influences to an airport's forecast is critical to its validity. In reviewing the projected forecast numbers, a comparison with the historical trends can provide a more detailed projection of future activity based on history. While this does not provide a guarantee of future activity, levels the data helps determine the validity of the forecast. In the case of SFZ the historical forecasts don't reinforce the methodology used in the projections. Table 3.5 below shows the annual historical aircraft operations, the number of based aircraft, and the operations per based aircraft from 1998 until 2007.

Table 3.5
SFZ Historical Operations and Based Aircraft Activity 1998-2007

Year	Total Operations	% Growth	Total Based Aircraft	% Growth	Ops Per Based Aircraft
1998	41,054	N/A	144	N/A	145
1999	54,956	34%	117	-18.8%	235
2000	42,400	-23%	117	0.0%	167
2001	47,269	11%	115	-1.7%	180
2002	48,015	2%	115	0.0%	359
2003	32,108	-33%	115	0.0%	266
2004	24,880	-23%	115	0.0%	186
2005	29,510	19%	115	0.0%	156
2006	31,337	6%	115	0.0%	231
2007	27,181	-13%	116	0.9%	127
Average Annual Growth:		-2.2%	N/A	-2.2%	205

Sources: RIAC, Landmark Aviation and FAA Form 5010-1 Airport Master Records

Overall fuel sales at SFZ have also fluctuated over the last ten years. Table 3.6 reflects the annual fuel sales for AvGas, Jet A, and total fuel sales. As indicated, while AvGas is down during the period, overall fuel sales have trended towards a 2.1% annual increase.

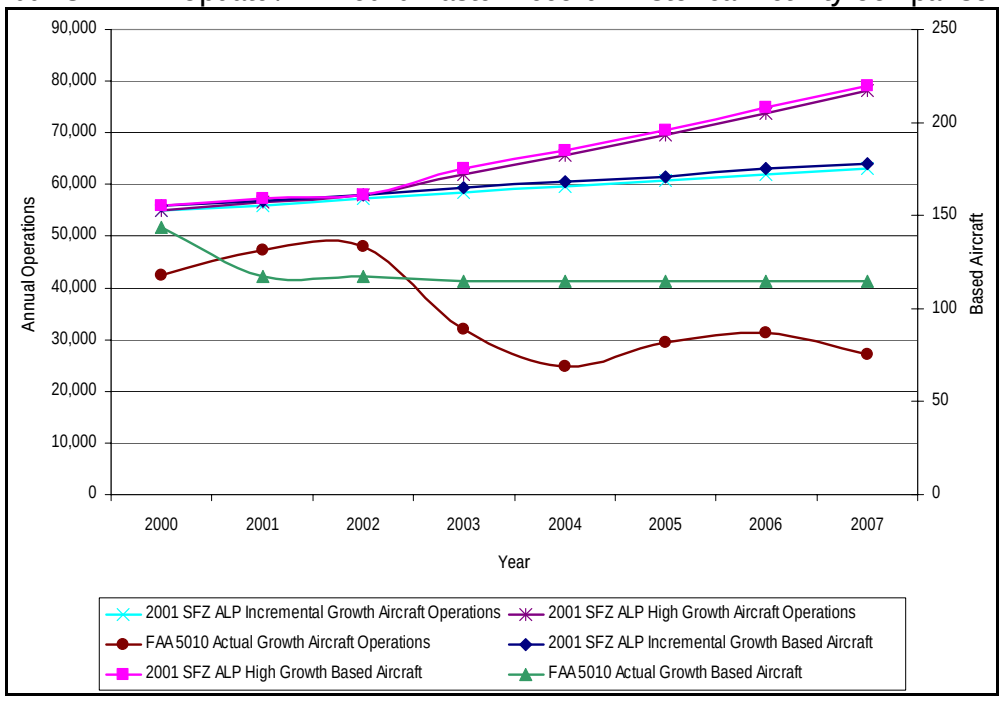
Table 3.6
SFZ Historical Fuel Sale Activity 1998-2007

Year	AvGas Gallons	% Change	Jet A Gallons	% Change	All Fuel	% Change
1998	99,086	N/A	34,911	N/A	133,997	N/A
1999	129,070	30%	39,484	13.1%	168,554	25.8%
2000	101,963	-21%	57,973	46.8%	159,936	-5.1%
2001	97,710	-4%	49,110	-15.3%	146,820	-8.2%
2002	83,958	-14%	54,655	11.3%	138,613	-5.6%
2003	76,440	-9%	97,585	78.5%	174,025	25.5%
2004	70,004	-8%	58,598	-40.0%	128,602	-26.1%
2005	52,009	-26%	131,486	124.4%	183,495	42.7%
2006	66,973	29%	114,672	-12.8%	181,645	-1.0%
2007	60,126	-10%	68,625	-40.2%	128,751	-29.1%
Average Annual Change:		-3.7%	N/A	18.4%		2.1%

Sources: RIAC, Landmark Aviation and FAA Form 5010-1 Airport Master Records

And finally to look at all planning activity for SFZ, this Master Plan reviewed the 2001 ALP Update for SFZ. While that Update did not provide long term forecasts, it utilized two forecast scenarios: Incremental Growth, and High Growth. The incremental growth scenario assumed a 2% average annual growth rate over a ten year period. And the high growth scenario assumed a 5% average annual growth rate over the same period. Neither of these forecast scenarios were achieved over there intended planning period. This activity is shown in Figure 3.2 below.

Figure 3.2
2001 SFZ ALP Update / FAA 5010 Master Record - Historical Activity Comparison



As indicated in the above tables and discussion, certain trends, correlations, and growth figures were obtained and applied to developing the forecast. In the case of SFZ, historical data such as based aircraft, total operations, the TAF for the State of Rhode Island, and the current Rhode Island State Airport System Plan were examined during this process. In review, the following are the Average Annual Growth (AAG) rates obtained from this data over their forecast or historical performance period:

- Historical Trends – SFZ Annual Operations.....(-2.20%)
- Historical Trends – SFZ Based Aircraft.....(-2.20%)
- FAA TAF State of Rhode Island – Based Aircraft.....(-0.05%)
- FAA TAF State of Rhode Island – GA Operations 0.08%
- Draft 2008 Rhode Island Airport System Plan – Operations 1.30%
- North Central 2001 ALP Update – Incremental Growth 2.00%
- North Central 2001 ALP Update – High Growth.....5.00%

The results of this information will be taken into account in the forecast scenarios presented in the next section.

3.3.2 Forecasting Scenarios

In developing the forecast for SFZ, three different forecasting scenarios were developed. These scenarios present the airport's total based aircraft and total airport operations over the forecasting period (2012, 2017 and 2027). It should be noted that the realistic period is the short range period (2012). After that period the forecast should be reassessed to track against the medium and long range projections. It is important to note that the forecasted year is not the trigger for development. Project development would only occur if the projection is realized.

Each forecasting scenario represents a different level of growth depicting a low, medium, and high growth forecast. Once a preferred scenario is chosen, further analysis will be conducted to indicate the scenario's type of based aircraft fleet mix, to include single-or multi-engine, helicopters, and total operations. This will allow the master plan to develop facility requirements that properly addresses the forecasted growth.

- Forecast Scenario One – Low Growth
  This scenario takes into account recent declines in activity and utilizes a judgment growth rate of 0.5% annually.

- Forecast Scenario Two – Medium Growth
  This scenario utilizes the System Plan growth rates for based aircraft and operations of 1.30%.

- Forecast Scenario Three – High Growth
  This scenario utilizes expert judgment and applies a growth scenario that takes into account the possibility of improving the instrument approaches for SFZ that would increase the attractiveness and use of SFZ. It assumes an average annual growth rate of 3.0%.

3.3.2.1 Forecast Scenario One – Low Growth

Scenario One, represents the SFZ low growth forecast. Based on historical activity declining over the last ten years, this is a conservative growth outlook at an average annual growth rate of 0.05%. This scenario would be the likely scenario to track given an extended downturn in the economy. Table 3.7 indicates the projected levels of activity under this limited growth scenario. SFZ is projected to reach 128 based aircraft and a total of 30,032 total operations by 2027.

Table 3.7
Forecasting Scenario One: Low Growth

	Historical	Forecast		
Year:	2007	2012	2017	2027
Total Based Aircraft:	116	119	122	128
Total Airport Operations:	27,181	27,867	28,571	30,032

3.3.2.2 Forecast Scenario Two – Medium Growth

Scenario Two represents the medium growth forecast. This scenario assumes no improvement to the instrument approaches and utilizes the System Plan average annual growth rate of 1.3%. This forecasting scenario indicates SFZ is projected to reach 156 based aircraft and 36,765 total operations by 2027. Table 3.8 indicates the forecasted figures for this particular scenario.

Table 3.8
Forecasting Scenario Two: Medium Growth

Year:	Historical 2007	Forecast 2012	Forecast 2017	Forecast 2027
Based Aircraft:	116	129	137	156
Total Airport Operations:	27,181	30,289	32,310	36,765

3.3.2.3 Forecast Scenario Three – High Growth

Scenario Three is considered to be a high growth forecast. This forecasting scenario assumes a precision instrument approach will be implemented but not enough to change the design aircraft. Obviously it will encourage greater use of the facility and therefore it is appropriate to assume increased activity. Utilizing the System Plan and Instrument Approach activity statistics from the TAF, it is our professional judgment that an average annual growth rate of 3.0% is appropriate for this scenario. This forecast scenario indicates that SFZ is projected to reach 224 based aircraft and 52,961 total operations by 2027 as indicated in Table 2.15.

Table 3.9
Forecasting Scenario Three: High Growth

Year:	Historical 2007	Forecast 2012	Forecast 2017	Forecast 2027
Based Aircraft:	116	141	167	224
Total Airport Operations:	27,181	33,323	39,408	52,961

3.2.4 Based Aircraft and Operations Forecast Summary

Table 3.10 summarizes the three forecasting scenarios presented above.

Table 3.10
SFZ Forecast Summary

Scenario		Historical 2007	Growth Rate	Forecast 2012	Forecast 2017	Forecast 2027
One – Low Growth	Based Aircraft	116 27,181	0.05%	119	122	128
	Aircraft Operations		0.05%	27,867	28,571	30,032
Two – Medium Growth	Based Aircraft		1.30%	129	137	156
	Aircraft Operations		1.30%	30,289	32,310	36,765
Three – High Growth	Based Aircraft		3.00%	141	167	224
	Aircraft Operations		3.00%	33,323	39,408	52,961

3.3.4 Fleet Mix Forecast

The fleet mix of based aircraft was inventoried in the baseline conditions section of this master plan study. There is no indication that the fleet mix for North Central State Airport will change in the forecasting period, except for the potential of based jet aircraft in the high scenario. Table 3.11 shows the historical fleet mix from 2007 and applies these percentages to each of the forecast scenarios developed above.

Table 3.11
Based Aircraft Fleet Mix Forecast

Aircraft Type	2007 Historical Fleet Mix	Scenario One - Low			Scenario Two - Medium			Scenario Three - High		
		2012	2017	2027	2012	2017	2027	2012	2017	2027
Single-Piston	92%	110	113	118	119	126	143	130	154	206
Multi-Piston	8%	9	9	10	10	11	11	11	11	14
Turbine	0%	0	0	0	0	0	1	0	1	2
Helicopter	0%	0	0	0	0	0	1	0	0	2
Total	100%	119	122	128	129	137	156	141	167	224

3.3.5 Peak Period Activity Levels

The peak period calculations are used to determine the capacity of the airport and its ability to handle that capacity. The peak period operations for North Central State Airport are derived for the peak month and the average day within the peak month. The busiest month, as is the case with most general aviation airports in the northeast, was identified as August and confirmed by Landmark. Based on experience with Northeastern airports, the month of August, on average, yields approximately 15% of the average annual operations. This is a typical scenario, given that many GA airports' operational activity is up during the summer months.

The peak day is calculated by dividing the peak month's operations by the number of days within that month. Since August has been determined to be the peak month, the total operations for the month are divided by 31 days. Based on the annual number of operations, 27,181, at 15% for August (4,077), divided by 31 days, the historical peak day is calculated to be 131 operations and will be utilized in the Facility Requirements to determine Peak Day design requirements.

3.4 Airport Role

3.4.1 Airport Classification

The annual National Plan of Integrated Airport Systems (NPIAS) identifies more than 3,400 existing and proposed airports that are significant to national air transportation and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). The NPIAS provides a broad assessment of the funds required to bring the airport infrastructure to current design standards and/or increase capacity at congested airports. The Federal Aviation Administration is required to provide Congress with a NPIAS report every 2 years.

The NPIAS identifies the roles within the national transportation system by establishing a classification system for airports that are important to the national air transportation system. The role of North Central within the aviation system is identified as serving general aviation traffic. This includes all types of aircraft including small single engine aircraft to larger corporate jet traffic. The types of activity typically seen at SFZ are flight training, leisure or recreational flying, as well as some corporate business aviation service. It is important to note that SFZ does not accommodate scheduled air service or cargo operations. Although SFZ serves various types of general aviation aircraft, it is identified as a "Reliever / General Aviation Airport" for T.F. Green in Providence.

3.4.2 Airport Reference Code (ARC)

The Airport Reference Code (ARC) is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport. The airport reference code has two components pertaining to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to the aircraft approach speed, an operational characteristic. The second component, depicted by a roman numeral, is the aircraft design group and relates to the aircraft wingspan, a physical characteristic. These are fully explained in Section 1.2 of this Master Plan Update.

Operations at SFZ are characterized by single and twin-engine piston aircraft, along with occasional turbo prop and small to medium size jet activity. The 2001AMP, as well as the draft 2008 Airport System Plan, identifies SFZ as typically serving aircraft from Category B, and Design Group II. Considering the above mentioned standards the current role of SFZ is a General Utility Stage II Airport having an ARC of B-II.

3.4.3 Design Standard

The role of the airport influences its design and determines the type of aircraft the airport can accommodate. An airport's role is also determined by the level of services the airport provides. There are three airport roles associated with commercial service, reliever, and general aviation airports. These roles are basic utility, general utility, and transport. These definitions are further clarified below:

Basic Utility Stage I. This type of runway serves 75 percent of the small (12,500 pounds or less) single-engine and twin-engine aircraft in Aircraft Approach Categories A and B used for personal and business purposes. Precision approach operations are not anticipated. This runway type is usually designed for aircraft in Airport Reference Code A-1.

Cessna 172
Sample A-I Aircraft

Beechcraft Baron
Sample B-I Aircraft

Basic Utility Stage II. This type of runway serves 95 percent of the small (12,500 pounds or less) single-engine and twin-engine aircraft in Approach Categories A and B. This includes all aircraft served by Basic Utility Stage I runways, plus some small business and air-taxi twin-engine aircraft. Precision approach operations are not anticipated. This type of runway is usually designed for aircraft in Airport Reference Code B-1.

Beechcraft King Air
Sample B-II Aircraft

General Utility Stage I. This type of runway serves 100 percent of the small (12,500 pounds or less) single-engine and twin-engine aircraft in Aircraft Approach Categories A and B. Precision approach operations are not anticipated. This type of runway is usually designed for aircraft in Airport Reference Code B-II.

General Utility Stage II. This type of runway serves all aircraft included in General Utility Stage I, plus most of the large aircraft (60,000 pounds or less) in Aircraft Approach Categories A and B. The runway may have the capability for precision-approach operations. This type of runway is normally designed for aircraft in Airport Reference Code B-II or C-II.

Transport. This type of runway serves all the aircraft accommodated by Basic and General Utility runways, plus general aviation aircraft in Aircraft Approach Categories C and D. This type of runway is normally designed for aircraft in Airport Reference Code C-III or D-II or III.

3.4.4 Design Aircraft

Choosing the design aircraft for an Airport is based on the family of aircraft currently and forecasted to use the facility on a regular basis. A review of the 2001 airport master planning data revealed that the critical design aircraft reference code is B-II. The two runways at the airport are of two different categories and need to be identified as such. The critical design aircraft for Runway 5-23 is the Falcon 50 Jet which has an ARC B-II designation. Runway 15-33, is 3,210 feet long and the critical design aircraft are the Piper Navajo (PA 31-310) and Cessna 421, both twin engine pistons with an ARC of B-I designation.

Based on the information obtained for this study the type of aircraft currently operating at SFZ over the planning period will not change. Therefore the approach speed category B (> 91 knots but < 121 knots) and Design Group II (wing span > 49 feet or < 79 feet) is still the appropriate ARC for the 20-year planning period. Even if a precision approach is implemented, the FAA criteria, which requires 500 operations by a transient aircraft larger than a B-II, is not forecasted in the planning period.

Sample aircraft are shown on Table 3.12 on the following page.

Table 3.12
Based and Transient Aircraft Types & ARC's

Aircraft Type	Example	ARC	Based/Transient
Cessna 172		A-I	Based/Transient
Piper Cherokee		A-I	Based/Transient
Beech Bonanza		A-I	Based/Transient
Piper Archer Warrior		A-I	Based/Transient
Cessna 421		B-I	Based/Transient
Cessna Caravan		B-II	Transient
Piper Aztec		B-II	Transient
Beech King Air		B-II	Transient

3.5 Recommended Forecast

The recommended forecast is Scenario 3 – High Growth. This was agreed to after discussion between FAA, RIAC and the consultant. It also considered input from the Local Advisory Group.

Although it is the most optimistic of the three forecast scenarios it was chosen because it tested the extreme limits of the airport's ability to handle such a demand. If the Facility Requirements analysis showed it could accommodate that demand then the airport was capable of managing less than that. To cite what was noted earlier in the Chapter; *"... project development would only occur if the projection is realized."*

Two other contributing factors influencing the decision to go with the higher scenario was (a) the ability to achieve an improved instrument (LPV) approach and (b) over time aircraft currently using T.F. Green as a base of their training activity would change and potentially relocate to SFZ.

Lastly, the consultant also concluded that the family of aircraft anticipated to be served by SFZ during the forecast period will remain in its current role as a General Utility Stage II Airport having an ARC of B-II.