Saratoga County Airport

AIRPORT MASTER PLAN UPDATE

DRAFT CHAPTER 5 DEMAND CAPACITY AND FACILITY REQUIREMENTS

Prepared for:

SARATOGA COUNTY DEPARTMENT OF PUBLIC WORKS

Submitted By:

McFarland Johnson

60 Railroad Place, Suite 402
Saratoga Springs, NY 12866
www.mjinc.com

May 2014

Table of Contents

Table of Tables

Table of Figures

Chapter 5
Demand Capacity and Facility Requirements

5.0 INTRODUCTION

This chapter describes the airside and landside facility requirements necessary to accommodate existing and forecasted demand in accordance with Federal Aviation Administration (FAA) and New York State Department of Transportation (NYSDOT) design criteria and safety standards. The facility requirements are based upon the aviation demand forecasts presented in Chapter 3, *Forecasts of Aviation Activity* and the guidelines provided in FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, and 14 CFR Part 77, *Objects Affecting Navigable Airspace*. The major components of this chapter are listed below:

- Airfield Capacity Analysis
- Design Aircraft and Runway Design Code
- Airport Design Standards
- Airside Facilities
- Landside Facilities
- Other Facility Requirements
- Facility Requirements Summary

5.1. AIRFIELD CAPACITY

Airfield capacity refers to the ability of an airport to safely accommodate a given level of aviation activity. The FAA has prepared a number of publications and computer programs to assist in the calculation of capacity. This report will use the methodologies described in AC 150/5060-5, *Airport Capacity and Delay*.

Capacity is described using three terms: Annual Service Volume (ASV), Visual Flight Rules (VFR) Hourly Capacity, and Instrument Flight Rules (IFR) Hourly Capacity. The ASV is a reasonable estimate of the annual capacity, or the maximum annual level of aircraft operations that can be accommodated at an airfield. Airports can, and often do, exceed their stated annual service volume. Delays begin to increase rapidly once the annual service volume has been exceeded.

The VFR and IFR Hourly Capacities are the maximum number of aircraft operations that can take place on the runway system in one hour under VFR or IFR conditions respectively. When hourly demand approaches or exceeds the hourly capacity, delays may force traffic into the succeeding hours or cause aircraft to divert to other airports.

5.1.1. Airfield Capacity Analysis

It is important to understand the various factors that affect the ability of an air transport system to process demand. Once these factors are identified and their effect on the processing of demand is understood, efficiencies can be evaluated. The airfield capacity analysis considers several factors that affect the ability of the airport to process aviation demand. These factors include:

- Meteorological Conditions
- Runway Configuration
- Runway Utilization
- Aircraft Fleet Mix
- Percent Arriving Aircraft
- Percent Touch-and-Go Operations
- Exit Taxiway Locations

Meteorological Conditions

Meteorological conditions specific to the location of an airport not only influence the airfield layout, but also affect the use of the runway system. As weather conditions shift, low ceilings and visibility can reduce airfield capacity. Runway usage will alter as the wind speed and direction change, also impacting the capacity of the airfield.

Capacity is affected adversely as weather deteriorates. To better understand the impact of deteriorating weather on capacity, a brief synopsis of aviation flying conditions is provided. For the purposes of capacity evaluation, these flying conditions are described as VFR conditions, IFR conditions and Poor Visibility & Ceiling (PVC) conditions. The National Climactic Data Center defines VFR conditions "occur whenever the cloud ceiling is at least 1,000 feet above ground level and the visibility is at least three statute miles." IFR conditions "occur when the reported cloud ceiling is at least 500 feet but less than 1,000 feet and/or visibility is at least one statute mile but less than three statute miles." PVC conditions "exist when the cloud ceiling is less than 500 feet and/or the visibility is less than one statute mile." Decreases in cloud ceiling and visibility require an increase in aircraft spacing, as mandated by the FAA. This increase in aircraft spacing causes a decline in the frequency at which aircraft can land and depart the airfield over a specified period.

Climate data specific to the Airport is not available, although there is an Automated Weather Observation System (AWOS) at Saratoga County Airport, the data is not recorded. FAA criteria allow wind data for other airports to be used during a wind analysis. As a result, the nearest airport collecting weather data was identified as the Floyd Bennett Memorial Airport (GFL) in Queensbury, NY. The National Oceanic and Atmospheric Administration (NOAA) data for GFL was obtained and analyzed to reflect the ceiling and visibility characteristics at Saratoga County Airport. The analysis of this data indicated that VFR conditions occur approximately 89.3% of the time, IFR conditions 8.9%, and PVC conditions about 1.8% of the time.

Runway Configuration

The configuration of the runway system refers to the number, location, and orientation of the active runway(s), the type and direction of operations, and the flight rules in effect at a particular time. The two-runway configuration at Saratoga County Airport provides a high level of wind coverage.

The methodology in AC 150/5060-5 requires the selection of a runway use configuration in Figure 2-1 that provides an estimate of VFR and IFR hourly capacity for the given runway arrangement. For Saratoga County Airport, the configuration representing two intersecting runways (Configuration 9) was used.

Runway Utilization

The active runway is determined by current wind and weather conditions. Aircraft must takeoff and land into the wind, thus the predominant wind direction is taken into account and the traffic pattern is established around that active runway. Based on information provided in the 2003 Airport Master Plan and discussions with the FBO, Runway 23 is the primary runway based on annual usage. Table 5-1 presents the breakdown by runway.

Table 5-1 – Runway Use

Runway	Annual Runway Use
5	15%
23	60%
14	5%
32	20%

Source:2003 Airport Master Plan

Aircraft Fleet Mix

The capacity of a runway is dependent upon the type and size of aircraft that use it. Aircraft are placed into one of four classes when conducting capacity analysis. These classes are based upon the amount of wake vortex created when the aircraft passes through the air. The more severe the wake vortex, the greater the separation that must be maintained between aircraft approaching or leaving the airport.

The majority of the aircraft operations at Saratoga County Airport is a mix of small single and twin engine aircraft weighing less than or equal to 12,500 pounds, which places them in Class A (single) or Class B (multi-engine). There are also Class C aircraft that weigh over 12,500 pounds but less than 255,000 pounds. These aircraft include corporate jets operating at the Airport. The mix of aircraft is presented in Table 5-2:

Table 5-2 – Aircraft Fleet Mix

Aircraft Class	Fleet Mix (%)
A	96.2
B	3.2
C	0.6

Source: McFarland Johnson

Percent Arriving Aircraft

The capacity of the runway is also influenced by the percentage of aircraft arriving at the airport during the peak hour. Arriving aircraft are typically given priority over departing aircraft. However, arriving aircraft require more time to complete their operation (approach and land) than do departing aircraft (takeoff), and can reduce capacity. Therefore, the higher the percentage of aircraft arrivals during peak periods of operations, the lower the annual service volume. As is typical with General Aviation (GA) airports, operational activity is well balanced between arrivals and departures. Thus, it is assumed in the capacity calculations that arrivals equal departures during the peak period.

Percent Touch-and-Go Operations

A touch-and-go operation refers to an aircraft maneuver in which the aircraft performs a normal landing touchdown followed by an immediate takeoff, without stopping or taxiing clear of the runway. A touch-and–go is counted as two operations, one take off and one landing. These operations are normally associated with flight training, and are included in the local operations figures reported by the airport. The FBO estimates that 20% of all operations are touch-and-gos at Saratoga County Airport.

Exit Taxiway Locations

A final factor in analyzing the capacity of a runway system is the ability of an aircraft to exit the runway as quickly and as safely as possible. The location, design, and number of exit taxiways affect the occupancy time of an aircraft on the runway system. The longer an aircraft remains on the runway, the lower the capacity of that runway.

The current taxiway configuration for each runway represents a partial-parallel taxiway system rather than a true full-parallel taxiway for each runway. However, the configuration does operate as though it were a full-parallel taxiway system to each runway as there is access to each runway end with no need to back-taxi on either runway. A back-taxi is an aircraft ground procedure where any portion of a runway is instead used as a taxiway, implying that an aircraft must taxi in the opposite direction from which it will take off or has landed. Therefore, for purposes of this analysis, it was assumed that each runway has a parallel taxiway. There are two exit taxiways associated with each runway.

5.1.2. VFR/IFR Hourly Capacities and Annual Service Volume

Because the characteristics of airports vary so widely, guidance in AC 150/5060-5, *Airport Capacity and Delay* is provided for different types of airports, from large commercial service hubs to small, single runway facilities. For Saratoga County Airport, runway capacity was calculated for VFR and IFR weather. Special characteristics of the Airport that were considered are:

- For the purpose of this analysis, the capacity was calculated assuming Class C aircraft represents 0.6% of operations.
- Both runways have a parallel taxiway.
- The Airport has radar coverage through Albany Approach, but does not have an Instrument Landing System (ILS).
- Arrivals equal departures.
- There are no airspace limitations affecting runway use.
- Percentage of touch-and-go operations is approximately 20%.

The methodology presented in AC 150/5060-5 was used to calculate the hourly capacity and annual service volume (ASV).

Hourly Capacity

Hourly capacity values for VFR and IFR conditions were determined using the formula presented in AC 150/5060-5. The formula for hourly capacity is presented below:

Hourly capacity of the runway component = C * T * E

Where: **C =** Base Capacity
T = Touch-and-Go Factor
E = Exit Factor

The base capacity value (C), the touch-and-go factor (T), and the exit factor (E) are derived from the hourly airfield capacity graphs contained in AC 150/5060-5. The hourly capacity is determined for each aircraft arrival and departure configuration for Saratoga County Airport. The hourly capacities for the following arrival departure scenarios were calculated:

- Arrival and Departure Runway 5 or 23 / Departure Runway 14 or 23 VFR conditions
- Arrival and Departure Runway 05 or 23 IFR conditions
- Arrival and Departure Runway 05 or 23 VFR conditions
- Arrival and Departure Runway 14 or32 VFR conditions
- Airport Closed

Figures representing these operating conditions were referenced in AC 150/5060-5 to obtain the three components making up the hourly capacity formula. The results are shown in Table 5-3.

Table 5-3 – Hourly Capacity

	C	T	E	Hourly Capacity
Arr/Dep RW 5-23 – Dep 14 or 32 VFR	109	1.06	.93	107
Arr/Dep RW 5-23 or 23/5 IFR	62	1	.99	61
Arr/Dep RW 5-23 or 23/5 VFR	104	1.17	.94	114
Arr/Dep RW 14-32 or 32/14 VFR	120	1.2	.94	135
Airport Closed	0	0	0	0

Note: Arr = Arrival, Dep = Departure
Source: AC 150/5060-5, McFarland Johnson

The hourly capacity calculations above were then used to derive the weighted hourly capacity (Cw) which is used in the Annual Service Volume calculation discussed in the next section. The weighted hourly capacity averages the various operating conditions using the following formula:

$$\frac{(P_1*C_1*W_1) + (P_2*C_2*W_2) + \ldots + (P_n*C_n*W_n)}{(P_1*W_1) + (P_2*W_2) + \ldots + (P_n*W_n)}$$

Where: **P =** Percent of Time Each Runway Configuration Is Used Annually
C = Hourly Capacity
W = Weighting Factor

The percent of time (P) was based on the previous Master Plan Assumptions detailing the percent of time that each runway configuration was used, the hourly capacity (C) was taken from Table 5-2 presented earlier and the (W) was determined from Table 3-1 in the AC. The resulting weighted hourly capacity (Cw) was approximately 103 operations.

Annual Service Volume

The ASV was calculated using the VFR and IFR hourly capacities calculated above using the methodology provided in AC 150/5060-5 *Airport Capacity and Delay.* Hourly capacity was converted to a weighted hourly capacity (Cw) through use of a formula that considers the relative occurrence of those two conditions. This number is then multiplied by two factors that account for airport peaking characteristics. The H and D ratios are used to adjust for hourly peak periods during the day, and daily peak periods during the year, respectively. The formula to calculate the ASV is shown below:

ASV = C_W* H * D, where:

ASV = Annual Service Volume
C_W = Weighted Hourly Capacity
H = Ratio of Average Daily Demand to Average Peak Hour Demand, and
D = Ratio of Annual Demand to Average Daily Demand

Using the formula above, the Weighted Hourly Capacity and the demand ratios provided in Table 3-2 of the AC were used to develop the ASV for Saratoga County Airport. The ASV for the airport is as follows:

ASV = 103 (Cw) x 7(H) x 372(D) = 231,100 operations

In developing the capacity assessment for Saratoga County Airport, two scenarios were considered. Aviation activity associated with Track Season in late July, August and early September is significantly higher than during the remaining portion of the year. Track Season fuel sales represent 33% of annual fuel sales for the Airport. This level of activity represents the Peak Period operations at the Airport. Based on this, a second scenario identified the next busiest month for fuel sales at the Airport and is assumed to represent the true Peak Period operations without the Track Season influence. The fuel sales data indicated May as the next busiest month, accounting for 8% of annual fuel sales. This percentage is comparable to other similarly sized New York GA airports.

Tables 5-4 and 5-5 present a summary of the airfield capacity calculations for Saratoga County Airport for Non-Track Season and Track Season capacity levels.

Table 5-4 - Demand and Capacity Summary – Non-Track Season

	Demand		Capacity 1/			Utilization	
Year	Annual	Peak Hour	ASV	Hourly VFR	Hourly IFR	Percent Peak Hour (VFR/IFR)	Percent ASV\
2012	38,550	17	231,100	107	61	16% / 28%	17%
2017	39,724	18	231,100	107	61	17% / 30%	17%
2022	40,827	18	231,100	107	61	17% / 30%	18%
2032	43,616	19	231,100	107	61	18% / 31%	19%

1/ VFR hourly capacity based on combined Runway 5-23 and 14-32 operational condition and IFR is based on Runway 5-23 operational condition
Source: AC 150/5060-5, McFarland Johnson

Table 5-5 - Demand and Capacity Summary – Track Season

	Demand		Capacity 1/			Utilization	
Year	Annual	Peak Hour	ASV	Hourly VFR	Hourly IFR	Percent Peak Hour (VFR/IFR)	Percent ASV
2012	38,550	52	231,100	107	61	49% / 85%	17%
2017	39,724	54	231,100	107	61	50% / 89%	17%
2022	40,827	55	231,100	107	61	51% / 90%	18%
2032	43,616	59	231,100	107	61	55% / 97%	19%

1/ VFR hourly capacity based on combined Runway 5-23 and 14-32 operational condition and IFR is based on Runway 5-23 operational condition
Source: AC 150/5060-5, McFarland Johnson

Tables 5-4 and 5-5 above show the dramatic effect on the Airport's capacity during Track Season. As noted earlier, the figures shown in Table 5-4 are representative of GA airports with similar annual activity as Saratoga County Airport. Saratoga County Airport operates at approximately 17% of annual capacity today. During the peak hour, the Airport operates at approximately 17% of capacity under VFR conditions while IFR represents 28% of capacity. The modest forecasted aviation activity growth increases the ASV percentage to 19% while VFR and IFR percentages increase to 18% and 31%, respectively.

When Track Season aviation activity is analyzed, the Airport operates much closer to its maximum hourly capacity under Peak Period conditions. While the ASV percentages remain the same over the planning period, the Peak Period percentages increase significantly. The VFR percentages increase to 49% of Peak Period operations while IFR increases to 85% of Peak Period operations. Applying the forecasted growth in activity, VFR operations represent 55% of Peak Period Operations while IFR reaches 97% of capacity of the Airport.

As seen in these statistics, Track Season aviation activity pushes the hourly capacity under VFR and IFR conditions to levels that would suggest capacity changes might be necessary to accommodate Peak Period operations during this timeframe, especially under IFR conditions.

The Airport does not have an Air Traffic Control Tower (ATCT), therefore, pilots operating at the Airport must communicate over the common traffic advisory frequency and state their position on the ground and in the runway traffic pattern. During normal peak operations, this is not a factor as there is adequate capacity to accommodate demand under both VFR and IFR conditions. However, during peak period VFR operations, hourly demand is close to half the total hourly demand. Discussions with the FBO indicate that the Airport becomes very busy and radio traffic is constant.

During IFR conditions, the potential hourly capacity is nearly met based on the calculations presented in Table 5-5. However, without an ATCT, IFR hourly capacity is significantly reduced. The lack of a tower requires that Albany Approach can only allow one aircraft to use an instrument approach until that aircraft has landed or declared a missed approach. All other aircraft must await clearance to fly the IFR approach, thus creating significant delays based on calculated IFR hourly capacity.

As discussed, Track Season activity significantly affects the hourly VFR and IFR capacity of the Airport. As such, discussions with FAA should be initiated to determine if temporary short term ATCT services could be provided during the 6 week Track Season period to provide aircraft tracking and separation for aircraft operating at Saratoga County Airport. This service would ensure that the Airport operates efficiently and enhance operational safety.
.

Recommendation: Discuss the potential to provide temporary air traffic control services at Saratoga County Airport during Track Season.

Glider Operations

Two glider clubs operate at Saratoga County Airport through three seasons of the year, typically March through November. A discussion with the glider clubs offered insight to their operations and is discussed in the following paragraphs.

Glider activity at GA airports typically occurs on separate turf runways off to the side of the paved runways or runway system, thus separating powered and non-powered aircraft. However, a key difference in glider operations at Saratoga County Airport is that gliders must stage, launch, land, and recover on the paved runway surfaces. This is required as the turf areas of Saratoga County Airport are protected habitat of the Karner blue butterfly and cannot be used, with the exception of about 2,000’ of turf area immediately off the side of the runway ends that can be used for emergency glider landings.

During low wind conditions, the gliders typically operate off Runway 14-32 while powered aircraft use Runway 5-23. Discussions with the Airport users indicated that there are no runway capacity issues as powered aircraft operate independently of the gliders. However, based on discussions with the glider clubs, both gliders and powered aircraft must share Runway 5-23 or 14-32 about 10% of the year. Peak glider operations generally coincide annually with track season, further exacerbating runway capacity issues under certain conditions. During busy weekend days, when glider operations peak during a typical week, the hourly capacity of the runway may be reduce. The time it takes to launch or recover a glider (about 8-10 minutes) requires a longer runway occupancy time, thus reducing overall capacity. To assess this scenario, the capacity calculations were revisited assuming one runway is available and used by both powered and non-powered aircraft.

Referring to AC 150/5360-5, the hourly capacity calculation for one runway is 98 VFR operations per hour based on Figure 2-1, Diagram 1. This equates to 1.6 aircraft per minute. Assuming that it takes 10 minutes to launch or recover one glider, 16 powered aircraft operations could occur during the time it takes to launch or recover one glider. This illustrates that under certain conditions, airfield capacity can easily be exceeded during the peak summer months, creating arrival and departure delays.

The analysis above highlights the unique nature of mixing powered and non-powered aircraft when they cannot be separated. As this situation occurs about 10%of the year, it is recommended to evaluate the potential options to segregate powered and non-powered aircraft operations. These options could include a separate turf runway adjacent to either Runway 5-23 or 18/36 or operational staging areas to the sides of the runways to launch or recover gliders. These options will be further assessed in Chapter 6, *Alternatives.*

5.2. DESIGN AIRCRAFT AND RUNWAY DESIGN CODE

Airport design is based upon the identification of a critical aircraft for that airport. The dimensions and performance characteristics of the critical aircraft form the basis on which design guidelines for the airport are identified, which in turn determine appropriate runway and taxiway width and separation standards, as well as dimensions of various airport safety areas. The critical aircraft for an airport is defined as the most demanding aircraft (based on its approach speed and wingspan or tail height) that conducts, or is anticipated to conduct, a minimum of 250 or more takeoffs/landings (500 operations) per year. When the crosswind runway has significantly different operating or usage characteristics than the primary runway, the design aircraft for the two runways may vary.

Prior to the update of AC 150/5300-13A, *Airport Design,* airports were given an Airport Reference Code that defined the class of aircraft according to which the airport would be designed. In the AC update, the definition of the Airport Reference Code (ARC) was expanded to now signify the highest Runway Design Code (RDC), minus the visibility component of the RDC. The update also defines the RDC for single or multiple runway airports. For multiple runway airports, each runway may have its own RDC. The following analysis will define the critical aircraft and RDC for each runway at Saratoga County Airport.

5.2.1. RDC Components and Design Aircraft

The parameters used to define the design aircraft are similar to those used to classify the RDC. For the purposes of this report, the RDC components are discussed. The Taxiway Design Group (TDG) component of the Design Aircraft will be addressed in Chapter 4, *Facility Requirements Analysis*.

Table 5-6 presents the RDC criteria used in airport planning.

Table 5-6 – Airport Reference Code (ARC)

	Aircraft Approach Category	
Category	**Approach Speed**	
A	Less than 91 knots	
B	91 knots or more but less than 121 knots	
C	121 knots or more but less than 141 knots	
D	141 knots or more but less than 166 knots	
E	166 knots or more	
	Airplane Design Group	
Group	**Wingspan**	**Tail Height**
I	Up to but not including 49 feet	Up to but not including 20 feet
II	49 feet up to but not including 79 feet	20 feet up to but not including 30 feet
III	79 feet up to but not including 118 feet	30 feet up to but not including 45 feet
IV	118 feet up to but not including 171 feet	45 feet up to but not including 60 feet
V	171 feet up to but not including 214 feet	60 feet up to but not including 66 feet
VI	214 feet up to but not including 262 feet	66 feet up to but not including 80 feet
	Visibility Minimums (VIS)	
RVR (FT)	**Flight Visibility Category (statute mile)**	
VIS	Visual Approaches	
4000	Lower than 1 mile but not lower than ¾ mile (APV ≥ 3/4 but < 1 mile)	
2400	Lower than 3/4 mile but not lower than 1/2 mile (CAT-I PA)	
1600	Lower than 1/2 mile but not lower than 1/4 mile (CAT-II PA)	
1200	Lower than 1/4 mile (CAT-III PA)	

Source: FAA Advisory Circular (AC) 150/5300-13 A

The RDC is comprised of three components. The first component, depicted by a letter, is the Aircraft Approach Category (AAC) and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the Airplane Design Group (ADG) and relates to either the aircraft wingspan or tail height (physical characteristics); whichever is most restrictive. The third component relates to the visibility minimums expressed by Runway Visual Range (RVR) values.

The 2003 Master Plan Update identified a “then” future design aircraft as the Gulfstream G-IV, which has an AAC and ADG of C-II. To determine if there have been changes in the types of corporate aircraft operating at Saratoga County Airport today, an analysis of corporate aircraft activity was undertaken to reaffirm the C-II designation.

For this analysis, the critical aircraft was determined using data obtained from a flight tracking service (Flightwise) as the Airport does not have a tower. The data obtained from the flight tracking service included aircraft operating on an IFR flight plan. No VFR traffic was identified. Data was obtained from 2008 to 2012 and broken down by month to include aircraft type, departure airport and flight time. The focus for this effort was the identification of aircraft type.

Data was collected for aircraft flying into Saratoga County Airport. As such, the data only represented one aircraft operation - landing. Because arriving aircraft eventually depart the Airport, each arrival is assumed to have a corresponding departure (one landing and takeoff) that comprises two operations. Table 5-7 summarizes the turboprop and jet operational activity between 2008 and 2012.

Table 5-7 – Jet and Turboprop Activity

Year	Jet	Turboprop	Total
2008	962	582	1,544
2009	966	702	1,668
2010	1,056	654	1,710
2011	1,012	570	1,582
2012	930	646	1,576

Source: Flightwise, McFarland Johnson Analysis

Corporate jets using the Airport range from small Cessna Citation series aircraft to large Gulfstream G-V aircraft. Table 5-8 below lists the aircraft and their corresponding ARC that have used the Airport during the 2008 to 2012 period.

Table 5-8 – Corporate Jet Aircraft Using Saratoga County Airport

Aircraft	ARC	Aircraft	ARC	Aircraft	ARC
IAI Astra 1125	C-II	Canadair Challenger 300	C-II	Gulfstream II	D-II
Beechjet 400A	B-I	Canadair Challenger 600	C-II	Gulfstream III	C-II
Cessna Citation CJ2	B-II	Canadair CRJ 200	C-II	Gulfstream IV	C-II
Cessna Citation CJ3	B-II	Embraer ERJ 135	C-II	Gulfstream V	C-III
Cessna Citation CJ4	B-II	Embraer Legacy 500	C-II	Learjet 25	C-I
Cessna Citation I	B-I	Eclipse 500	B-I	Learjet 31	C-I
Cessna Citation I/SP	B-I	Dassault Falcon 2000	B-II	Learjet 35	D-I
Cessna Citation Mustang	B-I	Dassault Falcon 900	B-II	Learjet 40	C-I
Cessna Citation CJ1	B-II	Dassault Falcon 10	B-II	Learjet 45	C-I
Cessna Citation II	B-II	Dassault Falcon 20	B-II	Learjet 55	C-I
Cessna Citation V/Ultra	B-II	Dassault Falcon 50	B-II	Learjet 60	C-I
Cessna Citation Excel	B-II	Dassault Falcon 7X	B-II	Beechcraft Premier 1	B-II
Cessna Citation IV/VI/VII	C-II	Bombardier Global Express	C-II	Beechcraft Hawker 800	C-I
Cessna Citation Sovereign	C-II	Rockwell Saberliner 61	C-I		
Cessna Citation X	C-II	Gulfstream 200	B-II		

Source: Flightwise, McFarland Johnson Analysis, FAA AC/150/5300-13A, Burns and McDonnell Aircraft Characteristics 7th/10th Edition

Table 5-8 indicates there is a range of corporate jet aircraft that use the Airport with the AAC and ADG between B-II to C-III. C/D-II/III aircraft represented 260 Jet operations in 2012, or 28% of total jet activity. As such, the majority of aircraft are in the B-II aircraft category. Table 5-9 provides a breakdown of 2012 operations by aircraft manufacturer.

Table 5-9 – Jet Aircraft By Manufacturer

Manufacturer	2012 Operations	% of Ops.
Category B Aircraft		
Cessna Citation Series (B-I/II)	382	41%
Beech Series (Beechjet/Hawker) (B-II)	166	18%
Dassault Falcon Series (B-II)	92	10%
Other B Category Aircraft	30	3%
Total Category B Aircraft	670	72%
Category C Aircraft		
Canadair Challenger Series (C-II)	50	5%
Embraer Series (C-II)	30	3%
Cessna Citation Series (C-II/III)	52	6%
Gulfstream G Series (C-II/III)	26	3%
Learjet Series (C/D-I)	88	9%
Other C Category Aircraft	14	2%
Total Category B Aircraft	260	28%
Total Category B and C aircraft	930	100%

Source: Flightwise, McFarland Johnson Analysis

Discussions with the FBO indicated they are planning to purchase a Cessna Citation Sovereign as a replacement for two smaller corporate jet aircraft by November 2013. The FBO also indicated that the aircraft would, at a minimum, conduct 500 annual operations (250 takeoffs and 250 landings) from Saratoga County Airport. This is based on how the existing corporate jet aircraft to be replaced are operated.

The Sovereign's AAC and ADG, as presented in AC 150/5300-13A Appendix 1, were not fully defined. The data has no letter defining the AAC but does define the ADG as Group II. To define the AAC, information was obtained from Cessna Aircraft to determine the aircraft approach category using the landing stall speed (Vso) multiplied by a factor of 1.3 as outlined in AC 150/5300-13A, Section 102-Definitions, item c. Using the stall speed chart provided in the Cessna document, the stall speeds were multiplied by 1.3 to define the approach speed of the aircraft. Table 5-10 shows the results of the calculations.

Table 5-10 – Cessna Citation Sovereign Stall Speed Calculations

Landing Weight	Flap Setting (degrees) 35	15	7	0
30,300 lbs.	121 kt.	131 kt.	138 kt.	144 kt.
30,000 lbs.	121 kt.	131 kt.	137 kt.	143 kt.
29,000 lbs.	118 kt.	129 kt.	135 kt.	140 kt.
28,000 lbs.	117 kt.	126 kt.	133 kt.	139 kt.
27,000 lbs.	114 kt.	125 kt.	130 kt.	137 kt.
25,000 lbs.	111 kt.	120 kt.	126 kt.	131 kt.
23,000 lbs.	107 kt.	116 kt.	121 kt.	126 kt.
21,000 lbs.	101 kt.	101 kt.	116 kt.	121 kt.

*Note: The blue numbers represents approach speeds within the AAC B category
Source: 2007 Cessna Citation Sovereign Flight Planning Guide, McFarland Johnson Calculations

As shown in Table 5-10, the aircraft operates as an AAC Category B or C aircraft depending upon the flap setting configuration. Therefore, the aircraft straddles the two categories. At the maximum landing weight of 27,100 lbs or below, the aircraft will operate at Saratoga County Airport as either an AAC Category B aircraft or Category C aircraft based upon landing configurations. For purposes of this analysis, stall speeds at or below the maximum aircraft landing weight were assessed and it was determined that there is a 50/50 split between AAC Category B and C. As such, it was assumed that half of the Cessna Citation Sovereign operations, or 250 annual operations, would represent AAC Category C operations.

The final step was to combine the 260 annual operations conducted by C/D-II/III during Track Season with the projected activity of the FBO's Cessna Citation Sovereign at 250 annual operations. When combined, C/D category aircraft will conduct 510 annual operations during calendar year 2014, meeting the FAA's definition of the critical design aircraft. When this level of activity is forecasted over the planning period using the recommended forecast's growth rates, this number climbs to 580 annual operations in 2023.

It must also be considered that over time, the number of AAC Category C aircraft using the Airport may climb as aircraft owners upgrade to the larger and faster aircraft over time or use the larger and faster aircraft within their aircraft fractional share programs. Another consideration is that in the future the FBO may upgrade to a larger and faster aircraft such as a G-V, as they had considered when upgrading their aircraft recently. Together, the presence of AAC Category C aircraft will remain throughout the planning period, subsequently maintaining the AAC/ADG category of C/D-II, which will provide the highest level of efficiency and safety for Saratoga County Airport.

5.2.2. RDC Runway 5-23 and 14-32

Based on the information discussed in the previous section, the appropriate AAC and ADG for Saratoga County Airport is C/D-II. As it relates to the two runways, Runway 5-23 is the main runway and the longer of the two runways at 4,700'. Almost all of the corporate jets use this runway. This runway currently has two LPV approaches to each runway end; both approaches have 1-mile visibility minimums. Based on this, the RDC for Runway 5-23 will be C/D-II - 4000 is appropriate for this runway.

Runway 14-32, which is the crosswind runway, is shorter at 4,000'. The previous Airport Master Plan defined the design aircraft as the Beech King Air 200, which has an AAC and ADG of B-II. A King Air is based at the Airport currently. Runway 14-32 is a visual runway currently. It is recommended to maintain an RDC of B-II - VIS for Runway 14-32.

5.3. AIRSIDE FACILITIES

Airside facilities are the facilities associated with the takeoff and landing of aircraft, i.e., the airfield and its components. Airside facility requirements are identified for current and ultimate airport needs. This section examines the needs of the following airside facilities:

- Runway Orientation
- Runway Length
- Runway Width
- Runway Strength and Condition
- Runway Safety Areas
- Runway Object Free Areas
- Runway Protection Zones
- Runway Visibility Zone
- Runway Obstacle Free Zone
- Runway Pavement Markings
- Taxiways
- Airfield Lighting and Visual Aids
- Airport Weather Observation System
- Instrument Approaches
- FAR Part 77 Surfaces
- Runway End Siting Surfaces
- Wildlife Hazard Assessment
- Airfield Facility Requirements Summary

5.3.1. Runway Orientation

A major factor in evaluating a runway's orientation is the direction and velocity of the prevailing winds as discussed previously. Ideally, aircraft takeoffs and landings are conducted directly into the wind to maximize lift and allow for shorter takeoff runs and slower landing approach speeds. A runway alignment that is not oriented directly into the wind creates what is known as a crosswind component, which requires additional techniques to guide the airplane down the intended glide path. Therefore, every effort is made to align runways with the prevailing wind direction.

The commonly used measure of the degree to which a runway is aligned with the prevailing wind conditions is the wind coverage percentage. Wind coverage percentage is that percent of time crosswind components are below an acceptable velocity. Essentially, this figure estimates the average percentage of time that aircraft within a particular design group would be able to use the runway if runway length, width or surface type were not a consideration. Current FAA standards recommend airfields provide 95 percent All-Weather wind coverage for aircraft that regularly use an airport.

Wind data for Saratoga County Airport was not available. However, the FAA allows the use of wind data from nearby airports that have similar topographical features. In the case of Saratoga County Airport, wind data was obtained for Floyd Bennett Memorial Airport in Queensbury, NY. The wind data covered a ten-year period between 2000 through 2009. Recorded weather data includes measurements of ceiling, visibility, wind velocity, and direction.

The wind data was compiled into All Weather, VFR and IFR wind roses that are presented in Figures 5-1, 5-2 and 5-3. The wind roses show the percentage of time winds originated from different directions at various velocities. The data is further segregated to provide wind conditions for the overall runway system and each runway end.

Given the range of aircraft that operate at Saratoga County Airport, three crosswind components were assessed. The 10.5-knot crosswind component was used for aircraft in RDC A/B-I, the 13-knot crosswind component was used for RDC B-II, and the 16-knot value was used for RDC C-III aircraft. Tables 5-11 and 5-12 present the wind analysis for both the individual runways and comprehensive runway system, as well as the wind coverage for each runway end.

Table 5-11 - Runway Wind Coverage Analysis

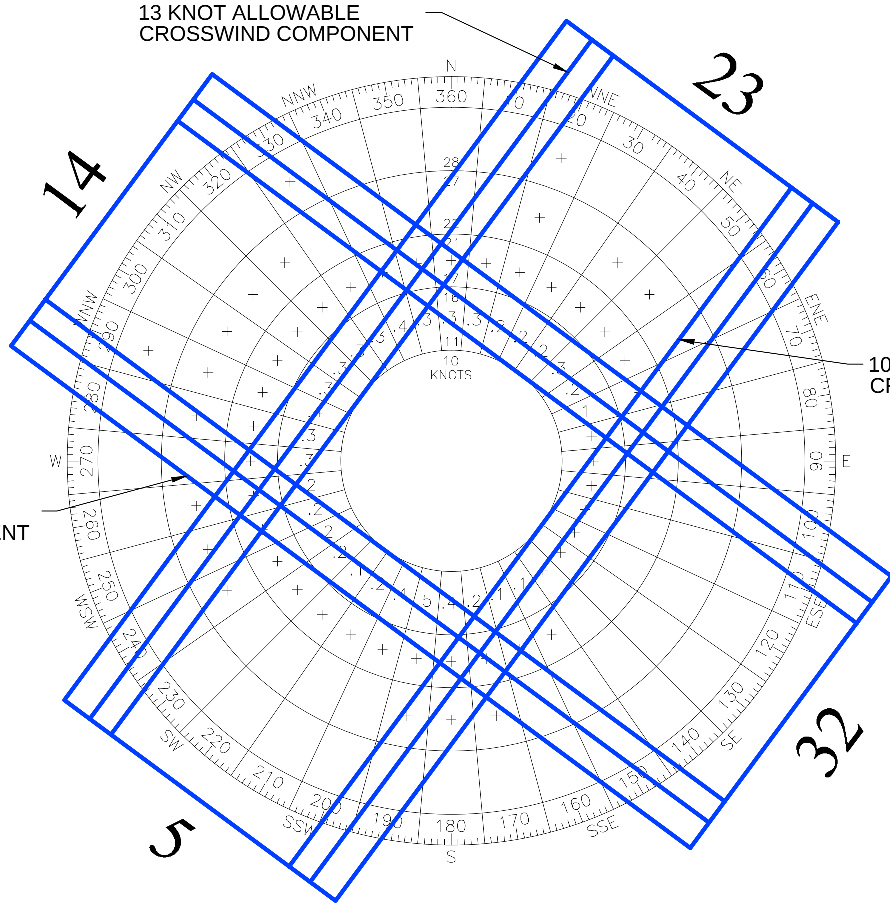
Wind Coverage Category	Runway 5-23	Runway 14-32	Runway 5-23 and 14-32 Combined
All Weather Wind Coverage [1/]			
10.5 Knot Crosswind	97.03%	95.92%	99.70%
13.0 Knot Crosswind	98.56%	98.00%	99.95%
16.0 Knot Crosswind	99.72%	99.71%	99.99%
VFR Wind Coverage [2/]			
10.5 Knot Crosswind	96.76%	95.65%	99.34%
13.0 Knot Crosswind	98.42%	97.87%	99.95%
16.0 Knot Crosswind	99.69%	99.68%	99.99%
IFR Wind Coverage [3/]			
10.5 Knot Crosswind	99.30%	97.92%	99.83%
13.0 Knot Crosswind	99.71%	98.97%	99.98%
16.0 Knot Crosswind	99.92%	99.88%	100.00%

1/ All Weather Conditions: All Ceiling and Visibility Conditions
2/ VFR Weather Conditions: Ceiling greater than or equal to 1,000' and greater than or equal to 3 miles visibility
3/ IFR Weather Conditions: Ceiling less than 1,000' and below 3 miles visibility but greater than or equal to ceiling greater than 200' and 1/2 mile visibility
Source: National Climactic Data Center – 72518 Floyd Bennett Memorial Airport, NY 2000-2009, McFarland Johnson

ALL WEATHER WIND ROSE

FIGURE 5-1

ALL WEATHER
ALL CEILING AND VISIBILITIES



WIND ROSE

ALL WEATHER WIND COVERAGE			
	10.5 KNOT CROSSWIND	13.0 KNOT CROSSWIND	16.0 KNOT CROSSWIND
RUNWAY 5	58.91%	59.61%	60.16%
RUNWAY 23	70.54%	71.37%	72.00%
RUNWAY 14	65.83%	66.87%	67.81%
RUNWAY 32	62.78%	53.83%	64.61%
RUNWAY 5/23	97.03%	98.56%	99.72%
RUNWAY 14/32	95.92%	98.00%	99.71%
RUNWAY 5/23 AND 14/32 COMBINED	99.70%	99.95%	99.99%

SOURCE:
NATIONAL CLIMACTIC DATA CENTER
72518 FLOYD BENNETT MEMORIAL AIRPORT, NY
PERIOD OF RECORD 2000–2009
NUMBER OF OBSERVATIONS: 79894
CALMS: 33%

SARATOGA COUNTY AIRPORT

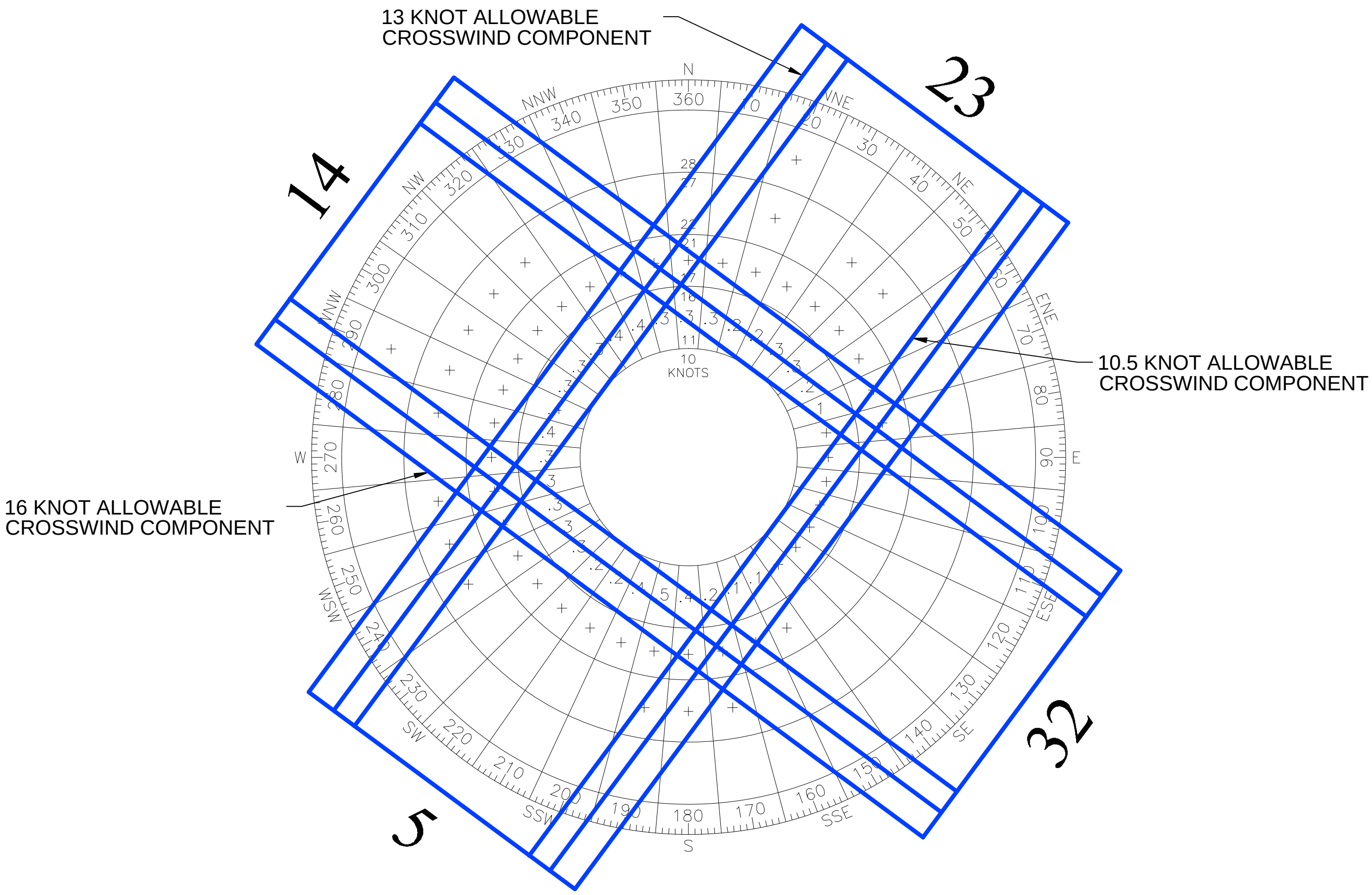
McFarland Johnson

VFR WIND ROSE

FIGURE 5-2

VFR

CEILING ≥ 1000' AND VISIBILITY ≥ 3 MILES



WIND ROSE

VFR WIND COVERAGE			
	10.5 KNOT CROSSWIND	13.0 KNOT CROSSWIND	16.0 KNOT CROSSWIND
RUNWAY 5	56.99%	57.75%	58.35%
RUNWAY 23	69.85%	70.76%	71.45%
RUNWAY 14	63.84%	64.96%	65.97%
RUNWAY 32	62.20%	53.30%	64.12%
RUNWAY 5/23	96.76%	98.42%	99.69%
RUNWAY 14/32	95.65%	97.87%	99.68%
RUNWAY 5/23 AND 14/32 COMBINED	99.34%	99.95%	99.99%

SOURCE:
NATIONAL CLIMACTIC DATA CENTER
72518 FLOYD BENNETT MEMORIAL AIRPORT, NY
PERIOD OF RECORD 2000–2009
NUMBER OF OBSERVATIONS: 79863
CALMS: 27%

SARATOGA COUNTY AIRPORT

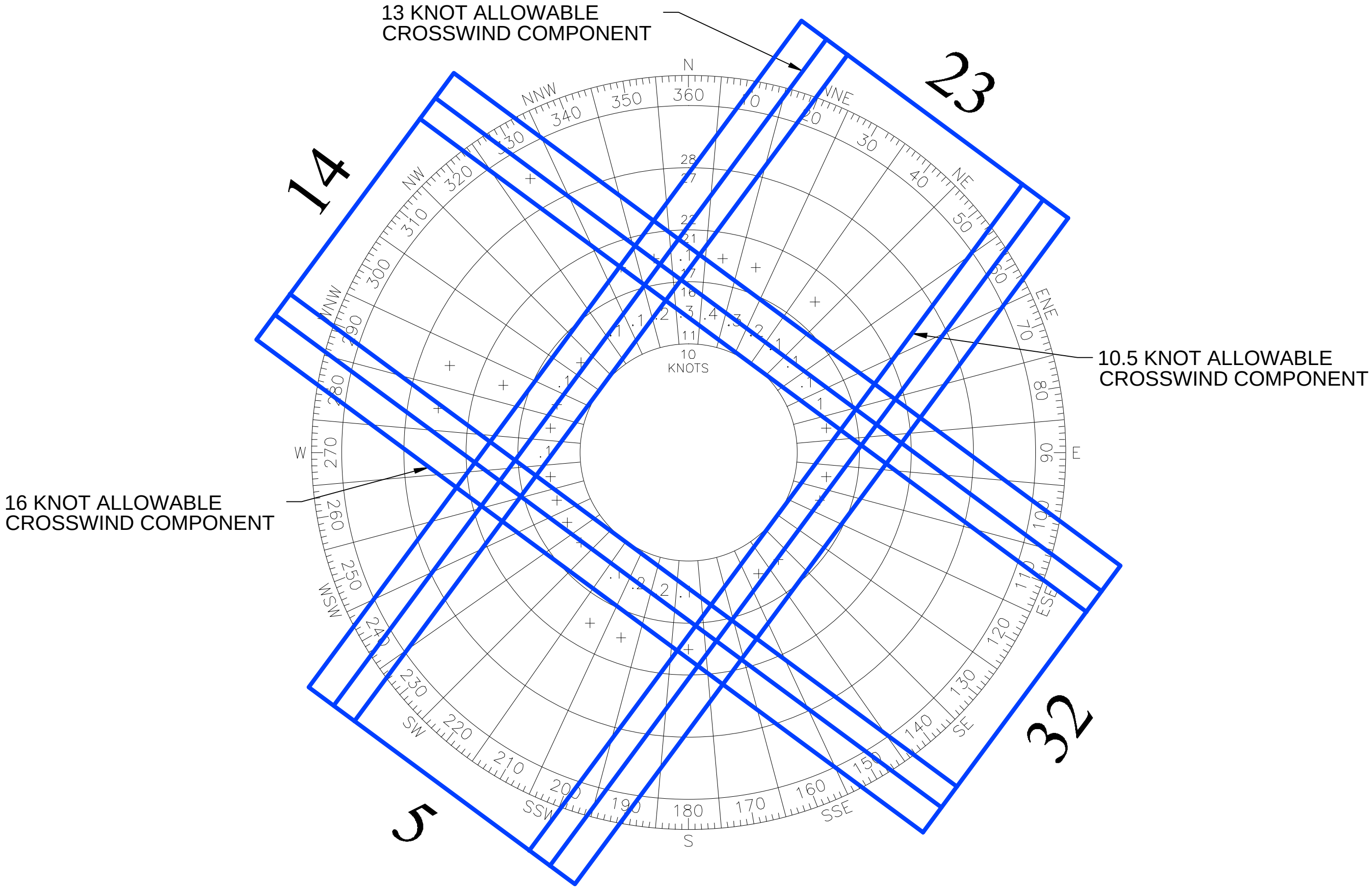
McFarland Johnson

IFR WIND ROSE

FIGURE 5-3

IFR

CEILING < 1000' AND / OR VISIBILITY < 3 MILES BUT CEILING ≥ 200' AND VISIBILITY ≥ ½ MILES



WIND ROSE

IFR WIND COVERAGE			
	10.5 KNOT CROSSWIND	13.0 KNOT CROSSWIND	16.0 KNOT CROSSWIND
RUNWAY 5	72.54%	72.80%	72.93%
RUNWAY 23	74.63%	74.76%	74.88%
RUNWAY 14	81.51%	81.95%	82.38%
RUNWAY 32	64.38%	65.00%	65.48%
RUNWAY 5/23	99.30%	99.71%	99.92%
RUNWAY 14/32	97.92%	98.97%	99.88%
RUNWAY 5/23 AND 14/32 COMBINED	99.83%	99.98%	100.00%

SOURCE:
NATIONAL CLIMACTIC DATA CENTER
72518 FLOYD BENNETT MEMORIAL AIRPORT, NY
PERIOD OF RECORD 2000–2009
NUMBER OF OBSERVATIONS: 79863
CALMS: 4%

SARATOGA COUNTY AIRPORT

McFarland Johnson

Table 5-12 - Runway End Wind Coverage Analysis

Wind Coverage Category	Runway 5	Runway 23	Runway 14	Runway 32
All Weather Wind Coverage				
10.5 Knot Crosswind	58.91%	70.54%	65.83%	62.78%
13.0 Knot Crosswind	59.61%	71.37%	66.87%	53.83%
16.0 Knot Crosswind	60.16%	72.00%	67.81%	64.61%
VFR Wind Coverage				
10.5 Knot Crosswind	56.99%	69.85%	63.84%	62.20%
13.0 Knot Crosswind	57.75%	70.76%	64.96%	53.30%
16.0 Knot Crosswind	58.35%	71.45%	65.97%	64.12%
IFR Wind Coverage				
10.5 Knot Crosswind	72.54%	74.63%	81.51%	64.38%
13.0 Knot Crosswind	72.80%	74.76%	81.95%	65.00%
16.0 Knot Crosswind	72.93%	74.88%	82.38%	65.48%

Source: National Climactic Data Center – 72518 Floyd Bennett Memorial Airport, NY 2000-2009, McFarland Johnson

Based on the information above, Runway 5-23 and 14-32 separately meet the FAA's recommended 95% wind coverage for all weather crosswind categories. As such, small aircraft, which are affected most by crosswind conditions, are able to operate on either runway under a given crosswind component.

As seen in the data, Runway 5-23 provides the greater wind coverage of the two runways. As such, this runway represents the main runway used annually, which was confirmed through discussions with the FBO. When both runways are combined, the wind coverage meets over 99% of the annual winds for all wind coverage categories.

A comparison of the runway end analysis in Table 5-12 indicates that Runway 23 provides the highest wind coverage under All Weather conditions and VFR conditions. Under IFR conditions, Runway 14 provides the highest IFR coverage as compared to each runway end. This is consistent with information provided in the previous Airport Master Plan.

Recommendation: Based on the analysis, no changes to the current runway configuration are required.

5.3.2. Runway Length

Runway length requirements are based upon the most demanding aircraft, or the most demanding aircraft group, anticipated to utilize the airport on a regular basis. For airports such as Saratoga County Airport that will serve a variety of aircraft from small propeller aircraft up to large corporate jets on a regular basis, runway length is determined by utilizing a series of published curves presented in AC 150/5325-4B, *Runway Length Requirements for Airport Design.* Information provided by an aircraft fractional share company whose aircraft frequent the airport was also used to supplement and support the AC data.

Runway length requirements are a function of aircraft performance and includes such factors as runway grades, temperature, and runway surface conditions (wet, icy, snow covered). The previous Airport Master Plan assessed the runway length for both runways. The findings suggested a potential 300' extension of Runway 5-23, providing an overall length of 5,000'. Runway 14-32 was maintained at its current 4,000'. The runway lengths were reassessed based on the changes in the aircraft fleet and advances in aircraft performance that have occurred since the last Airport Master Plan.

Runway 5-23

Runway 5-23 accommodates a wide range of aircraft and is the primary runway used by corporate turboprop and jet aircraft. The runway is currently 4,700' long and is grooved to provide drainage and improve wet runway operations. The runway length analysis for this runway evaluated the information presented in AC 150/5325-4B and information provided by a fractional share aircraft company. The findings are summarized below.

Based on the aircraft using this runway, aircraft performance graphs for aircraft with a maximum certificated weight of more than 12,500 lbs. up to and including 60,000 lbs. were used. Table 3-1 and Table 3-2 in the AC, which provide a listing of aircraft that make up 75% of the fleet and 100% of the fleet respectively, were compared to corporate jet aircraft that use the Airport. The comparison concluded that the Airport accommodates 100% of the fleet and both tables were used for this assessment. Table 5-13 presents the findings, which were based on a Mean Daily Maximum Temperature of the Hottest Month of 85 degrees Fahrenheit and an Airport elevation of 434' Mean Sea Level.

Table 5-13 – FAA Runway Length Analysis

Percent of Fleet	Runway Length
75% of Fleet, 60% Useful Load	4,800'
75% of Fleet, 90% Useful Load	6,400'
100% of Fleet, 60% Useful Load	5,500'
100% of Fleet, 90% Useful Load	8,300'

Source: AC 150/5325-4B, McFarland Johnson

As the Airport accommodates 100% of the fleet, the useful load was assessed. Based on discussions with the FBO, the distances flown by these aircraft are between 500 and 1,000 nautical miles and are not heavily loaded with passengers and fuel. Given this factor, aircraft within 100% of the fleet operate at 60% useful load, equating to a runway length requirement of 5,500'.

The information above was supplemented by data from a fractional share aircraft company whose aircraft operate at Saratoga County Airport. Their aircraft are used to fly clients to and from Saratoga County Airport throughout the year. The fractional share aircraft company provided data including takeoff performance and landing lengths under dry and wet runway conditions. The information is detailed below.

Data was provided on the destinations that are flown to and from Saratoga County Airport to understand the typical stage lengths of the flights. As seen in Table 5-14 below, the typical stage lengths are between 500 and 1,000 nautical miles, which correspond to the information provided by the FBO.

Table 5-14 – Typical Stage Lengths from Saratoga County Airport

Aircraft	Airport / State	Distance (nm)
BE-400A	KOMA - Eppley Airfield, NE	986
CE-560E	KMSP - Minneapolis St. Paul Airport, MN	844
CE-560EP	KPLN - Pellston Regional Airport, MI	569
CE-560XL	KTPA - Tampa Airport, FL	997
CE-560XLS	KTPA - Tampa Airport, FL	997
CE-680	KHOU -Houston Hobby Airport, TX	1306
CE-750	KCVG - Cincinnati/Northern Kentucky Airport, KY	546
DA-2000	KPBI - West Palm Beach Airport, FL	1182
DA-2000EX	KBCT - Boca Raton Airport, FL	1045
G-200	KPBI - West Palm Beach Airport, FL	1182
GIV-SP	KBLM - Monmouth Executive Airport, NJ	198
HS-125-800XP	KTEB - Teterboro Airport, NJ	152
HS-125-800XPC	KSDF - Louisville International Airport, KY	616
HS-125-900XP	KSDF - Louisville International Airport, KY	616

Source: Fractional Share Aircraft Company

The fractional share company also provided a listing of weight restrictions imposed by the existing runway length of 4,700'. Taking a weight penalty requires that fuel, passenger load or both, be reduced to ensure the aircraft is able to take off on the available runway length. For purposes of this analysis, the weight penalties are based on maximum takeoff weight and an 82-degree day. Table 5-15 presents this information.

Table 5-15 - Weight Penalties Based on Existing 5-23 Runway Length

Aircraft	Maximum Takeoff Weight (lbs)	Required Weight at 4699' (lbs)	Weight Reduction (lbs)	% of Takeoff Weight
BE-400A	16,300	15,990	310	2%
CE-560E	16,630	16,630	0	
CE-560EP	16,830	16,830	0	
CE-560XL	20,000	20,000	0	
CE-560XLS	20,200	20,200	0	
CE-680	30,300	30,300	0	
CE-750	35,700	32,493	3,207	9%
DA-2000	36,500	32,405	4,095	11%
DA-2000EX	42,220	36,021	6,199	15%
G-200	35,450	28,674	6,776	19%
GIV-SP	74,600	66,650	7,950	11%
HS-125-800XP	28,000	25,257	2,743	10%
HS-125-800XPC	28,000	25,390	2,610	9%
HS-125-900XP	28,000	26,242	1,758	6%

Source: Fractional Share Aircraft Company

As seen in this table, more than half of the aircraft must take a weight penalty based on maximum takeoff weight. The majority of the weight penalty is about 10%, with the exception of the Dassault Falcon 2000EX and the Gulfstream G-200 at 15% and 19%, respectively. The findings of this analysis indicate that additional runway length would reduce or in some cases, eliminate weight penalties.

The final piece of information provided by the fractional share aircraft company was runway landing lengths based on dry and wet runway pavements. At times, landing distance can be more critical under these conditions than for takeoff length requirements. The data was presented applying required FAA landing length adjustments based on the type of operation. The FAA requires that an aircraft be able to land within 80% of the runway length at the destination airport under Federal Aviation Regulation (FAR) Part 91 (private flights) and 60% of the available runway length under FAR Part 135 commercial charter operations. The calculations presented in Table 5-16 are based on maximum takeoff weight and 83.

Table 5-16 - Landing Distance Calculations – Dry and Wet Pavement

Aircraft	Dry (80%)	Dry (60%)	(Wet 80%)	Wet (60%)
BE-400A	4,014	**5,345**	**5,383**	**6,146**
CE-560E	3,637	4,850	4,395	**5,577**
CE-560EP	3,642	4,857	4,395	**5,585**
CE-560XL	4,165	**5,082**	**5,282**	**5,844**
CE-560XLS	4,166	**5,082**	**5,248**	**5,844**
CE-680	3,449	4,599	3,967	**5,289**
CE-750	4,528	**6,037**	**5,207**	**6,943**
DA-2000	3,940	**5,253**	4,531	**6,041**
DA-2000EX	4,401	**5,868**	**5,061**	**6,748**
G-200	4,075	**5,434**	4,687	**6,249**
GIV-SP	N/A	**5,337**	N/A	**6,137**
HS-125-800XP	N/A	4,464	N/A	**5,133**
HS-125-800XPC	N/A	4,464	N/A	**5,133**
HS-125-900XP	N/A	4,464	N/A	**5,133**
Average Length	-	**5,300’**	**5,200’**	**6,300’**

Note: Bold numbers represent landing requirements above 4,700’
Source: Fractional Share Aircraft Company

As demonstrated in the Table 5-16, under dry runway conditions, aircraft operating under FAR Part 91 have no trouble landing within 80% of the available dry pavement. However, when the runway is wet, about half of the aircraft would require 5,000’ or longer to meet the 80% landing distance requirements under wet runway conditions. When averaged, wet runway length requirements would be about 5,200’ to operate safely.

Under FAR Part 135, almost all of the aircraft exceed 4,700’ to meet the 60% rule under dry runway conditions. The average length under dry conditions is 5,300’. Under wet runway conditions, the runway length requirement to meet the 60% rule increases significantly. The average landing length increases to 6,300’ under wet runway conditions.

Based on this range of landing lengths, and taking into account available land for a runway extension, an 800’ extension providing a 5,500’ runway is recommended to be considered. This runway length meets the requirements of 100% of the fleet at 60% useful load as shown in Table 5-12. FAR Part 91 operators would be accommodated under both dry and wet runway conditions. For FAR Part 135 operators, most of the aircraft could operate efficiently under dry conditions while about half of the aircraft would be able to operate efficiently under wet runway conditions. This runway length effectively covers the majority of aircraft operating at the Airport today.

Runway 14-32

The current length of Runway 14-32 is 4,000’. It is the crosswind runway and is used during certain wind conditions predominantly in the Spring and Fall. The types of aircraft that use this runway range from small single engine aircraft to turboprop and small jet aircraft, all of which are based at the Airport. AC 150/5325-4B and aircraft manufacturer information was used to determine the optimal runway length for Runway 14-32.

Consulting the AC, Figure 2-2 Small Airplanes Having 10 or More Passenger Seats was used to derive a recommended runway length for Runway 14-32. Using an Airport elevation of 434’ MSL and an average mean maximum temperature of 85 degrees Fahrenheit, the graph in Figure 2-2 recommended a runway length of about 4,250’.

To provide a comparison of the AC findings, aircraft manufacturer data was obtained for the smaller corporate jet aircraft not presented in Table 5-16. These aircraft weigh between 10,000 lbs to 17,000 lbs, which allows these aircraft to operate on shorter runways at the smaller airports. The aircraft presented in Table 5-17 also represent the current generation of the small corporate jet aircraft, thus having exceptional operational characteristics due to the latest engine and airframe technology.

The analysis was completed for FAR Part 91 and FAR Part 135 operations, as was done for Runway 5-23. These operational requirements outline the specific regulatory requirements for wet pavement conditions and the calculations are presented in Table 5-17 below.

Table 5-17 – Aircraft Landing Distances – Dry and Wet Pavement Runway 14-32

AIRCRAFT	Wet Landing*	Wet Pavement (60%)**	Wet Pavement (80%)***
Mustang	3,033	4,571	**3,428**
CJ1+	3,481	5,054	**3,791**
CJ2+	3,225	5,802	4,351
CJ3	3,578	5,374	4,031
Bravo	3,102	5,963	4,472
CJ4	3,250	5,196	**3,877**

Sources: Flight Planning Guides for various Cessna aircraft, http://www.cessna.com/citation.html
Notes: 1,000' msl and 86° temperature
60% useful load
* Wet landing length = dry landing length x 1.15
** FAR Part 135 Analysis Wet landing length = wet landing length divided by 0.6
*** FAR Part 91 Analysis Wet landing length = wet landing length divided by 0.8

As shown in Table 5-17, with no regulatory requirements applied, these aircraft require between a 3,000' to 3,600' to land on wet runways. Applying the regulatory statutes, under FAR Part 91, three of the six aircraft in the Wet Pavement (80%) column can land within the existing runway length. FAR Part 135 operations shown in the Wet Pavement (60%) column require much longer lengths that are more than 5,000' due to more stringent regulatory requirements. Given the longer runway lengths and regulatory requirements, FAR Part 91 aircraft would likely use the runway during wet pavement conditions, thus the Wet Pavement (80%) results were used for comparison purposes.

Comparing the AC findings with the operational data from the aircraft manufacturers, the landing lengths under the Wet Pavement (80%) column are similar to the landing length identified by the AC at 4,250'. The 250' extension would be built on the Runway 14 end and would require land acquisition to accommodate the extended Runway Safety Area (RSA) and Object Free Area (OFA). In addition, the RPZ would be moved northeast and capture a number of residential properties and based on FAA's current Runway Protection Zone (RPZ) guidance, these residential properties would need to be acquired. Given the significant costs associated with the runway extension and associated land acquisition, the 250' extension cannot practicably be achieved without significant community disruption and was not considered further. Retaining the current length of Runway 14-32 is recommended.

Recommendation: An ultimate length of Runway 5-23 of 5,500' is recommended. The current 4,000' length of Runway 14-32 should be maintained.

5.3.3. Runway Width

Runway pavement must be wide enough to accommodate the dimensions of the critical aircraft it is designed to serve. Therefore, width requirements are based on a RDC for each runway. The RDC for Runway 5-23 is C-II-4000, which dictates a standard runway width of 100', which is the current width for 5-23.

The RDC for Runway 14-32 is B-II-VIS, which equates to a width of 75', however, the current width is 100'. The 100' runway width should be retained based on the utility and safety this runway width provides. The runway is used by a variety of aircraft, including the smaller corporate jet aircraft, many of which are operated under FAR Part 91 and are more than capable of using this runway for takeoff and landing (see Table 5-12 above). Under wet runway conditions, about half of the FAR Part 91 operated aircraft can also land on Runway 14-32 at slightly less than maximum landing weight.

The runway is also used by the glider clubs when Runway 5-23 is active. The runway provides both a staging area as well as takeoff and recovery area for the gliders. As the glider clubs cannot use the turf areas on the Airport, the width of the runway provides adequate area to prepare gliders while also allowing gliders to be launched or recovered at the same time. Reducing runway width would significantly affect the operational requirements of the gliders.

Based on the information above, the current width of Runway 14-32 should be maintained.

Recommendation: Runway 5-23 currently meets airport design requirements of a 100' width. Runway 14-32's width should be retained at 100' to continue providing operational flexibility and enhanced safety of powered aircraft and gliders.

5.3.4. Runway Strength and Condition

The required runway strength is dependent upon the demands of the aircraft with the greatest wheel load (considering aircraft weight and landing gear type) operating at the Airport. It does not depend upon the runway's RDC because the aircraft with the greatest wheel load is not necessarily the most demanding aircraft in terms of wingspan and approach speed.

The current runway strength of both runways at Saratoga County Airport is reported to be 30,000 lbs. in a single wheel configuration. Both runways have been reconstructed since the last Airport Master Plan was completed in 2003. During construction of either runway, the runway strength was assessed for corporate jet aircraft, more specifically, the Gulfstream G-IV, which weighs about 74,000 lbs. Therefore, the pavement was designed to accommodate the larger and heavier corporate aircraft that operate at the airport annually. This in turn extends the life of the pavement and reduces the overall maintenance of the pavements over their twenty-year design life. As such, the runway strength for both runways is adequate to accommodate existing and future aircraft operating at Saratoga County Airport.

The current pavement condition for both runways is good. Runway 5-23 and Runway 14-32 were reconstructed in 2001 and 2003 respectively. Pavement life for a GA runway is around twenty years. Based on the dates of reconstruction, the pavements are at about half of their useful life. Continued maintenance of the pavement surfaces, including crack sealing, should continue to maximize the remaining pavement's useful life.

Recommendation: The current strength of each runway is adequate for existing and future aircraft. The pavements are in good condition and are at about half of their useful life. Continued pavement maintenance is recommended to maintain and maximize the pavement surfaces.

5.3.5. Runway Safety Areas

The Runway Safety Area (RSA) is an area surrounding a runway that is designated to improve the safety of aircraft operations. The dimensions of the RSA are based on the size and speed of aircraft operating at the Airport as represented by the runway's RDC.

The RSA is a defined surface surrounding a runway prepared for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. This area must be cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations. The surface should not permit water accumulation and, under dry conditions, should be capable of supporting snow removal equipment, aircraft rescue, and firefighting equipment, and the occasional passage of aircraft. The RSA should be free of objects higher than three inches, except for those objects that must be located in the area for air navigation or aircraft ground maneuvering purposes.

The required dimensions of the RSA for Runway 5-23 is based on a RDC of C-II-4000. The RSA is 500' wide and extends beyond each runway end 1,000'. The current RSA for Runway 5-23 meets dimensional requirements. The RSA does not have any surface irregularities.

Runway 14-32 has an RDC of B-II-VIS. Based on this criterion, the RSA dimension is 150' wide and extends 300' beyond each runway end. The RSA meets the FAA's dimensional and surface requirements.

Table 5-18 summarizes the RSA requirements for both Runways.

Table 5-18 – Runway Safety Area Requirements

	Runway 5-23	Runway 14-32
Width	500'	150'
Length Beyond Runway End	1,000'	300'
Length Prior to Threshold	600'	300'

Source: AC 150/5300-13A, McFarland Johnson

Recommendation: The current RSA for both runways meet current FAA standards.

5.3.6. Runway Object Free Area

The OFA is a two-dimensional surface surrounding the RSA and runway that should be clear of objects, except for objects that need to be located within the area for aeronautical purposes. The ROFA clearing standard requires the removal of objects protruding above the ground.

The current ROFA for Runway 5-23 is 800' wide and extends beyond each runway end 1,000' based on an RDC of C-II-4000. The ROFA for the runway is clear of violations. The runway 14-32 ROFA is 500' wide and extends beyond each runway end 300'. There are no violations to this ROFA. Table 5-19 summarizes the ROFA requirements for both Runways.

Table 5-19 – Runway Object Free Area Requirements

	Runway 5-23	Runway 14-32
Width	800'	500'
Length Beyond Runway End	1,000'	300'

Source: AC 150/5300-13A, McFarland Johnson

Recommendation: The current ROFA for both runways meet current FAA standards.

5.3.7. Runway Protection Zone

The Runway Protection Zone (RPZ) is a large trapezoidal area off each runway end that underlies aircraft approach and departure paths. The RPZ is intended to enhance the protection of people and property on the ground. Certain land uses (e.g., residential, places of public assembly, and fuel storage) within these areas are prohibited by the FAA when the airport controls the land use. Airport control of these areas is strongly recommended and is achieved through airport property acquisition, easements, or zoning to control development and land use activities.

The RPZ is located 200' from the end of the runway and the dimensions are based upon the RDC for each runway. The dimensions of each RPZ for Runways 5-23 and 14-32 are presented in Table 5-20.

Table 5-20 – Runway Protection Zone Dimensions

Runway End	Inner Width	Outer Width	Length
5	500'	1,010'	1,700'
23	500'	1,010'	1,700'
14	500'	700'	1,000'
32	500'	700'	1,000'

Source: AC 150/5300-13A, McFarland Johnson

There are no planned approaches to the runways at this time; therefore, the RPZs will not change.

The FAA recommends that the airport own or control the land within each RPZ. The current RPZ ownership is discussed below:

Runway 23 RPZ – Most of the RPZ overlies Airport property. The County has obtained easements on the northeast corner of the RPZ that overlies private property.

Runway 5 RPZ - About half of the Runway 5 RPZ lies on Airport property, the remainder of the RPZ extends beyond the Airport and overlies private property and easements have been acquired within most of this area. There are no easements on the southwest corner of the RPZ.

Runway 32 RPZ – About one third of the RPZ overlies Airport property; the remaining portion overlies public and private property. The RPZ is incorporated was part of the Old Mill Planned Development District (PDD) zoning that lies off this runway end. The Town of Milton redesigned the PDD to Town Center zoning, but retained the requirements for the RPZ to assure consistency with protection of the RPZ and associated airspace from the previous PDD requirements.

Runway 14 RPZ – Similar to the Runway 32 RPZ, about a third of the RPZ is on Airport while the remaining portion overlies private property. Easements have been acquired in the outer portion of the RPZ. A small portion along the south central portion of the RPZ does not have an easement.

The Airport controls most of the RPZs that overlie non-Airport property. It is recommended to acquire remaining easements within portions of the RPZs that do not yet have easements.

It should be noted that a medical building was partially constructed within the Runway 32 RPZ immediately off Airport property in June of 2013; the building is now complete. As the building is a prohibited use within an RPZ, the FAA is evaluating the building's impact on the approach to Runway 32 and is awaiting information from the developer to complete the analysis. The potential effect could require that the Runway 32 threshold be displaced to clear the building. This results in a loss of landing length and may restrict larger aircraft from using this runway.

Recommendation: The current RPZs for each runway end meet current FAA standards and are mostly controlled through easements within non-Airport owned property. The County should continue to pursue avigation easements within portions of the Runway 14 and 23 RPZs.

5.3.8. Runway Visibility Zone

Advisory Circular 150/5300-13A, *Airport Design*, presents criteria regarding the minimum line of sight along and between multiple runway configurations. The following criteria defines the line of sight criteria requirements

The Runway Visibility Zone (RVZ) is applied when there are two runways. A clear line of sight between the ends of intersecting runways is recommended. Terrain needs to be graded and objects need to be sited so there will be an unobstructed line of sight from any point 5 feet above one runway centerline to any point 5 feet above an intersecting runway centerline within the RVZ. At this time, there are no violations associated with the RVZ.

Recommendation: The current RVZ meets current clearing requirements.

5.3.9. Runway Obstacle Free Zone

The OFZ is a design surface but is also an operational surface that must be kept clear during operations. The OFZ is a defined volume of airspace centered above the runway centerline, above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The OFZ extends 200’ beyond each end of the runway. The width is 400’ for operations by large aircraft and is applicable to Runway 5-23. The width of the OFZ for Runway 14-32 is 250’ wide based on the types of aircraft using the runway and visual approaches to either runway end.

Recommendation: The OFZ dimensional and clearing standards are met for both runway OFZs.

5.3.10. Runway Pavement Markings

Runway 5-23 has non-precision approaches to each runway end. The runway is currently marked with non-precision markings. Runway 14-32 has no instrument approaches to either runway end, but the VOR/DME-A circling approach requires non-precision markings are in good condition. The runway markings were repainted in September 2013 and are in excellent condition. No new approaches to the runways are proposed, therefore no changes are required.

Recommendation: No runway marking changes are required for either runway.

5.3.11. Taxiways

Planning standards for taxiways include taxiway width, taxiway safety areas, taxiway object free areas, taxiway shoulders, taxiway gradient, and for parallel taxiways, the distance between the runway and taxiway centerlines. The dimensions of each standard vary based on the identified Airplane Design Group (ADG) and Taxiway Design Group (TDG) for each taxiway. The ADG is based on the wingspan and tail height of an aircraft, while the TDG is based on the distance between an aircraft's cockpit to main gear, as well as the width of the main gear. There are six ADG groups, and seven TDG groups. Details regarding the various dimensions follow in Tables 5-21 and 5-22.

Table 5-21 - Taxiway Requirements – Airplane Design Group

Design Standard	ADG I	ADG II	ADG III	ADG IV	ADG V	ADG VI
Taxiway Safety Area	49	79	118	171	214	262
Taxiway Object Free Area	89	131	186	259	320	386
Runway/Taxiway Separation	225 – 400*	240 – 400*	300-400*	400	400	500*

* Runway/Taxiway Separation vary based on approach visibility minimums
Source: FAA Advisory Circular 150/5300-13A

Table 5-22 - Taxiway Requirements – Taxiway Design Group

Design Standard	TDG 1	TDG 2	TDG 3	TDG 4	TDG 5	TDG 6	TDG 7
Taxiway Width	25	35	50	50	75	75	82
Taxiway Shoulder Width	10	10	20	20	25	35	40

Source: FAA Advisory Circular 150/5300-13A

It should also be noted that the new requirements for taxiway design published in AC 150/5300-13A, *Airport Design* now requires the design to be based on "cockpit over centerline" taxiing as opposed to "judgmental oversteering". This change particularly impacts curves and intersections, which will require modifications to accommodate the "cockpit over centerline" taxiing. The dimensions of intersection fillets and taxiway curves are based on the associated TDG for each taxiway.

The design standards to be used for Saratoga County Airport were based on the design aircraft, which was identified as the Cessna Citation Sovereign. For purposes of this analysis, the entire taxiway system is assumed to be used by all aircraft, including the Sovereign. The aircraft's ADG is C-II and based on its cockpit to main gear distance of 25', the TDG was identified as 3. Reviewing Tables 5-21 and 5-22, the following taxiway design standards apply to Saratoga County Airport:

Table 5-23 - Taxiway Design Standards

Design Standard	Dimension
Taxiway Safety Area	79'
Taxiway Object Free Area	131'
Runway/Taxiway Separation Runway	300'
Taxiway Width	50'
Taxiway Shoulder Width	20'

Source: FAA Advisory Circular 150/5300-13A

The existing taxiway width for all taxiways is 50’ and meets TDG-3 standards, requiring no changes. All other elements noted in Table 5-18 are also met on the airfield. Also, the taxiways are lighted with Medium Intensity Taxiway Lights (MITLs). The MITLs were replaced as part of a taxiway project that was completed in 2013.

The current taxiway configuration operates as a parallel taxiway system to both runways in that an aircraft can get to all runway ends without the need to back-taxi on the runways. However, Taxiways A, C and D, which primarily serve Runway 5-23 and Runway 32 can experience congestion during busy weekend days or during the 6 week Track Season.

When operations dictate the need for both powered and non-powered aircraft to operate on either Runway 5 or 23 or access Runway 32, the taxiway system can become significantly congested. This is because gliders cannot be pulled to the side on the turf areas due to the protected habitat for the Karner Blue Butterfly. As such, powered aircraft must wait until all glider operations have departed or hooked up to be towed back to the glider hangars. This can become a larger efficiency issue during Track Season, when activity levels increase significantly. In order to provide a more efficient movement of aircraft, a full parallel taxiway to Runway 5-23 is proposed. The taxiway would be offset 400’ from the centerline of Runway 5-23, connecting into existing portions of Taxiway A and D near the ends of Runway 5-23.

The taxiway would provide an alternate routing that does not exist today. Possible use scenarios include the use of the parallel taxiway to access Runway 23 during glider operations. Taxiway C and D can be used by gliders to stage or recover while powered aircraft use the parallel taxiway, thereby separating powered aircraft from non-powered aircraft. In the case of Runway 5 operations, powered aircraft could use Taxiway A while gliders stage on the parallel taxiway. In these instances, gliders can be segregated and allow powered aircraft access to Runway 5 or 23 unimpeded. The parallel taxiway has the added benefit of reducing taxi distances and queuing times, resulting in reduced fuel burn, exhaust and greenhouse gas emissions, and reduced noise.

Recommendation: Provide a parallel taxiway to Runway 5-23 to relieve congestion and provide efficient movement of powered aircraft to either runway end and reduce environmental effects associated with movement of powered and non-powered aircraft.

5.3.12. Airfield Lighting and Visual Aids

This section discusses the airfield lighting and visual aids on the Airport.

Runway Lighting

Runway 5-23 and 14-32 are lighted with Medium Intensity Runway Lighting (MIRLS). The lighting system for Runway 5-23 was replaced when the runway was reconstructed in 2001. The MIRL system for Runway 14-32 was replaced when this runway was reconstructed in 2003. The existing lighting systems for both runways meet the lighting requirements for the current approaches.

Runway End Identifier Lights (REILS) are provided on Runways 5, 23 and 32 to assist pilots during night conditions. These lights are in good condition and no changes are recommended.

Recommendation: Both runways are lighted appropriately with Medium Intensity Runway Lights and have REILs.

Precision Approach Path Indicators (PAPI)

Runways 5, 23 and 32 currently have four box Visual Approach Slope Indicators (VASIs). All except the Runway 23 VASI are currently inoperative. However, they are being replaced by Precision Approach Path Indicators (PAPI) units to provide visual guidance to these runway ends. The Runway 23 PAPI's is operational while the Runway 5 PAPI is expected to be operational in 2015.

Recommendation: No changes are required pending completion of the PAPI installations.

Wind Cone and Wind Tee

A wind cone provides visual reference of the wind direction and velocity for pilots using the Airport. A wind cone is located southeast of the runway intersection and is lighted. The wind cone is being replaced with a new assembly due to its age. The new wind cone is expected to be installed by Spring 2014.

A wind tee is similar to a wind cone as it provides a visual reference of the wind. The wind tee is lighted and has a T shape. The Airport has a wind tee located adjacent to the wind cone. It is old and redundant; consequently, the wind tee will be removed.

Recommendation: The current wind cone will be replaced and the wind tee removed.

Beacon

The Airport beacon is located south of the terminal area on a tower. The beacon is in good condition. Trees to the southeast obstruct pilot's view of the beacon when approaching from the south. A State grant was obtained in September 2013 to remove the trees that affect the ability to see the beacon when approaching from the south. The trees are expected to be removed in 2014.

Recommendation: No changes are recommended. A State grant was obtained to remove trees that obstruct the view of the beacon from the air.

5.3.13. Automated Weather Observation System (AWOS-III)

The Airport has an AWOS unit that is located west of the based aircraft tie-downs and Taxiway A. The unit was replaced in 2009 with a new and updated unit. The AWOS broadcasts on 132.025 MHz and provides weather information including wind speed, wind direction, temperature and dew point, among other parameters. The AWOS broadcast can also be obtained by telephone at (518) 884–9289.

Recommendation: As the unit was replaced in 2009, no recommendation is required.

5.3.14. Instrument Approaches

There are three instrument approaches to Saratoga County Airport. There is a Localizer Performance with Vertical Guidance (LPV) approach to Runway 23, an Area Navigation (RNAV) approach to Runway 5 and a VOR/DME circling approach to the Airport.

Both the RNAV and LPV approaches provide 314’ and 1 mile and 426’ and 1-mile visibility minimum, respectively. The lowest possible minimums for these types of approaches are 250’ and ¾ mile visibility with no obstructions to approach surfaces. Subsequently, the existing approach minimums provide adequate poor weather access to Saratoga County Airport. The ability to obtain better minimums to these approaches is through the removal of trees that obstruct the current approaches. An analysis of the current approaches is underway to determine if better minimums can be obtained and will be presented in a subsequent chapter.

The VOR/DME-A circling approach has high minimums at 826’ and 1-mile visibility and provides access to the Airport during poor weather conditions. As it is a circling approach, once a pilot has visually acquired the airport on the approach, the pilot may choose to land on any runway based upon current wind conditions. This approach provides an additional poor weather approach resource to access the Airport. No changes are recommended at this time for this approach.

The feasibility of attaining a precision approach was studied in the past; however, the amount of trees within the current 5-23 approaches prohibits this from being a viable option. As such, no precision approach is recommended at this time.

Recommendation: The recommendation is to assess the current tree obstructions to Runway 5 and 23 to determine if better minimums can be obtained.

5.3.15. FAR Part 77 Surfaces

In an effort to protect the safety of aircraft operations, the FAA defines and regulates the airspace surrounding airports in FAR Part 77, *Objects Affecting Navigable Airspace*. This airspace is defined and delineated by a set of geometric surfaces referred to as “imaginary surfaces” that extend outward and upward from airport runways. An object that protrudes through an imaginary surface is an obstruction. Obstructions may be hazards, and an FAA analysis may result in a recommendation to light and/or mark the object. The height and dimensions of the imaginary surfaces are determined by the runway end and airfield elevation, aircraft size and runway approach. Existing and proposed imaginary surfaces at Saratoga County Airport are discussed below.

The surfaces that comprise the FAR Part 77 surfaces are as follows:

- **Primary Surface**: A surface longitudinally centered on the runway. When the runway has a paved surface, the Primary Surface extends 200 feet beyond each runway end. The width of the Primary Surface depends upon the type of approach provided to the runway, the aircraft using the approach and the associated visibility minimums.

For purposes of this analysis, Runway 5-23 is considered other than utility runway, which defines the primary surface as 500 feet. Runway 14-32 is defined a utility runway and has a Primary Surface width of 250'. In addition, the elevation of any point of the Primary Surface is the same as the nearest point on the runway centerline.

- **Horizontal Surface**: This surface is a horizontal plane 150 feet above the highest point on the runway surface. The elevation of the Horizontal Surface for Saratoga County Airport is 584' MSL. The edges of this surface are defined by 10,000-foot radial arcs centered from the ends of Runway 5-23 and 5,000' arcs on Runway 14-32.

- **Conical Surface**: This surface extends outward and upward from the perimeter of the Horizontal Surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

- **Approach Surface**: The Approach Surface is an inclined plane longitudinally centered on the extended runway centerline, extending outward and upward from the Primary Surface. The dimensions and slope of these surfaces are based on the category of approach (visual, non-precision, or precision), the visibility minimums of the published approach, and the type of aircraft that will use the approach. The Approach Surfaces for all runways start 200 feet from end of usable pavement. The Approach Surface for Runway 5 and 23 are 34:1 based on the existing approaches. Runway 14-32 has 20:1 approaches, as both runway ends are visual approaches.

- **Transitional Surface**: A surface extending outward and upward at right angles from the sides of the Primary and Approach Surfaces at a slope of 7:1. The Transitional Surfaces terminate at the overlying Horizontal Surface.

When an object penetrates an imaginary surface, it is considered an obstruction to air navigation. Obstructions can include man-made objects (buildings, towers), objects of natural growth (trees), and terrain. Not all obstructions are hazards, although they are generally presumed to be hazards in the absence of further study. The determination of obstruction hazard status is made by the FAA as a result of an Aeronautical Study conducted in accordance with FAR Part 77 procedures.

No new approaches are proposed at this time; therefore, the FAR Part 77 dimensions discussed above will not change.

Recommendation: No changes are recommended.

5.3.16. Runway End Siting Surface

The runway end siting surfaces identify the minimum approach clearances to obtain a safe approach and night use of instrument approaches, and are defined in Table 3-2 of Advisory Circular 150/5300-13A, *Airport Design*. If penetrations to the surface cannot be removed, threshold displacement or obstruction lighting may be required. Table 5-24 presents the runway end siting surface dimensions and slopes that are associated with existing approaches to Runway 5-23 and 14-32.

Table 5-24 - Existing Runway End Siting Surface Dimensions and Slopes

Runway	Table 3-2 Designation	Approach Type	Initial Width	Final Width	Length	Slope
Runway 23	5	Non-Precision	800 feet	3,800 feet	10,000 feet	20:1
	8	Non Precision	300 feet	1,520 feet	10,000 feet	30:1
Runway 05	5	Non-Precision	800 feet	3,800 feet	10,000 feet	20:1
	8	Non Precision	300 feet	1,520 feet	10,000 feet	30:1
Runways 14 and 32	2	Visual	250 feet	700 feet	5,000 feet	20:1

Source: FAA Advisory Circular 150/5300-13A, Table 3-2

As there are no changes in the types of approaches to either runway, these surface dimensions do not change.

Recommendation: No changes are recommended.

5.3.17. Wildlife Hazard Assessment

An FAA grant to conduct a Wildlife Hazard Assessment (WHA) was awarded in September 2013. The WHA will assess and evaluate the potential wildlife hazards that may exist on the Airport. The WHA will comprise of the following elements:

1. An analysis of the events or circumstances that prompted the assessment.
2. Identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.
3. Identification and location of features on and near the Airport that attract wildlife.
4. A description of wildlife hazards to general aviation operations.
5. Recommended actions for reducing identified wildlife hazards to air carrier operations.

Once the study is complete, the findings will be evaluated and incorporated into the Airport Master Plan recommendations.

Recommendation: Incorporate the findings of the WHA into the recommended development for the Airport.

5.3.18. Airside Facility Requirements Summary

The summary of recommendations for airside facilities is provided in Table 5-25.

Table 5-25 - Summary of Airside Facility Requirements

Item/Facility	Existing Facility or Capacity	Ultimate Requirement	Recommendation
Runway Length	Runway 5-23 – 4,699' Runway 14-32 – 4,000'	Runway 5-23 – 5,500' Runway 14-32 – 4,000'	Extend Runway 5-23 800', Maintain Length of Runway 14-32
Runway Width	Runway 5-23 – 100' Runway 14-32 – 100'	Runway 5-23 – 100' Runway 14-32 – 100'	Maintain 5-23 and 14-32 Width at 100'
Runway Safety Areas	Runway 5-23 – 500'x1,000' Runway 14-32 – 150'x300'	Runway 5-23 – 500'x1,000' Runway 14-32 – 150'x300'	None
Runway Object Free Area	Runway 5-23 – 800'x1,000' Runway 14-32 – 500'x300'	Runway 5-23 – 800'x1,000' Runway 14-32 – 500'x300'	None
Runway Protection Zone	Under Airport Control through Ownership and Avigation Easements	Under Airport Control through Ownership and Avigation Easements	Target Remaining Avigation Easements
Runway Visibility Zone	Standard	Standard	None
Runway Lighting	Runway 5-23 – MIRLs Runway 14-32 - MIRLs	Runway 5-23 – MIRLs Runway 14-32 - MIRLs	None
Runway Visual Aids	Runway 5 – VASI Runway 23 – VASI Runway 32 – VASI Runway 14 - None	Runway 5 – PAPI Runway 23 – PAPI Runway 32 – PAPI Runway 14 - None	VASIs Being Replaced with PAPIs 2014/2015
Instrument Approaches	Runway 5 – RNAV (GPS) Runway 23 – RNAV (GPS) Runway 14 – Visual Runway 32 – Visual	Runway 5 – RNAV (GPS) Runway 23 – RNAV (GPS) Runway 14 – Visual Runway 32 – Visual	Assess Obstructions to Current Approaches to Improve Minima
Taxiways	Runway 5-23 – Partial Parallel Runway 14-32 – Partial Parallel	Runway 5-23 – Full Parallel Runway 14-32 – Partial Parallel	Runway 5-23 – Full Parallel
Taxiway Width	50'	50'	None
Taxiway Lighting	All Taxiways – MITL	All Taxiways – MITL	MITL's Replaced 2013
Glider Operations	Operate on Runway 5-23 and 14-32	Separate Powered Aircraft and Gliders	Considerations Include Separate Glider Runway, Staging Areas at Ends of Runways. Assess in Chapter 6 *Alternatives*

Source: McFarland Johnson

5.4. LANDSIDE FACILITIES

In order to accommodate existing and future demand, improvements to landside facilities should keep pace with improvements to airside facilities and with growth in aviation activity at the Airport. Various methodologies have been applied to the forecasts presented in Chapter 3, *Forecasts of Aviation Activity* to determine the magnitude of the landside facility requirements. Industry standards and design criteria contained in AC 150/5300-13A, *Airport Design*, are the basis for these methodologies. Landside facilities include the following:

- Hangars
- Aprons
- Aviation Fuel Facilities
- Airfield Security
- Airfield Maintenance and Equipment
- Terminal
- Airport Rescue and Fire Fighting
- Ground Access and Parking
- Utilities
- Summary of Landside Facility Requirements

5.4.1. Hangars

Hangar requirements are typically a function of the number and type of based aircraft, owner preferences, hangar rental costs, and climate conditions in the region. Owners of large and expensive aircraft tend to prefer hangar storage to outdoor storage and the preference for enclosed storage increases when the weather conditions are severe. Since GA airports often find that T-hangars are a flexible and cost effective way to meet the aircraft storage needs of their customers, this report divides the calculated hangar demand between conventional hangar and T-hangar facilities.

Existing hangar facilities include three conventional hangars and two T-hangars. The conventional hangars are used for short and long-term storage (19,000 sf) and aircraft maintenance (7,860 sf). The FBO indicated that all the hangars are full and additional hangar space is needed. The FBO plans to purchase a larger corporate jet aircraft that will displace other aircraft in their main hangar. Additionally, the FBO indicated that they are quickly outgrowing the current maintenance hangar and that additional area is needed.

T-hangar space is comprised of two sets of T-hangars providing 22,800 sf and 13 individual units. The FBO indicated there is a waiting list of 6 aircraft for future T-hangars space.

The FBO uses the old Richmor hangar as a maintenance hangar. Maintenance service has been growing over the past few years and the maintenance facility is now at capacity. Based on discussions with the FBO, additional space is needed to service the demand. For purposes of this analysis, the general calculation to determine maintenance space is 20% of the overall hangar demand as the maintenance service provides specialty work on Cessna jets and attracts aircraft from the New England states and New York.

Table 5-26 presents the storage preferences and space requirements for existing and future based aircraft at Saratoga County Airport and is based upon discussions with the FBO and information from the 2003 Airport Master Plan:

Table 5-26 – Hangar Requirements by Aircraft Type

Aircraft Type	Type of Storage	Space Requirement
Single Engine – 30%	T-Hangar	1,200 sf
Single Engine – 10%	Conventional Hangar	1,200 sf
Multi-engine Piston – 90%	T-Hangar	1,400 sf
Multi-engine Piston – 10%	Conventional Hangar	1,400 sf
Turboprop – 100%	Conventional Hangar	1,800 sf
Jet – 100%	Conventional Hangar	3,500 sf
Helicopter – 100%	Conventional Hangar	3,500 sf

Source: FBO, 2003 Master Plan, McFarland Johnson

Future hangar facility requirements for Saratoga County Airport were computed by applying the above assumptions to the based aircraft forecasts provided in Chapter 3, *Forecasts of Aviation Activity*. Table 5-27 presents these hangar requirements.

Table 5-27 – Hangar Requirements

Conventional Hangar	**2017**	**2022**	**2027**	**2032**
Single-Engine	4,800 sf	4,800 sf	4,800 sf	6,000 sf
Multi-Engine	0 sf	0 sf	1,400 sf	1,400 sf
Turboprop	5,400 sf	5,400 sf	5,400 sf	5,400 sf
Turbojet	10,500 sf	10,500 sf	10,500 sf	10,500 sf
Helicopter	3,500 sf	3,500 sf	3,500 sf	3,500 sf
Subtotal	24,200 sf	24,200 sf	25,600 sf	26,800 sf
Existing Conventional Hangar Area:	19,000 sf			
Surplus (Deficiency)	(5,200 sf)	(5,200 sf)	(6,600 sf)	(7,800 sf)
T-Hangar				
Single-Engine	14,400 sf	14,400 sf	15,600 sf	16,800 sf
(units @1,200 sf. ea.)	12	13	13	14
Multi-Engine	5,600 sf	5,600 sf	7,000 sf	7,000 sf
(units @1,400 sf ea.)	4	4	5	5
Subtotal	20,000 sf	21,200 sf	22,600 sf	23,800 sf
(units)	16	17	18	19
Existing T-Hangar Units: 13				
Unit Surplus (Deficiency)	(3)	(4)	(5)	(6)
Maintenance Area				
20% of Hangar/T-hangar Demand	8,900 sf	9,100 sf	9,600 sf	10,000 sf
Existing Maintenance Area: 7,680 sf. (say 7,700 sf.)				
Surplus (Deficiency) (3,100	(3,100 sf)	(3,100 sf)	(1,900 sf)	(2,300 sf)

Source: McFarland Johnson

As shown in Table 5-27, conventional hangar space demand will increase to approximately 26,800 sf through the end of the planning period. Based on existing hangar space today, there is an immediate deficit of 5,200 sf, which increases to 7,800 sf of conventional hangar space over the planning period. The FBO indicated that hangar demand has grown and that demand is a combination of aircraft owners wanting covered storage, covered itinerant hangar needs as well as the FBO's growing fleet of aircraft. Based on this, the demand can be fulfilled by adding an additional large conventional hangar to meet near and long-term demand.

The calculation for T-hangar space also shows a deficit over the planning period. In addition, the FBO indicated that there is a current waiting list of 6 aircraft for T-Hangar Space. Based on the calculation, there is a deficit of 6 T-hangar units through the planning period. As there is a current waiting list of 6 aircraft requesting T-hangars space, the short and long-term demand will be satisfied through the development of a new 6 unit T-hangar.

Maintenance space is currently at capacity today. Based on the FBO's information, the need to provide additional space is needed in the short term. The calculations shown in Table 5-27 suggest the need for additional space in the short term and growing over the twenty-year planning period. The existing maintenance hangar is in poor condition and in need of replacement. The FBO is planning to completely renovate of this hangar in 2014/2015. The renovation of the hangar will provide the additional maintenance area identified in the facility needs. As such it is assumed that the future maintenance area will be satisfied with the renovation of the hangar.

Recommendation: To address short and long term demand, there is a need to add a new conventional hangar, a 6 unit T-hangar and replacement of the maintenance hangar with a hangar to meet future demand.

Glider Facilities

There are two glider hangars located to the east of Taxiway C. The hangars were built by the Saratoga Soaring Association in 2003 and the Adirondack Soaring Association in 2012. Discussions with the glider clubs indicate that both hangars are appropriately sized and they have adequate land to store glider trailers and area to assemble gliders. Both hangars also have direct access to Taxiway C. These hangars currently meet the needs of the two glider clubs; therefore, no additional facility needs are identified at this time.

Recommendation: Current facilities meet glider club needs and no changes are necessary.

5.4.2. Aprons

Three components of use were considered in the determination of apron requirements for Saratoga County Airport. They are as follows:

- Based aircraft parking
- Transient aircraft parking
- Aircraft Fueling Apron

Based Aircraft Parking

The current area designated for parking based aircraft is located along Taxiway C. There are currently 46 tiedowns on this apron, equating to 34,450 square yards (sy). The apron pavement is in poor condition and there is a planned project to reconstruct the pavement in 2014.

To calculate based aircraft needs, it was assumed that 60% of Single Engine based aircraft would require a tiedown. A tiedown represents 300 sy. Using these factors and the forecast of based aircraft, Table 5-28 presents the based aircraft tiedown requirement.

Table 5-28 – Based Aircraft Apron Requirements

	2017	2022	2027	2032
60% of Based Aircraft	25	26	26	27
Area (300 sy/tiedown)	7,500 sy	7,800 sy	7,800 sy	8,100 sy
Existing Space - 13,450 sy				
Surplus (Deficiency)	5,950 sy	5,650 sy	5,650 sy	5,350 sy

Source: McFarland Johnson

As shown in Table 5-28, there is a surplus of approximately 20 tiedowns in 2017 and 18 in 2032. It should be noted that although there is a surplus of space, there are a number of tiedowns that are used during the summer when aircraft temporarily base at the Airport. During Track Season, itinerant parking space for corporate jets and private aircraft requiring short-term parking becomes very limited. The FBO has used the surplus area over the years to temporary park itinerant aircraft. Removing the surplus area would reduce the flexibility to temporarily park itinerant aircraft parking. As such, it is recommended to retain the surplus area for itinerant parking during Track Season.

Recommendation: There is a surplus of tiedown space, however, it is recommended to retain the apron for itinerant aircraft parking during Track Season.

Itinerant Aircraft Parking

Itinerant aircraft represent approximately 57% of the total operations conducted at Saratoga County Airport annually. Itinerant parking needs generally are accommodated during the year. However, unique to Saratoga County Airport, itinerant aircraft parking needs increase significantly during Track Season. The increased volume of aircraft, as well as an increase in aircraft size associated with mid-sized and large corporate aircraft dramatically reduces available parking space. Based on this, two itinerant parking assessments were done, one for normal activity and one for Track Season.

AC 150/5300-13A, *Airport Design*, suggests one methodology for determining apron space requirements for transient aircraft. The methodology is described as follows and modified to be consistent with airport characteristics and activity level:

- Calculate monthly itinerant operations (8% for average month, 33% for Track Season)
- Calculate total design day operations (assumes 31 day average month x 10% for busy day);
- Calculate itinerant operations on design day and divide by two to obtain number of itinerant aircraft on the apron;
- Normal Peak Month - Assume 25% percent of these aircraft require transient parking space;
- Track Season – Assume 50% of these aircraft require transient parking space.
- Allow an apron area of 360 SY per transient airplane or 1 tiedown under normal conditions and 400 sy for Track Season conditions.

The above methodology was applied to determine the apron space requirements for transient aircraft at Saratoga County Airport. Table 5-29 presents the Normal Itinerant Apron needs followed by Table 5-30, which represents the Itinerant Apron Parking Needs during Track Season.

Table 5-29 - Normal Transient Aircraft Apron Area Requirements

Year	Design Day Operations	Itinerant Operations Per Design Day	Transient Aircraft on Apron	Required Transient Apron Space (sy)	Existing Transient Apron Space (sy)	Transient Apron (sy) Surplus or (Deficit)
2017	47	23	6	2,100	15,700	13,600
2022	48	24	6	2,200	15,700	13,500
2027	50	25	6	2,300	15,700	13,400
2032	54	27	7	2,400	15,700	13,300

Source: McFarland Johnson Analysis

Table 5-30 – Track Season Transient Aircraft Apron Area Requirements

Year	Design Day Operations	Itinerant Operations Per Design Day	Transient Aircraft on Apron	Required Transient Apron Space (sy)	Existing Transient Apron Space (sy)	Transient Apron (sy) Surplus or (Deficit)
2017	194	97	49	19,600	15,700	(3,900)
2022	200	100	50	20,000	15,700	(4,300)
2027	206	103	52	20,800	15,700	(5,100)
2032	221	111	55	22,100	15,700	(6,300)

Source: McFarland Johnson Analysis

As seen in Table 5-29, outside of Track Season, there is a surplus of itinerant parking needs under normal peak period conditions. However, as noted by the FBO, itinerant parking during Track Season shows a 6,300 sy deficit as presented in Table 5-30.

Based on this analysis, the surplus apron space shown in Table 5-29 is critical to accommodating itinerant apron parking needs during Track Season. However, there still remains a deficit of itinerant parking space throughout the planning period. The based aircraft apron has been used as itinerant parking in the past. Factoring the surplus based aircraft apron area shown in Table 5-28, Track Season parking needs can be met in 2017, however, in the long-term, there is a deficit of 6,300 sy of itinerant parking with the based aircraft apron surplus included.

Therefore, it is recommended to retain the current transient parking space to meet normal and Track Season parking demand. In the long term future, up to an additional 6,300 sy of itinerant parking apron will be required to meet demand.

Recommendation: In the long term, provide up to 6,300 sy of additional itinerant parking apron to meet demand.

Aircraft Fueling Apron

The fueling apron is located adjacent to the FBO's hangar facility. There is an apron in front of the fuel tanks for aircraft of various sizes to fuel the aircraft. In addition to the fueling apron, the FBO also has a mobile truck to dispense fuel remotely. As such, there is no recommendation needed to address the fueling apron at this time.

Recommendation: No changes are recommended.

5.4.3. Aviation Fuel Facilities

The FBO has two above ground 10,000-gallon fuel tanks to store 100 low lead (100LL) fuel and Jet-A fuel. The tanks are located west of the North American Flight Services hangar. The system has a fueling apron for aircraft with two dispensers for 100LL fuel and Jet-A fuel. The tanks meet current Federal and State regulations for double walled tanks and containment. Additionally, a Spill Prevention, Control and Countermeasure plan (SPCC) has also been developed to meet Federal and State regulations. The FBO also has two mobile tankers with 3,000-gallon capacity, for each brand of fuel that allows the FBO to fuel aircraft remotely.

The FBO indicated that the 100LL tank is adequate for this fuel's demand. However, during the summer months, a 10,000 gallon tanker is brought in to supplement Jet-A capacity due to the demand for Jet-A during Track Season. This has occurred over the past four years to ensure that the FBO has an adequate supply of Jet-A fuel.

The fuel sales data presented in Table 3-4 of Chapter 3, *Forecasts of Aviation Activity* was reviewed to determine the magnitude of the problem. The three busiest months for Jet-A sales is between July and September. Table 5-31 presents the Jet-A sales between 2009 and 2012.

Table 5-31 – Jet A Fuels Sales (Gallons)

Month	2009 Jet A	2010 Jet A	2011 Jet A	2012 Jet A
July	16,875	20,580	23,872	32,018
August	72,823	64,649	65,985	56,633
September	26,384	15,910	24,374	8,915
3 Month Average	38,694	33,713	38,077	32,522

Source: Avfuels

Averaging the 3-month average over the four years, the average monthly demand for Jet-A fuel is 35,750 gallons, which equates to an average weekly demand of 8,940 gallons. As a typical tanker trailer load is about 8,000 gallons, a tanker load per week is required to meet demand. The industry recommendation is to have at least a two-week fuel supply available to operate efficiently and limit the potential of exhausting the fuel supply. The calculations above confirm that the single Jet-A tank is inadequate to accommodate demand. As such, it is recommended that a second 10,000-gallon Jet-A tank be installed to provide a minimum two-week supply of Jet-A fuel. The installation will meet all Federal and State regulations.

The maneuvering area for delivery tankers is limited and the trucks must pull in and back out, which is inefficient. As such, during the design of the second Jet-A fuel tank, the fuel delivery area should be examined to provide a more efficient configuration that will eliminate the need for the tankers trucks to back out of the delivery area.

Recommendation: Install a second 10,000-gallon Jet-A fuel tank and reconfigure the tanker truck delivery area.

5.4.4. Airfield Security

A security fence currently runs around the entire Airport perimeter and ending at the entrance to the Airport. There are several gates located along Rowland Street, Geyser Road, and Stone Church Road to provide access to the various areas of the Airport. Perimeter fencing is needed within a portion of the terminal area. It is recommended to add a fence from the old Richmor hangar around the T-hangars and Glider Hangars and connecting to the security fence along the eastern edge of the Airport. A gate should be incorporated to allow vehicles to access the hangars, T-hangars and Glider hangars. Consideration should be given to establishing a access control system to provide a higher level of security. This would ensure that only tenants could access the landside buildings and apron areas.

Recommendation: Complete the security fencing within the terminal area to limit access to the airside. The system should integrate a access control system to allow only tenants access to the hangar buildings and apron areas.

5.4.5. Airfield Maintenance Facility and Equipment

An airport requires sufficient equipment to maintain the airport facilities, and adequate storage and maintenance buildings to protect and service the maintenance equipment. The maintenance building should provide sufficient equipment storage space and an ancillary support area with maintenance work facilities, including at least one maintenance bay.

A maintenance and storage facility is not required at Saratoga County Airport. The Saratoga Department of Public Works (SCDPW) operates and maintains the Airport. The SCDPW complex is located about 2.5 miles from the Airport and maintenance equipment used to maintain the Airport is stored at this facility.

The SCDPW maintenance vehicles are used to mow grass during the fall and plow snow in the winter. This equipment is dispatched from the SCDPW facility as needed. In addition, two dedicated snow blowers are owned by the SCDPW and used during snow events. The blowers include a 1972 Sicard and a 2005 Larue.

All other maintenance such as light replacement and other maintenance needs are also provided by the SCDPW. The FBO will contact SCDPW and let them know of any maintenance needs as they arise.

Discussions with SCDPW staff indicated that no new maintenance or snow removal equipment is required.

Recommendation: No recommendations are required.

5.4.6. Terminal

The terminal building is the gathering place for pilots, passengers, visitors, and airport management. The building design should be functional, comfortable and provide a positive image of the airport. A GA terminal building typically provides space for management offices, a pilot lounge, flight planning, restrooms, eating facilities, a public telephone, and other space, such as training rooms, to meet the needs of pilots, passengers, and employees.

The current terminal amenities are provided at North American Flight Services. This area provides about 1,000 sf of space and includes a pilot lounge, pilot flight planning area, restrooms on the first floor and offices and training rooms on the second floor. The area is adequate to meet the needs of the airport. Similar administrative space provided in the North American Flight Services facility should be incorporated in the new hangar to provide additional terminal space.

Recommendation: Current terminal facilities are adequate. When a new hangar is built, additional terminal space should be incorporated.

5.4.7. Aircraft Rescue and Fire Fighting (ARFF)

There are no ARFF facilities or equipment located at the airport. The Town of Milton Fire Department provides emergency response services through a mutual aid agreement with the County. The Town of Milton's Fire Department is located ½ mile from the entrance of the Airport on Geyser Road.

Recommendation: No recommendations are required.

5.4.8. Ground Access and Parking

The current access road to the Airport is located along Geyser Road. The road is in good condition and provides access to all of the hangar facilities. There are no recommendations at this time to add additional access.

There are two automobile parking areas on the Airport. The primary lot is located adjacent to the North American Flight Services hangar and has 60 parking spaces. A second lot is located adjacent to the maintenance hangar and has 10 parking spaces.

Parking demand was estimated based upon peak period operations. The following approach was used to develop the parking estimates:

- Identify GA Peak Period operations for normal and Track Season conditions.
- Determine the number of peak-hour pilots and passengers by multiplying the number of peak hour operations by 2.5 pilots and passengers
- Estimate the number of parking spaces in use by assuming that parking demand will be half the number of pilots and passengers, since parking spaces will be utilized only by departing pilots and passengers

Using this approach, Tables 5-32 and 5-33 present the GA parking demand estimates.

Table 5-32 - GA Automobile Parking Requirements – Normal Conditions

Year	GA Peak Hour Operations	Pilot & Passenger Parking Demand	Total Parking Demand	Existing Spaces	Surplus(Deficit)
2012	17	43	21	70	49
2017	18	44	22	70	48
2022	18	45	23	70	47
2032	19	48	24	70	46

Source: McFarland-Johnson

Table 5-33 - GA Automobile Parking Requirements – Track Season Conditions

Year	GA Peak Hour Operations	Pilot & Passenger Parking Demand	Total Parking Demand	Existing Spaces	Surplus(Deficit)
2012	52	130	65	70	5
2017	54	134	67	70	3
2022	55	138	69	70	1
2032	59	146	73	70	(3)

Source: McFarland-Johnson

As shown, there is adequate parking available during the year under normal conditions. During Track Season, demand for parking increases, however, there is enough parking spaces to meet demand with the exception of the small deficit in the long term. For purposes of this analysis, the small deficit does not require an adjustment.

Recommendation: The existing roadway and parking meet the needs of the Airport.

5.4.9. Utilities

Section 2.4.6 in Chapter 1 *Inventory*, described the utilities available at the Airport. Based on discussions with the County, most of the utilities are adequate and each building has one or more utilities serving the building. The only note is that a water line was connected to the new 9,000 sf hangar constructed across from the Richmor hangar. The water line cannot be completed until a gray water system can be built for the building. Consideration should be given to incorporate the gray water system.

Recommendation: The utilities services meet current and future needs of the Airport. A septic system should be incorporated to service the new hangar across from the maintenance hangar.

5.4.10. Summary of Landside Facility Requirements

Table 5-34 provides a summary of the Landside Facility Requirements.

Table 5-34 – Landside Facility Requirements Summary

Item/Facility	Existing Facility or Capacity	Ultimate Requirement	Recommendation
Conventional Hangar	19,000 sf	26,800 sf	Increase Hangar Space by 7,800 sf
T-Hangars	13 Units	17 Units	Increase T-hangars by 6 Units Based on Waiting List
Based Aircraft Apron	13,450 sy	8,100 sy	None
Transient Aircraft Apron			Utilize Based Aircraft Apron Surplus to Meet Short Term Demand. Provide 6,400 sy to Meet Long Term Demand
Normal	15,700 sy	2,400 sy	
Track Season	15,700 sy	22,100 sy	
Fuel Storage Capacity	10,000 gal 100 LL 10,000 gal Jet-A	10,000 gal 100 LL 20,000 gal Jet-A	Install an Additional 10,000 Gallon Jet-A Tank
Auto Parking			
Normal	70 Spaces	24 Spaces	None
Track Season	70 Spaces	73 Spaces	
Terminal Space	Adequate	Adequate	Adequate
ARFF	Adequate	Adequate	Adequate
Maintenance Facility and Equipment	Adequate	Adequate	Adequate
Utilities	Adequate	Adequate	Add gray water system to recently built hangar

Source: McFarland Johnson

McFarland Johnson