Leesburg Executive Airport Master Plan Update

FINAL DRAFT

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Prepared for:

Town of Leesburg

1001 Sycolin Road, SE, Suite 7

Leesburg, Virginia 20175

Prepared by:

Talbert and Bright

10105 Krause Road, Suite 100

Chesterfield, Virginia 23832

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1.0 INVENTORY CHAPTER

The Leesburg Executive Airport (JYO), governed by the Town of Leesburg, is a publicly-owned general aviation airport located in Leesburg, VA, serving the aeronautical needs of the greater Washington DC area. JYO is the second busiest general aviation (GA) airport in the Commonwealth of Virginia in both based aircraft and annual general aviation operations.

An update of the Airport Master Plan (AMP) and Airport Layout Plan (ALP) has been initiated to determine appropriate capital development priorities for the next 20-years. This updated plan describes the current airport facilities, projects future aviation demand on the Airport, and details future facility needs and plans to accommodate the forecast demand.

The AMP and ALP, as adopted by the Town of Leesburg and acceptable to the FAA and DOAV, enable the Airport sponsor to apply for funding for capital improvements as eligible under the federal and state airport aid programs. The timing of these Airport improvements can then be incorporated into local capital improvement programs (CIPs).

1.1 Objectives

The primary purpose of this Master Plan Update is to determine the current and future activity and facility needs of JYO. This document will be used to assist the Town of Leesburg, FAA, and DOAV in determining and planning for future facility needs and development/improvement costs at the Airport. The existing ALP for JYO was approved in 2007. Many of the proposed airport development projects identified during the previous ALP Update have been completed including land acquisition and hangar construction, which results in a need for an updated 20-year development plan focusing on the continued enhancement of the Airport. The revised AMP reflects the goals and objectives of the Airport including:

- Review existing airport layout, facilities, and uses,
- Determine appropriate development needs based on forecast demand,
- Ensure preferred development meets all local, state, and federal regulations and standards,
- Evaluate terminal area plan and evaluate concepts for general aviation development along the western side of the Airport,
- Determine the best use of existing airport property,
- Ensure the continued financial growth of the Airport.

1.2 Airport Location

The Leesburg Executive Airport is a public-use general aviation airport located within the incorporated limits of the Town of Leesburg in Loudoun County. The Airport is also located within the Piedmont Region of northern Virginia, approximately 35-miles northwest of Washington D.C. The elevation of the Airport is recorded at 389.7-feet above mean sea level

(AMSL) and the airport property totals approximately 293.3 acres. An airport location map and vicinity map are shown in **Exhibit 1-1**.

The Airport has a single 5,500' long x 100' wide runway (Runway 17-35), an instrument landing system (ILS) for Runway 17, several aircraft hangars (including both conventional 'box' hangars as well as T-hangars), and a terminal building. Currently, there are an estimated 118,255 annual operations at JYO with 249 aircraft based at the Airport in 2016.

The Airport is bounded by Sycolin Road (VA Rt. 643) and Miller Drive to the east, Battlefield Parkway to the north, and the Dulles Greenway (VA Rt. 267) to the west as shown in **Exhibit 1-2**.

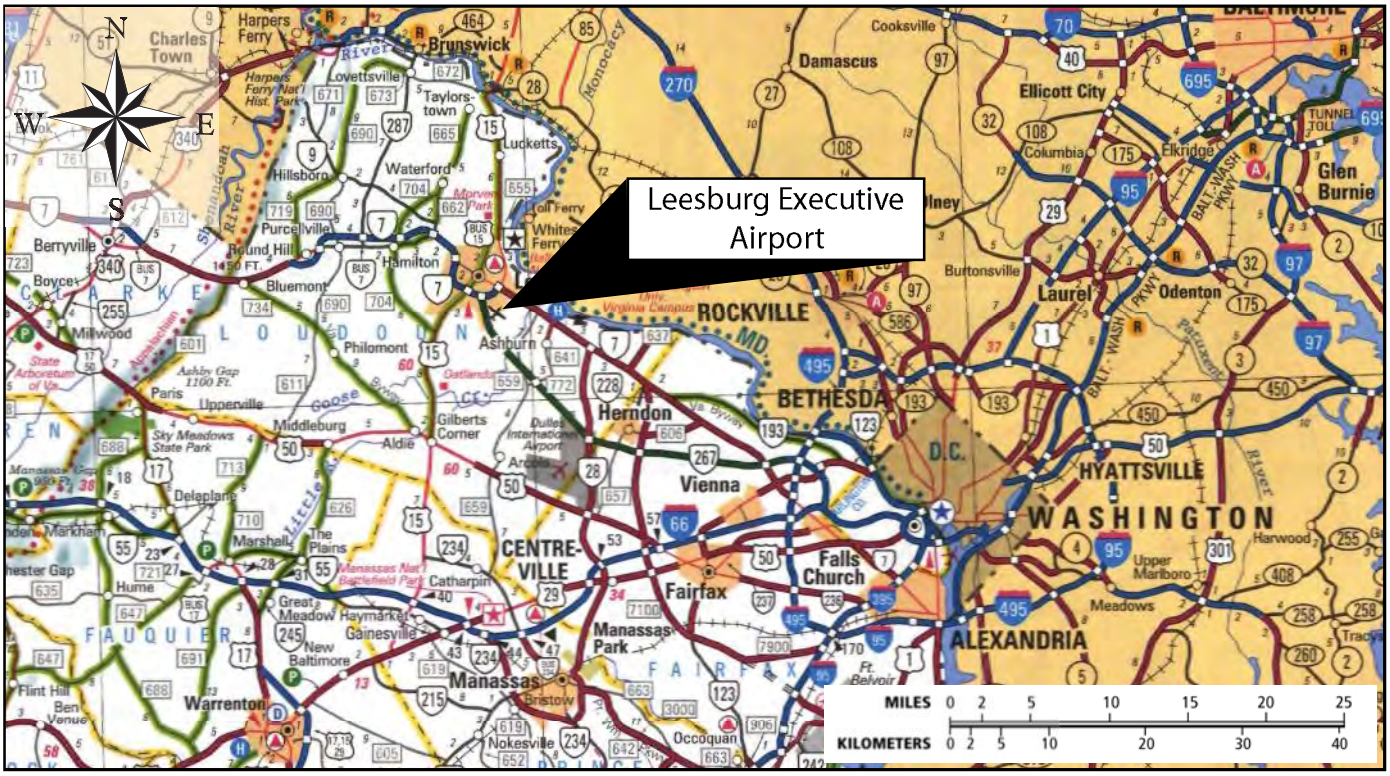
Land use around the Airport consists of industrial/commercial and residential areas to the east, residential to the north, and undeveloped to the west and south. However, the former Crosstrail property immediately west of the Airport is undergoing commercial development known as Compass Creek with retail shopping opening in 2018. There are also government and recreational facilities located east and north of the Airport including administrative offices, National Guard recruiting center, regional park, park and ride lot, fire rescue training center, and sheriff's office. Land use designations and zoning are discussed in Section 1.13 of this Chapter.

1.3 Airport Ownership

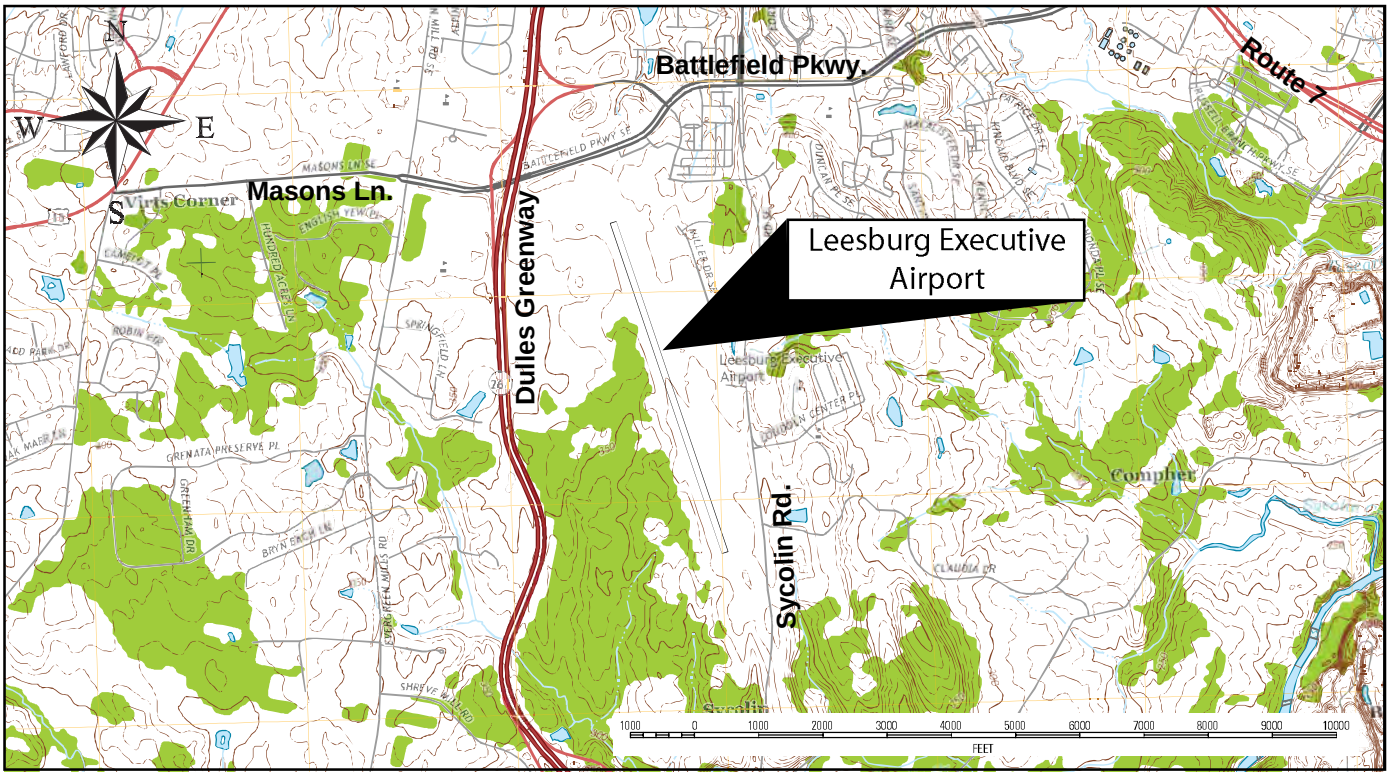
The Leesburg Executive Airport is owned and operated by the Town of Leesburg with oversight provided by the Leesburg Executive Airport Commission. The Commission advises and makes recommendations to the Leesburg Town Council regarding the development of the Airport, rules and regulations, and administration of the Airport. The Commission is comprised of seven members as appointed by the Town of Leesburg Town Council. Two additional members serve as Town Council Representative and Board of Supervisors Representative respectively. A full-time Airport Manager is responsible for the day-to-day operation of the Airport.

1.4 Airport History

Aviation in Leesburg began in 1918 during World War I when a plane landed on a grassy field of Wallace George's farm; the airstrip became known as "George's Field" and became popular with barnstormers in the 1920's. George's Field was located about one mile from the Town of Leesburg, along the south side of Edward's Ferry Road and immediately west of the current Route 15 Leesburg Bypass. After World War II George's Field became a privately-owned airfield known as the Leesburg Airpark. In 1950 Arthur Godfrey purchased Leesburg Airpark and donated the property to the Town of Leesburg.



Location Map



Vicinity Map

Exhibit 1-1
Leesburg Executive Airport

Location & Vicinity Maps

TALBERT & BRIGHT
ENGINEERING & PLANNING CONSULTANTS
10105 KRAUSE ROAD, SUITE 100
CHESTERFIELD, VIRGINIA 23832
PHONE: 804-768-6878 FAX: 804-768-6871

Exhibit 1-2
Leesburg Executive Airport Overview

Source: *Google maps*

In 1961, the Leesburg Airport Committee commissioned a study that recommended that the airport be relocated to a new and larger site. The site of the current Leesburg Executive Airport was identified for the new facility. Mr. Godfrey released the town of Leesburg from their obligation and in June 1963 Leesburg was awarded the grant and construction began on the new airport. When Godfrey Field opened on October 10, 1964 it featured a 3,500-foot runway, taxiways, parking aprons, two hangars, and an administration building with passenger lounge.

The Airport began receiving FAA funding for airport development beginning in 1982 from land acquisition, to a new terminal building and FAA Automated Flight Service Station in 1983, and the runway was extended to 4,500-feet in 1984.

The runway was extended again in 1989 to its current length of 5,500-feet. In 1993, the Town of Leesburg took over direct control of the airport from the FBO (who was also the airport manager) and in 2000 the airport was renamed Leesburg Executive Airport at Godfrey Field[1]. A new airport terminal building was opened in 2004 and the apron area was expanded in 2009. Ten T-Hangars and six executive hangars were completed in 2010 and an Instrument Landing System (ILS) was installed in 2011.

[1] http://www.leesburgva.gov/government/departments/airport/airport-history, accessed 18 November 2015

1.5 Airport Role

A number of classifications are used by the FAA and DOAV to group airports by location, services provided, and airport activity. The Leesburg Executive Airport serves as a reliever facility to the Washington Dulles International Airport (IAD). The current role/classifications for the Leesburg Executive Airport are shown in **Table 1.1** below.

TABLE 1.1
Leesburg Executive Airport Role / Classification

	Current JYO Classification	Definition
Ownership	Public	any airport that is used or to be used for public purposes, under the control of a public agency, the landing area of which is publicly owned (Section 47102(16) of Title 49 of the United States Code)
FAA Asset Role	Regional	are located in metropolitan areas and serve relatively large populations. These 467 airports support interstate and some long distance (cross country) flying with more sophisticated aircraft. Forty-nine states currently have regional airports with the exception of Hawaii. They account for 37 percent of total flying at the studied general aviation airports and 42 percent of flying with flight plans. There is a substantial amount of charter (air taxi), jet flying, and rotorcraft flights at regional airports. (2012 General Aviation Airports: A National Asset, FAA)
FAA Service Level	Reliever	are airports designated by the FAA to relieve congestion at Commercial Service Airports and to provide improved general aviation access to the overall community. These may be publicly or privately-owned. These airports must be open to the public, have 100 or more based aircraft, or have 25,000 annual itinerant operations. (2015-2019 FAA NPIAS Report)
DOAV Service Role	Reliever	General aviation airports in metro areas intended to reduce congestion at large commercial service airports by providing general aviation pilots with comparable landside and airside facilities. To accommodate the full range of general aviation aircraft, reliever airports should be developed to ARC-C design criteria (aircraft with approach speeds between 121 and 141 knots) when feasible. A precision instrument approach should be provided if technically and economically feasible. Such airports are eligible for Air Carrier/Reliever discretionary funding from the Commonwealth. (2003 DOAV VATSP)

The FAA lists the following requirements for reliever and relieved airports:

(1) The candidate reliever airport can provide substantial capacity as evidenced by:
- **(a)** A current activity level of at least 100 based aircraft or 25,000 annual itinerant operations (a heliport may qualify as a reliever if it has one half of this activity level).
- **b)** In the case of a new airport or an existing airport it must have a forecasted activity level of at least 100 based aircraft or 25,000 annual itinerant operations for the time period in which it is being designated as a reliever.

(2) The relieved airport:
- **(a)** Is a commercial service airport that serves a metropolitan area (MA) with a population of at least 250,000 persons or at least 250,000 annual enplaned passengers, and,
- **(b)** Operates at 60 percent of its capacity, or would be operated at such a level before being relieved by one or more reliever airports, or is subject to restrictions that limit activity that would otherwise reach 60 percent of capacity."

The Leesburg Executive Airport meets reliever requirements and Washington Dulles International Airport (IAD) meets relieved requirements.

1.6 Based Aircraft and Operations Overview

In 2016, JYO has an estimated 115,659 annual aircraft operations and 249 based aircraft, at the time of this report. **Table 1.2** shows a breakdown of the number of annual operations by type.

TABLE 1.2
2016 JYO Operations

Operation Type	Estimated Number of Annual Operations in 2016
Air Taxi	2,024
General Aviation	
Local	100,722
Itinerant	11,730
Military	1,183
Total Estimated Annual Aircraft Operations	**115,659**

Source: *FAA Terminal Area Forecast (TAF) Records (2016)*

The FAA TAF depicts 2,024 "Air Taxi" operations at JYO. The TAF forecast and discussions with the Fixed Base Operator indicate approximately 1.7% of all operations conducted at the Airport are air taxi operations. The forecast annual operations discussed in Chapter 2 include this approximation of 1.7% for air taxi operations.

JYO has a wide range of transient aircraft which use the airport, including business jets (Gulfstreams, Cessna Citations, Bombardier Challengers, and Learjets), and larger turbine aircraft (King Air, Super King Air, Beechcraft 1900). **Exhibit 1-3** below depicts some of these transient and based aircraft in front of the terminal building at JYO.

Exhibit 1-3
Leesburg Executive Airport Terminal Area

Source: *New Media Systems, Inc.*

1.7 Airport Service Area

Loudoun County consists of approximately 521 square miles with a population of 363,050 according to the U.S. Census Bureau's 2014 data. The County seat and largest town, Leesburg, consists of approximately 12.5 square miles, with approximately 49,496 residents. Loudoun

County is included in the Northern Virginia Washington-Arlington-Alexandria Metropolitan Statistical Area (MSA) with a total population of 6,032,744 in 2014. Loudoun County is the fastest growing county in Virginia and the second fastest growing large county in the U.S. A list of the airports closest to the Leesburg Executive Airport is shown in **Table 1.3** below.

In accordance with National Plan of Integrated Airport Systems (NPIAS) criteria, the service area of the Leesburg Executive Airport consists of the area within a 30-minute drive time of the Airport as shown in **Exhibit 1-4**. The service area also includes the locations of typical JYO based aircraft owner's residence or work. Exhibit 1-4 also depicts the locations of the nearest airports to JYO. The JYO service area encompasses the majority of Loudoun County and portions of Fairfax County and Prince William County. The northern edge of the service area is defined by the Potomac River.

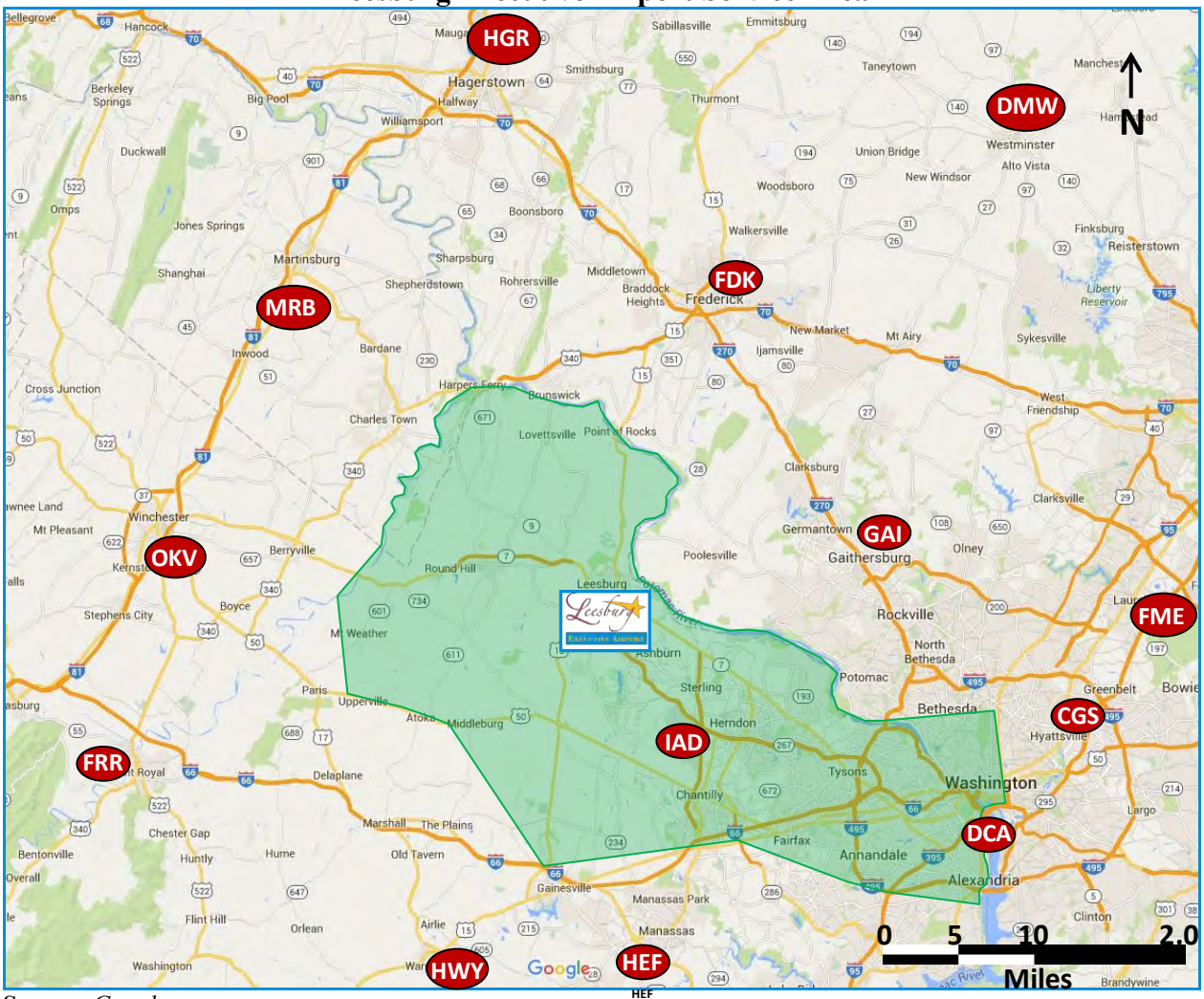
It should be noted that the JYO service area also encompasses the Washington Dulles International Airport which is expected since JYO is a designated reliever the Washington Dulles International Airport. The majority of based aircraft at JYO include addresses within Loudoun County.

TABLE 1.3
Surrounding Airports

Identifier	Airport Name	Service Level	Distance from JYO
IAD	Washington Dulles International Airport	Commercial Service	9.1 NM Southeast
GAI	Montgomery County Airpark	General Aviation	19.0 NM East
HEF	Manassas Regional Airport	General Aviation	21.5 NM South
FDK	Frederick Municipal Airport	General Aviation	22.1 NM Northeast
OKV	Winchester Regional Airport	General Aviation	27.6 NM West
MRB	Eastern WV Regional Airport	General Aviation	27.7 NM Northwest
DCA	Ronald Reagan Washington National Airport	Commercial Service	27.8 NM Southeast
CGS	College Park Airport	General Aviation	30.2 NM East
HWY	Warrenton-Fauquier Airport	General Aviation	30.4 NM South
FRR	Front Royal-Warren County Airport	General Aviation	33.8 NM West
FME	Tipton Airport	General Aviation	37.2 NM East
HGR	Hagerstown Regional Airport	Commercial Service	38.6 NM North
DMW	Carroll County Regional Airport	General Aviation	40.8 NM Northeast

Source: *AirNav.com*

Exhibit 1-4
Leesburg Executive Airport Service Area



Source: *Google maps*

It should also be noted that Loudoun County has the highest income per capita in Virginia which is reflected in the general aviation demand in the County. The Leesburg Executive airport experiences a large volume of corporate general aviation traffic and a number of based aircraft tenants use their aircraft for commuting purposes. This is partly driven by the large concentration of high-tech companies, the Dulles technology corridor, and various government agencies located in Loudoun County.

1.8 Climate

Climate data is used to determine airport facilities such as runway length and orientation. The specific climate elements for Leesburg, VA are listed below.

- **Temperature -** Temperature can significantly impact aircraft performance. Higher temperatures directly decrease aircraft performance as exhibited by increased runway takeoff distance requirements compared to colder weather. The coldest month in Loudoun County is January with an average high temperature of 41°F, an average low temperature of 21°F. July is the hottest month in Loudoun County with an average high temperature of 87°F, an average low temperature of 63°F[2].

- **Precipitation -** Precipitation occurs consistently throughout the year in Loudoun County. May is generally the wettest month with an average monthly precipitation total of 4.5". February is typically the driest month with an average monthly precipitation total of 2.5".

- **Wind -** Wind direction determines runway orientation and the subsequent directional use of each runway. The direction of aircraft operations are determined by the prevailing wind at the given time – aircraft generally land and takeoff into the wind. FAA Advisory Circular 150/5300-13A, "Airport Design" recommends 95% wind coverage by an airport's runway configuration. Coverage is determined using historical wind speed and direction data, applying a crosswind component to each runway, and analyzing the percentage of time the crosswind component is below an accepted velocity. The crosswind component is the wind velocity acting at a right angle to a given runway. FAA-accepted crosswind components are as follows:

    - 10.5 knots for Runway Design Codes A-I and B-I including A-I and B-1 small;
    - 13 knots Runway Design Codes A-II and B-II;
    - 16 knots for Runway Design Codes A-III, B-III, and C-I through D-III; and
    - 20 knots for Runway Design Codes A-IV through D-VI, and E-1 through E-VI.

    JYO is classified as a C-II airport. When analyzing wind coverage, there are three meteorological conditions examined:

    1. All Weather: All reported ceiling and visibility observations.
    2. Visual Meteorological Conditions (VMC): All observations with greater than 1,000' ceiling and greater than 3.0 miles visibility. Based on data obtained from FAA for the period 2006-2016, these conditions occurred 92% of the time at JYO.
    3. Instrument Meteorological Conditions (IMC): All observations with greater than 200' but less than 1,000' ceiling and greater than ½ mile but less than 3.0 miles visibility. Based on data obtained from FAA for the period 2006-2016, these conditions occurred approximately 8% of the time at JYO.

Table 1.4 lists the calculated wind coverages for Runway 17-35 at the Leesburg Executive Airport for the different weather conditions. As can be seen from the tables, Runway 17-35

[2] Temperature and precipitation data from National Climatic Data Center

provides greater than 95% wind coverage for all crosswind components for All Weather, VMC and IMC conditions.

TABLE 1.4
Runway Wind Coverage Calculations

Weather Condition	CROSSWIND COMPONENT			
	10.5 KTS	13 KTS	16 KTS	20 KTS
VMC	96.88%	98.65%	**99.61%**	99.94%
IMC	99.54%	99.83%	**99.95%**	99.99%
All Weather	97.07%	98.72%	**99.63%**	99.94%

Source: *FAA Wind Data: 724055 Leesburg Executive Airport annual period record 2006-2016*

1.9 Airport Design Standards

FAA Advisory Circular 150/5300-13A, *Airport Design* (Airport Design A/C) defines requirements for runway design listed in **Table 1.5** and based on the following concepts and definitions:

Design Aircraft. An aircraft with characteristics that determine the application of airport design standards for a specific runway, taxiway, taxilane, apron, or other facility. This aircraft can be a specific aircraft model or a composite of several aircraft using, expected, or intended to use the airport or part of the airport. (Also called "critical aircraft" or "critical design aircraft."). FAA Advisory Circular 150/5325-4B *Runway Length Requirements for Airport Design* dictates that the critical design aircraft is that aircraft or group of aircraft that has at least 500 or more annual itinerant operations at the airport (landings and takeoffs are considered as separate operations) for an individual airplane or a family grouping of airplanes.

Runway Design Code (RDC). A code signifying the design standards to which a runway is to be built, comprised of the design aircraft approach category, the airplane design group (based on wingspan and tail height), and the runway visibility minimums (see Table 1.4 below).

Runway Reference Code (RRC). A code signifying the current operational capabilities of a runway and associated parallel taxiway.

Airport Reference Code (ARC). An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the

RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

TABLE 1.5
Components of Runway Design Code

Aircraft Approach Category (AAC)		Airplane Design Group(ADG)		
CATEGORY	**APPROACH SPEED (KNOTS)**	**GROUP #**	**WINGSPAN (ft.)**	**TAIL HEIGHT (ft.)**
A	<91	**I**	<49	<20
B	91 to <121	**II**	49 to <79	20 to <30
C	121 to <141	**III**	79 to <118	30 to <45
D	141 to <166	**IV**	118 to <171	45 to <60
E	166+	**V**	171 to <214	60 to <66
		VI	214 to <262	66 to <80

VISIBILITY MINIMUMS RVR (ft)	INSTRUMENT FLIGHT VISIBILITY CATEGORY (STATUTE MILE)
5000	Not lower than 1 mile
4000	Lower than 1 mile but not lower than ¾ mile
2400	Lower than 3/4 mile but not lower than 1/2 mile
1600	Lower than 1/2 mile but not lower than 1/4 mile
1200	Lower than 1/4 mile

Source: *FAA Advisory Circular 150/5300-13A, Airport Design*

The current critical aircraft at the Leesburg Executive Airport is a Gulfstream G350 which is a C-II business jet. The G350 has the following characteristics:

- Wingspan: 77.83’
- Length: 89.33’
- Height: 25.16’
- Maximum Takeoff Weight (MTOW): 70,900 pounds
- Seating Capacity: 19 maximum
- Range: 3,800 nautical miles

Aircraft larger than the G350 operate at JYO however; operations by these aircraft do not meet the 500 annual operations requirement to be considered as the Airport’s critical aircraft. **Table 1.6** lists the current Runway Design Codes for Category C-II aircraft for each runway end and **Table 1.7** lists the runway design standards at JYO. The Forecast Chapter (Chapter 2) includes additional information about the current and future critical aircraft.

TABLE 1.6 JYO Runway Design Code		
RUNWAY	**RUNWAY DESIGN CODE**	**APPROACH VISIBILITY MINIMUMS**
17-35	C-II-5,000	≥ 1 Mile

Source: *FAA Advisory Circular 150/5300-13A, Airport Design*

TABLE 1.7 JYO Runway Design Requirements				
ITEM	**RDC C-II STANDARDS**		**EXISTING JYO DIMENSIONS**	
RUNWAY DESIGN				
Runway Length	To be determined per FAA A/C 150/5325-4 in "Facility Requirements"		5,500 ft.	
Runway Width	100 ft.		100 ft.	
Shoulder Width	10 ft.		0 ft.	
Blast Pad Width	120 ft.		0 ft.	
Blast Pad Length	150 ft.		0 ft.	
RUNWAY PROTECTION				
Runway Safety Area (RSA)				
Length beyond departure end	1,000 ft.		1,000 ft.	
Length prior to runway threshold	1,000 ft.		1,000 ft.	
Width	400 ft.		400 ft.	
Runway Object Free Area (ROFA)				
Length beyond runway end	1,000 ft.		1,000 ft.	
Length prior to runway threshold	1,000 ft.		1,000 ft.	
Width	800 ft.		761.9 ft.	
Runway Obstacle Free Zone (ROFZ)				
Length beyond runway end	200 ft.		200 ft.	
Width	400 ft.		400 ft.	
Precision Obstacle Free Zone	**Rwy 17**	**Rwy 35**	**Rwy 17**	**Rwy 35**
Length	200 ft.	N/A	200 ft.	N/A
Width	800 ft.	N/A	800 ft.	N/A
Approach Runway Protection Zone	**Rwy 17**	**Rwy 35**	**Rwy 17**	**Rwy 35**
Length	1,700 ft.	1,700 ft.	1,700 ft.	1,700 ft.

Inner Width	500 ft.	500 ft.	500 ft.	500 ft.
Outer Width	1,010 ft.	1,010 ft.	1,010 ft.	1,010 ft.
Size (acres)	29.465	29.465	29.465	29.465
	Departure Runway Protection Zone (RPZ)			
Length	1,700 ft.		1,700 ft.	
Inner Width	500 ft.		500 ft.	
Outer Width	1,010 ft.		1,010 ft.	
Size (acres)	29.465		29.465	
RUNWAY SEPARATION				
Runway centerline to:				
Holding Position	250 ft.		193 ft.	
Parallel Taxiway/Taxiway centerline	300 ft.		263 ft.	
Aircraft Parking Area	400 ft.		400 ft.	

Source: *FAA Advisory Circular 150/5300-13A, Airport Design*

1.10 Existing Airport Airside Facilities

A primary role of master planning involves developing a detailed listing of recommended facilities and improvements for implementation over the planning period. A first step in this process is to inventory existing facilities and review their current condition.

Airport facilities are often described as either airside or landside. Airside (or airfield) facilities are those directly used by aircraft, such as runways, taxiways, aprons, hangars, lighting, and instrumentation. Landside facilities are support buildings and structures, typically accessible to the airfield, such as terminal facilities, maintenance facilities, parking lots, and access roads. As part of this Airport Master Plan Update, all airport facilities were visually inspected and inventoried as described in the sections below.

1.10.1 Runway

JYO has one runway – Runway 17-35. Specific runway data is listed in **Table 1.8**. Runway 17-35 is 5,500' long x 100' wide. The runway has high intensity runway edge lights (HIRLs), and a full parallel taxiway. The runway has Precision Instrument Runway (PIR) markings on the Runway 17 end with non-precision markings on the Runway 35 end. The runway does not have blast pads or paved shoulders. The original 3,500' runway was constructed in 1963-64 and has subsequently been extended to its current length of 5,500'. The runway also meets the visibility line of sight standards as any point 5-feet above the runway centerline can be seen from any other point 5-feet above for at least ½ the runway length per FAA A/C 150-5300-13A, *Airport Design*.

TABLE 1.8 JYO Runway Data	
RUNWAY DATA	**RUNWAY 17-35**
Length	5,500’
Width	100’
Surface Type-Condition	Asphalt-Good
Surface Treatment	Grooved
Gross Weight, lbs.	
Single Wheel	30,000 lbs.
Dual Wheel	70,000 lbs.
Dual Tandem Wheel	Not reported
Double Dual Tandem Wheel	Not reported
Pavement Class. No. (PCN)	Not reported
Edge Light Intensity	High (HIRL)
Runway Marking Type-Condition	PIR-Good / NPI-Good
Visual Glide Slope Indicator	PAPI-4L / PAPI-4L
Threshold Crossing Height	45’ / 32’
Visual Glide Angle (degrees)	3.00° / 3.00°
Centerline/Touchdown Zone	Not reported
Runway Visual Range-Runway Visibility	Not reported
Runway End Identifier Lights (REIL)	Yes / Yes
Approach Lights	NSTD ODALS / None
Runway 17 Latitude	39° 05' 06.4300" N
Runway 17 Longitude	077° 33' 38.1800" W
Runway 17 End Elevation	377.6’ (MSL)
Runway 35 Latitude	39° 04' 14.9500" N
Runway 35 Longitude	077° 33' 15.8100" W
Runway 35 End Elevation	387.3’ (MSL)
FAR Part 77 Category	PIR / B(V)
Displaced Threshold	None / None
Controlling Obstruction	Tree/Tree
Obstruction Marked/Lighted[1]	--/--
Height Above Runway End	27’ / 74’
Distance from Runway End	679’ / 2030’
Centerline Offset & Direction	549’ left / 421’ right
Obstruction Clearance Slope	17:1 / 24:1

TABLE 1.8 JYO Runway Data	
RUNWAY DATA	**RUNWAY 17-35**
Close in Obstruction	No / No
B(V) – Basic (Visual) **HIRL** – High Intensity Runway Lights **NPI** – Non-Precision Marking **NSTD** – Non-Standard **ODALS** – Omni-Directional Approach Lights **PAPI** – Precision Approach Path Indicator **PIR** – Precision Instrument Runway	

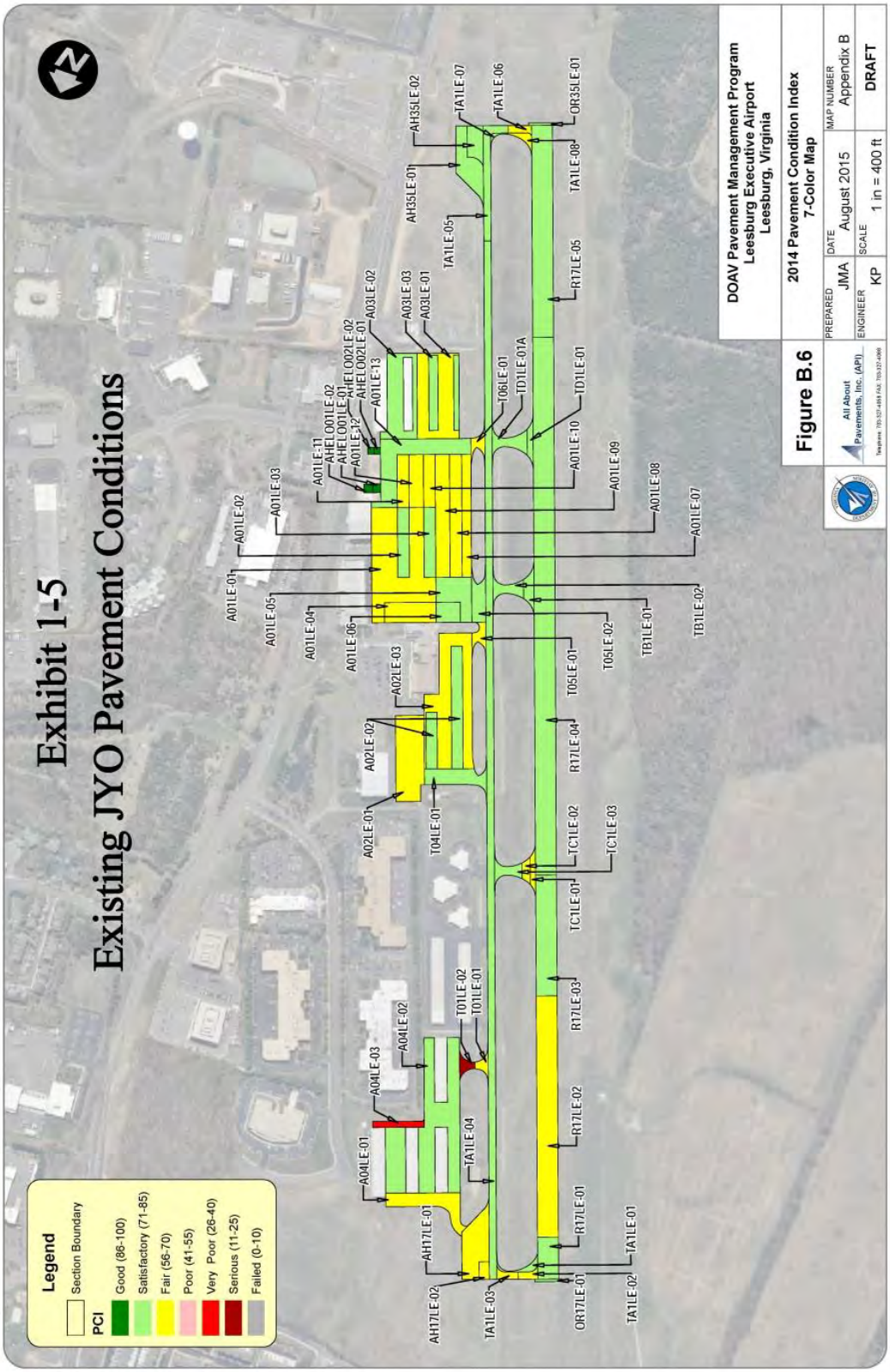
[1] Obstruction lights will be added to the poles along Tolbert Lane. The water tower east of Sycolin Road has an obstruction light.

***Source**: FAA Airport Master Record and Report, FAA Form 5010-1, Accessed 18 November 2015*

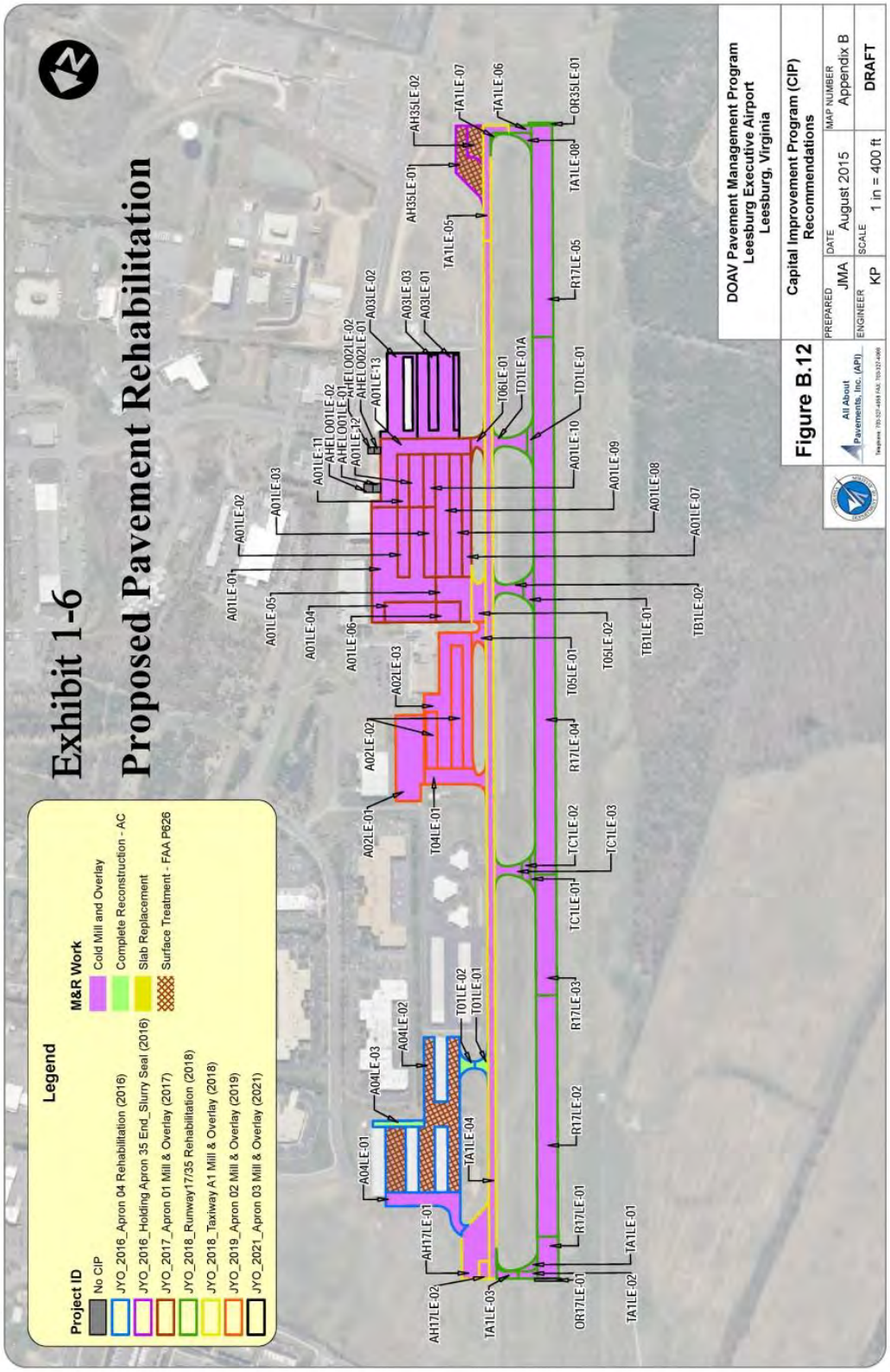
All-About Pavements, Inc., conducted a pavement condition inspection dated October 2015 at the Leesburg Executive Airport under contract to DOAV. The results of the report, titled "Commonwealth of Virginia Pavement Management Update – Leesburg Executive Airport" are listed below. The PCI ratings for JYO are depicted on **Exhibit 1-5** and are color-coded as follows:

- PCI 0 – 10 = Failed (gray) (not applicable at JYO)
- PCI 11 – 25 = Serious (dark red)
- PCI 26 – 40 = Very Poor (red)
- PCI 41 – 55 = Poor (pink)
- PCI 56 – 70 = Fair (yellow)
- PCI 71 – 85 = Satisfactory (light green)
- PCI 86 – 100 = Good (dark green)

The average pavement PCI for JYO was 71. The runway, taxiways, and aprons were listed as fair to satisfactory condition. The pavement management report recommended a combination of mill and overlay and surface treatment for the majority of pavements at JYO in order to maintain and restore the pavement condition over the next 5 years as shown in **Exhibit 1-6**. The pavements identified as being in serious condition will require complete reconstruction.



Source: *2015 Commonwealth of Virginia Pavement Management Update – Leesburg Executive Airport*



Source: *2015 Commonwealth of Virginia Pavement Management Update – Leesburg Executive Airport*

1.10.2 Taxiways

The Leesburg Executive Airport has a 35-foot wide parallel taxiway that connects the ends of Runway 17-35 with the terminal/hangar area. Five 35-foot wide connector taxiways link the runway to the parallel taxiway and eight 35-foot wide connector taxiways link the parallel taxiway to the aprons/taxilane network. These taxiways were rated as "fair" to "satisfactory" with one section rated "very poor" in the 2015 Pavement Management Report. Taxilanes are located between the T-Hangars on the north and south sides of the Airport and along the aprons. The taxilanes are in "fair" to "satisfactory" condition.

FAA A/C 150-5300-13A lists the required separation distances between the runway centerline and parallel taxiway centerline. The required separation for JYO based on a C-II runway design code is 300-feet with the current approach visibility minimums (≥ 1-mile) and 400-feet with approach visibility minimums (< ¾-mile). The existing runway/taxiway separation distance at JYO is approximately 263-feet.

1.10.3 Aprons and Hangars

The apron area at JYO totals approximately 67,912 square yards as shown in **Exhibit 1-7**. The Airport has 134 total aircraft tie-down spaces located in three separate apron areas. **Table 1.9** describes the aprons and their condition based on the Commonwealth of Virginia Aviation Pavement Management Program pavement condition data. The aprons serve corporate, based and itinerant GA aircraft.

Exhibit 1-7
JYO Apron Locations

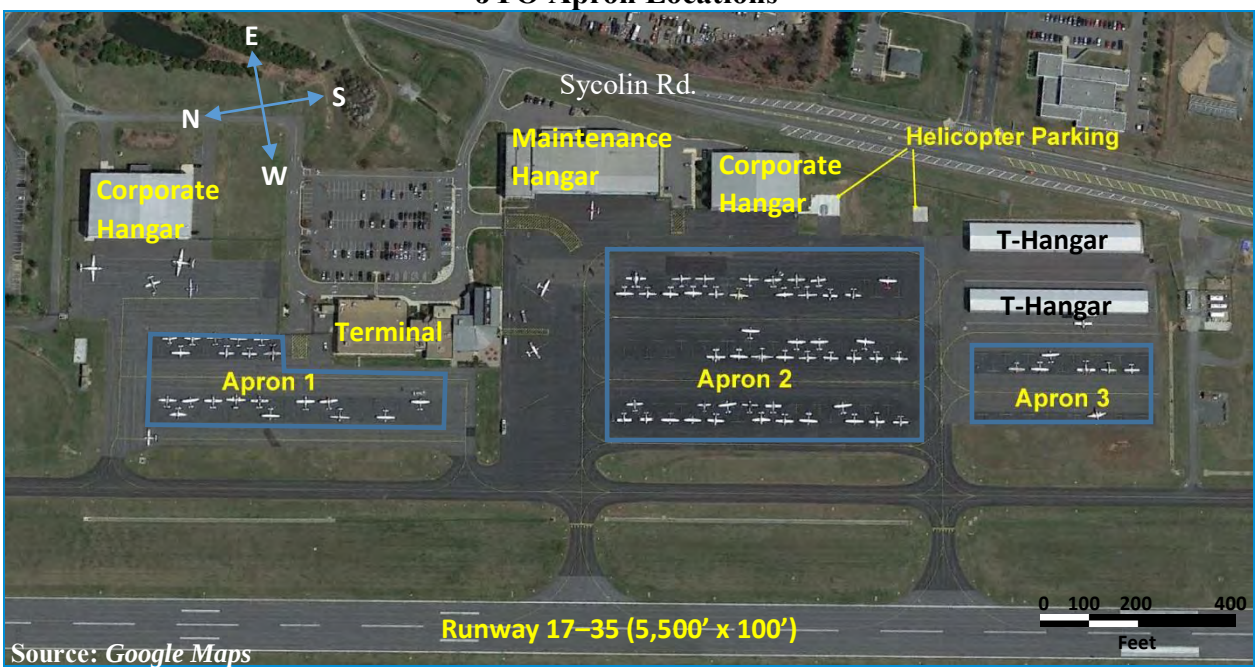


TABLE 1.9 Aprons at JYO					
User	**Aprons**	**Approximate Area**	**Surface Type**	**Tie Downs**	**Condition**
Terminal	Apron 1	14,154 sy	Asphalt	36	Fair - Satisfactory
FBO Maintenance & Corporate Hangar	Apron 2	44,737 sy	Asphalt	75	Fair - Satisfactory
T-Hangar	Apron 3	9,021 sy	Asphalt	23	Fair - Satisfactory
Total		**67,912 sy**		**134**	

***Source**: Airport Layout Plan, Talbert & Bright*

The Airport is also equipped with two designated helicopter parking pads located east of the main apron. The northern pad measures 45' x 55' and the southern pad measures 30' x 30'. Both concrete pads were constructed in 2013 and are used for helicopter storage and not for helicopter takeoffs and landings (helipads). These pads are shown in Exhibit 1-7 and are in good condition.

There are three types of hangars at the Airport, corporate/box hangars, T-Hangars, and Hexagon Hangars. The Airport currently has 96 T-Hangar units (including the hexagon condo hangars), 11 box hangars, and 3 corporate hangars. **Exhibit 1-8** shows the locations of the hangars and **Table 1.10** describes the Airport hangars in detail. **Exhibits 1-9** and **1-10** depict oblique aerial views of the northern and southern hangars areas respectively. It should be noted that Hangars 6, 7, and 9 are located within the runway object free area (ROFA) and will need to be removed in order to meet the FAA airport design requirements specified in A/C 150-5300-13A. The removal/replacement of these hangars is evaluated in Section 3.1.9 of Chapter 3 *Facility Requirements* of this Master Plan Document.

Exhibit 1-8
JYO Hangars

Note: Hangar numbers correspond to the hangars listed in Table 1.10.
Source: *Google Maps*

TABLE 1.10
JYO Airport Hangars

Hangar Number (Designation)	Hangar Address Number	Type	Size	Number of Units	Condition
1 (D)	937	Box Hangars	65’ x 65’ per unit (325’ x 65’ total)	5	Good
2 (C)	939	T-Hangar	65’ x 310’	12	Good
3 (B)	941	T-Hangar	65’ x 310’	12	Good
4 (A)	943	T-Hangar	65’ x 310’	12	Good
5	945	T-Hangar	57’ x 408’	15	Good
6	947	T-Hangar	57’ x 384’	16	Good
7	949	Hexagon Hangar	7,041 sf	6	Fair
8	951	Hexagon Hangar	9,684 sf	6	Fair
9	953	Hexagon Hangar	6,270 sf	6	Fair
10 (ProJet)	957	Corporate Hangar	24,000 sf	N/A	Good
11 (ProJet)	1005	Corporate Hangar	25,000 sf	2	Good
12	1007	Corporate Hangar	18,000 sf	N/A	Good
13 (S)	1011	Box Hangars	55’ x 50’ (50’ x 335’ total)	6	Excellent
14 (S)	1013	T-Hangar	50’ x 335’ total	10	Excellent

Source: *JYO Airport Layout Plan, Talbert & Bright*

Exhibit 1-9
JYO North Hangar Area

Source: *New Media Systems, Inc.*

Exhibit 1-10
JYO South Hangar Area

Source: *New Media Systems, Inc.*

1.10.4 Airfield Lighting

Existing lighting for the runways and taxiways is listed in Table 1.8. Lighting is primarily for nighttime visual guidance along the runways and taxiways. The approach lighting systems are an aid to identifying the runway environment during low visibility conditions.

Runway 17 is equipped with an Omnidirectional Approach Lighting System (ODALS) which is non-standard since it only has three of the required five light units. ODALS consist of a series of seven lights, five flashing high intensity white lights in a row located in-line with the runway centerline and two Runway End Identifier Lights (REIL). These lights aid pilots in lining up with the runway at night and in inclement weather.

Both runway ends have Runway End Identifier Lights (REIL), flashing strobe lights that help pilots identify the end of the runway and are particularly useful where surrounding lights may confuse the visual cues of the runway end.

Runway 17 – 35 is equipped with High Intensity Runway Lights (HIRL) which are in poor condition. Ground water is likely impacting the current to these lights, which can result in dim or non-functional runway lights.

The taxiways have Medium Intensity Taxiway Lights (MITL) which are in poor condition. Ground water is likely impacting the current to these lights which can result in dim or non-functional taxiway lights. The terminal apron, GA aprons, and corporate hangar aprons, and T-Hangar taxilanes have elevated flood lighting.

A rotating beacon is located at the Airport for visually assisting pilots in locating the airfield at night or during inclement weather. The rotating beacon is a green and white flashing light spaced 180 degrees apart. Airport rotating beacons are required for any airport with runway edge lights.[3] The rotating beacon is in good condition and is currently located adjacent to the fuel farm, south of the hangar area. The rotating beacon is 60-feet AGL.

1.10.5 Navigational Aids (NAVAIDS) and Approach Procedures

Navigational Aids (NAVAIDS) are radio facilities or, can be visual devices, providing either enroute or approach guidance information to aircraft. Approach NAVAIDs are specialized radio transmission devices that help guide pilots to landing in low visibility conditions.

The primary approach NAVAID at JYO is an Instrument Landing System (ILS) for Runway 17. ILS provides lateral and vertical guidance on approach to landing. ILS is referred to as a Precision Approach due to its high accuracy. The ILS system consists of a localizer antenna (lateral guidance) and glideslope antenna (vertical guidance). ILS systems are grouped into three categories. A Category I (CAT I) ILS is installed at JYO with horizontal and vertical guidance and visibilities minimums as low as 1-mile. CAT I procedures are available to instrument rated pilots with supporting equipment installed in their aircraft. The ILS is also equipped with a Distance Measuring Equipment (DME) antenna which allows pilots to determine their distance from the Airport.

Runways 17 and 35 are equipped with a 4-box PAPI which has four light units indicating white, red, or both depending on the aircraft vertical position on the glidepath. These lights are aligned for a 3° approach to both runway ends. The PAPI lights were recently rehabilitated and are in good condition.

[3] Advisory Circular 150/5300-13A, *Airport Design*.

The Leesburg Executive Airport is also equipped with a Global Positioning System (GPS) approach to Runway 17. GPS is accurate enough for enroute navigation and limited approach capability. The Runway 17 Area Navigation (RNAV) GPS approach at JYO provides minimums as low as 1-mile and 250' above the runway elevation.

The Airport's published runway approaches procedures are summarized in **Table 1.11** and **Exhibit 1-11 and Exhibit 1-12**. All of the instrument approaches at JYO are designed for Runway 17. There are currently no instrument approach procedures to Runway 35, just a visual approach. This is due to the proximity of Washington Dulles International Airport (IAD) and associated Class B airspace. JYO is located approximately 7 nautical miles northwest of the runways at IAD.

TABLE 1.11
JYO Instrument Approach Procedures

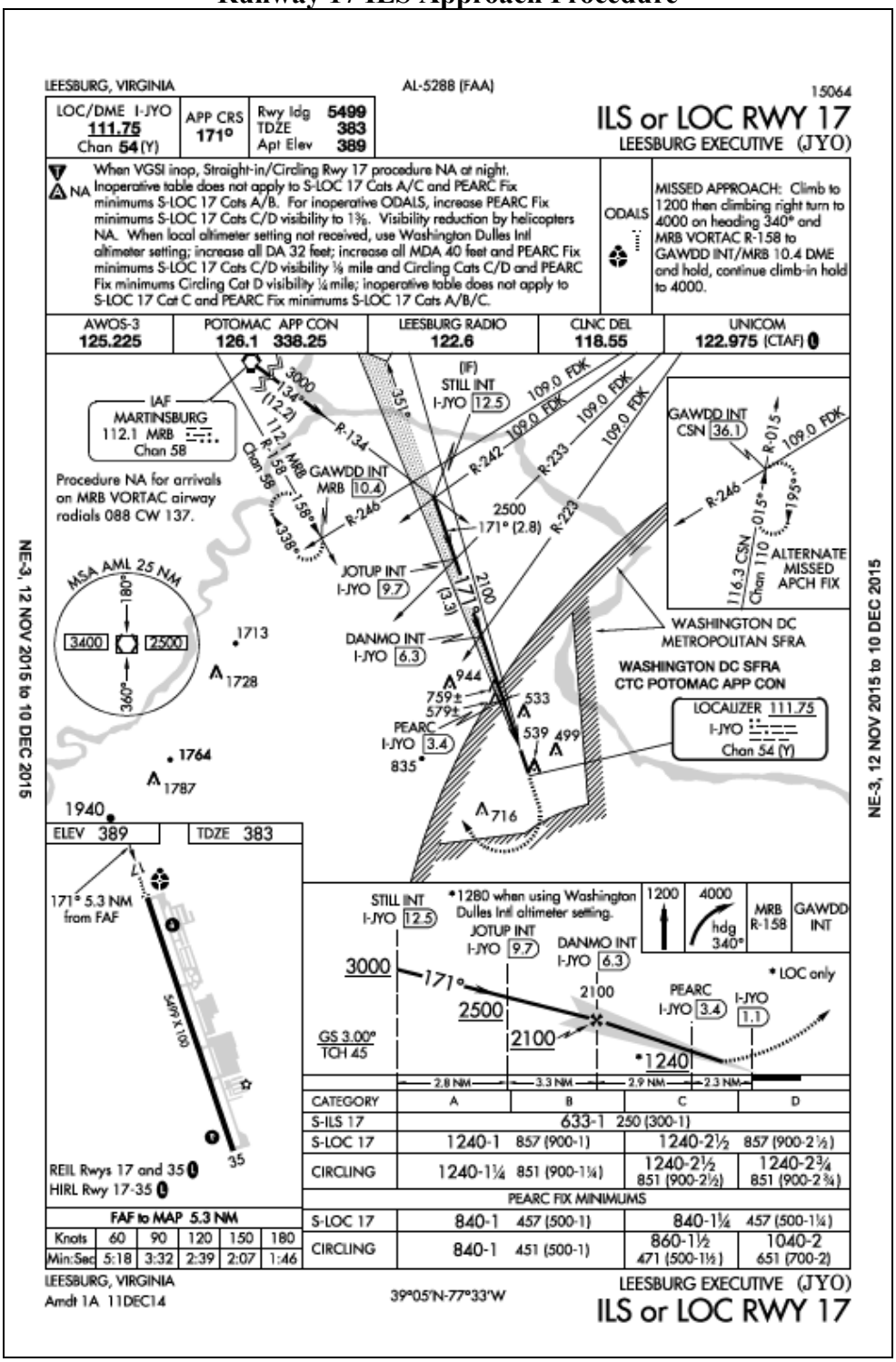
Instrument Approach Procedure	Aircraft Category	Minimum Descent		Visibility Minimum Mile
		MSL	AGL	
ILS RWY 17	All	633	250	1.0
GPS RWY 17 LPV	All	633	250	1.0
GPS RWY 17 LNAV/VNAV	All	725	342	1.0
GPS RWY 17 LNAV MDA	A/B	940	557	1.0
	C/D	940	557	1.5

Notes:
- Circling minimums are also published for each of the IAP above
- All ILS procedures also have LOC only minimums
- LNAV/VNAV procedures also have LNAV minimums

Aircraft Approach Category (approach speed):
A: 0 – 90 Knots B: 91 – 120 Knots C: 121 – 140 Knots D: 141 Knots and above

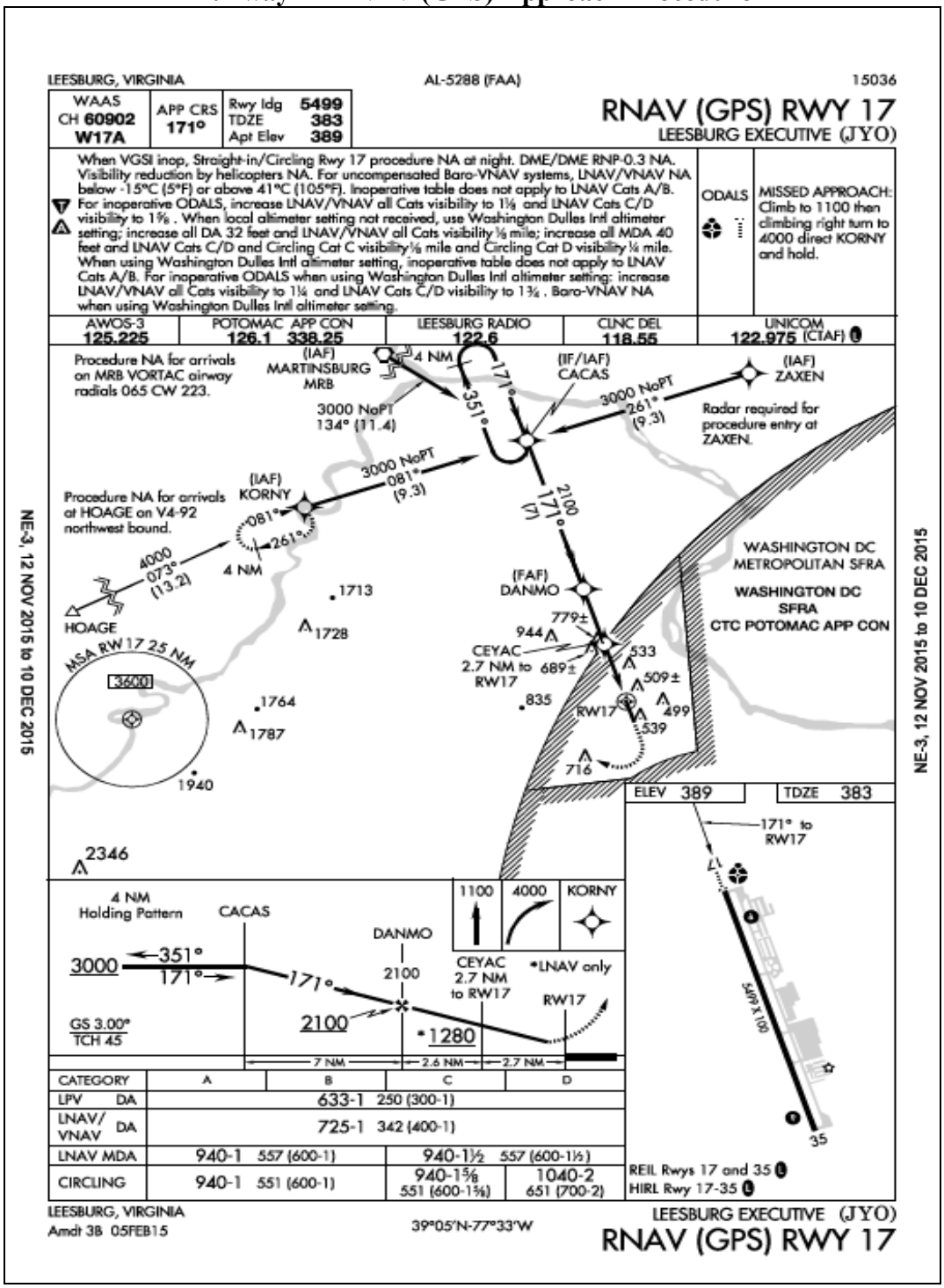
Source: *JYO Instrument Approach Procedures*

Exhibit 1-11
Runway 17 ILS Approach Procedure



Source: *Instrument Approach Plate, Leesburg Executive Airport, Leesburg, Virginia*

Exhibit 1-12
Runway 17 RNAV (GPS) Approach Procedure



Source: *Instrument Approach Plate, Leesburg Executive Airport, Leesburg, Virginia*

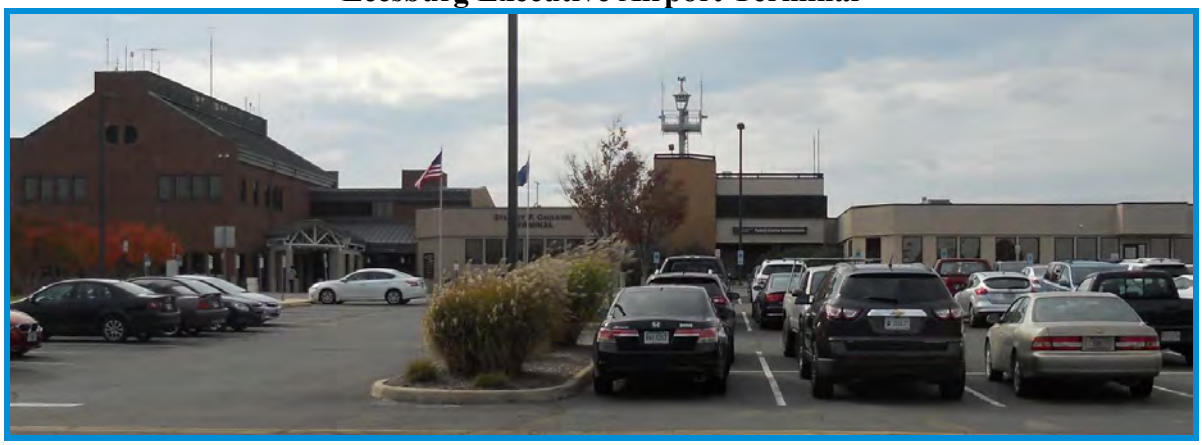
1.11 Landside Facilities

Landside facilities at the Airport include the terminal building, FAA office facility complex, auto parking, airport access roads, and additional airport facilities not individually covered in other sections.

1.11.1 Terminal Building

The existing Airport terminal building is located on the east end of the airport, approximately at midfield and is in good condition (**Exhibit 1-13**). The Stanley F. Caulkins terminal building was constructed in 2004 and provides 18,339 square feet of space for passengers, pilots, the FBO operations, as well as airport administrative offices. Approximately 5,554 square feet of terminal space is designated for tenant leases. An FAA office facility complex is located adjacent to the terminal and measure approximately 14,000 square feet.

Exhibit 1-13
Leesburg Executive Airport Terminal



Source: *Site visit, 5 November 2015*

1.11.2 Auto Parking

There are four separate auto parking areas at JYO, with the main lot located adjacent to and east of the terminal building. A total of 245 paved parking spaces are available. The location of these lots and available spaces are listed in **Table 1.12** and depicted in **Exhibit 1-14** below. The main parking lot was constructed in 2004 and is in good condition. Additional auto parking is available on a temporary basis in the grass area located between corporate hangar 10 and the main terminal parking lot; this area serves as "overflow" parking during special events, there are no plans now or in the future to convert this area into a permanent parking facility.

TABLE 1.12 JYO Auto Parking Spaces	
Location	**Spaces**
Box Hangar 1	20
Corporate Hangar 10	20
Terminal Building	167
Corporate Hangars 11 & 12	38
Total	**245**

Source: *Site visit, 5 November 2015*

Exhibit 1-14
Primary JYO Parking Lots

1.11.3 Airport Access

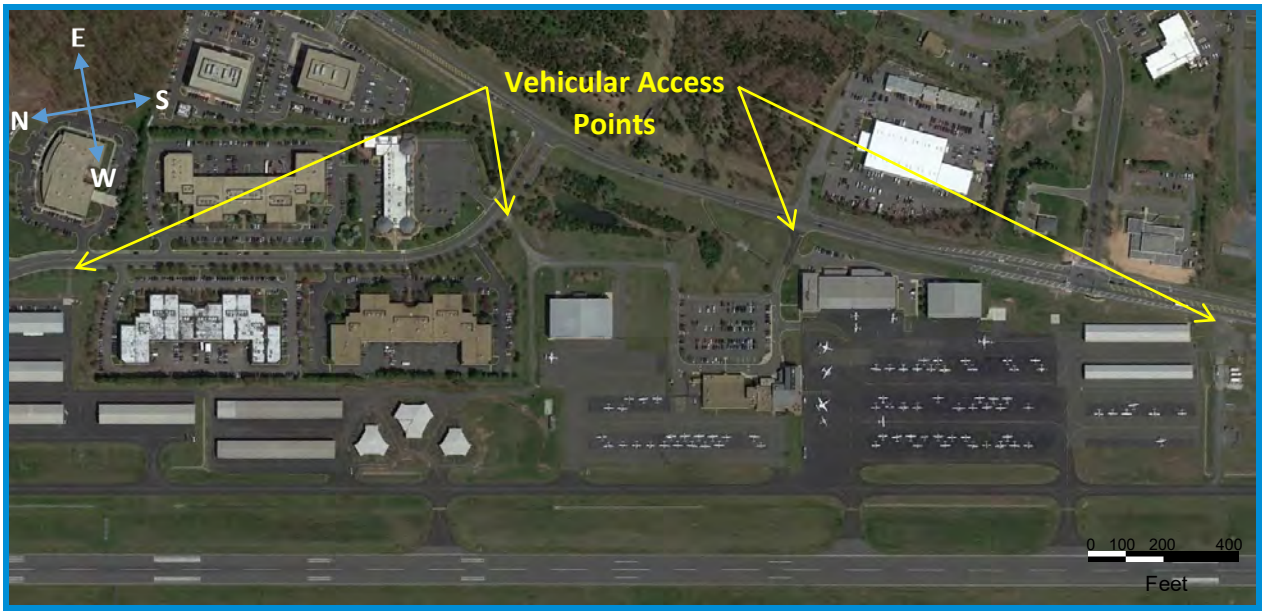
Access to the Airport terminal is provided via Sycolin Road to the east of the Airport. A two-lane connector road links the terminal parking lot and the ProJet hangars with Sycolin Road. The Town of Leesburg will be widening the section of Sycolin Road in front of the Airport within the next five years. This will allow for two lanes in each direction plus dedicated turn lanes into the main airport entrance. The widening will temporarily close the entrance. Therefore, airport traffic will be routed to the terminal area from Miller Drive.

Access to the fuel farm on the south end of the Airport is also available from Sycolin Road. Miller Drive runs along the northeast side of the Airport and provides automobile access to the north T-Hangars and Corporate Hangar 10 located at midfield. There are four access gates, **Exhibit 1-15** and **Exhibit 1-16**, onto the Airport which require an access PIN code to enter from public areas to secure areas.

Exhibit 1-15
JYO Access Gate

Source: *Site Visit, 5 November, 2015*

Exhibit 1-16
JYO Vehicular Access Points



Source: *Google Maps*

To the west of the Airport is Virginia State Route 267 (Dulles Greenway), a 14-mile toll road that connects JYO to Washington Dulles International (IAD) Airport. To the east is Virginia State Route 643 (Sycolin Road) which leads to the Town of Leesburg to the north. The Airport is located 25 miles west of Interstate 495 "Beltway" and 18 miles north of Interstate 66 via Route 15. See **Exhibit 1-17**.

Exhibit 1-17
JYO Access Roads

Source: *Google maps*

1.11.4 Airport Maintenance Building

The Airport does not have a dedicated maintenance / equipment storage building however, the end units of two T-Hangar buildings are used for this purpose.

1.11.5 Fuel Farm

The fuel farm at the Airport is located south of the terminal area and immediately east of the parallel taxiway. Access to the fuel farm is gate controlled and requires an access PIN to enter. **Table 1.13** discusses the Airport's Above Ground Storage Tanks (AGST). These tanks are located within a concrete spill containment area, with a manual valve control outfall into an oil / water separator, **Exhibit 1-18**. The tanks are of double wall construction and are in good condition. The pavement at the fuel farm is in poor condition.

TABLE 1.13 JYO Fuel Storage Tanks			
Tank Number	**Size (gal)**	**Single / Double Wall**	**Contents**
AST1	12,000	Double	100LL (Avgas)
AST2	15,000	Double	Jet A
AST3	15,000	Double	Jet A
N/A	500	Single	Diesel
N/A	300	Single	Used Oil

Source:http://www.deq.state.va.us/Programs/LandProtectionRevitalization/PetroleumProgram/FilesForms.aspx#petdbf, *accessed 19 November 2015*

Exhibit 1-18
Fuel Farm

Source: ***Site Visit, 5 November, 2015***

In addition to the tanks, the Airport is equipped with four 2,400-gallon Jet A fueling trucks, which are parked on the ramp when in service during the day, and parked adjacent to the fuel farm when not in service. There is an oil / water separator in this location as well as spill

emergency and cleanup equipment per 40 CFR Part 112, Oil Pollution Prevention (as amended), §112.3.

1.11.6 Fixed Base Operator (FBO)

The Leesburg Executive Airport currently has one Fixed Base Operator (FBO) on the airfield. FBO services are handled by ProJet Aviation which operates from the terminal building and adjacent corporate hangars. ProJet Aviation provides a full range of services to local and transient pilots including:

- Hangar parking
- Bottled oxygen
- Private aircraft charter services
- Flight planning
- Pilot's lounge
- Aircraft management / leasing / consulting
- Concierge services
- Aircraft fuel sales – Jet-A and 100LL
- Aircraft maintenance provided by subcontractors

Flight training and aircraft rental at JYO is provided by Atlantic Airways, AV-ED Flight School, Aviation Adventures, and OpenAir Flight Training. All four are certified FAR Part 141 flight schools.

1.11.7 Additional Airport Facilities

The airfield electrical vault is located between the Hexagon Hangars and the Terminal building on the east side of the Airport. A wind cone is located midfield and is equipped with a segmented circle. The wind cone is also equipped with lighting for night operations. The Airport is equipped with an Automated Weather Observing System (AWOS-III-PT), which provides real-time weather information to pilots operating at the Airport. The wind sensor is currently providing inaccurate readings to pilots. A proposed relocation of this sensor is discussed in Section 3.4.4. The AWOS-III is located between the Hexagon Condo Hangars and the Terminal building on the east side of the Airport, adjacent to the electrical vault.

The Airport is also equipped with a temporary Remote Air Traffic Control Tower (ATCT). This system consists of a series of cameras located on top of the airport terminal building (**Exhibit 1-19**) which capture a 360° view of the airfield. This view is displayed on screens located in a room in the terminal. Controllers in this room can use the system to direct air traffic arriving and departing from JYO. This is a proof of concept test that may one day provide air traffic control capabilities to non-towered airports.

Exhibit 1-19
JYO Terminal / Remote Air Traffic Control Tower

Source: *Site Visit, 5 November, 2015*

1.12 Airspace

Aircraft are subject to varying degrees of control depending on the specific airspace and meteorological conditions in which they operate. This system of air traffic control is the responsibility of the FAA, which has the statutory duty to establish, operate, and maintain Air Traffic Control (ATC) facilities and procedures.

JYO currently does not have an approved Air Traffic Control Tower (ATCT); however, aircraft operating in the Washington DC Metropolitan airspace above 17,000 feet are controlled by the Washington Air Route Traffic Control Center (ARTCC). Aircraft operating at or below 17,000 feet, including aircraft taking off or landing at JYO, are controlled by the Potomac Terminal Radar Approach Control (PCT/TRACON). JYO is located within the boundaries of the Washington DC Metropolitan "Special Flight Rules Area" (SFRA), formerly known as the Air Defense Identification Zone (ADIZ). IFR flights are handled in normal operating procedures;

however, VFR procedures specific to JYO must comply with the current SFRA Notice to Airmen[4] (NOTAM).

These airspace classifications impose several requirements upon the operations of aircraft, including visibility minimums, cloud clearances, contact with ATC, and special aircraft equipment. JYO is located in Class G airspace and under Washington Dulles International Airport Class B airspace. Class G airspace extends upward from the surface within a 6-mile radius at Leesburg Executive Airport and provides controlled airspace to aid the Potomac Terminal Radar Approach Control Facility (TRACON) in the safe and orderly management and flow of air traffic at JYO. The airspace surrounding JYO is illustrated in **Exhibit 1-20**, and the classification system is summarized below and shown on **Exhibit 1-21**.

- Class A – Encompasses the enroute, high-altitude environment used by aircraft to transit from one area of the country to another. All aircraft in Class A must operate under IFR. Class A airspace exists within the United States from 18,000-feet up to and including 60,000-feet Mean Sea Level (MSL).

- Class B – All aircraft, both IFR and VFR, in Class B airspace are subject to positive control from ATC. Class B airspace exists at 29 high-density airports in the United States as a means of managing air traffic activity around the airport. Class B airspace generally includes all airspace from an airport's established elevation up to 12,000-feet MSL, and at varying altitudes, out to a distance of about 30 Nautical Miles (NM) from the center of the airport. Aircraft operating in Class B airspace must have specific radio and navigation equipment, including an altitude encoding transponder, and must obtain ATC clearance.

- Class C – Airspace around airports with airport traffic control towers and radar approach control. It normally has two concentric circular areas with a diameter of 10 and 20 NM. Variations in the shape are often made to accommodate other airports or terrain. The top of Class C airspace is normally set at 4,000-feet AGL. Aircraft operating in Class C airspace must have specific radio and navigation equipment, including an altitude encoding transponder, and must obtain ATC clearance. VFR aircraft are only separated from IFR aircraft in Class C airspace (i.e. ATC does not separate VFR aircraft from other VFR aircraft, as this is the respective pilot's responsibility).

- Class D – Airspace is under the jurisdiction of a local Air Traffic Control Tower (ATCT). The purpose of an ATCT is to sequence arriving and departing aircraft and direct aircraft on the ground; the purpose of Class D airspace is to provide airspace within which the ATCT can manage aircraft in and around the immediate vicinity of an airport. Aircraft operating within this area are required to maintain radio communication with the ATCT. No separation services are provided to VFR aircraft.

[4] *http://www.leesburgva.gov/home/showdocument?id=223, accessed 19 November 2015*

Class D airspace is normally a circular area with a radius of five miles around the primary airport. This controlled airspace extends upward from the surface to about 2,500-feet AGL. When instrument approaches are used at an airport, the airspace is normally designed to encompass these procedures.

- Class E – Airspace is a general category of controlled airspace that is intended to provide air traffic service and adequate separation for IFR aircraft from other aircraft. Although Class E is controlled airspace, VFR aircraft are not required to maintain contact with ATC, but are only permitted to operate in VMC. In the eastern United States, Class E airspace generally fills in the gaps between Class B, C, and D airspace at altitudes below 18,000-Feet MSL. Federal Airways, including Victor Airways Below 18,000-feet MSL are classified as Class E airspace.

- Class G – Airspace that is uncontrolled, except when associated with a temporary control tower, and has not been designated as Class A, Class B, Class C, Class D, or Class E airspace. ATC does not have the authority or responsibility to manage air traffic within this airspace. In the Eastern United States, Class G airspace lies between the surface and 700 / 1,200-feet AGL.

The Leesburg Executive Airport is also equipped with a "maneuvering area" which extends from the surface to the floor of the Class B Airspace, above the Class G Airspace. The Leesburg Executive Airport lies within the Dulles International Airport Class B airspace however; the Leesburg Maneuvering Area (LMA) serves as a "cut-out" of this airspace and allows for operations at JYO without clearance from Dulles air traffic control. The national Flight Data Center (FDC) Notice to Airmen (NOTAM) 4/9152 states:

"flight operations, including ultra-light vehicles and unmanned aircraft systems (UAS), each aircraft must:

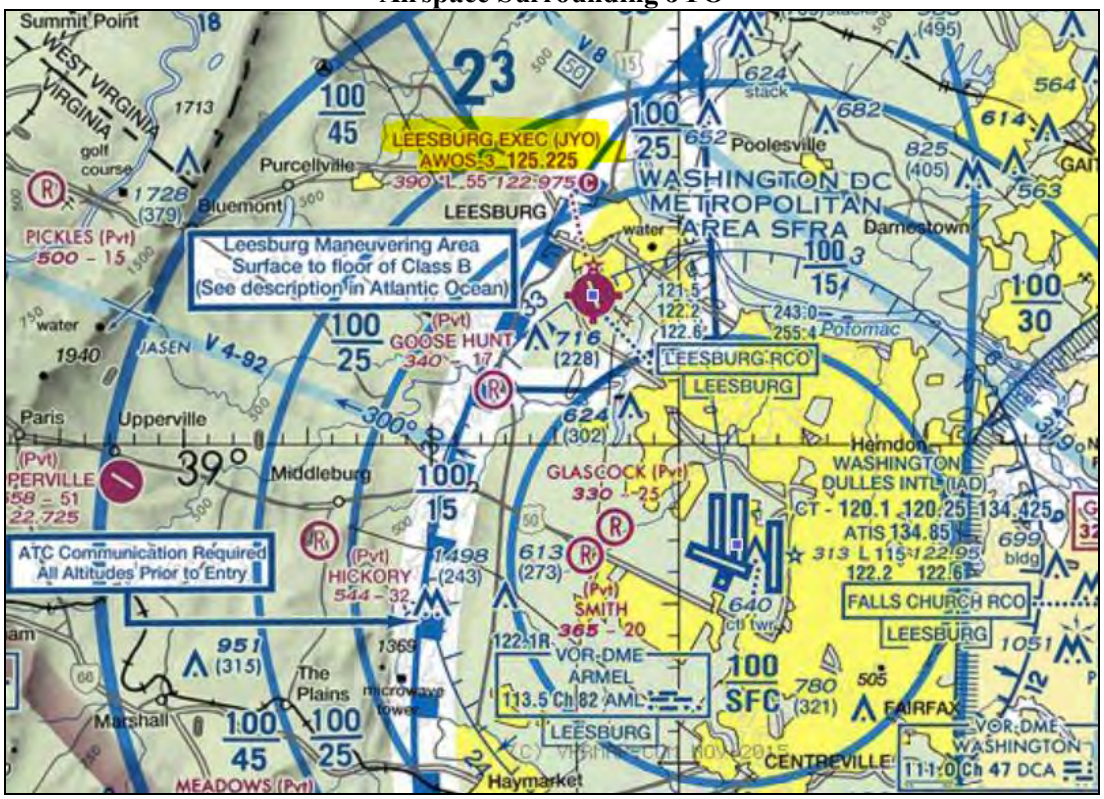
1. be equipped with at least one operable two-way radio capable of communicating with Potomac TRACON (pct) on appropriate radio frequencies.

2. be equipped with an operating transponder with automatic altitude reporting capability as specified under 14 CFR section 91.215.

3. monitor VHF guard 121.5 or UHF guard 243.0, if able.

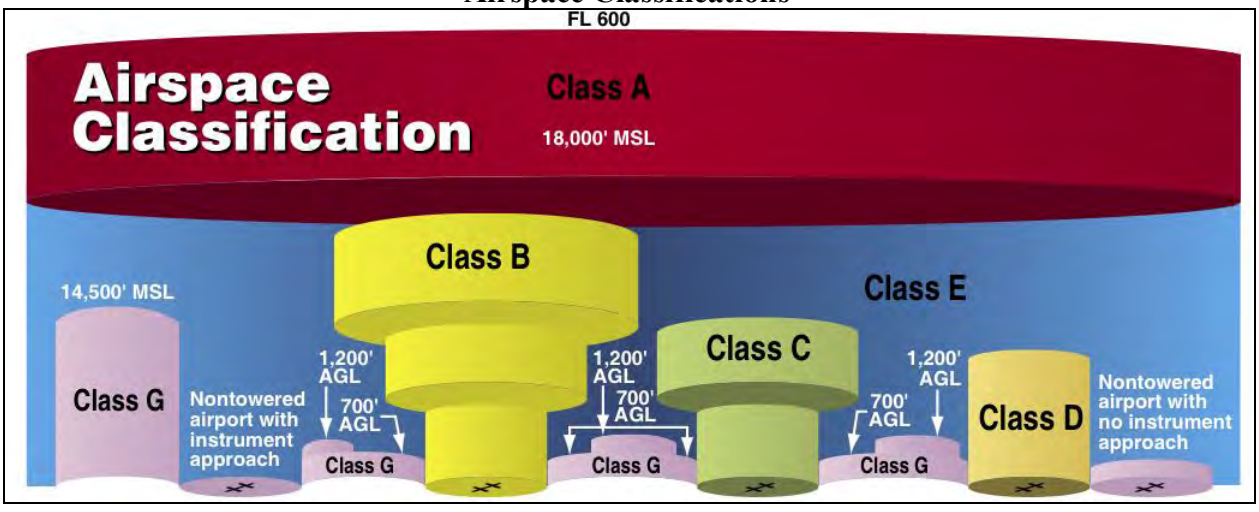
4. squawk the ATC assigned transponder code or appropriate LMA beacon code at all times. code 1200 is not permitted at any time within the LMA or DC SFRA."

Exhibit 1-20
Airspace Surrounding JYO



Source: *http://vfrmap.com/?type=vfrc&lat=39.078&lon=-77.558&zoom=10, accessed 19 November 2015*

Exhibit 1-21
Airspace Classifications



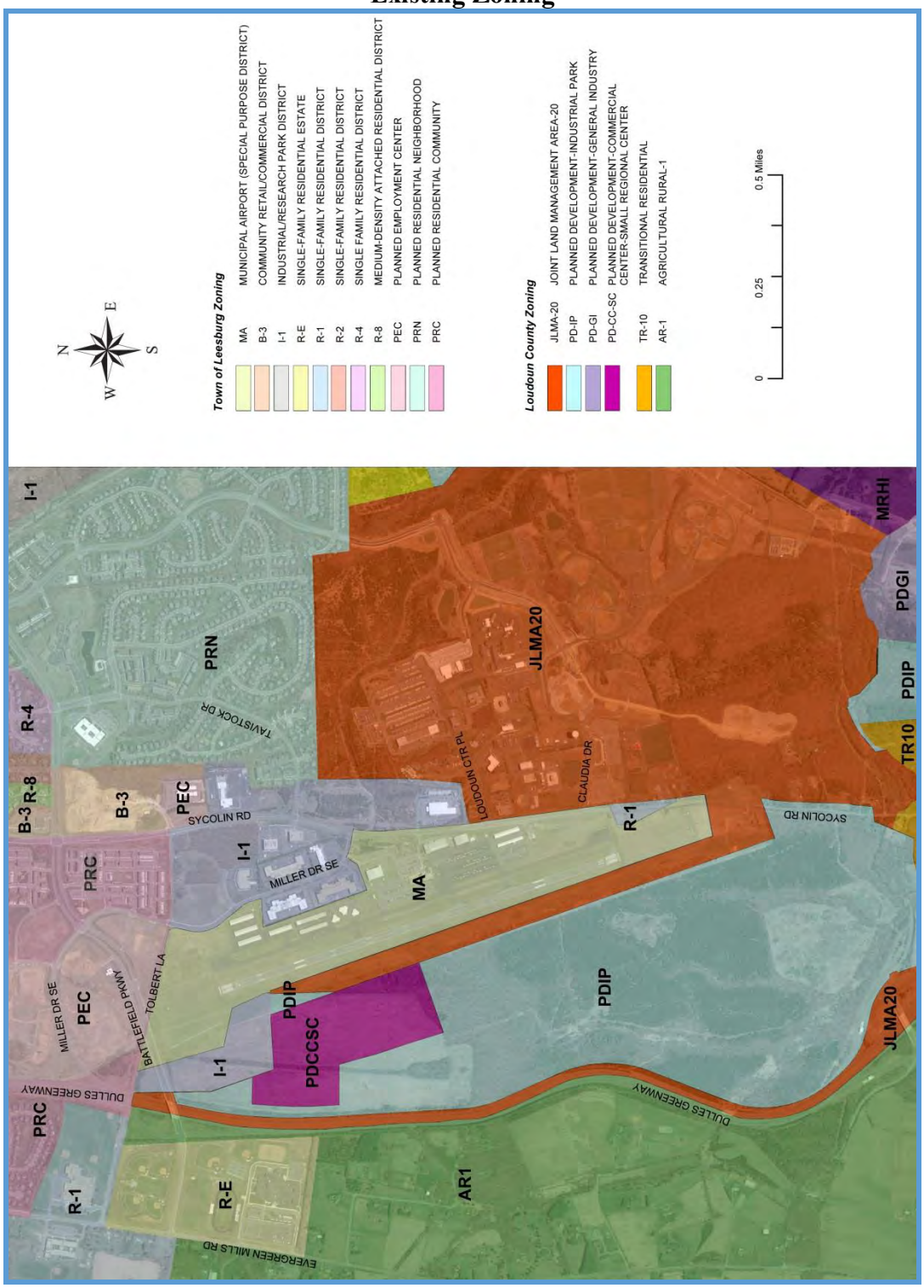
Source: *http://expertaviator.com/wp-content/uploads/2011/01/AirspaceClassification.jpg, accessed 18 November 2015*

1.13 Land Use and Zoning

Zoning on and in the vicinity of the Airport is shown in **Exhibit 1-22**. The Airport itself is zoned as MA (Municipal Airport Special Purpose District) by the Town of Leesburg. The land immediately surrounding the western and southern sides of the Airport is zoned Joint Land Management Area (JLMA-20) District by Loudoun County. The land adjacent to the Airport on the northern end is zoned as I-1 (Industrial/Research Park District) and PEC (Planned Employment Center District). The description of these zoning districts is shown in **Table 1.14**. **Exhibit 1-23** shows the land uses in the area of JYO, based on the Leesburg Town Plan.

Large portions of land surrounding the Leesburg Executive Airport have been developed in recent years with the addition of residential and commercial/industrial to the west, north, and east of the Airport. The 550-acre Compass Creek property (former Crosstrail Property) sits adjacent to and immediately west of the Airport is currently (2016) being developed with a mix of commercial uses. This development is located between JYO property and the Dulles Greenway and falls within the JYO traffic pattern as shown in Exhibit 1-23.

Exhibit 1-22
Existing Zoning



Source: *2016 Leesburg Town Plan, Loudoun County GIS Database*

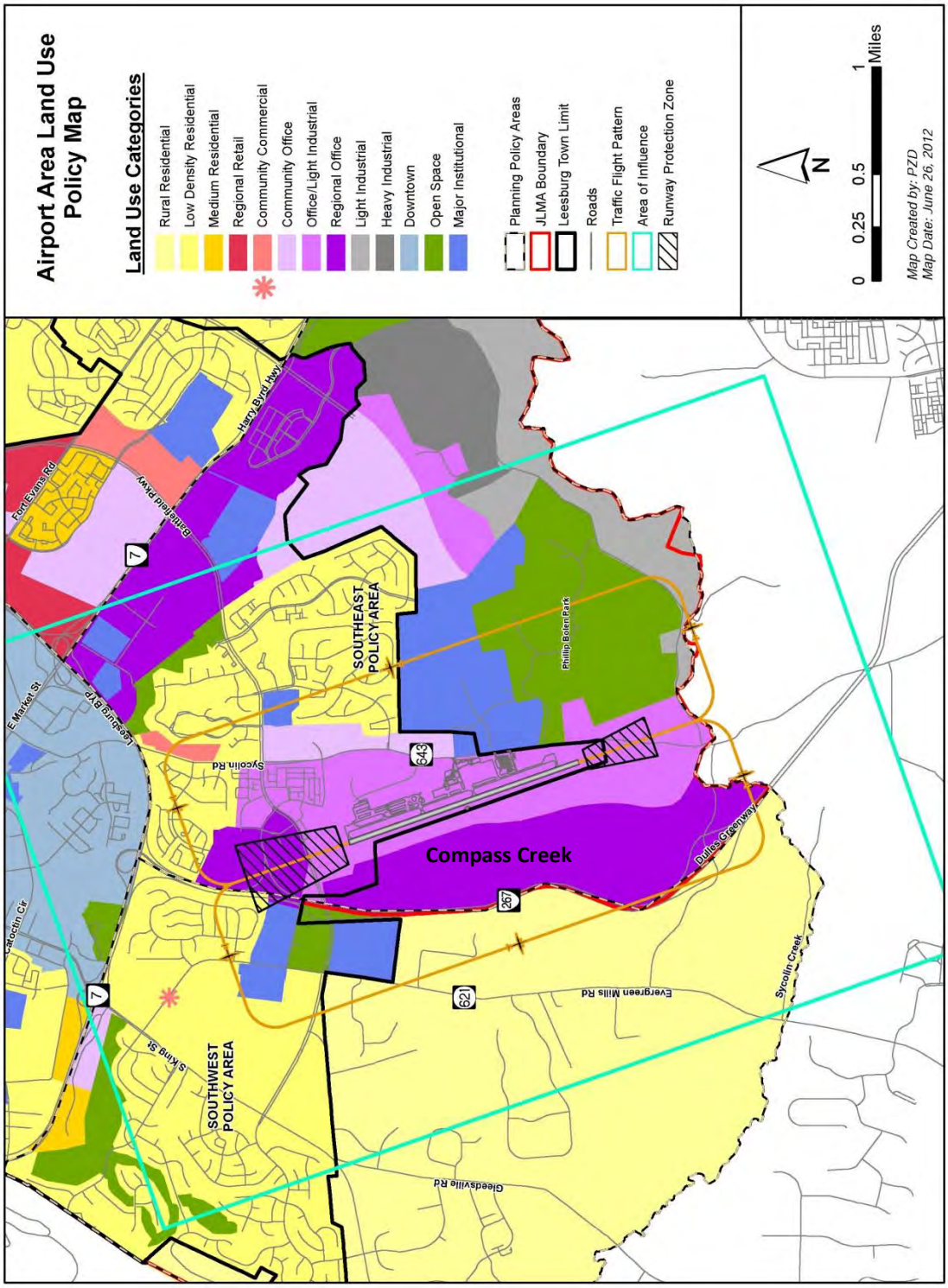
TABLE 1.14 Town of Leesburg and Loudoun County Surrounding Zoning Districts		
Town of Leesburg Zoning		**Description**
MA	Municipal Airport (Special Purpose) District	Provides the opportunity for the Leesburg Executive Airport to develop in conformance with the established Airport Master Plan (AMP) and Airport Layout Plan (ALP). The AMP and ALP control the physical development of the airport facilities and related parking needs of the facility, and are subject to Town Council approval and endorsement by the Virginia Department of Aviation and the Federal Aviation Administration (FAA). Accordingly, the MA District acknowledges the physical constraints of the existing airport location and the necessity of providing adequate support facilities.
B-3	Community Retail / Commercial District	Accommodates moderate-size, retail and service-oriented land uses that serve Leesburg area residents. The district is generally appropriate for application in areas designated in the Town Plan for "Community Commercial" development.
I-1	Industrial / Research Park District	Established solely to accommodate previously approved industrial / research park development and to permit reasonable development of lands within existing I-1 Districts until such time as those lands are rezoned to classifications that are consistent with the Town Plan. The I-1 District is not intended to be available for future rezoning, nor as a means of expanding the boundaries of existing I-1 Districts.
R-1	Single-Family Residential District	Intended to accommodate single-family detached dwelling units at densities of no more than one (1) dwelling unit per acre. The district is appropriate for application in areas designated in the Town Plan for "Low Density Residential" development. The low-density development patterns promoted by the R-1 District are intended to help ensure conservation of environmental features, such as woodlands, steep slopes and ridge lines.
R-2	Single-Family Residential District	Intended to accommodate single-family detached dwelling units at densities of no more than two (2) dwelling units per acre. The district is generally appropriate for application in areas designated in the Town Plan for "Low Density Residential" development.
R-4	Single-Family Residential District	Intended to accommodate single-family detached dwelling units at densities of no more than four (4) dwelling units per acre. The district is generally appropriate for application in areas designated in the Town Plan for "Low Density Residential" development. The low density development patterns promoted by the R-4 District are intended to promote the efficient use of land by encouraging the provision and conservation of open space through cluster development. Cluster development allows a reduction in lot area, yard (setback) and bulk requirements, provided maximum density allowed by the underlying zoning district is not exceeded. Residential cluster developments must preserve the integrity of their sites by protecting and promoting the preservation of steep slopes, stream valleys, desirable vegetation, and other natural features.

TABLE 1.14 Town of Leesburg and Loudoun County Surrounding Zoning Districts		
R-8	Medium-Density Attached Residential District	Accommodates single-family attached, single-family detached and duplex development. The district is generally appropriate for application in areas designated in the Town Plan for "Medium Density Residential" land use category.
PEC	Planned Employment Center	Intended to encourage innovative and creative design of office and industrial development. The PEC District regulations are designed to promote attractive employment areas which complement surrounding land uses through high quality layout, design and construction techniques.
PRN	Planned Residential Neighborhood	Intended to encourage the development of a mixture of housing types and price ranges to promote the organization of residential development into efficient neighborhood units with appropriate supportive community facilities and services.
PRC	Planned Residential Community	Intended to promote the development of self-sufficient communities which are organized around a mixed-use center of commercial, employment, community facility and high density residential uses. The intent of the PRC District is to encourage efficient land use patterns which conserve energy and natural resources and provide a variety of living and working environments integrated with adequate open space and recreational facilities.
Loudoun County Zoning		**Description**
JLMA-20	Joint Land Management Area-20	Provide for uses that are compatible with the Airport and allow for future expansion of the Airport and / or existing agricultural use; provide for the continued practice of agriculture, farm operations, agriculturally related and home based business; encourage an appropriate mix of land uses; and implement jointly adopted area plans, where applicable.
PD-IP	Planned Development – Industrial Park	Established for light and medium industrial uses, office uses, and necessary supporting accessory uses and facilities, designed with a park-like atmosphere to complement surrounding land uses by means of appropriate siting of buildings and service areas, attractive architecture, and effective landscape buffering.
PD-GI	Planned Development – General Industry	Established primarily for medium industrial uses with a public nuisance potential, and necessary accessory uses and facilities, built in well-coordinated and attractive manner to be compatible with surrounding land uses.
PD-CC-SC	Planned Development-Commercial Center- Small Regional Center	Established to permit the development of small regional centers consisting of individual large and small scale commercial uses selling a broad range of goods or services to a market area beyond the local community. Specially centers shall be located with controlled access to major collector roads and will be designed, landscaped, and buffered so as to be compatible with neighboring development. When mapped, such districts shall be a minimum of twenty (20) acres and a maximum of sixty (60) acres.

TABLE 1.14 Town of Leesburg and Loudoun County Surrounding Zoning Districts		
TR-10	Transitional Residential	Create a visual / spatial transition between the suburban area and the rural area of the County. Provide for an environment that is low density in character to facilitate a transition between the suburban area and the rural area of the County. Achieve a blend of rural and suburban development, a balance between the built and natural environment. Protect drinking water resources; and implement requirements that open space be provided in conjunction with the standards of the County Ordinances.
AR-1	Agricultural Rural-1	AR-1 district is to: A. Support the use of land for rural economy uses, with residential uses allowed at densities consistent with the general open and rural character of the rural economy uses. B. Allow for a broad range of rural economy uses, including (agriculture, horticulture and animal husbandry), agriculture support and services associated with on-going agricultural activities, and other uses that can be developed in ways consistent with the rural character of the AR-1 district through mitigation or other standards. C. Recognize the County's tourism industry is interconnected with the rural economy and rural economy uses in the district by allowing for tourism uses related to agricultural uses, conference and training center uses, and rural activity and special event uses. D. Promote consistency between residential development and rural economy uses through lower density residential development or clustering of residential development. E. Ensure that the rural economy uses are compatible with any existing permitted residential development.

Source: *http://www.leesburgva.gov/government/departments/planning-zoning/zoning/zoning-ordinance and https://www.loudoun.gov/DocumentCenter/View/99645*

Exhibit 1-23
JYO Airport Area Land Use Policy Map



Source: *2016 Leesburg Town Plan*

The Town of Leesburg Airport Overlay District limits the height of objects around JYO and restricts certain land uses around the Airport. Section 7.7 A-1 of the Town of Leesburg Zoning Ordinance states:

> "The purpose of the Airport Overlay District is to regulate and restrict the height of structures, objects or natural growth, regulate the locations of noise sensitive uses, and otherwise regulate the use of property in the vicinity of the Leesburg Executive Airport by creating the appropriate zones and establishing the boundaries thereof; providing for changes in the restrictions and boundaries of such zones; defining certain terms used herein; providing for enforcement; and imposing penalties. Accordingly, it is declared:
>
> A. That it is necessary in the interest of the public health, safety, and general welfare, to prevent obstructions that are hazards to air navigation;
>
> B. That it is necessary in the interest of the public health, safety, and general welfare, to avoid noise-related problems associated with aircraft using the Leesburg Executive Airport;
>
> C. That the creation or establishment of an obstruction has the potential for being a public nuisance and may injure the area served by the airport; and
>
> D. That the Town of Leesburg derives economic development and enhanced interstate commerce from the Leesburg Executive Airport which are held strictly to the highest possible safety standards."

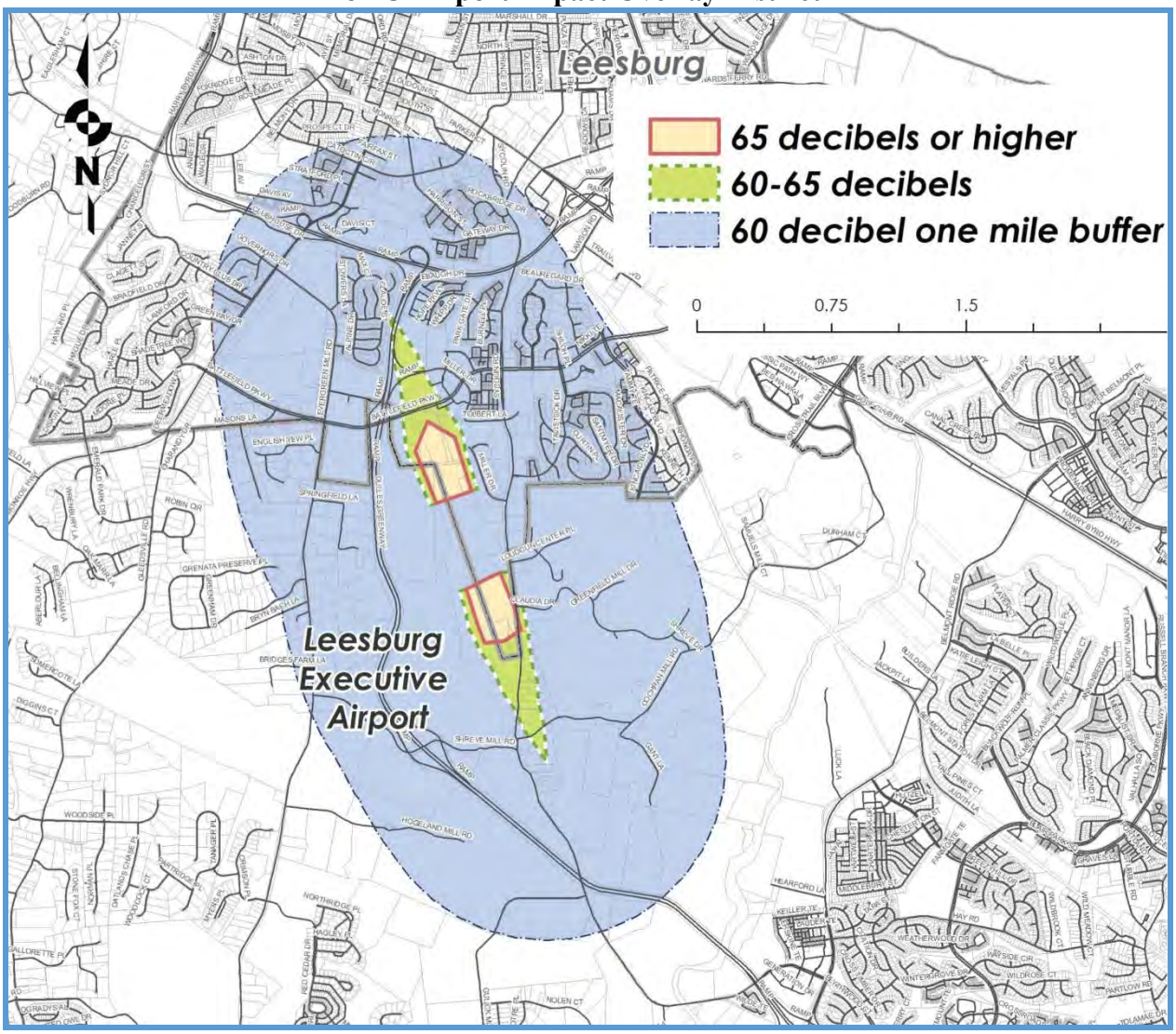
The complete Zoning Overlay District Ordinance is included in **Appendix B**.

Loudoun County has also adopted an airport zoning overlay district for the Leesburg Executive Airport as noted in Section 4-1400 of the Loudoun County Ordinances. The Town and County versions of the Airport Overlay District are nearly identical. The County Ordinance states:

> This district is established to acknowledge the unique land use impacts of airports, regulate the siting of noise sensitive uses, ensure that the heights of structures are compatible with airport operations, and complement Federal Aviation Administration regulations regarding noise and height.

The Town Airport Impact Overlay District is shown in **Exhibit 1-24** below.

Exhibit 1-24
JYO Airport Impact Overlay District



Source: *2016 Leesburg Town Plan*

2.0 FORECASTS OF AVIATION ACTIVITY CHAPTER

General aviation forecasts represent a key component in the master planning process. Aviation forecasts are time-based projections that provide a reasonable expectation for anticipating Airport demand, and serve as a guide in determining required Airport infrastructure, equipment and service needs. The updated forecasts provide a re-assessment of activity during the next 20-year (2017-2036) planning period and prove the framework for future facilities that will be needed to meet the forecasted demand. The following components of aviation demand are included in this forecast chapter as part of the Airport Master Plan Update for the Leesburg Executive Airport:

- Based Aircraft (including aircraft type)
- Annual Aircraft Operations (including aircraft type)
- Local versus Itinerant Operations
- Instrument Operations
- Peaking Activity Forecasts
- Annual Passengers
- Critical Aircraft operations

The FAA develops Terminal Area Forecasts (TAF) for all airports included in the National Plan of Integrated Airport Systems (NPIAS) including the Leesburg Executive Airport. A review of the current (2016) TAF data for JYO indicates that the forecasts developed by the FAA are largely representative of anticipated growth at the Airport. Therefore, new forecasts were not developed for this Master Plan Update. The forecasts included in this Chapter use the TAF numbers which are then analyzed by specific forecast item such as based aircraft by type or annual operations by type. This level of detail is not included in the TAF but can be deduced using standard forecasting methods. Additional sources of data used to refine the forecasts include:

- JYO Airport Records
- 2016 Virginia Air Transportation System Plan (VATSP)
- FAA Aircraft Licensing Data
- FAA Traffic Flow Management System Counts (TFMSC)

2.1 Current and Historic Airport Activity Levels

A snapshot of current and historical airport activity is listed in **Table 2.1**. This information serves as a baseline for developing the forecasts of aviation activity.

TABLE 2.1 Historic Leesburg Executive Airport Activity Levels		
Year	**Based Aircraft**	**Annual Operations**
2007	231	119,328
2008	184	96,878
2009	184	103,656
2010	162	103,656
2011	162	103,656
2012	248	110,635
2013	248	110,635
2014	248	110,635
2015	253	113,117
2016	249*	115,659

Note*: *2016 JYO Airport Records*
Source: *2016 FAA Terminal Area Forecast (TAF) Records*

2.2 Forecast of Based Aircraft

A based aircraft is defined as an actively registered airplane stationed at a select airport, which regularly uses that airport as the primary "home-base" for filing flight plans, frequently uses available airport amenities, and/or maintains a formal commitment for long-term parking/storage.

The number of based aircraft at a given airport directly impacts the size, number, and type of facilities needed at that airport. **Table 2.2** lists the JYO based aircraft forecasts from the 2016 FAA Terminal Area Forecasts (TAF) and the 2016 DOAV Virginia Air Transportation System Plan (VATSP).

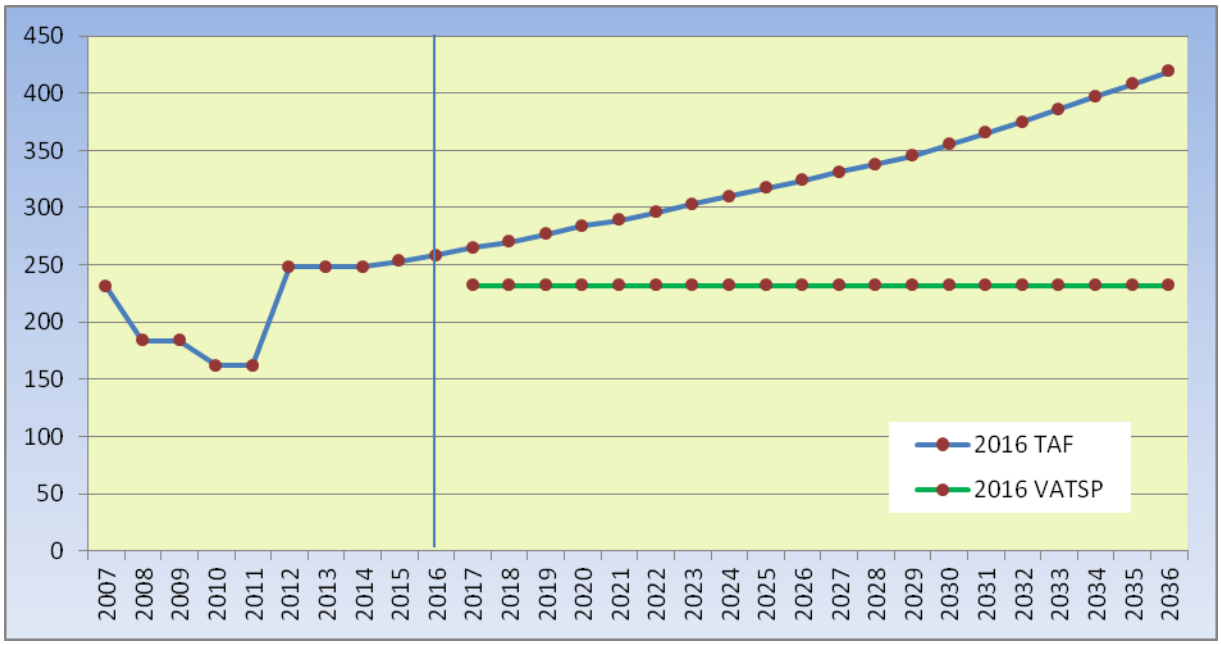
TABLE 2.2 Based Aircraft Forecast Comparison		
Year	**2016 DOAV VATSP**	**2016 FAA TAF**
2017	232	265
2018	232	270
2019	232	277
2020	232	284
2021	232	289
2022	232	296
2023	232	303
2024	232	310
2025	232	317
2026	232	324
2027	232	331
2028	232	338
2029	232	345
2030	232	355
2031	232	365
2032	232	375
2033	232	386
2034	232	397
2035	232	408
2036	232	419

Source: *2016 FAA TAF Record (JYO: 2016), 2016 VATSP*

There are currently 249 based aircraft at JYO according to airport records. The TAF indicates that based aircraft will increase to 419 in 2036. This results in an additional 170 based aircraft for the Airport by 2036. These forecasts represent "unconstrained" growth and are not limited by existing or future airport facilities or size. The FAA Terminal Area Forecast based aircraft are also depicted in **Exhibit 2-1**. The FAA has requested that the TAF forecasts serve as the JYO forecasts for this Master Plan Update. New forecasts will not be generated as a part of this updated Master Plan. Future facility needs and phasing will be based on the FAA TAF forecasts depicted in Tables 2.2 and 2.4.

The VATSP does not depict any forecast growth in based aircraft over the next 20 years. The potential cause of this may be the historical data used for the VATSP Update which may not have depicted any growth over the past 10 years at the Airport. This zero growth rate was then carried forward with the VATSP forecasts.

EXHIBIT 2-1
FAA Terminal Area Forecast Based Aircraft for JYO



Source: *2016 FAA TAF Record (JYO: 2016), 2016 DOAV VATSP*

These forecast numbers are categorized by type of aircraft propulsion over the 20-year planning period, as shown in **Table 2.3**. The existing (2016) ratios of aircraft type compared to the total number of based aircraft at JYO is listed in the 2016 row in Table 2.3. The FAA Aerospace Forecasts for 2016-2036 were evaluated to determine appropriate future based aircraft ratios for the Airport. The total fleet of single and multi-engine piston powered aircraft is forecast to decline over the next 20 year according to the FAA while turboprop, jet, and helicopters will increase. These growth assumptions have been incorporated into the forecast fleet mix for JYO with the proposed based aircraft percentages listed for 2036. A constant growth rate between the 2016 and 2036 forecast fleet mix numbers depicted in Table 2.3. The number of based single and multi-engine aircraft is forecast to increase at JYO but at a slower rate than the turboprops, jets, and helicopters.

TABLE 2.3
Based Aircraft Forecast by Type

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
2016	194 (77.9%)	31 (12.4%)	12 (4.8%)	7 (2.8%)	5 (2.0%)	249 (100%)
2017	208	32	12	8	5	265
2018	211	32	13	8	6	270
2019	216	33	13	9	6	277

TABLE 2.3 Based Aircraft Forecast by Type						
Year	**Single-Engine**	**Multi-Engine**	**Turboprop**	**Jet**	**Helicopter**	**Total**
2020	221	33	14	10	7	284
2021	223	34	14	10	7	289
2022	228	34	15	11	8	296
2023	233	35	15	12	8	303
2024	238	35	15	13	9	310
2025	243	36	16	13	9	317
2026	248	37	16	14	10	324
2027	253	37	17	15	10	331
2028	258	38	17	15	10	338
2029	262	38	17	16	11	345
2030	270	39	18	17	11	355
2031	278	39	18	17	12	365
2032	286	40	19	18	12	375
2033	295	40	19	19	13	386
2034	304	41	20	20	13	397
2035	313	41	20	20	14	408
2036	322 (76.8%)	42 (10.0%)	20 (4.9%)	21 (5.0%)	14 (3.3%)	419 (100%)

Source: *Talbert & Bright, analysis*

2.3 Forecast of Aircraft Operations

An aircraft operation is defined as either a takeoff or landing at an airport (i.e., a touch & go consists of two operations). The number of forecast annual operations at an airport is used to determine future facilities that may be required to accommodate this activity such as runways and aprons. A list of the historical JYO operations and forecasts is shown in **Table 2.4**.

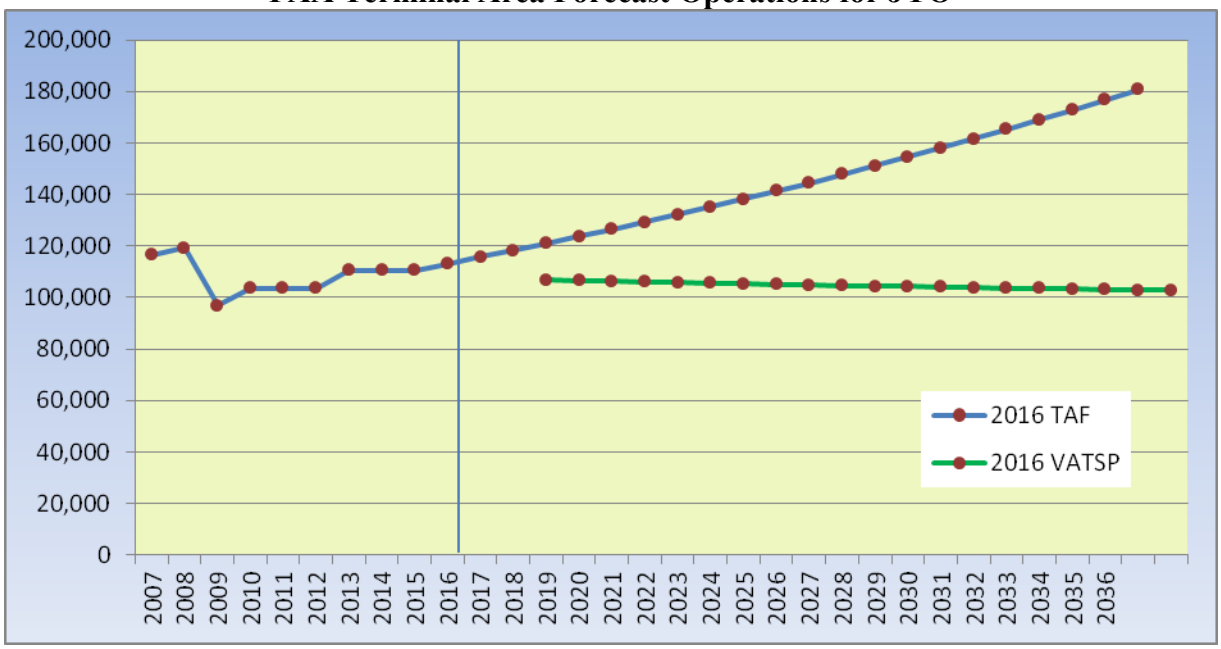
TABLE 2.4 Annual Operations Forecast Comparison		
Year	**2016 DOAV VATSP**	**2016 FAA TAF**
2017	106,720	118,259
2018	106,488	120,920
2019	106,256	123,640
2020	106,024	126,421

TABLE 2.4 Annual Operations Forecast Comparison		
Year	**2016 DOAV VATSP**	**2016 FAA TAF**
2021	105,792	129,271
2022	105,560	132,184
2023	105,328	135,166
2024	105,096	138,217
2025	104,864	141,339
2026	104,632	144,534
2027	104,400	147,801
2028	104,214	151,144
2029	104,029	154,562
2030	103,843	158,062
2031	103,658	161,644
2032	103,472	165,309
2033	103,286	169,058
2034	103,101	172,894
2035	102,915	176,819
2036	102,730	180,834

Source: *2016 FAA TAF Record (JYO: 2016), 2016 VATSP*

The TAF projects an increase of 66,700 operations at JYO over the next 20 years. The VATSP depicts a slight decline in annual operations over the same time frame. According to DOAV, this is due to the limited projected increase in general aviation operations in Virginia over the next 20 years. Also, the annual operations in the VATSP are derived from the based aircraft forecasts which are flat for JYO. It should be noted that this "no growth" forecast is not realistic for JYO given the current level of operations and recent increases in based aircraft and operations at the Airport. Also, JYO is located in the fastest growing county in Virginia based on population. This population growth is anticipated to fuel additional growth in airport activity in the region and more specifically, at JYO. **Exhibit 2-2** depicts the FAA Terminal Area Forecast annual operations for JYO.

EXHIBIT 2-2
FAA Terminal Area Forecast Operations for JYO



Source: *2016 FAA TAF Record (JYO: 2016), 2016 DOAV VATSP*

2.4 Operations by Aircraft Type

The forecast operations levels are divided into the specific categories of aircraft based on the type of propulsion. The based aircraft forecasts are grouped into these same categories. The percentages of operations by aircraft type were also determined using the FAA TFMSC data which lists all instrument aircraft operations at JYO by specific aircraft type. **Table 2.5** lists the average operations by type for 2006-2014. The majority of the operations are conducted by single, reciprocating-engine aircraft (53.5%). The FAA numbers indicate that helicopter operations only comprise 0.1% of total operations at JYO. This low number is not uncommon and is typically due to the limitations of recording instrument helicopter approaches.

TABLE 2.5
Average Percentage of Instrument Operations by Type (2006-2014)

Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
53.5%	11.5%	18.4%	16.5%	0.1%	100.0%

Source: *FAA Traffic Flow Management System Counts (TFMSC) 2006-2014*

Table 2.6 lists the forecast operations levels by aircraft type using the percentages from Table 2.6 as a guideline. The helicopter percentage was increased to account for the operations not recorded by the FAA. The total operations forecasts were multiplied by the aircraft type

percentages to determine the approximate number of operations by aircraft type. FAA Aerospace forecast data indicates that the number of registered turboprop and jet aircraft in the U.S. will increase over the next 20 years. Therefore, the percentages for these types were increased as shown in Table 2.6.

TABLE 2.6
JYO Forecast Operations by Aircraft Type

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
2017	62,677 (53%)	10,643 (9%)	21,287 (18%)	18,921 (16%)	4,730 (4%)	118,259
2022	67,414 (51%)	11,897 (9%)	25,115 (19%)	22,471 (17%)	5,287 (4%)	132,184
2027	75,379 (51%)	13,302 (9%)	28,082 (19%)	25,126 (17%)	5,912 (4%)	147,801
2036	84,992 (47%)	16,275 (9%)	36,167 (20%)	34,358 (19%)	9,042 (5%)	180,834

Source: *Talbert & Bright analysis*

2.5 Local and Itinerant Operations Forecast

The forecast operations at the Leesburg Executive Airport were also divided into local and itinerant operations categories as well as general aviation and military classifications. Local operations consist of those within a 25-mile radius of the Airport vicinity. Itinerant operations include flights having a terminus of flight from another Airport at least 25 miles away. **Table 2.7** lists the current average percentages of itinerant versus local operations at the Leesburg Executive Airport based on the FAA TAF data for 2016. **Table 2.8** shows the FAA TAF break-down of annual operations, by operation type, for the Airport throughout the 20-year planning period.

TABLE 2.7
Current Percentage of Operations by Type

	Itinerant Operations			Local Operations		
Year	Air Taxi	GA	Military	GA	Military	Total
2016	1.7%	10.71%	1.0%	87.2%	0%	100%

Source: *2016 FAA TAF, Airport Master Record Form 5010-1*

TABLE 2.8 Forecast Annual Operations by Type						
	Itinerant Operations			Local Operations		
Year	Air Taxi	GA	Military	GA	Military	Total
% of Ops.	1.7%	10.4%	1.0%	89.1%	0%	100%
2017	2,010	11,944	1,183	103,122	0	118,259
2022	2,247	13,351	1,322	115,264	0	132,184
2027	2,513	14,928	1,478	128,882	0	147,801
2036	3,074	18,264	1,808	157,688	0	180,834

Source: *Talbert & Bright analysis*

According the FAA TAF data, the majority of operations at JYO are categorized as General Aviation (GA) local at 89.1%. These percentages were applied to the total annual operations to determine the anticipated split of operations by type over the 20-year planning period. It should be noted that air taxi operations will become more common at general aviation airports throughout the U.S. as more companies and travelers take advantage of point to point air travel service instead of utilizing commercial air carriers.

2.6 Instrument Operations Forecasts

A necessary task in assessing the need for new or improved landing aids is a forecast of the levels of instrument operations at the Airport. An instrument approach can be defined as a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is important to note that instrument approaches are recorded only during IMC weather and only for aircraft that do not cancel IFR when they make visual contact with the airport. Thus, the number of recorded instrument approaches is always less than the number of instrument-assisted landings.

Presently, JYO has both precision and non-precision instrument approaches to its runways. For planning purposes, instrument approaches were assumed to be 12% percent of total airport operations based on FAA instrument operations data for JYO. Six percent (6%) of the total operations are instrument approaches while the remaining 88% of operations are conducted under Visual Flight Rules (VFR). Assuming that this ratio continues into the future, a forecast can be developed using the airport's total forecast operations. **Table 2.9** presents the results of this forecasting process.

TABLE 2.9
Instrument Operations Forecasts

Year	Annual IFR Ops (12% of Total Ops based on historical data)	Annual VFR Operations (Total Ops - IFR Ops)	Annual Instrument Approaches (50% of IFR Ops)	Annual Touch & Go (Training) Ops 5% of Total Ops
2017	14,191	104,068	7,096	5,913
2018	14,510	106,410	7,255	6,046
2019	14,837	108,803	7,418	6,182
2020	15,171	111,250	7,585	6,321
2021	15,513	113,758	7,756	6,464
2022	15,862	116,322	7,931	6,609
2023	16,220	118,946	8,110	6,758
2024	16,586	121,631	8,293	6,911
2025	16,961	124,378	8,480	7,067
2026	17,344	127,190	8,672	7,227
2027	17,736	130,065	8,868	7,390
2028	18,137	133,007	9,069	7,557
2029	18,547	136,015	9,274	7,728
2030	18,967	139,095	9,484	7,903
2031	19,397	142,247	9,699	8,082
2032	19,837	145,472	9,919	8,265
2033	20,287	148,771	10,143	8,453
2034	20,747	152,147	10,374	8,645
2035	21,218	155,601	10,609	8,841
2036	21,700	159,134	10,850	9,042

Source: *Talbert & Bright analysis*

2.7 Forecast of Airport Peaking Characteristics

Peak period operations indicate the amount of activity that occurs during the busy times of the year and busy times of the day. Peak period operations can be used to determine the recommended size of administration/terminal buildings, itinerant apron spaces, and automobile parking lots. **Table 2.10** shows airport peaking criteria calculated from the forecast of annual operations. The figures represent the anticipated maximum operations which can be expected at JYO over the 20-year planning period.

TABLE 2.10 Airport Operations Peaking Characteristics				
Year	**Total Annual Ops.**	**Average Peak "Month" Ops.**	**Average Peak "Day" Ops.**	**Average Peak "Hour" Ops.**
2016	115,659	12,144	399	60
2017	118,259	12,417	408	61
2022	132,184	13,879	457	68
2027	147,801	15,519	510	77
2036	180,834	18,988	625	94
Peak Month = (Annual operations) * (10.5%) ***Peak Average Day*** = (Peak Month Operations) / (30.4 Days) ***Peak Hour*** = (Peak Day Operations) * (15%)				

Source: *Talbert & Bright analysis*

2.8 Passenger Forecasts

Forecasts of annual general aviation enplaned passengers play an important role in determining landside facilities such as the general aviation terminal building sizes and the amount of automobile parking required. To forecast general aviation enplaned passengers, an aircraft occupancy rate is typically multiplied by the number of forecast itinerant operations. An average of four passengers per aircraft was multiplied by the number of forecast itinerant departures as shown in the last column of **Table 2.11**. Air taxi passengers represent approximately 10% of the total number of passengers at JYO. The number of general aviation passengers (total passengers minus air taxi passengers) is depicted in the third column of Table 2.11.

TABLE 2.11 Airport Passenger Forecasts			
Year	**Annual Air Taxi Passengers**	**Annual GA Passengers**	**Total Annual Passengers**
2017	2,791	25,118	27,909
2022	3,120	28,076	31,195
2027	3,488	31,393	34,881
2036	4,268	38,409	42,677

Source: *Talbert & Bright analysis*

2.9 Critical Aircraft Forecast

The critical aircraft is the largest airplane or family of aircraft conducting at least 500 annual operations (combination of 250 takeoffs and landings) per year at the Airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design, structural, and equipment needs for the airfield and terminal area facilities. The approach speed of the aircraft and its wingspan/tail height are the two main characteristics used to determine the FAA category and grouping. The various aircraft approach categories are listed in **Table 2.12** while the airplane design groups are listed in **Table 2.13**.

TABLE 2.12
Aircraft Approach Category

Aircraft Approach Category	Aircraft Approach Speed
Category A	Less than 91 knots
Category B	91 knots or more but less than 121 knots
Category C	121 knots or more but less than 141 knots
Category D	141 knots or more but less than 166 knots
Category E	More than 166 knots

Source: *FAA Advisory Circular 150/5300-13A Airport Design*

TABLE 2.13
Airplane Design Group

Airplane Design Group	Tail Height	Aircraft Wingspan
I	Up to but not including 20’	Up to but not including 49’
II	20’ up to but not including 30’	49’ up to but not including 79’
III	30’ up to but not including 45’	79’ up to but not including 118’
IV	45’ up to but not including 60’	118’ up to but not including 171’
V	60’ up to but not including 66’	171’ up to but not including 214’
VI	66’ up to but not including 80’	214’ up to but not including 262’

Source: *FAA Advisory Circular 150/5300-13A Airport Design*

The current critical aircraft at JYO is the Gulfstream G350 business jet which is classified as C-II (Aircraft Approach Category C and Airplane Design Group II). **Table 2.14** lists the Gulfstream G350 design characteristics.

TABLE 2.14 Existing and Future Critical Aircraft						
Aircraft Type & Reference Code	**Wingspan**	**Aircraft Length**	**Aircraft Height**	**Seating (including crew)**	**Max. Gross Takeoff Weight**	**Approach Speed**
Gulfstream G350 (ARC C-II)	77.8’	89.3’	25.2’	14-18	70,900 lbs.	140 knots

Source: *Gulfstream Aerospace - Aircraft Characteristics Data*

The FAA Traffic Flow Management System Counts (TFMSC) data was used to determine the approximate number of operations currently being conducted at JYO by category C-II and larger (faster) aircraft. This information is used to determine if the future critical aircraft needs to be upgraded from the existing designation of C-II. Approximately 0.4% of the total operations at JYO are conducted by C-II and greater aircraft. This percentage is anticipated to increase through the 20-year planning period to 0.7% as more of these aircraft are manufactured. This results in an increase from 473 to 1,266 annual operations by 2036 as shown in **Table 2.15** below.

TABLE 2.15 Forecast Critical Aircraft Operations		
Year	**Total Forecast Annual Operations**	**Forecast Operations by C-II or Greater Aircraft (0.4% to 0.7% of Total Operations)**
2017	118,259	473
2018	120,920	503
2019	123,640	534
2020	126,421	566
2021	129,271	599
2022	132,184	633
2023	135,166	669
2024	138,217	706
2025	141,339	744
2026	144,534	784
2027	147,801	825
2028	151,144	867
2029	154,562	911
2030	158,062	957

TABLE 2.15 Forecast Critical Aircraft Operations		
Year	**Total Forecast Annual Operations**	**Forecast Operations by C-II or Greater Aircraft (0.4% to 0.7% of Total Operations)**
2031	161,644	1,004
2032	165,309	1,053
2033	169,058	1,103
2034	172,894	1,156
2035	176,819	1,210
2036	180,834	1,266

Source: *Talbert & Bright analysis*

The increase in C-II and greater aircraft over the planning period indicates that the future critical aircraft should remain as a C-II. The operations by this group of aircraft are projected to increase at JYO with increased regional commercial and industrial development as well as the popularity of these aircraft among business travelers. All future airport facilities should be designed to ARC C-II standards.

2.10 Summary

The forecasts of aviation activity developed as part of this Airport Master Plan Update indicate consistent growth in activity over the next 20 years. Future airport enhancements and facilities should be planned, designed, and constructed with this growth in mind. **Table 2.16** provides a summary of the forecasts for the Leesburg Executive Airport throughout the 20-year Master Plan Update planning period.

TABLE 2.16 JYO Forecast Summary				
Aircraft Type	**2017**	**2022**	**2027**	**2036**
BASED AIRCRAFT				
Single-Engine Piston	208	228	253	322
Multi-Engine Piston	32	34	37	42
Turboprop	12	15	17	20
Jets	8	11	15	21
Helicopters	5	8	10	14

TABLE 2.16 JYO Forecast Summary				
Aircraft Type	**2017**	**2022**	**2027**	**2036**
TOTAL BASED AIRCRAFT	**265**	**296**	**331**	**419**
AIRCRAFT OPERATIONS				
GA Local (Civil)	103,122	115,264	128,882	157,688
GA Itinerant	11,944	13,351	14,928	18,264
Air Taxi	2,010	2,247	2,513	3,074
Military	1,183	1,322	1,478	1,808
TOTAL OPERATIONS	**118,259**	**132,184**	**147,801**	**180,834**

Source: *Talbert & Bright analysis*

3.0 FACILITY REQUIREMENTS

The purpose of the Facility Requirements analysis is to determine the airport's capacity and ability to support the forecast levels of aviation demand identified in the Forecasts Chapter. Facility requirements identify development, replacement, or modification of airport facilities to accommodate the existing and 20-year anticipated demand.

The methodology used to determine facility requirements begins with an examination of the airport's major components: Airfield, Airspace, Buildings and Landside/Surface Access. It is important to note that each of these system components should be balanced, in order to achieve system optimization. Any deficiencies in the airport facilities that encompass these four elements will be identified based upon standards presented in Federal Aviation Administration (FAA) Advisory Circular 150/5300-13A *Airport Design*, and FAA Advisory Circular 150/5060-5 *Airport Capacity and Delay*. Any recommended improvements to facilities are noted in the following sections.

3.0.1 Airfield Capacity and Delay

Airport capacity and delay computations are used to design and evaluate airport development and improvements. As demand approaches capacity, individual aircraft delay is increased. Successive hourly demands exceeding the hourly capacity result in unacceptable delays. Even when hourly demand is less than the hourly capacity, aircraft delays can still occur if the demand within a portion of the time interval exceeds the capacity during that interval.

Airport capacity is governed by runway use configuration, percent of arrivals; percent of touch-and-go operations, taxiway configuration, airspace limitations and runway instrumentation. Annual service volume (ASV) is a reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, and weather conditions that would be encountered over a year's time.

The airfield operational capacity for the Leesburg Executive Airport, as calculated from FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay,* is approximately 230,000 annual operations per year. The current Airport configuration provides an 'hourly' runway capacity of 98 Visual Flight Rules (VFR) operations and 59 Instrument Flight Rules (IFR) operations. A comparison of future demand to current airfield operational capacities does not indicate the need for capacity-enhancement projects such as additional runways. Based on the forecasts for the Airport, the demand as a percent of ASV is presented in **Table 3.1**.

TABLE 3.1 Forecast Demand as Percent of Annual Service Volume (ASV)		
Year	**Forecast Annual Operations**	**Percent of ASV**
2017	118,259	51.4%
2022	132,184	57.5%
2027	147,801	64.3%
2036	180,834	78.6%

Source: *Talbert & Bright analysis*

Table 3.1 indicates that the forecast total annual operations are expected to grow from 51.4% to 78.6% of the annual service volume by the end of the planning period. Industry and FAA guidelines recommend that capacity improvements be pursued when annual operations reach 60% of the theoretical Annual Service Volume. Therefore, when actual annual operations reach 138,000 operations, more detailed analysis should be performed to better determine the runway's capacity. The FAA TAF forecasts this to occur in approximately 2024.

Hourly airfield capacity is a measure of the maximum number of aircraft operations which can be accommodated on the airport or airport component in an hour. Hourly capacity is an important consideration, since this measure determines whether an airport can accommodate the projected peak hour operations during the planning period.

FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, is used to estimate the hourly capacity of the Leesburg Executive Airport. The forecast demand as a percent of hourly capacity is presented in **Table 3.2**.

TABLE 3.2 Forecast Demand as Percent of Hourly Capacity			
Year	**Forecast Peak Hour Operations (ops/hr)**	**VFR Hourly Capacity (ops/hr)**	**Percent of Hourly Capacity (%)**
2017	61	98	62.2%
2022	68	98	69.4%
2027	77	98	78.6%
2036	94	98	95.9%

Source: *Talbert & Bright analysis*

The maximum hourly capacity for JYO under VFR conditions is currently 98 operations. The forecast annual operations are used to derive the peak hour operations as part of the Forecast analysis. The Airport is currently at 62% of their peak hour capacity with this number growing to nearly 96% by 2036. The current peak hour operations levels represent a theoretical estimate of

current demand. Interviews with airport personnel have indicated that JYO is not currently experiencing the 61 operations per hour. As operations increase at JYO, further analysis may be warranted in order to maximize future operations while minimizing the potential for operational delays.

3.0.2 Airport Service Level

The current National Plan of Integrated Airport Systems (NPIAS) is a comprehensive list of all airports that are eligible for Federal funding from the FAA and are therefore required to meet FAA standards. The Leesburg Executive Airport is listed as a Reliever facility in the NPIAS. Similarly, the 2016 VATSP classifies the Airport as a Reliever facility as well. The Airport currently serves the Washington DC/Northern Virginia area by relieving general aviation traffic from Washington Dulles International Airport. There is no need to change the Airport service level designation at this time. JYO will continue to serve the general aviation reliever role over the 20-year planning period. No scheduled commercial-service (air carrier) passenger operations are anticipated to occur at the Airport over the next 20 years.

3.0.3 Airport Reference Code

The Airport Reference Code (ARC) is a measure of the approach speed, wingspan, and tail height of the most critical aircraft that operates at an airport. The critical aircraft is thus used to determine the required airport approach and layout dimensions. The FAA aircraft approach categories are listed in **Table 3.3** while the airplane design groups are listed in **Table 3.4**.

TABLE 3.3
Aircraft Approach Category

Aircraft Approach Category	Aircraft Approach Speed
Category A	Less than 91 knots
Category B	91 knots or more but less than 121 knots
Category C	121 knots or more but less than 141 knots
Category D	141 knots or more but less than 166 knots
Category E	More than 166 knots

Source: *FAA Advisory Circular 150/5300-13A Airport Design*

TABLE 3.4 Airplane Design Group		
Airplane Design Group	**Tail Height**	**Aircraft Wingspan**
I	Up to but not including 20’	Up to but not including 49’
II	20’ up to but not including 30’	49’ up to but not including 79’
III	30’ up to but not including 45’	79’ up to but not including 118’
IV	45’ up to but not including 60’	118’ up to but not including 171’
V	60’ up to but not including 66’	171’ up to but not including 214’
VI	66’ up to but not including 80’	214’ up to but not including 262’

Source: *FAA Advisory Circular 150/5300-13A Airport Design*

The current and future critical aircraft at JYO is the Gulfstream G350 business jet which is classified as C-II (Aircraft Approach Category C and Airplane Design Group II). **Table 3.5** lists the Gulfstream G350 design characteristics.

TABLE 3.5 Existing and Future Critical Aircraft						
Aircraft Type & Reference Code	**Wingspan**	**Aircraft Length**	**Aircraft Height**	**Seating (including crew)**	**Max. Gross Takeoff Weight**	**Approach Speed**
Gulfstream G350 (ARC C-II)	77.8’	89.3’	25.2’	14-18	70,900 lbs.	140 knots

Source: *Gulfstream Aerospace - Aircraft Characteristics Data*

The FAA Traffic Flow Management System Counts (TFMSC) data was used to determine the approximate number of operations currently being conducted at JYO by category C-II and larger (faster) aircraft. This information is used to determine if the future critical aircraft needs to be upgraded from the existing designation of C-II. Approximately 0.4% of the total operations at JYO are conducted by C-II and greater aircraft. This percentage is anticipated to increase through the 20-year planning period to 0.7% as more of these aircraft are manufactured. This results in an increase from 473 to 1,266 annual operations by 2036 as shown in **Table 3.6**.

TABLE 3.6 Forecast Critical Aircraft Operations		
Year	**Total Forecast Annual Operations**	**Forecast Operations by C-II or Greater Aircraft (0.4% to 0.7% of Total Operations)**
2017	118,259	473
2022	132,184	633
2027	147,801	825
2036	180,834	1,266

Source: *Talbert & Bright analysis*

A change to the ARC designation should be considered when the critical aircraft or family of aircraft with at least 500 annual operations changes.

The increase in C-II and greater aircraft over the planning period indicates that the future critical aircraft should remain as a C-II. The operations by this group of aircraft are projected to increase at JYO with increased regional commercial and industrial development as well as the popularity of these aircraft among business travelers. Therefore, all future airport facilities should be designed to ARC C-II standards.

3.0.4 Runway Approach Capability

Airport design features and sizing/layouts are also determined by the approach visibility minimums for each runway end. These minimums represent ceiling height and visibility, the lower the minimums, the larger the safety areas and separation standards. Runway 17 currently has an Instrument Landing System (ILS) which is considered a "precision" approach by the FAA. An ILS can provide approach minimums as low as a 200' ceiling and ½-mile visibility. However, due to the lack of a full approach lighting system and the existing runway-taxiway separation distance, Runway 17 has a 1-mile visibility minimum. Data from the JYO AWOS was obtained from the National Centers for Environmental Information (NCEI) which indicates that for 2017, visibility was not lower than 1-mile at JYO 99% of the time. Visibility was lower than 1-mile but greater than ¾-mile 0.3% of the time and visibility was lower than ¾-mile 0.7% of the time at JYO. Therefore, the existing approach procedures for Runway 17 at JYO accommodate approaches approximately 99% of the time. However, it is recommended that the Airport pursue ¾-mile visibility minimums to this runway end which would allow aircraft to land when visibility is reduced to ¾ of a mile or greater. Approach capabilities that are less than ¾-mile would require additional runway/taxiway separation which cannot be accommodated at JYO.

Runway 35 is considered a "visual" runway and does not currently have instrument landing capabilities. The FAA has indicated that a nonprecision GPS approach can be created for this runway end if a clear 34:1 Part 77 approach slope can be obtained. It is recommended that this nonprecision approach be implemented on the existing and proposed Runway 35 ends in Phase II of the development timeframe. This will allow for non-precision approaches to Runway 35 when the prevailing winds dictate operations on that runway end.

3.1 AIRPORT GEOMETRY

This section presents the airport geometric design standards and recommendations to ensure the safety, economy, efficiency and longevity of an airport. It is important for airport operators to review both, the present, and the future uses of the airport and determine if there are any geometric deficiencies that need to be addressed.

3.1.1 Runway Wind Coverage

Meteorological conditions play an important role in the operation of an airport and must be taken into account for future development. The orientation of the runway to the prevailing wind direction is critical to the safe operation of aircraft, especially small single engine aircraft which are more susceptible to crosswinds. Crosswinds are wind components perpendicular to the runway or path of an aircraft. Wind data was obtained from the National Climatic Data Center for the Leesburg Executive Airport for the period 2006-2015. The wind data was recorded by the JYO Automated Weather Observing System (AWOS) and was used to develop updated wind roses which are shown on the ALP.

The FAA recommends 95% wind coverage for various crosswind components based on specific Airport Reference Codes. The 95% wind coverage is computed on the basis that a crosswind not exceed 10.5 knots for Airport Reference Code A-I and B-I, 13 knots for Airport Reference Code A-II and B-II, 16 knots for Airport Reference Code A-III, B-III, and C-I through D-III, and 20 knots for Airport Reference Codes A-IV through D-VI.

Wind coverage is computed for a 16 knot crosswind component as JYO is a Category C-II Airport. Due to the number of smaller single engine piston and twin engine piston aircraft that utilize the Airport on a regular basis which are more susceptible to crosswinds, the runway has been evaluated for a more conservative 13 knot as well as a 16 knot crosswind. The calculated wind coverage is shown in **Table 3.7**.

TABLE 3.7
Runway Wind Coverage Calculations

Weather Condition	CROSSWIND COMPONENT			
	10.5 KTS	13 KTS	16 KTS	20 KTS
VMC	96.88%	98.65%	**99.61%**	99.94%
IMC	99.54%	99.83%	**99.95%**	99.99%
All Weather	97.07%	98.72%	**99.63%**	99.94%

Source: *FAA Wind Rose Form; Talbert & Bright analysis*

Based on the wind analysis, the current runway orientation at JYO exceeds FAA requirements for wind coverage and an additional crosswind runway is not required at this time. The FAA recommends 10 consecutive years of wind observation data for determining runway wind

coverage. A wind rose analysis should be performed periodically to ensure that runway geometry meets the future needs of the airport users.

3.1.2 Runway Length Requirements

The following section describes the recommended runway length requirements for the Leesburg Executive Airport. The planned, or future, runway length is determined by: **1)** performance requirements to satisfy the most demanding aircraft or family of aircraft utilizing the Airport; **2)** conformance with FAA recommended runway length standards per *FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Runway Design*; **3)** Airport and local interest commensurate with community competitiveness for retaining and attracting business and investment to the region. Section 306 from Advisory Circular 150/5325-4B has been reprinted below and describes the runway length requirements for general aviation airports.

> *306. GENERAL AVIATION AIRPORTS. General aviation (GA) airports have privately owned business jets. Over the years business jets have proved themselves to be a tremendous asset to corporations by satisfying their executive needs for flexibility in scheduling, speed, and privacy. In response to these types of needs, GA airports that receive regular usage by large airplanes over 12,500 pounds (5,670 kg) MTOW, in addition to business jets, should provide a runway length comparable to non-GA airports. That is, the extension of an existing runway can be justified at an existing GA airport that has a need to accommodate heavier airplanes on a frequent basis.*

The Federal Aviation Administration provides guidance for all airports receiving federal funding for determining future runway length requirements. As stated in paragraphs 102.b.(2) of AC 150/5325-4B: "Except for regional jets, when the maximum takeoff weight (MTOW) of the list of critical design airplanes is 60,000 pounds or less, the recommended runway length is determined according to a family grouping of airplanes having similar performance characteristics and operating weights." There are five steps identified in AC 150/5325-4B for determining the require runway length which are listed below.

Step #1. Identify the list of critical design airplanes that will make regular use of the proposed runway for an established planning period of at least five years.

Step #2. Identify the airplanes that will require the longest runway lengths at maximum certificated takeoff weight (MTOW).

Step #3. Use Table 1-1 and the airplanes identified in step #2 to determine the method that will be used for establishing the recommended runway length.

Step #4. Select the recommended runway length from among the various runway lengths generated by step #3 per the process identified in chapters 2, 3, or 4, as applicable.

Step #5. Apply any necessary adjustment to the obtained runway length, when instructed by the applicable chapter of this AC, to the runway length generated by step #4 to obtain a final recommended runway length.

Table 1-1 from this advisory circular has been reprinted as **Table 3.8** below.

TABLE 3.8
FAA Runway Length Calculation Approach
Table 1-1. Airplane Weight Categorization for Runway Length Requirements

Airplane Weight Category Maximum Certificated Takeoff Weight (MTOW)			Design Approach	Location of Design Guidelines
12,500 pounds (5,670 kg) or less	Approach Speeds less than 30 knots		Family grouping of small airplanes	Chapter 2; Paragraph 203
	Approach Speeds of at least 30 knots but less than 50 knots		Family grouping of small airplanes	Chapter 2; Paragraph 204
	Approach Speeds of 50 knots or more	With Less than 10 Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-1
		With 10 or more Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-2
Over 12,500 pounds (5,670 kg) but less than 60,000 pounds (27,200 kg)			Family grouping of large airplanes	Chapter 3; Figures 3-1 or 3-2 [1] and Tables 3-1 or 3-2
60,000 pounds (27,200 kg) or more or Regional Jets [2]			Individual large airplane	Chapter 4; Airplane Manufacturer Websites (Appendix 1)

Note 1: When the design airplane's APM shows a longer runway length than what is shown in figure 3-2, use the airplane manufacturer's APM. However, users of an APM are to adhere to the design guidelines found in Chapter 4.

Note 2: All regional jets regardless of their MTOW are assigned to the 60,000 pounds (27,200 kg) or more weight category.

Source: *FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Runway Design, Table 1-1*

FAA Traffic Flow Management System Counts (TFMSC) data was used to determine the types of jet aircraft most frequently operating at the Airport as well as the most demanding aircraft operating at JYO. This data consists of all aircraft that operated via an instrument flight plan to or from JYO for 2012 through 2016. The majority of jet aircraft currently operating at JYO are B-I or B-II Category aircraft. **Table 3.9** depicts the annual jet operations as well as the number of operations by the existing and future critical aircraft (Gulfstream G350) or larger jet aircraft. The Gulfstream G350 is classified as a C-II aircraft based on approach speed and wingspan. The takeoff and landing distance requirements set by the manufacturers are also listed in Table 3.9. These distances have been adjusted to account for the mean daily maximum temperature during the hottest month and the existing runway gradient.

TABLE 3.9
Jet Operations at JYO

Aircraft	Maximum Takeoff Weight (MTOW) in lbs.	Airport Reference Code	Takeoff Distance from Manufacturer	Takeoff adjusted for Max. Temp. & Runway Gradient	Landing Distance Wet (15% increase)	Annual Operations at JYO				
						2012	2013	2014	2015	2016
Annual Jet Operations at JYO										
					Total	**2,043**	**2,029**	**2,155**	**2,176**	**2,291**
Reference Code C-II and Greater Jet Aircraft Currently Operating at JYO										
Cessna Citation X	36,100	C-II	5,140	5,703	3,140	16	22	29	32	30
Bombardier Challenger 600/601/604	41,250	C-II	5,700	6,313	3,191	32	29	22	113	76
Embraer ERJ Legacy	49,604	C-II	5,551	6,151	2,652	2	8	6	4	1
Bombardier BD-700 Global Express	92,500	C-III	5,540	6,139	3,071	8	8	6	15	10
Gulfstream III/G300/G350 (Critical Aircraft)	70,900	C-II	5,050	5,605	3,036	18	0	2	0	0
Gulfstream IV/G400/G450	74,600	D-II	5,600	6,204	3,749	97	119	132	114	58
Gulfstream V/G500/G550	91,000	C-III	5,910	6,542	3,186	4	4	4	6	18
Bombardier Learjet 60	23,500	D-I	5,360	5,942	3,933	38	41	15	45	22
BAe HS 125/700-800/Hawker 800	28,000	C-II	5,032	5,585	2,582	196	216	227	215	214
					Total	**411**	**447**	**443**	**544**	**429**

Source: *FAA TFMSC Records, Aircraft manufacturer data.*

The most predominant jet operations are conducted by aircraft that can operate at the current 5,500' runway length without restrictions. There were 429 operations conducted by reference code C-II and higher aircraft at JYO in 2016. This category represents the existing and proposed critical aircraft for the Airport. Based on the critical family of aircraft currently operating at JYO, AC 150/5325-4B requires the use of tables and charts located in Chapter 3 of that document for determining the recommended runway length. "First use Tables 3-1 and 3-2 to determine which one of the two "percentage of fleet" categories represents the critical design airplanes under evaluation." These aircraft are included in either the 75% of fleet category (requiring 5,000 feet of runway or less) or the remaining 25% of the fleet (requiring more than 5,000 feet of runway).

Tables 3-1 and 3-2 are shown in **Exhibits 3-1** and **3-2** respectively. As per FAA requirements, when there are aircraft currently operating at a given airport, the runway length calculation should be based on the most demanding category of aircraft which is the 25% category in this case as most of the aircraft currently operating at JYO can be found in Table 3-2 in Exhibit 3-2.

Exhibit 3-1
AC 150/5325-4B, Table 3-1

Table 3-1 Airplanes that Make Up 75 Percent of the Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bae	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A
Cessna	550 Citation Bravo	Learjet	40/45
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	Raytheon	390 Premier
Cessna	552 Citation	Raytheon Hawker	400/400 XP
Cessna	560 Citation Encore	Raytheon Hawker	600
Cessna	560/560 XL Citation Excel	Sabreliner	40/60
Cessna	560 Citation V Ultra	Sabreliner	75A
Cessna	650 Citation VII	Sabreliner	80
Cessna	680 Citation Sovereign	Sabreliner	T-39

Note: Additional modern aircraft operating at JYO that would be listed in Table 3-1 include: the Cessna Citation Jet (CJ1), Embraer Phenom 100 and 300, Cessna Citation Mustang, Honda HA-420 HondaJet, and Eclipse 500.
Source: *FAA Advisory Circular 150/5325-4B Runway Length Requirements for Runway Design, Table 3-1.*

Exhibit 3-2

AC 150/5325-4B, Table 3-2

Table 3-2. Remaining 25 Percent of Airplanes that Make Up 100 Percent of Fleet

Manufacturer	Model
Bae	Corporate 800/1000
Bombardier	600 Challenger
Bombardier	601/601-3A/3ER Challenger
Bombardier	604 Challenger
Bombardier	BD-100 Continental
Cessna	S550 Citation S/II
Cessna	650 Citation III/IV
Cessna	750 Citation X
Dassault	Falcon 900C/900EX
Dassault	Falcon 2000/2000EX
Israel Aircraft Industries (IAI)	Astra 1125
IAI	Galaxy 1126
Learjet	45 XR
Learjet	55/55B/55C
Learjet	60
Raytheon/Hawker	Horizon
Raytheon/Hawker	800/800 XP
Raytheon/Hawker	1000
Sabreliner	65/75

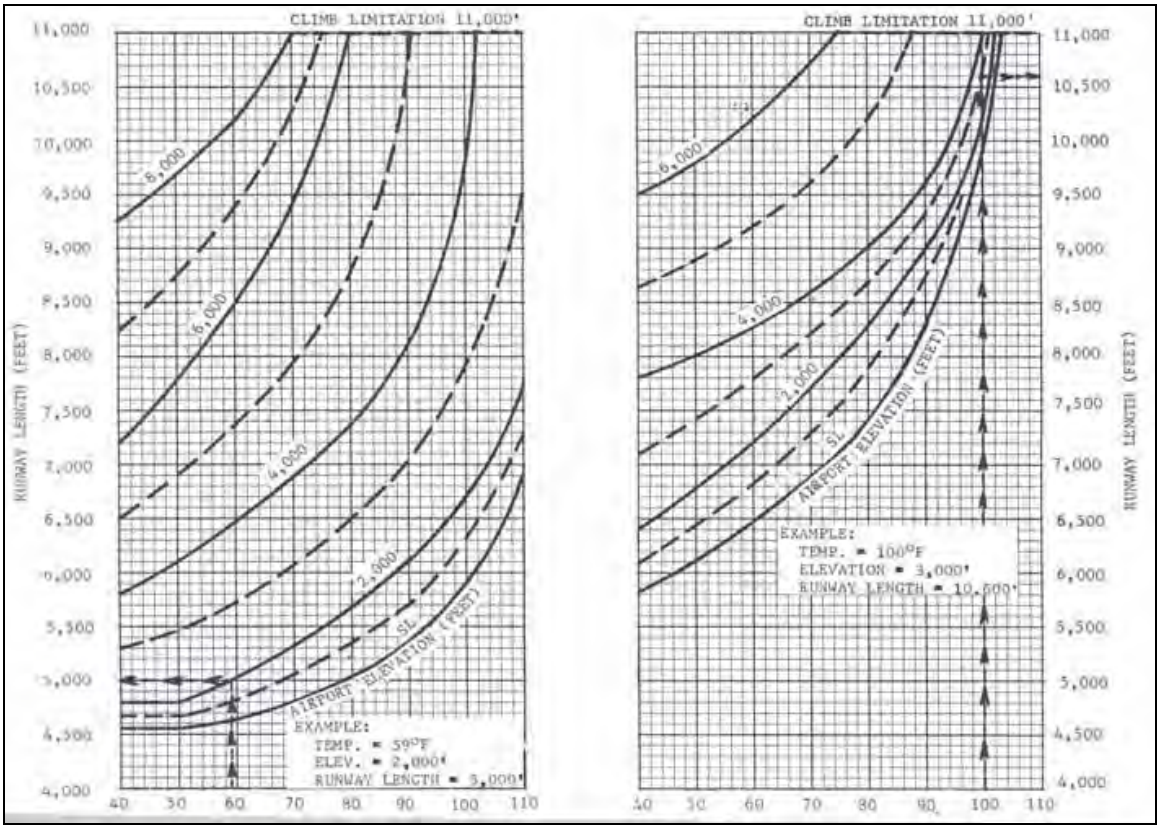
Note: Airplanes in tables 3-1 and 3-2 combine to comprise 100% of the fleet.

Note: Additional modern aircraft operating at JYO that would be listed in Table 3-2 include: the Embraer Legacy, Bombardier Global Express, Gulfstream GIV (450), Gulfstream GV (550), Gulfstream G650, and Dassault Falcon 7X.

Source: *FAA Advisory Circular 150/5325-4B Runway Length Requirements for Runway Design, Table 3-2*

The next step in determining the recommended runway length is to use Figure 3-2 (shown in **Exhibit 3-3**) from AC 150/5325-4B to calculate the runway length given the elevation and mean maximum daily temperature of the hottest month at JYO.

Exhibit 3-3
100 Percent of Fleet at 60 or 90 Percent Useful Load



100% of fleet at 60% useful load **100% of fleet at 90% useful load**

Source: *FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Runway Design, Figure 3-2*

The length of haul for these types of aircraft is used to determine which category of useful load to use, either 60% or 90%. A review of the most common destinations from JYO was conducted using the FAA TFMSC data. A 1,000 nautical mile haul length was chosen for the runway length calculations as the majority of destinations from JYO fall within this distance. This represents a 60% useful load for the critical family of aircraft operating at JYO.

The final data required to calculate the recommended runway length are the airport elevation and the mean daily maximum temperature of the hottest month at the Airport. The surveyed elevation of JYO is 389.5'. Weather records recorded by the AWOS station at JYO were obtained from The National Climatic Data Center. The hottest month at JYO is July and the mean daily maximum temperature is 87.0°F.

Using the graph shown above for 100% of the fleet at 60% useful load, the resultant runway length is 5,500'. This length needs to be adjusted for effective runway gradient. The runway length is increases by 10' for every 1 foot of elevation change between the runway centerline. The calculations for the recommended runway length are shown below.

Runway 17 elevation = 377.6'
Runway 35 elevation = 387.2'
Runway Elevation Change = 9.6'
Increase Runway Length by 96'
Recommended Runway Length = 5,500' + 96' = 5,596'

Based on the operational data for JYO the recommended runway length should accommodate 100% of aircraft weighing between 12,500 pounds and 60,000 pounds, operating at 60% useful load. The resultant recommended runway length is therefore 5,600'.

Based on FAA runway length calculations and specific aircraft performance data, a 5,00' runway extension is recommended for the Leesburg Executive Airport which is commensurate with the results and recommendations from the previous JYO Master Plan Study. This will give the Airport a total runway length of 6,000'. This extension will allow the critical family of aircraft currently operating at the Airport to operate more efficiently. The extension will allow these aircraft to depart with additional fuel or payload therefore increasing stage length and eliminating any additional fuel stops. A 500’ runway extension will also allow 99.8% of the existing and future aircraft to operate at JYO without weight or flight distance restrictions. There are currently not enough operations by larger aircraft to currently justify a runway length beyond 6,000’.

3.1.3 Runway Numbering

Runway numbers are determined by the nearest tenth of a degree in magnetic heading. The constant shifting of magnetic north due to declination change can cause runway designation numbers to change occasionally. The true runway heading (161.29°) at the Leesburg Executive Airport, plus the magnetic declination (10.55° West as of August 2016) equals the magnetic runway heading of 171.84° or 170° when rounded. The existing runway numbers of 17-35 will not need to be altered as part of this study. It is important to monitor declination changes in the future so that the most accurate magnetic heading may be reflected through the runway designation numbers.

3.1.4 Runway Width

FAA Advisory Circular 150/5300-13A provides guidance for runway width standards based on ARC and wind coverage. For Category B-II and C-II (aircraft greater than 12,500 pounds) runways, a 100 foot width is recommended. Runway 17-35 at the Leesburg Executive Airport is currently 100’ wide. No runway widening is proposed.

3.1.5 Pavement Strength and Condition

Airport pavements are constructed to provide adequate support for the loads imposed by aircraft using the airport and to produce a firm, stable, smooth, all year, all weather surface free from dust or other particles that may be blown or picked up by propeller wash or jet blast. For pavements to meet the requirements noted they must have the strength and stability to withstand abrasive action, adverse weather and other deteriorating influences. Braking performance on pavement surfaces becomes critical with increases in forecasted jet operations. Under certain conditions, hydroplaning or unacceptable loss of friction can occur resulting in poor braking performance and possible loss of directional control.

As determined during the inventory of airport facilities, the existing runway and taxiway pavements were found to be in fair to satisfactory condition. There is minimal cracking which should be sealed to ensure the maximum pavement design life. A runway overlay/rehabilitation will likely be needed within the next 10 years as the typical design life of these pavements is 20 years.

The FAA, in conjunction with the International Civil Aviation Organization (ICAO), has developed a standard for measuring the strength of a pavement sections and the ability of those pavements to support a given type of aircraft as identified in FAA Advisory Circular 150/5335-5B *Standardized Method of Reporting Airport Pavement Strength - PCN*. The Pavement Classification Number (PCN) is determined from the thickness of the existing pavement, California Bearing Ratio (CBR) value of the subgrade, and type and frequency of operations of the most demanding aircraft operating at the Airport. An Aircraft Classification Number (ACN) is determined for each type of aircraft operating at a given airport. If the ACN is less than the PCN for that Airport then the existing pavement will accommodate that particular aircraft at its maximum takeoff weight without failing during the 20-year life of the pavement.

The PCN values were calculated using the FAA pavement strength program COMFAA 3.0. The annual departures by aircraft type were entered into the program along with the CBR value for the subgrade and the depth of the existing pavement section. A PCN calculation is then generated for each type of aircraft with the highest PCN determining the overall PCN for that pavement. At JYO, the Gulfstream G-V generated the highest PCN with a value of 62.7 as shown in **Table 3.10**. The published runway pavement strength for JYO is 30,000 pounds single main gear wheel (per side) aircraft and 70,000 pounds double wheel. The results of the PCN analysis indicate that the pavement can likely support heavier aircraft than 70,000 pounds. Limited operations by heavier aircraft heavier than 70,000 pounds should not adversely impact the existing pavements however, a full boring and CBR analysis should be performed on these pavements prior to revising the published weight bearing capacities.

TABLE 3.10 Pavement Classification Number (PCN)		
Pavement	**Critical Aircraft (by weight)**	**Existing (2016) PCN**
Runway 17-35	Gulfstream G-V	62.7
Taxiways	Gulfstream G-V	62.7
Apron	Gulfstream G-V	62.7

Source: *FAA COMFAA Computer Program*

The ACN for the Leesburg Executive Airport was also calculated using the FAA COMFAA program. The ACN is determined from the CBR grade and specific aircraft type using a given pavement. The existing and future critical aircraft, as determined previously in this study, were evaluated using this method. The current critical aircraft and heaviest aircraft operating at JYO were also evaluated with the ACN results shown in **Table 3.11**.

TABLE 3.11 Aircraft Classification Number (ACN)		
Aircraft	**ACN**	**Description**
Gulfstream G350	22.8	Existing JYO Critical Aircraft
Gulfstream G-V	29.4	Existing & Future Heaviest Aircraft Operating at JYO

Source: *FAA COMFAA Computer Program*

The ACN numbers for both aircraft are less than the PCN number tabulated above. Based on these calculations, the pavements at the Leesburg Executive Airport will accommodate all existing and future forecast operations without the need for additional pavement strengthening due to aircraft weights. Additional analysis should be performed if heavier aircraft begin regular operations at JYO or the frequency of the critical aircraft increased beyond the forecast annual operations.

Airfield pavement condition is measured using the Pavement Condition Index (PCI) method. Visual inspections of sample areas of the pavement are conducted and entered into MICRO Paver software to determine the numerical PCI rating with 100 being the highest or best condition and 0 being the worst. A pavement condition survey was completed at JYO in 2015 as part of the Commonwealth of Virginia Aviation Pavement Management Update which is noted in Section 1.10.1 of this Master Plan document. The overall PCI for JYO was 71 or "satisfactory". Pavement should be reconstructed when the PCI falls below 40 and overlaid when PCI falls between 40 and 65 for runways and 40 and 60 for taxiways and aprons. The JYO PCI is projected to fall to "fair" condition by 2018 which is nearly the end of the designed 20-year useful life.

3.1.6 Runway Protection Zones

The Runway Protection Zone's (RPZ) function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZ's. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through acquisition of sufficient property interest in the RPZ. The geometrics of the RPZ vary depending upon the visibility minimums for the runway approach and the aircraft utilizing the airport as shown in **Table 3.12**. Runway 17 has an Instrument Landing System (ILS) which is considered a "precision" approach by the FAA while Runway 35 is considered a "visual" approach. However, the size of the RPZ is based on the approach visibility minimums with Runway 17 having "not lower than 1-mile" minimums and Runway 35 having "visual" minimums.

Runway 17 will continue to have precision approach capabilities in the future however; the relocation of the parallel taxiway will allow minimums as low as ¾-mile which increases the approach RPZ from 29.5 acres to 48.9 acres. This enlarged RPZ should be protected from future development via fee-simple acquisition by the Airport or restrictive easements which prohibit the construction of any structures or roads within the RPZ. Coordination with the FAA will be required to implement this larger RPZ and lower approach minimums once the parallel taxiway is relocated. Also, it is recommended that the Airport install the final two lights in the ODALS approach lighting system in order to provide standardized approach lighting. Residential development within this larger RPZ should be limited as much as possible however; this development may not prohibit the implementation of the lower approach minimums as the final determination will be made by the FAA. Battlefield Parkway is currently located within the Runway 17 RPZ however; the road has not adversely impacted the approach capabilities of this runway end. Approximately 11.4 acres of the Runway 17 Approach RPZ are located on JYO property. Runway 35 is planned to be upgraded to a "nonprecision" approach however; the existing 29.5 acre RPZ will not increase due to this upgraded approach capability.

TABLE 3.12
Approach Runway Protection Zone (RPZ) Dimensions and Design Standards

Runway	Approach Visibility Minimums	Facilities Expected to Serve	Length	Inner Width	Outer Width	RPZ Acres
Runway 17 Existing	Not Lower than 1-Mile	All Aircraft	1,700'	500'	1,010'	29.465
Runway 17 Future	Not Lower than 3/4-Mile	All Aircraft	1,700'	1,000'	1,510'	48.978
Runway 35 Existing	Visual	All Aircraft	1,700'	500'	1,010'	29.465
Runway 35 Future	Not Lower than 1-Mile	All Aircraft	1,700'	500'	1,010'	29.465

Source: *Advisory Circular 150/5300-13A, Airport Design*

The Leesburg Executive Airport also has Departure Runway Protection Zones. The departure RPZ dimensional standards are equal to or less than the approach RPZ dimensional standards and are listed in **Table 3.13**.

TABLE 3.13
Departure Runway Protection Zone (RPZ) Dimensions and Design Standards

Runway	Facilities Expected to Serve	Length	Inner Width	Outer Width	RPZ Acres
Runway 17 Existing	All Aircraft	1,700'	500’	1,010'	29.465
Runway 17 Future	All Aircraft	1,700'	500’	1,010'	29.465
Runway 35 Existing	All Aircraft	1,700'	500’	1,010'	29.465
Runway 35 Future	All Aircraft	1,700'	500’	1,010'	29.465

Source: *Advisory Circular 150/5300-13A, Airport Design*

The Airport should work to ensure that the portion of the Runway 17 RPZ located north of Battlefield Parkway (off of JYO property) remains undeveloped to the maximum extent possible in accordance with the RPZ design requirements. Fee-simple acquisition of the remaining portion of this RPZ by the Airport is recommended. This would prevent the construction of structures within the RPZ, even if they were lower than the elevation of the Part 77 approach surface and corresponding avigation easement.

3.1.7 Runway Safety Area

A Runway Safety Area (RSA) is defined as a surface surrounding the runway which is suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The dimensional standards are noted in **Table 3.14**. In addition to the dimensional standards, the RSA should conform to the following design standards:

- Graded and cleared of hazardous items or surface variations
- Drained by grading or other conveyance to prevent water accumulation
- Capable of supporting airport vehicles (maintenance, service, and rescue) and the occasional passage of aircraft under dry conditions
- Free from objects except those fixed by function. Objects greater than 3 inches in height above grade shall be frangible

TABLE 3.14
Runway Safety Area Dimensions and Design Standards

Runway	ARC	RSA Width	RSA Length Beyond Runway End	Meets Design Standards
17-35	C-II	400’	1,000’	Yes

Source: *Advisory Circular 150/5300-13A, Airport Design; Talbert & Bright analysis*

Declared distances can be used in order to publish a runway length available for takeoff, landing, or rejected takeoff that is less than the physical runway length. This option would allow the airport to meet design standards while mitigating the environmental impacts associated with a full 500' runway extension. Adding a 500' runway extension with declared distances would allow the RSA to remain in its current location on the approach end of Runway 23 and would eliminate the need to relocate a church, cemeteries, and Sycolin Road. Additional information regarding the potential use of declared distances is included in Chapter 4.

3.1.8 Runway Obstacle Free Zone

The Runway Obstacle Free Zone (OFZ) clearing standards preclude taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function. The runway OFZ, the inner-approach OFZ, the inner-transitional OFZ, and the precision OFZ comprise the airport obstacle free zones.

Runway OFZ. The runway OFZ is a defined volume of airspace centered above the runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway. Its width varies depending on the aircraft being served. At the Leesburg Executive Airport, Runway 17-35 serves aircraft weighing more than 12,500 pounds and therefore has an ROFZ width of 400 feet.

Inner-approach OFZ. The inner-approach OFZ is a defined volume of airspace centered on the approach area. The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the approach lighting system. Its width is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning. The inner-approach OFZ at the Leesburg Executive Airport only applies to Runway 17 and measures 900' in length by 400' in width. The inner-approach OFZ will need to be extended to 200' beyond the last approach light unit if the final two ODALS lights are added to Runway 17. A full approach lighting system will not be required for Runway 17 since ½-mile approach minimums are not anticipated for that runway end.

Inner-transitional OFZ. The inner-transitional OFZ is a defined volume of airspace along the sides of the ROFZ and inner-approach OFZ. It applies only to runways with lower than ¾-mile approach visibility minimums. Aircraft tails may not violate the inner-transitional OFZ. JYO does not currently have approach minimums low enough to require an inner-transitional OFZ. These minimums are not anticipated to be reduced below ¾-mile in the future and therefore, the inner-transitional OFZ does not apply to JYO.

Precision OFZ. The precision OFZ (POFZ) is a defined volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the

extended runway centerline, 200' long by 800' wide. The surface is in effect only when all of the following operational conditions are met:

- The approach includes vertical guidance.
- The reported ceiling is below 250' or visibility is less than ¾ statute mile (or Runway Visual Range (RVR) is below 4,000').
- An aircraft is on final approach within two (2) miles of the runway threshold.

When the POFZ is in effect, a wing of an aircraft holding on a taxiway waiting for runway clearance may penetrate the POFZ; however neither the fuselage nor the tail may infringe on the POFZ.

The Leesburg Executive Airport does not currently have approach minimums low enough to require a POFZ (1/2-mile visibility). However, the Airport should protect a 200' x 800' area adjacent to the approach end of Runway 17 in the event that lower minimums are obtained for the approach to Runway 17 and a POFZ is required.

3.1.9 Runway Object Free Area

The Runway Object Free Area (ROFA) is an area on the ground centered on the runway centerline provided to enhance the safety of aircraft operations by having the area free of objects except objects that need to be located in the ROFA for air navigation or aircraft maneuvering purposes. The ROFA dimensional standards are noted in **Table 3.15**.

TABLE 3.15
Runway Object Free Area Dimensions and Design Standards

Runway	ARC	Required Width	Required Length Beyond Runway End	Meets ROFA Clearing Requirements
17-35	C-II	800'	1,000'	No (762' wide, limited by existing two westernmost octagonal hangars and T-Hangar building)

Source: *Advisory Circular 150/5300-13A, Airport Design; Talbert & Bright analysis*

As noted in Table 3.15, there are three hangars (6, 7, and 9) currently located partially within the ROFA at the Airport. These hangars will be demolished once the leases expire in 2022. The aircraft housed in these hangars will be relocated to new T-Hangars which are discussed in Section 3.2.2.

A portion of airport security fencing along Battlefield Parkway is angled on the northeast corner of airport property in for the fence to remain on airport property and accommodate a future intersection. The fence cuts the corner of the ROFA by approximately 20 feet in this location. A

Modification Of Standards (MOS) may be necessary for this portion of fence since it cannot be relocated further north.

3.1.10 Runway Line of Sight

An acceptable runway profile permits any two points five feet above the runway centerline to be mutually visible for the entire runway length. However, if the runway has a full length parallel taxiway, the runway profile may be such that an unobstructed line of sight will exist from any point five feet above the runway centerline for one-half the runway length. There are no obstructions or limitations to the line of sight within the visibility zone at JYO as an object five feet above the runway can be seen from a point five feet above the runway from any two locations on the runway and therefore exceeds the requirement. No changes are required to meet runway visibility standards. The future Runway 35 end will need to be located at an elevation so that line of sight requirements are met. Also, the potential implementation of a manned or remote air traffic control tower at JYO should be located so that clear lines of sight are provided from the tower to both runway ends.

3.1.11 Runway Edge Lighting and Signage

Edge lights are used to outline usable operational areas of airports during periods of darkness and low visibility weather conditions. The Leesburg Executive Airport is currently equipped with High Intensity Runway Lights (HIRL) which can be controlled remotely via a Pilot Controlled Lighting (PCL) system. A manned or remote future air traffic control tower will require direct airfield lighting controls. Also, a separate airfield generator should be installed in order to provide backup power to the runway and taxiway lights in the event of a power failure. There is no recommended alteration to these lights other than periodic maintenance. The runway lighting system is recommended for rehabilitation in 0-5 years.

Existing airside signage consists of lighted guidance signs. These signs will require periodic maintenance but do not currently need to be replaced or upgraded. The future implementation of an air traffic control tower (manned or remote) will require alphanumeric designations for the taxiways and associated directional signage. It is recommended that taxiway designation “A1” through “A5” be applied to the connector taxiways between the runway and the parallel taxiway “A” from north to south. This same naming approach should also be allied to the proposed ultimate west-side parallel taxiway using the prefix “B”.

3.1.12 Helipad

A helipad designates a specific landing and takeoff area for helicopters. The Leesburg Executive Airport is not currently equipped with a designated helipad. The Airport is equipped with two concrete helicopter parking pads located east of the main apron. Helicopter operations at the Airport consist of aircraft approaching the runway and hover taxiing to the ramp or hangar area. For this reason and due to limited space for accommodating helipad approach and takeoff zones,

a dedicated helipad is not proposed at this time however; additional analysis should be performed as rotorcraft operations increase at the Airport.

3.1.13 Taxiway Requirements

The minimum pavement widths, curve radii, fillets, and separations associated with airplane movement areas and airplane physical characteristics establish the taxiway system. Since the taxiway system is the transitional facility, which supports airport operational capacity, the capability to maintain an average taxiing speed of at least 20 mph is recommended, which is currently met by the existing taxiways at the Airport. **Table 3.16** summarizes the taxiway dimensional standards. In addition, the taxiway safety area shall be:

- cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;
- drained by grading or storm sewers to prevent water accumulation;
- capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage for the aircraft; and
- free of objects except those that need to be located in the taxiway safety area because of their function. Objects higher than 3 inches above grade should be constructed on low impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches above grade. Other objects, such as manholes, should be constructed at grade. In no case should their height exceed 3 inches above grade.

FAA Advisory Circular 150/5300-13A also requires the use of taxiway intersections that are simple and easy to navigate. The AC states "Complex intersections increase the possibility of pilot error. The 'three-node concept' means that a pilot is presented with no more than three choices at an intersection – ideally, left, right and straight ahead." Taxiway turns should be 90 degrees wherever possible. "For intersections, standard angles (deltas) of 30, 45, 60, 90, 120, 135, and 150 degrees are preferred." The use of simple taxiway layouts can reduce the chances of incursions while enhancing the safe movement of aircraft. The taxiway intersections at JYO are set at 90 degrees and there are not "hot spots" or taxiway areas that can cause pilot confusion. All proposed taxiways will be designed to meet these standards in order to reduce the chances of incursion for taxiing aircraft.

3.1.14 Taxiway and Taxilane Object Free Areas

The taxiway and taxilane OFAs are centered on the taxiway and taxilane centerlines. The taxiway and taxilane OFA clearing standards prohibit service vehicle roads, parked airplanes, and above ground objects except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. Vehicles may operate within the OFA provided they give right of way to oncoming aircraft by either maintaining a safe distance ahead or behind the aircraft or by exiting the OFA to let the aircraft pass. The taxiway/taxilane OFAs meet FAA design standards and no modifications are necessary as listed in Table 3.16.

TABLE 3.16 Taxiway Dimensional Standards			
Item	**Taxiway Design Group 1B Dimensional Standards**	**Taxiway Design Group 2 Dimensional Standards**	**Meets Dimensional Standards**
Taxiway Width	25’	35'	Yes – meets Group 2
Taxiway Edge Safety Margin	5’	7.5'	Yes – meets Group 2
Taxiway Shoulder Width	10’	15'	Yes – meets Group 2
Item	**Airport Design Group I Dimensional Standards**	**Airport Design Group II Dimensional Standards**	**Meets Dimensional Standards**
Taxiway Centerline to Parallel Taxiway/Taxilane Centerline	70’	105'	Yes
Taxiway Centerline to Fixed or Movable Object	44.5’	65.5'	Yes
Taxilane Centerline to Parallel Taxilane Centerline	64’	97'	Yes
Taxilane Centerline to Fixed or Movable Object	39.5’	57.5'	No, taxilane east of T-Hangars #4 & #5 it is ±55’ between hangar and fence/property line (±25’ taxilane centerline to hangar and ±30’ taxilane centerline to fence)
Taxiway Wingtip Clearance	20’	26'	Yes
Taxilane Wingtip Clearance	15’	18'	No, taxilane east of T-Hangars #4 & #5 it is ±55’ between hangar and fence/property line (a 49’ wingspan results in a ±0.5’ wingtip clearance to hangar and ±5.5’ wingtip clearance to fence)
Taxiway Safety Area Width	49’	79'	Yes
Taxiway Object Free Area Width	89’	131'	Yes
Taxilane Object Free Area Width	79’	115'	No, taxilane east of T-Hangars #4 & #5 (±55’ between hangar and fence/property line)

Source: *Advisory Circular 150/5300-13A, Airport Design*

The taxilane running along the east side of T-Hangars #4 and #5 does not currently meet Group I design standards as the separation between the hangar and fence/property line is approximately 55 feet. Also, the hangar bays along the east side of these two T-Hangars should be used for the storage of small single-engine aircraft only. An FAA review of a Modification Of Standards (MOS) for the deficient taxilane to fixed or moveable object separation requirement was recently denied. There are three options for meeting the taxilane standard, acquire additional airport property and remove the terrain and vegetation to accommodate the clearance standard, relocate the T-hangars to meet the standard, or restrict access to these hangars to aircraft with smaller wingspans only.

It is recommended that access between T-Hangars #4 and #5 and the airport property line/fence should be limited to aircraft with a wingspan of 29' or less. The taxilane object free area is 1.2 times the wingspan plus 20'. Therefore a 29' wingspan or less would still have the required taxiway clearance.

The existing runway/taxiway separation is discussed in detail in Section 3.1.16. The existing parallel taxiway should be relocated towards the east in order to meet the 300 foot FAA separation standard for reference code C-II airports.

3.1.15 Parallel Taxiways

A basic airport consists of a runway with a full-length parallel taxiway, an apron, and connecting transverse taxiways between the runway, parallel taxiway, and the apron. The Airport currently has a 35'-wide full parallel taxiway system connecting each end of the 5,500' runway. This taxiway is connected to the runway via five stub taxiways and to the terminal and hangar areas via eight stub taxiways. Future expansion or enhancements to the parallel taxiway system should incorporate the Group II design standards depicted in Table 3.16.

Connector taxiways should permit free flow to the parallel taxiway. The location of connector taxiways depends on the mix of aircraft, approach and touchdown speeds, point of touchdown, exit speed, rate of deceleration, dry or wet pavement, and number of exits. Connector taxiways are located roughly 2,000' and 1,500' from the Runway 17 and 35 thresholds respectively at the Leesburg Executive Airport. There is also an additional connector taxiway located approximately 2,300' from the end of Runway 35. The existing parallel taxiway should be extended by 500' to coincide with the proposed 500' runway extension towards the south. No additional connector taxiways are needed at this time.

3.1.16 Runway to Taxiway Separation

Runway to taxiway separation standards are predicated on the Airport Reference Code (ARC), on the airport facility, and the existing/future visibility minimums expected. The higher the ARC and the lower the visibility minimums, the greater the runway to taxiway separation distances. The existing and proposed runway approach visibility minimums are listed below.

- Runway 17 Existing – Not lower than 1-mile

- Runway 17 Proposed – Not lower than ¾-mile
- Runway 35 Existing – Visual
- Runway 35 Proposed – Not lower than 1-mile

For airports with an ARC of C-II and runways with precision instrument approach visibility minimums, FAA AC 150-5300-13A recommends a 400 foot separation between the runway and taxiway with approach visibility minimums lower than ¾-mile. A 300 foot separation is required for C-II Airport such as JYO with visibility minimums greater than or equal to ¾-mile. The existing parallel taxiway centerline at JYO is 263 feet from the runway centerline. This taxiway should be relocated in Phase I of the Airport Development Plan so that it is 300 feet from the runway centerline. Relocating the taxiway to accommodate a 400 foot separation would require substantial redevelopment of the existing airfield including the removal of aprons and taxiways and is therefore not recommended. This separation distance is the limiting factor which will determine the ultimate approach capabilities for JYO. Any future parallel taxiways on the west side of the Airport should be constructed at least 300 feet from the runway centerline.

The FAA AC also identifies minimum separation requirements between the runway and taxiway centerlines and aircraft parking areas. The existing and proposed runway centerline to parking separation distance is 400 feet while the existing and proposed taxiway to aircraft parking distance is 65.5 feet.

3.1.17 Taxiway Edge Lighting and Signage

The taxiway edge lighting system is a configuration of lights that define the lateral and longitudinal limits of usable taxiway. Taxiway signage provides the airport users with guidance information for taxiing destinations and to assist in taxi route decision making upon exiting the apron area. The Leesburg Executive Airport is currently equipped with Medium Intensity Taxiway Lighting (MITL) and lighted taxiway signs. Future taxiways at the Airport should be equipped with LED MITLs due to their efficiency and longer useful life. Also, the existing taxiway lights along the parallel taxiway will need to be replaced once that taxiway is shifted in order to meet the runway to taxiway separation requirements. The taxiway lights and associated cabling are reaching the end of their useful life and require increased maintenance and should be replaced when the taxiway is relocated.

The future implementation of an air traffic control tower (manned or remote) will require alphanumeric designations for the taxiways and associated directional signage. It is recommended that taxiway designation “A1” through “A5” be applied to the connector taxiways between the runway and the parallel taxiway “A” from north to south. This same naming approach should also be allied to the proposed ultimate west-side parallel taxiway using the prefix “B”.

3.1.18 Building Restriction Line

The Building Restriction Line is line depicted on the Airport Layout Plan that identifies suitable and unsuitable locations for buildings on airports. FAA AC 150/5300-13A states: "The BRL should be set beyond the Runway Protection Zones (RPZs), the Obstacle Free Zones (OFZs), the Object Free Areas (OFAs), the runway visibility zone, NAVAID critical areas, areas required for TERPS, and ATCT clear line of sight (LOS)". The BRL at JYO is collocated with the Runway Object Free Area.

The Airport is also equipped with a remote air traffic control tower with 360-degree cameras mounted on a tower on the terminal building. The tower height and location were established so that there is a clear line-of-sight from the cameras to both runway ends, the parallel taxiway, and the airport aircraft traffic pattern. All of the proposed hangars at JYO have been sighted so that they are outside of the BRL and will not obstruct the line-of-sight from the cameras to the airport movement areas listed above.

3.1.19 Taxilane System

The taxilanes, having access from the apron and taxiway system to hangar and ramp areas, should be designed in accordance with the future ARC (C-II) standards as specified in FAA Advisory Circular 150/5300-13A, *Airport Design*. The taxilane strength should be commensurate with aircraft usage as needed between the airfield and associated hangar/ramp maneuvering areas. Hangar taxilanes should be of sufficient width to allow unencumbered wingtip clearance between fixed objects (hangars, fence, fueling facilities, light poles, etc.).

The taxilanes at the Leesburg Executive Airport are used for aircraft maneuvering from the taxiways to and from the hangars and apron areas. Taxilanes should be sized to accommodate aircraft stored in the hangars that they provide access to. For example, taxilanes providing access to larger hangars that can accommodate Group II aircraft should be designed to meet the Group II taxilane dimensional standards. Taxilanes accessing the T-Hangars should be designed to Group I standards as these hangars are used to store smaller aircraft. All taxilanes at JYO meet FAA design standards with the exception of the taxilane along the east side of T-Hangars #4 and #5. The existing tree line should be removed in order to accommodate a Group I taxilane object free area in this location. There are no other modifications or improvements required at this time to the taxilane network at the Leesburg Executive Airport.

3.1.20 Airfield Facility Requirements Summary

The following bullets along with **Table 3.17** summarize the planned runway design parameters given the existing and future runway approach visibility minimums.

- **Existing Runway 17-35**
  - Runway 17 Approach Visibility Minimums = Not lower than 1-mile
  - Runway 35 Approach Visibility Minimums = Visual

- **Future Runway 17-35**
  - Runway 17 Approach Visibility Minimums = Not lower than ¾-mile
  - Runway 35 Approach Visibility Minimums = Not lower than 1-mile

TABLE 3.17
Runway Design Parameters

Runway Design Factors	Existing (ARC C-II) Approach Visibility Minimums Not Lower than 1-mile	Future (ARC C-II) Approach Visibility Minimums Not Lower than ¾-mile
Runway Designation	17 & 35	17 & 35
Runway Length	5,500’	6,000’
Runway Width	100’	100’
Runway Crosswind Coverage (16 knots – All Weather)	99.63%	99.63%
Runway Strength Single Wheel Gear: Double Wheel Gear: PCN: ACN:	 30,000 lbs. 70,000 lbs. 62.7 22.8	 30,000 lbs. 70,000 lbs. 62.7 29.4
Runway Line of Sight	Full runway length	Full runway length
Runway Safety Area (RSA) RSA width: RSA length beyond runway end:	 400’ 1,000’	 400’ 1,000’
Object Free Area (OFA) OFA width: OFA length beyond runway end:	 762’ 1,000’	 800’ 1,000’
Runway Obstacle Free Zone (ROFZ)	400’ wide, 200’ beyond runway end	400’ wide, 200’ beyond runway end
Inner-Approach Obstacle Free Zone	400’ wide, 900’ long (Runway 17)	400’ wide, 1,700’ long (Runway 17)
Precision Obstacle Free Zone	none	800’ wide, 200’ long (Runway 17 if 1/2-mile minimums are obtained)
Building Restriction Line (BRL)	400’ from centerline (coincides with ROFA) 21’ Structure	400’ from centerline (coincides with ROFA) 21’ Structure

TABLE 3.17 Runway Design Parameters		
Runway Design Factors	**Existing (ARC C-II) Approach Visibility Minimums Not Lower than 1-mile**	**Future (ARC C-II) Approach Visibility Minimums Not Lower than ¾-mile**
Approach Runway Protection Zone (RPZ) Inner width: Length: Outer width: RPZ Size (Acres):	RWY 17 / RWY 35 500' / 500' 1,700' /1,700' 1,010' / 1,010' 29.465 acres / 29.465 acres	RWY 17 / RWY 35 1,000' / 500' 1,700' /1,700' 1,510' / 1,010' 48.9 acres / 29.465 acres
Departure Runway Protection Zone (RPZ) Inner width: Length: Outer width: RPZ Size (Acres);	RWY 17 / RWY 35 500' / 500' 1,700' /1,700' 1,010' / 1,010' 29.465 acres / 29.465 acres	RWY 17 / RWY 35 500' / 500' 1,700' /1,700' 1,010' / 1,010' 29.465 acres / 29.465 acres
Taxiway width	35'	35'
Runway to Taxiway Distance **Runway to Parking Distance** **Taxiway to Parking Distance**	263' 400' 65.5'	300' 400' 65.5'

Source: *FAA Advisory Circular 150/5300-13A, Airport Design*

3.2 AIRCRAFT PARKING AND STORAGE REQUIREMENTS

This section identifies airfield facilities needed to satisfy the 20-year forecast of aviation demand at the Leesburg Executive Airport. The identification of needed facilities does not constitute a requirement in terms of absolute design standards or goals, but rather an option for facility improvements to resolve various types of facility or operational inadequacies, or to make improvements as demand warrants. The facilities recommended as part of this Master Plan Update have been identified from inventory and forecast findings, and planned in accordance with FAA/DOAV airport design standards and airspace criteria.

The following analysis addresses various types of airport airside facilities including aircraft storage, aprons, fueling facilities, electrical vault, maintenance equipment storage, and fencing. The runway length has been addressed as part of the Demand/Capacity study and is thus not

included in the following analysis. FAA and DOAV accepted facility requirement parameters were used in developing this analysis.

3.2.1 Aircraft Storage

General aviation aircraft parking and storage requirements can vary widely from airport to airport depending on the number of transient aircraft using the airport and the number of based aircraft owners who chose to tie down their aircraft on the ramp versus those who choose to use available hangar space. **Table 3.18** lists the existing storage percentages at the Leesburg Executive Airport by aircraft type.

TABLE 3.18
Based Aircraft Storage Ratios
(2016 Based Aircraft Distribution)

Aircraft Types	Apron Tiedowns	T-Hangars	Conventional Hangars	Total
Single-Engine Piston	40% (78 aircraft)	40% (78 aircraft)	20% (38 aircraft)	**100% (194 aircraft)**
Multi-Engine Piston	20% (6 aircraft)	50% (16 aircraft)	30% (9 aircraft)	**100% (31 aircraft)**
Turboprop	0% (0 aircraft)	0% (0 aircraft)	100% (12 aircraft)	**100% (12 aircraft)**
Jet	0% (0 aircraft)	0% (0 aircraft)	100% (7 aircraft)	**100% (7 aircraft)**
Rotorcraft (Helicopters)	0% (0 aircraft)	0% (0 aircraft)	100% (5 aircraft)	**100% (5 aircraft)**

Source: *Talbert & Bright analysis*

3.2.2 T-Hangar Storage

General aviation airports typically utilize T-Hangars as covered storage for small general aviation aircraft. Roughly 40 percent of single-engine and 50 percent of multi-engine piston based aircraft are currently stored in T-Hangars at JYO. Based on this ratio, a total of 152 T-Hangar units will be required at JYO by 2036 to accommodate based aircraft. There are currently six T-Hangar buildings and three condo hangars consisting of 96 total T-Hangar units at JYO (152-96=56 new T-Hangar units required over the next 20 years to meet future demand). However, 34 existing T-Hangar units and condo hangars at JYO will be demolished by 2022 in order to accommodate the relocated parallel taxiway and to remove these structures from falling within the Runway Object Free Area. Therefore, 90 (56+34) new T-Hangar units or condo hangars will need to be constructed at JYO over the next 20 years. Development of the west-side of the airfield will be required to accommodate all of the additional hangars. Also this future T-Hangar requirement accounts for the recent trend of growing interest in T-Hangar storage as

opposed to apron storage. As more T-Hangars become available on the airfield, more based aircraft will likely move from being stored on the apron to T-Hangars.

The Airport is also planning to construct approximately 26 T-Hangar units in FY 2021 in order to replace the T-Hangar and condo hangar units that will be lost. It should also be noted that the future T-Hangar storage requirements are proportional to the FAA based aircraft forecasts. This forecast represents the "high" scenario and may not be realistic given the predicted ongoing trend in a shrinking single-engine aircraft fleet in the U.S. The exact number of hangar units and development timing will be dependent upon airport user demand. Also, JYO has finite space available for future hangar development. It is possible that the amount of available space will dictate future hangar levels, especially near the end of the 20-year planning period.

TABLE 3.19
T-Hangar Aircraft Storage Requirements
(Existing T-Hangar Units: 96)

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Transient Aircraft Storage	Total
2017	83	16	0	0	0	1	**100**
2022	91	17	0	0	0	1	**109**
2027	101	19	0	0	0	1	**121**
2036	129	21	0	0	0	2	**152**

Source: *Talbert & Bright analysis*

3.2.3 Conventional Hangar Storage

Conventional hangars represent the other most common method of covered aircraft storage. The following represents the DOAV accepted calculations for conventional hangar storage:

- Single-Engine – 850 square feet
- Multi-Engine – 1,200 square feet
- Turboprop – 1,700 square feet
- Jet – 2,900 square feet
- Helicopter – 1,500 square feet

The existing conventional hangar storage area at JYO totals 127,620 square feet. Roughly 20 percent of the single-engine aircraft are stored in conventional hangars while 30 percent of multi-engine aircraft are stored in these same hangars. All of the turboprop, jet, and helicopters are stored in conventional hangars due to the value of these aircraft. Approximately 198,000 square feet of conventional hangar storage will be needed by 2036 for based aircraft storage as shown in **Table 3.20**. This recommended hangar square footage accounts for transient aircraft storage as well as aircraft maintenance operations.

TABLE 3.20 Conventional Hangar Aircraft Storage Requirements (square feet) (Existing Total Conventional Hangar Space: 127,620 sf)							
Year	Based Aircraft Storage					Transient Aircraft Storage	Total
	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter		
2017	35,340	11,358	21,112	22,323	8,175	7,009	**105,318**
2022	38,811	12,348	24,674	32,437	11,550	8,058	**127,877**
2027	42,962	13,338	28,235	42,550	14,925	9,010	**151,020**
2036	54,701	15,084	34,646	60,755	21,000	11,482	**197,667**

Source: *Talbert & Bright analysis*

3.2.4 Apron Area

Apron areas are used for outside aircraft storage. The remaining 40 percent of single-engine and 20 percent of multi-engine based aircraft are stored on these apron areas. The following represents the DOAV accepted calculations for apron area storage:

- Single-Engine – 870 square yards
- Multi-Engine – 960 square yards
- Turboprop – 1,730 square yards
- Jet – 2,540 square yards

These calculations account for the ingress and egress of aircraft to and from the apron parking spaces. However, current JYO apron utilization rates indicate that aircraft are using approximately 70% of the space requirements identified by DOAV above. Therefore, the total apron areas have been adjusted to reflect this current utilization rate. The existing apron areas at JYO total roughly 67,912 square yards. Approximately 150,000 total square yards of apron space will be needed by 2036 to accommodate based and transient aircraft. This results in an additional 81,700 square yards of apron space required for based and transient aircraft by 2036 as shown in **Table 3.21**.

TABLE 3.21 Aircraft Apron Storage Requirements (square yards) (Existing Total Apron Space: 67,912 sy)							
Year	Based Aircraft Storage					Transient Aircraft Storage	Total
	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter		
2017	72,343	6,058	0	0	0	18,665	**97,066**
2022	79,449	6,586	0	0	0	21,205	**107,240**
2027	87,946	7,114	0	0	0	23,711	**118,771**
2036	111,976	8,045	0	0	0	29,588	**149,609**

Source: *Talbert & Bright analysis*

3.2.5 Transient Aircraft Storage

Transient aircraft parking requirements typically make up the largest demand for apron space. Transient aircraft are defined as those aircraft not based at JYO. **Table 3.22** lists the current transient aircraft storage ratios. These percentages were used to calculate the total aircraft storage areas required to meet the forecast demand over the 20-year planning period. Transient aircraft storage needs are calculated based on the peak number of transient flights which may occur on a given day. The forecast peaking operations (Table 2.10) are used to determine the approximate number of transient aircraft by type. The peak hour forecast operations were subdivided by the ratios of operations by each aircraft type. The number of peak transient aircraft id also depicted in Table 3.22. These numbers were then used to calculate the transient hangar and apron area needs using the same DOAV space requirements listed above for based aircraft.

TABLE 3.22
Transient Aircraft Storage Ratios

Aircraft Types	Apron Tiedowns	T-Hangars	Conventional Hangars
Single Engine Piston	80%	0%	20%
Multi Engine Piston	80%	0%	20%
Multi Engine Turbine	70%	0%	30%
Business Jet	70%	0%	30%
Rotorcraft	60%	0%	40%

Peak Number of Transient Aircraft

Aircraft Types	2017	2022	2027	2036	2017	2022	2027	2036	2017	2022	2027	2036
Single Engine Piston	8	9	10	12	0	0	0	0	2	2	2	3
Multi Engine Piston	1	2	2	2	0	0	0	0	0	0	0	1
Multi Engine Turbine	2	3	3	4	0	0	0	0	1	1	1	2
Business Jet	2	2	3	3	0	0	0	0	1	1	1	2
Rotorcraft	0	1	1	1	0	0	0	0	0	0	0	0

Source: *Talbert & Bright analysis*

Table 3.23 lists the total aircraft storage requirements (based and transient aircraft) for the 20-year planning period.

TABLE 3.23 Total Aircraft Storage Requirements				
Facility	**Existing**	**Phase 1 Short-Term (2017-2021)**	**Phase 2 Mid-Term (2022-2026)**	**Phase 3 Long-Term (2027-2036)**
T-Hangar Units	96	109	121	152
Conventional Hangar (sf)	127,620 sf	127,877 sf	151,020 sf	197,667 sf
Total Apron Area (sy)	67,912 sy	107,240 sy	118,771 sy	149,609 sy

Source: *Talbert & Bright analysis*

3.3 AIRPORT ANCILLARY FACILITY REQUIREMENTS

3.3.1 Fueling Facilities

Table 3.24 lists the existing fueling facilities at the Airport. The Airport has experienced steady growth in AvGas and Jet A sales in recent years and the FBO has expressed an interest in providing self-serve AvGas fueling capabilities.

TABLE 3.24 JYO Fuel Storage Tanks			
Tank Number	**Size (gal)**	**Single / Double Wall**	**Contents**
AST1	12,000	Double	100LL (Avgas)
AST2	15,000	Double	Jet A
AST3 (not currently in use)	15,000	Double	Jet A
N/A	500	Single	Diesel
N/A	300	Single	Used Oil

Source:http://www.deq.state.va.us/Programs/LandProtectionRevitalization/PetroleumProgram/FilesForms.aspx#petdbf*, accessed 19 November 2015*

The fuel farm meets Environmental Protection Agency (EPA) containment requirements and is in good condition. An additional 12,000 to 15,000 gallon AvGas tank may be required to meet demand over the 20-year planning period. This will allow the Airport to continue to serve piston powered aircraft without fuel supply interruptions or the need for more frequent fuel deliveries. The area adjacent to the existing fuel farm should be reserved for a future additional tank.

There is gravel over cement treated asphalt surrounding the fuel farm which is in poor condition. It is recommended that this area be paved in Phase I (0-5 years) in order to provide a stabilized access for fueling trucks. Also, the existing fuel farm containment area is in poor condition and will require reconstruction in Phase I in order to extend the useful life of this facility.

The Airport does not currently offer a self-fueling option for pilots operating reciprocating-engine aircraft. A small AvGas storage tank and associated self-service fueling system is recommended for installation in Phase I. This system should include a payment terminal and will allow pilots to refuel 24 hours a day. This tank should be located near the existing fuel farm and in a location that does not interfere with the existing storage and flow of taxiing aircraft.

3.3.2 Airport Electrical Vault

The airfield electrical vault is located between the Hexagon Hangars and the Terminal building on the east side of the Airport. This vault provides three-phase power to the airfield is in good condition. No changes to this equipment are needed at this time however, as additional facilities are constructed at the Airport, upgrades to the electrical vault should be considered.

3.3.3 Airfield Maintenance Equipment Storage Facilities

The airport currently has various pieces of airfield maintenance equipment including vehicles, tractors, mowing decks, and snow removal equipment. The Airport does not have a dedicated maintenance / equipment storage building however, the end units of two T-Hangar buildings are used for this purpose. A dedicated airfield maintenance storage facility should be constructed at JYO in order for this equipment to be stored out of the elements and properly maintained. A 2,000 sf to 3,000 sf facility with two roll-up garage doors is recommended.

3.3.4 Perimeter Fencing

Perimeter fencing is crucial to the prevention of animal and human incursion on aircraft operating areas. The Leesburg Executive Airport has completed the installation of a 10-foot security perimeter fence around the entire airport property with the exception of a 1,400’ section of field fencing along the east side of the Airport near Miller Drive. This 1,400’ section of fence should be upgraded to an 8-foot chain link fence with three strands of barbed wire. The existing 4-foot fence in this location falls within the taxilane object free area (79’ wide) for the taxilane between T-Hangar #5 and the airport property line. A Modification Of Standards (MOS) to address this condition was denied by the FAA. Therefore, it is recommended to limit access to the east side of T-Hangars #4 & #5 to aircraft with wingspans of 29’ or less in order to allow for the taxiway object free area safety margin.

The airport fence should be realigned as necessary so that the airfield remains secure when additional facilities such as hangars are constructed. The condition of the fence is good but it may require periodic maintenance during the planning period.

3.4 AIRSPACE AND NAVAID REQUIREMENTS

It is important to analyze the existing airspace surrounding the Leesburg Executive Airport and how it impacts aircraft approaching or departing from the Airport. It is also important to identify existing and potential obstructions to the airspace surfaces in the immediate vicinity of the Airport. This section discusses the airspace around the Airport from both perspectives.

In 2010, the Virginia Department of Aviation released a study which identifies the future NAVAID requirements for all airports in Virginia. The results of this study are shown in **Table 3.25** and discussed in the following sections.

TABLE 3.25
DOAV Recommended NAVAID Improvements for JYO

Proposed Improvement	Expected Benefit	Recommendation
General		
Weather Reporting - Upgrade existing AWOS-III to include freezing rain sensor.	Improves information available to pilot.	Recommended – Phase I
Communications - Install sign with Clearance Delivery Frequency and Phone Number at apron and each runway end hold position.	Improves pilot/controller communications and clearance delivery process.	Recommended if ATCT not installed – Phase I
Data link - Provide ADS-B coverage while on the ground.	Provides traffic surveillance, terrain avoidance, weather data, etc. Crucial component for Next Generation Air Transportation System.	Remote ADS-B receiver recommended for FBO, flight planning offices – Phase I
Runway 17		
Approach Lighting System - Upgrade nonstandard Runway 17 ODALS to MALSR.	Improves pilot's ability to detect the landing environment.	Not Recommended due to cost and inability to meet ½-mile runway-taxiway separation standards. Recommended completion of RWY 17 ODALS – Phase I
Visibility Minimum - Upon installation of approach lighting system and subsequent acceptance of visibility credit (1 sm to 3/4 sm), different design standards apply (less than 1 mile).	Lower landing visibility minimum.	Recommended with completion of RWY 17 ODALS – Phase I
Runway 35		

Approach Lighting System - Install MALS for Runway 35.	Improves pilot's ability to detect the landing environment.	Not Recommended due to cost. Recommend ODALS if nonprecision approach is developed for RWY 35.
New Procedure - Request development of RNAV (GPS) RWY 35 Approach with LPV and LNAV landing minimums. Procedure may be designed to align with runway centerline or parallel to IAD traffic flow.	Improve all-weather capability of the runway and airport and eliminate requirement for circle to-land operations.	Recommended with removal of tree obstructions to RWY 35 – Phase I

Source: *Virginia Department of Aviation, 2010 Virginia Airports NAVAID Study.*

The specific recommendations for both runway ends include developing new instrument approach procedures once the required approach lighting systems are installed. However, as noted in the recommendation, the lower approach visibility minimums will increase the separation and design standards for the airfield. These recommendations represent ideal airport enhancement which may not be practical or obtainable.

3.4.1 Airspace Capacity

As discussed in the Inventory Chapter of this document, the Leesburg Executive Airport lies within Class G airspace and under Washington Dulles International Airport Class B airspace. The Airport lies within a relatively congested area of airspace. A large number of commercial flights transition through the immediate airspace surrounding the Leesburg Executive Airport due to the proximity of Washington Dulles International Airport. Future approach requirements for the Airport should be closely coordinated with the FAA to ensure that surrounding air traffic does not adversely impact operations at JYO.

The permanent installation of a manned or remote air traffic control tower at JYO will require a change in the airspace designation around the Airport. The existing Class G airspace would become Class D airspace, centered on JYO with a radius of two nautical miles and a top elevation of 2,500 feet above the airport elevation. Aircraft operating at or flying over (below 2,500 feet) would be required to communicate with and receive clearance from the ATCT during the tower's operational hours. Student pilots are allowed to operate in Class D airspace and no adverse impact is anticipated with this potential future change. It would likely increase the safe operation of aircraft in this congested area of airspace.

JYO is located within the boundaries of the Washington DC Metropolitan "Special Flight Rules Area" (SFRA), formerly known as the Air Defense Identification Zone (ADIZ). IFR flights are handled in normal operating procedures; however, VFR procedures specific to JYO must comply with the current SFRA Notice to Airmen[1] (NOTAM). Also, the proximity of Dulles International Airport airspace limits the future potential for the creation of a precision approach to Runway 35

[1] *http://www.leesburgva.gov/home/showdocument?id=223, accessed 19 November 2015*

at JYO. Aircraft using a precision approach to Runway 35 would likely conflict with takeoff and landings at Dulles. However, preliminary discussions with the FAA have indicated that a non-precision approach may be possible for this runway end. Therefore, the ALP has been revised to reflect a future 34:1 non-precision approach to Runway 35. The airspace, land use, and associated Runway Protection Zone should be protected on both runway ends for the future decrease in approach visibility minimums to 3/4-mile. Also, the implementation of any towers near the Airport should be coordinated with the FAA for an airspace analysis.

3.4.2 Instrument Landing System

As discussed in the Inventory Chapter, the Leesburg Executive Airport is equipped with a Category I Instrument Landing System (ILS) approach to Runway 17 with horizontal and vertical guidance and visibility minimums as low as 1-mile. A ¾-mile visibility approach minimum is recommended for this runway end in the future which will allow the Airport to accommodate aircraft when visibility minimums fall between ¾-mile and 1-mile.

3.4.3 Visual Guidance Lighting System

The Precision Approach Path Indicator (PAPI) is a lighted instrument that provides electronic visual guidance to the pilot to allow vertical guidance to the runway end. The PAPI provides accurate guidance with one set of lights which indicate different slopes: above, on course, or below the glide slope. It is recommended that PAPIs be installed on each end of an instrument runway or where maintaining vertical guidance is necessary (such as over populated areas). Four-box PAPIs are currently installed at either end of Runway 17-35 at the Leesburg Executive Airport. An obstruction clearance plane is required for PAPIs. This surface extends 4 nautical miles from the runway touchdown point at a slope of 1° 50' which is 1 degree less than the lowest on-course aiming angle of 2° 50'. No improvements are needed for the existing PAPIs at the Airport other than periodic maintenance.

The Leesburg Executive Airport is also equipped with an Omnidirectional Approach Lighting System (ODALS) on the approach end of Runway 17. This system assists pilots in determining the centerline of the runway and is recommended for nonprecision approaches with ¾-mile visibility minimums. The system consists of five light sequenced white flashing lights in line with the runway and two Runway End Identifier Lights (REILs) located at the outer corners of the approach end of the runway. The existing ODALS at JYO consist of three in line lights which is considered nonstandard. It is recommended that the missing two lights be added to the Runway 17 ODALS in Phase I of the Airport Development Plan. Also the installation of ODALS is recommended for Runway 35 if a nonprecision approach can be developed by the FAA for this runway end in the future.

3.4.4 Automated Weather Observing System

The Leesburg Executive Airport is currently equipped with an Automated Weather Observing System AWOS-III-PT system. This system has the standard features of an AWOS-III plus the

capability of present weather reporting and lightning detection information. It is recommended that a freezing rain sensor be added to the existing JYO AWOS. This will allow pilots to better determine the presence of icing in the vicinity of the Airport. This system is expected to accommodate the forecast weather information demand for the 20-year planning period.

3.5 TERMINAL, AUTO PARKING, AND ACCESS REQUIREMENTS

This section identifies landside facilities needed to satisfy the 20-year forecast of aviation demand at the Leesburg Executive Airport. The identification of needed facilities does not constitute a requirement in terms of absolute design standards or goals, but rather an option for facility improvements to resolve various types of facility or operational inadequacies, or to make improvements as demand warrants. The facilities recommended as part of this Master Plan Update have been identified from inventory and forecast findings, and planned in accordance with FAA/DOAV airport design standards.

3.5.1 Terminal Building

The airport terminal facility serves as the focal point of an airport and represents the front-door to the community for arriving passengers. The existing terminal building at the Leesburg Executive Airport was constructed in 2004 and provides 18,339 square feet of space for passengers, pilots, the FBO operations, as well as airport administrative offices. Approximately 5,554 square feet of terminal space is designated for tenant leases. The 2016 VATSP plan identifies a need for an 8,362 square foot terminal building at JYO. The existing terminal exceeds this size and no terminal expansion is required over the 20-year planning period. However, the development of the west side of airport property will likely justify the development of a separate/new terminal facility to meet accommodate future transient operations. This would allow for these operations without requiring aircraft to taxi across an active runway to reposition from the east to west ramp and vice versa.

3.5.2 Auto Parking

An adequate number of auto parking spaces should be provided for airport employees, tenants, and the general public that use the airport facilities. There are currently 245 auto parking spaces at the Airport which are located in four separate lots. These lots are approximately 75% occupied at any given time. The number of parking spaces required is projected to increase proportionally to based aircraft at JYO. With this ratio applied to the preferred based aircraft forecast, a total of roughly 309 spaces will be needed by 2036, as shown in **Table 3.26**.

TABLE 3.26 Auto Parking Space Requirements				
Facility	**Existing**	**Phase 1 Short-Term (2017-2021)**	**Phase 2 Mid-Term (2022-2026)**	**Phase 3 Long-Term (2027-2036)**
Auto Parking Spaces	245	218	244	309

Source: *Talbert & Bright analysis*

3.5.3 Airport Access

Access to the Airport terminal is provided via Sycolin Road to the east of the Airport. A two-lane connector road links the terminal parking lot and the ProJet hangars with Sycolin Road. Access to the fuel farm on the south end of the Airport is also available from Sycolin Road. Miller Drive runs along the northeast side of the Airport and provides automobile access to the north T-Hangars and Corporate Hangar 10 located at midfield.

To the west of the Airport is Virginia State Route 267 (Dulles Greenway), a 14-mile toll road that connects JYO to Washington Dulles International (IAD) Airport. To the east is Virginia State Route 643 (Sycolin Road) which leads to the Town of Leesburg to the north. The Airport is located 25 miles west of Interstate 495 "Beltway" and 18 miles north of Interstate 66 via Route 15. The existing roadway network provides the Airport with excellent access to major north-south and east-west thoroughfares.

The proposed north hangar development area will be accessed via the old Tolbert Lane which connects directly to Sycolin Road. Access from Tolbert Lane would eliminate the need for an additional entrance to airport property from Sycolin Road and allow for the development of an auto parking lot adjacent to the proposed hangars.

The northern portion of Compass Creek Parkway is currently under construction immediately west of airport property and will ultimately connect Battlefield Parkway to the north with the proposed Crosstrail Boulevard to the south. There will be one exit ramp from the Dulles Greenway to Compass Creek Parkway (but no entrance ramp from Compass Creek Parkway to the Dulles Greenway). Crosstrail Boulevard is currently under construction east of the airport between Sycolin Road and Kincaid Boulevard. Eventually Crosstrail Boulevard will extend further east to Route 7, and further west to an intersection with future Compass Creek Parkway.

Proposed airport development west of the runway will require vehicular access from this proposed roadway. One to two entrances along this proposed roadway will accommodate the airport vehicular traffic and allow direct access to the Dulles Greenway.

3.6 FACILITY REQUIREMENTS SUMMARY

Table 3.27 summarizes the Facility Requirements for the Leesburg Executive Airport and lists the phases which various facilities will be needed as driven by demand. The aircraft storage facilities such as hangars and aprons are directly proportional to the FAA forecast growth in based aircraft at JYO. The exact size and development timing will be dependent upon actual growth in JYO activity as well as localized demand for these additional facilities.

TABLE 3.27
Facility Requirements Summary

Facility	Existing	Phase 1 Short-Term (2017-2021)	Phase 2 Mid-Term (2022-2026)	Phase 3 Long-Term (2027-2036)
Runway	5,500' x 100'	5,500' x 100'	Extend Runway 500' (6,000' x 100')	6,000' x 100'
Runway Lighting	HIRL	HIRL	HIRL	HIRL
NAVAIDs	ILS, GPS	ILS, GPS	ILS, GPS	ILS, GPS
Approach Lighting	Partial ODALS, PAPI, REILs	Full ODALS, PAPI, REILs	Full ODALS, PAPI, REILs	Full ODALS, PAPI, REILs
Taxiway	Full-Parallel	Relocate Existing Full-Parallel	Construct West-Side Connector	Construct West-Side Full-Parallel
Taxiway Lighting	MITL	MITL	MITL	MITL
T-Hangar Units	96	109	121	152
Conventional Hangar (sf)	127,620 sf	127,877 sf	151,020 sf	197,667 sf
Total Apron Area (sy)	67,912 sy	107,240 sy	118,771 sy	149,609 sy
Total Auto Parking Spaces	245	218	244	309
GA Terminal (sf)	18,339 sf	-	-	-
Fueling Facility	AvGas & Jet A tanks	-	-	Additional 12,000 gallon AvGas tank
Security Fencing	Airport Property (minus 1,400' on east side)	Full 8' fence around perimeter	-	-
Airfield Maintenance Storage Facility	T-Hangar end units	New 2,100 sf facility	-	-
Airport Access	Via Sycolin Rd.	Via Sycolin Rd, & Tolbert Ln.	Via Sycolin Rd, & Tolbert Ln.	Via Sycolin Rd, & Tolbert Ln. & Compass Creek Pkwy.

Source: *Talbert & Bright analysis*

4.0 DEVELOPMENT ALTERNATIVES

The next step in the master plan process is to develop and evaluate various airport alternatives which allow the Airport to meet the projected demand identified in the Demand/Capacity and Facility Requirements chapter of this study. The facility requirements were developed from the Federal Aviation Administration (FAA) and Virginia Department of Aviation (DOAV) approved forecasts of aviation demand as discussed in Chapter 2.

The Leesburg Executive Airport has experienced steady growth in based aircraft and annual operations over the past 20 years. The development alternatives discussed in this Chapter reflect that growth and the anticipated demand for future airport facilities and infrastructure. The primary facility additions to the Airport include a 500' runway extension, taxiway relocation, and additional hangars and aprons.

Various development alternatives for each type of airport infrastructure have been developed as part of this Master Plan Update. The primary differences between these alternatives relate to the approach for accommodating demand for each airport facility type. For example, the Facility Requirements Chapter identified a need for a 500' runway extension. The runway alternatives discussed below identify different ways that the Airport can accommodate this facility need. A preferred alternative is then recommended for each airport facility type.

4.1 RUNWAY ALTERNATIVES

The current ALP reflects a 500' future runway extension towards the south. This is the only practical option for extending the runway as Battlefield Parkway immediately north of JYO prohibits an extension in that direction. Therefore, it is recommended to keep the proposed 500' runway extension on the ALP as it is currently shown towards the south. Aircraft that would benefit from this proposed runway extension currently operate less than 500 operations annually and 500 annual operations is the minimum requirement to be considered the "critical aircraft" by the FAA. However, this extension should remain in Phase II of the proposed development timeline so that a minimal number of jet operations are adversely affected by the current 5,500' runway length as operations by these aircraft are forecast to increase at JYO over the next ten years. These forecasts are discussed in detail in Chapter 2 of this study.

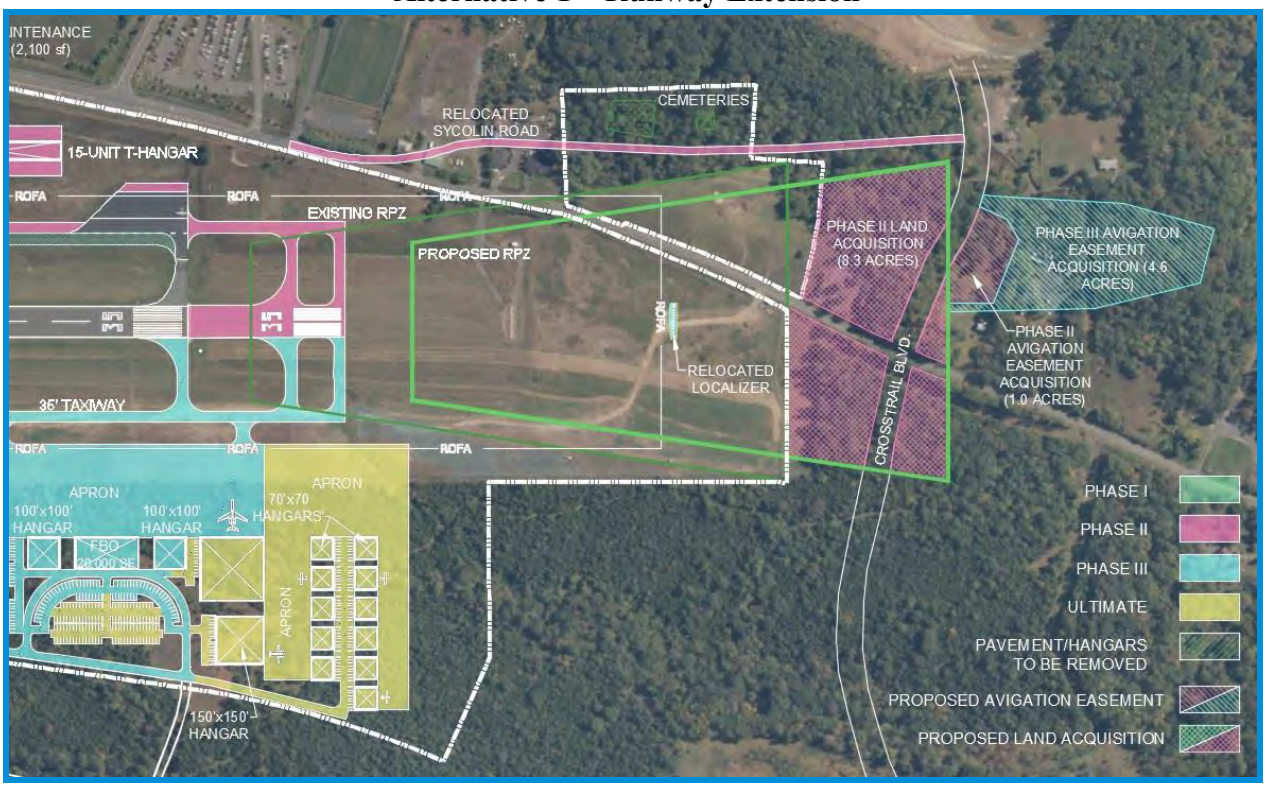
Extending the runway towards the north by adding a 500' displaced threshold is not considered as a viable alternative since the Part 77 approach slope (50:1) to Runway 17 is as far north as possible given the clearance requirements over Battlefield Parkway. The Part 77 approach slope is determined by the location of the runway end as opposed to the runway threshold. Extending the runway towards the north would result in vehicle on Battlefield Parkway becoming obstruction to the Part 77 approach surface. Also, extending towards the north would result in Battlefield Parkway encroaching more into the approach Runway Protection Zone which is not recommended by the FAA. This is the same reason that a combination of runway extensions

north and south for a total of 500' is not possible. Therefore, the only viable direction for the extension is towards the south.

Alternative 1

Alternative 1 depicts a 500' runway extension (100' wide) on the southern end of Runway 35, resulting in a total runway length of 6,000' as recommended in the facility requirements analysis in Chapter 3. This extension matches the one depicted on the existing 2007 JYO Airport Layout Plan and is depicted in **Exhibit 4-1**. The existing east-side parallel taxiway would also be extended by 500' to reach the extended runway end.

Exhibit 4-1
Alternative 1 – Runway Extension



The proposed 500' extension would require the relocation of a portion of Sycolin Road in order to ensure that it does not interfere with the shifted Runway Object Free Area. Also, approximately 15 acres of non-airport property would need to be acquired by JYO so that the shifted RPZ for Runway 35 would be owned by the airport as recommended by the FAA. However, a church adjacent to and immediately east of Sycolin Road would fall within the shifted Runway 35 RPZ which is considered a non-compatible land use within the RPZ. Therefore the church would need to be relocated. The costs associated with relocating Sycolin Road and relocating the church (approximately $12 million) would outweigh the benefits of a runway extension under this alternative. The costs associated with implementing Alternative 1 include:

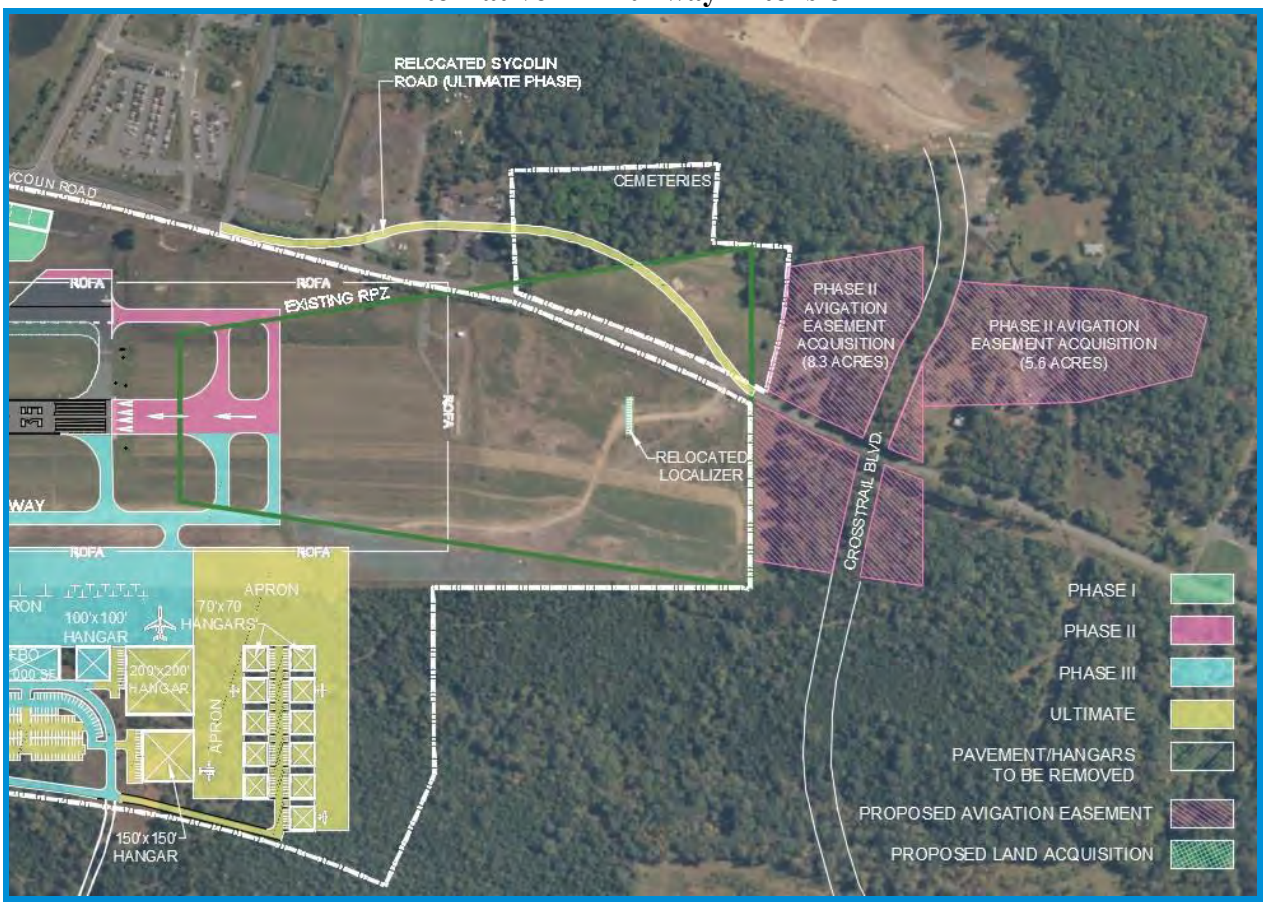
• Runway 35 RPZ Land Acquisition	$1,500,000
• Localizer Antenna Relocation	$400,000
• Obstruction Removal	$500,000
• Church Relocation	$3,000,000
• Sycolin Road Relocation	$9,000,000
• 500' Runway/Taxiway Extension	$6,000,000
• Runway 35 Avigation Easement Acquisition	$250,000
Total	**$20,650,000**

Impacts associated with implementing Alternative 1 include potential cultural, historic, archeological impacts related to the church and cemetery relocations as well as residence relocations and impacts to the existing roadway network with the relocation of Sycolin Road. Also, wetland impacts may occur as a result of the obstruction removal.

Alternative 2

Alternative 2 depicts the proposed 500’ runway extension as a displaced threshold as shown in **Exhibit 4-2**. The extension would be marked with threshold arrows instead of the standard runway markings. This extension would allow for 6,000’ of available runway for departures on Runway 35. Operations on Runway 17 would be limited to 5,500’ which is the current length. By limiting operations to 5,500’ on Runway 17, the Runway Protection Zone on the south end of the Runway would remain in its current location. This alleviates the need to acquire and remove the church immediately south of Airport property or relocate Sycolin Road.

Exhibit 4-2
Alternative 2 – Runway Extension



Typically, the Runway 35 RPZ will need to shift 500 feet towards the south in conjunction with the proposed 500-foot runway extension. However, this would result in the shifted RPZ encompassing a church along the east side of Sycolin Road. The presence of the church in the RPZ is considered a non-compatible land use by the FAA. Therefore, it is recommended to keep the existing Runway 35 RPZ in its current location and implement declared distances for operations on Runway 17. This would result in a 5,500' useable runway length for arrivals and departures on Runway 17. This is the same as the current runway length and is not anticipated to adversely impact operations. The 500 foot runway extension benefit would come from the ability for aircraft departing on Runway 35 to have a full 6,000 feet of runway. Since a displaced threshold with declared distances is being recommended for Runway 35, the existing ROFA can remain in its current location and Sycolin Road will not need to be relocated. However, the useable runway length for operations on Runway 17 will be 5,500' with this option.

A portion of Sycolin Road will remain within this RPZ however; it is not anticipated to adversely impact the proposed 500' runway extension as roads are permissible within RPZs. Also, Sycolin Road is located within the existing Runway 35 RPZ and the 500-foot runway extension is not anticipated to result in an incompatible use of the RPZ and Sycolin Road. However, the

relocation of Sycolin Road is depicted in the Ultimate Phase of development (beyond 20 years) so that it can remain on the Town of Leesburg and Loudoun County transportation plans.

Typically, the departure RPZ would shift with the proposed 500 foot runway extension, similar to the approach RPZ. However, due to the proximity of the church south of the Airport, it is recommended to keep the departure RPZ on the south side of the Airport in its current location so that the church will not be impacted. This would reduce the Take Off Distance Available (TODA) & Take Off Run Available (TORA) by 500' resulting in a published takeoff distance of 5,500' for Runway 17 departures. The costs associated with implementing Alternative 2 include:

• Localizer Antenna Relocation	$400,000
• Obstruction Removal	$500,000
• 500' Runway/Taxiway Extension	$6,000,000
• Runway 35 Avigation Easement Acquisition	$250,000
Total	**$7,150,000**

Impacts associated with Alternative 2 include potential wetland impacts from the obstruction removal however; there would be no cultural resource impacts with this alternative.

Therefore, it is recommended that a 500' displaced threshold be constructed to Runway 35 in order to provide 6,000' of takeoff runway for aircraft departing on Runway 35. Landing distances on 35 would remain at 5,500' and all operations on Runway 17 would be limited to 5,500' with the implementation of declared distances. This will allow the airport to provide a longer runway meeting the forecast critical aircraft demand while not requiring a shift of the Runway Object Free Area or RPZ towards the south. This alternative would result in a published runway length of 6,000 feet and provide 6,000 feet of runway for departures on Runway 35 which is predominantly used for departures due to fewer airspace restrictions towards the north. The development costs of $7.15 million are far less than the $20.65 million associated with a full 500 foot bi-directional use runway extension and will provide the additional capability required by existing and future large corporate aircraft operating at JYO.

4.2 APPROACH CAPABILITIES

As part of the alternatives evaluation, various options were considered for the existing and future approach capabilities for the Leesburg Executive Airport as discussed below.

Alternative 1

The minimum approach visibility siting distance is ½-mile. JYO currently has a precision approach to Runway 17 with minimums as low as 1-mile. Alternative 1 includes the requirements for achieving a ½-mile visibility minimum at JYO as shown in **Exhibit 4-3**. A ½-mile minimum would require a 400' separation between the runway centerline and parallel taxiway centerline. This would require relocating the existing parallel taxiway towards the east by approximately 137 feet and removing four hangars to accommodate it. It is not feasible to

pursue this alternative at JYO due to the lack of space to accommodate these airfield changes. This alternative would also require the purchase of approximately 53.2 acres of land encompassing the larger approach RPZ.

Exhibit 4-3
Alternative 1 – Runway 17 Approach / RPZ

Alternative 2

Alternative 2 includes a ¾-mile approach visibility minimum for Runway 17 and 1-mile non-precision approach for Runway 35. In order to achieve ¾-mile minimums to Runway 17, the Runway Protection Zone (RPZ) would need to be expanded as shown in **Exhibit 4-4**. Also, the remaining two ODALS lights would be installed once the RPZ is enlarged and the parallel taxiway is relocated. No other modification to the airport would be required to achieve these lower minimums. The costs associated with Alternative 2 include:

- Runway 17 RPZ Land Acquisition (fee simple) $2,300,000
- 2 ODAL Lights Design/Construction $250,000

Total $2,550,000

Exhibit 4-4
Alternative 2 – Runway 17 Approach / RPZ

Runway 35 is considered a "visual" runway and does not currently have instrument landing capabilities. The FAA has indicated that a nonprecision GPS approach can be created for this runway end if a clear 34:1 Part 77 approach slope can be obtained. An evaluation of future obstruction has identified approximately 4.5 acres of off-airport property that contain trees which would need to be removed in order to clear the 34:1 approach slope to the existing Runway 35 end. An avigation easement for this area is also recommended so that the Airport can maintain clear approaches if a nonprecision approach is established for Runway 35 in Phase I. An additional 9.5 acres of off-airport property will need to be cleared of trees in order to establish a nonprecision 34:1 approach to the future Runway 35 end with the proposed 500 foot runway extension. An avigation easement is also recommended for this additional clearing area in Phase II once the runway is extended. It is recommended that this nonprecision approach be implemented on the existing and proposed Runway 35 ends.

4.3 TAXIWAY ALTERNATIVES

As discussed in Chapter 3, the centerline of the existing parallel taxiway at JYO is located 263 feet from the runway centerline. The minimum separation distance for the approach capabilities at JYO is 300 feet.

Alternative 1

Alternative 1 involves relocating the existing parallel taxiway towards the east by 137 feet in order to accommodate a future ½-mile visibility minimum approach to Runway 17 in accordance with FAA airport design standards as shown in **Exhibits 4-5** and **4-6**. This relocation would also eliminate the existing non-standard separation distance between the taxiway and runway. When approach minimums fall below ¾-mile, a 400' runway centerline to parallel taxiway centerline separation is required per FAA Advisory Circular 150/5300-13A. Relocating the existing parallel taxiway out to 400' from the runway would require a relocation of five hangars and the existing terminal building. It would also result in the loss of multiple tie-down spaces on the existing apron and limit the ability of the Airport to develop future hangars and aprons given the limited space available for these facilities. This alternative has been included in the Master Plan Update in order to demonstrate the impacts associated with this option. This alternative is not recommended due to airport infrastructure impacts and is therefore not further considered in this Chapter.

Exhibit 4-5
Alternative 1 – Parallel Taxiway North

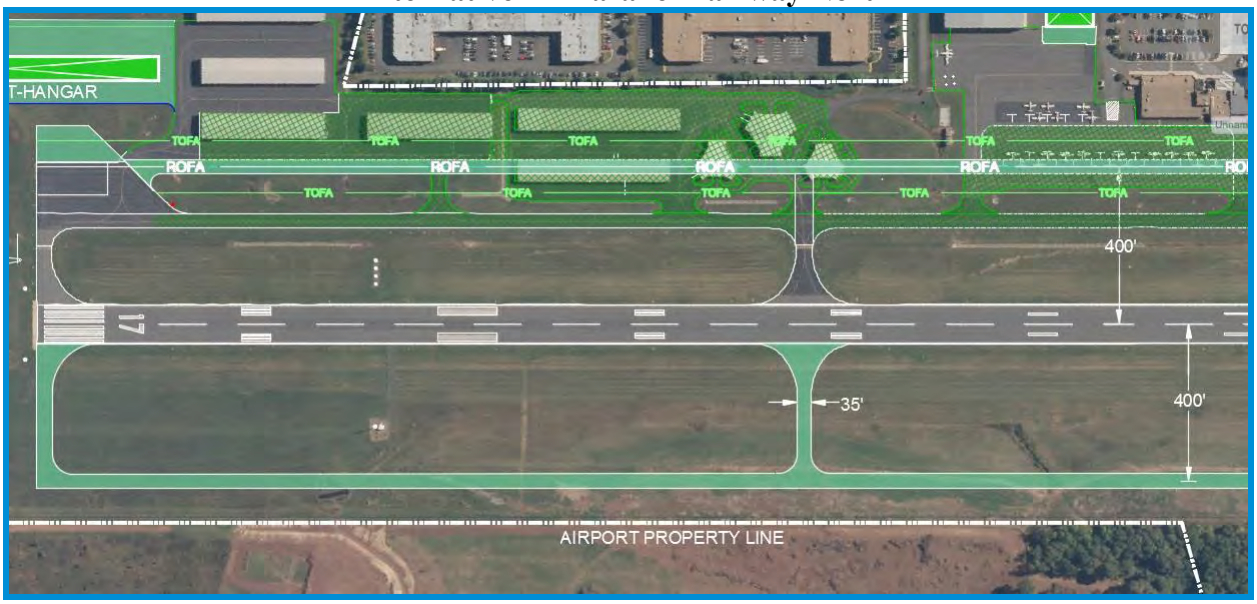


Exhibit 4-6
Alternative 1 – Parallel Taxiway South

Alternative 2

Alternative 2 would relocate the existing parallel taxiway towards the east by 37 feet in order to meet FAA airport design standards as shown in **Exhibits 4-7** and **4-8**. This relocation would eliminate the existing non–standard condition while also allowing for future ¾-mile approach visibility minimums for Runway 17. The relocation would not impact the existing terminal building or apron as Alternative 1 would and provides for additional development areas east and west of the runway. The proposed west parallel taxiway that will be required to provide access to the west hangar development area should also be constructed at a 300 foot separation distance. The relocation of the taxiway will result in the elimination of 26 existing tiedown spaces. Therefore, 26 new tiedowns are proposed for the north and south hangar development areas. The costs associated with Alternative 2 include:

- Parallel Taxiway Relocation Design/Construction $4,500,000

Total $4,500,000

Exhibit 4-7
Alternative 2 – Parallel Taxiway North

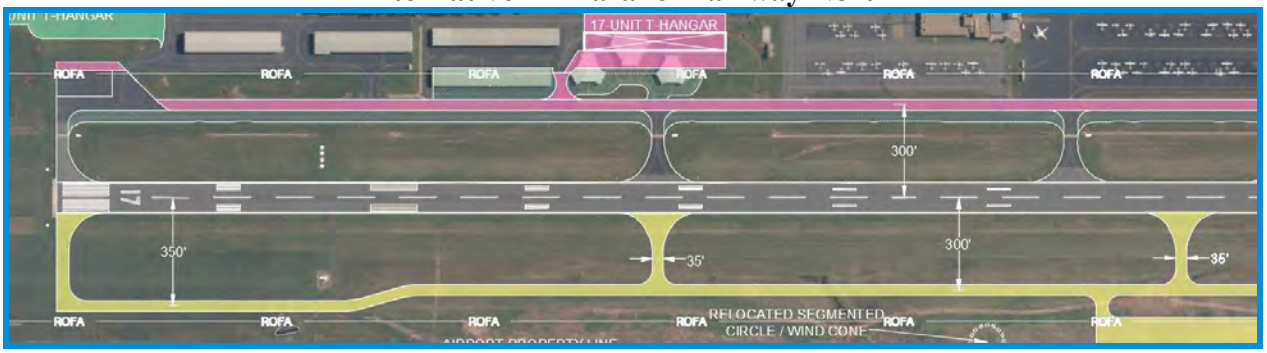
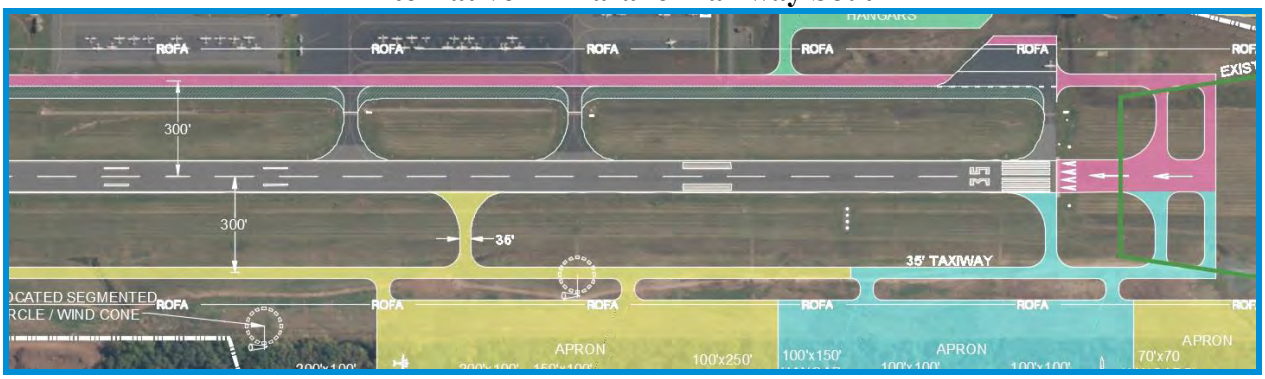


Exhibit 4-8
Alternative 2 – Parallel Taxiway South



Alternative 2 requires a 350' runway to taxiway separation along the northwest side of the runway in order to avoid the existing glide slope antenna and associated critical area. The rest of the taxiway is 300 feet from the runway centerline. Alternative 2 is recommended in order to meet FAA design standards while maximizing available airport property and minimizing impacts.

4.4 HANGAR DEVELOPMENT ALTERNATIVES

The facility requirements analysis of this study identified a need for additional corporate box-type hangars and T-hangars at JYO over the next 20 years. Various options and location were considered for these facilities as discussed below.

Alternative 1

Corporate hangars are typically larger "clear-span" facilities for storing larger aircraft or multiple smaller aircraft under one roof. The facility requirements section identified a need for additional corporate hangars at JYO over the next 20 years. Future corporate hangar development options have been limited to the northeast side the airport and the west side based on available space for these larger facilities. One corporate hangar is currently being designed for the open space at midfield next to an existing hangar. Alternative 1 includes corporate box hangars at the northeast, midfield, and southeast areas of the Airport as well as the future/ultimate west-side development area as shown in **Exhibits 4-9**, **4-10**, **4-11**, and **4-12**.

In order to meet the forecast demand for smaller aircraft storage at JYO, various options for T-hangar development were considered. These T-Hangars are also needed to offset the loss of the existing T-Hangars and condo hangars that will be demolished in order to bring the Runway Object Free Area in to compliance with FAA standards.

Exhibit 4-9
Alternative 1 – North Hangar Development

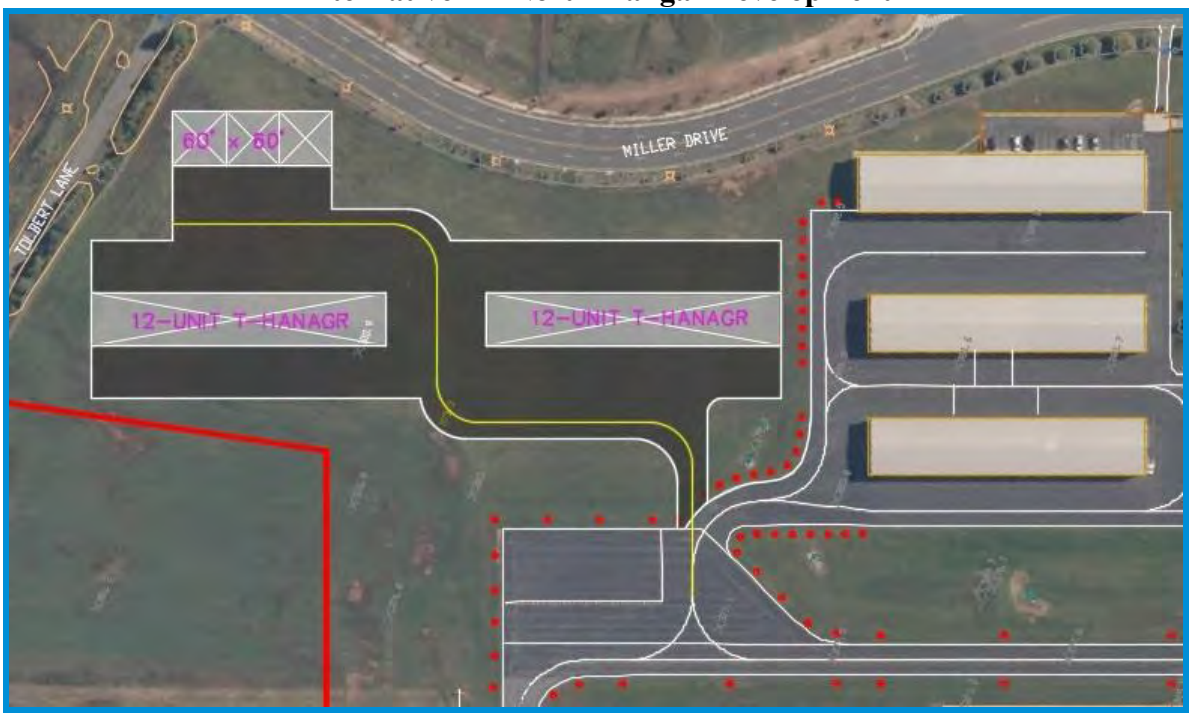
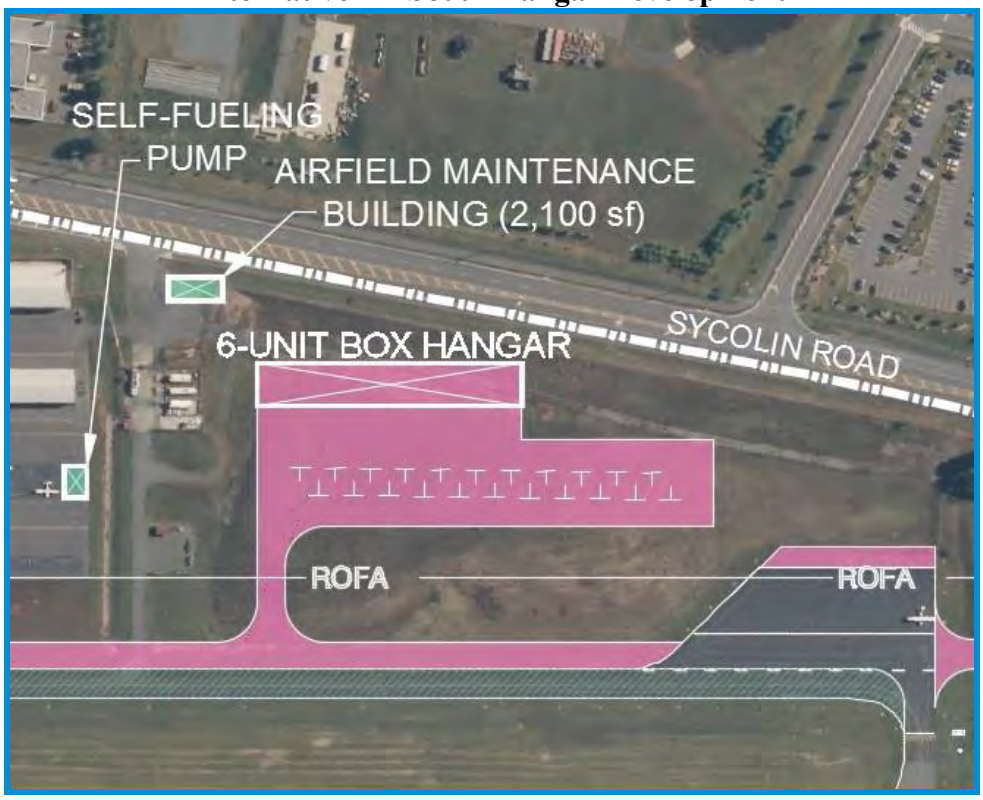


Exhibit 4-10
Alternative 1 – Midfield Hangar Development

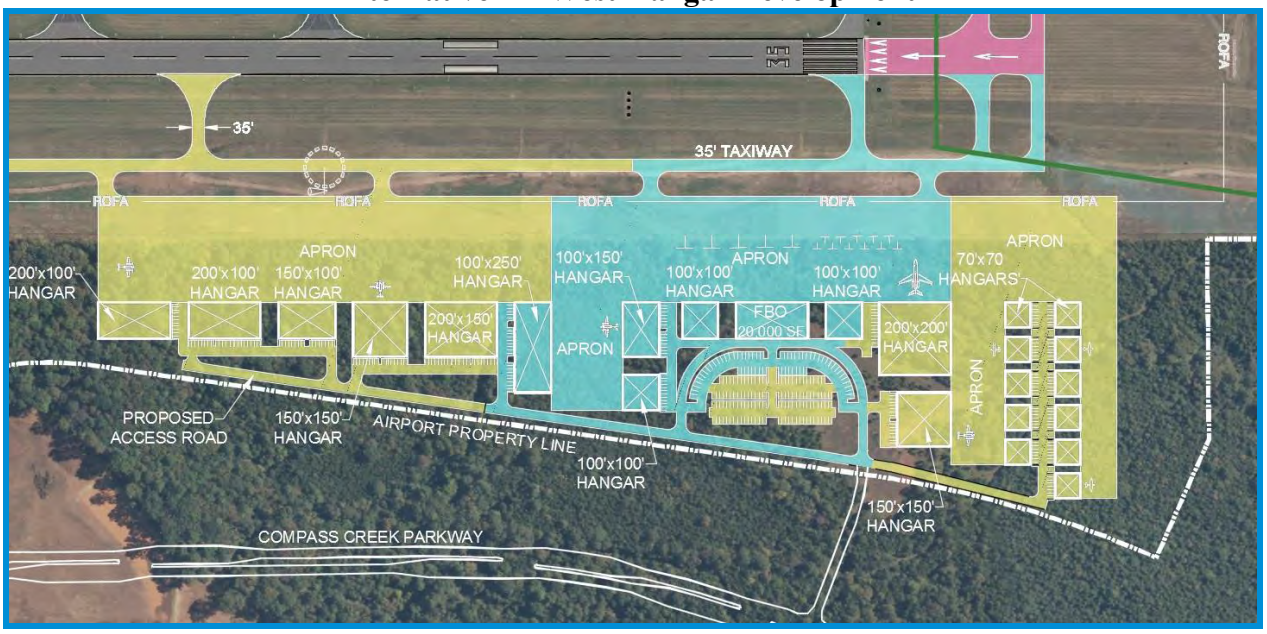
Exhibit 4-11
Alternative 1 – South Hangar Development



The intent is for the Airport to construct on existing developable areas of Airport property on the east side of the runway prior to developing the west side of the runway. The west side will need to be graded and utilities installed prior to the start of hangar and apron construction on this side. Based on the forecasts of aviation demand, the Airport will need to begin developing the west side in Phase III (11-20 years) to accommodate the forecast growth in based aircraft. A list of the proposed hangars included in Alternative 1 as well as the order of magnitude costs of these facilities includes:

• Two 12-Unit T-hangars (north end)	$1,000,000
• Three 60'x60' Corporate Hangars (north end)	$2,000,000
• One 120'x120' Corporate Hangar (midfield)	$2,000,000
• One 9-Unit 50'x50' Box Hangars (midfield)	$600,000
• One 6-Unit Box-Hangar (south side)	$700,000
• West Side Corporate Hangars	$8,000,000
Total	**$14,300,000**

Exhibit 4-12
Alternative 1 – West Hangar Development



Alternative 2

Alternative 2 provides another option for hangar development at JYO as shown in **Exhibits 4-13**, **4-14**, and **4-15**. A list of the proposed hangars included in Alternative 2 as well as the order of magnitude costs of these facilities includes:

• One 26-Unit T-hangar (north end)	$900,000
• Three 60'x60' Corporate Hangars (north end)	$2,000,000
• One 120'x120' Corporate Hangar (midfield)	$2,000,000
• One 17-Unit T-hangar (midfield)	$700,000
• One 11-Unit 60'x60' Box Hangars (south side)	$900,000
• West Side Corporate Hangars	$8,000,000
Total	**$14,500,000**

This alternative provides more storage space by incorporating T-hangars at the midfield location and combining T-hangars at the north end location. Also, an 11-Unit Box Hangar is located on the south side of the Airport and includes a new access road from the fuel farm road with six adjacent automobile parking spaces. This layout also includes 14 new tiedowns on the south side and 12 new tiedowns on the north side which will replace the existing 26 tiedowns that will be lost once the parallel taxiway is relocated. The cost associated with the development of the Alternative 2 hangars is comparable to Alternative 1 and there would be no additional land disturbance impacts associated with pursuing Alternative 2. Therefore, the Alternative 2 hangar development option is recommended.

Exhibit 4-13
Alternative 2 – North Hangar Development

Exhibit 4-14
Alternative 2 – Midfield Hangar Development

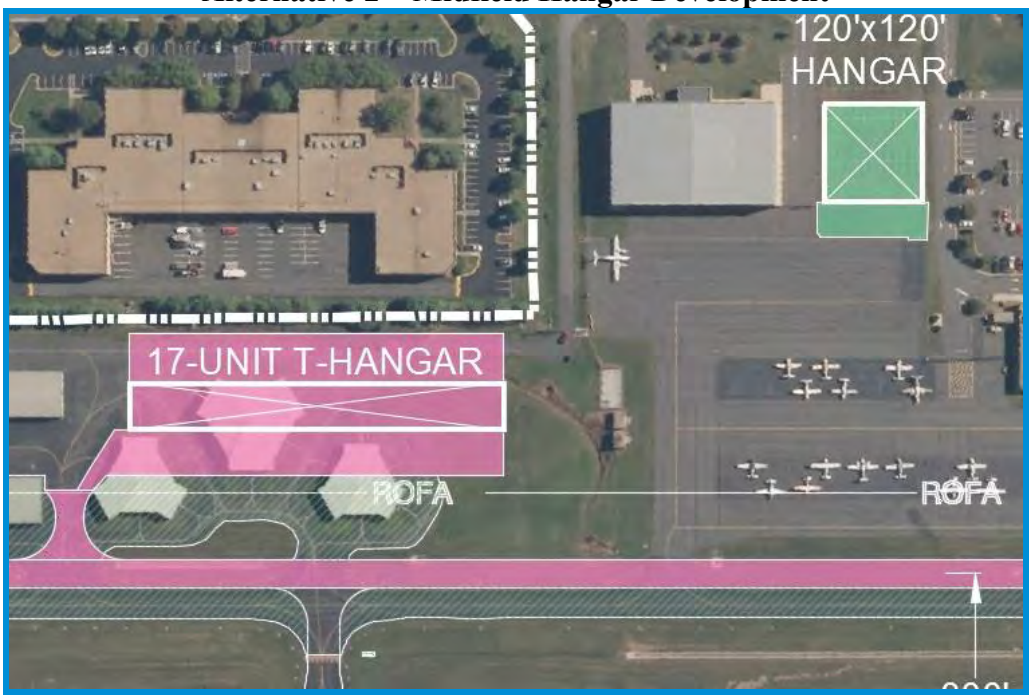
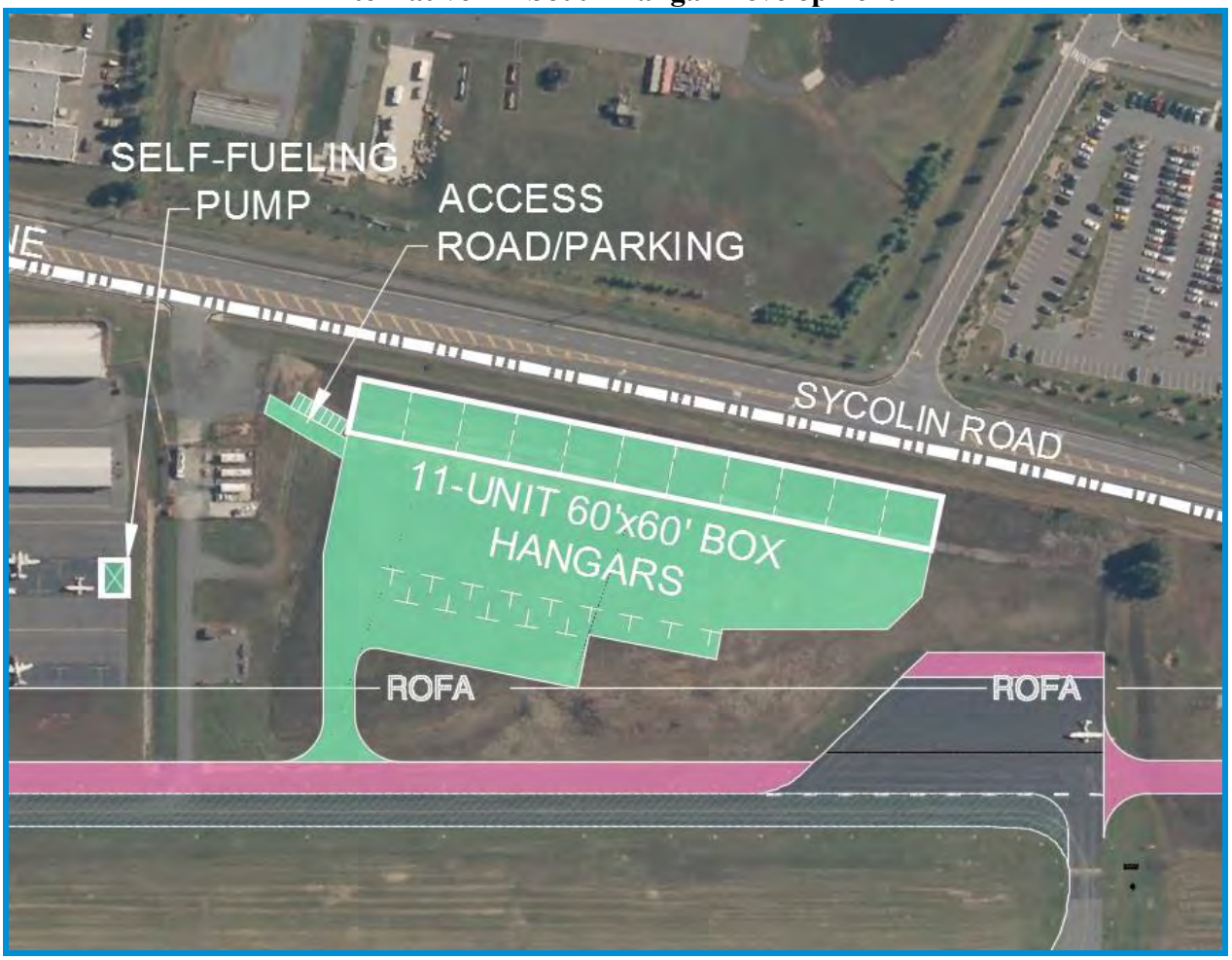


Exhibit 4-15
Alternative 2 – South Hangar Development



4.5 SYCOLIN ROAD ALTERNATIVES

Alternative 1

As discussed in the Runway alternatives section, the proposed 500' extension would require the relocation of a portion of Sycolin Road in order to ensure that it does not interfere with the shifted Runway Object Free Area. Alternative 1 includes the relocation of Sycolin Road outside of the extended ROFA as shown in **Exhibit 4-16**.

Exhibit 4-16
Alternative 1 – Sycolin Road Relocation

Alternative 2

Alternative 2 includes keeping Sycolin Road in its current location and utilizing declared distances for takeoffs on Runway 17 in order to eliminate the need to extend the ROFA beyond its current location when the runway is extended as shown in **Exhibit 4-17**. Alternative 2 would keep the road relocation on the JYO ALP in the ultimate phase in the event that the proposed runway extension becomes a full 6,000' useable runway in both directions in the future. The costs associated with developing Alternative 2 are substantially less than relocating the road in Alternative 1. Also, the cultural and residential impacts are greatly reduced with Alternative 2. Therefore, this alternative is recommended for inclusion on the revised JYO ALP as the proposed development plan for the Airport.

Exhibit 4-17
Alternative 2 – Sycolin Road Relocation

4.6 ADDITIONAL AIRPORT FACILITY ALTERNATIVES

Additional airport facilities not discussed in the sections above include the proposed airfield maintenance storage facility. The proposed location for this facility is near the proposed hangar development on the northeast side of the Airport (Exhibit 4-13). This location allows for easy access to the airfield and Miller Drive. This location is also preferred as there is not potential aeronautical use for this area of airport property.

4.7 RECOMMENDED DEVELOPMENT

4.7.1 Alternatives Matrix

In determining the best development alternative for the Leesburg Executive Airport, an evaluation matrix was created to numerically compare the positive and negative attributes of these alternatives. A series of six attributes were used to evaluate the alternatives for each airport facility. A numerical score was developed ranging from 1 to 5. The higher the number, the more likely it is for the alternative to meet the attribute. These scores were totaled to objectively

determine the preferred alternative for each facility. The matrix is shown in **Table 4.1**. The following criteria were used to score each alternative:

1. Ability to Serve Forecast Demand – How well does each alternative accommodate the forecast airport activity levels including based aircraft and annual operations over the next 20 years and beyond.

2. Airfield Functionality – How well does each alternative maximize available developable airfield property and provide for the safe and efficient movement of aircraft around the airfield.

3. Environmental Compatibility – What are the environmental impacts associated with each alternative. These impacts include land use, noise, cultural, archeological, social, transportation, and wetlands to name a few. The lower potential for adverse environmental impacts, the higher the score for each alternative.

4. Development Costs – How does each alternative compare given approximate order of magnitude development costs. A higher score was given to the lower cost options.

5. Operating and Maintenance Costs – Similar to development cost, how does each alternative compare regarding potential operating and maintenance costs. Again, a higher score was given to the alternatives with lower operating and maintenance costs.

TABLE 4.1
Alternatives Matrix

Evaluation Criteria	Ability to Serve Forecast Demand	Airfield Functionality	Enviro. Compatibility	Dev. Costs	O&M Costs	Total
Runway Extension						
Alternative 1 – 500' Extension	5	4	2	1	4	**16**
Alternative 2 – 500' Displaced Threshold	5	5	4	4	5	**23**
Approach Capabilities						
Alternative 1 – ½-mile Visibility	5	2	4	2	4	**17**
Alternative 2 – ¾-mile Visibility	4	5	5	4	4	**22**
Taxiway Alternatives						
Alternative 1 – 400' Separation	5	2	3	2	4	**16**
Alternative 2 – 300' Separation	5	4	4	4	5	**22**
Hangar Development Alternatives						
Alternative 1	4	4	5	5	5	**23**
Alternative 2	5	5	5	5	5	**25**
Sycolin Road Alternatives						

Alternative 1 – Relocation	5	4	1	1	4	**15**
Alternative 2 – Existing Alignment	5	5	5	5	5	**25**
Total						

Source: *Talbert & Bright analysis*

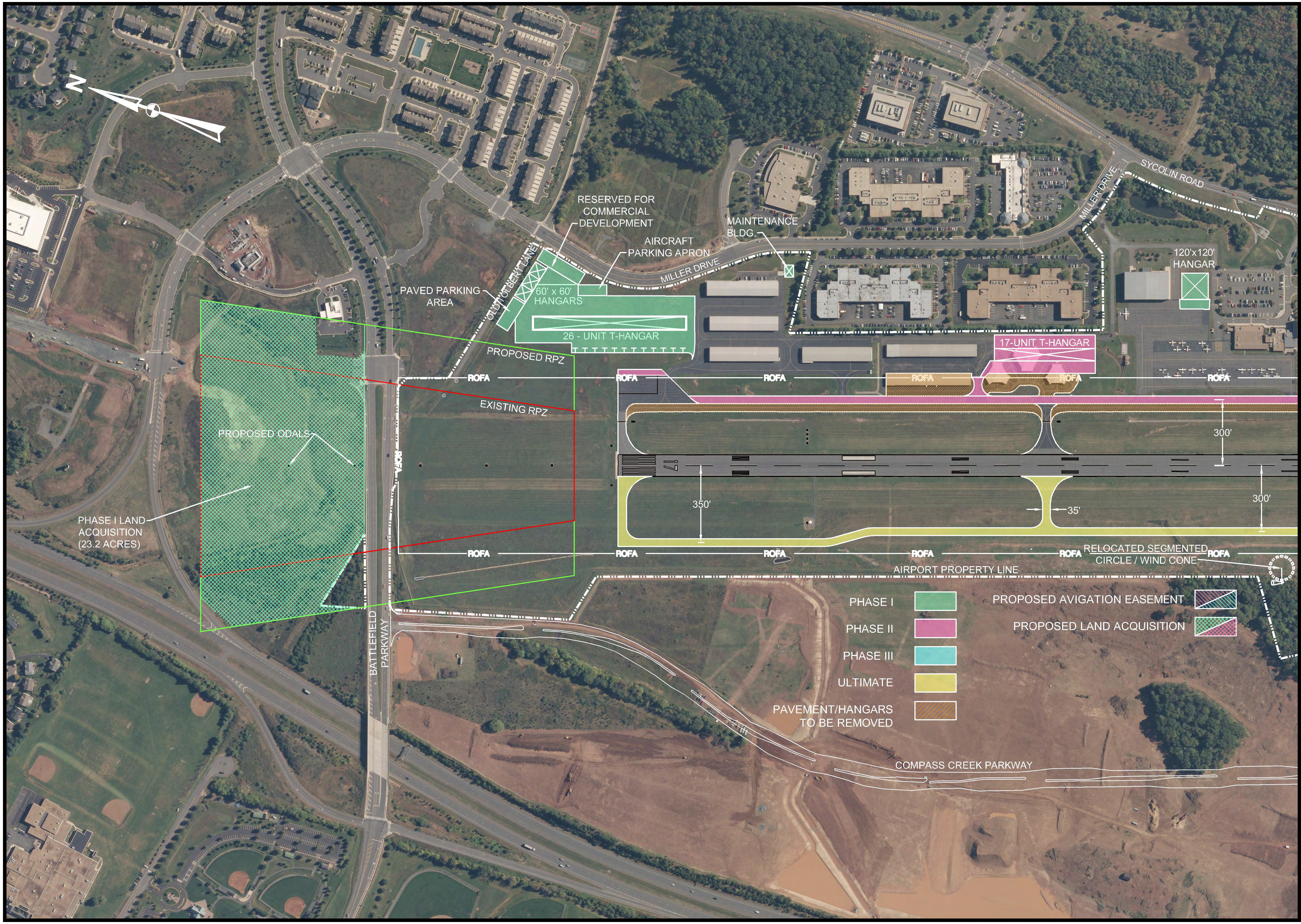
The numerical analysis indicates that the Alternative 2 projects for each airport facility scored higher than the Alternative 1 projects. This is due mainly to the higher development costs and potential for higher environmental impacts for Alternative 1 for the runway extension and road relocation. Alternative 1 also scored lower for approach capabilities due to the impacts and cost associated with achieving the ½-mile visibility, including the requirements for a 400' runway/taxiway separation. Alternatives 1 and 2 scored similarly for hangar development however, Alternative 2 score slightly higher due to its incorporation of more T-hangar units and thus its ability to accommodate a larger number of individual aircraft.

The Recommended Development incorporates the preferred development options for each airport facility as depicted in **Exhibits 4-18** and **4-19**. The recommended development facilities were selected based on the matrix scoring and are reflected in Alternative 2 for each facility. These proposed facility improvements are discussed in further detail below.

The recommended depicts various hangar development options for JYO including a mix of future T-Hangars and corporate box hangars. The sizes and number of these facilities was determined from the facility requirements analysis in Chapter 3. The intent is for the Airport to construct on existing developable areas of Airport property on the east side of the runway prior to developing the west side of the runway. The west side will need to be graded and utilities installed prior to the start of hangar and apron construction on this side. Based on the forecasts of aviation demand, the Airport will need to begin developing the west side in Phase III (11-20 years) to accommodate the forecast growth in based aircraft.

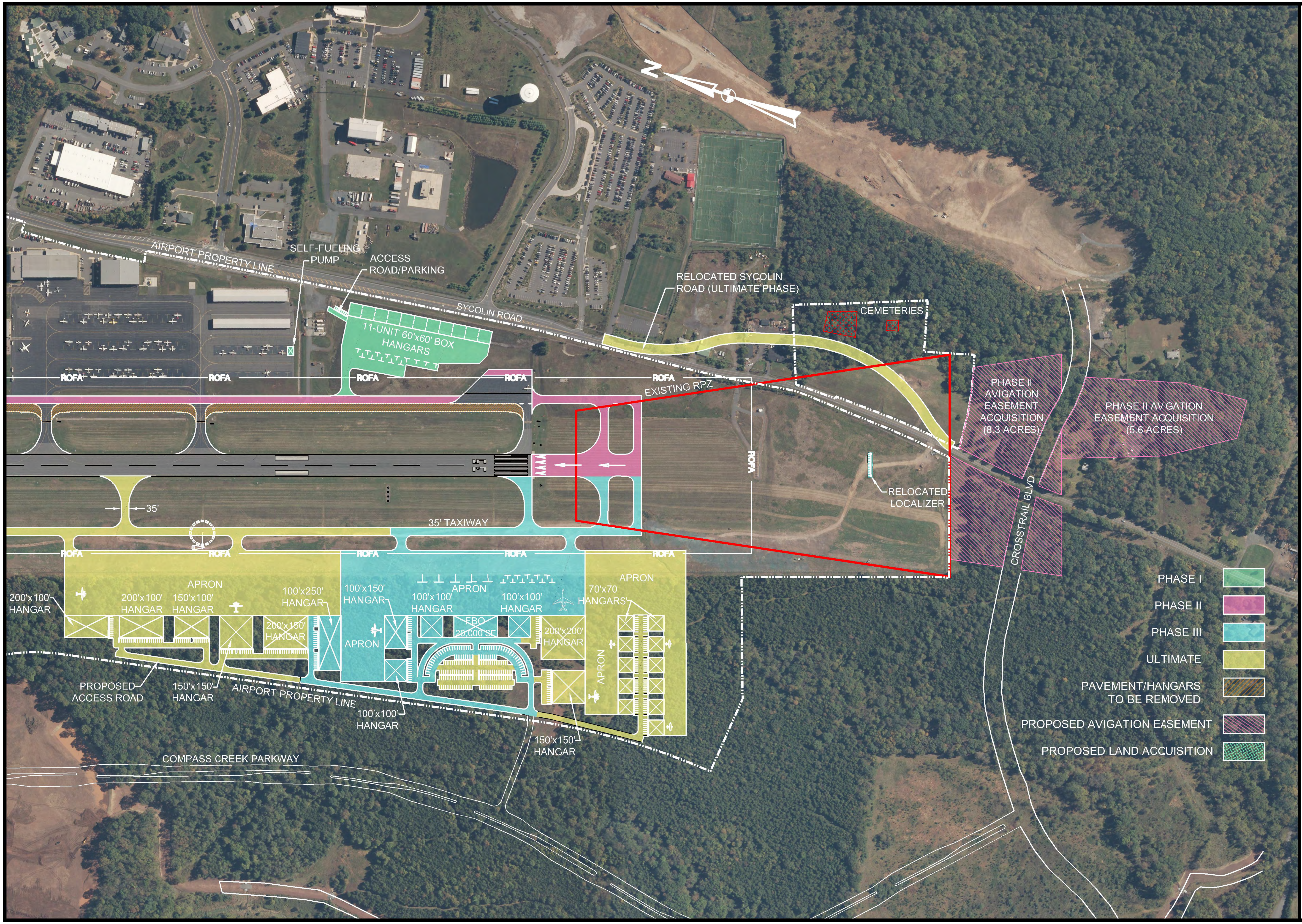
This recommended alternative offers the most airport-beneficial mix of development while meeting the forecast airport activity and minimizing development costs and impacts to the surrounding community. The amount of aircraft storage space depicted meets or exceeds the amounts specified in Chapter 3. However, the exact timing of the development of these hangars depends primarily upon local demand for these facilities.

The recommended alternative also represents a lower development cost to the Leesburg Executive Airport Authority, FAA, and DOAV which will enable the Airport to maximize federal, state, and local dollars while meeting the forecast airport demand. The recommended alternative continues the development plan of smaller general aviation aircraft being stored towards the northeast and southeast sides of the Airport while identifying the west side for future corporate aircraft storage and operations. This will allow for a more efficient flow of traffic on the airfield. It will provide the Airport with the best "bang for their buck" in meeting the forecast aviation demand. Based on discussions with Airport management, the Leesburg Executive Airport Commission, and the Town of Leesburg, this alternative is carried forward in this Master



TALBERT & BRIGHT
ENGINEERING & PLANNING CONSULTANTS
10105 KRAUSE ROAD, SUITE 100
CHESTERFIELD, VIRGINIA 23832
PHONE: 804.768.6878 FAX: 804.768.6871

Exhibit 4-18
Leesburg Executive Airport
Recommended Alternative North



TALBERT & BRIGHT
ENGINEERING & PLANNING CONSULTANTS
10105 KRAUSE ROAD, SUITE 100
CHESTERFIELD, VIRGINIA 23832
PHONE: 804.768.6878 FAX: 804.768.6871

Exhibit 4-19
Leesburg Executive Airport

Recommended Alternative South

Plan Update as the recommended alternative and has been applied to the Airport Layout Plan (ALP) Set which is discussed in the next chapter.

4.7.2 Recommended Development Phasing

The recommended development, as shown in Exhibits 4-18 and 4-19, depicts the existing and proposed Leesburg Executive Airport facilities. The proposed facilities have been shaded green, red, blue, or yellow depending upon their estimated implementation timeframe. These colors correspond to the four phasing periods which represent the first five years of development, the second five years of development, the remaining ten years of development, and the ultimate phase which is beyond 20 years. The projects associated with each development phase are listed below. The proposed phasing corresponds to the needs as identified during the Facility Requirements analysis portion of this Study. The exact timing of construction will be dependent upon specific airport and user needs.

Phase I (0-5 years)

Phase I of the recommended development represents facilities that are needed at JYO in the near-term (0-5 years). These facilities are shown in green on Exhibits 4-18 and 4-19 and include:

- Construct one 120’ x 120’ corporate hangar
- Construct one 26-Unit T-Hangar & associated aprons
- Construct three 60’ x 60’ box hangars and associated auto parking
- Construct 11-Unit south 60’ x 60’ box hangars and associated apron/taxiway
- Runway 17 RPZ land acquisition (±23.2 acres)
- Construct 2,100 sf airfield maintenance storage building
- Construct self-serve AvGas fuel pump
- Install final two ODAL approach lights for Runway 17

Phase II (6-10 years)

Phase II represents the mid-term development phase. The proposed Phase II airport facilities are shown in red on Exhibits 4-18 and 4-19 and include:

- Demolish Existing T-Hangar and three condo hangars
- Construct new east parallel taxiway
- Expand Runway holding pads (run-up areas)
- Construct 17-Unit T-hangar (midfield)
- Demolish existing parallel taxiway
- Acquire 8.3 acres of avigation easement for existing Runway 35 GPS approach
- Relocate Localizer antenna
- Acquire 5.6 acres of avigation easement for future Runway 35 GPS approach

- Extend Runway and parallel taxiway 500' south

Phase III (11-20 years)

Phase III represents the long-term development phase. The proposed Phase III airport facilities are shown in blue on Exhibits 4-18 and 4-19 and include:

- Construct partial west side parallel taxiway and taxiway/runway connectors
- Construct west side apron
- Construct west side access road and auto parking
- Construct 20,000 sf west side FBO facility
- Construct three 100' x 100' corporate hangars
- Construct one 150' x 100' corporate hangar
- Construct one 250' x 100' corporate hangar

Ultimate Phase (beyond 20 years)

This phase includes continued development of the hangar areas on the west side of the Airport. Facilities which could be developed in this area include aprons, and hangars as well as aviation-related businesses. Detailed cost estimates for facilities identified for the ultimate phase of development are not included in this Master Plan due to the difficulty in projecting development and implementation costs beyond the next 20 years. It is recommended that the ALP be reviewed and updated periodically as activity increases at JYO so that these ultimate facilities can be planned for and developed as needed. These facilities are shown in yellow on Exhibits 4-18 and 4-19 and include:

- Completion of west-side parallel taxiway and associated runway/taxiway connectors
- Additional apron expansion, access road, and auto parking
- Construct eleven 70' x 70' box hangars
- Construct two 150' x 150' corporate hangars
- Construct one 200' x 200' corporate hangar
- Construct one 200' x 150' corporate hangar
- Construct one 150' x 100' corporate hangar
- Construct two 200' x 100' corporate hangars

4.7.3 Recommended Development Cost Estimate

An order of magnitude cost estimate for Phases I, II, and III has been generated to approximate the funding required by the Airport over the next 20 years. These costs are shown in **Table 4.2** and represent the approximate total expenditures required to design and construct all of the proposed facilities. These costs are not adjusted for inflation are should be used for planning purposes only.

TABLE 4.2
Recommended Development Cost Estimate

Facility	Phase	Total Cost	Funding Source			
			FAA	State	Local	Private
120' x 120' Corporate Hangar	I	**$2,000,000**				$2,000,000
Airfield Maintenance Storage Building	I	**$400,000**		$320,000	$80,000	
Self-Serve AvGas Fueling Pump	I	**$150,000**		$100,000	$50,000	
North Apron Design/Construction	I	**$2,500,000**	$2,250,000	$200,000	$50,000	
Taxiway Lighting Rehabilitation	I	**$600,000**	$540,000	$48,000	$12,000	
Runway Lighting Rehabilitation	I	**$1,200,000**	$1,080,000	$96,000	$24,000	
26-Unit North T-Hangar Construction	I	**$900,000**			$900,000	
North Corporate Box Hangar Construction (3)	I	**$2,000,000**				$2,000,000
Runway 17 RPZ Land Acquisition	I	**$2,300,000**	$2,070,000	$184,000	$46,000	
2 ODAL Lights Design/Construction	I	**$250,000**		$200,000	$50,000	
11-unit Box Hangar Construction	I	**$900,000**			$900,000	
Parallel Taxiway Relocation Design/Construction	II	**$4,500,000**	$4,050,000	$360,000	$90,000	
17-unit T-hangar Construction	II	**$700,000**			$700,000	
Localizer Antenna Relocation	II	**$400,000**	$360,000	$32,000	$8,000	
Obstruction Removal	II	**$500,000**	$450,000	$40,000	$10,000	
500' Runway/Taxiway Extension	II	**$6,000,000**	$5,400,000	$480,000	$120,000	
Runway 35 Avigation Easement Acquisition	II	**$250,000**	$225,000	$20,000	$5,000	
West-side Partial Parallel Taxiway	III	**$5,000,000**	$4,500,000	$400,000	$100,000	
West-side Access Road/Apron	III	**$8,000,000**	$7,200,000	$640,000	$160,000	

TABLE 4.2
Recommended Development Cost Estimate

Facility	Phase	Total Cost	Funding Source			
			FAA	State	Local	Private
Design/Construction						
West-Side FBO Building	III	**$3,000,000**				$3,000,000
West-side Corporate Hangars	III	**$8,000,000**			$8,000,000	
Total		**$49,550,000**	**$28,125,000**	**$3,120,000**	**$11,305,000**	**$7,000,000**

***Note**: The hangar site preparation costs are eligible for 80% reimbursement by DOAV.*
Source: *Talbert & Bright analysis*

5.0 ENVIRONMENTAL OVERVIEW

The purpose of this chapter is to present an overview of existing environmental conditions at the Leesburg Executive Airport (JYO). This overview does not constitute a Categorical Exclusion, Environmental Assessment, or an Environmental Impact Statement, (collectively referred in this study as a NEPA study), as defined by Federal Aviation Administration (FAA) Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, or FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures.* However, the analysis in this section is conducted in accordance with FAA Advisory Circular (A/C) 150/5070-6B, Change 2, *Airport Master Plans.* Further environmental studies will likely be necessary for some of the proposed development within this Airport Master Plan Update (AMPU), in accordance with NEPA requirements. Project-specific impacts and necessary mitigation measures would be determined and identified in those individual NEPA studies.

In accordance with the guidelines of FAA Advisory Circular 150/5070-6B, "*Airport Master Plans*", and FAA orders 5050.4B "*National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*" and 1050.1F "*Environmental Impacts: Policies and Procedures*", the following environmental categories are addressed in this chapter:

- Air Quality
- Climate
- Biological Resources
- Historical, Architectural, Archaeological, and Cultural Resources
- Socioeconomic Impacts, Environmental Justice, and Children's Environmental health and Safety Risks
- Water Resources (Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)
- Coastal Resources
- Construction Impacts
- Department of Transportation Act: Section 4(f)
- Farmlands
- Hazardous Materials, Pollutions Prevention, and Solid Waste
- Light Emissions and Visual Effects
- Natural Resources, Energy Supply and Sustainable Design
- Cumulative Impacts / Secondary (Induced) Impacts
- Land Use
- Noise

In addition to the aforementioned federal guidance, this chapter also includes governing practices set forth by Commonwealth and local government agencies including the State of Virginia, Department of Environmental Quality (DEQ), Virginia Department of Game and Inland Fisheries (DGIF), Virginia Department of Historic Resources (DHR), and the Virginia Department of Aviation (DOAV). DEQ is the lead agency in the Commonwealth's government for environmental management and stewardship with the expressed goal of safeguarding the health and safety of Virginia citizens from environmental hazards, protecting and improving the quality of Virginia's land, air and water. DEQ has a broader mission than does DGIF, which is to "manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth." DHR's mission is to foster, encourage, and support the stewardship of Virginia's significant historic architectural, archaeological, and cultural resources.

For the purposes of this study, the above-mentioned environmental categories will be addressed only as they apply to JYO. Every effort has been made to ensure the accuracy of this overview and the information provided.

5.1 AIR QUALITY

The National Environmental Policy Act of 1969 (NEPA), the Clean Air Act (CAA), as amended, and Title 49 U.S.C. 47106(c)(1)(B), as amended are the primary laws that apply to air quality. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The need for an air quality assessment to satisfy NEPA depends on the nature of the project, the project area's attainment status, and the size of the airport.

The CAA established National Ambient Air Quality Standards (NAAQS) for six pollutants, termed "criteria pollutants". The six pollutants are: ozone (O_3), carbon monoxide (CO), particle pollution ($PM_{2.5}$ and PM_{10}), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). The Leesburg Executive Airport is located in Loudoun County, VA, which is currently in the 2008 Ozone NAAQS Nonattainment Area and 1997 $PM_{2.5}$ NAAQS Attainment / Maintenance Area. Activities located within this area must comply with the CAA conformity mandates.

The Metropolitan Washington nonattainment area developed and submitted an 8-hour ozone attainment plan along with a base year inventory to satisfy CAA requirements. The plan and inventory is available at http://www.mwcog.org/environment/air/SIP/default.asp, EPA issued final approval of the plan on April 10, 2015.

The Metropolitan Washington nonattainment area also developed and submitted a $PM_{2.5}$ attainment plan to address the 1997 $PM_{2.5}$ NAAQS. The plan was submitted to EPA on April 4, 2008 and was issued final approval on October 6, 2014 and is available at https://www.gpo.gov/fdsys/pkg/FR-2014-10-06/pdf/2014-23624.pdf.

The General Conformity Rule establishes the procedures and criteria for determining whether certain federal actions conform to state or EPA (federal) air quality implementation plans. To determine whether conformity requirements apply to a proposed federal action, the following must be considered:

- The non-attainment or maintenance status of the area;
- Type of pollutant or emissions;
- Exemptions from conformity and presumptions to conform;
- The project's emission levels; and
- The regional significance of the project's emissions.

FAA actions are subject to the General Conformity Rule. Because the airport is in compliance for all but two pollutants and is designated "maintenance" for those two pollutants, General Conformity requirements apply, unless the project is exempt, presumed to conform, or does not exceed emission thresholds. Based on current projection, the Leesburg Executive Airport is expected to have 180,834 total annual aircraft operations by 2036. Aviation Emissions and Air Quality Handbook, Version 3 (January 2015), details the requirements for preparing an air quality assessment or an emissions inventory. With the forecast total annual aircraft operations, it is anticipated that an emissions inventory would be required for long-term projects. Further coordination with FAA and DEQ should be completed prior to any proposed development to determine if further actions are required to satisfy General Conformity Rule requirements. However, the forecast increase in airport activity over the next 20 year is not anticipated to exceed the de minimis standard for air quality.

5.2 CLIMATE

The Intergovernmental Panel on Climate Change (IPCC) estimates that aviation accounts for 4.1% percent of global transportation Greenhouse Gas (GHG) emissions. In the US, EPA data indicates that commercial aviation contributed 6.6% of total CO_2 emissions in 2013, compared

with other sources, including the remainder of the transportation sector 20.7%, industry 28.8%, commercial 16.9%, residential 16.9%, agricultural 9.7%, and U.S. territories .05%.[1]

Increasing concentrations of GHGs in the atmosphere affect global climate.[2] GHG emissions result from anthropogenic sources including the combustion of fossil fuels. GHGs are defined as including carbon CO2, methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).[3] CO2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years. Research has shown there is a direct correlation between fuel combustion and GHG emissions. The proposed development of the Leesburg Executive Airport is not anticipated to result in significant climate impacts. Additional operations will result in the consumption of more aviation fuel however, this increase will be somewhat offset by the shift towards more efficient general aviation aircraft over the next 20 years.

5.3 BIOLOGICAL RESOURCES

The Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661 – 667e; 1958, as amended) provides the basic authority for the Fish and Wildlife Service (FWS) involvement in evaluating impacts to fish and wildlife from proposed development. To comply with the legislations, the FAA must coordinate with the FWS to assess the effects of proposed FAA actions on aquatic areas. Also, the FAA or the airport sponsor, as appropriate, must consult with Virginia Department of Game and Inland Fisheries (DGIF) for their input on the proposed development and its potential effects on the local biotic communities.

The Leesburg Executive Airport property can be characterized as a series of vegetative communities, many of which have been disturbed from their natural state for several decades as a result of prior airport development actions, agricultural activity or other human interaction. The character of vegetative communities is significant as the varying classes of vegetative cover provide habitat for wildlife, some of which are identified as species of note or special concern by the relevant ecological legislation. Soil types, comparative elevation, and drainage characteristics help determine the wetland or upland characteristics and, thereby, the type of dominant vegetation and subsequent habitat provided. A site survey to assess specific community types on-

[1] GHG allocation by economic sector. Environmental Protection Agency (2015). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013.*
[2] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland
[3] Executive Order 13693, *Planning for Federal Sustainability in the Next Decade.*

site and the possible presence of threatened and endangered species should be completed for future NEPA studies.

5.3.1 Federal and State Listed Endangered Species

The Endangered Species Act of 1973, as amended, requires each federal agency to ensure that actions authorized, funded, or carried-out by that agency do not jeopardize continued existence of any endangered or threatened species, or result in destruction or adverse modification of any endangered or threatened species' habitat.

Biological resources are valued for their intrinsic, aesthetic, economic, and recreational qualities, which includes fish, wildlife, plants, and their respective habitats. Typical categories of biological resources include:

- Terrestrial and aquatic plant and animal species;
- Game and non-game species;
- Special status species (state and federally-listed threatened or endangered species, marine mammals, or species of concern-such as species proposed for listing or migratory birds); and environmentally-sensitive or critical habitats.

The Virginia Department of Game and Inland Fisheries (DGIF) through their Fish and Wildlife Information Service (VaFWIS) online program and U.S. Fish and Wildlife Service (USFWS) through their Information for Planning and Conservation (IPaC) online project planning tool was utilized to obtain threatened and endangered species information for the JYO project areas.

IPaC identified one endangered species that could potentially be located within the 214-acres of Airport property, the Northern Long-eared Bat (*Myotis septentrionalis*). IPaC also identified a freshwater pond approximately 0.748-acres, which is discussed further in the wetland section. IPaC identified 17 migratory birds, (**Table 5.1**) that could potentially reside within the 214-acres of the Airport property however, none of those birds are identified as being federally or state listed threatened or endangered species. They are however identified as "birds of conservation concern". IPaC did not identify any critical habitats, wildlife refuges, or fish hatcheries within the 214-acres of the Airport property.

TABLE 5.1 Migratory Birds		
Name	**Scientific Name**	**Listing**
Bald Eagle	*Haliaeetus leucocephalus*	Conservation Concern
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Conservation Concern
Blue-winged Warbler	*Vermivora pinus*	Conservation Concern
Cerulean Warbler	*Dendroica cerulean*	Conservation Concern
Fox Sparrow	*Passerella iliaca*	Conservation Concern
Golden-winged Warbler	*Vermivora chrysoptera*	Conservation Concern
Kentucky Warbler	*Oporonis formosus*	Conservation Concern
Loggerhead Shrike	*Lanius ludovicianus*	Conservation Concern
Pied-billed Grebe	*Podilymbus podiceps*	Conservation Concern
Prairie Warbler	*Dendroica discolor*	Conservation Concern
Prothonotary Warbler	*Protonotaria Critera*	Conservation Concern
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Conservation Concern
Rusty Blackbird	*Euphagus carolinus*	Conservation Concern
Short-eared owl	*Asio flammeus*	Conservation Concern
Willow Flycatcher	*Empidonax traillii*	Conservation Concern
Wood Thrush	*Hylocichla mustelina*	Conservation Concern
Worm Eating Warbler	*Helmitheros vermivorum*	Conservation Concern

Source: *USFWS, IPaC Trust Resource Report*

The Virginia Department of Game and Inland Fisheries (DGIF) compiles endangered and threatened species information online, Virginia Fish and Wildlife Information Service (VaFWIS). They identified one Federally Threatened Species and Federally Endangered Species, seven State Threatened and two State Endangered Species (**Table 5.2)** VaFWIS did not identify any wildlife refuges or bald eagle nests.

TABLE 5.2 DGIF Threatened and Endangered Species		
Name	**Scientific Name**	**Listing**
Northern long-eared bat	Myotis septentrionalis	Federal Threatened
Dwarf Wedgemussel	Alasmidonta heterodon	Federal Endangered / State Endangered
Wood Turtle	Glyptemys insculpta	State Threatened
Peregrine Falcon	Falco peregrinus	State Threatened
Upland Sandpiper	Bartramia longicauda	State Threatened
Loggerhead Shrike	Lanius ludovicianus	State Threatened
Henslow's Sparrow	Ammodramus henslowii	State Threatened
Green Floater	Lasmigona subviridis	State Threatened
Migrant Loggerhead Shrike	Lanius ludovicianus migrans	State Threatened
Brook Floater	Alasmidonta varicosa	State Endangered
Regal Fritillary	Speyeria idalia	Federal Species of Concern
Bald Eagle	Haliaeetus leucocephalus	Federal Species of Concern
Dotted Skipper	Hesperia attalus slossonae	Federal Species of Concern
Yellow Lance	Elliptio lanceolata	Federal Species of Concern
Spotted Turtle	Clemmys guttata	Collection Concern
Timber Rattlesnake	Crotalus horridus	Collection Concern

Source: *VAFWIS Search Report*

The proposed JYO development projects will result in the removal of habitat for the removal of obstructions (trees). As part of NEPA documentation, an on-site biotic survey would be conducted prior to any construction to identify the potential for the species identified in the IPaC. The biological impacts anticipated from the proposed development are not anticipated to significantly affect existing biological resources on and around the Airport.

5.4 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

The Archaeological and Historic Preservation Act of 1974 (as amended), provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance by providing for the survey, recovery, and preservation of historical and archaeological data that might otherwise be destroyed or irreparably lost due to a federal, federally licensed, or federally funded action.

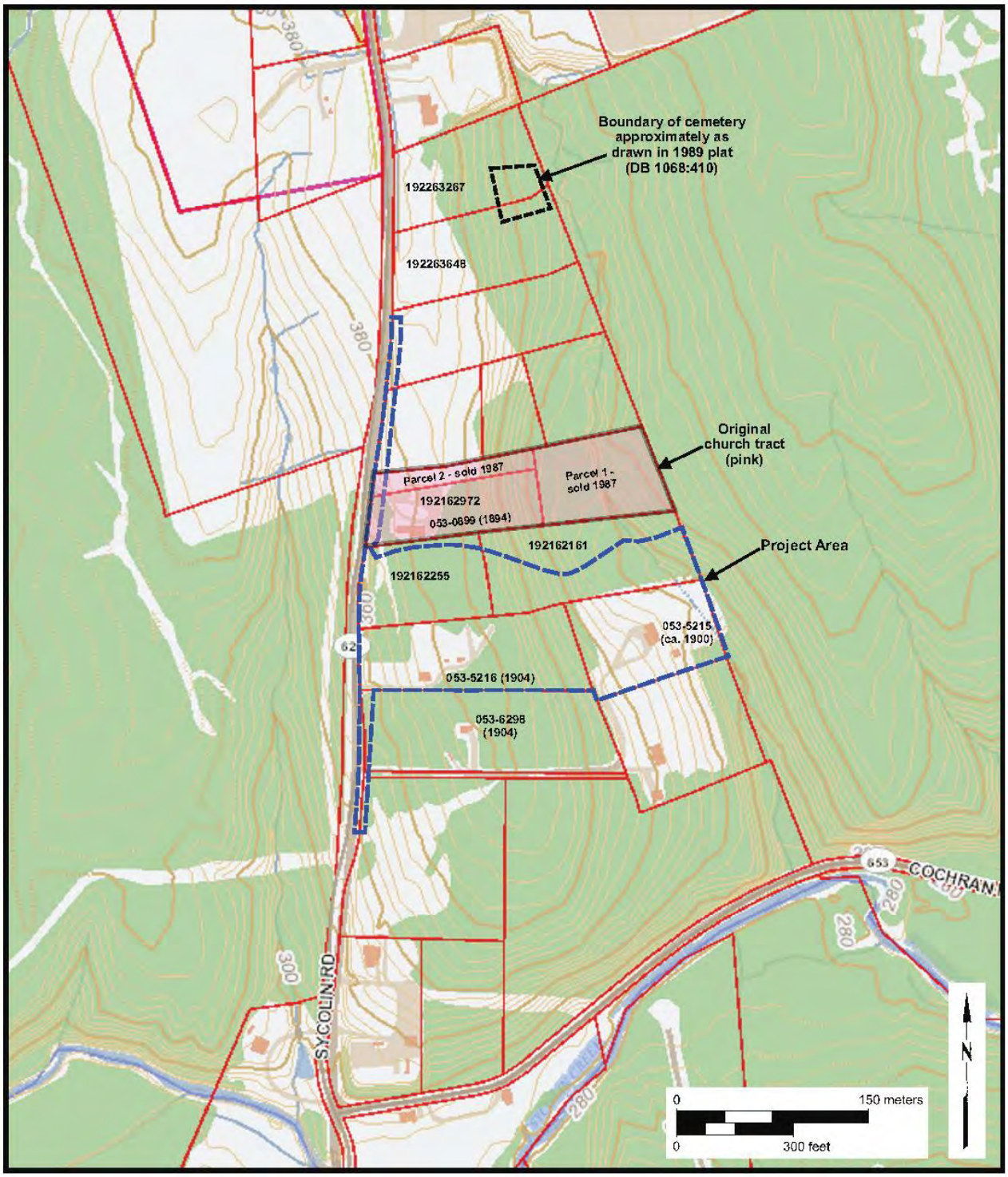
The National Register of Historic Places is a list of the Nation's cultural resources considered worthy of preservation. The staff of the Virginia Department of Historic Review (DHR) administers this program for the Commonwealth. The interdisciplinary committee meets twice a month and makes a recommendation regarding a property's eligibility to the State Review Board for listing in the Virginia Landmarks Register and the National Register.

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. They include archaeological resources (both prehistoric and historic), historic architectural resources, and Native American sacred sites and traditional cultural properties. Historic properties (as defined in CFR 36 Part 60.4) are significant archaeological, architectural, or traditional resources that are either listed or eligible for listing in the National Register.

The National Historic Preservation Act (NHPA) of 1966 (as amended) and the Archaeological and Historic Preservation Act (AHPA) of 1974 (as amended), provide protection against development impacts that would cause changes in the historical, architectural, archaeological, or cultural qualities of the property. Under NHPA, the airport sponsor is required to consider the effects of its undertaking on historic properties listed, or eligible for listing in the National Register.

JYO is not located near any resources identified on the National Register of Historic Places (NRHP). However, the Sycolin Community Cemetery is located on the southeast corner of airport property and contains approximately 65 known graves (**Exhibit 5-1)**. This cemetery contains burials associated with the nearby First Baptist Church of Sycoline, an African American church and associated community dating to the 19th century. No adverse impacts to the cemetery are anticipated as a result of the proposed airport development projects, including the 500' runway extension.

Exhibit 5-1
Sycolin Community Cemetery



Source: *Crosstrails Boulevard Cultural Resources Report*

A NEPA document would include the collect and review previous cultural resource investigations that were conducted on and in the immediate vicinity of airport property. Coordination with DHR would be conducted to identify impacts to cultural resources. The NEPA document would also include documentation of the coordination effort and any additional investigations.

5.5 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, and CHILDREN'S ENVIRONMENTAL HEALTH and SAFETY RISKS

Analyses of socioeconomics include addressing impacts to the following: economic activity (employment and earnings), population, housing, and public schools. The principal social impacts that must be considered are the relocation of businesses and / or residences, alteration of surface transportation patterns, division or disruption of established communities, disruption of orderly planned development, and the creation of an appreciable change in employment. If any relocation of residential or commercial properties is required, compensation shall be made under the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, as amended by the Surface Transportation and Uniform Relocation Act of 1987 and its implementing regulations (49 CFR Part 24, *Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally – Assisted Programs*.

If any potentially impacted properties cannot be acquired through a land acquisition program prior to the start of each specific project, the guidelines set forth in the documents described previously must be followed to mitigate impacts on the affected areas. Additionally, any areas with concentrated populations of people belonging to a single race, national origin, or low income bracket must be identified and evaluated under the requirements of Environmental Justice (Section 5.5.2) to ensure that they are not receiving a disproportionate share of adverse environmental impacts (e.g., high levels of noise or air exposure) in relation to other areas in the vicinity of the airport.

The only social impact expected to occur as a result of implementation of the proposed Airport development is the fee-sinple land acquisition for the Runway 17 RPZ and the avigation easement acquisition for the Runway 35 nonprecision approach. However, no residences or businesses will be acquired or relocated as a result of this proposed JYO development projects.

The following sections describe legal requirements for evaluating impacts to environmental justice, special risks to children, and induced socio-economic impacts.

5.5.1 Induced Socioeconomic Impacts

Induced socioeconomic impacts are those impacts on surrounding communities that are generally produced by large-scale development projects. The scope of such development may create shifts in population movement and growth patterns, public service and demand, and changes in commercial and economic activity. Given the scope of development initiatives proposed for the Airport, no induced socioeconomic impacts are expected to occur as a result of their implementation.

5.5.2 Environmental Justice

Environmental justice is defined by the Environmental Protection Agency (EPA) as "*fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies.*[4]"

Concern that minority populations and/or low-income populations bear a disproportionate amount of adverse health and environmental effects led to the issuance of Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994. The Environmental Impact Analysis Process, 32 CFR 989, addresses the need for consideration of environmental justice issues during impact analysis. An Environmental Justice analysis identifies disproportionately high and adverse human health and safety and environmental impacts on minorities and low-income communities and identifies appropriate alternatives. EO 12898 also requires the application of equal consideration for Native American populations.

As previously discussed, the proposed 500' extension of Runway 17/35 is not anticipated to result in social impacts related to relocations, community disruption, or surface transportation pattern changes. Also, none of these airport projects are anticipated to result in adverse impacts to minority or low-income populations.

5.5.3 Children's Environmental Health and Safety Risks

In 1997, Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks was enacted. This order mandates that all Federal agencies assign a high priority to addressing health and safety risks to children, coordinating research priorities on children's health, and ensuring that their standards take into account special risks to children. The EO states

[4] EPA, Guidance on Considering Environmental Justice During the Development of Regulatory Actions, May 2015.

that "environmental health and safety risks" means risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest.

Children are more sensitive to some environmental effects than the adult population, such as airborne asbestos and lead paint exposures from demolition, safety with regard to equipment, trips/falls/traps within structures under demolition, and noise. Activities occurring near areas that tend to have a higher concentration of children than the typical residential area during any given time, such as schools, churches, and community childcare facilities, may further intensify potential impacts to children.

None of the development alternatives proposed in this AMPU are anticipated to result in adverse impacts upon the health or safety of children. However, development projects requiring a NEPA document would require further analysis to verify that probability.

5.6 WATER RESOURCES

The Clean Water Act, 33 U.S.C. §1251 et seq. (1972) (as amended), establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. CWA significantly reorganized and expanded the Federal Water Pollution Control Act of 1948. The implementing federal regulations include 40 CFR Part 403, *National Pollutant Discharge Elimination System (NPDES)* permitting process, and CWA section 304(b) requires EPA to annually review and, if appropriate, revise Effluent Guidelines.

Overall water quality at JYO is regulated by federal and state legislation. CWA requires property owners to establish water control standards, control discharges into surface and subsurface waters, develop waste treatment management plans and practices, and issue permits for discharges and for dredged or filled materials into surface waters. The Fish and Wildlife Coordination Act, July 9, 1965 (P.L. 89-72), as amended, requires consultation with FWS and the DGIS when any alteration and/or impounding of water resources is expected. Additionally, the NPDES provides regulations that govern the quality of stormwater discharged into water resources of the U.S.

The most important water quality impact at an airport is related to storm water discharge and runoff as the paved surfaces may contain chemicals that cannot be discharged freely into either streams or sewer systems. In addition, construction that exceeds one acre requires a NPDES permit as administered by DEQ. Construction projects must also adhere to stormwater policies and permitting requirements set forth by the Loudoun County. Though none of the development

included in the AMPU is anticipated to adversely impact water quality, coordination with DEQ and Loudoun County will likely be necessary to identify preventative measures and ensure water quality. A separate stormwater Management Plan is currently being developed for JYO which will account for existing and proposed impervious surfaces and the necessary stormwater management controls.

5.6.1 Wetlands

Wetlands are defined as "*Those areas that are inundated or saturated by surface or ground water (hydrology) at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation (hydrophytes) typically adapted for life in saturated soil conditions (hydric soils). Wetlands generally include swamps, marshes, bogs, and similar areas.*[5]"

A preliminary review of existing wetlands in and around JYO was conducted for this study, see **Exhibit 5-2**. IPaC identified a freshwater pond Palustrine wetland measuring 0.75 acres within the 214-acre Airport property. A detailed wetland field survey will be conducted as part of future NEPA review processes for future development at the Airport.

The areas to be impacted by the proposed airport development are primarily located in upland areas and do not appear to contain substantial wetlands. The nearest on-airport wetlands are approximately 0.34 miles southwest and 0.22 miles southeast of the end of Runway 35. The extension of Runway 17-35 is not likely to directly impact wetlands however, the proposed west hangar and apron development may impact 0.34 acres of wetlands and associated streams. These impacts are not anticipated to cause significant adverse impacts. These impacts would be mitigated via the purchase of wetland credits as approved by the U.S. Army Corps of Engineers and DEQ.

[5] *40 CFR 232.2(r).*

Exhibit 5-2
JYO Wetlands

Source: *U.S. Fish and Wildlife Service - NEPAssist*

5.6.2 Floodplains

The proposed future development at JYO does not have the potential to impact FEMA identified floodplains for a 100-year flood (Zone A). Based on the applicable Flood Insurance Rate Map (FIRM), the Airport sits outside the 100-year and 500-year floodplains. There are no proposed airport development projects located within these floodplains.

5.6.3 Surface Waters

Surface water features in the vicinity of the Airport include Sycolin Creek which flows from west to the south of the Airport into Goose Creek which picks up Tuscarora Creek which flows northeast to southeast. Goose Creek flows eastwardly until it empties into the Potomac River until it ultimately the Chesapeake Bay. Small segments of intermittent streams associated with the wetlands may be impacted by the hangar development on the west side of the Airport. No other streams are anticipated to be adversely impacted by the proposed airport development projects.

5.6.4 Groundwater

Groundwater includes water present beneath the Earth's surface which flows between rocks and soil. Groundwater will not be directly impacted by the development of the proposed airport projects. However, a number of private well sites are identified in the single-family residential area located southeast of airport property along Sycolin Road. Some of these residences have been removed in recent years and the associated wells have likely been capped.

5.6.5 Wild and Scenic Rivers

The National Wild and Scenic Rivers Act (NWSRA) of 1968 describe those river segments designated, or eligible to be included, in the Wild and Scenic Rivers System. The Department of the Interior (DOI) National Park Service (NPS) River and Trail Conservation Assistance Program (RTCA) within NPS's National Center for Recreation and Conservation (NCRC) maintains a Nationwide Rivers Inventory (NRI) of river segments that appear to qualify for inclusion in the National Wild and Scenic River System. Under the provisions of the NWSRA, Federal agencies cannot assist, by loan, grant, license, or otherwise, in construction of any water resources project that would have direct and adverse impacts on river values. River segments protected under this legislation are administered by the NPS. According to NRI, there are no rivers in Virginia designated wild and scenic. However, there are several Loudoun County rivers listed in NCRC's NRI. They include the following:

- Catoctin Creek
- Goose Creek (two segments)
- Potomac River (four segments)

Goose Creek is about 1.80 miles east of the Airport's ultimate proposed development. The Potomac River, which is the largest body of water in the vicinity of the Airport, is about 4.90 miles to the east of Airport property. None of the three water bodies identified above will be impacted by the 500' runway extension.

5.7 COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the Coastal Barriers Resources Act (CBRA), the Coastal Zone Management Act (CZMA), and Executive Order (EO) 13089, Coral Reef Protection. This legislation prohibits the federal government from becoming financially involved with any project that seeks to develop within undeveloped portions of designated coastal barrier areas. The Department of the Interior (DOI) of the National Park Service (NPS) develops and maintains maps of the Coastal Barrier Resource System (CBRS).

Loudoun County, the Airport, and The Town of Leesburg are not contiguous with any coastal waters or lands protected under the identified regulations. Furthermore, the Airport is located 150 miles west of the Atlantic Ocean, which is the nearest coastal water body covered under the regulations. Therefore, Airport development initiatives are not subject to the provisions of the coastal zone management program and a coastal zone management consistency determination will not be required prior to any airport development projects.

5.8 CONSTRUCTION IMPACTS

Airport construction may cause various environmental effects primarily due to dust, aircraft and heavy equipment emissions, storm water runoff containing sediment and/or spilled or leaked petroleum products, and noise. Generally, these effects are subject to federal, state, or local ordinances or regulation. While the long-term impacts are usually greater than the construction impacts, construction may cause significant short-term impacts. The potential for impacts to off-Airport communities near the Airport is greatest during the initial phases of development. These impacts may consist of increased traffic on local roads, noise, mud, dust, and other effects associated with the activity of heavy construction vehicles.

Construction impacts related to the proposed development projects at JYO are expected to be minor and temporary in nature. Nevertheless, contractors should exercise best practices at JYO to contain and minimize impacts during construction phases of these projects.

5.9 DEPARTMENT OF TRANSPORTATION ACT, (SECTION 4(f)

Section 4(f) of the U.S. Department of Transportation (DOT) Act, 1996 (49 U.S.C. § 303), as amended, protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) provides that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land off a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance, only if there is no feasible and prudent alternative to the using that land and the program or project includes all possible planning to minimize harm resulting from the use. Enforcement of this legislation is the primary responsibility of the DOI, though the U.S. Fish and Wildlife Service (FWS) and U.S. Army Corps of Engineers (USACE) may provide assistance.

The proposed development at JYO will primarily be confined to existing airport property and does not seek to acquire land that is subject to Section 4(f) of the DOT Act. Additionally, it is anticipated that the development program will not adversely affect any public park; recreational areas; historical sites; or wildlife waterfowl refuge of national, state, or local significance. Therefore, the proposed Airport development described in this AMPU is not expected to adversely impact any of the previously mentioned lands.

5.10 FARMLANDS

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, or products. Unique farmland is land used for producing high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture necessary to produce high quality crops or high yields of crops.

The majority of the proposed development will be located within existing Airport property and that has been previously disturbed and therefore will not encroach upon any prime or unique farmland. However, acquisition of property south of the Airport is proposed. This property to be acquired is not currently farmed. The USDA soils inquiry reveals that airport property is predominantly Udorthents, Penn Silt Loam, Sycoline-Kelly Complex, Albano Silt Loam, and

Manassas Silt Loam of varying slopes. The NRCS provides farmland classifications and their percentage of the Airport's area as shown in **Table 5.3.**

TABLE 5.3
Soil Classification

Soil Type	Percentage of Area of Interest	Prime Farmland, Unique Farmland, Farmland of Statewide Importance
Udorthents	24.5%	--
Penn silt loam	17.9%	All areas are prime farmland
Sycoline-Kelly complex	13.1%	Farmland of statewide importance
Albano silt loam	9.9%	Not prime farmland
Manassas silt loam	8.8%	All areas are prime farmland
Dulles silt loam	7.0%	All areas are prime farmland
Sycoline-Catlett complex	6.6%	Farmland of statewide importance
Penn silt loam	6.0%	Farmland of statewide importance
Kelly silt loam	3.3%	Farmland of statewide importance
Sudley-Oatlands complex	2.8%	All areas are prime farmland
Elbert silty clay loam	0.1%	Not prime farmland
Panorama silt loam	0.0%	All areas are prime farmland

Source: *United Stated Department of Agriculture, Natural Resources Conservation Service – Web Soil Survey*

A portion of JYO's existing and proposed property is delineated as "prime farmland" or "farmland of statewide importance" by the NRCS. As such, coordination with the NRCS is recommended during the NEPA process of the Airport's future development projects.

5.11 HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Four primary laws have been passed governing the handling and disposal of hazardous materials, chemicals, substances, and wastes. The two statutes of most importance to the FAA are the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Facilities Compliance Act of 1992, and the Comprehensive Environmental Response, Compensation, and

Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization act of 1986 (SARA or Superfund) and the Community Environmental Response Facilitation Act of 1992. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of any release of hazardous substance (excluding petroleum) into the environment. The Pollution Prevention Act of 1990, as amended, and the Toxic Substances Control Act (TSCA) of 1976, as amended, also apply to FAA under FAA Order 1050.1F. The Pollution Prevention Act calls for pollution prevention through source reduction, recycling, and safe disposal. Hazardous materials, solid waste, and pollution prevention as an impact category includes an evaluation of the following:

- Waste streams that would be generated by a project, potential for the wastes to impact environmental resources, and the impacts on waste handling and disposal facilities that would likely receive the wastes;
- Potential hazardous materials that could be used during construction and operation of a project, and applicable pollution prevention procedures;
- Potential to encounter existing hazardous materials at contaminated sites during construction, operation, and decommissioning of a project; and
- Potential to interfere with any ongoing remediation of existing contaminated sites at the proposed project site or in the immediate vicinity of a project site.

Solid waste is defined as any discarded material that is not excluded under § 261.4(a) or that is not excluded by a variance granted under §§ 260.30 and 260.31 or that is not excluded by a non-waste determination under §§ 260.30 and 260.34.[6]

FAA Order 1050.1F defines hazardous material as any substance or material that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce. The term hazardous materials include both hazardous wastes and hazardous substances, as well as petroleum and natural gas substances and materials.[7]

The potential for handling hazardous waste must be evaluated when determining the impacts associated with Airport development. None of the proposed development projects contained in this AMPU are anticipated to create or require the handling of hazardous materials other than normal fueling procedures conducted on an airport. However, proper coordination with federal, state, and local officials should be completed during the NEPA process of each project to identify the potential hazardous waste impacts and ensure proper mitigations is completed, if necessary.

[6] 40 CFR Part 261.2, Definition of Solid Waste
[7] 49 CFR §172.101, Purpose and use of hazardous materials table

RCRA regulates solid waste impacts. It grants authority to the EPA to control hazardous waste from the "cradle-to-grave" including its generation, transportation, treatment, storage, and disposal. RCRA also provides for safe disposal of discarded materials, regulates hazardous waste, promotes recycling, and establishes criteria for sanity landfills. An amendment was made to RCRA in 1986 that enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous materials. DEQ has primary responsibility for regulating landfills and overseeing programs associated with solid wastes.

Increases in solid waste will likely be seen during periods of construction. Coordination with state and local officials should be completed to ensure that adequate capacity for the increase in solid waste disposal exists and is readily available prior to any construction on the Airport. Solid waste should be recycled where possible in order to reduce the amount of material sent to landfills.

5.12 LIGHT EMISSIONS AND VISUAL EFFECTS

Visual impacts are dependent upon the extent in which the proposed airport development would contrast with, or detract from, the visual resources and / or the visual character of the existing environment. Visual effects can be difficult to define and assess because they involve subjectivity. For that reason, visual effects are broken into two categories: a) *Light Emission Effects;* and b) *Visual Resources and Visual Character*.

> "*Light emissions include any light that emanates from a light source into the surrounding environment."*

Light emissions would include airfield and apron flood lighting, navigational aids, terminal lighting, parking / facility lighting, roadway lighting, etc. Glare is a type of light emissions that occurs when light is reflected off a surface (e.g. window glass or reflective building surfaces).

Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed development. This is often referred to as the "viewshed". Areas in close proximity to densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc.

There are no standards or special purpose laws for light emissions and visual impacts. Because of the relatively low levels of light intensity compared to background levels associated with most air navigation facilities (NAVAIDs) and other airport facilities, light emission impacts are unlikely to have adverse impact on human activity. Whenever the potential for an annoyance exists, such as location of lights or light systems, pertinent characteristics of the particular system and its use, and measures to reduce any annoyance, such as shielding or angular adjustments should be considered when applicable.

None of the proposed Airport development items described in this AMPU are expected to result in significant light or visual related impacts to the areas surrounding the Airport.

5.13 NATURAL RESOURCES AND ENERGY SUPPLY

Executive Order 13693, "*Planning for Federal Sustainability in the Next Decade*" (EO 13693), signed 25 March 2015, encourages each federal agency to build a clean energy economy that will sustain our prosperity and the health of our people and our environment for generations to come.

The proposed development at the Airport is not anticipated to significantly affect energy supply or natural resources. The largest demand requirements are expected to result from increased electrical requirements from additional hangars, airfield lighting, NAVAID equipment, and tenant facilities. The forecast increase in airport activity will likely result in increased aviation and vehicular fuel use. To limit or eliminate any possible negative impacts associated with increased energy demands, proper planning and coordination with the Town of Leesburg, Loudoun County and other necessary agencies should be conducted during the NEPA evaluation process.

5.14 CUMULATIVE IMPACTS

NEPA requires the evaluation of the environmental consequences, including cumulative, direct, and indirect effects, of all federal actions.

Cumulative impacts are defined as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."[8]

[8] 40 CFR Part 1508.7, Cumulative Impacts

Direct effects are defined as:

> "caused by the action and occur at the same time and place."[9]

Indirect effects are defined as:

> "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[10]

The proposed development at the Airport could likely result in some level of future cumulative direct and / or indirect effects as Airport operations and overall activity increases. Such impacts are likely to include, but may not be limited to, local transportation routes and traffic volumes, land use and community growth, industrial and commercial business activity, and overall demand for public services. Additionally, disruptions to area residences and businesses from periodic construction associated with Airport development may occur. Coordination with state and local officials will be necessary to ensure any future cumulative direct and / or indirect effects are identified and adequate facilities and services are planned to meet the long-term needs of the Airport and local community.

5.15 LAND USE

Land use is an important factor when determining the impact of airport development. Section 7.4 of the Leesburg Zoning Ordinance[11] identifies the Airport as Municipal Airport (MA) (Special Purpose) District. The MA District acknowledges the physical constraints of the existing airport location and the necessity of providing adequate support facilities.

Protecting the area around the airport is crucial as airport sponsors must work closely with city planners to ensure zoning around the airport is compatible. Preventing the construction of residential areas, schools, hospitals, churches, or other noise sensitive areas to be located within close proximity to the airport is good practice not only for the operator and users of the airport, but for the community as well. Existing land use around JYO consists of a small area to the southeast of the airport that is zoned Single Family Residential (R-1) and is located approximately 2.45 miles from the Airport. Located to northwest and northeast of the airport are areas zoned Industrial/Research Park (I-1), both areas are located less than mile from the Airport. Exhibit 1-23 in Chapter 1 identifies the Town of Leesburg Airport Area Land Use Policy Map.

[9] 40 CFR Part 1508.8, Effects
[10] 40 CFR Part 1508.8, Effects
[11] http://www.leesburgva.org/government/departments/planning-zoning/zoning/zoning-ordinance

Future land use around the Airport includes a Planned Employment Center (PEC) to the north and northeast of the Airport, a Planned Residential Community (PRC) north of the Airport, and Planned Residential Neighborhood (PRN) to the northeast of the Airport.

Section 7.7 of the Town of Leesburg Overlay and Special Purpose Districts[12] identifies the Airport Overlay District as regulating and restricting the height of structures, objects or natural growth, regulating the locations of noise sensitive uses, and otherwise regulating the use of property in the vicinity of the Airport. This is achieved by creating appropriate zones and establishing the boundaries thereof; providing for changes in the restrictions and boundaries of such zones; and providing for enforcement of the land uses within these zones.

The Town of Leesburg and Loudoun County should continue to promote airport-compatible development around JYO by limiting the development of this area with non-airport compatible uses such as residential areas, churches, hospitals, or schools.

5.16 NOISE

To achieve airport-environs compatibility, minimizing aircraft noise impacts on areas surrounding the airport is important. Noise is simply unwanted sound. Aircraft noise is perceived differently by individuals, but collectively is perceived as a nuisance. However, concerns about aircraft noise are often reflections of the degree to which aircraft noise intrudes on existing background noise. In general, where ambient noise is low, aircraft noise is perceived as a problem. For example, in an urban area, noise generated by aircraft is muffled by noise generated by traffic and industry; by contrast in a more rural setting aircraft noise is viewed as more intrusive. Each community must decide whether noise related land use controls around their airport should be limited to substantially noise-impacted areas or if there is a need to control land use in areas impacted by more moderate noise levels.

Historically, airports were constructed on the outskirts of communities. Aircraft noise was not a problem since the airport was located at a significant distance from developed areas. Through the years, development has often encroached closer to the airport. In many areas, residential development and other high density development is now occurring near airports. Coupled with increases in air traffic volumes, the potential for noise problems related to land uses in the airport environs has intensified. Non-compatible development approved near airports increases the perceived impact of aircraft noise.

[12] http://www.leesburgva.org/home/showdocument?id=4543

Noise impact areas for an airport are identified by noise contours. The basic methodology employed to define aircraft noise levels involves the use of a mathematical model: the Federal Aviation Administration's (FAAs) Aviation Environmental Design Tool (AEDT). AEDT software is a comprehensive tool that provides information to FAA stakeholders on specific environmental impacts, including noise. AEDT models aircraft performance in space and time to estimate noise, fuel consumption, emissions, and air quality consequences. The goal of noise modeling is to compute the location a size of noise contours and display them graphically. The Model computes the associated noise exposure level for the specific aircraft and engine thrust used at that point along the aircraft route of flight. The individual noise exposure levels are summed for each on a map of the airport. Although lines on a map tend to be viewed as definitive, it should be emphasized that the Model is only a planning tool. By developing a set of noise contours for an airport, a planner identifies areas that are most likely to be impacted by aircraft noise and plan accordingly. **Table 5.4** shows the FAA guidelines for sound levels and compatible land uses.

TABLE 5.4
FAA Guidelines for Airport Sound Levels and Compatible Land Uses

Land Use	Yearly day-night average sound level (Ldn) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes, and transient lodgings	Y	N (1)	N (1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N (1)	N (1)	N (1)	N	N
PUBLIC USE						
Schools	Y	N (1)	N (1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls,	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y (2)	Y (3)	Y (4)	Y (4)
Parking	Y	Y	Y (2)		Y (4)	N
COMMERCIAL						

TABLE 5.4
FAA Guidelines for Airport Sound Levels and Compatible Land Uses

Land Use	Yearly day-night average sound level (Ldn) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail building materials, hardware and farm equipment	Y	Y	Y (2)	Y (3)	Y (4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y (2)	Y (3)	Y (4)	N
Communications	Y	Y	25	30	N	N
MANUFACTURING & PRODUCTION						
Manufacturing-general	Y	Y	Y (2)	Y (3)	Y (4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y (6)	Y (7)	Y (8)	Y (8)	Y (8)
Livestock farming and breeding	Y	Y (6)	Y (7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y (5)	Y (5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits/zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, stables, water recreation	Y	Y	25	30	N	N

Note:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor

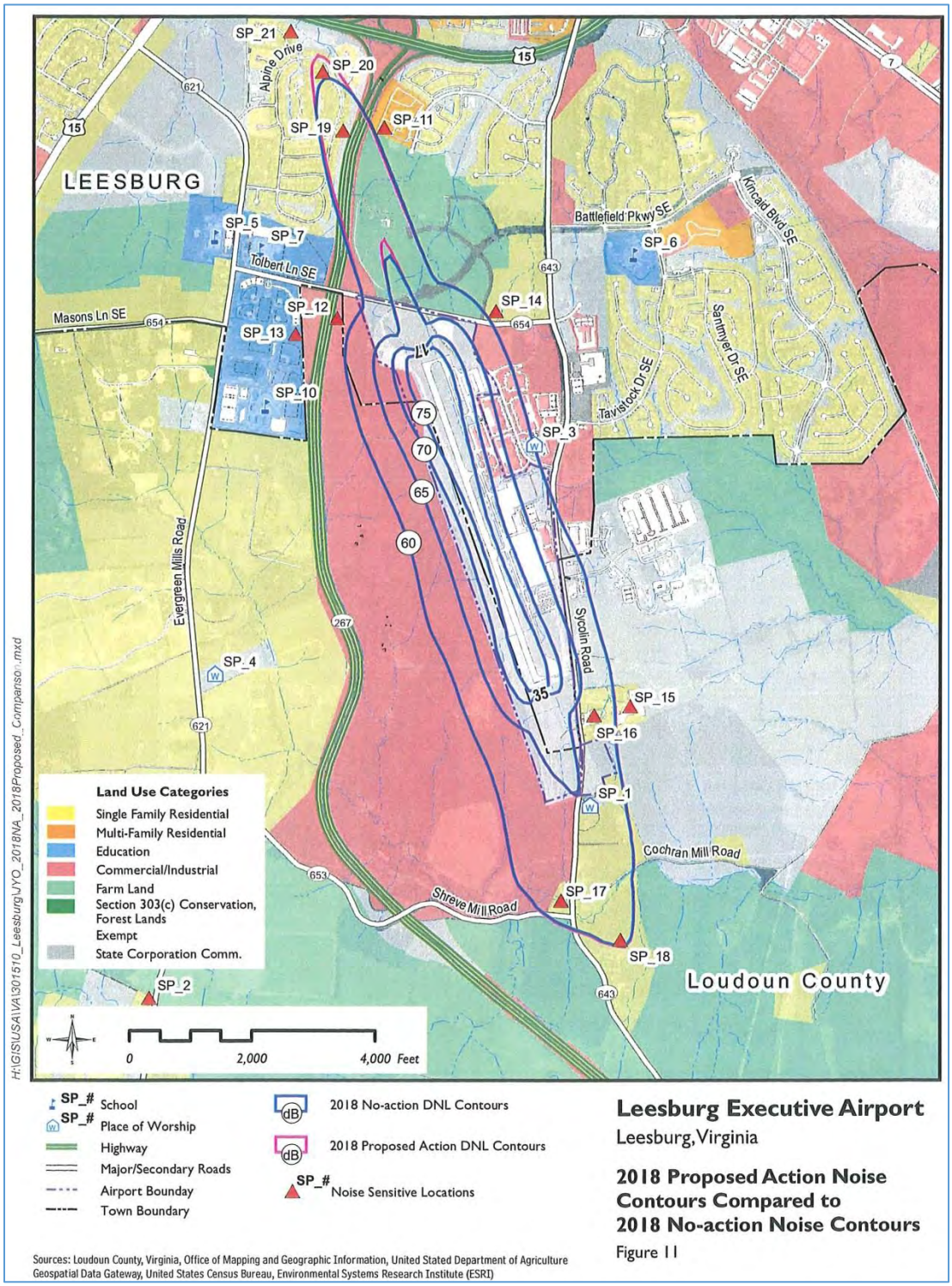
TABLE 5.4
FAA Guidelines for Airport Sound Levels and Compatible Land Uses

Land Use	Yearly day-night average sound level (Ldn) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low. (5) Land use compatible provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25. (7) Residential buildings require an NLR. (8) Residential buildings not permitted.						

Source: *14 CFR Part 150, Airport Noise Compatibility Planning, Appendix A, Table 1, Land Use Compatibility with yearly Day-Night Average Sound Levels, pg. 626.*

The noise contours developed for the 2007 JYO Instrument Landing System (ILS) Environmental Assessment are included in this AMPU. No additional noise contours were developed as part of this project. The contours depicted in **Exhibit 5-3** illustrate the projected 2018 noise contours with and without the installation of the ILS. The 65 db DNL contour falls mostly on JYO property with the exception of a small area extending north of Battlefield Parkway. The proposed airport development is not anticipated to dramatically affect these contours and no residential or commercial structures fall within the 65 db DNL contour. It is recommended however that noise abatement procedures be used whenever practical to reduce the impact on the surrounding residences and businesses.

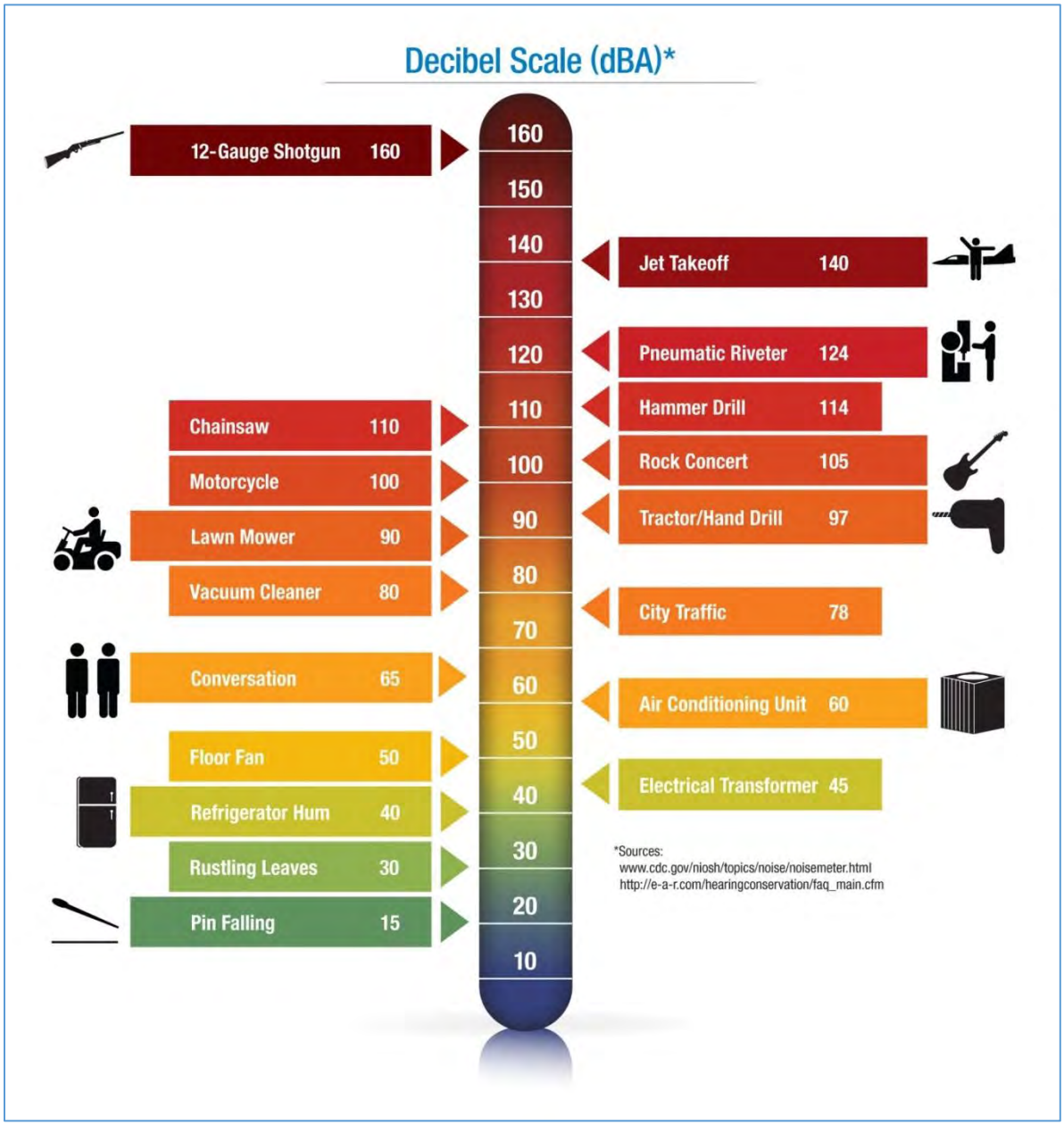
Exhibit 5-3
2007 JYO ILS Environmental Assessment Noise Contours



Source: *2007 JYO Instrument Landing System Environmental Assessment*

Exhibit 5-4 illustrates various noise producing elements in decibels (db). Note that airport noise falls between ordinary conversation and garbage disposal noise level.

Exhibit 5-4
Common Sound Levels



Source: *www.thehighroad.org*

5.17 AIRPORT RECYCLING, REUSE, and WASTE REDUCTION

FAA Memorandum *Guidance on Airport Recycling, Reuse, and Waste Reduction Plans* dated September 30, 2014 instructs airport sponsors to develop recycling plans as part of airport master plan updates. The memo states: The FAA Modernization and Reform Act of 2012 (FMRA), which amended Title 49, United States Code (U.S.C.), included a number of changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports.

a. Section 132 (b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including the cost of a waste audit."

b. Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a master plan, and that receive AlP funding for an eligible project, to ensure that the new or updated master plan addresses issues relating to solid waste recycling at the airport.

A recycling, reuse, and waste reduction plan was developed for JYO as part of this AMPU. The plan is described in the following subsections.

5.17.1 Facility Description and Background

The Leesburg Executive Airport is a general aviation reliever facility with 258 based aircraft and 115,659 annual operations. Additional airport details and facilities are discussed in Chapter 1 of this AMPU. Airport solid waste and recycling is collected at various locations on the landside and airside areas. Dumpsters are provided to collect solid waste and cardboard for recycling. These waste/recycling removal services are provided by Con-Serv Industries.

The Leesburg Executive Airport has direct control over the recycling provided in public spaces of the terminal building, airport administrative offices, and airport equipment storage areas. Recycling bins are provided in these areas of the terminal building. Sump fuel from aircraft is disposed of in storage containers near the main terminal building and apron area. The airport does not have control over recycling practices of the airport Fixed Base Operators and airport tenants, including aircraft stored in hangars. However, the Airport may have influence over these tenants and can recommend recycling practices for these tenants. These recommendations can include solid waste recycling and deplaned waste recycling.

In 1991 the Town of Leesburg Town Council adopted a resolution establishing a recycling policy. Beginning in 1997, the Town Plan committed the Town to an on-going review of its internal waste minimization and recycled content procurement practices. Updates of the Town Plan continue to include waste reduction as a Town Objective, setting a goal of ultimately recycling 50% of solid waste. The Plan states: "It is the policy of the Town of Leesburg that government operations shall be environmentally responsible in managing solid wastes through waste reduction, reuse, and recycling practices." The Town provides three recycling containers for the Leesburg Executive Airport. Acceptable recycled materials include:

1. Commingled containers include clear, green and brown glass bottles and jars, aluminum and steel food and beverage cans, and PET(1) and HDPE(2) plastic bottles and jugs.

2. Newsprint includes all inserts with the newspaper.

3. White paper includes letterhead, memos, copier, blueprint, notebook paper, computer, envelopes with/without windows and similar paper.

4. Cardboard / paperboard include corrugated and pressed cardboard.

5.17.2 Review of Recycling Feasibility

As previously mentioned, the Town of Leesburg supports recycling efforts by Town employees and residents. Recycling is not mandatory but it is highly encouraged. Hindrances to recycling efforts at the Airport include limited availability of landside and airside recycling bins that accept paper, plastic, metal, and glass. The Airport has adequate space to provide additional recycling bins if desired. Currently, only cardboard can be recycled in the dumpster adjacent to the terminal building parking lot.

5.17.3 Operation and Maintenance (O&M) Requirements

Airport terminal recycling is picked up by the Town of Leesburg and transported to one of the Town's recycling centers. Airport tenants voluntarily transport recycling materials either to their residences or one pf the Town's recycling centers. These centers also accept waste oil that tenants can utilize to dispose of oil from aircraft maintenance. Airport users and tenants can use the cardboard recycling dumpster in the terminal parking lot. This dumpster is emptied by Con-Serv Industries in a contract with the Town of Leesburg.

5.17.4 Review of Waste Management Contracts

Waste services at the Leesburg Executive Airport are provided by Con-Serv Industries. It is recommended that the Airport acquire additional recycling dumpsters which can accept paper, plastic, metal, and glass from Con-Serv. Janitorial service contracts could be amended so that recycling materials throughout the terminal and tenant facilities are collected and placed in these proposed recycling dumpsters.

5.17.5 Potential for Cost Savings or Revenue Generation

The current recycling program at the Airport is funded by the Town of Leesburg and the Airport's operating and maintenance budget. Tenant recycling activities are funded by those individuals/businesses. It may be possible for the Airport to offer additional recycling options via a bundled contract with the Town and waste service provider. Recycling costs can sometimes be offset via state and federal grants which may enable additional recycling at the Airport without added to airport costs.

5.17.6 Plan to Minimize Solid Waste Generation

The following recommendations were developed after reviewing the existing recycling and waste reduction efforts at the Leesburg Executive Airport.

1. Provide additional recycling bins/dumpsters that accept paper, plastic, metal, and glass both in the terminal, and on the airside for tenant use. Provide bins for dedicated tenant use to the extent practicable.

2. Revise tenant leases as they expire to include recycling and waste minimization goals.

3. Require recycling and waste minimization efforts in approving new capital development projects. Require contractors to recycle excess building materials and shipping packaging.

4. Install hand driers in restroom facilities to reduce paper towel use.

5. Provide a central sump oil tank that tenants can use for disposing of used aircraft oil/lubricants.

6. Encourage the use of electronic documents in place of paper copies when possible.

Additional information and recommendations regarding airport recycling programs and sustainability efforts can be found in the following resources:

1. Virginia Airports Sustainability Management Plan (http://www.doav.virginia.gov/Sustainability.htm)

2. Recycling, Reuse and Waste Reduction at Airports – FAA (https://www.faa.gov/airports/resources/publications/reports/environmental/media/RecyclingSynthesis2013.pdf)

3. Developing and Implementing an Airport Recycling Program – EPA (https://www.epa.gov/nscep)

6.0 AIRPORT DEVELOPMENT PLAN

This Section of the Master Plan Update incorporates the facility requirements into a phased 20-year airport development plan, utilizing the recommended development alternative from Chapter 4. This plan provides guidance and a strategic approach for continued maintenance, upgrade and expansion of facilities; as consistent with the long-term role of the Airport. The ALP, Airport Layout Drawing[1] depicts proposed capital improvements as documented by the ALP Update recommendations. Proposed facilities, which are not currently justifiable via the aviation activity forecasts, are shown in the ultimate phase for planning purposes only.

6.1 AIRPORT LAYOUT PLAN

The Airport Layout Plan (ALP) drawings for the Leesburg Executive Airport have been updated to correspond with recommendations identified for the 20-year planning period. The ALP drawings, which graphically depict existing and future facilities, have been prepared in conformance with FAA Advisory Circular 150/5300-13A, *Airport Design*, and in conformance with the FAA-Airport Layout Plan Checklist. The ALP drawings updated for the Leesburg Executive Airport include:

- Title Sheet
- Airport Layout Plan Drawing (ALD)
- Terminal Area Plan (TAP)
- Airport Airspace Drawing
- Inner-Portion of the Approach Surface Drawings
- Airport Land Use Plan
- Airport Property Map

The ALP represents the optimum plan to yield a safe, efficient, and economically viable airport. The updated ALP Set sheets are described in detail in the following subsections.

6.1.1 Title Sheet

The Title Sheet represents the front cover of the ALP Set and depicts the airport name and airport sponsor name, date and associated FAA and DOAV grant numbers. A vicinity map is shown which depicts the specific location of the airport in relation to surrounding towns and waterways. A location map is also shown depicting a more general overview of the airport location and surrounding areas. The Leesburg Executive Airport title sheet also provides an ALP table of contents. The FAA and DOAV ALP approval letters will be electronically added to the ALP Title sheet once the ALP Set is approved by the sponsor and these agencies.

[1] It should be noted that the development plan does not represent an obligation of local funds, nor does it require a funding commitment without justification of demand levels; the expressed desire, intent, and ability of the Airport Sponsor to achieve airport land use compatibility, coupled with favorable community and business support of the airport, remains an important funding consideration.

6.1.2 Airport Layout Plan Drawings

The Airport Layout Plan Drawings (ALD) graphically depict the existing and future airport facilities. The ALP acts as a public document and serves as a record of current and future airport facility requirements as well as the phasing for future facility additions and improvements. Equally as important, it is also a core document to be utilized by the community for decisions regarding land use, zoning, funding, and resource planning for the Airport.

Two separate ALPs have been developed for the Leesburg Executive Airport, one depicting existing facilities and one for future airport facilities. The JYO future ALP Drawing depicts the proposed development facilities identified as Alternative 4 in this Study. These facilities include additional corporate and T-hangars, apron expansions, and 500' runway extension. The proposed T-hangars, box hangars, and associated taxilanes are designed to meet aircraft design group I requirements for small aircraft storage. All other proposed development facilities are designed to meet aircraft design group II requirements. The smaller group I aircraft will primarily be stored in the T-Hangars as they are now with the larger group II aircraft stored in the corporate hangars.

6.1.3 Terminal Area Plan

The Terminal Area Plan represents a more detailed view of the terminal facility than the ALP. The terminal building, associated aircraft and auto parking facilities, hangars, and related roadways are also shown. All existing and proposed terminal related facilities and developments are depicted on this drawing. This drawing allows for a more detailed depiction of the terminal facilities for planning and design purposes.

6.1.4 Inner Approach Surface Drawing

The Inner Portion of the Approach Surface Drawing depicts obstructions to the approach areas for each end of the runway. This drawing is sometimes referred to as the Runway Plan and Profile Drawing. There are three approach surfaces for both existing and future conditions which are depicted on this drawing including: the Part 77 Approach Surface, Runway End Siting Surface, and the PAPI Surface. **Table 6.1** lists the dimensions of the existing and proposed approach surfaces.

TABLE 6.1 Runway Approach Surface Dimensions				
Approach Surfaces	**Slope**	**Inner Width**	**Outer Width**	**Length**
Runway 17				
Existing Part 77 Approach Surface	50:1 / 40:1	1,000’	16,000’	50,000’
Proposed Part 77 Approach Surface	50:1 / 40:1	1,000’	16,000’	50,000’
Existing Approach Obstacle Clearance Surface	30:1	300’	1,520’	10,000’
Proposed Approach Obstacle Clearance Surface	30:1	300’	1,520’	10,000’
Existing/Proposed PAPI Clearance Surface	1°50'	N/A	N/A	N/A
Runway 35				
Existing Part 77 Approach Surface	20:1	1,000’	1,500’	5,000’
Proposed Part 77 Approach Surface	34:1	1,000’	3,500’	10,000’
Existing Approach Obstacle Clearance Surface	20:1	400’	1,000’	10,000’
Proposed Approach Obstacle Clearance Surface	20:1	800’	3,800’	10,000’
Existing/Proposed PAPI Clearance Surface	1°50'	N/A	N/A	N/A

Source: *Table 3-2 of FAA Advisory Circular 150/5300-13A Airport Design, 14 CFR Part 77*

The inner portion of the approach surface drawing for JYO depicts a plan and profile view of the runway ends with obstruction locations and heights along with the approach surfaces. As part of this study, an aerial survey was conducted which was used to identify obstructions to the Part 77 approach or transitional surfaces to each runway end. Based on this analysis, 3 obstructions were identified in the transitional surface east of the approach to Runway 17. These obstructions consist of trees and a utility pole along the former Tolbert Lane. It is recommended that the trees be removed and obstruction light added to the utility pole if it cannot be removed.

There are approximately 14 obstructions to the approach and transitional surface associated with Runway 35. These obstructions consist of trees on the east and west sides of the approach as well as utility poles along the western side of Sycolin Road. It is recommended that the trees be removed and red obstruction lights added to the tops of the utility poles. Also, Sycolin Road is planned for an eventual widening. Relocating these utility lines underground during the widening would eliminate these obstructions. If a non-precision GPS approach is developed for Runway 35, additional trees will need to be removed within the approach surface (approximately 8.3 acres). The proposed displaced 500’ displaced threshold for Runway 35 would result in additional obstructions in the approach surface (approximately 5.6 acres in addition to the 8.3 acres). It is recommended that the Town acquire avigation easements for these 13.9 acres south of airport property when the displaced threshold is constructed and if a non-precision approach is developed for Runway 35.

6.1.5 Airport Airspace Drawing

The Airspace Drawing represents the current and future airspace surrounding the Leesburg Executive Airport. A graphical representation of the FAA Federal Aviation Regulation Part 77 imaginary surfaces is depicted as well for reference. This allows for a quick understanding of the locations and size of the airspace surfaces, which are intended to provide obstruction-free areas surrounding the Airport for air traffic. The size of these surfaces is based on the runway and approach categories while the location is dependent upon the runway ends and airport elevation. Also shown on tis drawing are profile views of the runway ends depicting the existing and proposed approach surfaces and any towers and corresponding elevations in the vicinity of the Airport.

6.1.6 Land Use Drawing

The Land Use Drawing is used to illustrate the zoning and use of land on and around the Airport. General development guidelines and proposed fee-simple and avigation easements acquisition areas are also depicted on this drawing. This helps to provide overall development guidance for the Airport and adjacent areas that are impacted by airport operations. The land use drawing for JYO depicts the existing and proposed airport property line along with surrounding zoning designations displayed over an aerial photo of the area.

Land use around the Airport consists of industrial/commercial and residential areas to the east, residential to the north, and undeveloped to the west and south. However, the former Crosstrail property immediately west of the Airport is undergoing commercial development known as Compass Creek with retail shopping opening in 2018. There are also government and recreational facilities located east and north of the Airport including administrative offices, National Guard recruiting center, regional park, park and ride lot, fire rescue training center, and sheriff's office. Land use designations and zoning are discussed in Section 1.13 of this Master Plan.

6.1.7 Airport Property Map

The Airport Property Map is used to depict the existing and proposed boundary of the Airport as well as all surrounding land parcels and deed metes and bounds. Existing and proposed airspace or avigation easements are also shown on this map. The Property Map for JYO depicts the current landowners of property immediately surrounding the Airport. Runway protection zones and safety areas are also shown on this map. A land and easement acquisition table is provided which lists current landowners, property sizes, and proposed airport ownership interests. Parcels which make up the existing airport property are also listed along with their sizes and grant numbers associated with their acquisitions.

6.2 AIRPORT DEVELOPMENT PROGRAM PHASING

The Airport Development Program is used to determine the timeframe for implementation of the proposed airport facilities. There are four separate phases of development identified at the Airport including Phases I, II, and III, as well as an ultimate development phase as shown in Exhibits 4-18 and 4-19. These phases are discussed in greater detail in the following sections.

Phase I (0-5 years)

Phase I represents facilities that are needed at JYO in the near-term (0-5 years). These facilities are shown in green on Exhibits 4-18 and 4-19 and include:

- Construct one 120’ x 120’ corporate hangar
- Construct one 26-Unit T-Hangar & associated aprons
- Construct three 60’ x 60’ box hangars and associated auto parking
- Construct 11-Unit south 60’ x 60’ box hangars and associated apron/taxiway
- Runway 17 RPZ fee simple land acquisition (±23.2 acres)
- Construct 2,100 sf airfield maintenance storage building
- Construct self-serve AvGas fuel pump
- Install final two ODAL approach lights for Runway 17

Phase II (6-10 years)

Phase II represents the mid-term development phase. The proposed Phase II airport facilities are shown in red on Exhibits 4-18 and 4-19 and include:

- Demolish Existing T-Hangar and three condo hangars
- Construct new east parallel taxiway
- Expand Runway holding pads (run-up areas)
- Construct 17-Unit T-Hangar (midfield)
- Demolish existing parallel taxiway
- Construct north-end commercial aircraft maintenance hangar
- Acquire 8.3 acres of avigation easement for existing Runway 35 GPS approach
- Relocate Localizer antenna
- Acquire 5.6 acres of avigation easement for future Runway 35 GPS approach
- Extend Runway and parallel taxiway 500’ south

Phase III (11-20 years)

Phase III represents the long-term development phase. The proposed Phase III airport facilities are shown in blue on Exhibits 4-18 and 4-19 and include:

- Construct partial west side parallel taxiway and taxiway/runway connectors
- Construct west side apron
- Construct west side access road and auto parking
- Construct 20,000 sf west side FBO facility
- Construct three 100’ x 100’ corporate hangars
- Construct one 150’ x 100’ corporate hangar
- Construct one 250’ x 100’ corporate hangar

Ultimate Phase (beyond 20 years)

This phase includes continued development of the hangar areas on the west side of the Airport. Facilities which could be developed in this area include aprons, and hangars as well as aviation-related businesses. Detailed cost estimates for facilities identified for the ultimate phase of development are not included in this Master Plan due to the difficulty in projecting development and implementation costs beyond the next 20 years. It is recommended that the ALP be reviewed and updated periodically as activity increases at JYO so that these ultimate facilities can be planned for and developed as needed. These facilities are shown in yellow on Exhibits 4-18 and 4-19 and include:

- Completion of west-side parallel taxiway and associated runway/taxiway connectors
- Additional apron expansion, access road, and auto parking
- Construct eleven 70’ x 70’ box hangars
- Construct two 150’ x 150’ corporate hangars
- Construct one 200’ x 200’ corporate hangar
- Construct one 200’ x 150’ corporate hangar
- Construct one 150’ x 100’ corporate hangar
- Construct two 200’ x 100’ corporate hangars

6.3 CONSTRUCTION IMPACTS

An Environmental Assessment (EA) for the proposed projects will addresses the impacts of the development of this area of the Airport, including the construction impacts. The impact upon airport users will be minimal due to the location of the proposed development. Potential construction impacts such as equipment noise, dust generation, and air and water quality impacts will be minimized with the use of appropriate controls. All required state and local permits will be obtained prior to the start of construction or facility alteration. Also, all applicable federal, state, and local regulations and guidelines for construction will be adhered to and enforced.

Appendix A
Glossary/Acronyms

GLOSSARY/ACRONYMS

TERMS:

Advisory Circular (AC): A series of external FAA publications consisting of all non-regulatory material of a policy, guidance, and informational nature.

Air Cargo: All commercial air express and air freight with the exception of air-mail and air parcel post.

Air Carrier: A commercial operator providing for the transport of passengers or property by aircraft for compensation or hire utilizing aircraft with greater than 30 seats and certificated in accordance with Federal Aviation Regulations (FAR) Parts 121 or 127.

Aircraft Mix: The numerical or percentage breakdown of aircraft into categories based on aircraft engine and weight.

Aircraft Operation: Any aircraft arrival or departure including touch-and-go operations.

Aircraft Type: A distinctive model of aircraft, as designated by the manufacturer.

Airline: A scheduled air carrier certificated by the Federal Aviation Administration under Part 121 of the Federal Aviation Regulations.

Airline Operations: Takeoffs and landings performed by aircraft operated by Part 121 or 127 airlines on scheduled and non-scheduled flights.

Airport: A landing area regularly used by aircraft for receiving or discharging passengers or cargo.

Airport Service Area: The geographic area that generates demand for aviation services at an airport.

Airport Surveillance Radar (ASR): A navigation instrument used to control air traffic within the immediate airport traffic areas.

Airspace: The area above the ground in which aircraft travel. It is divided into corridors, routes, and restricted zones for the control and safety of traffic.

Air Taxi: The transport of people or property for compensation or hire by a commercial operator (not an air carrier) in an aircraft having a maximum seating capacity of 30 or less and certified under Federal Aviation Regulations Part 135.

Ambient: The sum total of existing environmental conditions for any given impact category.

Ambient Air Quality: The existing quality of the air.

Aquatic: Growing or living in or upon water.

Approach Surface: An imaginary inclined surface longitudinally centered on the extended centerline of a runway, extending outward and upward from the runway. It has a shallower gradient than the corresponding glide slope.

Apron: An area on an airport designated for the parking, loading, fueling, or servicing of aircraft.

Aviation Easement: A form of limited property right purchase that establishes legal land-use control prohibiting incompatible development of areas required for airports or aviation-related purposes.

Based Aircraft: Aircraft permanently stationed or having a long-term agreement to reside at the Airport.

Beacon: See rotating beacon.

Biotic Community: Recognizable assemblages of vegetation and wildlife organisms generally functioning as a unit.

Building Restriction Line (BRL): An imaginary line that identifies suitable building area locations on airports. The BRL is also dependent upon the Runway Visibility Zone (RVZ) and ATCT line-of-sight capabilities.

Capacity: The airport operating level, expressed as the number of aircraft movements that can occur at an airport over a specified time period.

Circling Approach: A descent used in an approved procedure to an airport for a circle to land maneuver.

Commercial Aviation: Aircraft activity licensed by state or federal authority to transport passengers and/or cargo on a scheduled or non-scheduled basis.

Community: A city, group of cities, or a Metropolitan Statistical Area receiving scheduled air service by a certificated route air carrier at an airport.

Commuter Airline: Commercial operators that operate aircraft with a maximum of 60 seats, and that provides scheduled service, or that carriers mail; commuters may be either air taxis or certified air carriers.

Condemnation: Proceedings under which a property interest may be forcibly acquired; government may condemn land through the power of eminent domain; an individual may apply inverse condemnation to obtain just compensation for a property interest taken by government without prior agreement.

Conical Surface: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet and extending to a height of 350 feet above the airport elevation.

Critical Aircraft: The most demanding category or family of aircraft that performs 500 annual itinerant operations at an airport (Also referred to as the design aircraft).

Critical Habitat: An entire habitat or portion thereof, having any constituent element that is necessary to the normal needs or survival of an endangered or threatened species.

Decibel (dB): A unit of measurement used to describe sound pressure level. It is a dimensionless unit, which is commonly expressed as one-tenth of the logarithm of the ratio between two power levels, one of which is nominally a reference level. The human auditory response to a given increase in sound pressure is approximately proportional to the increase in sound pressure in comparison to the pressure already present.

Displaced Threshold: Actual touchdown point on specific runways designated due to obstructions that make it impossible to use the actual physical runway end.

Distance Measuring Equipment (DME): An airborne instrument that indicates the distance the aircraft is from a fixed point, usually a VOR station.

Draft Environmental Impact Statement: FAA's initial evaluation of the environmental impact of a proposed action when coordinated pursuant to Section 102(20Cc)) of NEPA is initiated.

Ecology: The science or study of the relationship between an organism and its environment.

Ecosystem: An ecological community together with its physical environment, considered as a unit.

Effective Runway Gradient: The maximum difference between runway centerline elevations divided by the runway length, expressed as a percentage.

Eminent Domain: Right of the government to take property from the owner, upon compensation, for public facilities or other purposes in the public interest.

Endangered Species: Those species in danger of extinction throughout all or a significant portion of their range.

Enplanement: A term applying to passengers and cargo which board a departing aircraft.

Enroute Airways: The route a flight follows from departure point to destination.

Express: Property transported under published air express tariffs.

Fauna: A collective term for the animal species present in an ecosystem.

Fixed Base Operator (FBO): A private enterprise engaged in services related to general aviation, such as fuel sales, aircraft maintenance, aircraft storage, aircraft rental and sales, flight instruction, and crop dusting.

Flora: A collective term for the plant species present in an ecosystem.

Floodplain: An area that would be inundated by storm-water runoff that occurs under a given recurrent frequency flood condition.

Fleet Mix: See Aircraft Mix.

Flight Service Station (FSS): FAA facility used for pilot briefings on weather, airports, altitudes, routes, and other flight planning data.

General Aviation (GA): All aviation activities except those performed by commercial air carrier or military.

General Aviation Aircraft: All civil aircraft except those owned by and classified as air carriers.

General Obligation Bond: A form of public indebtedness backed by the full faith and credit of the municipality or other appropriate public body.

Glide Slope (GS): Electronic vertical guidance provided the pilot while on the final approach to landing; usually an angle between two degrees and three degrees and intersecting the runway at the touch down area.

Global Positioning System (GPS): Satellite-based navigational system providing lateral and vertical positional accuracy using reference between multiple satellite constellations. GPS is currently FAA certified for en-route and non-precision instrument navigation (GPS stand-alone and overlay approaches). The extent of GPS/RNAV/LNAV/VNAV/WAAS approach capability depends upon the sophistication of on-board receiver equipment. Category I precision approaches in the near future, as enhanced by WAAS and LAAS technology currently under development.

Horizontal Surface: A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by tangent lines.

IFR Conditions: Weather conditions below the minimum prescribed for flight under VFR.

Indirect Source: A facility, building, structure, or installation which attracts mobile air pollution source activity that results in emissions of a pollutant for which there is a national standard.

Instrument Landing System (ILS): A landing approach system that establishes a course and a descent path to align an aircraft with a runway for final approach.

Instrument Flight Rules (IFR): Rules that govern flight procedures when ceiling and visibility are below 1,000 feet and three miles respectively.

Instrument Approach: A landing approach using electronic aids and made without visual reference to the ground.

Itinerant Operations: Arrivals and departures of aircraft to or from an area greater than 20 miles from the airport. Itinerant operations may involve an aircraft based at the airport or an aircraft from another airport.

Local Area Augmentation System (LAAS): Intended to compliment Wide Area Augmentation System (WAAS) by meeting Category II/ III instrument approach requirements, as well as provide users with all weather surface navigation, surface navigation, and surface surveillance/ traffic management system capabilities.

Localizer (LOC): An electronic instrument that is part of an ILS and emits radio signals which provide the pilot with course guidance to the runway centerline.

Local Operations: Operations performed by aircraft that (1) operate in the local traffic pattern or within sight of the tower; (2) are known to be departing for or arriving from +/- light in local practice areas located within a 20 mile radius of the control tower; and (3) execute simulated instrument approaches or low passes at the airport.

Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR): A facility by which the pilot is provided visual reference t the instrument runway during transition from instrument to visual flight.

Microwave Landing System: An instrument landing system using VHF radio signals to guide the aircraft's approach instead of the VHF system still widely used. The microwave system provides for fewer ground reflections, takes up less space, and uses small aerials.

Minimum Descent Altitude (MDA): The lowest altitude, expressed in feet above MSL, to which descent is authorized on final approach or during circling-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided.

Middle Marker (MM): An electronic beacon that indicates a position approximately 3,500 feet from the landing threshold.

Military Operations: An operation by military aircraft.

Missed Approach: A prescribed procedure to be followed by aircraft that cannot complete an attempted landing at an airport.

Nautical Mile: A measure of lineal distance equal to one minute of a great circle at the equator and is the length of one minute of latitude (6,076.1155 feet). To convert to statute miles, multiply by 1.150779.

NAVAID: Any navigational aids, such as PAPI, MALS, REIL, etc.

Noise Contour: A line connecting points of equal noise exposure.

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided.

Non-scheduled Service: Revenue flights that are not operated in regular scheduled service such as charter flights and all non-revenue flights incident to such flights.

Object Free Area (OFA): An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The 'precision' OFA is associated with runway ends with precision capabilities.

Obstacle Free Zone (OFZ): **The OFZ is the airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or departing from the runway, and for missed approaches.**

Operation: Any airborne arrival or departure of an aircraft at or from an airport. "Touch-and-go" practice landings are considered as two operations.

Origination: The initial enplanement of any passengers and cargo; total originations include all enplanements except transfers and stop-overs.

Outer Marker (OM): An electronic beacon that indicates a position at which aircraft will intercept the ILS glide path.

Parts 25 and 121 Criteria: Those applicable portions of the Federal Aviation Regulations within which criteria for operational takeoff flight paths are defined.

Part 77: The applicable portions of Federal Aviation Regulations which define obstructions to air navigation.

Peak Hour: Represents that highest number of operations or passengers during the busiest hour of an average day of a peak month.

Precision Approach Path Indicator (PAPI): A lighting system providing for visual flight path, within the airport approach zone, so that an approaching pilot can establish a positive controlled descent (also VASI).

Precision Instrument: The term used to describe an approach using both horizontal and vertical guidance. This term also describes the runway with this type of approach and the markings on the runway.

Primary Runway: That runway which provides the best wind coverage, etc.; this runway receives the most usage at an airport.

Primary Surface: A surface longitudinally centered on a runway. When the runway has a hard surface, the primary surface extends 200 feet beyond each runway end; but when there is no hard surface, or planned hard surface, the primary surface ends at the end of the runway. The width of the primary surface of a runway will be that width prescribed in FAA Part 77 for the most precise existing or planned approach to that runway end.

Revenue Bonds: A form of public indebtedness backed by the revenue generated by the facility for which the debt was incurred.

Rotating Beacon: A visual NAVAID displaying flashes of white and/or colored light used to indicate the location of an airport.

Runway (RW): A defined area on an airport prepared for landing and takeoff of aircraft.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground.

Runway Safety Area: A defined surface surrounding the runway prepared or suitable for reducing the risk of damage o aircraft in the event of an overshoot, undershoot, or excursion from the runway.

Runway Visibility Zone (RVZ): An acceptable runway profile permits any two points five feet (1.5m) above the runway centerline to be mutually visible for the entire runway length. Hence, a clear line-of-sight between the ends of the of intersecting runways is recommended. Finally, the RVZ is an area formed by the imaginary lines connecting the two runways' visibility points.

Scheduled Service: Transport service performed by a commercial operator on a regular basis.

Segmented Circle: An airport aid identifying the traffic pattern direction.

Socioeconomic: Data pertaining to the population and economic characteristics of a region.

Special Use Airspace: Airspace of defined dimensions, within which flight of aircraft, while not wholly prohibited, is subject to restrictions or to hazards that may exist to non-participating aircraft.

Straight-In Approach: A descent in an approach procedure in which the final approach course alignment and descent gradient permits authorization of straight-in landing minimums.

Student Activity: Any aviation activity by student pilots.

Taxiway (TWY): A defined area on an airport prepared for the surface movement of aircraft to and from the runway.

Terminal Airspace: The controlled airspace normally associated with aircraft departure and arrival patterns to or from airports within a terminal control system.

Terminal Building: That building on an airport which is used in making the transition between surface and air transportation.

T-Hangar: A T-shaped aircraft storage building that provides economical shelter for a single aircraft.

Threshold: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

Tie Downs: An area on an airport specifically designed for the outdoor storage of aircraft.

Total Operations: The total of all operations (domestic and international) performed at an airport.

Touch-and-Go Operations: An aircraft operation for practice or testing purposes characterized by a landing touch down and then continuing takeoff without stopping.

Traffic Pattern: The flow of traffic that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.

Transition Surface: An imaginary surface extending to the sides of the approach surface and inclined at a specified gradient 90 degrees to the extended centerline of the runway. Any object penetrating this surface would be an obstruction to air navigation.

Turnaround: A pavement area designed for turning around or holding aircraft at the end of a runway when a full parallel taxiway is not provided.

UNICOM: A ground radio communications station that provides pilots with pertinent airport information at specific airports.

Visual Approach Slope Indicator (VASI): A lighting system providing a visual flight path, within the airport approach zone, so that an approaching pilot can establish a more positive controlled descent (also PAPI).

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Visual Flight Rules (VFR): Rules under which aircraft are operated by visual reference to the ground, and fly on a "see and be seen" principle.

Very High Frequency Omni-Directional Range (VOR): Air navigation aid that provides bearing information to aircraft.

Wide Area Augmentation System (WAAS): Planned as a GPS augmentation by providing users with the use of GPS for all phases of flight from the en route environment to Category 1 precision instrument approaches. Thereby, providing more direct routing of aircraft, saving time, fuel, and money. The LNAV Approach will provide GPS non-precision lateral navigation capabilities. The LNAV/VNAV Approach will provide GPS precision lateral and vertical navigation capabilities.

Wind Cone (Sock): Conical wind direction indicator.

Wind Coverage: Refers to orientation of runway in relationship to direction of prevailing winds (concerns usability of runway for takeoffs and landings).

Wind Rose: A diagram indicating the prevalence of winds from various directions, at a specific place.

Wind Tee: A visual device used to advise pilots about wind direction.

ACRONYM

AC:	Advisory Circular
ADF:	Automatic Direction Finder
AGL:	Above Ground Level
AIP:	Airport Improvement Program
ASR:	Airport Surveillance Radar
ALP:	Airport Layout Plan
ALS:	Approach Lighting System
ARFF:	Aircraft Rescue and Fire Fighting
ARTCC:	Air Route Traffic Control Center
ASDA:	Accelerate – Stop Distance Available
ASV:	Annual Service Volume
ATC:	Air Traffic Control
ATCT:	Air Traffic Control Tower
AWOS:	Automated Weather Observing System
BRL:	Building Restriction Line
BWR:	Bucher, Willis & Ratliff Corporation
CAT:	Category
CWY:	Clearway
dB:	Decibel
DME:	Distance Measuring Equipment
DNL:	Day/Night Average Sound Level
DOT:	Department of Transportation
FAA:	Federal Aviation Administration
FAR:	Federal Aviation Regulation
FIS:	Federal Inspection Service
FBO:	Fixed Base Operator
FSS:	Flight Service Station
FTZ:	Foreign Trade Zone
GA:	General Aviation
GPS:	Global Positioning System
GVGI:	Generic Visual Slope Indicator
GS:	Glide Slope
HIRL:	High Intensity Runway Lights
HUD:	U.S. Department of Housing and Urban Development
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
INM:	Integrated Noise Model
KHz:	Kilohertz
LAAS:	Local Area Augmentation System
LDA:	Landing Distance Available
LNAV:	GPS Lateral Navigation Instrument Approach
LIRL:	Low Intensity Runway Lights
LOC:	Localizer
MALSF:	Medium Intensity Approach Lighting System
MALSR:	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MDA:	Minimum Descent Altitude
MHz:	Megahertz
MIRL:	Medium Intensity Runway Lights
MITL:	Medium Intensity Taxiway Lights
MM:	Middle Marker
MOA:	Military Operations Area
MSA:	Metropolitan Statistical Area
MSL:	Mean Sea Level
NAVAID:	Navigational Aid
NDB:	Non-directional Beacon
NOS:	National Ocean Survey
NPI:	Non-precision Instrument

NPIAS:	National Plan of Integrated Airport System
NWS:	National Weather Service
OAG:	Official Airline Guide
OC:	Obstruction Chart
OFA:	Object Free Area
OFZ:	Obstacle Free Zone
OM:	Outer Marker
OPBA:	Operations Per Based Aircraft
PAPI:	Precision Approach Path Indicators
PIR:	Precision Instrument
PLASI:	Pulsating Light Approach Slope Indicator
RAIL:	Runway Alignment Indicator Lights
REIL:	Runway End Identifier Lights
RNAV:	Area Navigation
RPZ:	Runway Protection Zone
RVR:	Runway Visibility Range
RVZ:	Runway Visibility Zone
RW:	Runway
SSALF:	Simplified Short Approach Light System with sequenced Flasher Lights
SSALR:	Simplified Short Approach Light System with RAIL
TACAN:	Tactical Air Navigation
TAP:	Terminal Area Plan
TCA:	Terminal Control Area
TERPS:	Terminal Instrument Procedures
TVOR:	Terminal Very High Frequency Omni Range
TW:	Taxiway
UHF:	Ultra-High Frequency
USGS:	United States Geological Survey
VASI:	Visual Approach Slope Indicator
VFR:	Very High Frequency
VMC:	Visual Meteorological Conditions
VNAV:	GPS Vertical Navigation Instrument Approach
VOR:	VHF Omni-Directional Range
WAAS:	Wide Area Augmentation System

Appendix B
Town of Leesburg Airport Overlay District Zoning Ordinance

7.7.1 Description
The purpose of the Airport Overlay District is to regulate and restrict the height of structures, objects or natural growth, regulate the locations of noise sensitive uses, and otherwise regulate the use of property in the vicinity of the Leesburg Executive Airport by creating the appropriate zones and establishing the boundaries thereof; providing for changes in the restrictions and boundaries of such zones; defining certain terms used herein; providing for enforcement; and imposing penalties. Accordingly, it is declared:

A. That it is necessary in the interest of the public health, safety, and general welfare, to prevent obstructions that are hazards to air navigation;

B. That it is necessary in the interest of the public health, safety, and general welfare, to avoid noise-related problems associated with aircraft using the Leesburg Executive Airport;

C. That the creation or establishment of an obstruction has the potential for being a public nuisance and may injure the area served by the airport; and;

D. That the Town of Leesburg derives economic development and enhanced interstate commerce from the Leesburg Executive Airport which are held strictly to the highest possible safety standards.

7.7.2 Applicability
The regulations of this section (Sec. 7.7) shall apply to all areas designated on the Airport Safety District Map and the Airport Noise Overlay Map within the corporate limits of the Town of Leesburg.

7.7.3 Definitions
The definitions of this section shall be used solely for the purpose of interpreting and administering the A-1 District regulations of this section. If the definitions of this section conflict with other definitions of this Zoning Ordinance, the definitions of this section shall control.

A. “Administrator” The Town of Leesburg's Zoning Administrator.

B. “Airport” Leesburg Executive Airport.

C. “Airport Elevation” The highest point on any usable landing surface expressed in feet above mean sea level.

D. “Approach Surface” A surface longitudinally centered on the extended runway centerline, extending outward and upward from the end of the

primary surface, and at the same slope as the approach zone height limitation slope set forth in Sec. 7.7.5. In the Airport Safety Zone Map, the perimeter of the approach surface coincides with the perimeter of the approach zone.

E. "Approach, Transitional, Horizontal, and Conical Zones" The airspace zones as set forth in Sec. 7.7.4.

F. "Board of Zoning Appeals" Refers to the Board of Zoning Appeals of the Town of Leesburg.

G. "Conical Surface" A surface extending horizontally twenty feet for every foot vertically from the periphery of the horizontal surface.

H. "Hazard to Air Navigation" An obstruction determined by the Virginia Department of Aviation or the Federal Aviation Administration to have substantial adverse effect on the safe and efficient utilization of navigable airspace in the Commonwealth.

I. "Height" For the purpose of determining the height limits in all zones set forth in this Zoning Ordinance and shown on the Airport Safety District Map, the datum shall be mean sea level (M.S.L.) elevation unless otherwise specified.

J. "Horizontal Surface" A horizontal plane 150 feet above the established airport elevation, the perimeter of which in plan coincides with the perimeter of the horizontal zone.

K. "Ldn" The symbol for "yearly day-night average sound level", which means the average daily sound level (based on a 365-day average), in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m., local time.

L. "45 db(A) Ldn" The symbol for the required level of noise attenuation in residential structures constructed within the area between airport noise contour 60 and airport noise contour 65, meaning a required yearly interior day-night average sound level of 45 decibels or less.

M. "Leesburg Airport Commission" An advisory commission appointed by the Leesburg Town Council whose responsibilities include, but are not limited to land acquisition, construction, improvement, maintenance and operation of the Leesburg Executive Airport.

N. "Nonconforming Use" Any existing or new structure or object of natural growth which is inconsistent with the provisions of this Zoning Ordinance or any amendment to this Zoning Ordinance.

O. "Obstruction" Any structure, growth, or other object, including a mobile object, which exceeds a limiting height, or penetrates any surface or zone floor, set forth in Sec. 7.7.5.

P. "Person" Any individual, firm, partnership, corporation, company, association, joint stock association, or governmental entity. The term includes a trustee, a receiver, an assignee, or a similar representative of any of them.

Q. "Primary Surface" A surface, with a specified width as provided in Sec. 7.7.4, longitudinally centered on a runway. When the runway has a specifically prepared hard surface, the primary surface extends 200 feet beyond each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.

R. "Runway" A specified area on an airport prepared for landing and takeoff of aircraft.

S. "Structure" Any object, including a mobile object, constructed or installed by any person, including but not limited to buildings, towers, cranes, smokestacks, earth formations, towers, poles and electric lines of overhead transmission routes, flag poles, and ship masts.

T. "Transitional Surfaces" Surfaces which extend outward perpendicular to the runway centerline extended at a slope of seven feet horizontally for each foot vertically from the sides of the primary and approach surfaces to where they intersect the horizontal and conical surfaces.

U. "Vegetation" Any object of natural and/or planted growth.

V. "Zone" All areas provided for in Sec. 7.7.4, generally described in three dimensions by reference to ground elevation, vertical distances from the ground elevation, horizontal distances from the runway centerline and the primary and horizontal surfaces, with the zone floor set at specific vertical limits by the surfaces found in Sec. 7.7.5.

W. "Zoning Permit" A document issued by Town of Leesburg allowing an activity that may result in structures or vegetation which exceed the height limitations provided for in this Zoning Ordinance.

7.7.4 Airport Safety Zones

In order to implement the provisions of this Zoning Ordinance, four zones are established which include the area and airspace of the Town of Leesburg lying equal to and above the approach surfaces, transitional surfaces, horizontal surfaces, and conical surfaces as they apply to Leesburg Executive Airport. These zones are established as overlay zones, superimposed over the existing zoning districts, being more specifically zones of airspace that do not affect the uses and activities of the zoning district except as provided for in Sec. 7.7.6. An area located in more than one of the following zones is considered to be only in the zone with the most restrictive height limitation. These zones are as follows:

A. "Airport Zone" A zone that is centered about the runway and primary surface, with the floor set by the horizontal surface.

B. "Approach Zone" A zone that extends away from the runway ends along the extended runway centerline, with the floor set by the approach surfaces.

C. "Transitional Zone" A zone that fans away perpendicular to the runway centerline and approach surfaces, with the floor set by the transitional surfaces.

D. "Conical Zone" A zone that circles around the periphery of and outward from the horizontal surface, with the floor set by the conical surface.

7.7.5 Airport Safety Zone Height Limitations

A. Except as otherwise provided in this Zoning Ordinance, in any zone created by this Zoning Ordinance no structure shall be erected, altered, or maintained, and no vegetation shall be allowed to grow to a height so as to penetrate any referenced surface, known as the floor, of any zone provided for in Sec. 7.7.4 at any point.

B. The specific geometric standards, height restrictions, or floors, for the individual zones shall be those planes delineated as surfaces in Part 77.25, Subchapter E (Airspace), of Title 14 of the Code of Federal Regulations, or in successor federal regulations. The official map which depicts the Airport Safety Zones height restrictions shall be maintained by the Zoning Administrator.

7.7.6 Use Regulations

Notwithstanding any other provisions of this Zoning Ordinance, and within the area below the horizontal limits of any zone established by this Zoning Ordinance, no use may be made of land or water in such a manner as to:

A. Create electrical interference with navigational signals or radio communication between the airport and airborne aircraft;

B. Diminish the ability of pilots to distinguish between airport lights and other lights;

C. Result in glare in the eyes of pilots using the airport;

D. Impair visibility in the vicinity of the airport;

E. Create the potential for bird strike hazards; or

F. Otherwise in any way endanger or interfere with the

7.7.7 Nonconforming Uses

A. Except as expressly provided in this section, the regulations prescribed by this Zoning Ordinance shall not require the removal, lowering, or other change or alteration of any structure or vegetation not conforming to the regulations as of [Insert Effective Date], or otherwise interfere with the continuance of a nonconforming use. Nothing contained in this Zoning Ordinance shall require the removal, lowering, or other change or alteration of any structure which construction was begun prior to [Insert Effective Date], and is in the process of being diligently pursued toward completion.

B. Notwithstanding the provisions of the preceding paragraph "A," the owner of any existing nonconforming structure or vegetation is hereby required to permit the installation, operation, and maintenance thereon of whatever markers and lights deemed necessary by the Federal Aviation Administration, the Virginia Department of Aviation, the Leesburg Airport Commission, or the Zoning Administrator to indicate to operators of aircraft the presence of that airport obstruction. These markers and lights shall be installed, operated, and maintained at the expense of the airport owners, and not the owner of the nonconforming structure in question.

7.7.8 Zoning Permits

A. Except as expressly provided in this section, no structure shall be erected or otherwise established in any zone created by this Zoning Ordinance unless a zoning permit issued by the Zoning Administrator shall have been applied for and granted. Each application for a zoning permit shall indicate the purpose for which desired, and provide sufficient geometric specificity to determine if the structure will conform to the regulations prescribed in this Zoning Ordinance. No zoning permit for a structure inconsistent with this Zoning Ordinance shall be granted unless a variance has been approved in accordance with all applicable regulations.

B. No zoning permit shall be granted that would allow the establishment or creation of an obstruction or permit a nonconforming use or structure to become a greater hazard to air navigation than it was on [Insert Effective Date] or any amendments thereto other than with a variance as provided for in Sec. 7.7.8D.

C. Whenever the Zoning Administrator determines that a nonconforming structure has been abandoned or more than fifty percent (50%) destroyed, physically deteriorated, or decayed, no zoning permit shall be granted that would enable such structure to be rebuilt, reconstructed, or otherwise refurbished so as to exceed the applicable height limit or otherwise deviate from the regulations contained in this Zoning Ordinance, except with the relief as provided for in Sec. 7.7.8D.

D. Any person desiring to erect or increase the height or size of any structure not in conformance with the regulations of this Zoning Ordinance may apply for a variance from the Board of Zoning Appeals, in accordance with the procedures set out in Sec. 3.13, if accompanied with a recommendation from the Leesburg Airport Commission. The Airport Commission shall consider the effect of the proposal on the operation of air navigation facilities, and determine whether the safe and efficient use of navigable airspace is impeded. The issuance of zoning permits by the Zoning Administrator may be subject to a final determination from the Virginia Department of Aviation that the safety of the airport is not impaired.

E. Any zoning permit or variance granted may, if such action is deemed advisable to effectuate the purpose of this Zoning Ordinance and be reasonable in the circumstances, be so conditioned as to require the owner of the structure in question to install, operate, and maintain, at the owner's expense, such markings and lights as may be deemed necessary by the Federal Aviation Administration, the Virginia Department of Aviation,

Leesburg Airport Commission, or the Zoning Administrator. If deemed proper with reasonable cause by the Board of Zoning Appeals, this condition may be modified to require the owner of the structure in question to permit the airport owner, at the owner's own expense to install, operate, and maintain the necessary markings and lights.

7.7.9 Airport Noise Overlay District Boundaries

The Airport Noise Overlay District boundaries shall be based on the Ldn 60 and 65 noise contours and an area that extends one (1) mile beyond the Ldn 60 contours. The Town shall use as a basis for delineating the Ldn noise contours the Leesburg Municipal Airport Environmental Assessment Report dated October, 1985. For the purpose of administering these regulations the Airport Noise Overlay District shall have the following three (3) components:

A. Ldn 65 or higher aircraft noise contour;

B. Ldn 60 to 65 aircraft noise contours; and

C. One-mile buffer area, measured from outside the Ldn 60 aircraft noise contour.

7.7.7 Disclosure Statements

A disclosure statement shall be placed on all subdivision plats, site plans and deeds required for subdivision or site plan approval for any parcel or development within the Airport Noise Overlay District, identifying any lot which is located within the Airport Noise Overlay District. The statement must also identify the component of the District in which the lot is located.

7.7.8 Airport Noise Overlay Use Limitations

In addition to the regulations for the zoning district over which an Airport Noise Overlay District is located, and in addition to the restrictions of the Airport Safety Zones set out in Sec. 7.7.4, the following use limitations shall apply within the Airport Noise Overlay District:

A. Ldn 65+. In aircraft noise contours Ldn 65 or higher, residential dwellings shall not be permitted. However, new dwelling units and additions to existing dwellings may be permitted provided that:

1. The lot was recorded or had record plat approval prior to the adoption of this Ordinance; and

2. The new dwelling unit or addition complies with the acoustical treatment requirements for residential districts set forth in the Virginia Uniform Statewide Building Code.

B. Ldn 60 to 65 Contours.

1. Disclosure Statement. A disclosure statement shall be required for all residential dwelling units to be constructed between the Ldn 60 to 65 aircraft noise contours. The subdivider or developer shall disclose in writing to all prospective purchasers that they are located within an area that will be affected by aircraft over-flights and aircraft noise. Such notification will be accomplished by inclusion of this information in all Homeowner Association Documents, and by inclusion on all subdivision plats and site plans, and within all deeds required for subdivision or site plan approval.

2. Acoustical Treatment. For all residential units located between the Ldn 60 to 65 aircraft noise contours, a subdivider or developer shall incorporate acoustical treatment into all dwelling units to insure that interior noise levels within living spaces (not including garages, sunrooms or porches) do not exceed an average noise level of 45 db(A) Ldn. Compliance with this standard shall be based upon a certification from an acoustical engineer licensed in the Commonwealth of Virginia, submitted at the time of zoning permit issuance, that the design and construction methods and materials to be used in the dwelling are such that the foregoing standard will be met, assuming exterior noise levels between Ldn 60 to 65.

C. One Mile Buffer Area. A disclosure statement shall be required for all residential dwelling units to be constructed outside of, but within one (1) mile of the Ldn 60 aircraft noise contour. The subdivider or developer shall disclose in writing to all prospective purchasers that they are located within an area that will be affected by aircraft over-flights and aircraft noise. Such notification will be accomplished by inclusion of this information in all Homeowner Association Documents, and by inclusion on all subdivision plats and site plans, and within all deeds required for subdivision or site plan approval.

Loudoun County has adopted an airport zoning overlay district for the Leesburg Executive Airport as noted in Section 4-1400 of the Loudoun County Ordinances. The Town and County versions of the Airport Overlay District are nearly identical. The County Ordinance states:

This district is established to acknowledge the unique land use impacts of airports, regulate the siting of noise sensitive uses, ensure that the heights of structures are compatible with airport operations, and complement Federal Aviation Administration regulations regarding noise and height.