

Chapter Three  
**FACILITY REQUIREMENTS**

---

**A. GENERAL**

The purpose of this chapter is to determine the airport's capacity in relation to the forecast of aviation demand presented in Chapter Two. This section will also identify the facility requirements to accommodate the existing through 20-year forecasted demand. An analysis of the forecasts presented in Chapter Two indicates an increase of aviation activity at Virginia Highlands Airport. To accommodate these increases, airport improvements and/or facility development will be necessary to meet the area's aviation needs.

The methodology used to determine facility requirements begins with an examination of the airport system's major components: airspace, airfield, buildings and surface access. It is important to note that each of these system components must be balanced to achieve system optimization. As previously discussed in Chapter One, the Virginia Highlands Airport has an existing airport reference code (ARC) of B-II small, i.e., aircraft of 12,500 pounds or less. Since the ARC is projected to remain the same throughout the planning period, any deficiencies in the airport's facilities will be identified based upon standards presented in FAA AC 150/5300-13 "Airport Design". Recommended improvements to facilities will be noted as required. It should be noted that the airport is currently undertaking land acquisition and obstruction removal in the approach to Runway 24. Once this is completed, the airport will be able to convert to B-II for large airplanes, i.e., aircraft greater than 12,500 pounds.

**B. CRITICAL AIRCRAFT**

Airports are planned and designed to accommodate the most demanding aircraft intended to regularly operate at a particular airport. Demands imposed by the design or "critical" aircraft relate to the aircraft's approach to landing speed and/or the aircraft wingspan. Based on this study (Chapter One – Inventory) the Cessna Citation family of aircraft represents the critical aircraft for VJI and should be used for analyzing the runway length requirement at the Airport. Although the Airport may occasionally serve C-I or C-II aircraft, the prominent aircraft utilizing



the airport are classified as B-II. **Table 3-1** presents representative business jet aircraft that utilize Virginia Highlands Airport. A detailed discussion of B-II standards and C-II standards will be presented in Chapter 4, Airport Development Alternatives.

**TABLE 3-1  
VIRGINIA HIGHLANDS AIRPORT  
CRITICAL AIRCRAFT**

AIRCRAFT	ARC	APPROACH SPEED (KNOTS)	WINGSPAN (FT)	TAKEOFF WEIGHT (LBS)
Cessna Citation II	B-II	108	51.7	13,300
Cessna Citation V	B-II	130	52.2	16,100
Dassault Falcon 200	B-II	114	53.5	30,650
Gates Learjet 25	C-I	137	35.6	15,000

Source: Delta Airport Consultants, Inc. Analysis  
FAA AC 150/5300-13 "Airport Design"

### C. RUNWAYS & TAXIWAYS

Virginia Highlands Airport has one (1) paved runway, 4,471' x 75'. The runway was constructed in 1984 and underwent an extension and overlay in 1991. The runway pavement strength is listed as a 12,500 pound single wheel gear configuration (U.S. Department of Commerce Airport/Facility Directory). The actual pavement strength of Runway 6-24 is 30,000 pounds single gear. However, the actual strength cannot be published until obstructions are removed from the Runway 24 end to allow a 34:1 approach slope. Currently, Runway 6-24 has a medium intensity runway lighting (MIRL) system that was installed when the runway was constructed in 1984, and extended in 1991.

In addition to analyzing the runway capacity, length and width requirements, this section includes an examination of the Taxiway System, Runway Safety Area (RSA), Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) requirements.



## 1. Runway Length and Width

Required runway length is a function of an airport's elevation, mean maximum temperature of the hottest month, aircraft take-off weight, aircraft engine performance, runway gradient and wet or dry pavement surfaces. All of these variables affect the runway take-off and landing length. Runway length can be determined using the respective manufacturer's performance curves and/or by using the FAA Airport Design Computer Program and procedures outlined in FAA Advisory Circular 150/5300-13 "Airport Design".

Table 3-2 presents the runway length requirements using the above referenced FAA Airport Design software version 4.2D. Using the mean maximum temperature of 85° for the hottest month, and an airport elevation of 2,087 feet, the required runway lengths were determined for the families of aircraft shown in the table.

**TABLE 3-2  
VIRGINIA HIGHLANDS AIRPORT  
RUNWAY LENGTH REQUIREMENTS**

<b>AIRPORT AND RUNWAY DATA</b>	
Airport elevation	2,087'
Mean daily maximum temperature of the hottest month	85°
Maximum difference in runway centerline elevation	25'
Stage length for airplanes of more than 60,000 pounds	500 miles
<b>RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN</b>	
Small airplanes with approach speeds of less than 30 knots	360'
Small airplanes with approach speeds of less than 50 knots	970'
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	3,160'
95 percent of these small airplanes	3,810'
100 percent of these small airplanes	4,400'
Small airplanes with 10 or more passenger seats	4,590'
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	5,500'
75 percent of these large airplanes at 90 percent useful load	7,000'
100 percent of these large airplanes at 60 percent useful load	6,130'
100 percent of these large airplanes at 90 percent useful load	8,900'

Source: Delta Airport Consultants, Inc. Analysis  
FAA Airport Design Software Version 4.2D



A runway length of 5,500 feet is required to serve 75 percent of large aircraft of 60,000 pounds or less given the Airport's mean daily maximum temperature, field elevation and assuming the aircraft is operating at 60 percent useful load capacity. The existing runway is not adequate to serve the Airport's critical aircraft during the planning period. **Therefore, it is recommended that a 1,029 foot extension be ultimately shown on the Airport Layout Plan Set allowing Virginia Highlands Airport a total runway length of 5,500 feet. An environmental assessment, land acquisition, and relocation of SR 611 are expected to be accomplished in Phase I. Construction of the runway extension is anticipated in Phase II.**

For airports with an airport reference code (ARC) of B-II with a visual or non-precision approach, the required runway width is 75 feet. **The existing runway width at VJI is 75 feet and meets FAA standards.**

## **2. Pavement Strength and Pavement Condition**

The pavement strength at Virginia Highlands Airport is currently published at 12,500 pounds single wheel capacity for Runway 6-24. The actual pavement strength of Runway 6-24 is 30,000 pounds single gear. However, the actual strength cannot be published until obstructions are removed from the Runway 24 end to allow a 34:1 approach slope. In 1991, the runway and taxiway at VJI were extended and overlaid. In 2001, a pavement management study was conducted by ERES Consultants, Inc. for the Commonwealth of Virginia Department of Aviation (DOAV). The report stated that the pavement at VJI is in very good to excellent condition. There was one area of the apron that was rated to be in fair condition; however that portion was partially reconstructed and overlaid during the apron expansion project conducted in 2001. Although the existing pavement is in excellent condition, most bituminous concrete surfaces have a life span of 15 to 20 years before oxidation and cracking result in the need for a preservation overlay. **Therefore, an overlay of the runway and taxiways should be anticipated during Phase III of the planning period. In conjunction with the overlay the runway should also be marked and grooved.**



### 3. 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. FAA AC 150/5300-13 "Airport Design" designates a minimum runway safety area based on the airport reference code of the runway. As discussed previously, Runway 6-24 is expected to remain as B-II.

The standard design for a B-II runway safety area is 150 feet wide centered on the runway centerline and is extended 300 feet beyond the end of the runway. **The RSA for Runway 6 and 24 at VJI currently meets the required safety area standards.**

### 4. Runway Object Free Area

The runway object free area (ROFA) is a two dimensional area on the ground centered on the runway centerline. It is provided to enhance the safety of aircraft operations by having the area free of objects, except for those that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and/or hold in the object free area. The standard design dimensions for a category B-II runway object free area with approach visibility minimums not lower than three-quarter-statute mile is 500 feet in width, centered on the runway, with extensions 300 feet beyond each runway end. Runway 6 meets the standard criteria. However, on the existing 1996 Airport Layout Plan for VJI a modification to standards was requested for Runway 24 stating that a fence on the airport side of Jerry Lane is at or above the ROFA elevation at a distance of 280 feet from the runway end. **It is recommended that the ROFA be brought into compliance.**

### 5. Runway Protection Zones

The function of the Runway Protection Zone (RPZ) is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ.

