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***CHAPTER 3.0 – AIRPORT FACILITY REQUIREMENTS AND  
LAYOUT***

## **3.0 AIRPORT FACILITY REQUIREMENTS AND LAYOUT**

### **3.1 INTRODUCTION**

For the Delaware Municipal Airport to fulfill its role in the local community and national airport system, it must be capable of satisfying the demands imposed by the aviation public. In the previous two chapters of this report, the existing facilities available at the airport were inventoried, and the aviation demand was forecast for the short (0-5 years), intermediate (5-10 years), and long (10-20 years) term planning periods. The aviation forecasts assumed that the airport facilities will not restrict demand.

In this chapter, the forecasted demands are imposed on the existing airport facilities, requirements are identified, and alternatives to satisfy these requirements are developed for each planning period. Specific requirements addressed in this chapter are airport capacity, runway length, crosswind runway, apron size, terminal space, hangar space, and other facilities.

### **3.2 DEMAND AND CAPACITY**

Airport capacity for Delaware Municipal Airport was determined using the procedures contained in FAA AC 150/5060-5. Using Chapter 2 for long range airport planning, the airport capacity is as follows:

98 operations per hour under VFR  
59 operations per hour under IFR conditions  
Annual Service Volume is 230,000 operations

The forecast estimates that in 2023, the total annual operations will be approximately 66,885. Adequate capacity exists to meet demand; therefore, no additional runway capacity is required through the planning period.

### 3.3.1 RUNWAY REQUIREMENTS

Runway 10-28 at Delaware Municipal Airport is presently 5,000 feet in length and 100 feet in width. Chapter 3 of FAA AC 150/5300-13, *Airport Design*, contains recommended criteria for runway design. The design requirements for Delaware Municipal Airport are based on airplane design group II with an approach category of C.

Table 3-1: Runway Design Standards for Aircraft  
Approach Category C and Airplane Design Group II

Item	Dimension (feet)
Length	*
Width	100
Shoulder Width	10
Blast Pad Width	120
Blast Pad Length	150
Safety Area Width	500
Safety Area Width Length Beyond RW End	1,000
Obstacle Free Zone Width	400
Obstacle Free Zone Length	200
Object Free Area Width	800
Object Free Area Length Beyond RW End	1,000

\* Runway Length is dependant on the design aircraft.

## **Runway Length**

The FAA's Airport Design computer program was used to determine the recommended length of the runway. The program is based on Chapter 2 of AC 150/5325-4A, *Runway Length Requirements for Airport Design*.

Using the FAA's Airport Design computer program, for airplanes of more than 60,000 lbs. the recommended runway length are as follows: 5,340 feet for a 500-mile haul and 6,340 feet for a 1000-mile haul. Considering Large aircraft 60,000 lbs. or less, the recommended length for Runway 10-28 is 5,460 feet serving 75% of the aircraft at 60% useful load. The printout from the program is included in Appendix E.

*Based on this data and analysis, we recommend that the runway be extended 800 feet to a total length of 5,800 feet. This will allow for US 42 to remain in its existing location and not be relocated, and allow for a perimeter road on the west end of the runway. This length of runway will accommodate greater than 60,000 lbs. aircraft for greater than 500 mile hauls, but less than 1,000 mile hauls. Based on the forecasts, the extension should be completed in the long-term (10-20 year) planning period. The runway extension is presented in Exhibit 3-1.*

## **Runway Object Free Area (OFA)**

The Runway OFA is an area on the ground centered on a runway 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. Currently and for the future runway extension the OFA is free of objects.

## **Runway Safety Area (RSA)**

As part of the master plan update, a runway safety area analysis was conducted on Runway 10-28 at DLZ. The safety area analysis determined that the standards are not currently met due to the locations of existing drainage ditches, and headwall structures that do not fully comply with the FAA requirements. The Runway Safety Area Study is included in Appendix F.

*Based on discussions with the FAA, it is recommended that the RSA improvements be completed during the runway extension, which is planned in the long-term (10-20 year) planning period.*

### 3.3.2 RUNWAY ORIENTATION AND WIND COVERAGE

The true azimuth of Runway 10-28 at Delaware Municipal Airport is 104° 48'24.98". The magnetic declination at the Delaware Municipal Airport is 6° 28'00". Applying the declination to the true azimuth yields a magnetic azimuth of 98° 20'24.98"; *therefore, the current designation is correct, and the runway orientation will remain 10-28.*

A wind analysis was performed using data from Port Columbus International Airport that was provided by the National Climatic Data Center. Wind data from Delaware Municipal Airport is not available. Port Columbus International Airport is approximately twenty-five (25) miles south of Delaware Municipal Airport and should provide a good representation of the wind. The analysis yielded the following results:

Table 3-2: Runway 10-28 Wind Coverage

Wind Speed	All Weather	IFR	VFR
12 mph (10.5 knots)	92.2%	92.1%	93.9%
15 mph (13 knots)	98.9%	95.7%	96.9%
18 mph (16 knots)	98.9%	98.9%	99.5%

A wind speed of 12 mph is used for Group A-I and B-I aircraft, a wind speed of 15 mph is used for Group A-II and B-II aircraft, and a wind speed of 18 mph is used for Group A-III, B-III, and C-I thru D-III aircraft. The FAA Advisory Circulars recommend that a runway provide a minimum of 95% wind coverage for any aircraft forecasted to use the airport on a regular basis. The forecasted aircraft to use DLZ include Group A-I, B-I, A-II, B-II, and C-II.

The 95% wind coverage is met for the 15 mph wind speed (Group A-II and B-II aircraft), and the 18 mph wind speed (Group A-III, B-III, and C-I thru D-III aircraft). The wind coverage for the smaller aircraft (Group A-I and B-I aircraft) is slightly below 95%, with an all weather wind coverage of 92.2%, IFR wind coverage of 92.1%, and VFR wind coverage of 93.9%.

There are other airports within a short distance of Delaware Municipal Airport that have crosswind runways. Ohio State University Airport is 20 miles from Delaware Municipal Airport and has Runways 14-32 and 5-23, and Marion Municipal Airport is 26 miles from Delaware Municipal Airport and has Runways 12-30 and 6-24.

In conclusion, Runway 10-28 at Delaware Municipal Airport has relatively high wind coverage for the aircraft forecasted to use the airport. The smaller aircraft (Group A-I and B-I aircraft) that fall below the recommended wind coverage of 95%, have alternate crosswind runways at other airports within a short distance, therefore *we do not recommend a crosswind runway at Delaware Municipal Airport.*

### **3.4 FAR PART 77 IMAGINARY SURFACES AND RUNWAY PROTECTION ZONES**

Federal Aviation Regulation Part 77 requires that runway imaginary surfaces meet designated clearance requirements. The following critical imaginary surfaces are described, as follows:

**Primary Surface:** A surface longitudinally centered on a runway extending along the clearance width and 200 feet beyond each end of the runway.

**Approach Surface:** A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. It is applied to each end of a runway based on type of available or planned approach.

**Transitional Surface:** These surfaces extend upward and outward at right angles to the runway centerline and runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces.

**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.

**Horizontal Surface:** A horizontal plane located 150 feet above the established airport elevation. The perimeter of this surface is constructed by swinging arcs of specified radii from the center of each runway's primary surface end and connecting the adjacent arcs with lines tangent to these arcs.

Please refer to Exhibit 3-1 for the proposed FAR Part 77 imaginary surfaces for an approach procedure with vertical guidance with visibility minimums as low as  $\frac{3}{4}$  mile.

**Runway Protection Zone (RPZ):** The RPZ begins 200 feet from the end of runway, is trapezoidal in shape and centered about the extended runway centerline. The RPZ dimensions are a function of the type of aircraft and approach visibility minimum associated with the runway. The optimum runway protection zone requirements for Runway 10-28 at Delaware Municipal Airport are presented in Table 3-3:

Table 3-3: Runway Protection Zone

Approach Visibility	Facilities Expected To Serve	Inner Width (feet)	Outer Width (feet)	Length (feet)	FAR Part 77 Slope (feet)
Not Lower than 3/4 mile	All	1,000	1,510	1,700	34:1
	Aircraft				

The RPZ's function is to enhance the protection of people and property on the ground, which is achieved through airport owner control. This control includes clearing areas of incompatible objects and activities. Land uses prohibited from the RPZ are residences and places of public assembly. Typical places of public assembly include churches, schools, hospitals, office buildings, and shopping centers. The FAA Great Lakes Policy and Procedures Memorandum 5300.1B "Runway Protection Zone and Airport Object Clearing Policy" states that as part of a runway extension project the Runway Protection Zone will need to be acquired in fee. Control is preferably exercised through ownership or an aviation easement.

