

## **APPENDIX D**

### **Design Aircraft Analysis**

## APPENDIX D - DESIGN AIRCRAFT ANALYSIS

Erie International Airport (elevation 733 feet above mean sea level) is a primary commercial service facility which accommodates aircraft from Airplane Design Groups I, II, and III, and Aircraft Approach Categories A, B and C. The Airport currently has an Airport Reference Code (ARC) of C-III. Thus, the airport will continue to be planned and designed as a primary commercial service facility according to Federal Aviation Administration Advisory Circular (AC) 150/5300-13, *Airport Design*, to accommodate Airport Reference Code C-III aircraft, those having approach speeds up to 141 knots with wing spans up to, but not including, 118 feet.

### COMMERCIAL AIRCRAFT CHARACTERISTICS

The types of airline and commercial aircraft routinely accommodated at the Airport are narrow-body aircraft, suited to the short- and medium-range service pattern. Currently, air carrier aircraft account for 4 of the 18 scheduled daily departures, or 22% of total departures. Commuter operations accounted for 14 departures or 78% of the total departures. The characteristics of the aircraft utilized and how they relate to the FAA's classifications of design group and approach categories are presented in Table D-1.

**TABLE D-1  
COMMERCIAL AIRCRAFT CHARACTERISTICS**

Aircraft Type	Maximum T/off Weight (lbs)	Approach Speed (knots)	Wingspan (feet)	Approach Category	Design Group
Air Carrier					
DC-9-30	108,000	127	93.3	C	III
F-100	101,000	130	92.1	C	III
Commuter					
Dehavilland Dash 8	41,000	90	90	A	III
Embraer 120	26,400	115	64.9	B	III
Beechcraft 1900	16,600	113	54.5	B	III

Source: C&S Engineers, Inc.

### DESIGN AIRCRAFT

According to FAA Advisory Circular 150/5300-13, *Airport Design*, the aircraft at primary commercial service airports are grouped into five categories based upon their certified approach speed. Approach Categories A and B include small, propeller aircraft and certain smaller business jets all which have approach speeds of less than 121 knots. Categories C, D, and E consist of the remaining business jets as well as larger jet and propeller aircraft generally associated with commercial and military use. Aircraft utilizing Erie International Airport currently fall into Category C or below.

The same advisory circular also indicates six Airplane Design Groups according to the

physical size of the aircraft. The airplane's wingspan is the principal characteristic affecting design standards. Airplane Design Groups range from Group I for small aircraft with wingspans less than 49 feet to Group VI for the largest aircraft. Most general aviation and commuter airline aircraft using Erie International Airport fit into Groups I and II (wingspans less than 79 feet). The major airline aircraft operating at the Airport are in Group III (wingspans less than 118 feet).

The current approved Airport Master Plan identified the DC-9-30 as the Design Aircraft for Erie International Airport. The DC-9-30 has an Airport Reference Code (ARC) of C-III. Part of the planning process includes a re-evaluation of the critical aircraft to determine if another aircraft more accurately addresses the aviation demands of the airport and should be designated as the critical aircraft. *Based upon the consultants re-evaluation that included discussions with the airport representatives, airlines and other concerned agencies, it is our recommendation that the DC-9-30, with an ARC C-III, remain the design aircraft for the primary purpose of evaluating minimum runway length requirements.* The DC-9-30 is the largest aircraft in the C-III family that meets the required 500 annual itinerant operations per year.

According to the aviation demand forecasts for air carrier and commercial operations prepared as part of the master plan, the likelihood exists for an aircraft other than the DC-9-30 to be used for cargo operations at the airport. Although there are no existing operations by B727s at the airport, air cargo operations are expected to include aircraft such as the Boeing 727-200. The B727-200 also has an ARC of C-III and will be consistent with the airfield separations and dimensional requirements of the current design aircraft. The Runway Length Analysis (Appendix E) discusses the requirements of the DC-9-30 as well as the B727-200 in more detail. Validation of the DC-9-30 as the design aircraft for the Airport affects the Runway 6-24 length requirement.

A second consideration associated with use of the B727-200 is the pavement strength requirement. The B727-200 has a greater impact on the design of the pavement because of the size and configuration of the landing gear, resulting in the need for additional pavement strength. No other significant design issues will result, based upon our analysis, with the DC-9-30 designated as the critical aircraft for Runway 6-24.

It is recommended that the critical aircraft for the planning period be a DC-9-30 aircraft having an ARC of C-III. However, it is recommended that all future pavement design be based upon the Boeing 727-200, including routine pavement maintenance projects and pavement expansion projects.

## SUMMARY

Based on our analysis, the Design Aircraft should remain the DC-9-30 for the planning period. However, for planning purposes the B727-200 should also be given consideration for runway length and should be the aircraft used for all future pavement designs. In addition, it is recommended that the ARC for Runway 6-24 remain C-III.