APPENDIX D: RUNWAY LENGTH ANALYSIS

Purpose

A runway length analysis was completed to FAA standards identified in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* in this airport master plan study for the Dawson Community Airport. Due to the technical nature of this analysis, a separate appendix has been prepared to calculate recommended runway lengths for the design aircraft identified in the aviation forecasts.

A runway length analysis was performed using the FAA's current methodology found in FAA AC 150/5325-4B. The design approach identifies a recommended runway length based on a family grouping of design aircraft.

At GRN the current overall design aircraft is small aircraft less than 12,500 pounds. A typical design aircraft fleet includes the Pilatus PC-12 operated by Gordon Memorial Health, as well as the Cessna 172 Skyhawk and a variety of ag spray aircraft, to include the Thrush 710P and the Air Tractor 502. The length of the primary Runway 4/22 will be driven by the length needs of the critical design aircraft fleet mix, which generally includes those with approach speeds of 120 knots or less. The complete design aircraft fleet mix is identified in **Chapter 1: Airport, Community & Aviation Overview.**

Small Airplanes Up to 12,500 Pounds

FAA Design Curves

The FAA design approach identified in Chapter 2 of FAA AC 150/5325-4B for most small aircraft less than 12,500 pounds requires several steps to be performed to determine runway length:

1. **Identify Number of Passenger Seats:** Classify design aircraft as one of two categories; "Less than 10 Passenger Seats" and "10 Passenger Seats or Greater"
2. **Select Percentage of Fleet:** Airplanes classified as "Less than 10 Passenger Seats" are grouped into two percentage categories based on the airport's location and the amount of existing or planned aviation activities. The categories include "95 Percent of Fleet" and "100 Percent of Fleet".
3. **Consider Future Airport Expansion:** Consider runway length requirements during Instrument Meteorological Conditions (IMC) or expansions to accommodate airplanes more than 12,500 pounds.
4. **Determine Airport Data:** Evaluate the airport elevation, mean daily temperature in hottest month and runway condition to adjust runway length.
5. **Calculate Runway Length Based on Curves:** Utilize FAA runway length curves published in AC 150/5325-4B.

Figure D-1 - FAA Figure 2-1: Small Airplanes with Fewer than 10 Passenger Seats

Gordon Municipal Airport
Temperature: 87.4°F - Airport Elevation: 3,562.4' MSL

Figure 2-1. Small Airplanes with Fewer than 10 Passenger Seats
(Excludes Pilot and Co-pilot)

Gordon Municipal Airport
Elevation 3,562'
Mean Max Temp 87.4 degrees

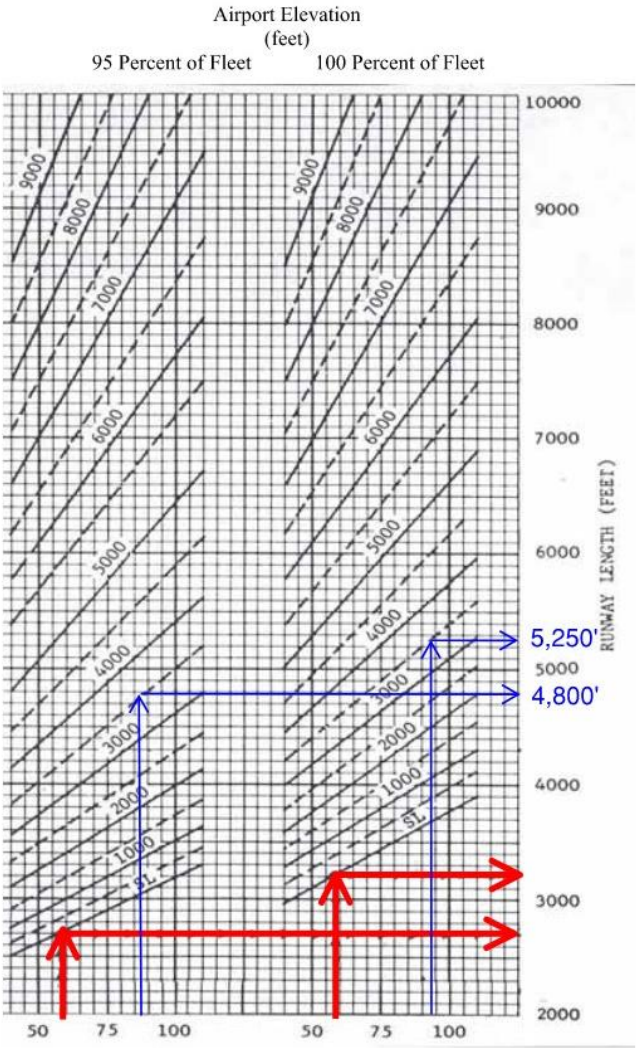
Example:

Temperature (mean day max hot month): 59° F (15° C)
Airport Elevation: Mean Sea Level

Note: Dashed lines shown in the table are mid values of adjacent solid lines.

Recommended Runway Length:

For 95% = 2,700 feet (823 m)
For 100% = 3,200 feet (975 m)



*Note that the red line indicates an example runway length calculation from the Advisory Circular. Calculations for GRN are indicated by blue lines

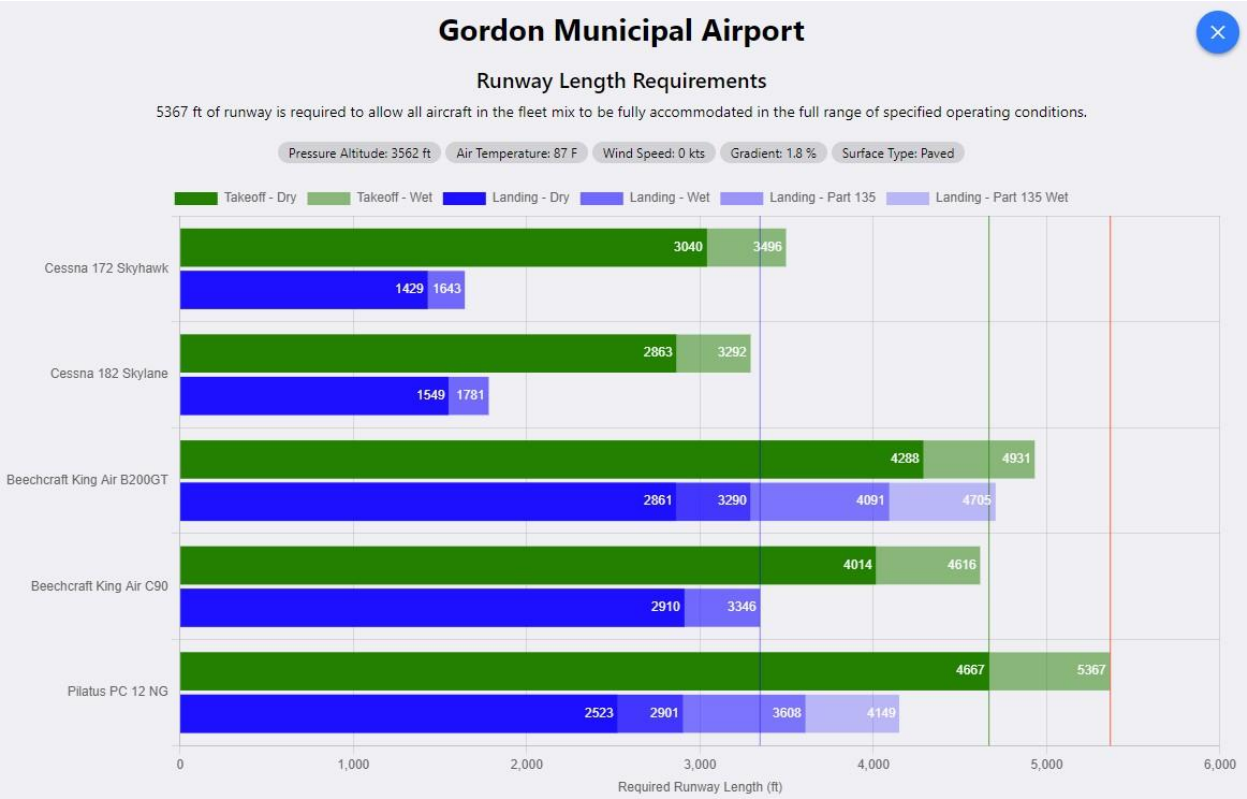
Runway Length at 95 Percent of Fleet: **4,800 feet**
Runway Length at 100 Percent of Fleet: **5,250 feet**

Individual Aircraft

FAA AC 150/5325-4B states airport planners can "determine the recommended runway length from airplane flight manuals for the airplanes to be accommodated by the airport in lieu of the runway length curves" as depicted in **Figures D-1**.

KLJ utilizes the Airport Cooperative Research Program (ACRP) release of the Small Aircraft Runway Length Analysis Tool (SARLAT) in late 2022. This tool allows multiple general aviation aircraft to evaluate the runway length needed for the airport. Aircraft derived from the verified operations as well as based aircraft list were applied and the SARLAT calculated the takeoff and landing length needed in wet and dry conditions. See **Figure D-2**.

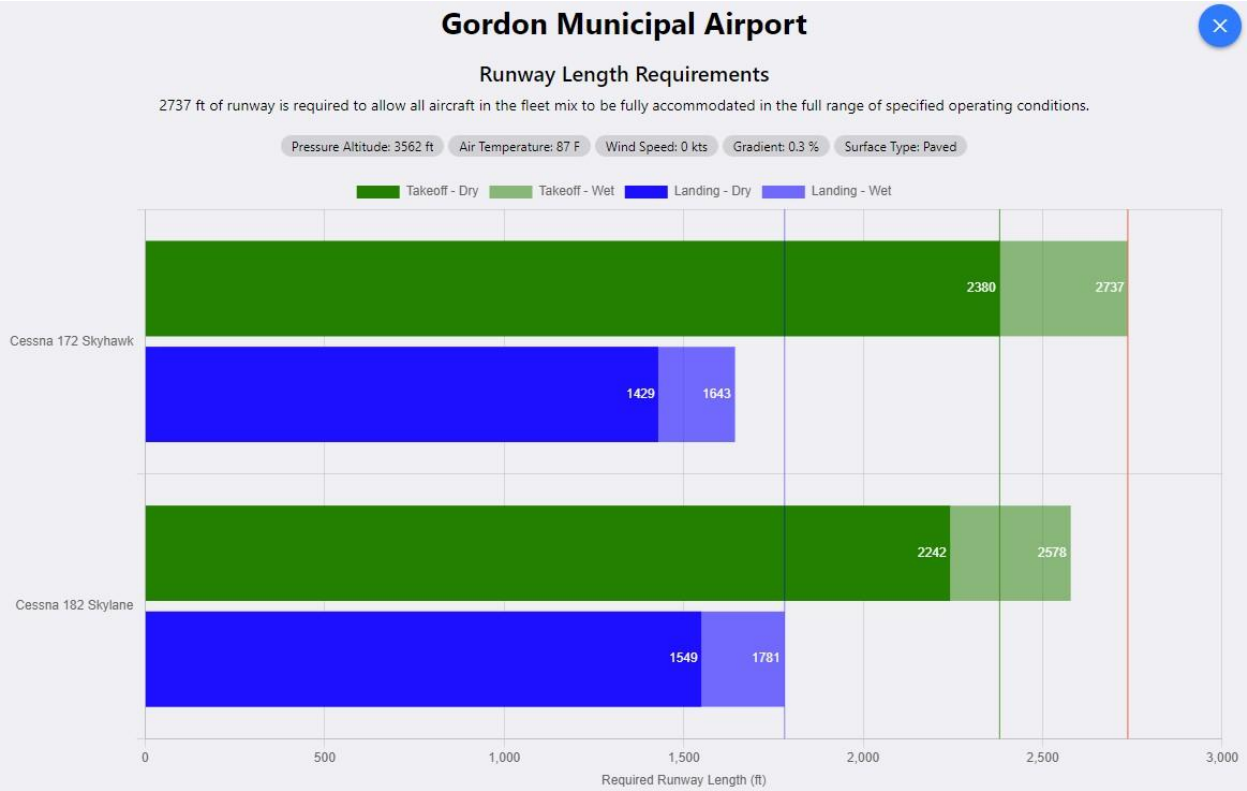
Figure D-2 – STARLAT Data for Primary Runway (4-22 at 1.8 percent gradient)



Source: Small Aircraft Runway Length Analysis Tool (SARLAT)

The gradient for Runway 11-29 is less than that for Runway 4-22 so a separate SARLAT calculation was completed for this runway at 0.3 percent gradient and for only the smaller aircraft. See **Figure D-3.**

Figure D-3 – STARLAT Data for Crosswind Runway (11-29 at 0.3 percent gradient)



The findings are summarized below and in conclusion **the existing runway length for Runway 4-22 will be adequate for the planning period and a length of 2,200 feet would be sufficient for Runway 11-29**.

Table D-1 – Runway Length Requirements (≤ 12,500 lbs.)

Airport and Runway Data		
Runway 4/22 Length	5,196 feet	
Airport Elevation	3,562.4 feet	
Mean Daily Maximum Temperature of Hottest Month	87.4°F	
Aircraft Classification	**Recommended Runway Takeoff Length**	
Small Airplanes 12,500 Pounds or less		
10 or more passenger seats	5,250 feet	
Less than 10 passenger seats at 100 percent of fleet	5,250 feet	
Less than 10 passenger seats at 95 percent of fleet	4,800 feet	
SARLAT	Dry	Wet
Cessna 172 (Runway 11-29)	2,380 feet	2,737 feet
Cessna 182 (Runway 11-29)	2,242 feet	2,578 feet
Beech King Air 200 (Runway 4-22)	4,286 feet	4,929 feet
Pilatus PC-12 (Runway 4-22)	4,645 feet	5,342 feet

Source: FAA AC 150/5325-4B, SARLAT, KLJ Analysis
Note: Runway length requirements estimated based on charts for airport planning purposes only.