ENVIRONMENTAL ASSESSMENT (EA)

FOR

TURF CROSSWIND RUNWAY

At Stanley Municipal Airport, Stanley, North Dakota

Prepared by: Mead & Hunt, Inc.

Lead Federal Agency:

Federal Aviation Administration

Dakota-Minnesota Airports District Office

Sponsor:

Stanley Municipal Airport Authority

FEBRUARY 2024

FAA CERTIFICATION:

This Environmental Assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

Responsible FAA Official CASEY RAY BUECHLER Digitally signed by CASEY RAY BUECHLER Date: 2024.02.07 03:33:39 -06'00' Date February 7, 2024

Environmental Protection Specialist

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1.1 Introduction

Stanley Municipal Airport ("Airport"), Federal Aviation Administration (FAA) identifier 08D, is located approximately one mile southwest of downtown Stanley, ND, fifty-five miles west of Minot, ND, and seventy miles east of Williston, ND (**Figure 1-1**). The Airport is owned by the Stanley Municipal Airport Authority (SMAA). The Airport has one runway, Runway 10/28 (Azimuth heading 108°/288°), which is 3,900 feet long by 60 feet wide and constructed of asphalt. Runway 28 has a GPS lateral navigation (LNAV) approach procedure with visibility minimums down to 1-mile. Runway 10 can also be accessed down to 1-mile visibility via a circling approach procedure associated with the Runway 28 LNAV straight-in approach procedure. The existing airfield is shown in **Figure 1-2**.

The Airport is currently updating its Airport Layout Plan (ALP) update to include a new turf crosswind runway. The Airport sponsor desires to construct the new turf crosswind runway in 2024.

Federal financial participation in projects through the Airport and Airway Improvement Act of 1982 (AIP) requires environmental review under the National Environmental Policy Act (NEPA). An Environmental Assessment (EA) is a document prepared under NEPA that evaluates the effects of a proposed action on the surrounding natural, social, and economic environments. This EA is prepared under the requirements of the Title V of Public Law 97-248 of the Airport and Airway Improvement Act of 1982, NEPA, and FAA Order 5050.4B, *National Environmental Policy Act Implementing Instructions for Airport Actions* (April 2006). The EA also meets the requirements of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures,* dated July 2015.

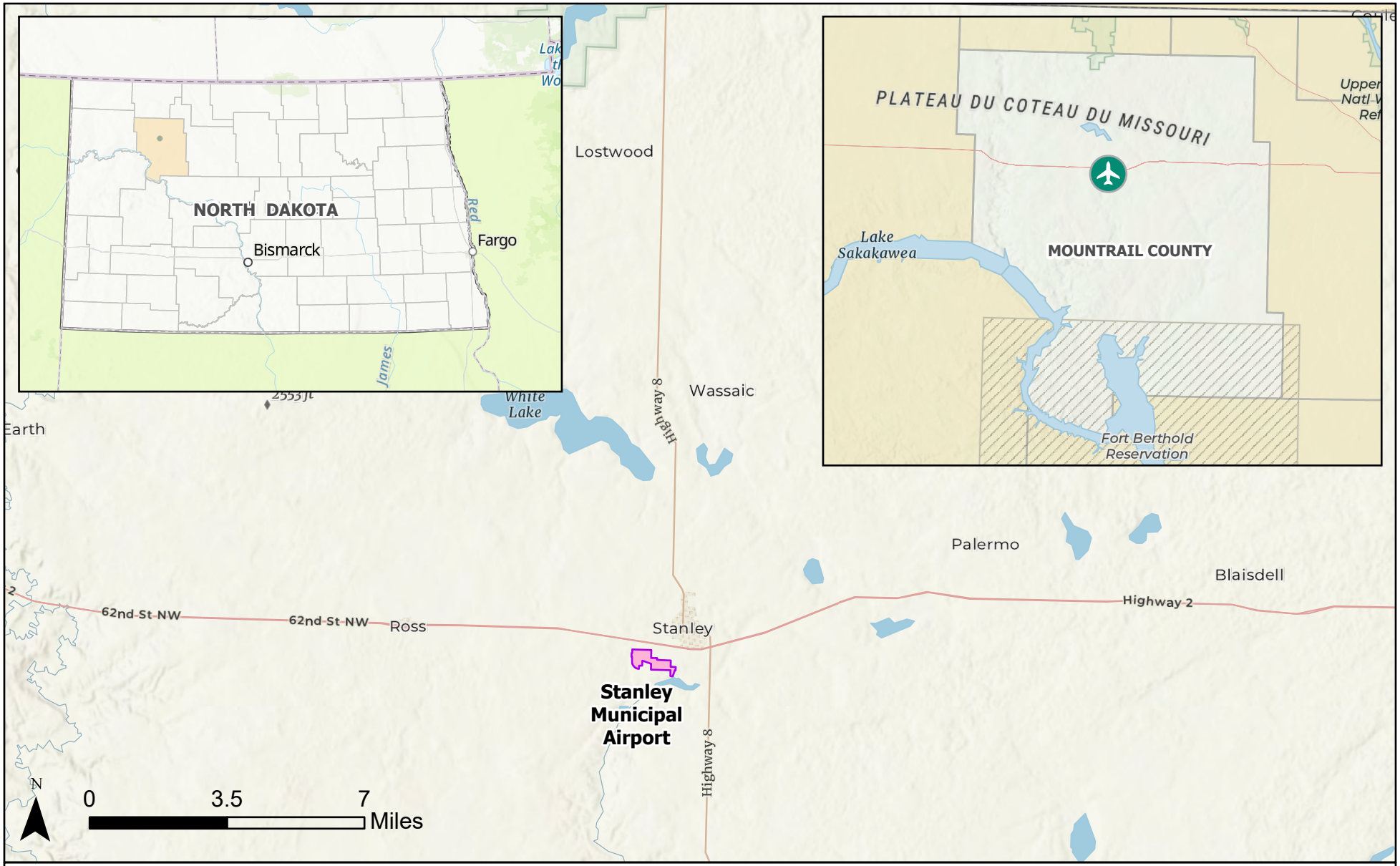
The intent of the EA is to provide the environmental documentation necessary to assist local, state, and federal officials in evaluating the proposed action at 08D. The EA outlines the purpose and need for a proposed project and evaluates the proposed action and a full range of alternatives. The analysis also identifies and discusses measures to avoid, minimize, and mitigate possible environmental impacts.

The FAA will evaluate the EA under NEPA and, if the project does not have the potential for significant impacts, issue a Finding of No Significant Impact (FONSI), or if it does have significant impacts, prepare an Environmental Impact Statement (EIS). No other agencies are expected to play a cooperating role.

The following sections outline the Purpose and Need for proposed improvements at Stanley Municipal Airport.

1.2 Project Purpose

The purpose of the proposed project is to provide adequate wind coverage for all aircraft that use the Airport on a regular basis, to satisfy near-term user needs, and to meet FAA airport design standards. Without a new crosswind runway, the Airport is not able to provide the recommended 95 percent wind coverage for the aircraft that regularly use the Airport.



Sources: CGIAR, ESRI, Garmin, NOAA, NPS, State of North Dakota, USDA, USGS

STANLEY MUNICIPAL AIRPORT
STANLEY, ND

4545300-230576.01
08/21/2023

LOCATION MAP

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FIGURE 1-1

1/25/2024 10:42:58 AM
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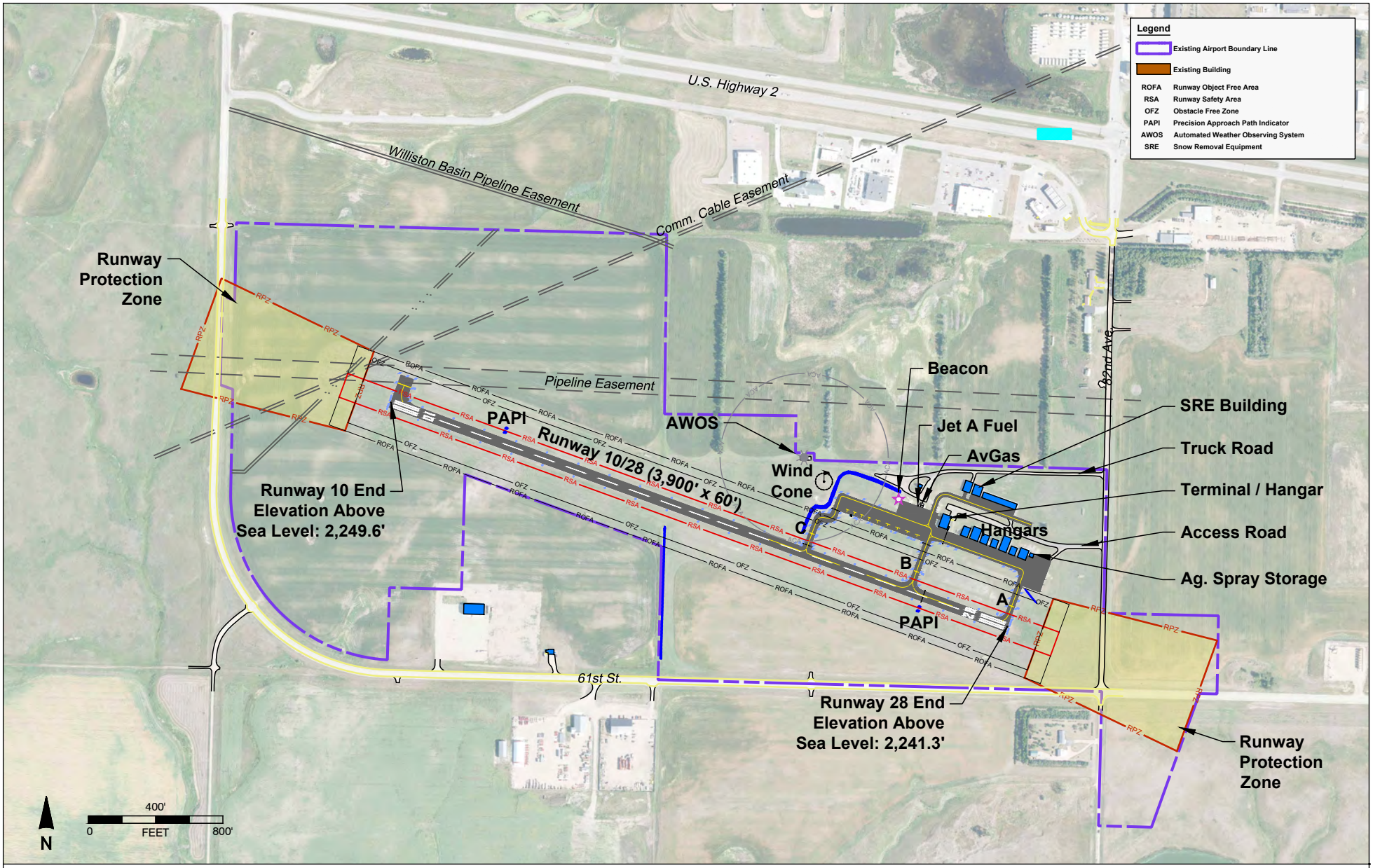

STANLEY MUNICIPAL AIRPORT
STANLEY, ND

4545300-230576.01
01/25/2024

EXISTING LANDSIDE/APRON FACILITIES

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FIGURE 1-2

1.3 Project Need

The primary paved Runway 10/28 at 08D has 86.49 percent[1] all weather wind coverage for small aircraft with an allowable 10.5-knot crosswind component. The need for the project is to provide a crosswind runway that will allow the Airport to provide the FAA-recommended 95 percent wind coverage for the aircraft that regularly use the Airport. The proposed action should provide:

- At least 95 percent wind coverage for all aircraft that use the Airport on a regular basis.
- A standard runway safety area (RSA), as well as a runway object free area (ROFA), runway obstacle free zone (OFZ), and Federal Aviation Regulations (FAR) Part 77 primary surface clear of above-ground objects.
- Adequate runway length for less crosswind capable aircraft expected to use the crosswind runway on a regular basis.
- Clear approach threshold siting surfaces and FAR Part 77 approach surfaces.
- A runway configuration that is compatible with existing and planned Airport development and that minimizes impacts to off-Airport land uses.

1.3.1 Provide Adequate Crosswind Coverage

This section identifies the wind coverage for the existing primary Runway 10/28 when considering wind data from both Stanley and nearby airports at Tioga and Minot. The analysis for the primary runway considers all-weather (AW) conditions, visual meteorological conditions (VMC), and instrument meteorological conditions (IMC) conditions for Runway Design Code (RDC) A-I/B-I aircraft, because these are the most demanding aircraft expected to use a turf crosswind runway at Stanley Municipal Airport on a regular basis.

DEFINITION OF TERMS

Wind Coverage:
Average percentage of time that a runway or grouping of runways is not subjected to crosswinds of magnitude greater than the allowable crosswind component for each runway.

Small Aircraft:
An aircraft with a maximum certificated takeoff weight of 12,500 pounds or less.

Runway Design Code (RDC):
A code signifying the design standards that apply to an existing or planned runway, based on the characteristics of the aircraft regularly using, or expected to regularly use, that runway. The combined RDC A-I/B-I referenced here applies to aircraft with a wingspan less than 49 feet and an approach speed less than 121 knots.

Aircraft typically take off and land into the wind and strong crosswinds make operations more difficult, requiring the pilot to land either in a crabbed or uneven position. Small aircraft, such as those that operate at Stanley or are based in Mountrail County, are generally light with low approach speeds, and are thereby more susceptible to crosswind forces. In recognition of these limits and potential hazards, FAA design guidelines recommend that the crosswind component not exceed 10.5 knots for RDC A-I/B-I aircraft. All 29 based aircraft at Stanley Municipal Airport are A-I aircraft.

[1] This wind coverage percentage is based on historical weather data (2013-2022) from the AWOS at Tioga Airport in Tioga, North Dakota. The wind coverage percentage derived using data from the on-site AWOS for the same period at 08D is 88.09 percent; however, this historical data is compromised due to tree rows that existed near the AWOS during this period.

Wind coverage is the average percentage of time that a runway or grouping of runways is not subjected to crosswinds of magnitude greater than the allowable crosswind component for each runway. FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, defines the desirable minimum wind coverage for the aircraft that are expected to use a given runway and airport as 95 percent of total wind velocity and direction observations over the most recent 10-year period. When the combination of available runways at a given airport do not meet the 95 percent threshold, a crosswind runway that increases the airport's overall wind coverage should be considered.

Wind speed and direction information is currently reported to the National Oceanic and Atmospheric Administration (NOAA) by an on-site Automated Weather Observation System (AWOS) located at 08D. However, the historical data available for this station is compromised, due to its proximity to wooded areas that were recently removed. As a result, wind data recorded between 2013 and 2022 was obtained for two nearby AWOS stations at Tioga Municipal Airport (20 nautical miles west of 08D) and Minot International Airport (45 nautical miles east of 08D).

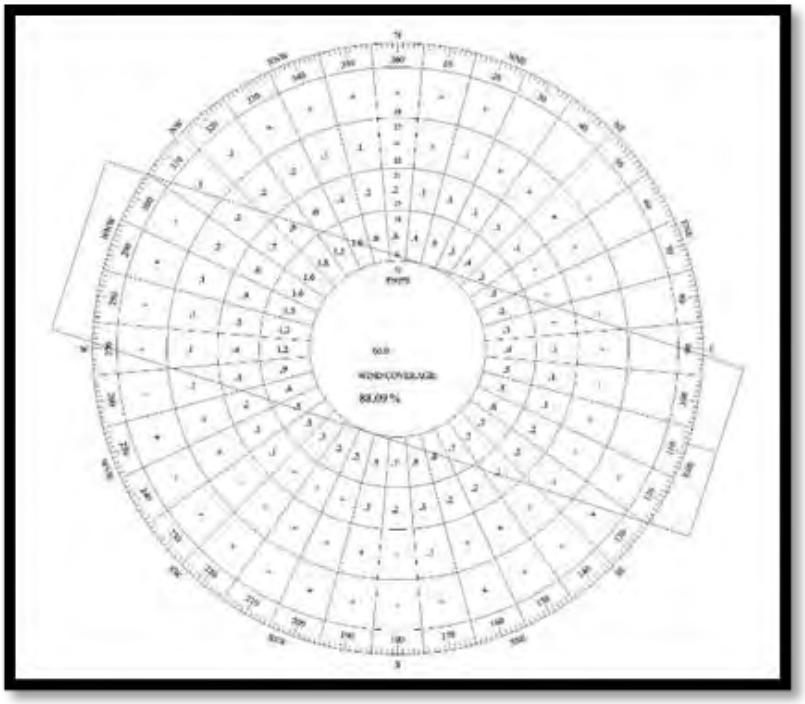
Table 1-1 shows Runway 10/28 wind coverage for AW, VMC, and IMC using a 10.5-knot crosswind component with respect to the most recent 10 years of historical wind data available from weather stations at Stanley, Tioga, and Minot. As shown in **Table 1-1** and the wind rose in **Figure 1-3**, Runway 10/28 provides 88.09 percent coverage for A-I/B-I aircraft in all-weather conditions. When using data from nearby Tioga, the A-I/B-I coverage drops to 86.49 percent. For each weather condition category, using either the Stanley, Tioga, or Minot wind data, Runway 10/28 does not meet the 95 percent minimum wind coverage recommended by AC 150/5300-13B at the 10.5 knot crosswind component.

Table 1-1: Runway 10/28 Wind Coverage

Data Source	True Heading	10.5 knots		
		AW	VMC	IMC
Stanley AWOS	108/288	88.09%	88.96%	80.06%
Tioga AWOS	108/288	86.49%	86.92%	81.72%
Minot AWOS	108/288	87.82%	88.40%	84.77%

Source: FAA Airport Data and Information Portal (ADIP), NOAA Integrated Surface Database

Figure 1-3: Runway 10/28 All-Weather Wind Rose (10.5-knot crosswind component, Stanley AWOS data)



Because the primary runway does not provide 95 percent coverage for A-I/B-I aircraft, a crosswind runway should be provided that meets the needs of A-I/B-I aircraft using and expected to use the Airport on a regular basis. Several airport users, including Pioneer AgViation 2 and Wilbur Ellis Company, have indicated that a turf crosswind runway would improve safety and reduce aircraft wear and tear. Airport users have expressed a preference for a turf, rather than paved, crosswind runway, as a turf surface would reduce tire wear and improve safety for the lightweight agricultural and taildragger aircraft that are based at the Airport.

1.3.2 Meet FAA Airport Design Standards

The FAA requires that runways be designed for the most demanding class of aircraft that will use the runway on a regular basis, known as the critical aircraft. In AC 150/5000-17, the FAA defines the critical aircraft as "the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport," explaining that "regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations." The first step in determining the appropriate FAA design standards for the proposed crosswind runway is to determine the appropriate RDC of the critical aircraft.

DEFINITION OF TERMS

Design Standard:

A physical characteristic, quality, configuration, function, operation, or procedure established by the FAA as a benchmark for uniformity, safety, capacity, performance, economy, and environmental quality.

Critical Aircraft:

The most demanding aircraft type, or grouping of aircraft with similar characteristics, regularly using, or expected to regularly use, the runway.

Small aircraft weighing less than 12,500 pounds are more susceptible to destabilization by crosswinds. These aircraft are typically categorized as RDC A-I/B-I aircraft, with wingspans less than 49 feet and approach speeds less than 121 knots. Representative aircraft in this category include primarily small single-engine piston aircraft. For the proposed turf crosswind runway, the critical aircraft should be RDC A-I/B-I (small) reflecting the size of those aircraft, based and itinerant, that would need to use the crosswind runway in the event of crosswinds higher than 10.5 knots. Therefore, the proposed action should meet all relevant FAA design standards for this RDC.

1.3.3 Provide Adequate Runway Length

Stanley Municipal Airport primarily serves smaller single- and multi-engine piston aircraft that are less crosswind-capable. The six most frequent small aircraft that use 08D, and their takeoff and landing distance requirements based on manufacturer specifications, are listed in **Table 1-2**. Images for a sampling of these aircraft are shown in **Figure 1-4** and **Figure 1-5**.

Table 1-2: Aircraft Manufacturer Published Takeoff and Landing Distances						
Manufacturer	**Aircraft Model**	**Gross Weight (lbs)**	**Stall Speed (kts)**	**Approach Speed (kts)**	**Temperature Adjusted Takeoff (ft)**	**Temperature Adjusted Landing (ft)**
Piper	PA-12	1,750	42	54.6	503	442
Cessna	C-152	1,670	43	55.9	890	583
Mooney	M20F	2,740	54	70.2	1,079	963
Piper	PA-28	3,000	47	61.1	1,087	1012
Cessna	C-172R	2,450	47	61.1	1,159	675
Piper	P-24-180	2,500	59	76.7	1,681	565

Source: Manufacturer published specifications, planephd.com.

Figure 1-4: Piper PA-12 Super Cruiser

Figure 1-5: Mooney M20F Executive

The airplanes listed in Table 1-2 are all either A-I or B-I aircraft and are in the category “small airplanes with an approach speed of 50 knots or more with maximum certificated takeoff weight of 12,500 pounds or less” defined by AC 150/5325-4B, *Runway Length Requirements for Airport Design*. This category is also known as “small airplanes with fewer than 10 passenger seats.”

AC 150/5325-4B recommends a crosswind runway length that is equal to “100 percent of the recommended runway length determined for the lower crosswind capable airplanes using the primary runway.” The AC 150/5325-4B runway length determination methodology produces recommendations for two family groupings of aircraft within the “small airplanes with fewer than 10 passenger seats” category: 95 percent of fleet, and 100 percent of fleet. The 95 percent of fleet grouping “applies to airports that are…primarily intended to serve low-activity locations, small population communities, and remote recreational areas.” The 100 percent of fleet grouping applies to airports that are “primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.” Based on these criteria, 08D belongs in the 95 percent of fleet grouping.

For aircraft with an approach speed 50 knots or greater, the AC uses a formula that considers mean maximum daily temperature during the hottest month of the year which at 08D is July, when the average daily high is 81˚ F. The recommended runway length for these aircraft at 08D is 3,800 feet. This runway length is far greater than the need and available space at 08D, more than tripling the length of the runway distance needed for aircraft that are expected to use the turf crosswind runway. The smallest aircraft most susceptible to crosswind forces, the PA-12 and the C152, have take-off distances under 900' and landing distances under 500'. Furthermore, many larger aircraft that frequently use the Airport, such as the AT-402 and AT-502, also have takeoff lengths that are significantly less than the FAA design guidance. Since the landing distances are less than the takeoff distances, and the need for a crosswind runway is greater for landing operations than takeoff operations, a shorter crosswind runway would benefit these larger aircraft, as well.

Section 202 of AC 150/5325-4B allows airport designers to "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 depicted [in the AC]." There is a greater need for a crosswind runway during landing as opposed to takeoff, as landing aircraft are more susceptible to the forces of a crosswind than one that is taking off. As shown in Table 1-2, the required landing distances are generally less than 1,000 feet and the required takeoff distances are generally less than 1,400 feet for the aircraft expected to use the crosswind runway. Therefore, a turf crosswind runway length between 1,000 and 1,400 feet long is expected to satisfy the needs of the less crosswind capable aircraft expected to use the turf crosswind runway on a regular basis.

Recommendations from the FAA's new Small Aircraft Runway Length Analysis Tool (SARLAT) were also evaluated. However, the results were much greater than the manufacturer's recommended lengths, and therefore were not considered in establishing the required turf crosswind runway length at 08D.

1.3.4 Minimize Incompatible Land Use

The FAA provides guidance aimed at ensuring land uses surrounding an airport are compatible with aircraft operations. This guidance focuses on the areas directly off the runway ends, though the guidance also describes best practices for general airport-area land use. Federal guidance includes trapezoidal areas called runway protection zones (RPZs) located off each end of a runway. The purpose of an RPZ is to protect people and property

Runway Protection Zone:
Airport owner control and implementation of compatible land use principles for each runway RPZ is the optimum method of ensuring the public's safety in these areas.

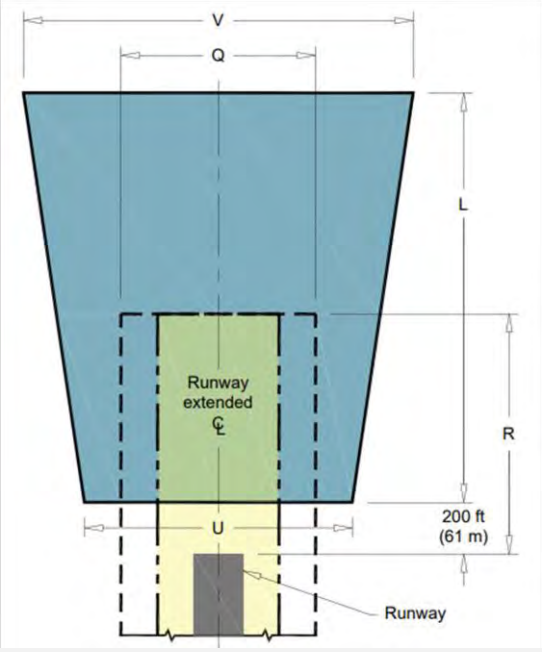


Figure 1-6: Runway Protection Zone (RPZ, blue), Runway Object Free Area (ROFA, clear dashed), and Runway Safety Area (RSA, yellow dash-dash-dot)

on the ground in the event of an aircraft accident, and to provide ready access for emergency vehicles responding to an accident.
To facilitate meeting these purposes, the FAA requires that the Airport have land use control over the RPZ (preferably through outright ownership or easements). It is recommended that RPZs be free of all structures, roadways, and land uses that have the potential to attract congregations of people.

1.4 Objectives

To meet the project purpose and address these needs, the following objectives will be pursued:

- Construct a turf crosswind runway that satisfies the runway length needs of less crosswind capable airplanes expected to use the Airport on a regular basis and provides at least 95 percent wind coverage for RDC A-I/B-I aircraft when combined with primary Runway 10/28.
- Meet design standards for the existing and expected future critical aircraft and provide space to meet based and transient aircraft design standards and facility needs.
- Minimize incompatible land uses in the RPZs.

Alternatives in Chapter 2 of this document will be screened against these objectives.