

# Preston (U10) Airport

## Airspace and Instrument Procedure Analysis

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**Submitted To**

Ardurra Group, Inc.

**For**

Preston (U10) Airport Master Plan

## Disclaimer for Airspace Study

This airspace study is based on information sourced from the Federal Aviation Administration (FAA), Aeronautical Geographic Information System (AGIS), other databases, stakeholder discussions, current procedure data, and identified obstructions at the time of the study throughout various sources.

While every effort has been made to ensure the accuracy and completeness of the information provided, the following disclaimers apply:

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2. **Stakeholder Input:** Stakeholder discussions were incorporated to provide contextual understanding. However, such input may represent subjective perspectives and should not be interpreted as definitive or binding.
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This document should be viewed as a snapshot in time, and regular updates are recommended to ensure continued relevance and compliance with evolving conditions and regulations.

## Table of Contents

|       |                                                               |    |
|-------|---------------------------------------------------------------|----|
| 1     | Executive Summary .....                                       | 4  |
| 2     | Objective of This Analysis .....                              | 5  |
| 3     | Document Overview .....                                       | 5  |
| 4     | Aeronautical and Geospatial Information .....                 | 5  |
| 4.1   | Baseline Information .....                                    | 5  |
| 4.1.1 | Runways .....                                                 | 6  |
| 4.1.2 | NAVAIDs and Lighting .....                                    | 7  |
| 4.1.3 | Obstacles and Terrain .....                                   | 8  |
| 5     | Historical Weather Data .....                                 | 10 |
| 5.1   | Terminal Weather Data .....                                   | 10 |
| 5.1.1 | Source and Methods for Terminal Weather Data Processing ..... | 10 |
| 5.1.2 | Winds and Runway Usage .....                                  | 11 |
| 5.1.3 | Effectiveness of Existing Airfield .....                      | 15 |
| 6     | Airspace and Instrument Procedures .....                      | 20 |
| 6.1   | Airspace/Air Traffic Control .....                            | 20 |
| 6.2   | Existing Instrument Procedures .....                          | 21 |
| 6.2.1 | Arrivals .....                                                | 21 |
| 6.2.2 | Departures .....                                              | 21 |
| 6.2.3 | Existing Instrument Approaches .....                          | 21 |
| 6.3   | Opportunities for Additional Approaches .....                 | 21 |
| 6.3.1 | Potential Future RNAV (GPS) Approach to Runway 4 .....        | 22 |
| 6.3.2 | Potential Future RNAV (GPS) Approach to Runway 22 .....       | 24 |
| 6.3.3 | Potential Future RNAV (GPS) Approach to Runway 35 .....       | 26 |
| 6.3.4 | Potential Future RNAV (GPS) Approach to Runway 17 .....       | 27 |
| 6.3.5 | Effectiveness of Proposed Approaches .....                    | 27 |
| 6.3.6 | VGSI and Proposed Procedures .....                            | 29 |
| 6.3.7 | Departures and Analysis of Departures .....                   | 29 |
| 6.3.8 | Summary of Analyzed Procedures .....                          | 32 |
| 7     | Summary of Findings .....                                     | 33 |
| 7.1   | Summary of Historical Weather Conditions .....                | 33 |
| 7.2   | Summary of Potential Instrument Procedures .....              | 34 |

# 1 Executive Summary

This analysis evaluates the feasibility and benefits of introducing RNAV (GPS) instrument approach and departure procedures to Preston (U10) Airport. It aims to enhance operational reliability, especially under adverse weather conditions, by reducing reliance on visual flight rules (VFR) minimums. The study focuses on Runway 4-22, the airport's primary paved runway, and considers current aeronautical, obstacle, airspace, and weather data. Currently, aircraft flying instrument flight rules (IFR) that request a visual approach into Preston (U10), must have reported weather at the airport that is at or above 1,000-foot cloud ceiling and 3 statute miles (SM) visibility or greater. If reported weather is less than this, Air Traffic Control (ATC) will not allow a visual approach from an instrument flight plan. The instrument approach procedures (IAPs) outlined in this report allow pilots to execute an approach below those weather minimums, thus making the airport available for landing in inclement weather.

## Key Findings:

### 1. Instrument Procedures:

- Development of RNAV (GPS) approaches to Runways 4 and 22 are feasible and would significantly enhance operational reliability, particularly during winter months.
- Proposed approaches include offset final approach courses with adjusted vertical descent angles (VDAs) to mitigate terrain challenges offering Category A-C aircraft improved weather minimums over the current VFR report weather requirements.

### 2. Weather Data Analysis:

- Historical data shows significant operational limitations during the winter months, with reduced runway effectiveness due to visibility and ceiling constraints.
- The addition of instrument approach procedures would mitigate these limitations, increasing operational availability during critical periods.

### 3. Runway and Airfield Infrastructure:

- Current VFR-only markings on Runway 4-22 would need to be upgraded to non-precision instrument (NPI) marking standards to support instrument approaches.
- Installation of on-site weather sensing equipment, such as an ASOS or AWOS-3, is recommended to improve the accuracy of local weather reporting. This will also eliminate the primary Remote Altimeter Setting Source (RASS) penalty, which will allow for a lower Minimum Descent Altitude (MDA) for the non-precision approaches and Decision Altitude (DA) for the precision approaches.

### 4. Departure Procedures:

- RNAV departure procedures for both north and south departures are feasible and compliant with current FAA design standards.

This report provides descriptions of analyzed procedures that were determined to be feasible for implementation at Preston (U10).

## 2 Objective of This Analysis

The analysis in this report was created as part of a master plan update for Preston (U10). The objective of the analysis was to identify the feasibility of obtaining public instrument approach and departure procedures at Preston (U10) serving one or both ends of existing Runway 4-22.

To determine the feasibility and efficacy of potential new instrument procedures LEAN performed a flight operations assessment of Preston (U10). This assessment included collecting historical weather data, publicly available aeronautical and obstruction information, data regarding the types and capabilities of current and potential future users of the airport. This information was used with the instrument procedure development platform Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS) to develop candidate approach and departure procedures based on the determined needs of the airport users and the constraints of the terminal environment. Once candidate procedures were developed, LEAN conducted an additional flight operations assessment utilizing historical weather conditions to determine the overall benefit to the airspace users in terms of runway and airport availability based on the improved approach minimums.

This analysis does not include any information related to the design or performance of NAVAIDs, approach lighting, radar, communications facilities, or runway lighting.

## 3 Document Overview

This document contains information about the inputs, methods, results, and limitations associated with instrument procedure assessments used to determine the feasibility and utility of the proposed procedures.

The sections below describe information that can be used by stakeholders to consider the accuracy and validity of the methods and results.

Section 4 addresses the aeronautical and geospatial information used to establish baseline aircraft performance and instrument procedure conditions.

Section 5 addresses historical weather information to assess the current state of the airport and the effectiveness of existing VFR operations.

Section 6 addresses the airspace that is currently in use at the airport and how new instrument procedures may be implemented and their impact on aircraft operations.

Section 7 contains a summary of the findings and any recommendations for consideration.

## 4 Aeronautical and Geospatial Information

### 4.1 Baseline Information

Aeronautical and geospatial information was collected by LEAN through a combination of FAA maintained publicly available sources, and surveyed sources as a part of the update to the master plan and airport layout plan (ALP). The following sections describe the information that was considered for the instrument procedure assessment.

### 4.1.1 Runways

Preston (U10) has two runways. Runway 4-22 is paved in asphalt and serves as the primary runway. Runway 17-35 is gravel/dirt and serves as a crosswind runway which is typically used for crop dusting operations. Runway 4-22 has two paved access points, one at midfield and the primary access point at the Runway 22 approach end with access to the majority of the aircraft hangars. There is a small hammerhead taxiway at the approach end of Runway 4.

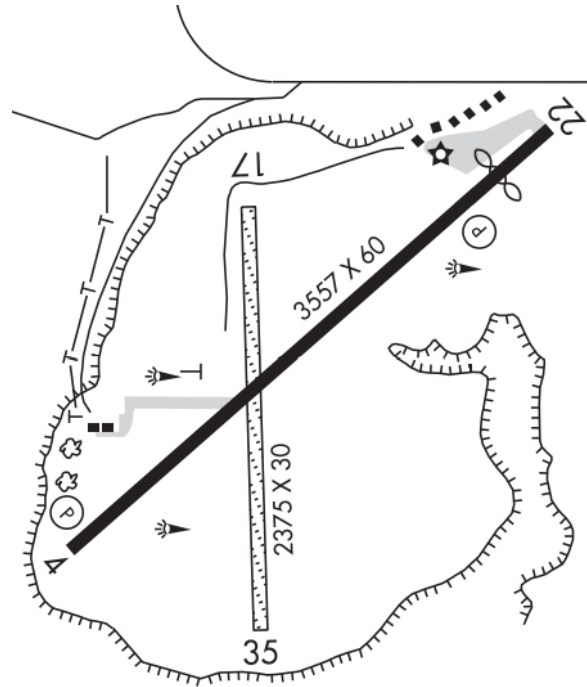


Figure 1: Preston (U10) Airport Sketch

For detailed information about the runways, and their aeronautical properties, please see [Table 1](#) below.

Table 1: Summary of Existing Declared Distances and Runway Properties at Preston (U10)

| RUNWAY | DER Elev.<br>(feet<br>MSL) | TORA<br>(feet) | TODA<br>(feet) | ASDA<br>(feet) | LDA<br>(feet) | Width<br>(feet) | Entry<br>Angle | PCN |
|--------|----------------------------|----------------|----------------|----------------|---------------|-----------------|----------------|-----|
| 4      | 4724.1                     | 3,557          | 3,557          | 3,557          | 3,557         | 60              | 90°            | N/A |
| 22     | 4725                       |                |                |                | 3,173         |                 |                |     |
| 17     | 4727.5                     | 2,375          | 2,375          | 2,375          | 2,375         | 30              | 180°           | N/A |
| 35     | 4727.7                     |                |                |                |               |                 |                |     |

All information in [Table 1](#) was compiled from FAA eNASR during the 26DEC2024. The DER refers to the departure end of the runway.

#### 4.1.1.1 Declared Distances

As listed in [Table 1](#), Runway 4-22 currently utilizes a displaced threshold in the Runway 22 direction of 384 feet. There are no published declared distances at Preston (U10).

#### **4.1.1.2 Runway 4-22 Markings and Surface Treatment**

Both Runways 4 and 22 currently have basic visual markings in accordance with typical VFR operations. Runway 17-35 is gravel and unmarked.

Runway 4-22 currently has no surface treatment, meaning it is not grooved nor does it have a porous friction course applied (PFC). The absence of any surface treatment could lead to reduced friction situations for landing and takeoff operations during periods of rain, snow, or ice. All FAR 91-KI, 125, 121, and 135 operators will be required to consider increased landing and takeoff distance considerations under wet and contaminated situations.

Any future jet operations will benefit from the application of grooving and/or PFC.

#### **4.1.1.3 Runway 4-22 Bearing Strength and PCN Limitations**

A pavement classification number (PCN) has not yet been established or published for Runway 4-22. The weight limitations published in the FAA Chart Supplement for Preston (U10) Runway 4-22, create potential limitations for larger business jet aircraft.

The single-wheel main landing gear limitation of 12,000 pounds is adequate for all existing aircraft operations of aircraft with that landing gear configuration. However, because there is no dual-wheel weight specified, it is unlikely that the existing runway could support aircraft beyond the current general aviation (GA) traffic which may limit the utility of future instrument procedures.

Without corrective action to either enhance the pavement strength, or identify a PCN appropriate to larger aircraft operations, this deficiency will require future aircraft operators to either impose a runway weight bearing restriction on the calculated maximum allowable takeoff weight, or to directly correspond with the airport to determine if some latitude exists to exceed the published runway weight limits.

If an opportunity arises to enhance the current bearing strength via runway rehabilitation, this will mitigate possible operational weight restrictions. Additionally, establishing a PCN value for the runway would mitigate possible operator-imposed weight restrictions on what is ostensibly a design life protection value. However, the team does not recommend those actions as a part of this study as the current and planned operations do not require it.

### **4.1.2 NAVAIDs and Lighting**

#### **4.1.2.1 NAVAIDs**

Having no existing published instrument approaches, departures, or arrivals, Preston (U10) is not currently served by any existing FAA or airport-owned NAVAIDs. The nearest VOR facilities are the Malad City (MLD) VOR/DME to the west and the Brigham City (LHO) VOR/DME to the southwest.

#### **4.1.2.2 Lighting**

The following visual guidance lighting system (VGLS) and visual glideslope indicators (VGSIs), identified in [Table 2](#), were considered for Runway 4-22.

*Table 2: Existing Approach Lighting Elements Supporting Runway 4-22*

| RUNWAY | Lighting | Type      | Length (feet) | Elevation (feet MSL) | Slope / TCH (feet AGL) |
|--------|----------|-----------|---------------|----------------------|------------------------|
| 4      | ALS      | REIL      | 0             | 4,275                | N/A                    |
|        | VGSI     | PAPI (2L) | 807.8         | 4724.9               | 3.00 / 43.6            |
| 22     | VGSI     | PAPI (2L) | 809.7         | 4725.7               | 3.00 / 43.6            |

All information in [Table 2](#) was compiled from FAA eNASR during the 26DEC2024. In addition to the information listed in [Table 2](#), Runway 4-22 is supported by medium intensity runway edge lighting. Both ends of Runway 4-22 have a 2-box PAPI that is installed at a 3° glide path angle (GPA) and is operated continuously. The Runway 22 PAPI is designated as unusable beyond 4.0 nautical miles (NM).

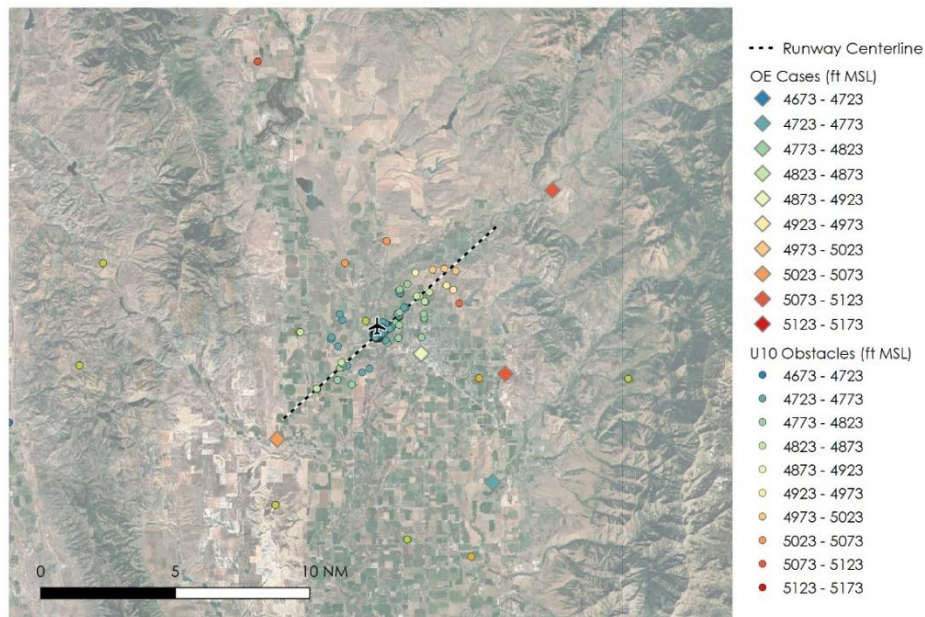
### 4.1.3 Obstacles and Terrain

Preston is situated at the northern end of the Cache Valley with significant rising terrain to the east and west. To the east is the Bear River Range which stands approximately 5 NM from Preston (U10) with peaks at approximately 10,000 feet AMSL. West of the airport is the Malad Range, which is another substantial mountain range with peaks exceeding 9,500 feet AMSL. The Cache Valley runs in a north-south orientation with slowly rising terrain north of the airport and decreasing terrain to the south.

The area surrounding the airport has a limited amount of residential and commercial development in the vicinity, but most of the areas surrounding the airport are agricultural with features related to transportation or power distribution dispersed through the valley.

#### 4.1.3.1 Overall Obstacles

Obstacle information considered in this analysis originated from a combination of FAA and airport/project team sources intended to cover a 50 NM area surrounding Preston (U10). This included obstacle information specific to Preston (U10) and other obstacle information in the vicinity of the airport as seen in [Figure 2](#) below.



*Figure 2. Obstructions within 15 NM of Preston (U10)*



The first source used to gather existing obstacle information in the vicinity of the airport was the FAA Obstacle Authoritative Source (OAS), which was accessed via the FAA AIRNAV download available from the Aeronautical Data Information Portal (ADIP). This data was obtained using a radius-based search for obstacle information located within 15 NM of Preston (U10).

OAS Obstacles in AIRNAV represent a combination of previous AC-150-5300-18 compliant obstacle surveys, surveys performed for airport surface clearance, determined 7460 obstructions and FAA flight inspection obstacles. Obstacles obtained from this source contain FAA assigned accuracy values which introduce a horizontal and vertical uncertainty that translates an obstacle referenced using WGS-84 coordinates to define a point with an elevation, into a 3-dimensional cylindrical shape. This is called survey accuracy and must be considered for instrument procedure design.

The second source used for this project were specific AC-150-5300-18 and NOAA 405 specification surveys. These were also downloaded from FAA ADIP and overlaid on top of the AIRNAV obstacles. In cases where the previous survey identified a point that was in the same latitude and longitude as a current AIRNAV/OAS obstacle, then the elevation and accuracy of the AIRNAV/OAS obstacle was used. However, there is certain supplemental object information in previous surveys which was not submitted to the FAA as obstacles through the airport's GIS process. These objects were valid unless a scan of aerial imagery, or feedback from the project team, indicated that the object was no longer valid or had been removed or relocated.

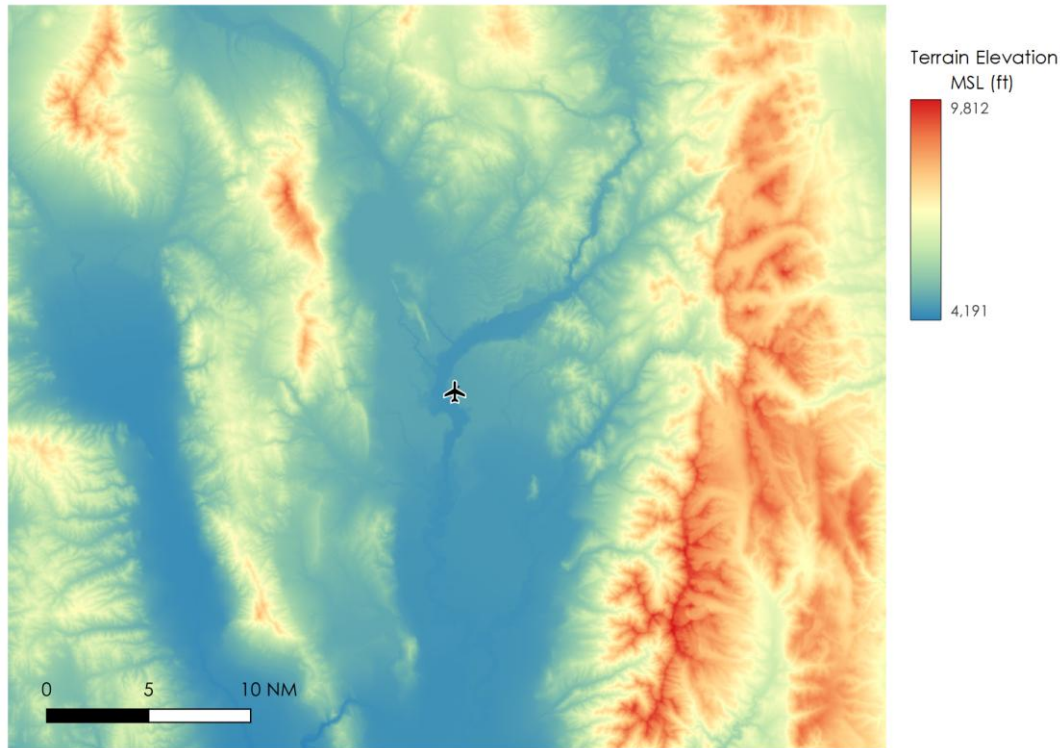
The final obstacle source considered in this analysis was the obstacle information available from the FAA Obstruction Evaluation and Airport Airspace Analysis (OEAAA) website. Determined OE cases represent proposed structures off the airport, while determined NRA cases represent proposed projects and structures on the airport. Cases determined between 2021 and Q4 2024 were retrieved and evaluated. Any determined obstacle that would result in a structure which could affect instrument procedures or aircraft performance was considered to exist today. The only exceptions were cases where the OE was seen to either be temporary, and not resulting in a new structure after the temporary action was completed, or cases where an NRA identified a temporary project on the airfield.

Proposed obstructions that are submitted without a survey accuracy code are assigned an accuracy of 4D (50 ft vertical accuracy, 250ft horizontal accuracy). This is likely both larger and taller than the accuracy values that will be determined by survey following the construction of the structure. However, proposed objects which are determined by the FAA to have no substantial impact on the surrounding airspace often do not receive an updated survey definition following the OE review.

#### **4.1.3.2 Terrain**

Terrain information was sourced from USGS 3DEP at a 30 meter to 90 meter spacing across the 50 NM area surrounding Preston (U10). Additionally, the FAA-required 200-foot Adverse Assumption Obstacle (AAO) value was also applied to all terrain points outside of the Preston (U10) AAO exempt area for procedure analysis.

The terrain surrounding the airport ([Figure 3](#)) is located in the FAA designated mountainous area, and therefore required mountainous terrain analysis for instrument procedure design both to Runway 4 and Runway 22.



*Figure 3: Cache Valley and Surrounding Terrain Near Preston (U10) (black airplane)*

## 5 Historical Weather Data

Review and analysis of historical weather provides important insight into the need and utility of instrument approach and departure procedures. This section describes the historical weather data that was collected, the overall properties of key weather data, and which historical weather data was used to create distributions as inputs to the instrument procedure feasibility assessment.

### 5.1 Terminal Weather Data

When using terminal weather data to inform a forward-looking feasibility of instrument procedures, the selection of weather-related inputs must be made in a manner to maintain statistically significant reliability. The goal of this selection is to ensure that a variable modeled as an input can be both a plausible expectation of future weather conditions and not an inadvertent statistical outlier that creates an unintentional bias in the results.

This section describes how terminal weather information was collected, which inputs were selected for use with takeoff performance computations, and how the information was converted into distributions for use with the Monte Carlo modeling.

#### 5.1.1 Source and Methods for Terminal Weather Data Processing

Terminal historical weather information was collected from the National Climactic Data Center (NCDC) Climate Data Online (CDO) servers over a 10-year historical period. Since Preston (U10) does not have on-airport weather reporting in the form of and ASOS/AWOS, the data collected for this report was originally reported from the nearest NCDC collection site which is the on airport ASOS at Logan-Cache (LGU), 18.3 miles to the south of Preston (U10). Data was collected in the form of METARs consisting of both routine

hourly observations and non-routine off-hour weather events, resulting in approximately 120,000 weather observations.

While Logan-Cache (LGU) sees similar weather to Preston (U10) as they are both situated in the Cache Valley at a similar elevation, the project team sought to corroborate the observed weather data with a more local source of information. The project team identified an Idaho DOT road weather sensor located approximately 7 miles to the south of the airport. The sensor data was fused with the available METAR data to provide a more accurate picture of the weather at Preston (U10).

To accurately analyze time-series weather data a process of time weighting must be accomplished over the period of study. Typically, weather observations are made on an hourly schedule. When a significant change in weather occurs for wind, ceiling, or precipitation due to a storm or turbulent wind conditions, these observations may be made more frequently. The process of time-weighting accounts for these “brief” weather observations that only occur during some portion of an hour, without exerting an excess influence relative to the typical hourly observations. The mathematical steps used to achieve time weighting are not expressed in this report but can be described in more detail by the project team upon request.

Increasing data fidelity to a time increment of less than an hour yields no statistical difference to the results constructed over a one-hour increment. However, accounting for monthly variations in data is essential to ensure the accuracy of any normalization in a data distribution used as an input.

### **5.1.2 Winds and Runway Usage**

Runway selection is a critical variable in the determination of overall runway length requirements, especially when comparing existing or proposed runways to other runways that may be advantageously oriented in such a way to enhance overall wind coverage. A runway, or more specifically a runway direction, is preferred for operational use when that direction experiences no tailwind and has limited crosswind. For a typical airport with multiple runways covering a large portion of possible wind directions, the preferred threshold for winds is for a runway to have 0 knots of tailwind and less than 10 knots of crosswind. These are general guidelines based on general aircraft handling and wind envelope limitations.

To determine which runway direction might be used, historical wind direction and intensity were modeled together using the same METAR information as the previous weather elements.

*Table 3* and *Table 4* show the historical likelihood that Runways 4 and 22 would have been preferred for use based on these wind criteria. Ceiling and visibility are not considered in this discussion.

Table 3: 10-Year Historical Likelihood of Runway 4 Being Preferred for Operation Based on Wind Data

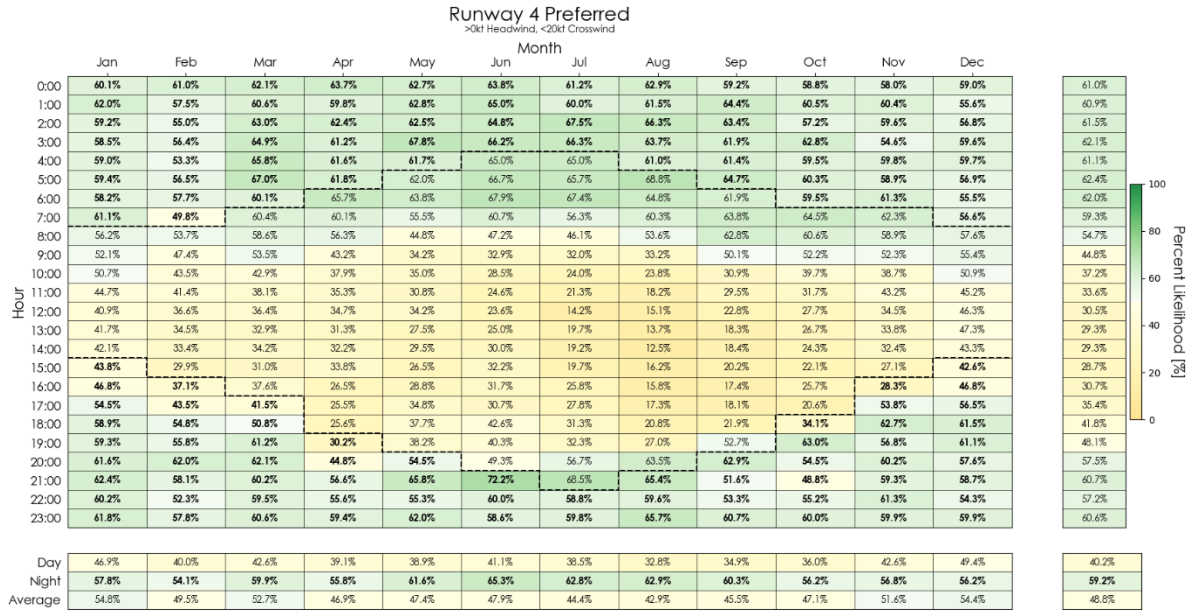
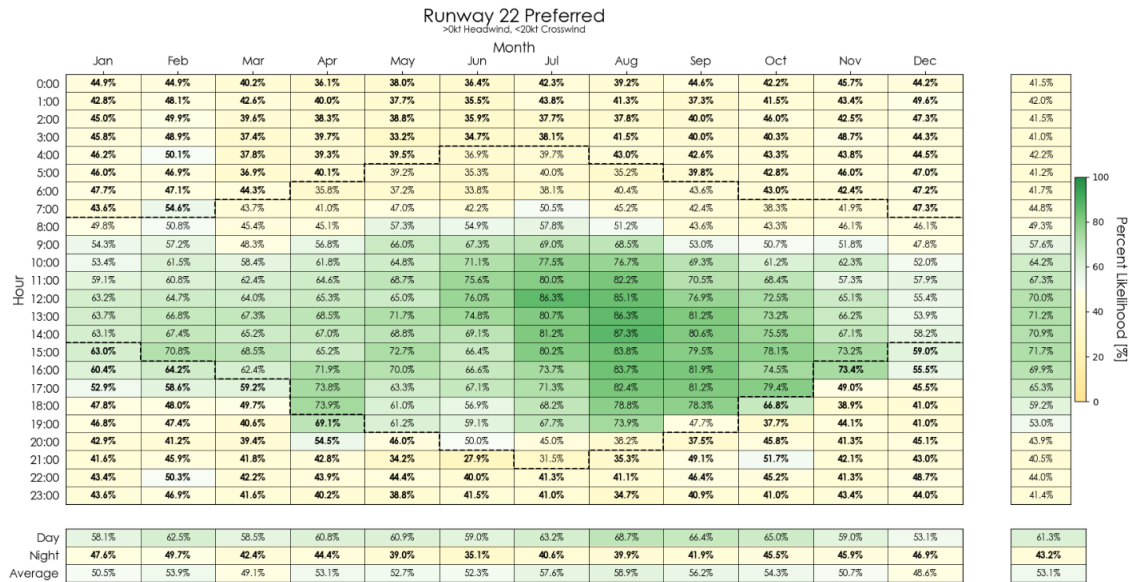


Table 4: 10-Year Historical Likelihood of Runway 22 Being Preferred for Operation Based on Wind Data



Hours and months containing values in green indicate periods when the runway would be preferred for use by an aircraft operator (assuming no other terrain, convective activity, or ATC restrictions). Hours in white represent an hour and month when the runway use is neutral, while hours and months in yellow represent periods when the runway is less likely to be used.

Similarly to runway preference, wind data was examined to assess whether a runway could be used. A runway is considered capable of supporting operations up to a much higher tailwind and crosswind limit compared to the previous analysis of runway preference. In the case of Preston (U10), no more than a 10-knot tailwind and a crosswind of up to 20 knots are used to determine whether a runway direction is capable of being used. These numbers are general guidelines the air traffic control tower (ATCT) uses for wind limits for runways at airports without an official wind study.

The likelihood of runway preference was compared to the runway capability to provide a complete picture about the hours per month when a runway is rarely considered for usage. This comparison could also illustrate if a runway was unsuitable for aircraft operations due to severe crosswinds.

**Table 5** and **Table 6** represent the runway capability analysis based on 10 years of historical wind data for Runways 4 and 22, respectively. Ceilings and visibility were not considered in this segment of the analysis.

**Table 5: 10-Year Historical Likelihood of Runway 4 Being Capable of Supporting Operations Based on Wind Data**

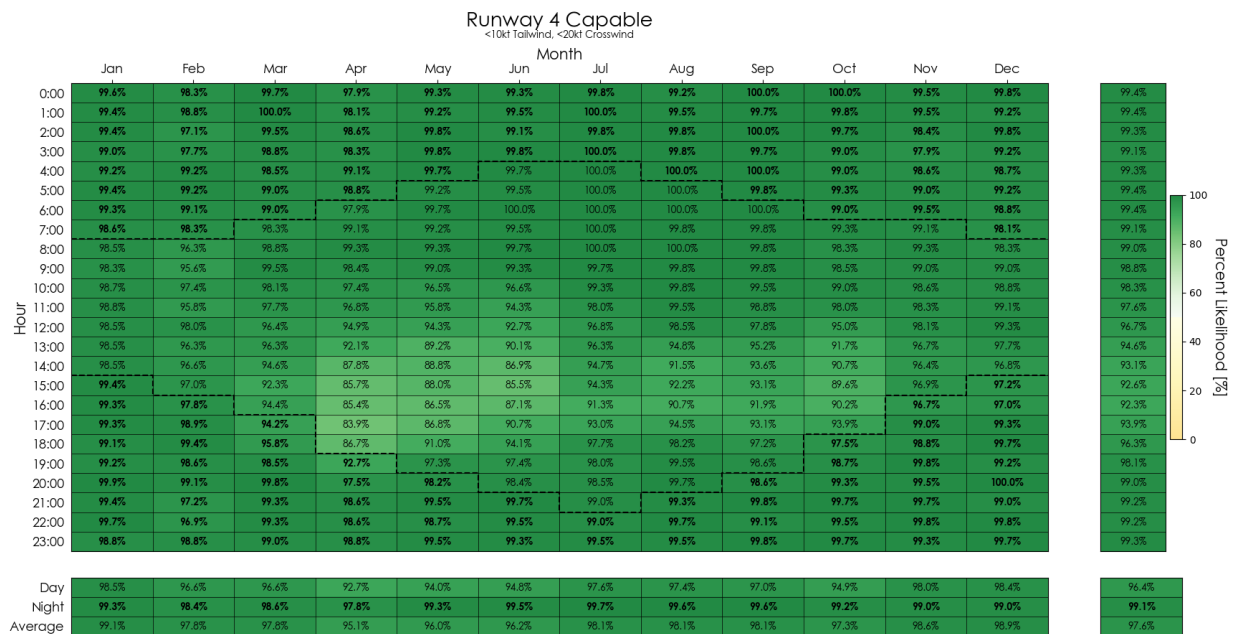
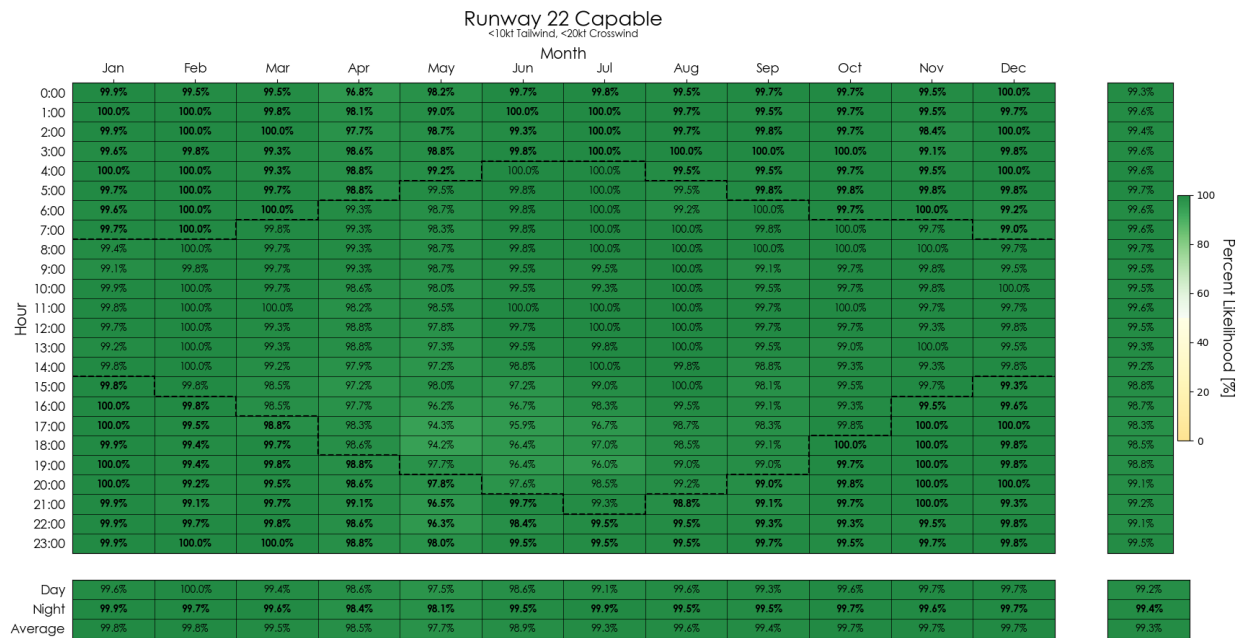


Table 6: 10-Year Historical Likelihood of Runway 22 Being Capable of Supporting Operations Based on Wind Data



The color selection in the cells for the runway capable likelihoods are the same used for the runway preference likelihoods.

This analysis shows that both runway directions are capable of supporting operations from a wind perspective. Consequently, the runway preference tables may yield a more accurate picture of likely runway selection. The preferred tables, ([Table 3](#) & [Table 4](#)), suggest that operations in the Runway 4 direction are preferred in the morning and evening hours while those in the Runway 22 direction are preferred during daytime hours, particularly in the afternoon. The capability tables ([Table 5](#) & [Table 6](#)), indicate that winds are not typically strong enough to prevent operation in either direction.

#### 5.1.2.1 Wind and Runway Usage Limitations

There are three limitations from this type of wind and runway usage analysis that should be noted. The first is that when comparing a specific likelihood value for a particular hour and month across all the runways, the sum of likelihoods can yield a value over 100%. This is primarily because calm wind conditions will be treated as enabling each runway to be equally likely of usage. Thus, if the winds were always calm at the airport, both Runway 4 and 22 would be 100% capable of operation.

The second limitation is that wind gusts were considered as steady state wind conditions without any further manipulation such as multiplying gusts by 1.5. This can result in time periods where the likelihood of a runway direction is neither preferred nor capable. Because gusting wind conditions typically do not last for long periods of time, the application of time weighting minimizes the overall impact of high gusting wind conditions over a given period. However, gust application against the established crosswind and tailwind limitations can limit the overall usability of a runway.

The third limitation is that this level of runway usage analysis is not based on any historical air traffic utilization information. Air traffic control information is valuable in verifying that the historical weather analysis is a close match to commonly experienced airfield conditions.



### 5.1.3 Effectiveness of Existing Airfield

To understand the effectiveness of an airport's instrument approach procedures, the procedures need to be evaluated relative to historical weather conditions when each runway is in use and when all runway/approach options are available for use by pilots and air traffic controllers. LEAN describes the effectiveness of instrument approaches in three ways: Runway Effectiveness of an Approach Procedure, Overall Effectiveness of an Approach Procedure, and Ability of the airport to stay open to approach operations.

#### 5.1.3.1 Runway Effectiveness of An Approach Procedure

Historical weather data was analyzed for a combination of runway use, ceilings, and visibility to examine the effectiveness of each runway-specific approach procedure and for the airport as a whole.

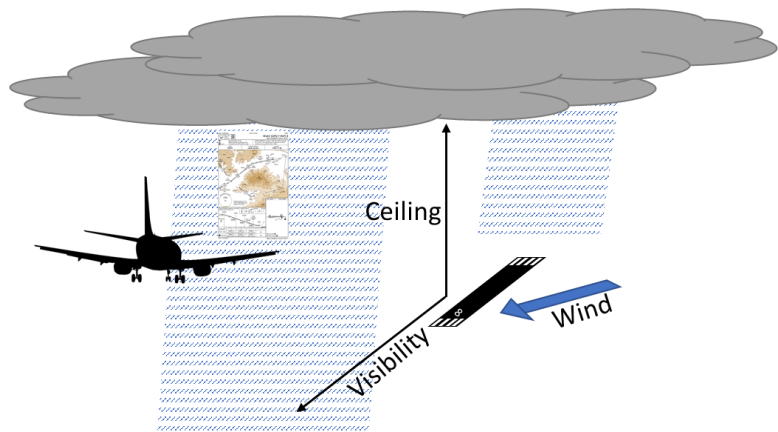
For runway effectiveness, descriptive statistics were generated from time weighted weather observations to determine the likelihood that:

1. The runway with the approach procedure was capable of supporting approach and landing based on wind conditions.

And

2. The runway with the approach procedure was experiencing ceiling and visibility greater than or equal to the approach procedure serving the runway.

For example, when winds on Runway 4 would have been capable of supporting an approach (from the south), we determined the likelihood that the ceilings and visibility in that time weighted period would be enough to support an approach. If the winds did not support the runway operation, then no descriptive statistics were calculated because the analysis assumed that a different runway, and approach procedure, would have been in use.

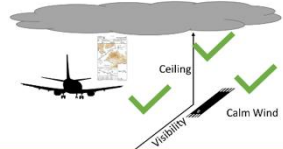
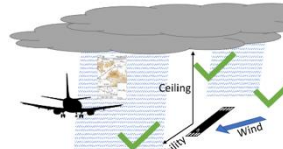
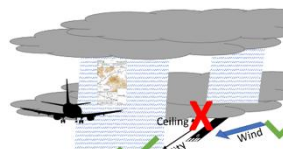


This analysis shows how effective an approach is when a specific runway is in use, but not how beneficial the approach is to the entire airport. Hence the term runway effectiveness to describe only how valuable the approach is for the specific runway it is intended to serve.

### 5.1.3.2 Overall Effectiveness of An Approach Procedure

Understanding the effectiveness of an approach enabling aircraft to land on the designated runway is important, but it does not reveal how often that approach would benefit overall operations at Preston (U10).

To determine the effectiveness of a specific approach to the overall airport, the ceilings and visibility supported by the approach, and the capability of the runway to support approaches by wind, are analyzed within the overall hourly availability of the runway. This is different from the runway effectiveness because it takes into consideration periods when the approach may have been usable, but it was unavailable because the winds favored another runway, or vice versa.

|                                                              | Runway 4                                                                            |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| March 09:00 – 10:00<br>Approach Benefits the Airport         |  |
| March 22:00 – 22:20<br>Approach Benefits the Airport         |  |
| March 22:20 – 22:40<br>Approach Does Not Benefit the Airport |  |

In the image shown above, the overall effectiveness of the approach enabling aircraft to arrive into Preston (U10) would be high from 09:00 – 10:00 and 22:00 – 22:20. However, because the ceiling was lower than what was required for the approach procedure between 22:20 – 22:40, the procedure would not be effective at enabling arrivals into Preston (U10) during that time.

### 5.1.3.3 Ability of the Airport to Support Approach Operations

To determine how effective the airport is at enabling pilots to successfully arrive at a given hour and month, LEAN used an analysis that combined multiple approach overall effectiveness together.

Determining whether an airport is likely to remain open involves examining which runway would likely have been the one available by wind preference/capability and then considering whether the aircraft/flight crew has the navigation capability to use the approach within the required weather minimums. For sophisticated aircraft operators with advanced onboard navigation technology, the range of options usually permits a higher likelihood of being able to arrive at the airport at the desired month/hour. However, for pilots with less training, or who are operating less capable aircraft, the number of approach procedure options may create a reduced likelihood of arriving at the desired time.

This reliance on training and onboard navigation technology results in different categories of aircraft that LEAN creates from historical and planned operations at the airport.

The figure below demonstrates the general analysis process of when the airport would be considered to be likely to be open to arrivals.



|                                                      | Runway 4 | Runway 22 |
|------------------------------------------------------|----------|-----------|
| March 09:00 – 10:00<br>Airport Likely to Be Open     |          |           |
| March 22:00 – 22:20<br>Airport Likely to Be Open     |          |           |
| March 22:20 – 22:40<br>Airport Not Likely to Be Open |          |           |

This example reveals that between 09:00 – 10:00, the airport would be open to arrivals using either Runway 4 or 22. It also reveals that the airport would be open to arrivals using Runway 4 between 22:00 – 22:20. However, it reveals that between 22:20 – 22:40, the airport would likely be closed to arrivals because the winds favored Runway 22 and the weather conditions were worse than those supported by the approach serving Runway 22.

By combining multiple approaches, for multiple runways, the likelihood expressed as a result of this analysis reveals how well the airport can remain open to aircraft operations at the desired time of day in a given month.

#### 5.1.3.4 Likelihoods used with Runway, Overall, and Airport Open to Operations Statistics

The process of statistically expressing the likelihood for an approach, or combination of approaches to different runway ends, to enable arrivals at the airport is expressed as a percentage of likely availability for the given hour and month.

The following relationship translates that statistical likelihood, into qualitative likelihoods determined by LEAN based on observations of aircraft, and airline, operations at airports of varying sizes over the past 20 years.

|                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>100% - 95%</b></p> <p>Pilots are successfully able to land with little to no delay</p>                                                                                                                 |
| <p><b>94% - 90%</b></p> <p>Pilots may experience small delays but often arrive on time and will generally maintain scheduled service</p>                                                                     |
| <p><b>89% - 80%</b></p> <p>Pilots experience delays when attempting to arrive at the airport and occasionally divert. Scheduled service may be performed with block time and cancellation contingencies.</p> |
| <p><b>79% - 60%</b></p> <p>Pilots expect delays when attempting to arrive at the airport and often consider gate holds and/or cancellations. Scheduled service is unlikely.</p>                              |
| <p><b>&lt;59%</b></p> <p>Pilots don't often expect to arrive on schedule, consider planned diversions destinations or plan for alternate passenger transport. Scheduled service is not possible.</p>         |

By considering these real-world relationships to discrete likelihood values, LEAN can not only determine how effective an approach is but also measure how effective a change in the approach procedure might be, or how impactful the change or loss of a procedure will be.

The following sections will all utilize a similar color coding relative to the likelihood values presented. The relationships listed in the tables are most applicable to real world operations when examining the “overall” and “airport open to operations” statistical results.

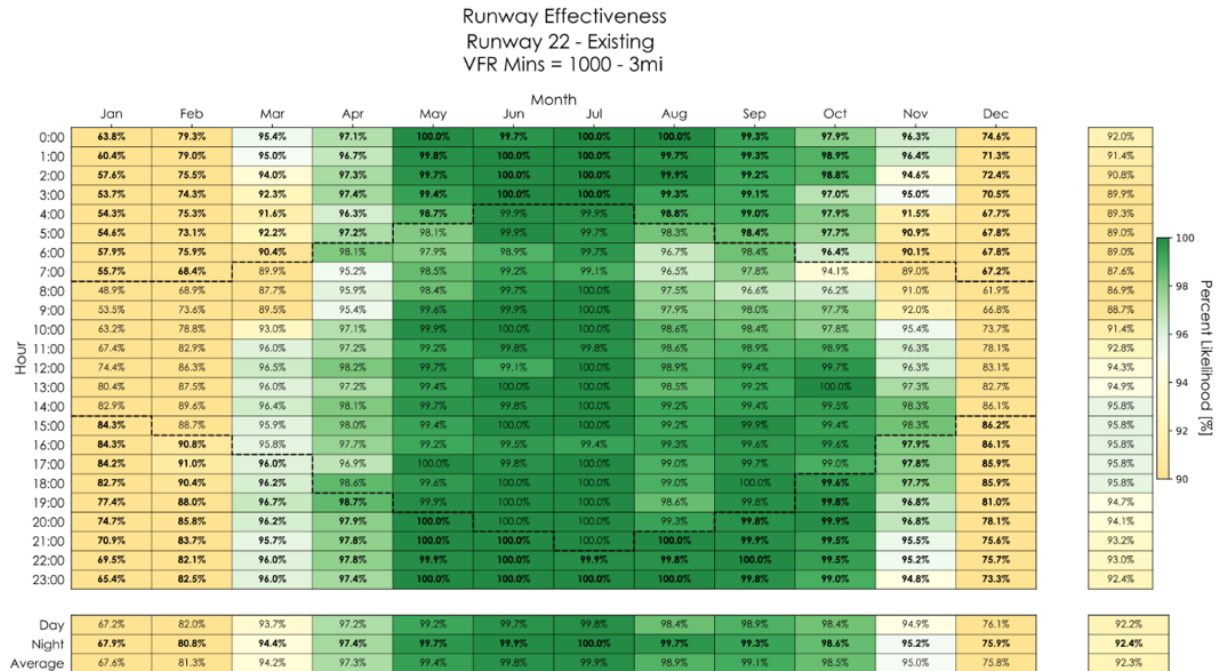
#### **5.1.3.5 Effectiveness of Existing Approaches**

Preston (U10) does not currently have published instrument procedures, therefore approach operations to the airfield are conducted under visual conditions. Operations where a pilot is on an IFR flight plan and requests a visual approach from ATC, the reported weather at Preston (U10) must have a ceiling at or above 1,000 feet and visibility of 3 SM or greater. [Table 7](#) and [Table 8](#) below indicate the runway effectiveness for Runway 4 and Runway 22, respectively, for these visual minimums.

Table 7: Existing Runway Effectiveness for VFR Minimums to Runway 4



Table 8: Existing Runway Effectiveness for VFR Minimums to Runway 22



The existing VFR minimums allow effective use of the airfield for the months of March through November with average runway effectiveness exceeding 95%. However, in the winter months of December, January and February, runway effectiveness drops precipitously with January being the most impacted. The early morning hours in January are particularly impacted, resulting in less than 60% runway effectiveness in both runway directions.

These runway effectiveness values combine to describe how often an operator should reasonably expect that the airport will be available for approach operations at a given time. This combination of wind direction, visibility and ceiling measurements results in the data given in [Table 9](#). Consistent with the individual runway effectiveness results above, the data shows the airport is constrained in the winter months, especially in the morning hours, due to the lack of available instrument approaches and published minimums below the VFR weather reporting requirements.

*Table 9: Airport Open to Operations Frequency Based on Existing Conditions*

| <b>Airport Open to Approach Operations</b><br><b>Existing VFR Minimums</b><br>Month |       |       |       |       |       |        |        |        |        |       |       |       |
|-------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|-------|-------|-------|
| Hour                                                                                | JAN   | FEB   | MAR   | APR   | MAY   | JUN    | JUL    | AUG    | SEP    | OCT   | NOV   | DEC   |
|                                                                                     | 64.0% | 78.4% | 95.2% | 97.0% | 99.4% | 99.7%  | 99.7%  | 99.9%  | 99.2%  | 97.9% | 96.3% | 74.4% |
|                                                                                     | 60.7% | 78.1% | 95.1% | 96.5% | 99.2% | 100.0% | 99.7%  | 99.7%  | 99.3%  | 98.8% | 96.1% | 71.0% |
|                                                                                     | 57.8% | 74.7% | 94.0% | 97.3% | 99.5% | 100.0% | 100.0% | 99.9%  | 99.0%  | 98.5% | 94.7% | 71.7% |
|                                                                                     | 53.8% | 73.3% | 91.5% | 96.9% | 99.1% | 100.0% | 100.0% | 99.2%  | 99.0%  | 96.5% | 94.7% | 70.4% |
|                                                                                     | 54.4% | 74.9% | 91.5% | 95.6% | 98.5% | 99.9%  | 99.9%  | 98.8%  | 99.0%  | 97.5% | 91.7% | 67.7% |
|                                                                                     | 54.7% | 72.2% | 91.6% | 96.8% | 98.1% | 99.9%  | 99.7%  | 98.3%  | 98.4%  | 97.6% | 90.6% | 67.9% |
|                                                                                     | 57.8% | 74.9% | 90.1% | 97.7% | 98.0% | 98.9%  | 99.7%  | 96.6%  | 98.4%  | 96.0% | 90.1% | 67.7% |
|                                                                                     | 55.7% | 68.2% | 89.4% | 94.8% | 98.5% | 99.2%  | 99.1%  | 96.5%  | 97.8%  | 94.2% | 89.0% | 66.3% |
|                                                                                     | 48.7% | 68.8% | 87.8% | 94.9% | 97.8% | 99.4%  | 100.0% | 97.5%  | 96.6%  | 96.1% | 90.9% | 62.2% |
|                                                                                     | 53.6% | 73.5% | 89.2% | 94.6% | 99.6% | 99.9%  | 100.0% | 97.8%  | 97.9%  | 97.7% | 91.6% | 66.7% |
|                                                                                     | 63.1% | 78.6% | 92.5% | 96.3% | 99.6% | 100.0% | 100.0% | 98.5%  | 98.4%  | 97.8% | 94.0% | 73.4% |
|                                                                                     | 67.4% | 82.6% | 95.6% | 95.9% | 99.0% | 99.8%  | 99.8%  | 98.6%  | 98.9%  | 98.9% | 95.7% | 77.8% |
|                                                                                     | 74.0% | 85.8% | 95.8% | 97.4% | 99.4% | 99.1%  | 100.0% | 98.9%  | 99.0%  | 99.4% | 96.0% | 83.0% |
|                                                                                     | 80.5% | 86.9% | 95.0% | 95.4% | 98.8% | 100.0% | 100.0% | 98.5%  | 98.8%  | 99.7% | 97.1% | 82.4% |
|                                                                                     | 82.7% | 89.0% | 95.6% | 97.0% | 99.4% | 99.7%  | 100.0% | 99.2%  | 99.1%  | 99.0% | 97.7% | 86.0% |
|                                                                                     | 83.6% | 87.5% | 95.3% | 95.7% | 98.2% | 99.5%  | 99.6%  | 99.0%  | 99.6%  | 99.3% | 98.0% | 85.8% |
|                                                                                     | 83.4% | 90.0% | 94.9% | 94.9% | 98.3% | 98.9%  | 98.4%  | 99.3%  | 99.6%  | 99.2% | 97.9% | 85.6% |
|                                                                                     | 83.6% | 90.2% | 94.9% | 93.9% | 98.3% | 98.4%  | 99.5%  | 98.2%  | 99.4%  | 98.7% | 97.6% | 85.4% |
|                                                                                     | 82.2% | 89.1% | 95.7% | 95.1% | 98.4% | 99.0%  | 100.0% | 98.1%  | 99.4%  | 99.3% | 97.4% | 85.9% |
|                                                                                     | 77.3% | 87.4% | 96.7% | 96.5% | 98.1% | 99.0%  | 99.6%  | 97.7%  | 98.7%  | 99.7% | 96.4% | 80.5% |
|                                                                                     | 74.9% | 85.2% | 95.8% | 96.1% | 98.7% | 99.3%  | 99.8%  | 98.7%  | 98.4%  | 99.5% | 96.5% | 77.7% |
|                                                                                     | 70.7% | 83.1% | 95.6% | 96.1% | 98.9% | 100.0% | 99.4%  | 100.0% | 98.9%  | 99.4% | 95.2% | 75.3% |
|                                                                                     | 69.7% | 81.3% | 95.9% | 96.9% | 98.9% | 100.0% | 99.6%  | 99.8%  | 100.0% | 99.4% | 94.7% | 75.5% |
|                                                                                     | 65.4% | 81.4% | 95.4% | 96.6% | 98.0% | 100.0% | 99.9%  | 100.0% | 99.8%  | 99.0% | 94.6% | 73.0% |

## 6 Airspace and Instrument Procedures

### 6.1 Airspace/Air Traffic Control

Preston (U10) is a non-towered airport that operates under the jurisdiction of Salt Lake City (ZLC) ARTCC and is just north of existing Class E airspace utilized by Logan-Cache (LGU) Airport ([Figure 4](#)). Preston (U10) does not have any significant air traffic concerns or constraints.





Figure 4: Image of FAA Sectional Chart Depicting the Classes of Airspace Surrounding Preston (U10)

## 6.2 Existing Instrument Procedures

### 6.2.1 Arrivals

Preston (U10) is not currently supported by any published Standard Terminal Arrival Procedures (STARs) and instead relies primarily on pilots visually navigating to and from the Preston (U10) airspace.

Currently, the overall frequency of operations, and the nature of flight operations activity on the airfield, does not suggest that there is a need for the FAA to publish and maintain STARs. Therefore, no further analysis was undertaken to explore the development of STARs in this report.

### 6.2.2 Departures

Preston (U10) is not supported by any published departure procedures, either obstacle, RNAV or otherwise. This means that aircraft operators that wish to depart Preston (U10) must depart under visual meteorological conditions (VMC) and determine their own path from the runway until reaching a safe altitude for the intended flight operation.

### 6.2.3 Existing Instrument Approaches

Preston (U10) does not currently have published approach procedures, when conducting a visual approach from an IFR flight plan cloud clearance requirements of 14 CFR section 91.155 are not applicable. Approach operations to the airfield must be authorized by the air traffic control facility and only occur when reported weather at the airport is at or above 1000' ceilings and 3 SM visibility or greater.

## 6.3 Opportunities for Additional Approaches

This project team examined additional approach opportunities into Preston (U10), including an exploration of new approaches to both Runway 4 and Runway 22. The goal of the analysis was to identify opportunities

to create viable RNAV (GPS) approaches to the runway end for both additional safety and increased airfield utility when weather drops below VFR weather minimums.

RNAV (GPS) approaches were evaluated for LPV, VNAV/LNAV, and LNAV under FAA 8260.3G, 8260.19K and 8260.58D via TARGETS 7.4.1.

### 6.3.1 Potential Future RNAV (GPS) Approach to Runway 4

A new RNAV (GPS) approach to Runway 4 would provide several enhancements to Preston (U10) in its current and future state. There are no current published instrument approach minimums for Runway 4. The only approach available from an IFR flight plan is a visual approach in which currently utilizes VFR reported weather minimums of 1,000 feet DH and 3 SM visibility. This leaves the airport with unreliable instrument approach coverage when environmental conditions favor Runway 4 operations, particularly during the winter season when heavy snow is a common occurrence.

Due to significant terrain to the southwest of the airport, a new RNAV (GPS) approach was constructed with emphasis first on whether a final approach course could be designed to either vertically and/or laterally avoid Obstacle Clearance Surface (OCS) penetrations. Several combinations of glidepath angle and offset angle of the final approach course were analyzed to determine if there were any viable combinations that could produce a criteria-compliant straight-in approach (+/- 3 degrees of the extended runway centerline).

The study revealed that an offset final approach course (FAC) and an increased vertical descent angle (VDA) were required to mitigate the mountainous terrain in the area. The leading candidate RNAV (GPS) procedure utilizes a FAC that is offset from the extended runway centerline by 20° to the east, keeping aircraft away from rising terrain. Even with the offset FAC, a VDA of 3.77° was required, which is the maximum VDA for a Category C approach. This combination of offset FAC and increased VDA meets FAA criteria for up to Category C but precludes the publication of Category D lines of minima for a public FAR Part 97 instrument approach procedure. Thus, the potential future RNAV (GPS) approach would only be capable of serving aircraft approach category A through C.

The new offset approach also has several Vertical Guidance Surface (VGS) penetrations which preclude the inclusion of vertically guided approach designs (VNAV/LNAV, LPV or RNP) leaving only LNAV. Refer to the graphics below, ([Figure 5](#) & [Figure 6](#)), that depict and the proposed obstacle evaluation areas and sample IAP chart respectively.



*Figure 5: Obstacle Evaluation Areas (OEAs) for Proposed RNAV (GPS) Approach to Runway 4*

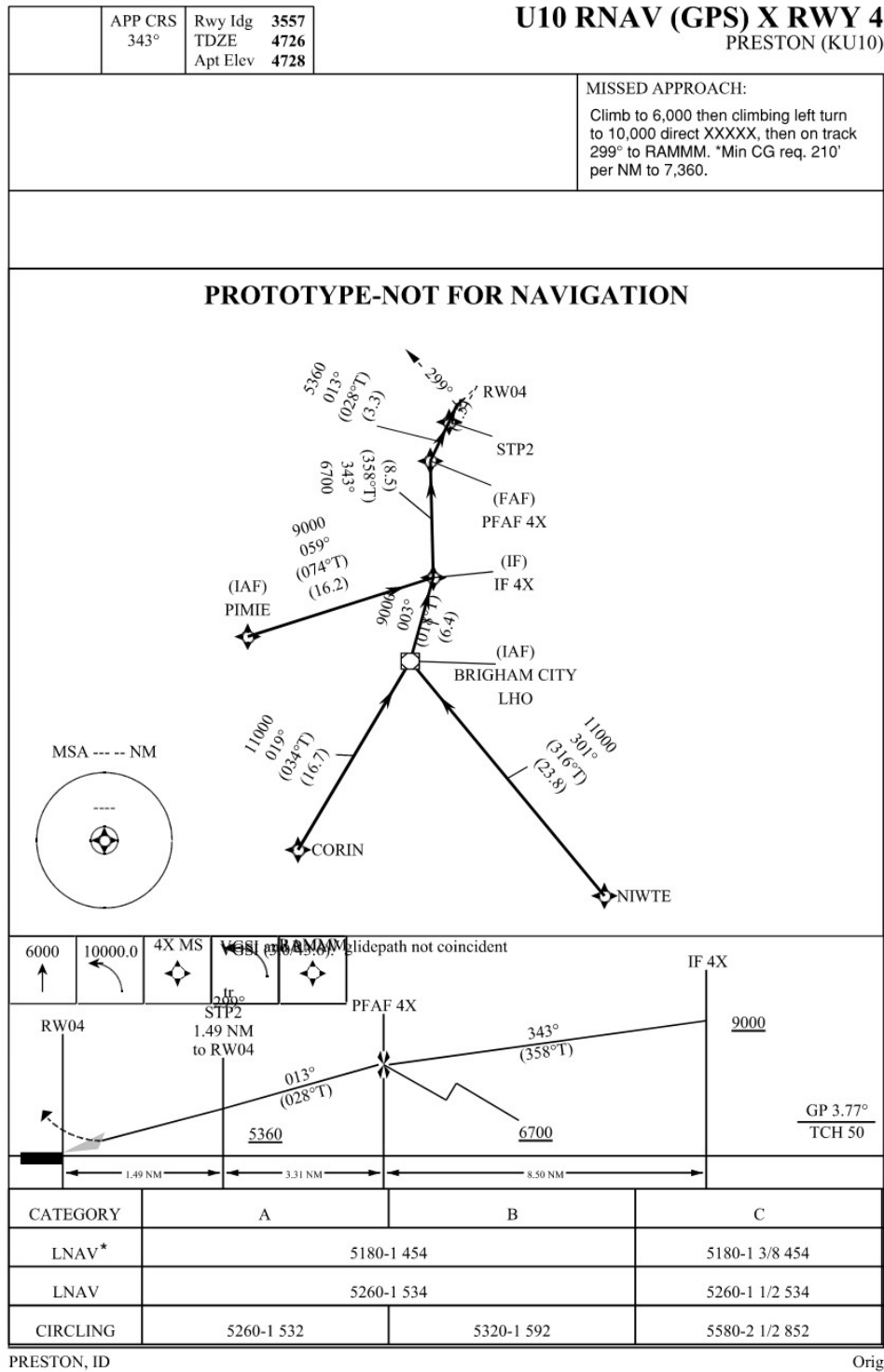


Figure 6: Sample Instrument Approach Procedure Chart for Potential Future RNAV (GPS) Approach to Runway 4



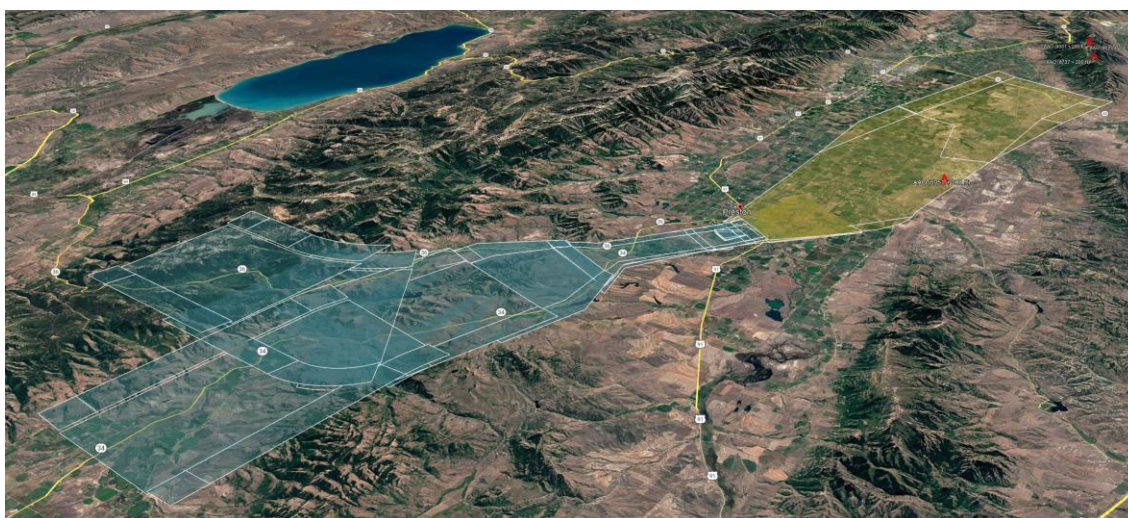
Note: 'XXXXX' represents a placeholder for a five-letter unique pronounceable name that will be identified by the FAA when the procedure is created.

These minimums represent a significant improvement over the existing VFR minimums. The addition of this approach would also require the markings on Runway 4 to be upgraded from the current basic visual to non-precision instrument markings. Because the airport does not currently have an on-airfield altimeter, the procedure minimums include a primary RASS adjustment of 84 feet. A RASS penalty or adjustment exists when the weather source is greater than 5 NM away from the airport reference point (ARP). If a primary weather radar system was installed on airport, this penalty would not apply and it would be removed from the calculation, which would allow for a lower MDA and circling MDA (CMDA).

### 6.3.2 Potential Future RNAV (GPS) Approach to Runway 22

A new RNAV (GPS) approach to Runway 22 would provide several enhancements to Preston (U10) in its current and future state. There are no current published instrument approach minimums for Runway 22. The only approach available from an IFR flight plan is a visual approach in which Runway 22 currently utilizes VFR reported weather minimums of 1,000 feet DH and 3 SM visibility. This leaves the airport with unreliable instrument approach coverage when environmental conditions favor Runway 22 operations, particularly during the winter season when heavy snows are common occurrences. Ideally, the airport would have approach procedures to both primary runway ends to accommodate operations in poor weather conditions regardless of wind direction.

Similarly to Runway 4, an RNAV (GPS) approach to Runway 22 is feasible utilizing an offset FAC which avoids the highest terrain north and east of the airport. The procedure requires a 15° offset to the west with a 3.50° VDA. This combination of offset approach course and increased VDA meets FAA criteria for up to Category C but precludes the publication of Category D lines of minima for the approach. Thus, the potential future RNAV (GPS) approach would only be capable of serving aircraft approach Category A through C. The new approach does not have vertical guidance surface (VGS) penetrations which allows for VNAV lines of minima but still does not meet the criteria to support LPV. Refer to the graphics below, ([Figure 7](#) & [Figure 8](#)), that depict the proposed obstacle evaluation areas and sample IAP chart respectively.



*Figure 7: Potential future RNAV (GPS) Approach to Runway 22 Obstacle Evaluation Areas with LNAV Final and Missed*

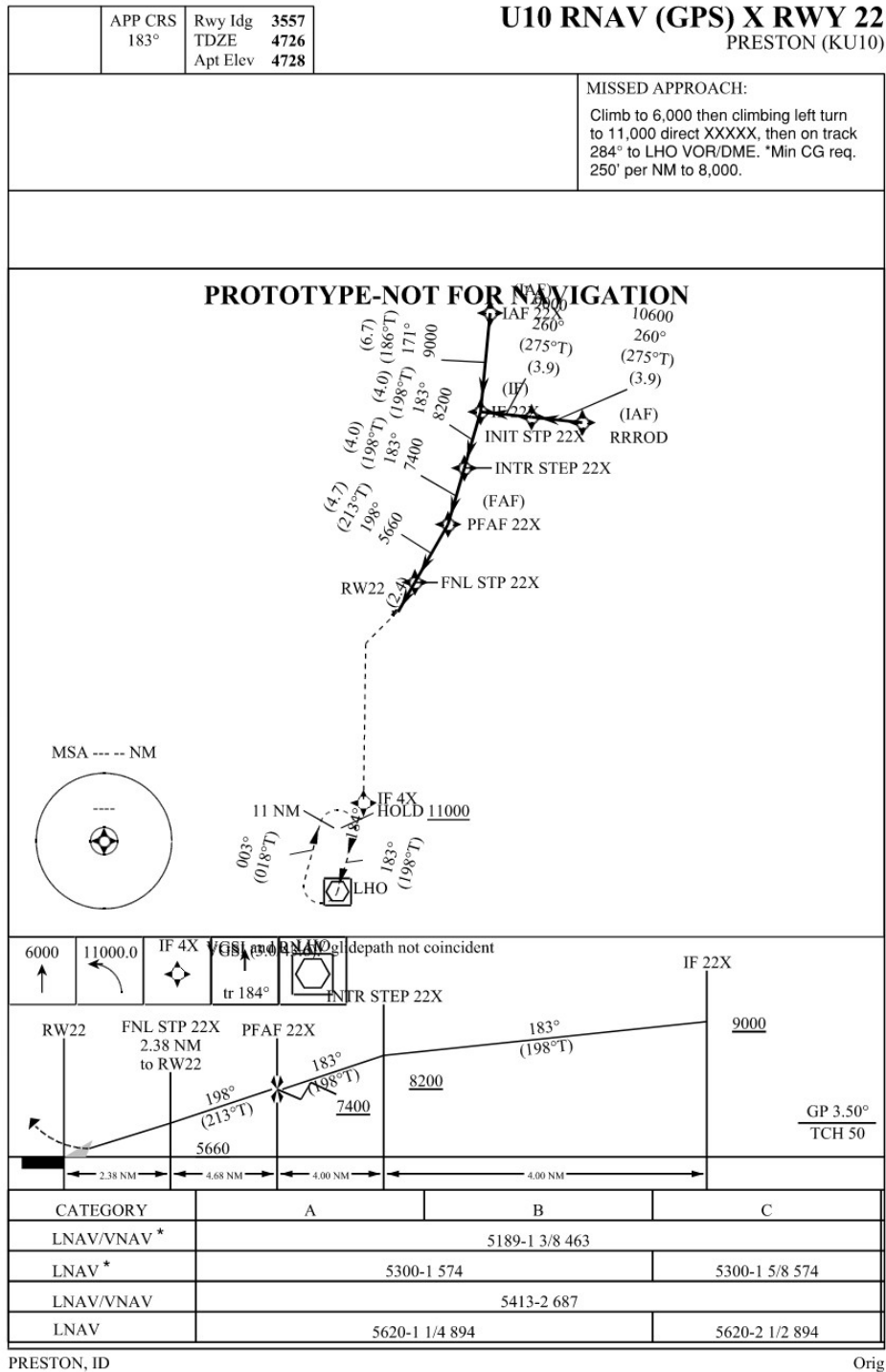


Figure 8: Sample Instrument Approach Procedure Chart for Potential Future RNAV (GPS) Approach to Runway 22

Note 1: 'XXXXX' represents a placeholder for a five-letter unique pronounceable name that will be identified by the FAA when the procedure is created.

Note 2: When circling minimums are created, they are applied to each runway end for the whole airport (unless otherwise specified as N/A). The circling minimums associated with RNAV (GPS) Approach to Runway 4 are also associated with RNAV (GPS) Approach to Runway 22. In the interest of limited space, they were omitted from the design IAP chart. When this procedure is published, circling minimums will fit on the page and be published on the bottom of the IAP chart.

Note 3: Everything described above about RASS remains the same for Runway 22.

It is recommended that Preston (U10) pursue the RNAV (GPS) Approach to Runway 22 via an FAA IFP Gateway Entry at the earliest possible opportunity.

### **6.3.3 Potential Future RNAV (GPS) Approach to Runway 35**

An RNAV (GPS) approach procedure to existing Runway 35 was briefly analyzed to determine if there would be future opportunity for a procedure. A future RNAV (GPS) approach is feasible to the existing Runway 35 alignment. Because the runway is oriented north-south within the valley a runway-aligned, straight-in approach is feasible utilizing a 3.50° GPA. However, this would require major alterations to the Runway 17-35 surface to support regular aircraft operations, including runway extension, paving, markings, and lighting. Without such alterations, the FAA will not create or publish an instrument approach to this runway end.

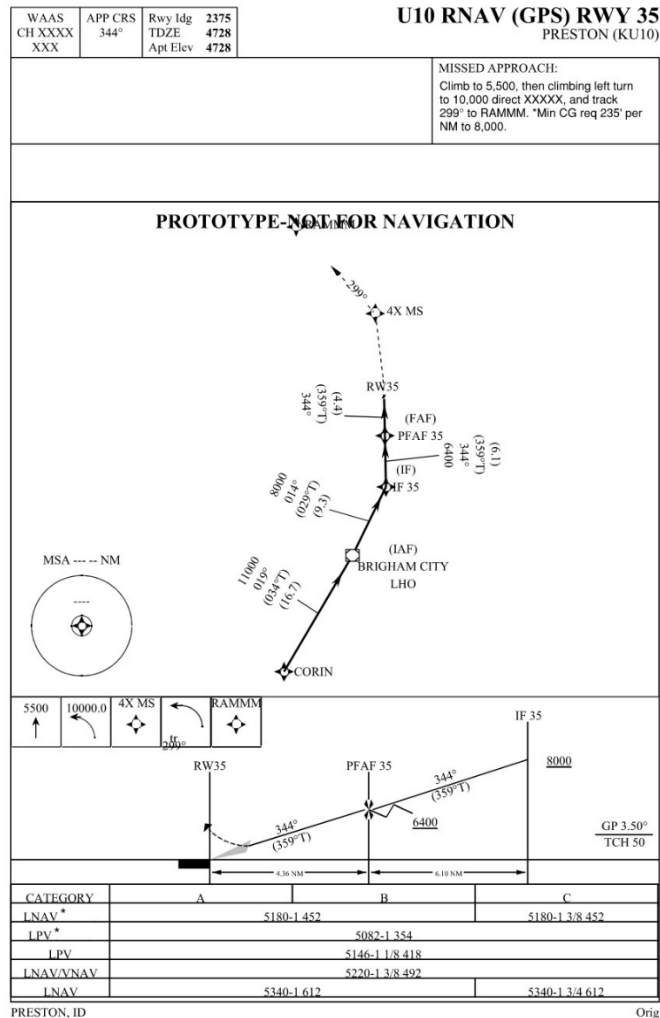


Figure 9: Sample Instrument Approach Procedure Chart for Potential Future RNAV (GPS) Approach to Runway 35

While this approach provides the best theoretical minimums to the airfield, Runway 17-35 will require significant infrastructure investment and upgrades to achieve them, which may not be commensurate with anticipated future at the airport, especially considering the introduction of new approach procedures to Runway 4-22.

### 6.3.4 Potential Future RNAV (GPS) Approach to Runway 17

Approach procedures to Runway 17 were not investigated thoroughly under the scope of this study. The existing condition of Runway 17-35 coupled with the rising terrain to the north allows for minimal opportunity to improve airfield operations.

LEAN does not recommend pursuing an additional approach procedure development to Runway 17.

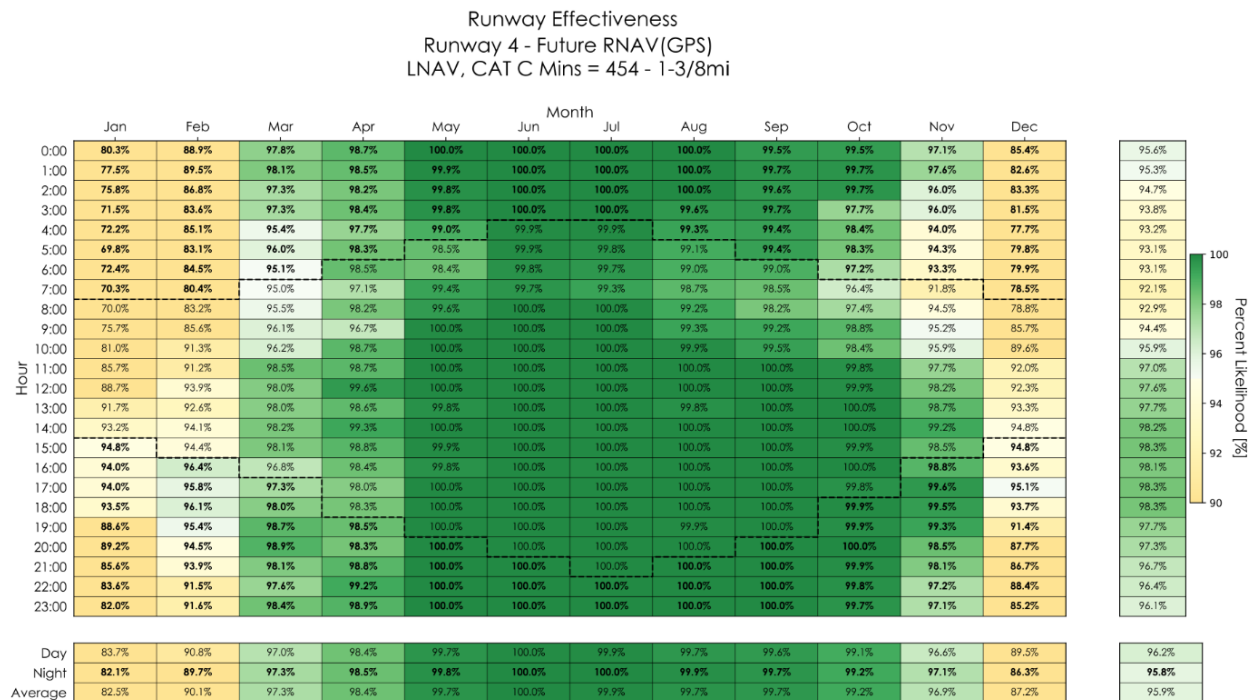
### 6.3.5 Effectiveness of Proposed Approaches

To understand the effectiveness of an airport's existing approach procedures, the approaches need to be examined relative to historical weather conditions when each runway is in use and when all runway/approach options are available for use by pilots and air traffic controllers. LEAN describes the

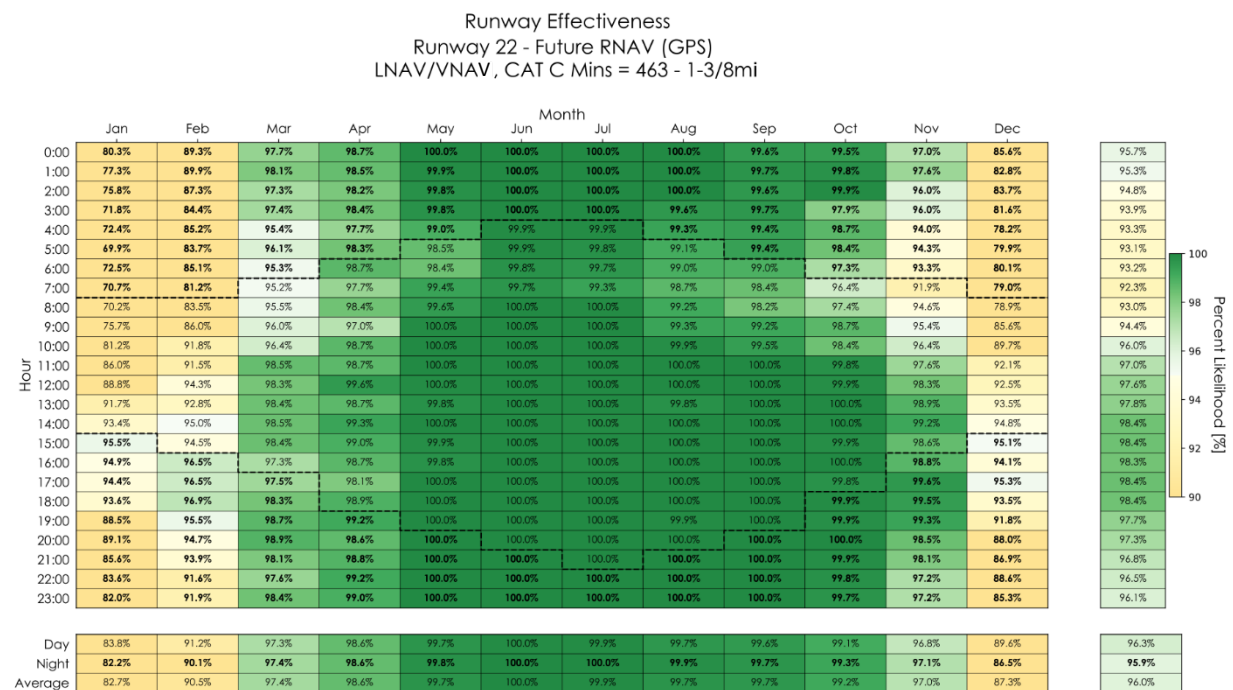
effectiveness of instrument approaches utilizing runway effectiveness of an approach procedure and ability of the airport to stay open to approach operations.

**Table 10** and **Table 11** below indicate the runway effectiveness for Runways 4 and 22.

**Table 10: Runway Effectiveness for Runway 4 with New RNAV (GPS)**



**Table 11: Runway Effectiveness for Runway 22 with New RNAV (GPS)**





The proposed approach procedures provide significant benefit over the existing VFR minimums available to the runway ends today. The most restrictive periods of operation in the winter months see a 10-15% improvement in runway effectiveness in both directions, bringing the average runway effectiveness over 80% for December, January, and February. The combined effect of this improvement can be seen in [Table 12](#) below. With the inclusion of the new lower minimums the airport's availability for operations increases significantly (10-15%) in the winter months. The procedure enhancements, along with required airfield upgrades, would position the airport for future expansion and support of larger and more sophisticated operators in the future.

*Table 12: Airport Open to Operations with New RNAV (GPS) to Runway 4-22.*

| <b>Airport Open to Approach Operations</b><br><b>New RNAV (GPS) Procedures to Runway 4-22</b> |       |       |       |       |        |        |        |        |        |       |       |       |
|-----------------------------------------------------------------------------------------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|
|                                                                                               | Month |       |       |       |        |        |        |        |        |       |       |       |
|                                                                                               | JAN   | FEB   | MAR   | APR   | MAY    | JUN    | JUL    | AUG    | SEP    | OCT   | NOV   | DEC   |
| 0:00                                                                                          | 80.4% | 88.6% | 97.5% | 98.5% | 99.4%  | 100.0% | 99.7%  | 100.0% | 99.5%  | 99.5% | 97.1% | 85.3% |
| 1:00                                                                                          | 77.5% | 88.9% | 98.2% | 98.2% | 99.3%  | 100.0% | 99.7%  | 100.0% | 99.7%  | 99.7% | 97.3% | 82.4% |
| 2:00                                                                                          | 75.9% | 86.6% | 97.2% | 98.1% | 99.5%  | 100.0% | 100.0% | 100.0% | 99.5%  | 99.7% | 96.1% | 82.8% |
| 3:00                                                                                          | 71.9% | 83.7% | 96.8% | 97.9% | 99.5%  | 100.0% | 100.0% | 99.5%  | 99.5%  | 97.4% | 95.6% | 81.4% |
| 4:00                                                                                          | 72.4% | 84.9% | 95.5% | 97.1% | 98.9%  | 99.9%  | 99.9%  | 99.4%  | 99.4%  | 98.4% | 94.1% | 78.1% |
| 5:00                                                                                          | 70.0% | 83.0% | 95.5% | 98.0% | 98.6%  | 99.9%  | 99.8%  | 99.1%  | 99.4%  | 98.3% | 94.0% | 79.9% |
| 6:00                                                                                          | 72.4% | 84.2% | 95.0% | 98.4% | 98.4%  | 99.8%  | 99.7%  | 98.9%  | 99.0%  | 97.0% | 93.2% | 80.0% |
| 7:00                                                                                          | 70.7% | 80.9% | 94.6% | 97.2% | 99.3%  | 99.7%  | 99.3%  | 98.7%  | 98.5%  | 96.5% | 91.9% | 78.3% |
| 8:00                                                                                          | 70.2% | 83.4% | 95.5% | 97.3% | 98.9%  | 99.7%  | 100.0% | 99.2%  | 98.3%  | 97.4% | 94.5% | 79.1% |
| 9:00                                                                                          | 75.7% | 85.8% | 95.7% | 96.2% | 100.0% | 100.0% | 100.0% | 99.3%  | 99.2%  | 98.8% | 94.9% | 85.2% |
| 10:00                                                                                         | 81.0% | 91.4% | 96.0% | 98.2% | 99.7%  | 100.0% | 100.0% | 99.9%  | 99.4%  | 98.4% | 95.1% | 89.4% |
| 11:00                                                                                         | 85.9% | 91.1% | 98.5% | 97.7% | 99.7%  | 100.0% | 100.0% | 100.0% | 100.0% | 99.8% | 97.0% | 92.1% |
| 12:00                                                                                         | 88.8% | 94.0% | 97.9% | 98.9% | 99.7%  | 100.0% | 100.0% | 100.0% | 99.7%  | 99.6% | 98.0% | 92.3% |
| 13:00                                                                                         | 91.7% | 92.8% | 97.7% | 96.8% | 99.2%  | 100.0% | 100.0% | 99.8%  | 99.6%  | 99.7% | 98.7% | 92.9% |
| 14:00                                                                                         | 93.2% | 94.4% | 97.7% | 98.3% | 99.7%  | 100.0% | 100.0% | 100.0% | 99.7%  | 99.7% | 98.6% | 94.6% |
| 15:00                                                                                         | 94.8% | 93.3% | 97.7% | 96.8% | 98.7%  | 99.5%  | 99.6%  | 99.8%  | 99.8%  | 99.8% | 98.3% | 94.5% |
| 16:00                                                                                         | 93.9% | 95.7% | 96.5% | 96.1% | 98.9%  | 99.7%  | 98.9%  | 99.9%  | 100.0% | 99.6% | 98.7% | 93.6% |
| 17:00                                                                                         | 93.7% | 95.5% | 96.8% | 95.1% | 98.4%  | 98.6%  | 99.5%  | 99.3%  | 99.7%  | 99.4% | 99.3% | 95.1% |
| 18:00                                                                                         | 93.4% | 95.5% | 97.7% | 95.8% | 98.8%  | 99.0%  | 100.0% | 99.1%  | 99.5%  | 99.8% | 99.2% | 93.5% |
| 19:00                                                                                         | 88.5% | 95.0% | 98.7% | 97.0% | 98.2%  | 99.0%  | 99.6%  | 99.3%  | 98.9%  | 99.9% | 99.0% | 91.2% |
| 20:00                                                                                         | 89.2% | 94.2% | 98.6% | 97.2% | 98.7%  | 99.3%  | 99.8%  | 99.4%  | 98.7%  | 99.9% | 98.2% | 87.9% |
| 21:00                                                                                         | 85.4% | 93.5% | 98.1% | 97.3% | 98.9%  | 100.0% | 99.4%  | 100.0% | 99.0%  | 99.9% | 97.8% | 86.6% |
| 22:00                                                                                         | 83.8% | 90.8% | 97.7% | 98.3% | 99.0%  | 100.0% | 99.7%  | 100.0% | 100.0% | 99.8% | 96.6% | 88.3% |
| 23:00                                                                                         | 82.0% | 90.9% | 97.9% | 98.2% | 98.5%  | 100.0% | 99.9%  | 100.0% | 100.0% | 99.7% | 97.0% | 85.0% |

### 6.3.6 VGSI and Proposed Procedures

The instrument approach procedures identified on Runway 4 and 22 both require the use of VDAs that are well in excess of the current VGSI nominal aiming angle of 3.00 degrees.

To comply with FAA Order 8260.3 and 8260.19 criteria, the existing VGSI's angle should be modified to equal their respective VDA angle identified on the RNAV (GPS) approaches. This would be increasing the VGSI to 3.77° for Runway 4, and 3.50° for Runway 22.

This report does not contain any detailed analysis for the design and modification of the VGSI. However, if the airport and LEAN continue to pursue instrument approach procedures like those identified in this report, it will be important to evaluate and modify the VGSI as well.

### 6.3.7 Departures and Analysis of Departures

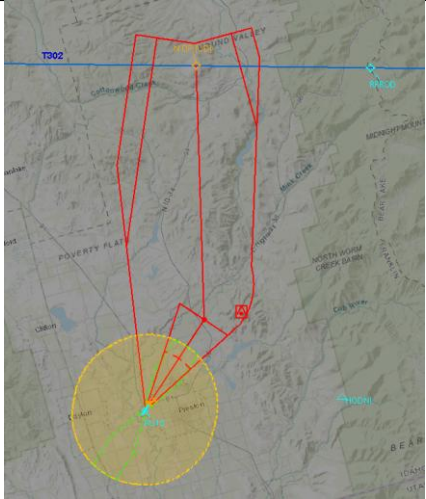
This study also included analysis of possible implementation of RNAV departure procedures for Preston (U10). Currently Preston (U10) operates as a visual-only airport and does not have published departure

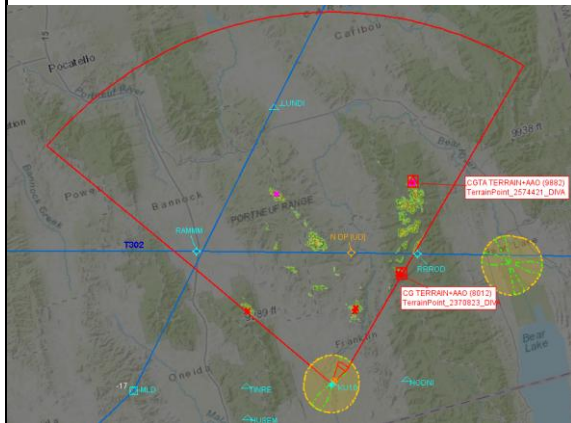


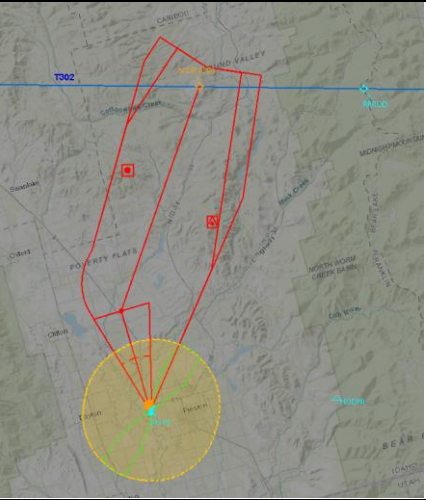
procedures. Sectorized departures and routed departure procedures were analyzed north and south departures from the airfield.

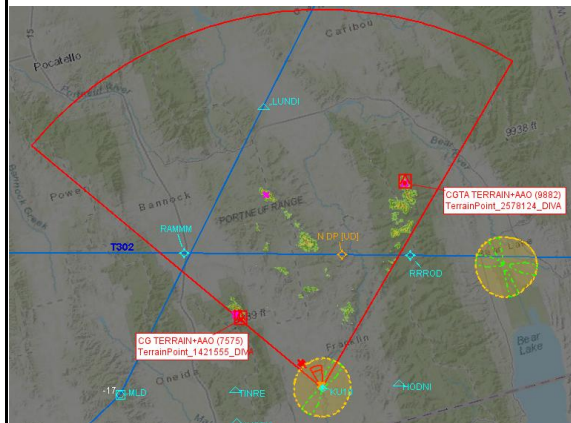
Through this investigation the project team identified several feasible options which are described in [Table 13](#) below:

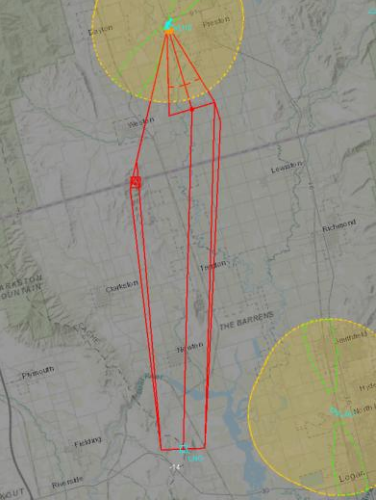
*Table 13: Potential Future Departure Procedures*

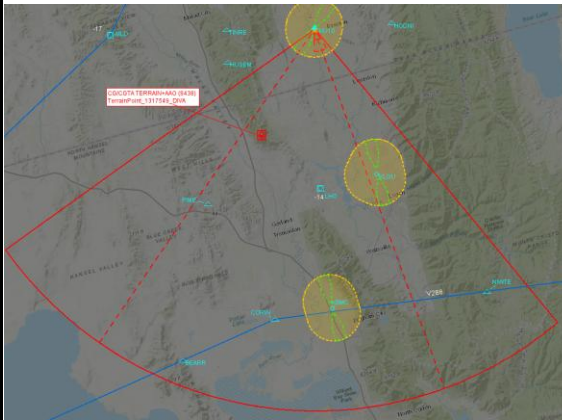
| Direction                                                                          | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| North                                                                              | 4        | RNAV ODP            | 370                       | 7,000                      |
|  |          |                     |                           |                            |
| Minimums                                                                           | Standard | Required<br>NAVAIDS | None                      |                            |

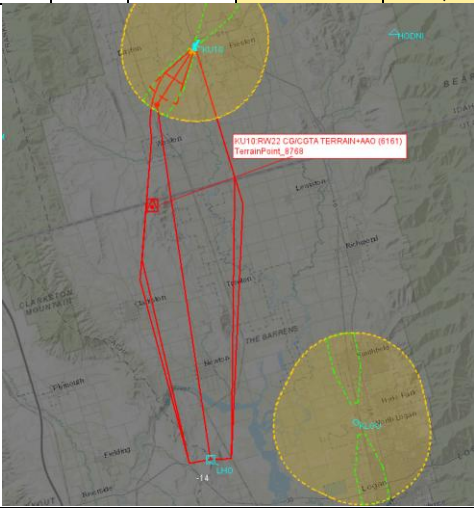
| Direction                                                                           | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|-------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| North                                                                               | 4        | Diverse             | 275                       | 9,100                      |
|  |          |                     |                           |                            |
| Minimums                                                                            | Standard | Required<br>NAVAIDS | None                      |                            |

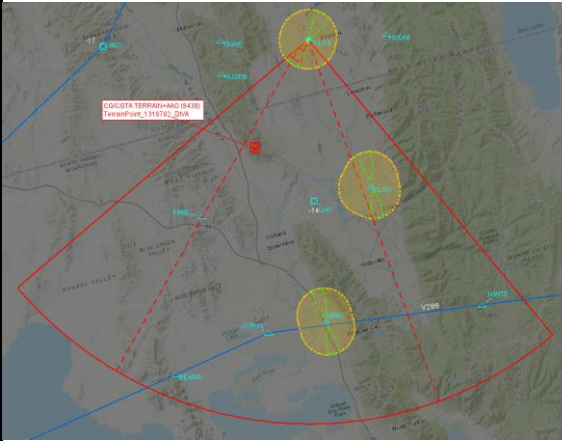
| Direction                                                                           | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|-------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| North                                                                               | 35       | RNAV ODP            | 250                       | 7,300                      |
|  |          |                     |                           |                            |
| Minimums                                                                            | Standard | Required<br>NAVAIDS | None                      |                            |

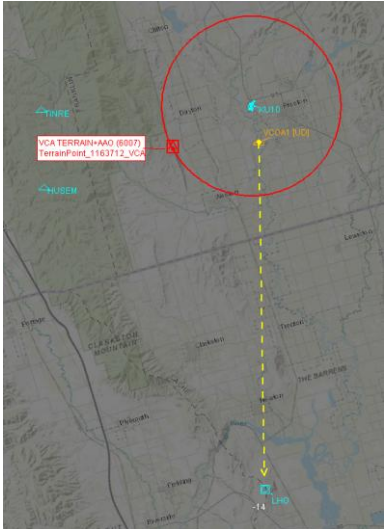
| Direction                                                                            | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|--------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| North                                                                                | 35       | Diverse             | 295                       | 8,500                      |
|  |          |                     |                           |                            |
| Minimums                                                                             | Standard | Required<br>NAVAIDS | None                      |                            |

| Direction                                                                         | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|-----------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| South                                                                             | 17       | RNAV ODP            | 205                       | 6,200                      |
|  |          |                     |                           |                            |
| Minimums                                                                          | Standard | Required<br>NAVAIDS | LHO VOR                   |                            |

| Direction                                                                          | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| South                                                                              | 17       | Diverse             | 340                       | 9,600                      |
|  |          |                     |                           |                            |
| Minimums                                                                           | Standard | Required<br>NAVAIDS | None                      |                            |

| Direction                                                                          | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| South                                                                              | 22       | RNAV ODP            | 255                       | 6,200                      |
|  |          |                     |                           |                            |
| Minimums                                                                           | Standard | Required<br>NAVAIDS | LHO VOR                   |                            |

| Direction                                                                           | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|-------------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| South                                                                               | 22       | Diverse             | 345                       | 9,600                      |
|  |          |                     |                           |                            |
| Minimums                                                                            | Standard | Required<br>NAVAIDS | None                      |                            |

| Direction                                                                         | Runway   | Type                | Climb Gradient<br>(ft/NM) | Term. Altitude<br>(ft MSL) |
|-----------------------------------------------------------------------------------|----------|---------------------|---------------------------|----------------------------|
| All                                                                               | All      | VCOA                | Standard                  | 10,000                     |
|  |          |                     |                           |                            |
| Minimums                                                                          | Standard | Required<br>NAVAIDS | LHO VOR                   |                            |

Each of these procedures was developed using the TARGETS platform and is compliant with current procedure design criteria and could be considered feasible for development in the future. All of the proposed procedures accounted for the traverse way and did not have an impact on that area. They are clear of all obstacles including terrain and manmade. All runways will require a higher than standard climb gradient therefore an additional departure procedure, a Visual Climb Over Airport (VCOA) will be required. The sectorized departures tend to require higher climb gradients than the routed RNAV departure procedures except for the climb gradient required for the Runway 22 RNAV departure which is affected by the terrain to the east and north of the airport.

### 6.3.8 Summary of Analyzed Procedures

Preston (U10) currently operates both departures and approaches under VFR. While this generally serves the needs of the existing user group for most of the year, the addition of instrument approach and departure procedures could afford the airfield the opportunity to operate more successfully in the winter months and to support larger aircraft and more sophisticated operators in the future.

Establishing new, offset RNAV (GPS) approaches to Runways 4 and 22 could provide significant benefit to the airport through the reduction in weather requirements below the existing VFR minimums.

*Table 14: Summary of Feasible Approach Procedures at Preston (U10)*

| Procedure         | Existing/New | Minimums (Cat C)                                            | Meets FAA Design Criteria | Airfield/NAVAID/ILS Modifications |
|-------------------|--------------|-------------------------------------------------------------|---------------------------|-----------------------------------|
| RNAV (GPS) Rwy 4  | New          | LNAV: 454 - 1 3/8                                           | Yes                       | NPI Paint Markings                |
| RNAV (GPS) Rwy 22 | New          | LNAV: 574 - 1 5/8<br>LNAV/VNAV: 463 - 1 3/8                 | Yes                       | NPI Paint Markings                |
| RNAV (GPS) Rwy 35 | New          | LPV: 354 - 1<br>LNAV/VNAV: 492 - 1 3/8<br>LNAV: 452 - 1 3/8 | Yes                       | Runway Paving, Paint, Lighting    |

There are currently no existing departure procedures at Preston (U10). In the future, the following procedures could be developed through several meetings between western flight procedures team, air traffic control, and Preston (U10) airport, to discuss the introduction of new instrument approach procedures, RNAV SIDs including ODPs and routed departures, and/or sectorized departures that safely take aircraft in and out of the valley and above surrounding terrain.

*Table 15: Summary of Analyzed Departure Procedures at Preston (U10)*

| Procedure                | Existing/New | Minimums (Cat C) | Meets FAA Design Criteria | Climb Gradient Required |
|--------------------------|--------------|------------------|---------------------------|-------------------------|
| RNAV ODP Rwy 4           | New          | Standard         | Yes                       | 370 ft/NM to 7,000' MSL |
| Diverse Departure Rwy 4  | New          | Standard         | Yes                       | 275 ft/NM to 9,100' MSL |
| RNAV ODP Rwy 35          | New          | Standard         | Yes                       | 250 ft/NM to 7,300' MSL |
| Diverse Departure Rwy 35 | New          | Standard         | Yes                       | 295 ft/NM to 8,500' MSL |
| RNAV ODP Rwy 17          | New          | Standard         | Yes                       | 205 ft/NM to 6,200' MSL |
| Diverse Departure Rwy 17 | New          | Standard         | Yes                       | 340 ft/NM to 9,600' MSL |
| RNAV ODP Rwy 22          | New          | Standard         | Yes                       | 255 ft/NM to 6,200' MSL |
| Diverse Departure Rwy 22 | New          | Standard         | Yes                       | 345 ft/NM to 9,600' MSL |
| VCOA (All Rwys)          | New          | Standard         | Yes                       | Standard                |

## 7 Summary of Findings

This report analyzed the effectiveness of the existing runways at Preston (U10), focusing on the capabilities of the existing paved Runway 4-22. This was performed through the analysis of the existing weather conditions, airspace, and available approach minimums. This airspace analysis and instrument procedure design identified several potential approach and departure procedures that may benefit the airport in the future through the introduction of reduced minimums and increased safety of operations.

### 7.1 Summary of Historical Weather Conditions

The historical weather information identified key periods throughout the year, particularly in the winter months, where the existing VFR minimums are not sufficient to reliably sustain operations into and out of Preston (U10). Wind data indicated that runway preference typically varies daily, favoring Runway 4 operations in the morning and Runway 22 operations in the late morning and afternoon periods. This preference pattern, in conjunction with the most limiting minimums occurring on winter early mornings indicates that enhancements to Runway 4 approach and departure minimums would provide the most value to the airport.

Because there is no weather sensing equipment on the airfield, weather data had to be aggregated from other sources in the area. As the airport pursues instrument approaches and departures with lower minimums, weather sensing equipment such as an ASOS or AWOS-3 will be important to ensure accurate local readings. The addition of this equipment would also contribute to further lowering the minimums of the proposed procedures by eliminating the RASS adjustment to the proposed MDA, CMDA, and DA.

## 7.2 Summary of Potential Instrument Procedures

This report determined that adding a new RNAV (GPS) procedure to both Runway 4 and Runway 22 is feasible and useful for Preston (U10). These procedures require no significant deviations from standard design set forth in FAA Order 8260.3, 8260.58 or 8260.19 and could be requested for development by the FAA. These approaches would reduce the overall minimums to both runway ends and potentially increase the overall usability of the airport while reducing pilot workloads. Should the airport choose to pursue only one procedure, the weather data indicates that the RNAV (GPS) to Runway 4 would provide the most overall benefit to the airport. To support any of these procedures, the runway would need to be updated with Non-Precision Instrument (NPI) markings.

Future opportunities to develop departure procedures at Preston (U10) could be undertaken to provide sub-VFR minimums for departing aircraft. There are viable departure procedure options to all runways at the airfield which meet current FAA criteria and do not have overly restrictive climb gradient requirements. However, Runway 4-22 is the only runway the FAA would design procedures to currently. Runway 17-35 is an option after major upgrades are completed.

Should the airport choose to pursue approach and/or departure procedure development with the FAA, it is not recommended to request any instrument procedures to Runways 17 or 35 until the airport is prepared to make significant investment in the improvement of the runway (extension, paving, lighting, etc).