# CHAPTER 2: RUNWAYS & TAXIWAYS

## Introduction

This Chapter of the Airport Master Plan is focused on the Runway and Taxiway system at the airport which is commonly referred to as the airfield where aircraft takeoff, land and maneuver on the ground. Please note that **Chapter 3: Terminal Area and Support Facilities** will look at the apron, hangars and other facilities supporting the airport. These two chapters will address existing and future facility needs at the Dawson Community Airport (GDV).

As the chapter analyzes various components of the runway and taxiways at GDV, it will review current conditions and any deficiencies that do not meet current FAA design standards. It will consider the future critical design aircraft and provide facility requirements to accommodate these aircraft through the planning period. The chapter will further present the alternatives that were considered to meet future needs and the preferred airfield alternative that was chosen. Included in this chapter will be the following elements:

- Critical Design Aircraft
- Meteorological Factors
- Runways
- Taxiways
- Airside Data Summary
- Alternatives
- Preferred Alternatives Summary

## Critical Design Aircraft

The critical design aircraft types must be identified to determine the appropriate airport design standards to incorporate into airport planning. As discussed in the previous chapter, the current and future critical design aircraft is a B-II aircraft which has a taxiway design group (TDG) 2-A and greater than 12,500 pounds. This is based on Alpine Air Express operating the Beechcraft 1900C. The existing/future critical design aircraft will be ARC B-II TDG 2-A. The existing and future critical design aircraft characteristics at the Dawson Community Airport are summarized in the following sections.

*Table 2-1 – Existing and Ultimate Airfield Design Aircraft Summary*

| Design Characteristics | Runway 12-30 | Runway 2-20 |
|---|---|---|
| Aircraft Make/Model | Beechcraft 1900C | Tecnam P2012 |
| Airplane Approach Category | B | B |
| Airplane Design Group | II | I (S) |
| Taxiway Design Group | 2 | 1A |
| Wingspan | 58’ 0” | 46’ 0” |
| Length | 47’ 10” | 38’ 6” |
| Height | 15’ 6” | 14’ 4” |
| Cockpit to Main Gear | 23’ 8” | 7’ 9” |
| Main Gear Width | 18’ 7” | 13’ 3” |
| Approach Speed (1.3 x Stall) | 113 knots | 110 knots |
| Maximum Takeoff Weight | 16,600 pounds | 8,113 pounds |
| Landing Gear Configuration | Dual Wheel | Single Wheel |

*Source: Beechcraft, Cessna, KLJ Analysis*

## Meteorological Factors

Meteorological conditions that affect the facility requirements of an airport include but are not limited to wind direction, wind speed, cloud ceiling, visibility, and temperature. Hourly metrological data was reviewed from the GDV Automated Weather Observation System (AWOS) facility available from the National Climatic Data Center (NCDC). Periodic "special" weather observations within each hour were removed. This method provides considers the true average weather trends at an airport without skewing conditions toward Instrument Flight Rules (IFR) where multiple observations may be taken each hour due to changing conditions.

Wind coverage and weather conditions are evaluated based on the two different flight rules, Visual Flight Rules (VFR) and IFR. Visual Meteorological Conditions (VMC) are encountered when the visibility is 3 nautical miles or greater, and the cloud ceiling height is 1,000 feet or greater. Conditions less than these weather minimums are considered Instrument Meteorological Conditions (IMC) requiring all flights to be operated under IFR.

### *Meteorological Facilities*

Metrological facilities provide users with up-to-date weather information at the airport to aid in pilot decision making for safe flight operations. See **Figure 2-1** for locations of facilities.

#### WIND INDICATOR(S)

Wind direction indicators provide an immediate visual indication of the wind direction and velocity. A segmented circle provides a visual indication of the wind direction and velocity together with runway alignment and/or traffic pattern information.

The primary wind cone and segmented circle for the airport is located on the northeast side of Runway 12-30 and is lighted. There are no supplemental wind cones.

#### AIRPORT BEACON

The airport beacon serves as the airport identification light so approaching pilots can identify the airport location from sunset to sunrise. The airport beacon is located west of the airport road from the terminal and its location at GDV adequately serves the airport without known obstructions to its line of sight.

#### WEATHER REPORTING

There are two types of weather reporting systems on an airport. The Automated Surface Observing System (ASOS) program was a joint effort between the Federal Aviation Administration and the National Weather Service (NWS) to deploy a network of high-grade weather monitoring stations across the United States. ASOS system serves as a primary climatological observing network in the United States and have equipment that provides weather observations every minute. A second-tier Automated Weather Observation System (AWOS) has varying sets of equipment packages to provide local weather observations. GDV has an AWOS-III P/T that is owned and maintained by the airport.

#### TEMPERATURE

Average high temperature data for the hottest month was reviewed from climate data available from the NCDC for GDV. Using locally available data, the average high temperature in the hottest month from 1991-2020 was 87.7 degrees Fahrenheit reported in July. Temperature affects recommended runway lengths and aircraft performance.

### *Meteorological Data*

Local weather conditions are a significant factor in the design and development of airport facilities since they affect aircraft performance. Temperature affects runway length; wind direction and speed affect runway orientation; and visibility and cloud ceiling conditions determine the need for runway navigational aids and lighting. Prevailing winds are generally aligned with the airport's runway configuration. Crosswind or tailwind conditions can be hazardous to aircraft operations if they exceed the operational capabilities of the airplane or flight crew. The smallest aircraft are typically the most affected operationally by crosswinds.




A runway's wind coverage is determined by an aircraft's ability to operate with a "direct" crosswind, which is defined as 90 degrees to the direction of travel. For planning purposes, FAA has defined the maximum direct crosswind for small aircraft as 12 miles per hour (10.5 knots). For increasingly larger aircraft, a 15-mile per hour (13 knot) direct crosswind is used up through 23-mile per hour (20 knots) for the largest aircraft. Aircraft can operate safely in progressively higher wind speeds as the crosswind angle decreases and the wind direction aligns more closely with the opposing the direction of flight. In addition, some aircraft are designed to safely operate with higher crosswind components. Ideally, an aircraft will take off and land directly into the wind or with a light crosswind. The FAA recommends that primary runways accommodate at least 95 percent of local wind conditions; when this level of coverage is not provided, the FAA recommends development of a secondary (crosswind) runway.

*Table 2-2 – FAA Wind Coverage Standards*

| AAC-ADG | Maximum Crosswind Component |
|---|---|
| A-I & B-I | 10.5 knots |
| A-II & B-II | 13.0 knots |
| A-III, B-III<br>C/D I through C/D-III | 16.0 knots |

*Source: FAA AC 150/5300-13B Change 1*

Runway 12-30 has 91.10 percent coverage in all-weather conditions for 10.5 knot winds and when combined with Runway 2-20, the airport has 97.7 percent coverage. **Table 2-3** provides the calculated all-weather wind coverage for the airport.

*Table 2-3 – All-Weather Wind Coverage*

| Runway | Crosswind Component (Wind Speed) | | |
|---|---|---|---|
| | 10.5 knots | 13.0 knots | 16.0 knots |
| Runway 12-30 | 91.10% | 96.53% | 98.89% |
| Runway 2-20 | 81.69% | 88.77% | - |
| **Combined*** | 97.70% | 99.15% | 98.89% |

*Source: KGDV AWOS (2014-2023), 85,773 total observations*
**Combined assumes up to maximum design aircraft crosswind component for each runway*

Pilots can fly with visual reference to the ground and other aircraft during most weather conditions during VMC. Pilots are required to reference flight instruments and be on a FAA IFR flight plan during IMC and be instrument rated.

Wind coverage during VMC is evaluated to determine the ideal alignment for runways used during visual operations, such as VFR flight training. The wind coverage for Runway 12-30 alone is below 95 percent for 10.5 knots, but when combined with Runway 2-20 there is 97.69 percent coverage with these winds. The coverage is shown in **Table 2-4**.

### *Table 2-4 – VMC Wind Coverage*

| Runway | Crosswind Component (Wind Speed) | | |
|---|---|---|---|
| | 10.5 knots | 13.0 knots | 16.0 knots |
| Runway 12-30 | 91.70% | 96.84% | 99.00% |
| Runway 2-20 | 81.61% | 88.79% | - |
| **Combined*** | 97.69% | 99.14% | 99.00% |

*Source: KGDV AWOS (2014-2023), 81,255 total observations*
**Combined assumes up to maximum design aircraft crosswind component for each runway*

Wind coverage during IMC is evaluated to determine the ideal alignment for instrument approach to an airport's runway. As shown in **Table 2-5**, the existing wind coverage at GDV is less than 95% at 13.0 knots.

### *Table 2-5 – IMC Wind Coverage*

| Runway | Crosswind Component (Wind Speed) | | |
|---|---|---|---|
| | 10.5 knots | 13.0 knots | 16.0 knots |
| Runway 12-30 | 80.30% | 90.95% | 96.97% |
| Runway 12 Only | 37.41% | 42.32% | 44.89% |
| Runway 30 Only | 49.62% | 55.36% | 58.81% |

*Source: KGDV AWOS (2014-2023), 4,518 total observations*

Based on true hourly weather data summarized in **Table 2-6**, the airport experiences IMC weather conditions 4.26 percent of the time. When considering the current instrument approach weather minimums of 250-foot cloud ceiling and 1-mile flight visibility, the airport has weather conditions below this criterion 3.7 days per year where the airport is not usable.

### *Table 2-6 – Meteorological Analysis*

| Weather Condition | Percentage | Days per Year | Hours per Year |
|---|---|---|---|
| VMC | 94.73% | 345.8 | 8,299 |
| Usable IMC | 4.26% | 15.5 | 373 |
| **Usability** | 98.99% | 361.3 | 8,672 |
| Below Weather Minimums* | 1.01% | 3.7 | 88 |
| ***Total*** | ***100.0%*** | *365.0* | ***8,760*** |

*Source: KGDV AWOS (2014-2023), 85,773 total observations*
**Current IFR minimums are 250-foot cloud ceiling and 1 mile flight visibility for Runway 12 & 30 approach*

### *Instrument Approach Conditions*

Instrument approach procedures to a runway end are used by landing aircraft to navigate to the airport during instrument conditions when the cloud ceiling is less than 1,000 feet and/or visibility is less than 3 miles. Establishing approaches with the lowest possible weather minimums allow the airport to maximize its operational utility. Each approach type requires differing infrastructure and navigational aids. Types of approach procedures include non-precision approach (NPA), approach with vertical guidance (APV) and precision instrument approach (PA). See **Appendix B: Commercial Service Airports 101** for details on the requirements for different levels of instrument approach procedures. **Table 2-7** is a list of the major approach categories and associated capabilities.

*Table 2-7 – Instrument Approach Procedure Visibility Minimums*

| Typical Categories of Approaches | | | | | |
|---|---|---|---|---|---|
| **Approach** | **Category** | **Vertical Guidance** | **Lowest Ceiling** | **Lowest Visibility** | **Ground Based Aids** |
| Visual | | | 1,000’ | 3 miles | |
| RNAV LNAV | NPA | No | 250’ | ¾ mile | MIRL, VGSI* |
| RNAV LNAV/VNAV | APV | Yes | 250’ | ¾ mile | MIRL, VGSI* |
| RNAV LPV** | APV | Yes | 250’ | ¾ mile | MIRL, VGSI* |
| VOR | NPA | No | 250’ | ¾ mile | VOR, MIRL, VGSI* |
| ILS CAT I | PA | Yes | 200’ | ½ mile | GS, LOC, MIRL, MALSR |
| ILS CAT II | PA | Yes | 100’ | ¼ mile | GS, LOC, HIRL, ALSF-1 or ALSF-2, TDZ/CL |
| ILS CAT III a | PA | Yes | 0’ | RVR 700’ | GS, LOC, RVR, HIRL, ALSF, TDZ/CL |
| ILS CAT III b | PA | Yes | 0’ | RVR 600’ | GS, LOC, RVR, HIRL, ALSF, TDZ/CL |
| ILS CAT III c | PA | Yes | 0’ | 0’ | GS, LOC, RVR, HIRL, ALSF, TDZ/CL |

*Source: KLJ Analysis; * Recommended; ** Often the best RNAV minimums but requires aircraft equipped with WAAS receiver*

Two IAPs (see **Table 2-8**) are available for Runways 12 and 30 with satellite-based NAVAIDS. The approach plates are in **Appendix B – Commercial Airports 101**. Instrument approach weather minimums are a result of the approach type, airport infrastructure, and any prevailing airspace obstructions. Coordination with FAA Flight Procedures Office is recommended to review the feasibility of implementing any new approach procedure though it is not recommended during this planning study.

*Table 2-8 – Instrument Approach Procedures (A & B Minimums)*

| Approach Procedure | Approach Type | | Lowest Cloud Ceiling Minimum (HAT) | Lowest Visibility Minimum (n.m.) |
|---|---|---|---|---|
| RNAV (GPS) RWY 12 | Non-Precision | LPV | 250 feet | 1 mile |
| | | LNAV/VNAV | 250 feet | 1 mile |
| | | LNAV | 442 feet | 1 mile |
| | | Circling | A: 442 feet B: 462 feet | 1 mile |
| RNAV (GPS) RWY 30 | Non-Precision | LPV | 250 feet | 1 mile |
| | | LNAV/VNAV | 250 feet | 1 mile |
| | | LNAV | 324 feet | 1 mile |
| | | Circling | A: 382 feet B: 462 feet | 1 mile |

*Source: Airnav. Note: HAT = Height Above Touchdown, n.m. = nautical miles (reported), VG = Vertical Guidance, NVG = Non-Vertical Guidance, ILS = Instrument Landing System, LPV = Localizer Performance with Vertical Guidance, LNAV = Lateral Navigation, VNAV = Vertical Navigation, VOR = Very High Frequency Omni-Directional Range, DME = Distance Measuring Equipment*

### *Crosswind Runway*

For the crosswind runway, a minimum of 500 operations must also be shown by aircraft needing the crosswind runway to support FAA funding. This is demonstrated at GDV by evaluating the fleet mix and wind coverage.

The existing crosswind runway is only available during daytime visual conditions. During these times, there is a wind coverage deficiency of 1.53 percent without a crosswind runway. This means that 1.53 percent of the time the design aircraft (FAA ARC A-II and B-II) requires a crosswind runway for the airport to achieve a minimum of 95 percent total wind coverage. **Aviation demand forecasts show that ARC A-I and B-I aircraft needing the crosswind runway GDV currently exceeds 500 annual operations.**

*Table 2-9 – Crosswind Runway Utilization (2024 Operations)*

| Aircraft | Total (T) | Rwy 12-30 | Rwy 2-20 | No Coverage |
|---|---|---|---|---|
| A/B-I | 2,328 | T x .911 = 2,120 | T x .066 = 154 | 54 |
| A/B-II | 750 | T x .9653 = 724 | T x ..0262 = 20 | 6 |
| C/D | 22 | T x .9889 = 22 | - | - |
| ***Total*** | *3,100* | *2,866* | ***174*** | ***60*** |

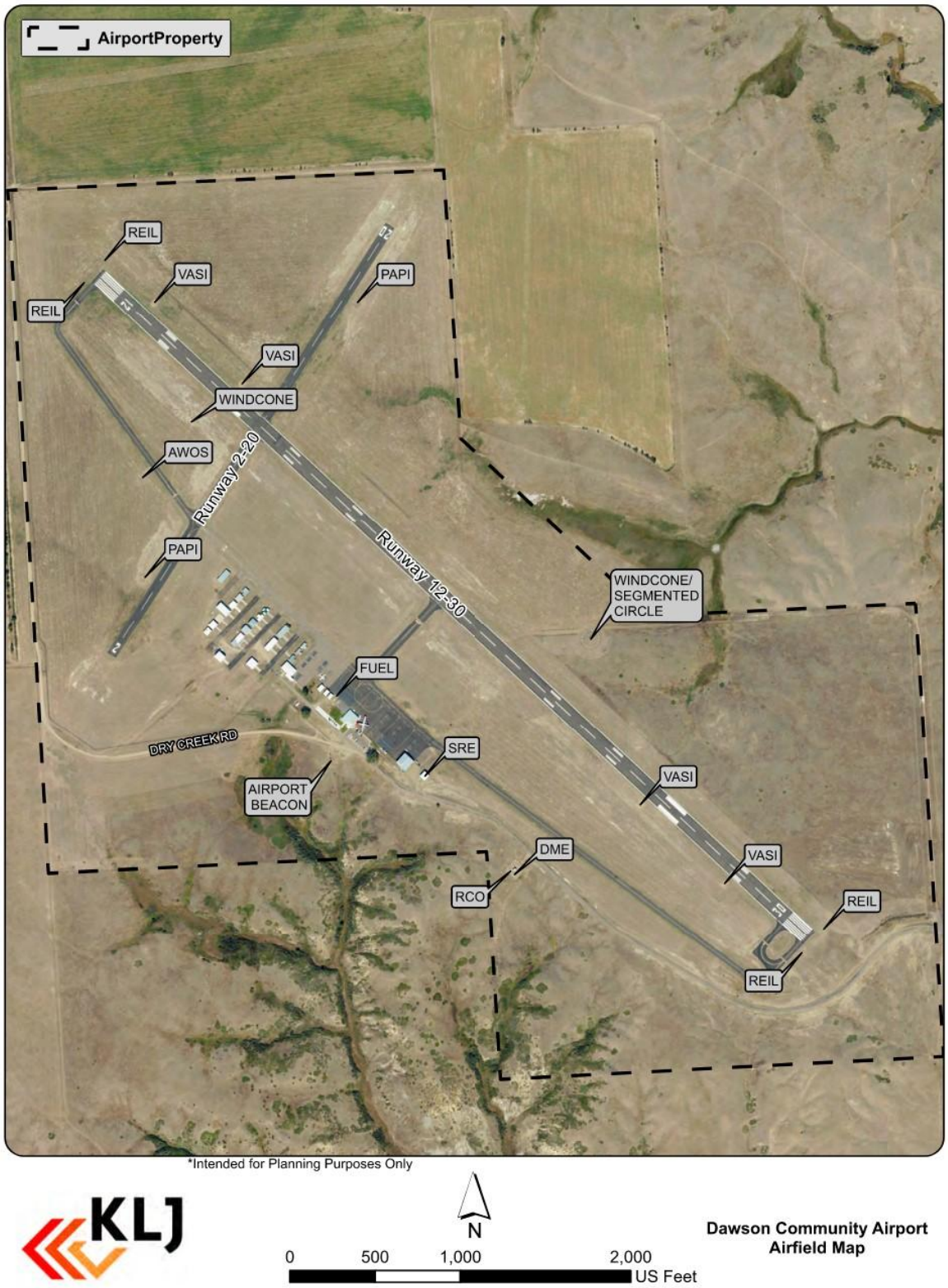
*Source: KGDV AWOS (2014-2023), 85,773 total observations; Operations Forecast Chapter 1*

*Table 2-10 – Crosswind Runway Utilization (2044 Operations)*

| Aircraft | Total (T) | Rwy 12-30 | Rwy 2-20 | No Coverage |
|---|---|---|---|---|
| A/B-I | 3,078 | T x .911 = 2,804 | T x .066 = 204 | 70 |
| A/B-II | 980 | T x .9653 = 946 | T x ..0262 = 26 | 8 |
| C/D | 28 | T x .9889 = 28 | - | - |
| ***Total*** | *4,086* | *3,778* | ***230*** | ***78*** |

*Source: KGDV AWOS (2014-2023), 85,773 total observations; Operations Forecast Chapter 1*

*Figure 2-1 – Airfield Facilities Map*



## Runways

GDV has two runways. Runway 12-30 is the airport's primary runway and is 5,704 feet long and 100 feet wide. The runway is designed to accommodate instrument approaches, has a Medium Intensity Runway Lighting (MIRL) System, and is marked with non-precision runway pavement markings. Runway 2-20 serves as the crosswind runway for aircraft not exceeding 12,500 pounds. This runway is 3,002 feet long by 60 feet wide, and is marked with visual pavement markings and has a MIRL system.

*Table 2-11 – Runway Facility Summary*

| Component | Runway 12-30 | Runway 2-20 |
|---|---|---|
| Runway Length (feet) | 5,704 | 3,002 |
| Runway Width (feet) | 100 | 60 |
| Runway Surface Material | Asphalt | Asphalt |
| Runway Surface Treatment | Grooved | - |
| Pavement Strength | 38,000 SW / 50,000 DW | 12,500 |
| Runway Design Code | B-II-5000 | B-I(S)-VIS |
| Runway Safety Area | 150' wide | 120' wide |
| Object Free Area | 500' wide | 250' wide |
| Object Free Zone | 400' wide | 250' wide |
| Runway Protection Zone | 500'x700'x1000' | 250'x450'x1000' |

*Source: KLJ Analysis*

### *Runway Design Codes*

The Runway Design Code (RDC) is a code that provides the design standards for the specific runway based on design aircraft and instrument approach minimums. Further information about Runway Design Codes can be found in **Appendix B: Commercial Service Airports 101**.

**Runway 12-30:** The existing RDC is A/B-II-5000 for both runway ends.

**Runway 2-20:** The existing RDC is A/B-I (Small)-VIS for both runway ends.

### *Runway Reference Codes*

Runway Reference Codes (RRCs) indicate current operational capabilities where no special operations procedures are necessary, and without consideration of the actual runway length. The existing operational capabilities of the runway is identified based on a taxiway separation distance.

At GDV, the current runway to parallel taxiway separation distance is 670 feet for Runway 12-30. The approach reference code (APRC) is B-III-2400 and D-II-4000 and the departure reference code (DPRC) is B-III and D-II. Runway 2-20 does not have a runway reference code as there is not currently a parallel taxiway. If the parallel taxiway were to change then the APRC and DPRC would also need to be updated.

### *Design Standards*

#### BASIC SAFETY STANDARDS

One primary purpose of this master plan is to review and achieve compliance with all FAA safety and design standards. The design standards vary based on the RDC and RRC as established by the design aircraft. Some of the safety standards include:

- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)

- Runway Obstacle Free Zone (ROFZ)

Other basic design standards include runway width, runway surface gradient, runway shoulder width, blast pad, and required separation distances to markings, objects, and other infrastructure for safety. Critical areas associated with navigational aids as well as airspace requirements are described further in this chapter.

The existing RSA, ROFA and ROFZ standards for all runways at GDV meet existing airport design standards. Improvements will need to be made to meet future standards. The basic safety standards dimensional requirements for all runways are summarized in **Table 2-12**.

*Table 2-12 - Runway Safety Design Standards*

| Standard | Runway 12-30 | Runway 2-20 |
|---|---|---|
| Runway Safety Area (RSA) | 6,304' x 150' | 3,482' x 120' |
| Runway Object Free Area (ROFA) | 6,304' x 500 | 2,482' x 250' |
| Runway Obstacle Free Zone (ROFZ) | 6,104' x 400 | 3,402' x 250' |

*Source: KLJ Analysis*

### RUNWAY PROTECTION ZONE

The Runway Protection Zone (RPZ) is a trapezoidal land use area at ground level prior to the landing threshold or beyond the runway end. The RPZ's function is to enhance the protection of people and property on the ground. The RPZ size varies based on the runway's RDC. The RPZ is further broken down to Approach RPZ and Departure RPZ.

Airport owners should, at a minimum, maintain the RPZ clear of incompatible activities, such as areas of public assembly, public roads, and residential structures Protection of the RPZ is achieved through the airport's control over RPZs including fee title ownership or clear zone easement.

The land uses in the existing RPZs appear to be acceptable except for roads within the Runway 30 End and Runway 2 End RPZs. Further review is required if new land uses, runway end locations or a change in the size of the RPZ is proposed and a land use requiring FAA coordination is in the RPZ. **GDV should consider acquiring land to control all existing, future, and ultimate RPZs in fee simple easement.**

### RUNWAY VISIBILITY ZONE (RVZ)

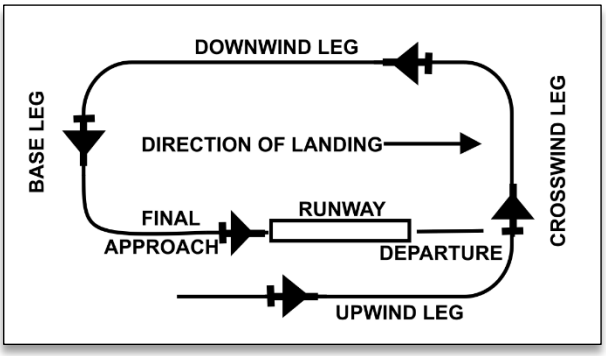
The airport has intersecting runways therefore a RVZ exists to prevent obstructions from blocking a pilots view and keep a clear Line of Sight (LOS). Currently, there are no obstructions within the RPZ to impede a pilots LOS. The airport should continue to keep the RVZ clear of any obstructions.

### APPROACH/DEPARTURE PROCEDURES

Aircraft operate under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) depending on weather conditions and/or operational standards.

### Visual Approach/Departure Procedures

Under VFR, pilots are advised to utilize a standard rectangular traffic pattern around the runway to approach or depart an airport. Standard traffic pattern legs include upwind, crosswind, downwind, base, and final. Departures are typically straight-out from a departing runway, a 90-degree crosswind, or 180 degree downwind. Arrivals typically enter a traffic pattern 45 degrees to a downwind leg for landing. All traffic at GDV follow a standard left traffic pattern.




*Standard VFR Airport Traffic Pattern (Source: FAA)*

### IFR/Obstacle Departure Procedures

Special procedures are published at airports to provide aircraft with adequate obstacle clearance. Examples include increased aircraft climb rates or recommended turns. The information below describes the current departure procedures for GDV.

**GLENDIVE, MT**
DAWSON COMMUNITY (GDV)
TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
ORIG 25AUG11 (11237) (FAA)
TAKEOFF OBSTACLE NOTES:
**Rwy 12,** light support structure beginning 8' from DER, left and right of centerline, up to 15' AGL/2456' MSL.
Vehicle on road 514' from DER, 555' left of centerline, 56' AGL/2468' MSL.
Windsock 6' from DER, 301' left of centerline, 29' AGL/2464' MSL.
**Rwy 20,** vehicle on road beginning 367' from DER, left and right of centerline, up to 36' AGL/2471' MSL.
**Rwy30,** trees beginning 311' from DER, 511' left of centerline, up to 10' AGL/2487' MSL.
Light support structures beginning 8' from DER, left and right of centerline, up to 9' AGL/2460' MSL.
Fence beginning 193' from DER, left and right of centerline, up to 34' AGL/2468' MSL.
Sign 27' from DER, 200' left of centerline, 9' AGL/2460' MSL.
Vehicle on road beginning 298' from DER, left and right of centerline, up to 26' AGL/2477' MSL.
Vehicle on road beginning 427' from DER, 145' left of centerline, up to 26' AGL/2477' MSL.
Post 428' from DER, 241' left of centerline, 23' AGL/2474' MSL.

## RUNWAY APPROACH/DEPARTURE SURFACES

FAA identifies sloping approach surfaces that must be cleared at an absolute minimum for safety of landing aircraft. These surfaces are identified in paragraph 3.6 of FAA AC 150/5300-13B Change 1.

The departure surface applies to runways with published instrument departures procedures. It begins at the end of the takeoff distance available and extends upward and outward at a 40:1 slope. No new penetrations are allowed unless an FAA study has been completed and a determination of no hazard has been issued.

The applicable approach/departure surface standards are identified in **Table 2-13:**

*Table 2-13 – Approach/Departure Surface Requirements*

| Runway End(s) | Par. 3.6 Surface | Description | Slope |
|---|---|---|---|
| **Existing, Future and Ultimate** | | | |
| 2,20 | 4 | Approach end of runways that support IFR circling procedures and procedures providing only lateral guidance | 20:1 |
| 12, 30 | 5 | Approaches supporting instrument operations with a localizer type direction aid with glidepath | 20:1 |

| | | | |
|---|---|---|---|
| 12, 30 | 6 | Approach end of runways to accommodate approaches with vertical guidance | 30:1 |
| 12, 30 | 7 | Departure runway ends for all instrument operations | 40:1 |

*Source: FAA AC 150/5300-13B Change 1, KLJ Analysis*

## RUNWAY LENGTH & WIDTH

Runway width is driven by the RDC and approach visibility minimums for each runway as identified in FAA AC 150/5300-13B Change 1. Based on the existing and recommended future design standards, no changes are recommended to the existing runway widths (see **Tables 2-14** through **2-15**).

The two methods listed below were used to evaluate recommended runway lengths. A detailed report, including FAA runway length charts and aircraft performance data can be found in **Appendix D: Runway Length Evaluation**.

### FAA AC 150/5325-4B Recommendations

As of the date this Master Plan study was initiated, FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* was the current guidance for determining runway lengths at airports. The FAA design approach to determine recommended runway length in large aircraft greater than 12,500 pounds up to 60,000 pounds is identified in Chapter 3 of the advisory circular. Chapter 2 identifies how to determine the recommended runway length in small aircraft of up to 12,500 pounds. The method requires several steps to be performed including identifying percentage of fleet, useful load factor and using airport data to calculate runway length based on curves.

### Individual Aircraft

FAA AC 150/5325-4B states airport planners can "determine the recommended runway length from airplane flight manuals for airplanes to be accommodated by the airport in lieu of the runway length curves depicted in Figure 2-1, Figure 2-2, and Figure 3-1" in the advisory circular. A new guidance from the Airport Cooperative Research Program (ACRP) was the Small Aircraft Runway Length Analysis Tool (SARLAT) which allows multiple general aviation aircraft be applied to the airport environment to be evaluated for recommended runway length. The SARLAT tool was also evaluated utilizing aircraft based at the airport and those listed in **Chapter 1**, **Table 1-22**.

### Primary Runway 12-30

The current primary Runway 12-30 is 5,704 feet long. The critical design aircraft, the Beechcraft 1900C was used to determine the necessary runway length for primary Runway 12-30. The 1900D model aircraft charts were used to determine the recommended runway length for the "C" model was not available. A length of 4,300 feet for takeoff is required to operate under Far Part 135, and 2,400 feet is required for landing, while 2,760 feet is recommended for a wet or slippery runway. These lengths are well within the current runway length therefore no change is recommended during this planning study for the length of Runway 12-30.

### Crosswind Runway 2-20

FAA recommends secondary "crosswind" runways have a length capable of accommodating the lower crosswind capable aircraft expected to use this runway. The length of a runway must now be justified to accommodate the aircraft that requires its use. At GDV, Runway 2-20 is 3,002 feet long and needed to provide adequate 95 percent wind coverage for ARC A/B-I and A/B-II aircraft types under a 10.5-knot and 13-knot crosswind component.

It was determined based aircraft tenants are the main users of the crosswind runway so a Cessna 150 aircraft was used to verify runway length since this aircraft specifications average the type of aircraft based at GDV. **The SARLAT showed a recommended length of 3,363 feet is needed for dry takeoffs. This length is currently 361 feet shorter than the current length of Runway 2-20.**

### PAVEMENT STRENGTH, CONDITION, AND SURFACE

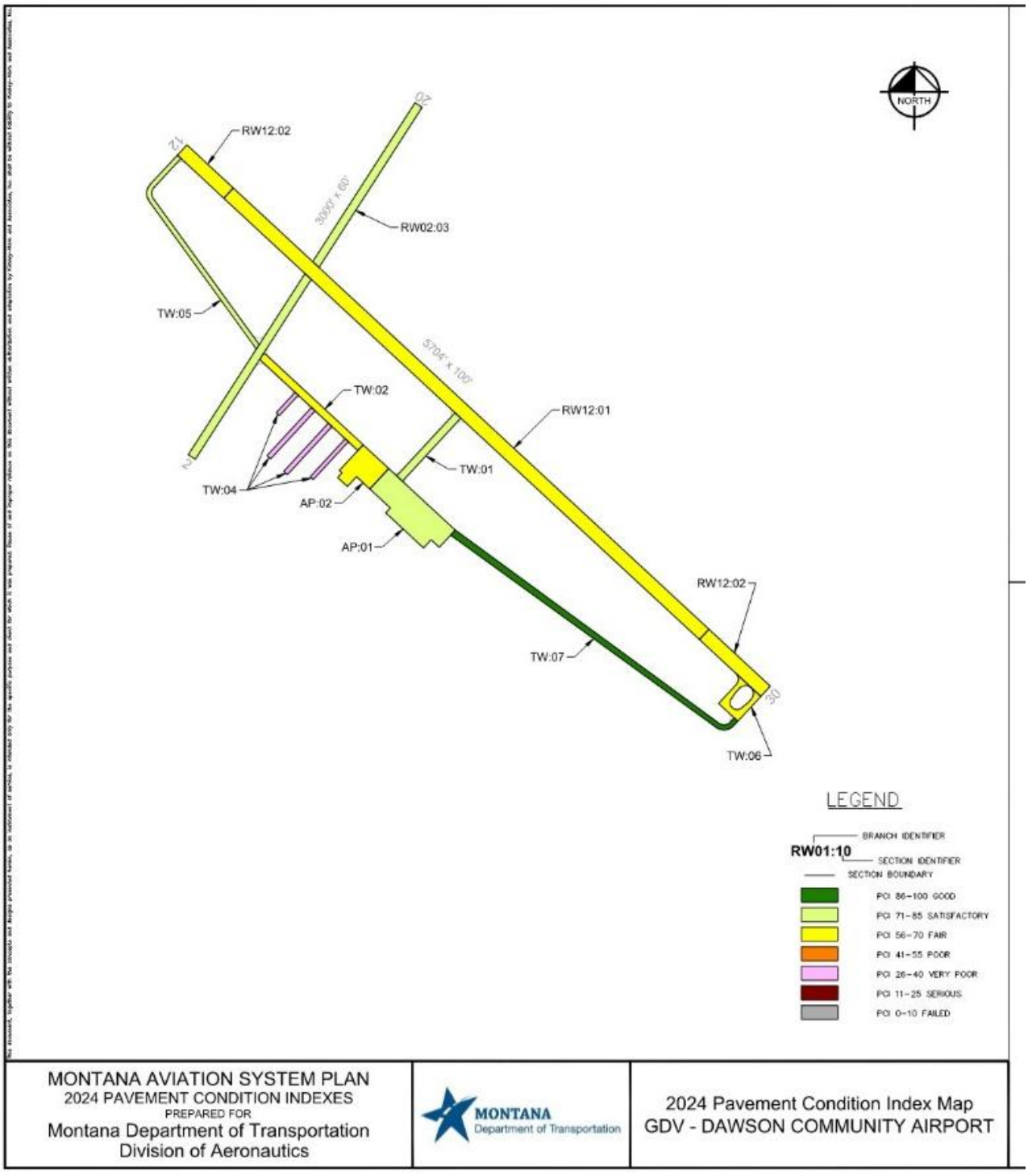
Airfield pavements should be adequately maintained, rehabilitated and reconstructed to meet the operational needs of the airport. The published pavement strength is based on the construction materials, thickness, aircraft weight, gear configuration and operational frequency for the pavement to perform over its useful life.

At GDV, the current surface treatment for Runway 12-30 is grooved asphalt with a single wheel weight bearing capacity of 38,000 pounds and a double wheel weight bearing capacity of 50,000 pounds. The runway was reconstructed with a mill and overlay in 2007. The runway has since been crack sealed in 2013 and 2019. According to the 2021 Pavement Condition Index (PCI) study, the runway was in fair condition. Runway grooving improves aircraft stopping performance when runway contaminants are present (water, ice, snow, slush, etc.). Runway grooving or friction treatment is recommended by the FAA for primary and secondary runways at commercial service airports. FAA AC 150/5320-12C considers this to be high priority safety work.

Runway 2-20 is asphalt and intended for aircraft weighing less than 12,500 pounds. The runway was reconstructed with a mill and overlay in 2007 and has been crack sealed in 2013 and 2019. The 2021 PCI study shows the condition to be satisfactory.

The FAA standard for measuring the reporting pavement strength on runways with pavement strengths greater than 12,500 pounds is defined in FAA AC 150/5335-5D, *Standard Method of Reporting Airport Pavement Strength - PCR*. The Aircraft Classification Rating – Pavement Classification Rating (ACR-PCR) method is defined within this guidance. The PCR values measures the cumulative damage resulting from an aircraft fleet mix. In general, the PCR value should equal or exceed the ACR value assigned for the design aircraft. Larger aircraft could occasionally exceed the pavement strength but not on a regular basis.

*Figure 2-2 - 2024 Pavement Condition Index*




*Source: Montana Department of Transportation 2024 SASP – Pavement Condition Index*

*Figure 2-2 - 2024 Pavement Condition Index (Continued)*

CURRENT 2024 PAVEMENT CONDITION INDEX

| Branch ID | Section ID | Branch Name | Surface Type | Section Area (SF) | Approx. Age at Inspection | Last Major Work Date | Last Inspection Date | Pavement Condition Index | PCI Category |
|---|---|---|---|---|---|---|---|---|---|
| RW02 | 03 | Runway 02-20 | AAC | 174,000 | 21.3 | 8/1/2003 | 10/16/2024 | 71 | Satisfactory |
| RW12 | 01 | Runway 12-30 | AAC | 465,000 | 17.3 | 8/1/2007 | 10/16/2024 | 67 | Fair |
| RW12 | 02 | Runway 12-30 | AAC | 105,400 | 17.3 | 8/1/2007 | 10/16/2024 | 68 | Fair |
| TW | 01 | Taxiway | AAC | 31,000 | 17.3 | 8/1/2007 | 10/16/2024 | 73 | Satisfactory |
| TW | 02 | Taxiway | AAC | 38,000 | 22.3 | 8/1/2002 | 10/16/2024 | 66 | Fair |
| TW | 04 | Taxiway | AAC | 52,850 | 22 | 11/1/2002 | 10/16/2024 | 30 | Very Poor |
| TW | 05 | Taxiway | AAC | 59,220 | 17.3 | 8/1/2007 | 10/16/2024 | 84 | Satisfactory |
| TW | 06 | Taxiway | AAC | 20,545 | 17.3 | 8/1/2007 | 10/16/2024 | 69 | Fair |
| TW | 07 | Taxiway | AC | 85,400 | 12.3 | 8/15/2012 | 10/16/2024 | 88 | Good |
| AP | 01 | Apron | AAC | 145,700 | 21.3 | 8/2/2003 | 10/16/2024 | 78 | Satisfactory |
| AP | 02 | Apron | AAC | 50,000 | 22.3 | 8/1/2002 | 10/16/2024 | 60 | Fair |

AIRFIELD PAVEMENT WORK HISTORY

1. ADAP 03-R-1, TW:01, AP:01, ALL HEATER SCARIFIED AND CHIP SEALED.
2. CBR=7 ASSUMED UNLESS OTHERWISE NOTED.
3. EXTENDED 1968
4. AIP-001-1986, OVERLAY RUNWAY 12/30, TAXIWAY, AND APRON.
5. AIP-002-1988, CONSTRUCT RUNWAY 2/20.
6. AIP-003-1989, EXTEND ACCESS TAXILANES; REHABILITATE PORTION OF PARALLEL TAXIWAY.
7. AIP-004-2002, MILL AND OVERLAY APRON (AP:02), TAXIWAY (TW:02), AND TAXILANES (TW:04); CRACK SEAL, FOG SEAL, AND REMARK RUNWAY 12/30 AND TAXIWAY (TW:01).
8. AIP-005-2003, MILL AND OVERLAY APRON (AP:01); OVERLAY RUNWAY (RW02:03).
9. AIP-008-2007, MILL, OVERLAY, AND GROOVE RUNWAY 12/30 (RW12:01,RW12:02); CONSTRUCT TAXIWAY (TW:05) AND TURNAROUND (TW:06).
10. AIP-011, 2012, CONSTRUCT TAXIWAY (TW:07).
11. AIP-012-2013, CRACK SEAL, FOG SEAL, AND REMARK ALL PAVEMENTS EXCEPT TW:07.
12. AIP-017-2019, CRACK SEAL, SURFACE SEAL, REMARK ALL PAVEMENTS EXCEPT AP:02, TW:02, AND TW:04

*Source: Montana Department of Transportation 2024 SASP – Pavement Condition Index*

## RUNWAY DESIGNATION

Runway designation is determined by the magnetic bearing (azimuth) of the runway centerline which is relative to the location of the magnetic north pole. The runway designator number is the whole number nearest the one-tenth of the magnetic azimuth along the runway centerline.

The 2024 magnetic declination at GDV is 8° 9' east, changing 0° 5' west per year as the location of the magnetic north pole moves over time. No changes are needed in the runway designations through the planning period. The official FAA published magnetic declination is 10° east from 2010.

## VISUAL NAVIGATION AIDS

Visual aids are installed to provide airport usability during periods of darkness and/or low visibility. Pavement markings and lighting systems available at the airport are summarized in the following sections.

### Runway Lighting

Runway edge lights are placed off the edge of the runway surface to help pilots define the edges and end of the useable runway during night and low visibility conditions. Both runways are equipped with a 3-Step Medium Intensity Runway Lighting (MIRL) system and are in good working condition.

### Visual Approach Slope Lighting

Visual approach slope lighting provides vertical descent guidance to pilots for a specific runway end. These visual and lighted approach aids enable the pilot to acquire and maintain the correct glide path for landing. Precision Approach Path Indicator Lights (PAPI) are the current FAA standard equipment installed for this purpose. However other types of equipment exist, including Visual Approach Slope Indicator lights, or (VASI).

Both PAPI and VASI lighting systems function similarly. They both have red and white lights that are used by the pilot to indicate whether they are too high, too low, or on the correct glidepath. Precision approach path indicators emit light along a standard glide path to a runway end, with red and white colored lights indicating the aircraft's vertical position (above, below, or on glide path) relative to the defined glide path. Visual approach slope indicators project a beam of light having a white segment in the upper part of the beam and red segment in the lower part of the beam.

GDV has a four box VASI system installed on both ends of Runway 12-30. The VASIs are set to a 3.00-degree angle for each runway end and is owned maintained and calibrated by the FAA on a quarterly schedule. Runway 2-20 has two light PAPIs on each end, set to a 3.00-degree angle and owned and maintained by the airport staff. The airport should continue to maintain the lighting in good condition.

### Runway End Identifier Lights (REIL)

REILs consist of a high intensity flashing white strobe lighting system located on the approach ends of runways to assist the pilot in early identification of the runway threshold. Both ends of Runway 12-30 feature REILs though Runway 2-20 does not.

### Pilot-Controlled Lighting

Airfield lighting systems allow for pilots to control the complexity and intensity of runway edge, approach threshold lights in addition to the activation of taxiway edge lights and guidance signage. At GDV, the MIRLs for both Runway 12-30 and 2-20, as well as the PAPIs for Runway 2-20 and the REILs for Runway 12-30 can be activated by pilots using the common traffic advisory frequency. The VASIs for Runway 12-30 operate continuously.

### Airfield Guidance Signs

Internally lighted airfield guidance signs provide location, direction, and guidance information to pilots on the ground to enhance overall pilot awareness. Signs are placed around the airfield to identify runway and taxiway intersections, runway hold positions and other guidance. Mandatory signs are red and identify an intersection with a runway or critical safety zone. Other types of signs include location, direction, destination, and distance remaining signs.

**GDV has mandatory, location, and directional signage on the airfield**. All types of signage are lighted and marked in accordance with FAA AC 150/5340-18F, Standards for Airport Sign Systems. The airport should continue to maintain airfield guidance signs in good condition.

### Pavement Markings

Pavement markings help airport users visually identify important features on the airfield. FAA has defined numerous different pavement markings to promote safety and situational awareness as defined by FAA AC 150/5340-1, *Standards for Airport Markings*.

The minimum required runway markings for a standard runway are as follows:

- Visual (Landing Designator, Centerline)
- Non-Precision (Landing Designator, Centerline, Threshold)
- Precision (Landing Designator, Centerline, Threshold, Aiming Point, Touchdown Zone, Edge)

Runway 12-30 is marked with non-precision markings which includes a landing designator, centerline, threshold markings, and aiming point. Runway 2-20 is marked with visual makings, which includes a landing designator and centerline. The markings are in good condition and the airport should continue to maintain their markings.

## Taxiways

### *System Design*

FAA has placed a renewed emphasis on taxiway design in their updated airport design standards. Fundamental elements help develop and efficient system to meet demands, reduce pilot confusion and enhance safety. Considerations include:

- Design taxiways to meet FAA design standards for existing and future users considering expandability of airport facilities.
- Design taxiway intersections so the cockpit is over the centerline with a sufficient taxiway edge safety margin.
- Simplify taxiway intersections to reduce pilot confusion using the three-node concept, where a pilot has no more than three choices at an intersection.
- Eliminate “hot spots” identified by the FAA Runway Safety Action Team where enhanced pilot awareness is encouraged.
- Minimize the number of runway crossings and avoid direct access from the apron to the runway.
- Eliminate aligned taxiways whose centerline coincides with a runway centerline.
- Other considerations include avoiding wide expanses of pavement and avoiding “high energy intersections” near the middle third of a runway.

### *Design Standards*

Taxiways provide for the safe and efficient movement of aircraft between the runway and other operational areas of the airport. The taxiway system should provide critical links to airside

infrastructure, increase capacity and reduce the risk of an incursion with traffic on the runway. The taxiway system should meet the standards design requirements identified in FAA AC 150/5300-13B Change 1. Taxilane elements are discussed in **Chapter 3**.

FAA identifies the design requirements for taxiways. The design standards vary based on individual aircraft geometric and landing gear characteristics. The Taxiway Design Group (TDG) and Airplane Design Group (ADG) identified for the design aircraft using a particular taxiway. Some of the safety standards include:

- Taxiway Width
- Taxiway/Taxilane Safety Area (TSA)
- Taxiway Edge Safety Margin (TESM)
- Taxiway/Taxilane Object Free Area (TOFA)

Other design standards include taxiway shoulder width to prevent jet blast soil erosion or debris ingestion for jet engines and required separation distances to other taxiways/taxilanes. More information can be found in **Appendix B: Commercial Service Airports 101**.

The TDG is 2A which requires a 35-foot-wide taxiway. The taxiway system at GDV consists of a paved parallel taxiway to Runway 12-30 and is adjacent to the terminal apron called Taxiway A. This taxiway is 40-feet wide around the terminal area beginning at Runway 2-20 until it reaches the southeast corner of the terminal apron and is 35 feet wide in all other areas. There is a 35-foot-wide taxiway connector at the northeast end of the parallel that connects to the threshold of Runway 12. There is a 35-foot-wide taxiway turn around at the Runway 30 End.

In addition to the parallel taxiway there is a 50-foot-wide taxiway connector from the apron to the midpoint of Runway 12-30 which is Taxiway B. **It is recommended to reconfigure this taxiway to require a turn from the apron/parallel taxiway to eliminate direct access to the runway environment.**

### PAVEMENT CONDITION

Various sections of the parallel taxiway have been rehabilitated over the years with the most recent work done in 2012. The 2024 PCI study shows the condition of sections ranging from fair to good. **Figure 2-2** shows the condition of the taxiway section at GDV.

Runway 12 End to Runway 2-20 has a PCI of 84 which is satisfactory. From Runway 2-20 to the beginning of the northwest apron has a PCI of 66 which is fair. Then, from the southeast edge of the apron to the Runway 30 turnaround has the best PCI rating of 88 which is good. The Runway 30 turnaround has a PCI of 69 that is fair. Finally, the connector from the apron area to mid Runway 12-30 has a PCI of 73 that is also satisfactory. It is recommended for the airport to maintain taxiway pavement in good condition.

### TAXIWAY LIGHTING

Taxiway edge lighting delineates the taxiway and apron edges. The parallel taxiway at GDV features Medium Intensity Taxiway Lighting (MITL) fixtures around the terminal area and along Taxiway B. Moving to the Runway 12-30 ends there are taxiway reflectors. The airport should maintain all current edge lighting and reflectors in good condition.

### PAVEMENT MARKINGS

Taxiway and taxilane markings are important for directional guidance for taxiing aircraft and ground vehicles. Taxiways at GDV include centerline markings and painted holding position markings to prevent aircraft from entering critical areas such as an active runway environment.

## Airside Data Summary

The following tables provide summary data of the facility requirements and recommendations associated with each of the runways at GDV through the planning period(s) identified in this study.

### *Table 2-14 – Runway 12-30 Design Standard Matrix*

| Design Standard | Actual Condition | Facility Requirement or Recommendation | |
|---|---|---|---|
| | | Existing | Future |
| Runway Identification | 12-30 | 12-30 | 12-30 |
| Runway Classification | Other-Than-Utility | Other-Than-Utility | Other-Than-Utility |
| Aircraft Classification | Large Aircraft | Large Aircraft | Large Aircraft |
| Runway Design Code (RDC) | B-II-5000 (Both) | B-II-5000 (Both) | B-II-5000 (Both) |
| Approach Reference Code (APRC) | B-III-2400 (Both)<br>D-II-4000 (Both) | B-III-2400 (Both)<br>D-II-4000 (Both) | B-III-4000 (Both)<br>B-II-2400 (Both)<br>D-II-4000 (Both) |
| Departure Reference Code (DPRC) | B-III (Both)<br>D-II (Both) | B-III (Both)<br>D-II (Both) | B-III (Both)<br>D-II (Both) |
| Pavement Strength (Wheel Loading) | 50,000 (DW) | 50,000 (DW) | 50,000 (DW) |
| Pavement Surface Type | Asphalt | Asphalt | Asphalt |
| Line of Sight Requirements Met | Yes | Yes | Yes |
| Runway Length | 5,704’ | 5,704’ | 5,704’ |
| Runway Width | 100’ | 100’ | 100’ |
| Displaced Threshold | 0’ | 0’ | 0’ |
| Runway Safety Area (RSA) Width | 150’ | 150’ | 150’ |
| RSA Length Past Departure End | 300’ | 300’ | 300’ |
| RSA Length Prior to Threshold | 300’ | 300’ | 300’ |
| Runway Lighting Type | MIRL | MIRL | MIRL |
| Approach RPZ Start from Runway | Airport Access Road in RPZ (30) | 200’ | 200’ |
| Approach RPZ Length | | 1,000’ (Both) | 1,000’ (Both) |
| Approach RPZ Inner Width | | 500’ (Both) | 500’ (Both) |
| Approach RPZ Outer Width | | 700’ (Both) | 700’ (Both) |
| Runway Marking Type | Non-Precision | Non-Precision | Non-Precision |
| 14 CFR Part 77 Approach Category | 34:1 (Both) | 34:1 (Both) | 34:1 (Both) |
| Approach Type | NPI (Both) | NPI (Both) | NPI (Both) |
| Visibility Minimums | 1 mile (Both) | 1 mile (Both) | 1 mile (Both) |
| Runway Departure Surface | Yes | Yes | Yes |
| ROFA Width | 500’ | 500’ | 500’ |
| ROFA Length Past Departure End | 300’ | 300’ | 300’ |
| ROFA Length Prior to Threshold | 300’ | 300’ | 300’ |
| ROFZ Length Past Runway | 200’ | 200’ | 200’ |
| ROFZ Width | 400’ | 400’ | 400’ |
| 13B Paragraph 3.6 Approach Surface | 4 (Both) | 4 (Both) | 4 (Both) |
| Start from Runway End | 200’ | 200’ | 200’ |
| Length | 10,000’ | 10,000’ | 10,000’ |
| Inner Width | 400’ | 400’ | 400’ |
| Outer Width | 3,400’ | 3,400’ | 3,400’ |
| Slope | 20:1 | 20:1 | 20:1 |
| Visual and Instrument NAVAIDs | GPS, REIL, VASI | GPS, REIL, VASI | GPS, REIL, VASI |
| Runway and Taxiway Separation | 350’ | 350’ | 300’ |
| Runway and Parking Separation | 730’ | 250’ | 250’ |
| Runway and Hold Line Separation | 200’ | 200’ | 200’ |

*Note: RED indicates a known deficiency to existing minimum design standards*
*Source: FAA AC 150/5300-13B Change 1, KLJ Analysis*

### *Table 2-15 - Runway 2-20 Design Standard Matrix*

| Design Standard | Actual Condition | Facility Requirement or Recommendation | |
|---|---|---|---|
| | | Existing | Future |
| Runway Identification | 2-20 | 2-20 | 2-20 |
| Runway Classification | Utility | Utility | Utility |
| Aircraft Classification | Small Aircraft | Small Aircraft | Small Aircraft |
| Runway Design Code (RDC) | B-I(S)-VIS (Both) | B-I(S)-VIS (Both) | B-I(S)-VIS (Both) |
| Approach Reference Code (APRC) | N/A | N/A | N/A |

| | | | |
|---|---|---|---|
| Departure Reference Code (DPRC) | N/A | N/A | N/A |
| Pavement Strength (Wheel Loading) | 12,500 (SW) | 12,500 (SW) | 12,500 (SW) |
| Pavement Surface Type | Asphalt | Asphalt | Asphalt |
| Line of Sight Requirements Met | Yes | Yes | Yes |
| Runway Length | 3,002' | 3,002' | 3,363' |
| Runway Width | 60' | 60' | 60' |
| Displaced Threshold | 0' | 0' | 0' |
| Runway Safety Area (RSA) Width | 120' | 120' | 120' |
| RSA Length Past Departure End | 240' | 240' | 240' |
| RSA Length Prior to Threshold | 240' | 240' | 240' |
| Runway Lighting Type | MIRL | MIRL | MIRL |
| Approach RPZ Start from Runway | Airport Access Road in RPZ (2) | 200' | 200' |
| Approach RPZ Length | | 1,000' (Both) | 1,000' (Both) |
| Approach RPZ Inner Width | | 250' (Both) | 250' (Both) |
| Approach RPZ Outer Width | | 450' (Both) | 450' (Both) |
| Runway Marking Type | Basic | Basic | Basic |
| 14 CFR Part 77 Approach Category | 20:1 (Both) | 20:1 (Both) | 20:1 (Both) |
| Approach Type | Vis (Both) | Vis (Both) | Vis (Both) |
| Visibility Minimums | Visual (Both) | Visual (Both) | Vis (Both) |
| Runway Departure Surface | Yes | Yes | Yes |
| ROFA Width | 250' | 250' | 250' |
| ROFA Length Past Departure End | 240' | 240' | 240' |
| ROFA Length Prior to Threshold | 240' | 240' | 240' |
| ROFZ Length Past Runway | 200' | 200' | 200' |
| ROFZ Width | 250' | 250' | 250' |
| 13B Paragraph 3.6 Approach Surface | 2 | 2 | 2 |
| Start from Runway End | Threshold | Threshold | Threshold |
| Length | 5,000' | 5,000' | 5,000' |
| Inner Width | 250' | 250' | 250' |
| Outer Width | 700' | 700' | 700' |
| Slope | 20:1 | 20:1 | 20:1 |
| Visual and Instrument NAVAIDs | PAPI | PAPI | PAPI |
| Runway and Hold Line Separation | 215' | 125' | 125' |

*Note: RED indicates a known deficiency to existing minimum design standards*
*Source: FAA AC 150/5300-13B Change 1, KLJ Analysis*

## Airfield Summary

This section identifies safety, capacity and development needs for the Dawson Community Airport based on forecast activity levels. These recommendations provide the basis for formulating development alternatives to adequate address recommended improvements. The following summarizes the facility deficiencies and recommendations:

- **Parallel Taxiway A:** The current parallel taxiway sits anywhere from 390 to 670 feet from the Runway 12-30 centerline. It is recommended to phase in a 35-foot-wide taxiway that is 300-feet from the runway centerline
- **Direct Access to the Runway:** The current connecting taxiway, Taxiway B, from the runway to the apron area needs to have a 90-degree turn before accessing the runway. This should be corrected when Taxiway A is reconfigured.
- **Runway 2-20:** The recommended runway length is 3,363 feet for the crosswind, which is 361 feet shorter than the current length of 3,002 feet.
- **Acquire Runway 30 Clear Zone:** There is property off the Runway 30 end that needs to be acquired in easement or fee for runway safety surfaces.

Any existing deficiencies to airport design standards would need to be noted in the ALP and a Modification to Design Standards requested from the FAA if they are to remain.

## Alternatives

A range of alternatives are evaluated to determine the best solution for the airport to meet facility needs. In many cases the process is iterative to react to new information and input. Please refer to the alternative analysis process in **Chapter 1** for details on the factors considered.

Initial alternatives were presented and reviewed by the Planning Advisory Committee to create a narrower slate of alternatives for further review. In the end a preferred airfield alternative was selected and portrayed at the end of this chapter.

### *Parallel Taxiway*

The current parallel taxiway, Taxiway A, has a centerline separation sitting further than needed for design standards. Moving it closer to Runway 12-30 can open areas for expanding the terminal area.

**No Change:** Keep Taxiway A where it currently is.

Advantages:

- No new capital improvement costs

Disadvantages:

- The terminal area cannot be expanded to be closer to the primary runway

**Option 1 – 240 Foot Centerline Separation:** Move Taxiway A closer towards Runway 12-30 with a 240-foot centerline separation.

Advantages:

- Offers room for terminal area expansion closer to the primary runway

Disadvantages:

- Approach surfaces for Runway 12-30 will have to remain at a 1-mile visibility approach

**Option 2 – 300 Foot Centerline Separation:** Move Taxiway A closer towards Runway 12-30 with a 300-foot centerline separation.

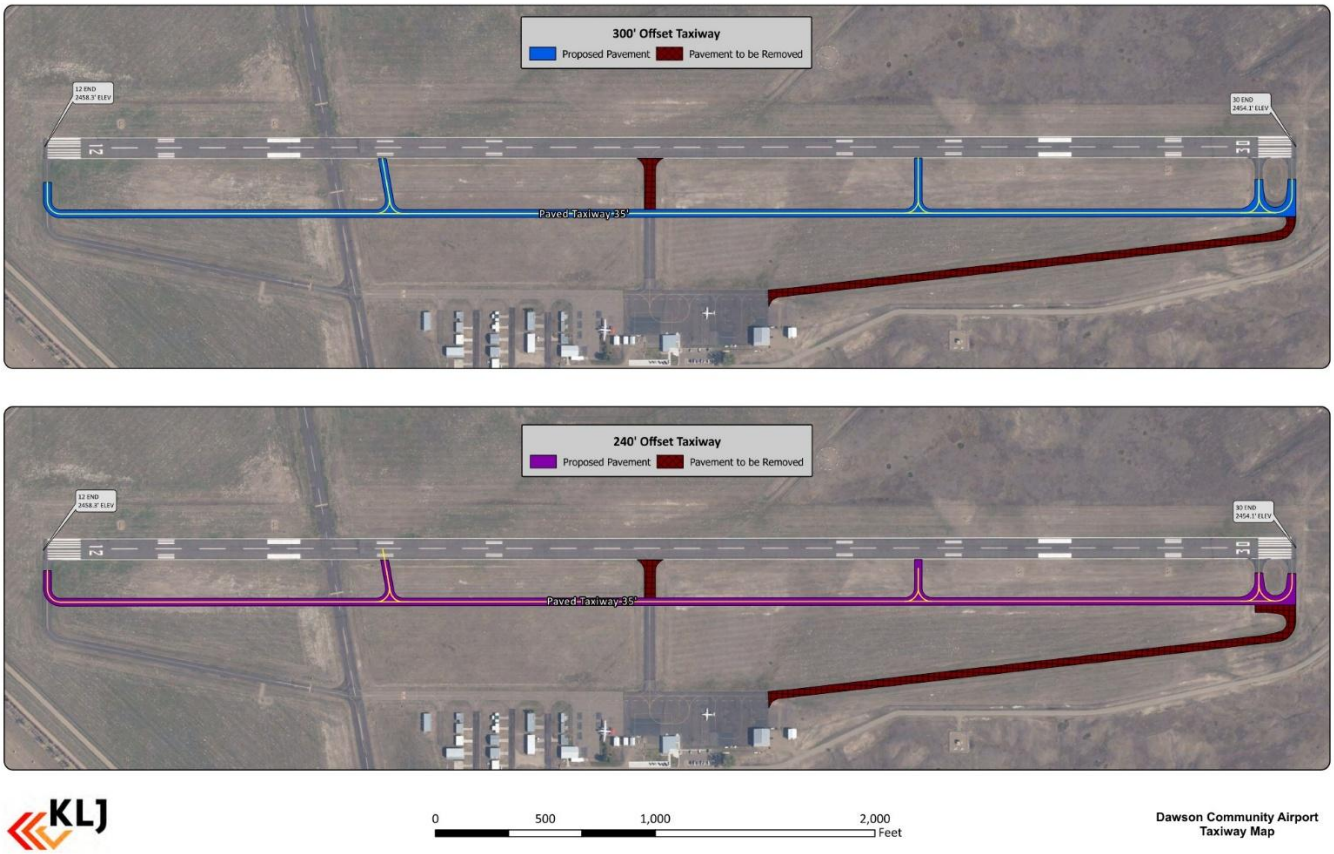
Advantages:

- Still offers adequate room for terminal area expansion closer to the primary runway
- Can have a lower visibility approach for Runway 12-30 for airplane design groups C/D/E-II

Disadvantages:

- None

*Figure 2-3 - Alternative Taxiway Comparison*




## *Runway 2-20 Length and Shifts*

The recommended runway length is 3,363 feet long for the crosswind runway based off the runway length requirements for various GA aircraft that utilize that runway. The location of the runway ends creates an RVZ that needs to be clear of buildings and parked aircraft for pilots to have a clear line of site (LOS).

**No Change:** Keep Runway 2-20 the same length, 3,002 feet and the runway ends in their current location.

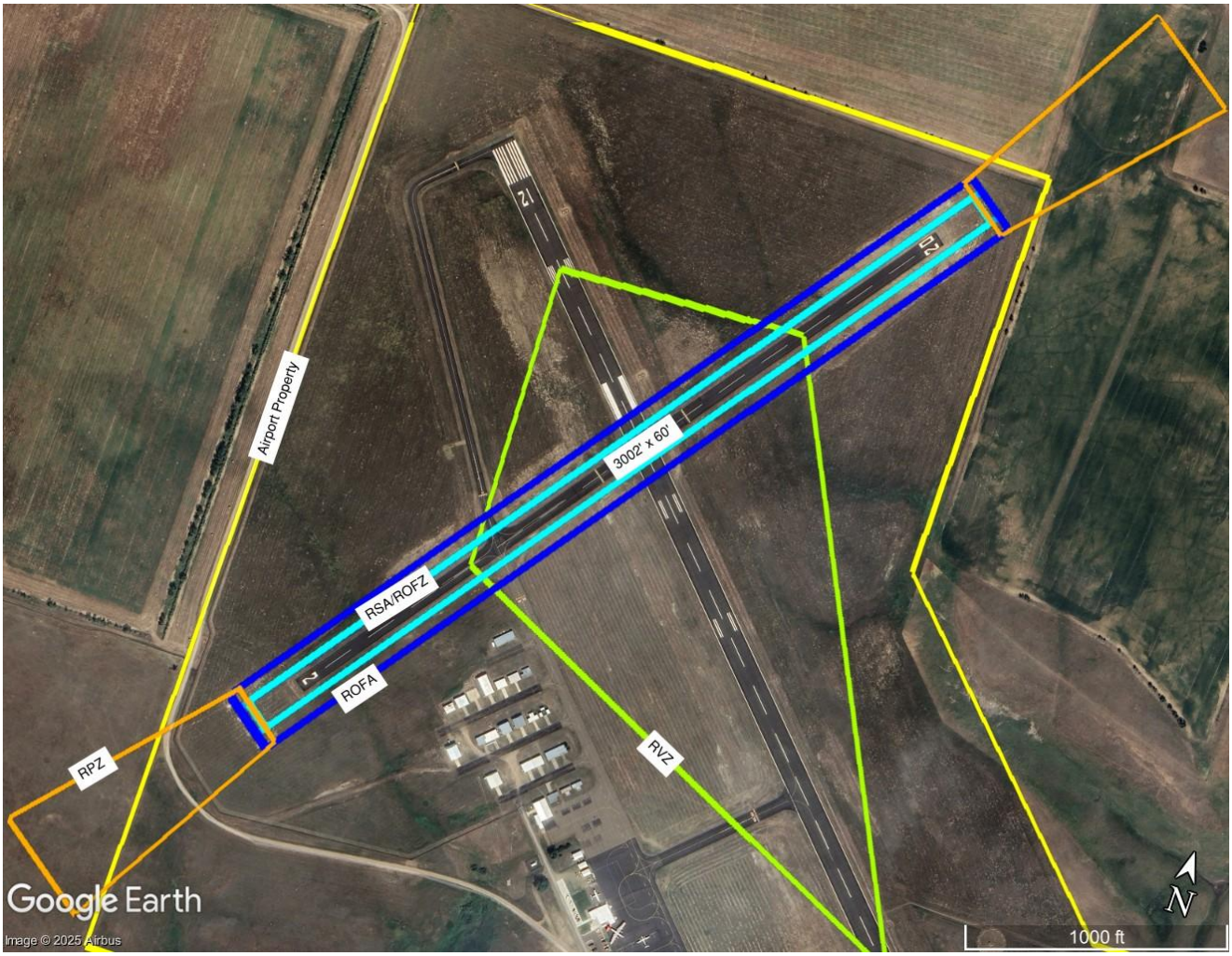
Advantages:

- No new capital improvement costs

Disadvantages:

- RVZ remains in the same location that can limit terminal area development on the northwest end

*Figure 2-4 - Runway 2-20 Currently*




**Option 1- Recommended Length of 3,363 feet:** Add 361 feet on the Runway 20 End.

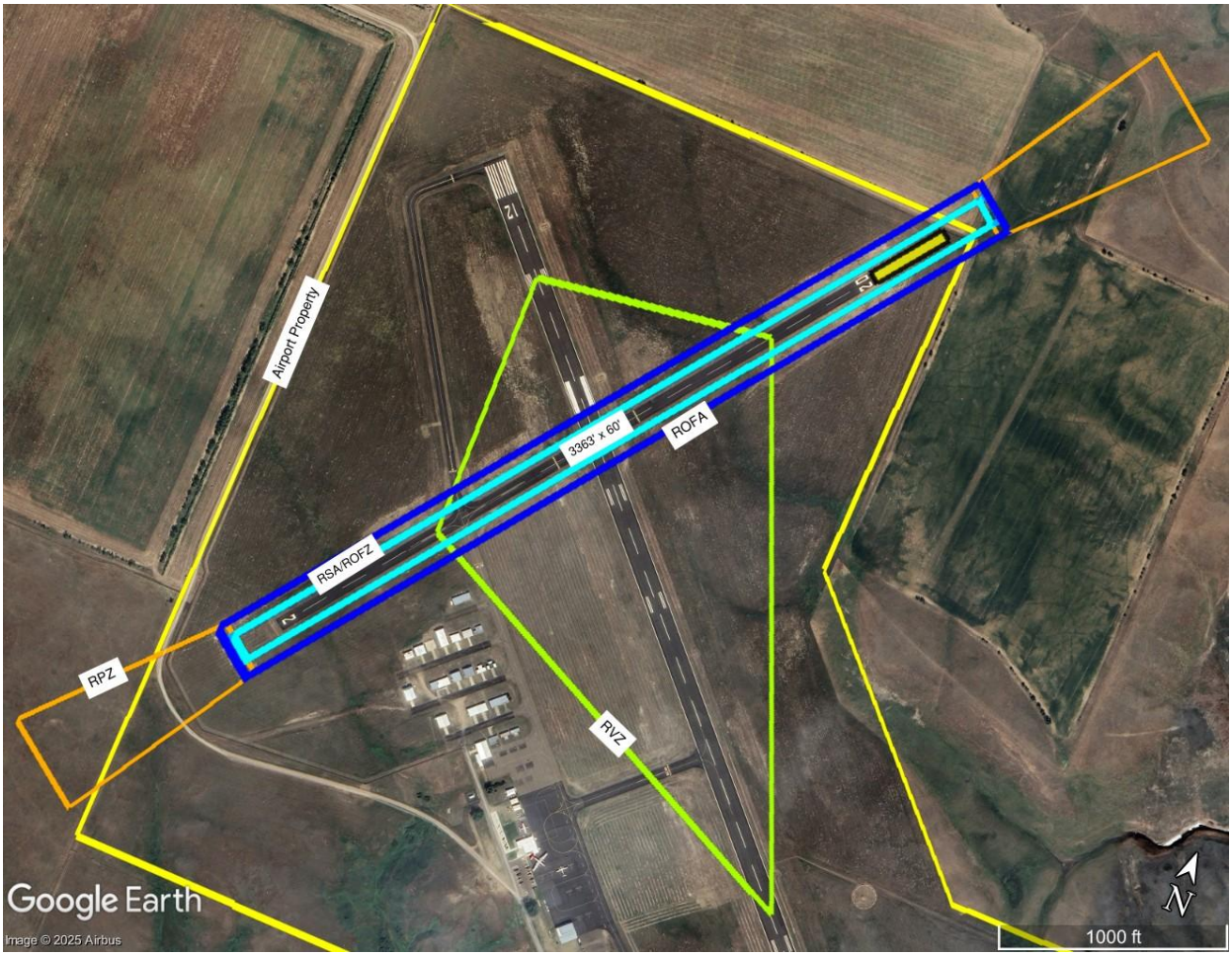
Advantages:

- Allows extra landing and takeoff distances for more aircraft

Disadvantages:

- Property would need to be acquired in fee and easement for the necessary runway safety areas
- Runway 2 End would remain in place therefore RVZ will still limit terminal area development on the northwest end of the hangar area

*Figure 2-5 - Recommended Length of 3,363 feet*




**Option 2- Shift Runway Northeast:** Shift the whole runway northeast 845 feet to maintain the current runway length of 3,002 feet.

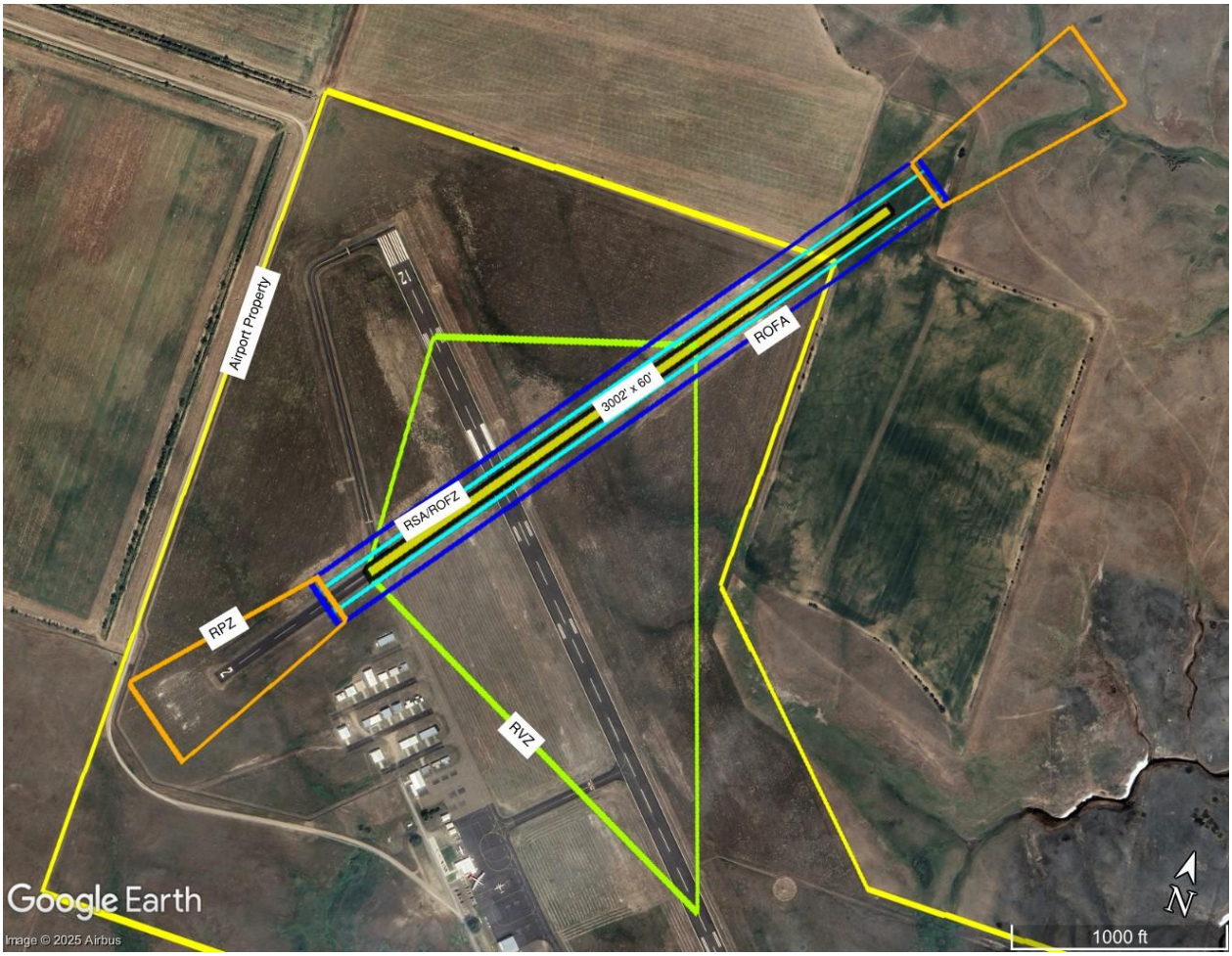
Advantages:

- Moves the Runway 2 End RPZ within the current airport property

Disadvantages:

- Property would need to be acquired in fee and easement for the necessary runway safety areas
- There is minimal RVZ change to offer more room for terminal area expansion

*Figure 2-6 - Shift Runway 2-20 845 feet*




**Option 3 – Shifting Runway for Maximum Terminal Area Expansion:** Shift the whole runway northeast by 1,125 feet for a runway length of 2,995 feet to offer optimal space for terminal area expansion.

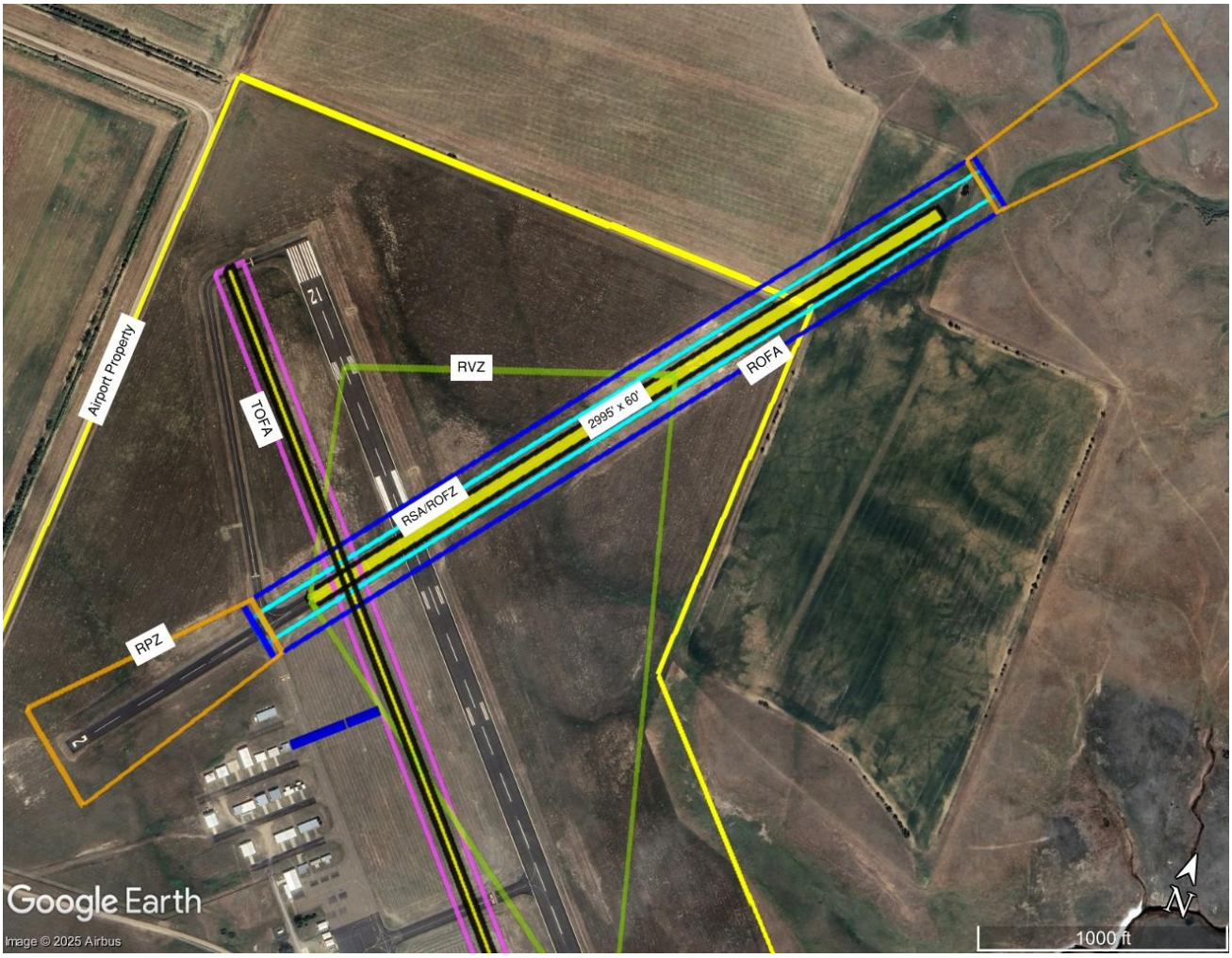
Advantages:

- Moves the RVZ which offers the most space for terminal area development
- Moves the Runway 2 End RPZ within the current airport property

Disadvantages:

- Shortens the runway length below the current and recommended runway length
- Property would need to be acquired in fee and easement for the necessary runway safety areas

*Figure 2-7 - Shift Runway 2-20 for Maximum Terminal Expansion*




## Preferred Alternative Summary

The preferred development selected for GDV involves relocating the parallel taxiway in phases to have 300-foot centerline separation beginning at the Runway 30 End to 300 feet east of Runway 2-20 and taxiway lighting will be incorporated for the entire length of the taxiway. Runway 12-30 will maintain its current length. Runway 2-20 will maintain its existing length and location with no RVZ change. Runway 2-20 has circling approaches and non-precision approach procedures will be considered for this crosswind runway with a 1-mile visibility to enhance airport accessibility.

*Figure 2-8 - Preferred Airfield Alternative*

