ODESSA AIRPORT SCHLEMEYER FIELD

Airport Layout Plan and Narrative

ALP UPDATE AND NARRATIVE REPORT

Odessa Airport – Schlemeyer Field

Ector County, Texas

Prepared for:
Ector County

Prepared by:

Coffman Associates
Airport Consultants

October 2023

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ODESSA AIRPORT
SCHLEMEYER FIELD

Airport Layout Plan and Narrative

NARRATIVE REPORT

INTRODUCTION

This Airport Layout Plan (ALP) Update and Narrative for Odessa Airport-Schlemeyer Field (ODO) serves as an update to the most recent Master Plan completed in 1997 and the ALP drawing set that was more recently updated in 2012. The primary focus of this study is to provide the airport sponsor (Ector County), the Texas Department of Transportation (TxDOT) – Aviation Division, and the Federal Aviation Administration (FAA) with a strategic plan and vision for short-term and long-term operations, as well as any necessary improvements that may be needed over the next 20 years. The report will include an updated ALP set, which serves as a blueprint of the current and future conditions at the airport. The updates to the ALP will focus on the development direction and facility changes that have taken place since the completion and approval of the previous planning study. The development of a Height Hazard Zoning Map for the sponsor's implementation will also be completed with this study.

This study was designed to guide future development and provide updated justification for projects for which the airport may receive funding participation through federal and state airport improvement programs. Coffman Associates, an airport consulting firm specializing in master planning and environmental studies, is preparing this plan.

This ALP Update and Narrative is being prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13B, *Airport Design*; AC 150/5070-6B, *Airport Master Plans*; and FAA ARP Standard Operating Procedure (SOP) 2.00 and 3.00 – Appendix A – ALP Review Checklist. The following goals and objectives have been determined for the ALP Update and Narrative.

- Analyze the current situation at ODO by conducting an inventory of existing conditions and operational data
- Identify aviation demand forecasts for airport operations and based aircraft for 5, 10, and 20 years into the future
- Determine facility requirements necessary to meet forecasted demand
- Draft alternatives for airport development and operation, in line with facility requirements
- Select a preferred development concept, which will be reflected on the ALP
- Develop a 20-year demand-based Capital Improvement Plan (CIP), including a recommended phasing plan
- Prepare an updated ALP drawing set of existing and proposed facilities
- Develop a Height Hazard Zoning map

STUDY PARTICIPATION

The ALP Update and Narrative is of interest to many within the local community and region, including local citizens and businesses, community organizations, Ector County officials, airport users and tenants, and aviation organizations. To assist in the development of the study, the county has identified a group of stakeholders to act in an advisory role as the plan progresses. The Planning Advisory Committee (PAC) is comprised of individuals and organizations with a vested interest in the future development of ODO. Members of the PAC will meet at designated points during the planning process to review draft study materials and provide comments to help ensure a realistic and viable plan is developed. A community outreach program will also be established to allow members of the public to review and comment on the study as it develops.

PROCESS

The ALP Update and Narrative is prepared in a systematic fashion pursuant to the scope of services that was coordinated with Ector County and TxDOT Aviation. The study includes several elements which are described below and depicted on **Exhibit 1**:

- **Study Initiation** – Development of the scope of services, budget, and schedule.
- **Inventory** – Inventory of facility and operational data and wind data. This step establishes existing airfield facility conditions and capacities and identifies existing environmental conditions at the airport.

INITIATION
- Goals and Objectives
- Project Website
- Planning Advisory Committee

PAC #1

INVENTORY
- Airport Facilities
- Airspace and Air Traffic Activity
- Airport Access and Parking, Utilities, and Aerial Photography
- Area Socioeconomic Data
- Local Planning and Land Use

FORECASTS
- Based Aircraft and Fleet Mix
- Annual Operations
- Peaking Characteristics
- Critical Aircraft Analysis

FACILITY REQUIREMENTS
- Design Categories
- Runway Length and Strength
- Support Facilities
- Taxiways
- Airfield Capacity
- Hangar Facilities
- Terminal Building
- Aprons
- Navigational Aids

PAC #2 — Working Papers

AIRPORT ALTERNATIVES
- Evaluate Development Scenarios
  - Airside
  - Landside
  - Support

PAC #3 — Working Papers

PW #1

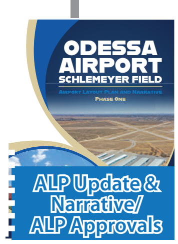
RECOMMENDED DEVELOPMENT CONCEPT AND CAPITAL FINANCIAL PLAN
- Detailed Facility and Land Use Plans
- Cost Estimates
- Funding Sources
- Airport Capital Improvement Plan

ENVIRONMENTAL CONSIDERATIONS
- Noise Exposure
- Recycling Plan
- Height/Hazard
- Review/Evaluation of NEPA Environmental Categories

PAC #4 — Working Papers

PW #2

AIRPORT LAYOUT PLANS
- Airport Layout Plan
- Landside Drawing
- Airspace/Approach Drawings
- On-Airport Land Use Plan
- Property Map
- Land Use Plans



PAC: Planning Advisory Committee
PW: Public Workshop

- **Forecasts** – Aviation demand levels at the airport (based aircraft and operations) are forecasted to establish the existing and ultimate critical aircraft per FAA AC 150/5000-17. The forecasting approach utilizes the FAA's *Terminal Area Forecast* (TAF), as well as regional and local socioeconomic and aviation trends. The forecasts will ultimately be submitted to TxDOT/FAA for review and approval.
- **Facility Requirements** – Determinations will be made for the airport's facility requirements for existing, short-term, intermediate-term, and long-term timeframes based upon both the critical aircraft and updated forecasts.
- **Alternatives** – Evaluation of various development alternatives to accommodate current and forecasted facility needs for airside and landside facilities.
- **Airport Plans and Land Use Compatibility** – Coordination with airport staff and the PAC will result in the selection of a recommended development concept. Airport layout plans will be developed to depict the recommended development concept. The drawings will meet the requirements of FAA's Standard Operating Procedure (SOP), *Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)*, effective date October 1, 2013. The updated ALP set will be included as an appendix to this study. The airport's noise exposure and land use compatibility will also be evaluated. An environmental overview will identify any potential environmental concerns that must be addressed prior to the implementation of the recommended development program.
- **Airport Development Schedules and Cost Estimates** – Development schedules will be prepared for the recommended concept, and potential federal and state aid for specific projects will be identified. A five-year CIP will be prepared to identify capital funds required by the County to accomplish each proposed stage of improvements for the airport.
- **Final Drawings and Reports** – Final report documentation will include a technical report (printed and digital formats) and full-size/full-color copies of report exhibits, and drawings produced for the study.

SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats associated with an action or plan. This exercise involves identifying an action, objective, or element, and then identifying the internal and external forces that are positively and negatively impacting it. The internal forces include attributes of the airport and market area that may be considered strengths or weaknesses, while the external forces are those outside the airport's control, such as the aviation industry as a whole or the economy. These manifest as opportunities or threats.

A SWOT analysis was conducted with the PAC in March 2022. A summary of this exercise and discussion is included on the next page. It is important to note that some attributes may fall into more than one category. For example, ODO has a significant amount of property, much of which is undeveloped. This was noted as a strength during the exercise, but it also serves as an opportunity.

S STRENGTHS	• Three runway system • Runway lengths available 6,200 feet (Runway 11-29), 5,703 feet (Runway 2-20), and 5,003 feet (Runway 16-34) can accommodate a wide array of business jets • Nice terminal building with many amenities • Instrument approach capability	• Significant amount of undeveloped property • Airport is not a major tax burden • Hangar space available • Fire station is nearby for emergencies and can access airfield via a knockdown gate • Location – close proximity to highway
W WEAKNESSES	• Significant amount of pavement in need of re-habilitation • Pavement strength • is too low to support some aircraft or deters other operators from using ODO • Wildlife on field has led to loss of customers	• Surrounding incompatible land uses including residential and a school located within the Run-way 20 approach • Other hard constraints including public roads limit expansion potential
O OPPORTUNITIES	• Increased pilot training is combatting ongoing pilot shortage • New through-the-fence (TTF) operator • Federal funding opportunities due to recent legislation (i.e., Bipartisan Infrastructure Law)	• Economic development in area (i.e., Nacero) • Development potential in the form of commer-cial activities including non-aeronautical uses
T THREATS	• Competition with other airports for fed-eral/state funds • Residential and educational land uses adja-cent to airport	• A pavement strength analysis could determine strengths that are less than what is reported, ex-acerbating an existing weakness

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AIRPORT BACKGROUND

Odessa Airport-Schlemeyer Field (ODO) is situated approximately five miles north-northeast of the City of Odessa, in Ector County, Texas. Odessa, with a population of 122,630[1], is the primary city within the Odessa metropolitan statistical area (MSA), which is part of the larger Midland-Odessa combined statistical area. The area is one of the fastest growing in the United States, due in large part to its role in the energy sector. The Permian Basin, encompassing more than 86,000 square miles in west Texas and southeastern New Mexico, is the largest oil and natural gas producer in the country. Since oil was first discovered in Odessa in 1927, the city's economy has been characterized by a boom/bust cycle that can be directly linked to the energy market. In addition to oil, Odessa is recognized nationally for its sports culture, with high school football serving as an economic driver in the community.

ODO's history dates back to 1945, when the airport was constructed to serve U.S. military efforts during World War II. Like many airports across the country, the airport was deeded to the local municipality after the war ended, with Ector County assuming ownership and responsibility of the field. Over the years, the airport has been the recipient of both federal and state grants which have funded construction and improvement projects to both the airfield and associated landside buildings. Today, ODO encompasses approximately 790 acres at an elevation of 3,004 feet above mean sea level. The airport serves a wide range of general aviation activities on its three runways and continues to attract users from all over Texas and beyond.

Exhibit 2 depicts the airport in its regional setting.

Airport Terminal Building

CLIMATE

Climate plays an important role in airport planning and preparing for weather conditions enhances the use of an airport. For example, high temperatures and humidity increase runway length requirements, while cloud cover percentages and frequency of inclement weather determine the need for navigational aids and lighting. Knowledge of these weather conditions during the planning process allows the airport to prepare for any improvements that may be needed on the airfield.

[1] U.S. Census Bureau, 2020 American Community Survey

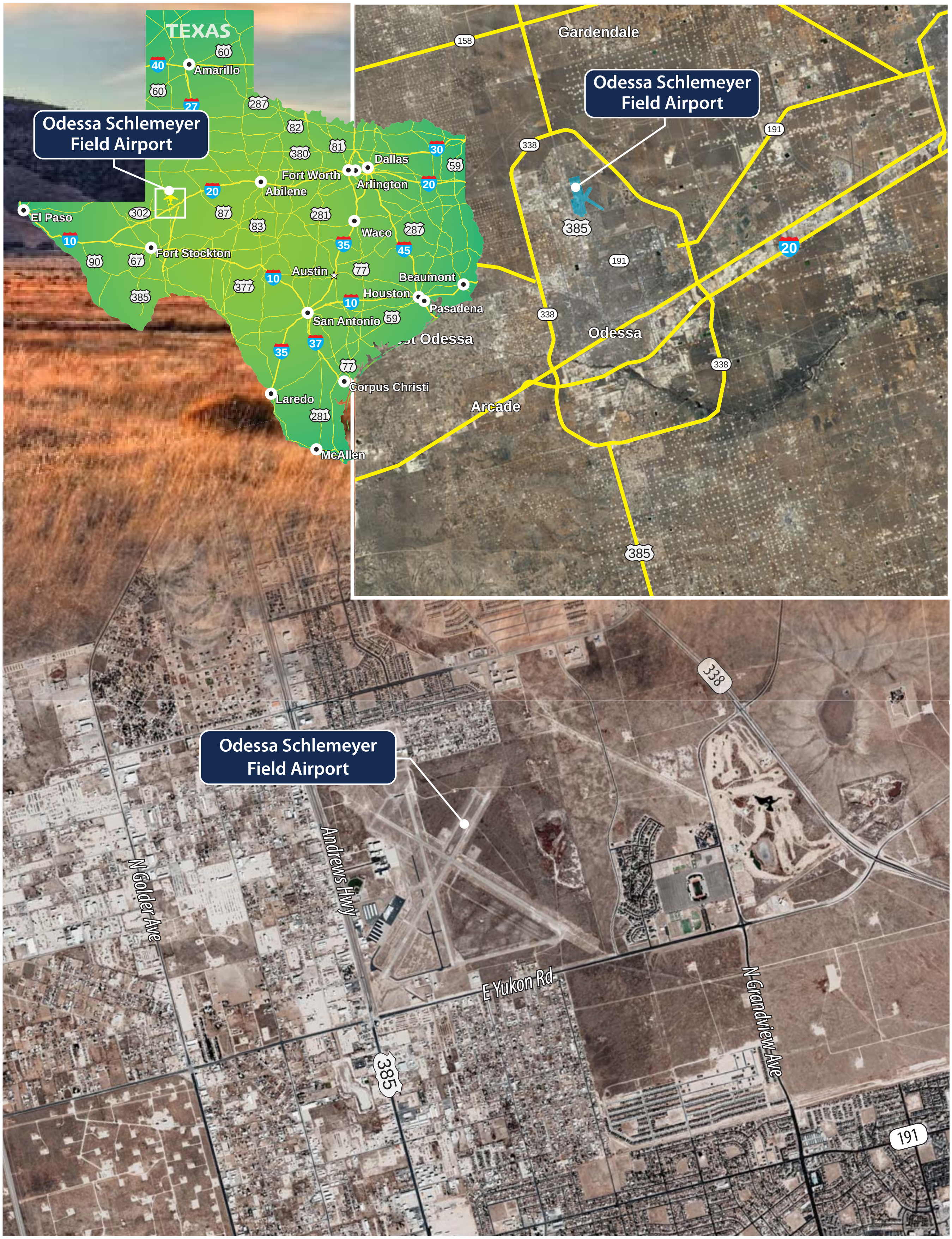

TEXAS
Odessa Schlemeyer Field Airport
Amarillo
Dallas
Fort Worth
Arlington
Abilene
El Paso
Waco
Fort Stockton
Austin
Beaumont
Houston
Pasadena
San Antonio
Corpus Christi
Laredo
McAllen
Gardendale
Odessa Schlemeyer Field Airport
Odessa
Arcade
Odessa Schlemeyer Field Airport
N Golder Ave
Andrews Hwy
E Yukon Rd
N Grandview Ave
338
385
191
20

Exhibit 3 summarizes temperature data sourced from the airport's Automated Surface Observation System (ASOS). The data shown represents total weather observations between 1991 and 2020. The hottest month is July, with a mean maximum high temperature of 95.3 degrees Fahrenheit (F), and January is the coldest month with minimum temperature of 31.7 degrees. Most precipitation occurs during the month of September, which records an average of 1.94 inches of rain.

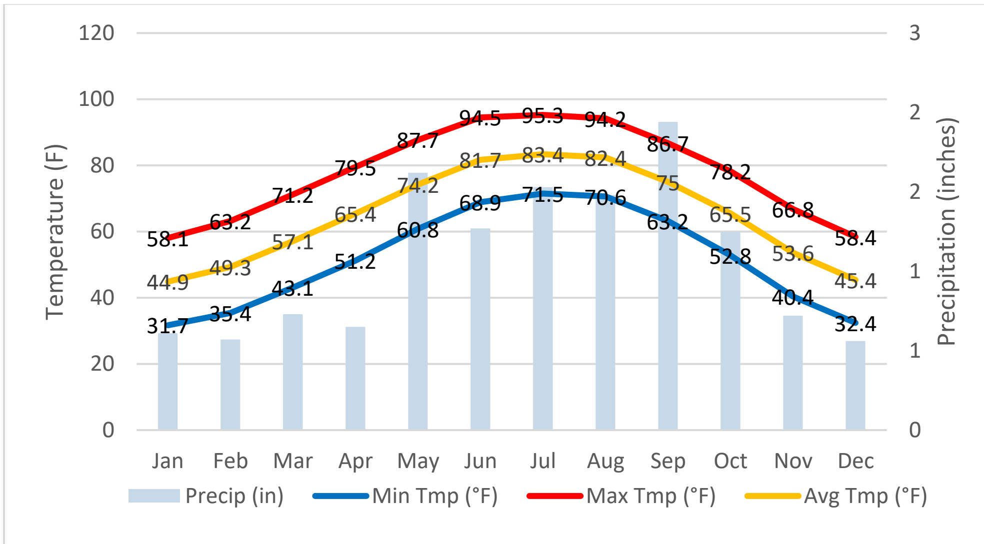


Exhibit 3 – Climate Data

Wind data has also been collected from the airport's ASOS, including wind speeds, direction, and gusts. A total of 96,003 observations of wind direction and other data points were made over a 10-year period beginning January 1, 2011, and ending December 31, 2020, which is the most recent data available for this airport. For the operational safety and efficiency of an airport, it is desirable for the runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

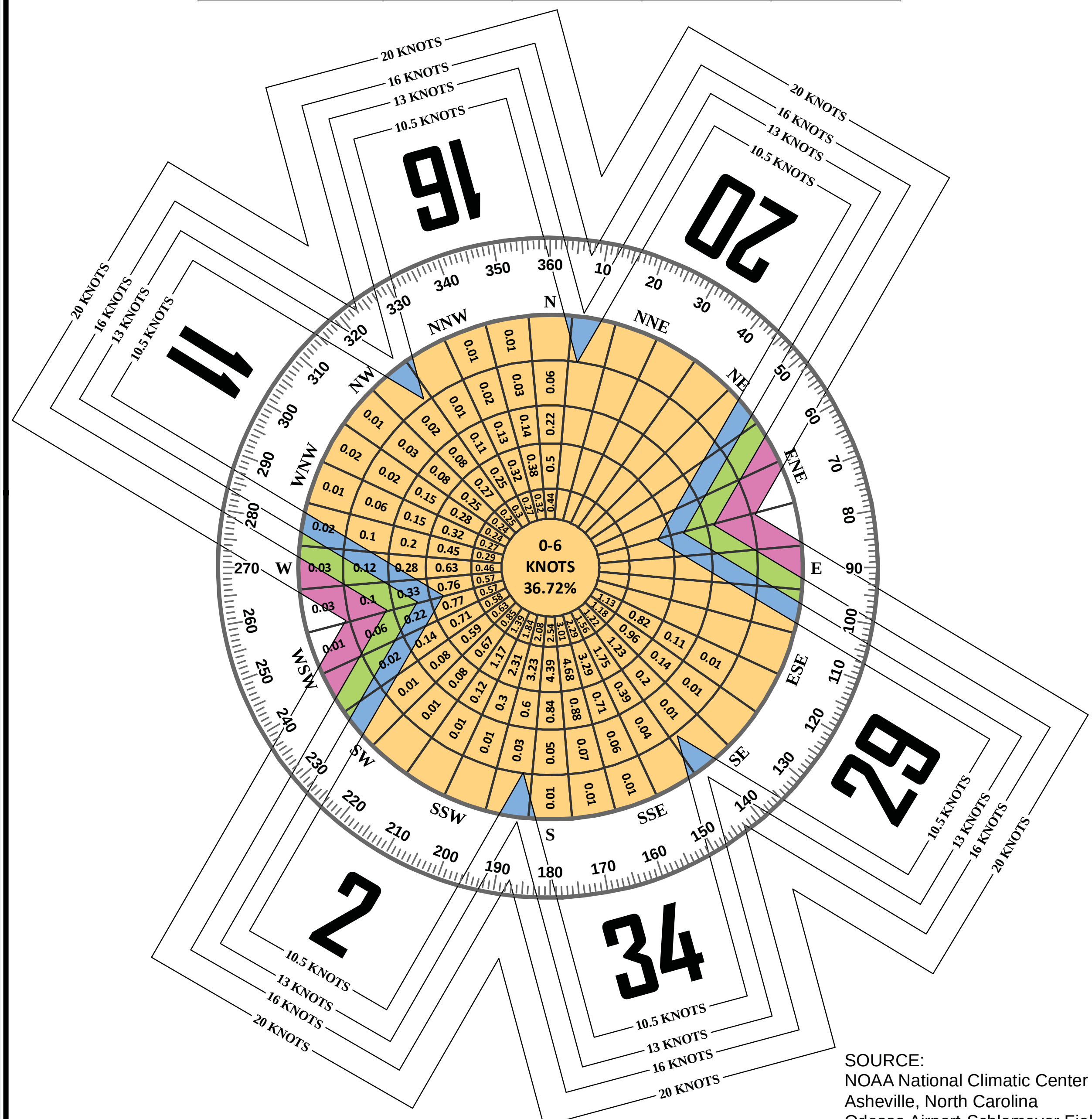
Exhibit 4 presents the associated wind coverage for the runway system at ODO. Combined, the three runways provide 98.68 percent coverage at 10.5 knots and greater than 99 percent coverage at 13 through 20 knot conditions in all weather conditions. The FAA standard for crosswind coverage is that if the primary runway provides for less than 95 percent coverage, a crosswind runway is justified. Individually, no single runway provides 95 percent or greater wind coverage until the 16-knot component. The eligibility for each runway will be discussed in greater detail in the Forecasts and Facility Requirements sections.

ECONOMIC IMPACT

In 2018, TxDOT Aviation undertook an Economic Impact Study to determine the impact and relationship of airports in Texas within the state's economy. According to the study, ODO is home to several on-airport businesses and is used by visitors from all over the state. Additionally, operations related to the energy sector (oil, gas, wind, and solar) occur frequently.

ALL WEATHER WIND COVERAGE

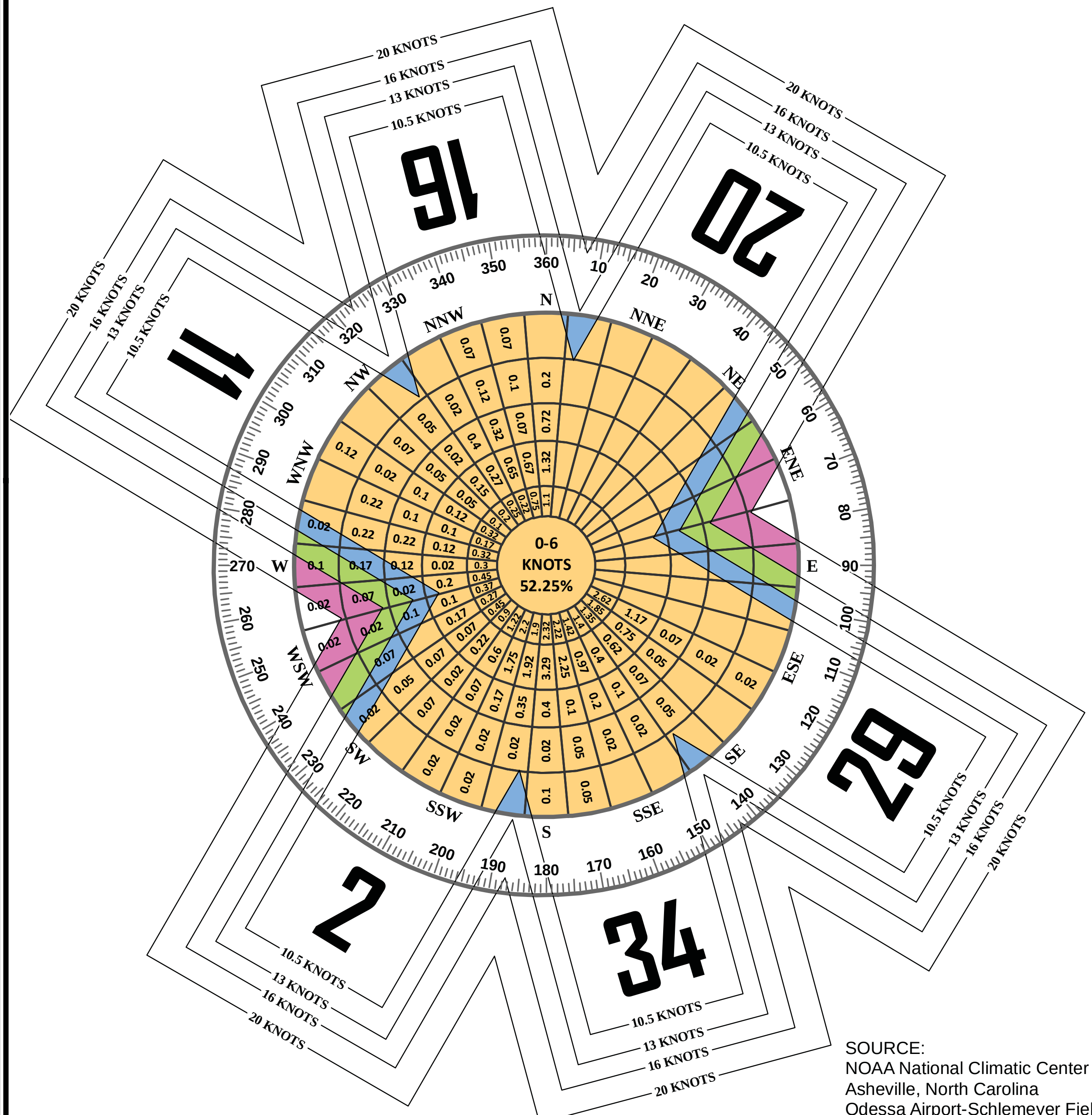
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	76.93%	87.13%	95.63%	99.02%
Runway 2-20	87.06%	93.39%	97.76%	99.38%
Runway 16-34	86.06%	91.72%	96.82%	99.07%
All Runways	98.57%	99.54%	99.89%	99.98%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Odessa Airport-Schlemeyer Field
Odessa, Texas

OBSERVATIONS:
96,360 All Weather Observations
Jan. 1, 2013 - Dec, 31 2022

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	72.47%	83.02%	93.33%	98.02%
Runway 2-20	92.52%	96.07%	98.35%	99.25%
Runway 16-34	77.60%	86.65%	95.32%	98.72%
All Runways	98.44%	99.53%	99.85%	99.97%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Odessa Airport-Schlemeyer Field
Odessa, Texas

OBSERVATIONS:
10,012 IFR Observations
Jan. 1, 2013 - Dec, 31 2022

As summarized in **Table 1** and **Exhibit 5**, when combined with the multiplier impact, aviation activity at the airport generated $15.1 million in total economic impact output, created 202 jobs, and paid out $4.7 million in payroll.

TABLE 1 | Aviation Economic Impact

	ODO	All Texas System Airports
Total Economic Activity	$15.1 million	$94.3 billion
Total Payroll	$4.7 million	$30.1 billion
Total Employment	202 jobs	778,955 jobs

Source: Economic Impacts, Odessa Airport-Schlemeyer Field, Odessa (2018), TxDOT

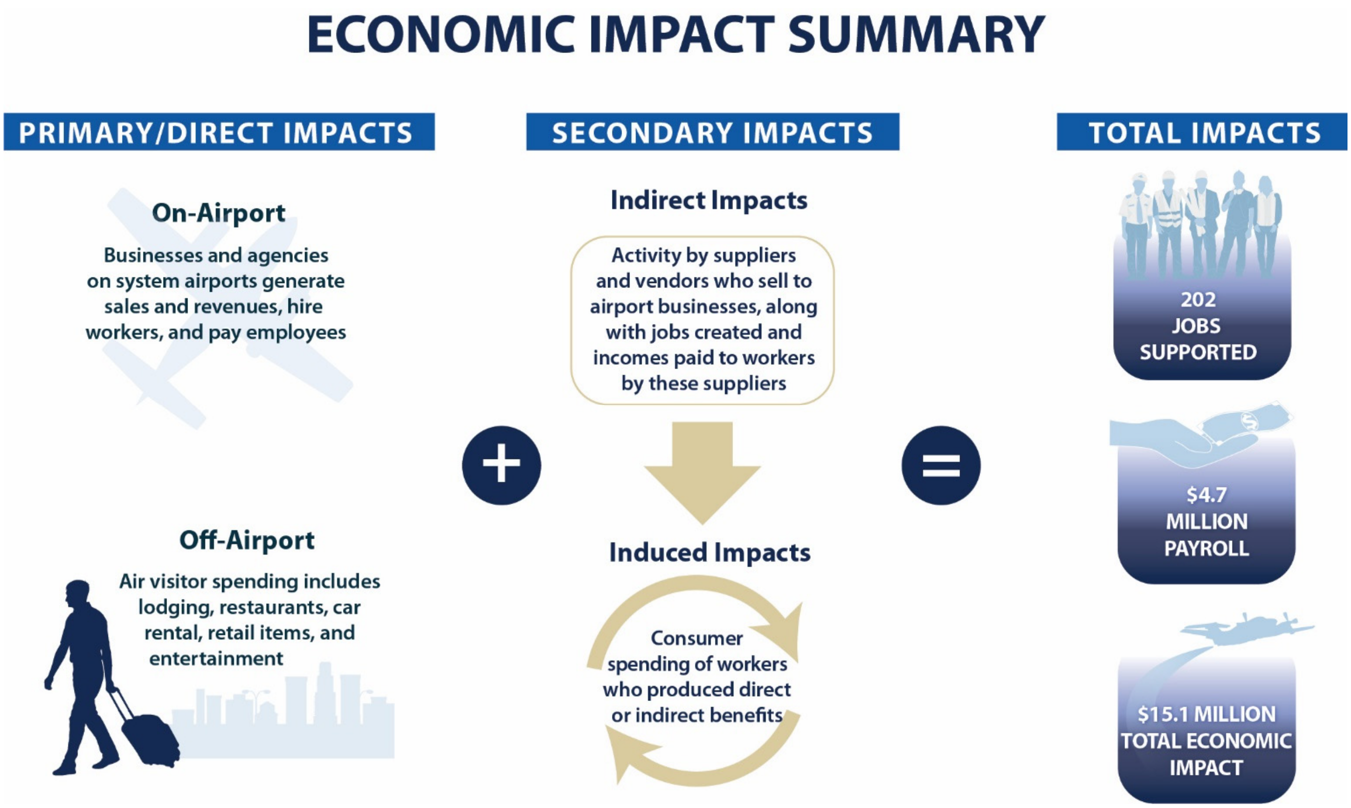


Exhibit 5 – ODO Economic Impact Summary

AIRPORT ROLE

An airport's role, both nationally and regionally, also plays a critical role in facility planning. At the national level, the FAA's *National Plan of Integrated Airport Systems* (NPIAS) categorizes airports based on their importance to national air transportation. Airports included within the NPIAS are qualified for federal funding through the Airport Improvement Program (AIP).

ODO is classified as a general aviation (GA) airport in the NPIAS. GA airports are further classified into one of four categories: National, Regional, Local, and Basic. The airport falls into the Regional GA category. Regional airports are located in metropolitan areas and support interstate and some long-distance flying. These airports typically have high levels of activity and average 90 based aircraft, including three jets.

At a more local level, the airport is also included in the 2010 *Texas Airport System Plan* (TASP). The TASP classifies ODO as a Business/Corporate (BC) facility, which is an airport that provides community access by business jets. According to the TASP, "Business/Corporate airports provide access to turboprop and turbojet business aircraft and are located where there is sufficient population or economic activity to support a moderate to high level of business jet activity and/or to provide capacity in metropolitan areas." These airports are generally located more than 30 minutes from commercial service or reliever airports and serve areas with concentrated population, purchasing power, or mineral production. The TASP further classifies ODO into a "regional" functional category, which includes airports that support higher performance aircraft than the surrounding smaller general aviation facilities. These airports may have periodic commuter or charter operations and should be able to provide the best technology available for weather, approach minimums, and approach aids.

AIRPORT ADMINISTRATION

The airport is owned by Ector County and overseen by a seven-person board. Appointments are made by the Ector County Commissioner's Court (four appointments), the County Judge (one appointment), and the other Airport Advisory Board members (one appointment). The seventh member is a representative of the Ector County Airport Association. The Airport Advisory Board oversees the facility and provides guidance on the operation, expansion, planning, and management of the airport. Daily operations are managed jointly by an Airport Manager and Texas Aero, the airport's fixed base operator (FBO).

GRANT HISTORY

To assist in ongoing capital improvements, the FAA and the Texas Department of Transportation – Aviation Division (TxDOT) provide funding to ODO through the Airport Improvement Program (AIP). Texas is a member of the FAA's Block Grant Program, giving TxDOT the responsibility, among other things, for administering AIP grants to reliever and general aviation airports, which includes ODO. The State of Texas also offers funding opportunities that ODO is eligible for, which are listed below.

- *Routine Airport Maintenance Program (RAMP)* – TxDOT matches local program grants up to $50,000 for basic improvements such as parking lots, fencing, and other airside or landside needs.
- *Federal Aviation Grants* – Provides federal and state grant funding for maintenance and improvement projects to airports included in the NPIAS.

Table 2 summarizes airport capital improvement projects and maintenance undertaken since 2002, with funding coming from federal, state, and local sources. TxDOT has awarded ODO over $11.7 million for airport improvement projects, including major runway and taxiway construction, visual approach aids, apron expansion, and installation of security fencing, among others. It should be noted that maintenance of Runway 2-20 is funded by Ector County.

TABLE 2 | TxDOT and FAA Grant Funded Airport Capital Improvement Project History

Year	Project Description	Local	State	Federal
2002	Acquire land for Runway 11-29 RPZ and relocation of sheriff's posse	$41,957		$377,611
2006	Replace sign panels Runway 2-20; Construct & realign new Runway 11-29 (6200 x 100); Install erosion/sedimentation controls; Mark Runway 11-29 (25,000 sf); Install MIRL Runway 11-29 (6200 lf); Install PAPI-4 Runway 11-29; Install taxiway centerline reflectors (7000 lf); Construct parallel & stub TWs to Runway 11-29 (8200 x 35); Relocate pipeline metering station; Install Runway 11-29 signs; (NPE 2006 2004 2005 and 2007)	$608,758		$5,478,823
2006	RAMP: Runway and taxiway crack repair and seal	$30,000	$30,000	
2006	Update ALP	$2,732		$24,591
2009	Design terminal building	$48,317	$48,317	
2009	Engineering/design to reconstruct north terminal apron (24,530 sy); Install sedimentation controls; Rehabilitate TW G (3250 x 35); Replace signage; Rehabilitate TW E (1380 x 35); Mark Runway 16-34 (25,600 sf); Rehabilitate Taxiway C (675 x 35); Contingency/RPR/Admin. services, etc.; Reconstruct south terminal apron (15,160 sy); Construct terminal building apron (5,120 sy); Rehab Runway 16-34 (5000 x 75); Improve drainage; Rehabilitate hangar access TWs (39,460 sy); Replace VASI w/PAPI-2s Runway 16-34; Rehabilitate & mark Taxiway F (15,400 sy) (SBGP-46-2008 $184,914; SBGP-49-2008 $28,500)	$11,232		$213,414
2010	RAMP: Airport entrance road construction and misc. paving repairs/maintenance	$20,797	$20,797	
2011	Replace signage; Rehabilitate & mark Taxiway F (15,400 sy); Rehabilitate hangar access taxiways (39,460 sy); Reconstruct north terminal apron (24,530 sy); Contingency/RPR/Admin. services, etc.; Replace VASI w/PAPI-2s Runway 16-34; Rehabilitate Taxiway E (1380 x 35); Rehabilitate Taxiway G (3250 x 35); Reconstruct south terminal apron (15,160 sy); Improve drainage; Construct terminal building apron (5,120 sy); Install sedimentation controls; Mark Runway 16-34 (25,600 sf); Rehab Runway 16-34 (5000 x 75); Rehabilitate Taxiway C (675 x 35) (SBGP-46-2008 $2,797,196; SBGP-84-2013 $160,206; SBGP-41-2007 $ 776,786; SBGP-73-2001 $357,682)	$454,652		$4,091,870
2011	Construct auto parking lot (920 sy); Construct new terminal building	$572,962	$551,683	
2012	RAMP: Airport general maintenance	$48,935	$48,935	
2013	RAMP: Airport general maintenance	$3,616	$3,616	
2014	Replace PAPI-4 RW 11-29		$102,202	
2014	RAMP: Airport general maintenance	$50,000	$50,000	
2015	RAMP: Airport general maintenance	$10,545	$10,545	
2016	RAMP: Airport general maintenance	$50,000	$50,000	
2017	Engineering and Design for Installation of ODALS for Runway 11/29; Engineering and Design Terminal Apron Expansion - 2013, 2014, and 2015 NPE; (SBGP-090-2015 $92,957.22; SBGP-097-2016 $19,899.23; SBGP-104-2017 $3,025.76)	$12,876		$115,882
2017	RAMP: Airport general maintenance	$19,950	$19,950	
2018	RAMP: Airport general maintenance	$49,118	$49,118	
2019	RAMP: Airport general maintenance	$50,000	$50,000	
2020	RAMP: Airport general maintenance	$50,000	$50,000	
2021	RAMP: Airport general maintenance	$50,000	$50,000	
2022	ALP Update			$285,969
	Totals	**$2,186,447**	**$1,135,163**	**$10,588,160**

- MIRL – Medium Intensity Runway Lights
- ODALS – Omnidirectional Approach Lights
- PAPI – Precision Approach Path Indicator
- RPZ – Runway Protection Zone

Source: Airport records

AIRPORT FACILITIES

Airport facilities are functionally classified into two broad categories: airside and landside. The airside category includes those facilities directly associated with aircraft operations. The landside category includes those facilities necessary to provide a safe transition from surface-to-air transportation and support aircraft servicing, storage, maintenance, and operational safety.

ODO Airfield

AIRFIELD FACILITIES

Runways

Airfield facilities at ODO, which are depicted on **Exhibit 6**, include the runway, taxiways, lighting, and navigational aids. The airport configuration at ODO consists of three runways. Details about each runway are included below.

Runway 11-29 | Runway 11-29 is oriented northwest/southeast and is reported to be in good condition. The runway is constructed of asphalt and measures 6,200 feet long by 100 feet wide. As reported on FAA Form 5010, *Airport Master Record*, Runway 11-29 has a weight-bearing capacity of 30,000 lbs. single wheel loading (SWL), which refers to the design of certain aircraft landing gear having a single wheel main landing gear strut. The runway slopes down from the Runway 29 end to the Runway 11 end by six feet, resulting in a longitudinal gradient of 0.10 percent.

Runway 2-20 | Runway 2-20 measures 5,703 feet long by 75 feet wide and is oriented southwest/northeast. The asphalt runway is reported to be in good condition and has a weight-bearing capacity of 14,000 pounds SWL. The runway slopes down from the Runway 20 end to the Runway 2 end by 51.2 feet, resulting in a longitudinal gradient of 0.90 percent.

Runway 16-34 | Runway 16-34 is 5,003 feet long by 75 feet wide and is constructed of asphalt, reported to be in excellent condition. The runway is oriented north-northwest/south-southeast and has a weight bearing capacity of 14,000 pounds SWL. The runway slopes down from the Runway 16 end to the Runway 34 end by 28.4 feet, resulting in a longitudinal gradient of 0.57 percent.

Taxiways

The taxiway system at ODO consists of partial-parallel, access, and connector taxiways that provide access to the runways and landside facilities. Taxiways are constructed of asphalt and equipped with green centerline reflectors. **Exhibit 6** depicts each taxiway in its location, and **Table 3** details pertinent information about each taxiway.

TABLE 3 | ODO Taxiway System

Designation	Function	Width (in feet)
A	Landside access	35-45
C	Connector	50
D	Partial-parallel, exit, runway access	40
E	Landside access, exit	35-50
F	Runway access	35
G	Partial-parallel, runway access	35

Source: Airport records

Pavement Condition

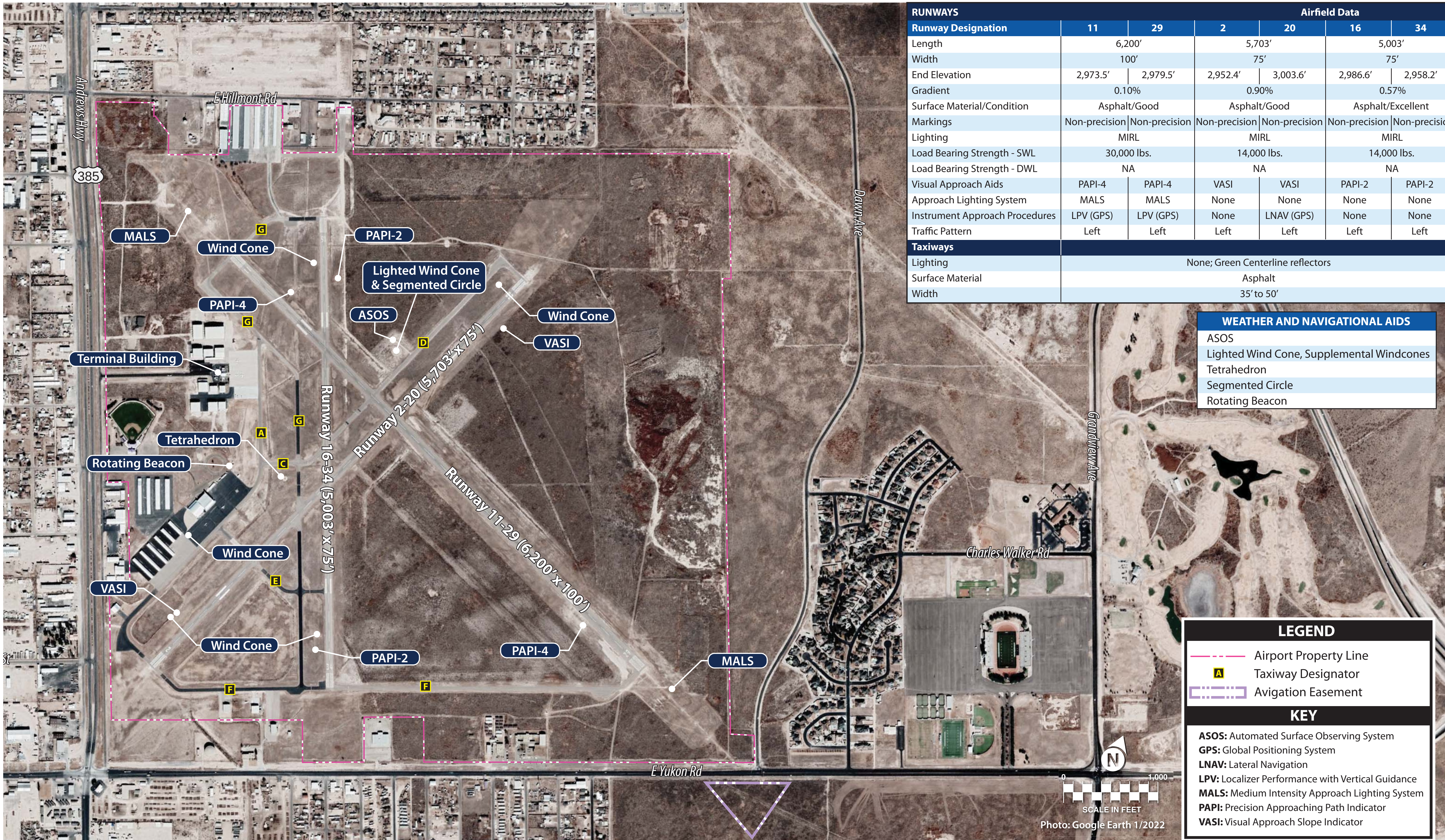
A pavement condition survey was conducted for ODO in 2020 and evaluated the runways, taxiways, and apron.[2] The inspection resulted in a pavement condition index (PCI) rating for each section of pavement. PCI ratings are determined through a visual assessment in accordance with FAA Advisory Circular 150/5380-6 and range from 0 (failed) to 100 (excellent) and are categorized as poor (PCI between 0 and 54), fair (PCI between 55 and 69), and good (PCI between 70 and 100). According to the 2020 pavement inspection, all of the runway pavement at ODO and most of the taxiway and apron pavement falls into the 'good' category. Portions of Taxiways A, E, F, and G are in the 'fair' category. **Exhibit 7** illustrates the pavement condition at ODO.

Pavement Markings

All runways at ODO have non-precision markings that include the runway centerline, designation, threshold markings, and aiming points. Yellow taxiway markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Apron pavement markings also identify aircraft tiedown positions.

Each entrance to the runway is equipped with yellow holding position markings. These markings indicate to pilots their position on the airfield, as well as help prevent inadvertent access to the runway. Hold

[2] Pavement Condition Report, Texas A&M Transportation Institute, 2020



RUNWAYS	Airfield Data					
Runway Designation	**11**	**29**	**2**	**20**	**16**	**34**
Length	6,200'		5,703'		5,003'	
Width	100'		75'		75'	
End Elevation	2,973.5'	2,979.5'	2,952.4'	3,003.6'	2,986.6'	2,958.2'
Gradient	0.10%		0.90%		0.57%	
Surface Material/Condition	Asphalt/Good		Asphalt/Good		Asphalt/Excellent	
Markings	Non-precision	Non-precision	Non-precision	Non-precision	Non-precision	Non-precision
Lighting	MIRL		MIRL		MIRL	
Load Bearing Strength - SWL	30,000 lbs.		14,000 lbs.		14,000 lbs.	
Load Bearing Strength - DWL	NA		NA		NA	
Visual Approach Aids	PAPI-4	PAPI-4	VASI	VASI	PAPI-2	PAPI-2
Approach Lighting System	MALS	MALS	None	None	None	None
Instrument Approach Procedures	LPV (GPS)	LPV (GPS)	None	LNAV (GPS)	None	None
Traffic Pattern	Left	Left	Left	Left	Left	Left
Taxiways						
Lighting	None; Green Centerline reflectors					
Surface Material	Asphalt					
Width	35' to 50'					

WEATHER AND NAVIGATIONAL AIDS
ASOS
Lighted Wind Cone, Supplemental Windcones
Tetrahedron
Segmented Circle
Rotating Beacon

LEGEND

- Airport Property Line
- Taxiway Designator
- Avigation Easement

KEY

ASOS: Automated Surface Observing System
GPS: Global Positioning System
LNAV: Lateral Navigation
LPV: Localizer Performance with Vertical Guidance
MALS: Medium Intensity Approach Lighting System
PAPI: Precision Approaching Path Indicator
VASI: Visual Approach Slope Indicator

Exhibit 6
EXISTING AIRSIDE FACILITIES

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lines also help to ensure proper separation between aircraft prior to entering the runway. Pilots using non-towered airports must visually confirm no aircraft traffic prior to crossing the hold line. Holding position markings are located at least 250 feet from the Runway 11-29 centerline, 200 feet from the Runway 2-20 centerline, and 200 feet from the Runway 16-34 centerline.

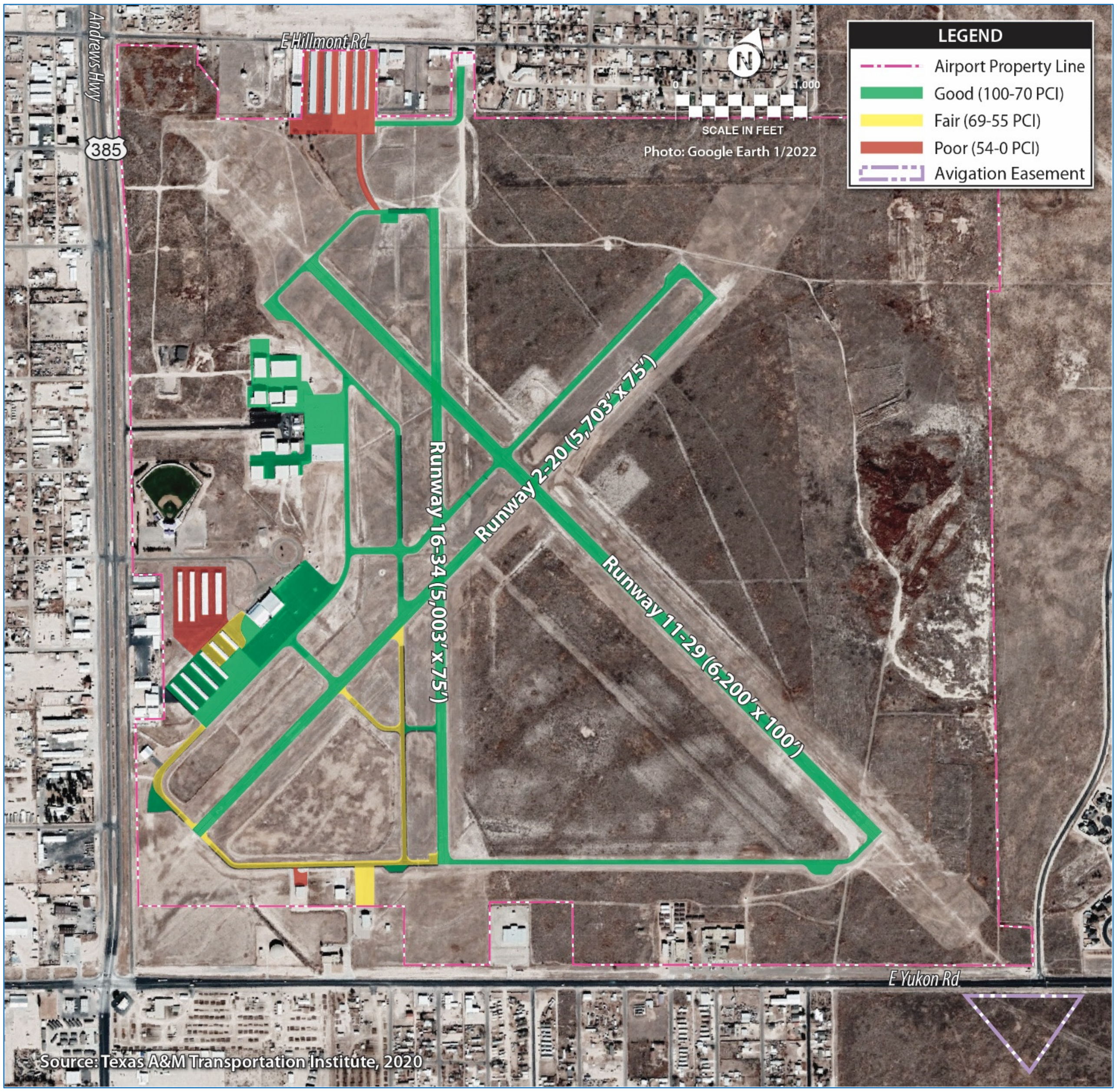

Exhibit 7 – Airfield Pavement Condition

Airfield Signage

Airfield identification signs assist pilots in identifying runways, taxiway routes, holding positions, and critical areas. ODO is equipped with lighted signs located at each taxiway intersection.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at an airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Identification Lighting | The location of the airport is identified by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at ODO is located south of the terminal building adjacent to the south apron.

Rotating Beacon

Runway and Taxiway Lighting | Runway lighting utilizes fixtures placed near the pavement edge to define the lateral limits of the runway. Both runway and taxiway lighting are imperative for safe and efficient access to and from aircraft parking areas and the runway, especially after dark and during times of low visibility. All runways at ODO are equipped with a medium intensity runway lighting (MIRL) system. Lights are set atop frangible supports, so if one is struck by an object, such as an aircraft wheel, they can easily break away. There is no taxiway lighting at ODO; however, green taxiway centerline reflectors are present and provide a visual guidance to taxiing aircraft.

Approach Lighting System | An approach lighting system (ALS) is a configuration of lights positioned symmetrically along the extended runway centerline to supplement navigational aids, such as an ILS, to provide lower visibility minimums. Examples include the ALS with Flashing Lights (ALSF), ALS with Sequenced Flashers I & II (ALSF-1/ALSF-2), Medium Intensity ALS with Runway Alignment (MALSR), and the Medium Intensity ALS (MALS). Both ends of Runway 11-29 are equipped with a MALS, which supports the existing published localizer performance with vertical guidance (LPV) GPS approach.

Visual Approach Lighting | Visual approaches at many GA airports are aided by lighting systems, such as a precision approach path indicator (PAPI) or a visual approach slope indicator (VASI), which provides visual approach slope guidance. The more sophisticated PAPI lighting system consists of a configuration of lights located at various distances from the runway threshold and gives pilots an indication of being above, below, or on the correct descent glide path to the runway. Both ends of Runway 11-29 are equipped with a four-light PAPI (PAPI-4) system, with the standard 3.00-degree glide path. Runway 16-34 is equipped with a two-light PAPI (PAPI-2) system at both ends, and Runway 2-20 has a VASI system at each end of the runway.

Runway End Identifier Lights (REILs) | REILs provide a visual identification of the runway end for landing aircraft. The REILs consist of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft. These flashing lights can be seen day or night for up to 20 miles depending on visibility conditions. None of the runways are equipped with REILs.

Pilot-Controlled Lighting | With the pilot-controlled lighting (PCL) system, pilots can turn on the MIRL from an aircraft through a series of clicks of their radio transmitter. Pilots using the airport can activate this system via a frequency of 123.0 MHz.

Weather Facilities


Lighted Wind Cone and Segmented Circle

ODO is equipped with a lighted wind cone near the juncture of Runway 11-29 and Taxiway D. Wind cones provide pilots with wind speed and direction information. The lighted wind cone is co-located with a segmented circle, which provides traffic pattern information to pilots. There are also five supplemental wind cones located near the ends of Runways 2, 20, 16, and 34 and on top of a T-hangar on the south apron.


ASOS Equipment

The airport also has a tetrahedron wind indicator located west of Runway 16-34 near the south apron. The tetrahedron functions essentially as a weathervane, swinging freely to point into the wind, and is an alternative to the more commonly used wind cone.

Many airports are equipped with an automated weather observation system (AWOS) or an ASOS, which automatically records weather conditions, such as wind speed, wind gusts, wind direction, temperature, dew point, altimeter setting, and density altitude. This information is then transmitted at regular intervals and is accessible to pilots. The airport is equipped with an ASOS, and weather information can be obtained via radio frequency 119.275 MHz or by calling 432-363-9719.

Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft operating near ODO include the very high frequency omnidirectional range (VOR) facility, a nondirectional beacon (NDB), and the global positioning system (GPS).

A VOR, in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Midland VORTAC is located 11.3 nautical miles (nm) to the east, while the Wink VORTAC and Big Spring VORTAC are located 43.8 nm west and 53.8 nm northeast, respectively.

An NDB is a radio transmitter at a known location, used as an aviation or marine navigational aid. The signal transmitted does not include inherent directional information, in contrast to other navigational aids, such as a VOR. NDB signals follow the curvature of the Earth, so they can be received at much greater distances at lower altitudes, a major advantage over VOR. Pilots at ODO can utilize the Farly NDB located 5.1 nm northeast.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from VOR in that pilots are not required to navigate using a specific ground-based facility. GPS uses satellites placed in orbit around the Earth that transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can navigate directly to any airport in the country and are not required to navigate using a ground-based navigational facility.

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. Instrument procedures are defined as either precision approach, approach with vertical guidance (APV), or non-precision. Precision instrument approaches provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway with a height above threshold (HATh) lower than 250 feet and visibility lower than ¾-mile. APVs also provide course alignment and vertical descent path guidance but have HATh s of 250 feet or more and visibility minimums of ¾-mile or greater. Non-precision instrument approach aids provide only horizontal guidance.

Instrument approach procedure capabilities are defined by visibility and cloud ceiling minimums. Visibility minimums define the horizontal distance the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach and must commence a missed approach procedure.

ODO is currently equipped with three straight-in approaches and one circling VOR-A approach. Instrument approaches based on GPS have become very common across the country. GPS is an inexpensive option for local airports as it does not require a significant investment in ground-based systems by an airport or FAA. Both ends of Runway 11-29 ends are served by GPS LPV approaches. GPS LPV approaches provide both horizontal and vertical guidance information to pilots but are not considered precision approaches. These approaches provide for the lowest cloud ceiling minimums at 200 feet above ground level (AGL) with visibility minimums down to ¾-mile. Runway 20 is also equipped with a GPS-based approach which provides lateral navigation (LNAV) guidance, with cloud ceiling minimums at 500 feet AGL and visibility minimums down to one mile for aircraft with approach speeds of less than 121 knots. For aircraft with approach speeds of 121 knots or greater, the visibility minimums are increased.

ODO has another published approach that utilizes very high frequency omnidirectional range (VOR) technology and provides circling minimums. Circling minimums allow pilots the flexibility to land on the runway most closely aligned with the prevailing wind at that time. This flexibility generally requires circling approaches to have higher visibility minimums than the straight-in approaches. This is done to provide pilots with sufficient visibility and ground clearance to navigate visually from the approach to the desired runway end for landing. This circling instrument approach procedure is non-precision in nature.

LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the airport terminal building, aircraft storage hangars, aircraft parking aprons, and support facilities, such as fuel storage and roadway access. Landside facilities are identified on **Exhibit 8**.

Airport Terminal and On-Airport Businesses

The airport terminal building is located on the west side of the airfield and can be accessed via Andrews Highway. The building was constructed in 2010 and encompasses approximately 4,100 square feet. The terminal offers a large, well-appointed lobby, conference room, flight planning room, offices, pilots' lounge and snooze room, kitchen/vending, and restrooms.

Terminal Building

Fixed Base Operator | The terminal also houses the airport's sole FBO, Texas Aero. The full-service FBO operates Monday through Friday from 6:00 a.m. to 8:00 p.m., Saturday from 8:00 a.m. to 5:00 pm, and Sunday 8:00 a.m. to 8:00 p.m., with after-hours services available upon request. Services include Jet A and 100LL fuel, hangar storage, aircraft services, aircraft tiedowns, and courtesy and rental vehicles.

Specialized Aviation Service Operator | Epic Aero is a specialized aviation service operator (SASO) that operates out of a 17,200 square foot hangar located on the southwest side of the airfield. Epic Aero offers aircraft maintenance, aircraft sales, and aircraft cleaning services.

Flight Training | Aerotex Aviation offers flight training at the airport. Aerotex is located on the southwest side of the airfield and operates out of a 17,000-sf conventional hangar. They offer different pilot training programs as well as a flying club that provides aircraft rental to members.

Non-Aeronautical Uses | Approximately 12 acres of land on the west side of airport property is used by Odessa College. The site is home to Wrangler Field, which opened in 2019 after the American Legion Ballpark closed and the facility was renovated.

Through-the-Fence Operators | "Through-the-fence" activities are those that are permitted by the airport sponsor through an agreement that provides access to the airside infrastructure to independent entities that have property adjacent to airport property. At ODO, there are through-the-fence operators on the southwest side of airport property, with access to the airfield via the south ramp T-hangar complex.

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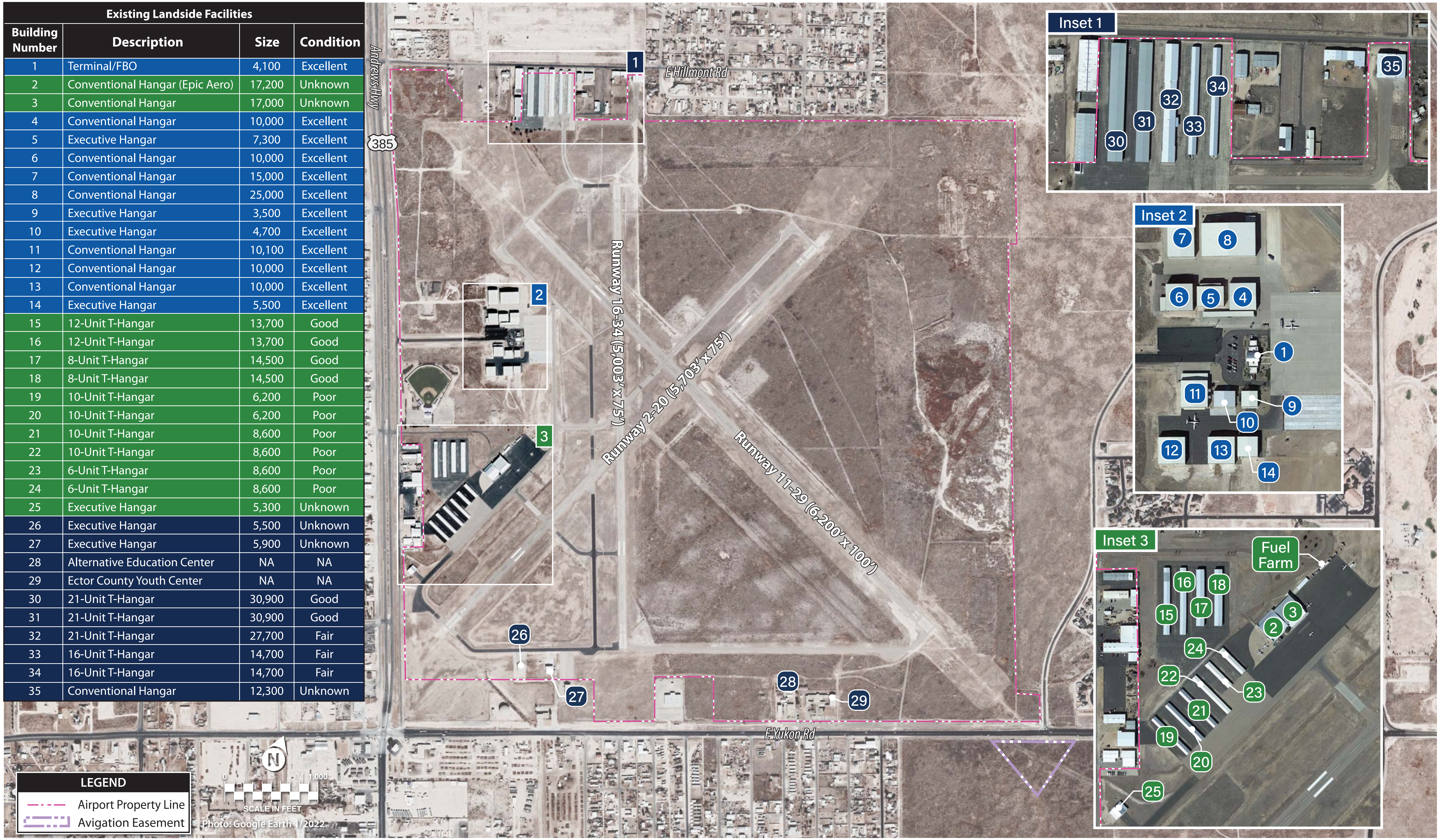
Existing Landside Facilities

Building Number	Description	Size	Condition
1	Terminal/FBO	4,100	Excellent
2	Conventional Hangar (Epic Aero)	17,200	Unknown
3	Conventional Hangar	17,000	Unknown
4	Conventional Hangar	10,000	Excellent
5	Executive Hangar	7,300	Excellent
6	Conventional Hangar	10,000	Excellent
7	Conventional Hangar	15,000	Excellent
8	Conventional Hangar	25,000	Excellent
9	Executive Hangar	3,500	Excellent
10	Executive Hangar	4,700	Excellent
11	Conventional Hangar	10,100	Excellent
12	Conventional Hangar	10,000	Excellent
13	Conventional Hangar	10,000	Excellent
14	Executive Hangar	5,500	Excellent
15	12-Unit T-Hangar	13,700	Good
16	12-Unit T-Hangar	13,700	Good
17	8-Unit T-Hangar	14,500	Good
18	8-Unit T-Hangar	14,500	Good
19	10-Unit T-Hangar	6,200	Poor
20	10-Unit T-Hangar	6,200	Poor
21	10-Unit T-Hangar	8,600	Poor
22	10-Unit T-Hangar	8,600	Poor
23	6-Unit T-Hangar	8,600	Poor
24	6-Unit T-Hangar	8,600	Poor
25	Executive Hangar	5,300	Unknown
26	Executive Hangar	5,500	Unknown
27	Executive Hangar	5,900	Unknown
28	Alternative Education Center	NA	NA
29	Ector County Youth Center	NA	NA
30	21-Unit T-Hangar	30,900	Good
31	21-Unit T-Hangar	30,900	Good
32	21-Unit T-Hangar	27,700	Fair
33	16-Unit T-Hangar	14,700	Fair
34	16-Unit T-Hangar	14,700	Fair
35	Conventional Hangar	12,300	Unknown

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Aircraft Parking Aprons

The airport is served by four aircraft parking aprons, as depicted on **Exhibit 9**. The north apron fronts the T-hangars located along Hillmont Road and is approximately 6,500 square-yards (sy) in size with 10 marked aircraft parking positions that remain visible on the apron. This apron can be accessed via Taxiway G. The FBO/terminal apron can be accessed from Taxiway A and is approximately 16,600 sy. This apron is frequently used to park aircraft, though there are no marked parking positions. The south apron is the largest at approximately 28,800 sy, with 28 marked parking positions and can be accessed via Taxiway. The south T-hangar apron is situated between the two T-hangar complexes on the south side of the airfield. This area encompasses approximately 5,700 sy and includes 15 marked parking positions.

Exhibit 9 – Aircraft Parking Aprons

Aircraft Storage

A variety of aircraft storage hangars are available at ODO, all located on the north and west side sides of the airfield. In total, there are 15 T-hangars providing 187 individual units and approximately 222,100 sf of aircraft storage face. T-hangars are located on the north side of the field along Hillmont Road and on the southwest side along Andrews Highway. Executive hangars, which typically have a footprint between 2,500 and 10,000 sf, comprise approximately 37,700 sf of space among seven units. Conventional hangars are 10,000 sf or more in size. There are 10 conventional hangars at ODO, offering approximately 136,600 of space. In all, the airport provides nearly 400,000 sf of hangar space for aircraft storage. Additional information about hangars is included on **Exhibit 8**.

Fuel Storage Facilities

Fuel storage facilities at ODO are located on the south apron, as shown on **Exhibit 8**. There are three aboveground tanks, one for 100LL fuel and two for Jet A. The 100LL tank has a capacity of 10,000 gallons, and the Jet A tanks have a 12,000-gallon capacity each. 100LL is dispensed via a self-service pump equipped with a credit card reader, while Jet A fuel is distributed by FBO staff. There are also five fuel trucks, two for 100LL and three containing Jet A fuel. These trucks have combined capacities of 1,950 gallons for 100LL and 10,200 gallons for Jet A.

Historic fuel flowage data is summarized in **Table 4**. In fiscal year (FY) 2021, the airport dispensed 115,204 gallons of 100LL fuel and 410,126 gallons of Jet A. Fuel flowage over the last three years has averaged 122,342 gallons of 100LL and 450,711 gallons of Jet A.

TABLE 4 | Fuel Flowage

Fiscal Year	100LL	Jet A	Total Fuel Sold
FY2019	147,950	570,759	718,709
FY2020	103,873	371,247	475,120
FY2021	115,204	410,126	525,330

Source: FBO records

Aircraft Rescue and Firefighting Facilities (ARFF)

As a general aviation airport, ODO is not required to have on-site ARFF equipment or facilities. The airport is served by the City of Odessa Fire Department. Station #8 is located on Yukon Road, immediately south of airport property.

Perimeter Fencing

The perimeter of the airfield is fully enclosed by fencing. This consists primarily of eight-foot wildlife resistant fencing with three-strand barbed wire. Automatic gates at various locations provides secure access to the airfield, with a code required to enter.

Automobile Access and Parking

The terminal building and hangars in this area can be accessed via East Terminal Drive, which extends from Andrews Highway. Hangars on the south side of the field can also be accessed from Andrews Highway, via East Centergate Street. North side hangars can be accessed from East Hillmont Road.

A paved vehicle parking area is located in front of the terminal and provides 22 parking spaces, including two handicapped spaces. An additional lot immediately to the west provides 31 spaces for tenants as well as overflow parking for the terminal. T-hangar tenants typically park outside of their hangar.

AVIATION ACTIVITY

AIRCRAFT OPERATIONS

Aircraft operations (takeoffs and landings) are a primary indicator of aeronautical activity at ODO. Aircraft operations are classified as local or itinerant. Local operations often consist of touch-and-go or pilot training activity. Itinerant operations consist of aircraft that arrive from or depart to destination airports outside the local operating area.

Aircraft operations can be separated into four general categories: air carrier, air taxi, general aviation, and military. The following provides a description of these categories of aircraft operations:

- **Air Carrier** – operations defined as those conducted commercially by aircraft having a seating capacity of 60 or more seats and a cargo payload capacity of more than 18,000 pounds. There are currently no air carriers operating at the airport by definition of an air carrier operation.
- **Air Taxi** – operations associated with aircraft originally designed to have less than 60 passenger seats or a cargo payload of less than 18,000 pounds and carries cargo or mail on either a scheduled or charter basis, and/or carries passengers on an on-demand basis or limited scheduled basis.
- **General Aviation (GA)** – civil aviation operations other than scheduled air services and nonscheduled air transport operations for hire. ODO caters to general aviation activities and the majority of its operations fall in this category.
- **Military** – operations conducted by aircraft and helicopters with a military designation.

Due to the absence of an airport traffic control tower (ATCT) at the airport, it can be difficult to maintain an accurate count of the airport's operations. An estimated account of annual activity is available via the FAA's Form 5010, *Airport Master Record* for ODO. The Form 5010 also provides a breakdown of estimated operation totals for the airport by type. The most current data, which is reflective of operations for 12 months ending 01/04/2018, estimates that ODO had approximately 78,000 operations in 2020, as detailed in **Table 5**. This, along with other methods for estimating annual operations, will be described in more detail in the next section of the report.

TABLE 5 | ODO Annual Operations

AIRCRAFT OPERATIONS	
Itinerant	
Air Carrier	0
Air Taxi & Commuter	0
GA	26,000
Military	0
Subtotal	26,000
Local	
GA	52,000
Military	0
Subtotal	52,000
TOTAL	78,000

Source: FAA Form 5010, *Airport Master Record*

BASED AIRCRAFT

Identifying the current number of based aircraft is an important part of the planning process; however, it can be challenging to be accurate given the transient nature of aircraft storage. ODO maintains an inventory record of based aircraft at the airport which accounts for 108 based aircraft; however, only 88 of those aircraft have been validated by the FAA as of 05/20/2021.

ENVIRONMENTAL FEATURES

Research has been conducted on 14 environmental impact categories outlined within FAA's Order 1050.1F, *Environmental Impacts: Policies and Procedures* (July 2015). Available information regarding the existing conditions at ODO was derived from internet resources, agency maps, and existing literature. The intent of this task is to catalog potential environmental sensitivities that might affect future improvements at the airport.

AIR QUALITY

The concentration of various pollutants in the atmosphere describes the local air quality. The significance of a pollutant's concentration is determined by comparing it to the state and federal air quality standards. In 1971, the U.S. Environmental Protection Agency (EPA) established standards that specify the maximum permissible short- and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb).

Based on federal air quality standards, a specific geographic area can be classified as either an "attainment," "maintenance," or "nonattainment" area for each pollutant. The threshold for nonattainment designation varies by pollutant.

The airport is in Ector County, Texas. Ector County is in attainment for all criteria pollutants.[3]

BIOLOGICAL RESOURCES

Biotic resources include the various types of plants and animals that are present in an area. The term also applies to rivers, lakes, wetlands, forests, and other habitat types that support plants and animals.

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act* (ESA). The ESA provides a framework to conserve and protect animal or plant species whose populations are threatened by human activities. The FAA and USFWS review projects to determine if a significant impact to protected species will result in the implementation of a proposed project. Significant impacts occur when a proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area. The USFWS's Information for Planning and Consultation (IPaC) resource list describes species and habitat protected under ESA within the vicinity of the airport (**Table 6**).

Section 3 of the ESA is used to protect critical habitat areas. Designated critical habitat areas are geographically defined and have been determined to be essential to the recovery of a specific species. There is no federally designated critical habitat at the airport.

There is potential for avian concerns for areas at the airport listed in the IPaC. Habitat for migratory birds may occur if bushes or other ground nesting substrate is present.

[3] Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants | Green Book | US EPA [Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants | Green Book | US EPA]

TABLE 6 | Species Protected Under ESA Section 7 with Potential to Occur at the Airport

Common Name (*Scientific Name*)	Federal Status	Habitat and Range	Potential for Occurrence
Northern Aplomado Falcon (Falco femoralis septentrionalis)	Endangered	Open grassland or savannah habitat with scattered trees or shrubs.	Potential. Foraging or nesting habitat (such as trees) may be present at the airport. Additional habitat surveys may be necessary to determine the presence of this species.
Piping Plover (Charadrius melodus)	Threatened	Coastal habitats include sand spits, small islands, tidal flats, shoals, and sandbars with inlets. Primary foraging habitats include sandy mud flats, ephemeral pools	None. There is no supporting habitat located within the vicinity of the airport.
Red Knot (Calidris canutus rufa)	Threatened	Sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey. Other habitats that might harbor knots include peat banks (remnants of ancient forest on the seashore, exposed by erosion), salt ponds, eelgrass beds, and Brazilian resting (coastal spits).	None. There is no supporting habitat located within the vicinity of the airport.
Monarch butterfly *(Danaus plexippus)*	Candidate	Monarchs feed exclusively on the leaves of milkweed. During winter Monarchs cluster together in colonies and root in forests in elevations up to 3,600 meters.	Potential. Individuals may occur seasonally as a potential migratory stopover. Additional habitat surveys may be necessary to determine the presence of this species.

Source: USFWS IPaC (IPaC: Home (fws.gov))

CLIMATE

Increasing concentrations of greenhouse gases (GHG) can affect global climate by trapping heat in Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. Climate change is a global phenomenon that can also have local impacts. GHGs, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and O_3, are both naturally occurring and anthropogenic (man-made). The research has established a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.[4]

The U.S. EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2020* shows total transportation emissions, including aviation, decreased largely due to coronavirus (COVID-19) and the combined impacts of long-term trends in population, economic growth, energy markets, technological changes, and changes in energy efficiency. The inventory included aviation as a part of the 13.3 percent decrease in transportation sector GHG emissions leading up to 2020.[5]

[4] Intergovernmental Panel on Climate Change AR5 Synthesis Report: Climate Change 2014 (http://www.ipcc.ch/)
[5] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020 https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf

Information regarding the climate for the airport and surrounding environments, including wind, temperature, and precipitation, is found earlier in this ALP Update and Narrative. Currently, the state of Texas has not implemented a state climate action plan recognized by the Center for Climate and Energy Solutions.[6] Larger cities neighboring Odessa have implemented climate action, equity, and resilience plans. The City of Odessa does not have a drafted Climate Action Plan.

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act*, the *Coastal Zone Management Act*, and Executive Order (E.O.) 13089, *Coral Reef Protection*.

The airport is not located within a coastal zone. The closest National Marine Sanctuary is the Flower Garden Bank National Marine Sanctuary, located 548 miles away.[7]

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) of the *Department of Transportation Act,* which was recodified and renumbered as Section 303(c) of 49 United States Code, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly or privately owned historic sites, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.[8]

Table 7 lists potential Section 4(f) resources within two miles of the airport. School playgrounds may be considered a Section 4(f) resource if the recreational facilities at the school are readily available to the public.

TABLE 7 | U.S. Dept. of Transportation Section 4(f) Resources Within Two Miles of the Vicinity of the Airport

Place	Distance from Airport (miles)	Direction from Airport
Schools		
Alternative Education Center	0.2	Southeast
Jordan Elementary School	1.2	North
Ross Elementary	1.7	Southeast
Ireland Elementary	2.0	Southeast
Dr. Lee Buice Elementary	0.4	Northeast
Public Recreational Facilities/Nature Preserves		
Lawndale Park	1.2	Northwest
Dorothy L. Murphy Park	1.2	Southwest
Sherwood Park	1.5	South
Ratliff Ranch Golf Course	0.8	East
Sunset Golf & Country Club	1.2	Northwest
Ratliff Stadium and Athletic Fields	0.4	East

Source: Google Earth Aerial Imagery (May 2022); Coffman Associates analysis

[6] U.S. State Climate Action Plans — Center for Climate and Energy Solutions (c2es.org)
[7] Google Earth Aerial Imagery (May 2022)
[8] 49 U.S. Code § 303 - Policy on lands, wildlife and waterfowl refuges, and historic sites

Significant historic resources are also protected under Section 4(f). The closest NRHP feature is White-Pool House, located five miles from the airport.

The I-20 Wildlife Preserve & Jenna Welch Nature Study Center is 16 miles northeast of the airport. The I-20 wildlife preserve is a 100-acre riparian forest campus. The reserve protects Midland's urban playa habitat including wetlands, floodplain thickets, prairie grassland that home various species of wildlife.

Nearest wilderness and national recreation areas are listed below:

- Nearest Wilderness Area: Carlsbad Caverns Wilderness (121 miles from the airport)
- Nearest National Recreation Area: Amistad National Recreation Area (170 miles from airport)
- Nearest Wildlife Refuge: (Muleshoe National Wildlife Refuge (139 miles from airport)

FARMLANDS

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and consider the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines, developed by the U.S. Department of Agriculture (USDA), apply to farmland classified as prime, unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

NRCS Web Soil Survey farmland classification shows the following types of soils within the vicinity of the airport: "Not prime farmland."

Table 8 lists each soil type in the airport area based on information obtained from the USDA Natural Resources Conservation Service's (NRCS) Web Soil Survey (WSS). Most of the airport is classified as KSA (Kimbrough-Stegall association) with a small strip of other soils along the airport property line abutting US Highway 385.

TABLE 8| Farmland Classification

Map unit symbol	Map unit name	Rating
Kb	Kimbrough-Urban Land complex	Not prime farmland
KSA	Kimbrough-Stegall association, nearly level	Not prime farmland
M-W	Miscellaneous water	Not prime farmland
Ra	Ratliff-Urban land complex	Not prime farmland
Summary by Map Unit Ector and Crane Counties, Texas (TX606)		

Source: USDS Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources. According to the U.S. EPA's *EJSCREEN*, there are no brownfield sites within three miles of the airport. There is one Superfund site (East 67th Street Ground Water Plume), located 0.3 mile south of the airport.

National Pollutant Discharge Elimination System (NPDES) permits outline the regulatory requirements of municipal storm water management programs and establish requirements to help protect the beneficial uses of the receiving waters. They require permittees to develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States to the maximum extent practicable (MEP). Texas manages the NPDES for the state under the guidance of the U.S. EPA.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the *Native American Graves Protection and Repatriation Act* (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when a proposed project causes an adverse effect on a resource which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.

Sections 14-3-1, 14-3-2, and 14-3-3 of the City of Odessa, Texas Zoning Ordinance includes Historical Preservation Regulations and applications for designation of historical landmarks or districts in Odessa.[9] The airport may still have buildings dating to the early 1970s or older. Such structures could be considered historic resources (i.e., 50 years or older) and should be evaluated for historic significance if proposed for demolition or alteration. Most of the surface area of the airport has been previously disturbed and the potential for intact prehistoric resources on the ground surface appears low.

LAND USE

Land use regulations near airports are achieved through local government codes, city policies, and plans that include airport districts and planning areas. Regulations are used to avoid land use compatibility conflict around airports.

Based on the City of Odessa Zoning Map, ODO is considered a light industrial land use and is surrounded by single family residential, open space, commercial, and light industrial land uses. Light Industrial zoning is present on and around the airport on the west, south, and east as far as Dawn Avenue. Commercial

[9] Zoning Ordinance (odessa-tx.gov) https://www.odessa-tx.gov/DocumentCenter/View/1433/New-Zoning-Ordinance---City-of-Odessa-Texas-PDF

and light industrial land uses immediately surround the airport's facilities on the west and south. The airport is also adjacent to residences on the north, east and southeast boundaries, and is in proximity to a new subdivision located on Dawn Avenue. The Ratliff golf course, stadium, softball and soccer fields, and tennis courts are less than 0.5 mile from the airport property on the east side. There are several schools within two miles of the airport (see **Table 7** and **Exhibit 10**)

Section 14-8-2 in the city's zoning ordinance includes specific height restrictions based on land use, but states that buildings in the Light Industrial District can be constructed to "any legal height not restricted by other laws or ordinances." In addition, the city's performance standards for Light Industrial Districts provide an exemption for transient noise of moving sources such as automobiles, trucks, and airplanes (Section 14-4-2 [4][D).

NATURAL RESOURCES AND ENERGY SUPPLY

Natural resources and energy supply provide an evaluation of a project's consumption of natural resources. It is the policy of FAA Order 1053.1C, *Energy and Water Management Program for FAA Buildings and Facilities*, to encourage the development of facilities that exemplify the highest standards of design, including principles of sustainability.

Odessa Water, through Odessa Utilities Department, provides water for about 97,802 residents living in the Odessa area. Established in 1881, Odessa Water purchases all its water, untreated, from the Colorado River Municipal Water District (CRMWD). The majority of the water is surface water from Lake Ivie (Runnels County), Lake Thomas (Scurry County), and Lake Spence (Coke County). Groundwater or well water from Ward and Martin Counties wells are also pumped to meet the water system demands.[10]

NOISE AND NOISE COMPATIBLE LAND USE

Federal land use compatibility guidelines are established under 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. According to 14 CFR Part 150, residential land and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level (Ldn or DNL)[11]. Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB DNL contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into the design and construction of the structure. Special consideration should also be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question.[12]

Table 9 shows noise-sensitive land uses within two miles of the airport. The nearest hospital/medical center, Odessa Regional Medical Center, is five miles south of the airport.

[10] Odessa Utilities Department https://waterzen.com/water-providers/odessa-water/
[11] The DNL accounts for the increased sensitivity to noise at night (10:00 PM to 7:00 AM) and is the metric preferred by FAA, the U.S. EPA, and the U.S. Department of Housing and Urban Development as an appropriate measure of cumulative noise exposure.
[12] 49 U.S. Code § 47141 – Compatible land use planning and projects by State and Local Governments

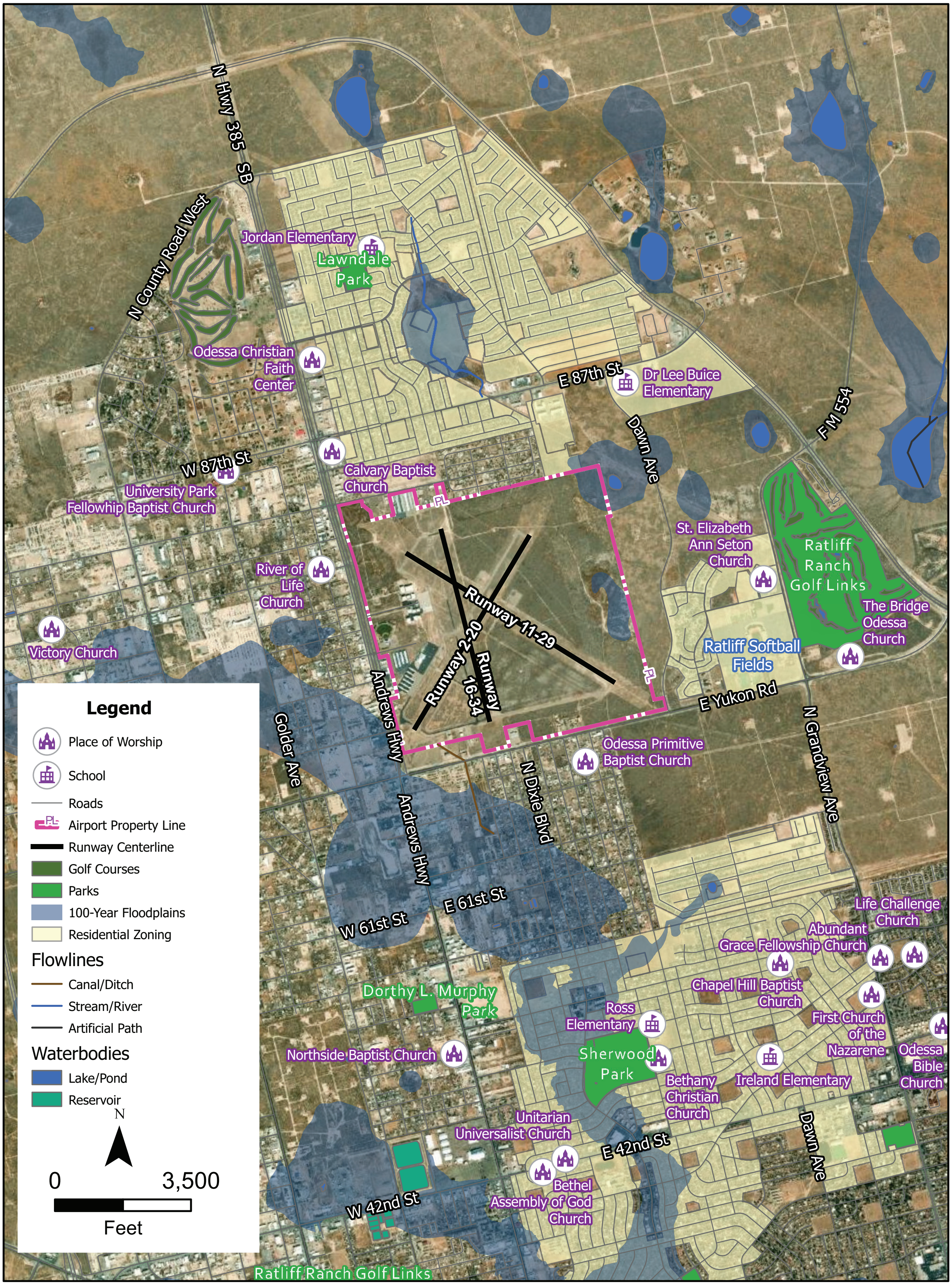
N Hwy 385 SB
N County Road West
Jordan Elementary
Lawndale Park
Odessa Christian Faith Center
E 87th St
Dr Lee Buice Elementary
Dawn Ave
FM 554
W 87th St
Calvary Baptist Church
University Park Fellowship Baptist Church
PL
St. Elizabeth Ann Seton Church
Ratliff Ranch Golf Links
River of Life Church
Runway 11-29
Runway 2-20
Runway 16-34
The Bridge Odessa Church
Ratliff Softball Fields
Victory Church
E Yukon Rd
Andrews Hwy
Golder Ave
Odessa Primitive Baptist Church
N Dixie Blvd
N Grandview Ave
Legend
Place of Worship
School
Roads
Airport Property Line
Runway Centerline
Golf Courses
Parks
100-Year Floodplains
Residential Zoning
Flowlines
Canal/Ditch
Stream/River
Artificial Path
Waterbodies
Lake/Pond
Reservoir
N
0
3,500
Feet
W 61st St
E 61st St
Life Challenge Church
Abundant
Grace Fellowship Church
Dorthy L. Murphy Park
Chapel Hill Baptist Church
Ross Elementary
First Church of the Nazarene
Odessa Bible Church
Northside Baptist Church
Sherwood Park
Bethany Christian Church
Ireland Elementary
Unitarian Universalist Church
E 42nd St
Bethel Assembly of God Church
W 42nd St
Ratliff Ranch Golf Links

TABLE 9 | Noise-Sensitive Land Uses within Two Miles of Airport

Facility	Distance from Airport (Miles)	Direction from Airport
Schools		
Alternative Education Center	0.2	Southeast
Jordan Elementary School	1.2	North
Ross Elementary	1.7	Southeast
Ireland Elementary	2.0	Southeast
Dr. Lee Buice Elementary	0.4	Northeast
Worship		
University Park Fellow Baptist Church	1.0	Northwest
Calvary Baptist Church	0.3	Northeast
Odessa Primitive Baptist Church	0.2	South
Unitarian Universalist Church	2.0	South
Northside Baptist Church	1.5	South
Bethany Christian Church	1.6	South
River of Life Church	0.2	West
St. Elizabeth Ann Seton Church	0.9	East
The Bridge Odessa	1.2	East
Odessa Christian Faith Center	1.0	Northeast
Life Challenge Church	2.1	Southeast

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics | Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature. A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s).

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population), be considered, as well as an evaluation of environmental health and safety risks to children. The FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts.

Would the proposed action:

- induce substantial economic growth in an area, either directly or indirectly;
- disrupt or divide the physical arrangement of an established community;
- cause extensive relocation when sufficient replacement housing is unavailable;
- cause extensive relocation of community business what would cause severe economic hardship for affected communities;
- disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- produce a substantial change in the community tax base?

Environmental Justice | Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

Meaningful Involvement ensures that:

- people have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- the public's contribution can influence the regulatory agency's decision;
- their concerns will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected.[13]

The closest residential area is immediately adjacent to the airport boundary. The airport is adjacent to low-income residences (trailers or mobile homes) on two sides including the north and south boundary and is in proximity to a residential subdivision off Dawn Avenue on the east side. According to 2019 American Community survey estimates, the population within one mile of the airport is 11,865 persons, of which 27 percent is considered low-income and 56 percent are considered people of color. **Table 10** details the population characteristics within one mile of the airport.

TABLE 10 | Population Characteristics Within One Mile of the Airport

Characteristic	
Total Population	11,865
Population by Race	
White	79%
Black	1%
American Indian	0%
Asian	3%
Pacific Islander	0%
Some Other Race	14%
Population Reporting Two or More Races	3%
Total Population by Race	**100%**
Total Hispanic population	6,050 (51%)

Source: American Community Survey (2019); U.S. EPA EJSCREEN ACS Summary Report (2019)

Children's Environmental Health and Safety | Federal agencies are directed, per E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks, to make it a high priority to identify and assess the environmental health and safety risks that may disproportionately impact children. Such risks include those that are attributable to products or substances that a child is likely to encounter or ingest (air, food, water – including drinking water) or to which they may be exposed.

[13] Environmental Justice EPA https://www.epa.gov/environmentaljustice

According to the U.S. EPA EJSCREEN report, approximately 30 percent of the population within the one-mile study area previously identified is under the age of 17. This equated to 3,618 children in 2019. See **Table 9** for a list of schools and recreational facilities that are used by children within a two-mile radius of the airport.

VISUAL EFFECTS

Visual effects deal broadly with the extent to which a proposed action or alternative(s) would either (1) produce light emissions that create an annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Each jurisdiction will typically address outdoor lighting, scenic vistas, and scenic corridors in zoning ordinances and their general plan.

Light Emissions | Light emission impacts typically relate to the extent to which any light or glare results from a source that could create an annoyance for people or would interfere with normal activities. Generally, local jurisdictions will include ordinances in the local code addressing outdoor illumination to reduce the impact of light on surrounding properties.

Existing light emission sources associated with ODO include airfield lighting and terminal/landside lighting. Airfield lighting includes lighting directly at or on the airfield system, such as runway and taxiway lighting.

Visual Resources and Visual Character | Visual character refers to the overall visual makeup of the existing environment where a proposed action or its alternative(s) would be located. For example, locations near densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, deserts, etc.

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s).

The National Scenic Byways Program is a voluntary, community-based program administered through the Federal Highway Administration to recognize, protect, and promote America's designated scenic routes. It is reported by the U.S. Department of Transportation and Federal Highways Administration, that the State of Texas is not on the national byways map.[14] Currently, Texas does have some protected highways not considered as "scenic" but are protected from new signage.[15]

[14] Preserve Texas Scenic Highways | Scenic Texas https://www.scenictexas.org/resources/scenic-highways
[15] Prohibition of Signs on Certain Highways (txdot.gov) https://ftp.txdot.gov/pub/txdot-info/row/scenic_prohibited.pdf

WATER RESOURCES

Wetlands | The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).

USFWS manages the National Wetlands Inventory on behalf of all federal agencies. The National Wetlands Inventory identifies surface waters and wetlands in the nation. The inventory and environmental sensitives exhibit (**Exhibit 10**) indicate a few Freshwater Emergent Wetlands directly outside of the northeast boundary of the airport.

Floodplains | E.O. 11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains.

The FEMA Flood Map Service Center indicates the airport property is within a 100-year flood zone. The selected flood map boundary, Panel 48135C0220E (effective date 3/15/2012), indicates that most of the airport is in Zone X, an Area of Minimal Flood Hazard. However, on the eastern portion of the airport, there is a special flood hazard area designated as Zone AE, which is located within a 100-Year Floodplain. This flood hazard area is located east of the airport and is identified on **Exhibit 10**.

Surface Waters | The *Clean Water Act* (CWA) establishes water quality standards, controls discharges, develops waste treatment management plans and practices, prevents or minimizes the loss of wetlands, and regulates other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. Additionally, Congress has mandated (under the CWA) the National Pollutant Discharge Elimination System (NPDES).

ODO is located in the Antelope Lake-Muskingam Draw Watershed. The nearest river is Beals Creek, 51 miles northeast of the airport. The nearest impaired watershed under Section 303 of the CWA is a segment of the Colorado River, 85 miles northeast of the airport.[16]

[16] EPA EJSCREEN – Water features https://www.epa.gov/ejscreen

Groundwater | Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes or reduction of infiltration or recharge area due to new impervious surfaces.[17]

The EPA's Sole Source Aquifer (SSA) Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA). Since 1977, it has been used by communities to help prevent contamination of groundwater from federally funded projects. It has increased public awareness of the vulnerability of groundwater resources. The SSA program is authorized by Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq), which states:

"If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register."[18]

According to the U.S. EPA Sole Source Aquifer for Drinking Water website, there are no sole source aquifers located within airport boundaries. The nearest sole source aquifer, Edwards Aquifer I (San Antonio Area) SSA - Streamflow Source Area, is located 169 miles from the airport. [19]

Wild and Scenic Rivers | The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic Rivers Act*, directing Federal agencies to consider potential wild and scenic rivers in the comprehensive planning process.

The closest designated wild and scenic river identified is the Rio Grande River, located 140 miles east of the airport.[20] The nearest National River Inventory feature is Pecos River, located 94 miles away.

AIRSPACE CHARACTERISTICS

The airspace within the National Air Transportation System (NAS) is divided into six different categories or classes. The airspace classifications that make up the NAS are presented on **Exhibit 11**. These categories of airspace are made up of Classes A, B, C, D, E, and G airspace. Each class of airspace contains its own criteria that must be met in terms of required aircraft equipment, operating flight rules (visual or

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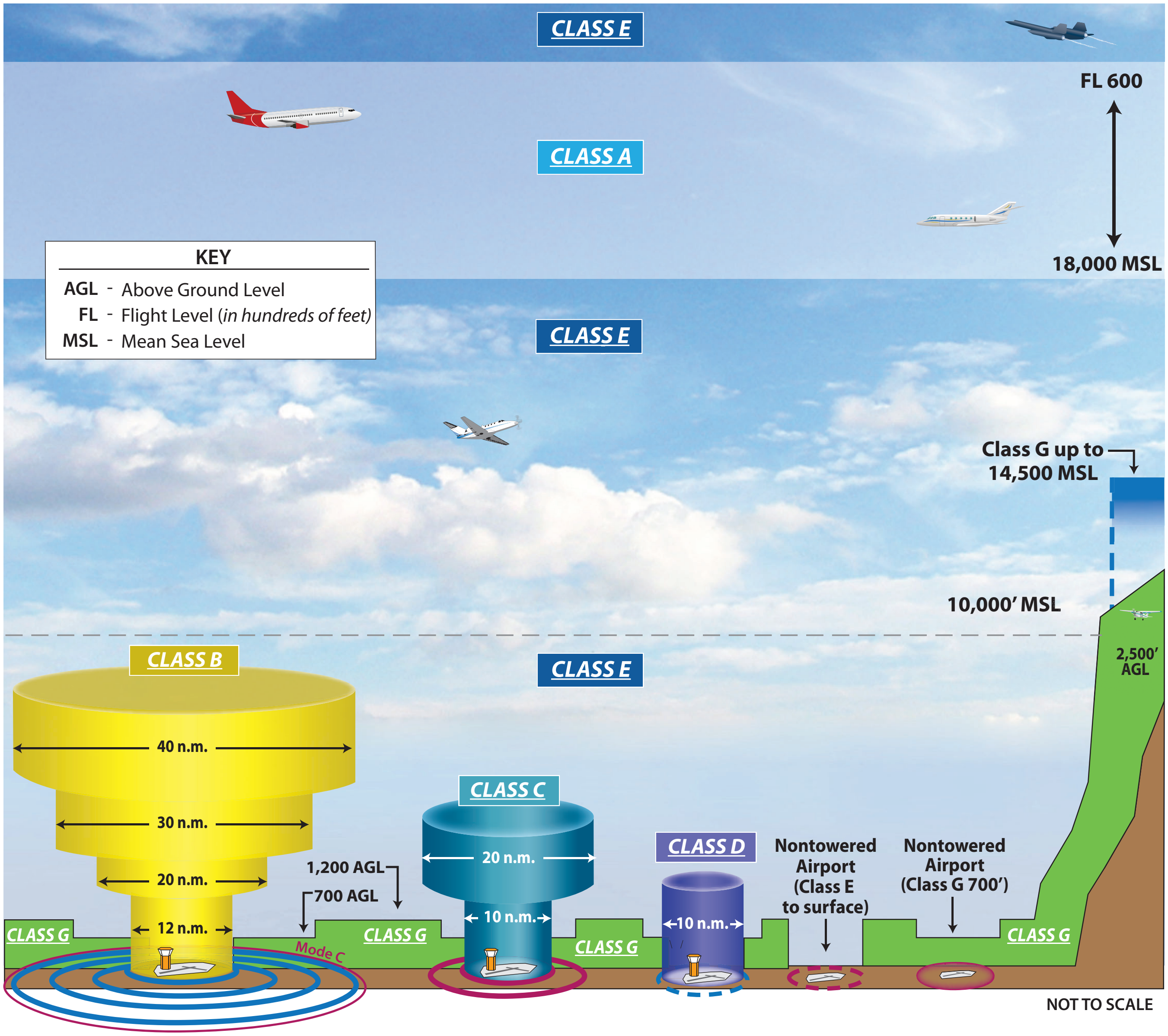
[17] United States Geological Survey - What is Groundwater? https://www.usgs.gov/faqs/what-groundwater
[18] Overview of the Drinking Water Sole Source Aquifer Program | US EPA https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#Authority
[19] Interactive Map for Sole Source Aquifers Sole Source Aquifers (arcgis.com)
[20] Nationwide Rivers Inventory – Rivers https://www.rivers.gov/california.php



DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A Think A - Altitude. Airspace above 18,000 feet MSL up to and including FL 600. Instrument Flight Rule (IFR) flights only, ADS-B 1090 ES transponder required, ATC clearance required.

CLASS B Think B - Busy. Multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. ADS-B 1090 ES transponder required, ATC clearance required.

CLASS C Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.

CLASS D Think D - Dialogue. Pilot must establish dialogue with tower. Generally airspace from the surface to minimum 2,500 feet AGL surrounding towered airports.

CLASS E Think E - Everywhere. Controlled airspace that is not designated as any other Class of airspace.

CLASS G Think G - Ground. Uncontrolled airspace. From surface to a 1,200 AGL (in mountainous areas 2,500 AGL) Exceptions: near airports it lowers to 700' AGL; some airports have Class E to the surface. Visual Flight Rules (VFR) minimums apply.

Source: www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/15_phak_ch15.pdf instrument flight rules), and procedures. Classes A, B, C, D, and E are considered controlled airspace, which requires pilot communication with the controlling agency prior to airspace entry and throughout operation within the designated airspace. Pilot communication procedures, required pilot ratings, and required minimum aircraft equipment vary depending upon the class of airspace, as well as the type of flight rules in use.

As shown on **Exhibit 12**, ODO is located on the western edge of Midland Class C airspace, which extends from 4,600 feet mean sea level (MSL) up to 6,900 feet MSL. Class E airspace, which extends from 700 feet above ground level (AGL) to the floor of Class C airspace, abuts the outer ring of Midland Class C airspace. Class G, or uncontrolled airspace, extends from the surface to the base of overlying Class E airspace.

Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at some commercial service airports. Pilots flying in Class C airspace around ODO must have an aircraft equipped with a two-way radio, an encoding transponder, and have established communication with the ATCT. Aircraft may fly below the floor of the Class C airspace or above the Class C ceiling without establishing communication with ATC.

Exhibit 12 also depicts other airspace features within the vicinity of ODO, including Victor Airways, Restricted Areas, Military Operations Areas (MOAs), Military Training Routes (MTRs), and Alert Areas.

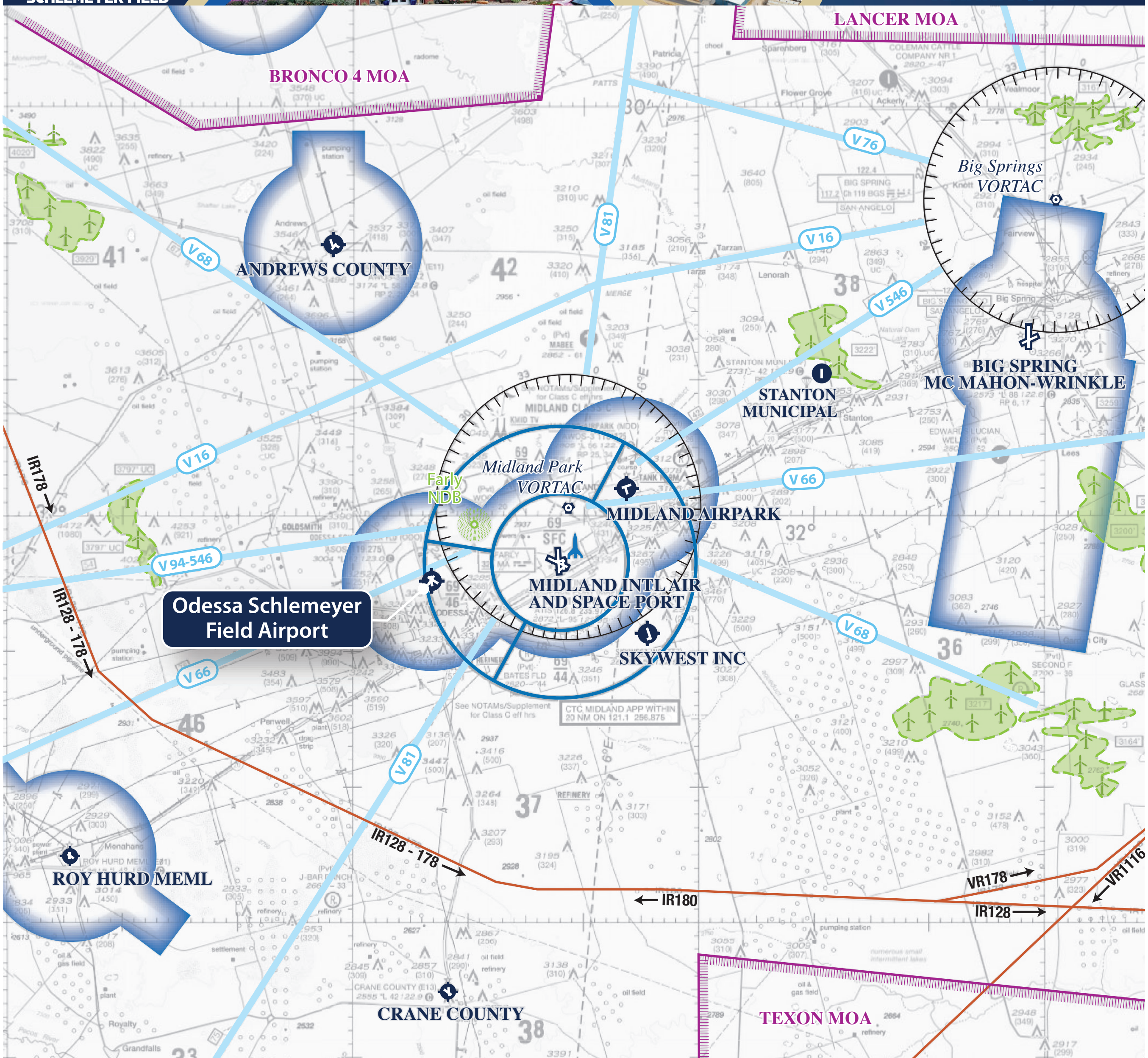
Victor Airways are corridors of airspace extending between VOR facilities that are eight miles wide and extend from 1,200 feet up to, but not including, 18,000 feet. Victor Airways near the airport emanate from the Pecos VOR-DME (V66), the Wink VORTAC (V94-546), and the Fort Stockton VORTAC (V81).

MOAs illustrate airspace where a high level of military activity is conducted and are intended to separate civil and military aircraft. Civilian air travel is not restricted in MOAs, but they are advised to exercise extreme caution when flying within an MOA when military activity is being conducted. There are three MOAs in the vicinity of the airport:

- Bronco 4 MOA – Located approximately 35 nm to the north, the Bronco 4 MOA is operated at 10,000 feet MSL between the hours of 0600 through 1800 Monday through Friday.
- Lancer MOA – Located approximately 46 nm northeast, the Lancer MOA is operated at 6,200 feet MSL Monday through Friday from 0900 to 2400.
- Texon MOA – Located 34 nm southeast of ODO, the Texon MOA is operated at 6,000 feet MSL Monday through Friday from sunrise to sunset.

Other times of operation for each MOA, outside of the listed times of use, are issued by NOTAM. Low level flight training and gunning/missile training is established near the airport at a high frequency and pilots operating in the area should be alert to these training activities.

MTRs are designated airspace that has been generally established for use by high-performance military aircraft to train below 10,000 feet AGL and in excess of 250 knots. There are VR (visual) and IR (instrument) designated MTRs. MTRs with no segment above 1,500 feet AGL will be designated with the VR or



LEGEND

- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Compass Rose
- Non-directional Radio Beacon (NDB)
- VORTAC
- Military Operations Area (MOA)
- Wind Turbine Farm
- Space Launch Activity Area
- Class C Airspace
- Class E (sfc) Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E airspace
- Victor Airways
- Military Training Routes

NORTH

NOT TO SCALE

Source:
Albuquerque Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, January 27, 2022

IR, followed by a four-digit number (e.g., VR1116). MTRs with one or more segments above 1,500 feet AGL are identified by the route designation followed by a three-digit number (e.g., IR178). The arrows on the route show the direction of travel.

Restricted airspace is an area of airspace that is typically used by the military in which the local controlling authorities have determined that air traffic must be restricted or prohibited for safety or security concerns. The nearest restricted area (R-6318) is located 130 nm southwest of the airport, which is operated continuously up to 14,000 feet MSL.

Alert Areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. There are no Alert Areas in the vicinity of the airport.

AIRPORT TRAFFIC CONTROL

There is no airport traffic control tower at ODO; therefore, no formal terminal air traffic control services are available for aircraft landing or departing the airport. Aircraft operating in the airport vicinity are not required to file any type of flight plan or to contact any air traffic control facility unless they are entering airspace where contact is mandatory (i.e., Midland Class C airspace). The common traffic advisory frequency (CTAF) is used by pilots to obtain airport information and to advise other aircraft of their position in the traffic pattern and their intentions.

The airport is located within the jurisdiction of the Fort Worth Air Route Traffic Control Center (ARTCC). The San Angelo flight service station (FSS) provides additional weather data and other pertinent information to pilots in the vicinity of the airport.

REGIONAL AIRPORTS

A review of other public-use airports within 30 nm of ODO was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at ODO. Public-use airports within the 30 nm of the airport are detailed in **Exhibit 13**, with information pertaining to each airport obtained from FAA Form 5010-1, *Airport Master Record*.

COMMUNITY PROFILE

For an airport planning study, a profile of the local community including its socioeconomic characteristics is collected and examined to derive an understanding of the dynamics of growth within the study area. Socioeconomic information related to the local area is an important consideration in the master planning process. The community profile for the City of Odessa on **Exhibit 14** is derived from the city's 2016 comprehensive plan, *Envision Odessa*, as well as information sourced from the city's economic development department and Woods & Poole Economics - *Complete Economic and Demographic Data Source*, 2021.

Odessa's population has historically been tied to the boom/bust cycle that occurs in the energy sector. In 2020, the city had a population of 122,630 residents, according to U.S. Census estimates. Current projections for population were not available, but the 2016 *Envision Odessa* report included 5-year projections through 2035, when the population is anticipated to reach 140,322. In terms of the Midland-Odessa combined statistical area, the population is expected to grow at a compound average growth rate of 1.2 percent, which is faster than both the State of Texas and the United States. Key industries in Ector County include oil and gas, construction, transportation, manufacturing, and government. These, along with others, support a labor force of more than 90,000 people.

MIDLAND INTERNATIONAL AIR AND SPACE PORT (MAF)

Distance from ODO .... 10 mi E
Airport NPIAS Classification .... Primary Commercial Service
FAA Asset Study Classification .... N/A
Elevation .... 2,872' MSL
Weather Reporting .... ASOS
ATCT .... Yes
Annual Operations 58,010
Based Aircraft 106

Primary Runway	16R/34L	10/28	4/22	16L/34R
Length	9,501'	8,302	4,605	4,247
Width	150'	150	75	100
Pavement Strength (pounds)				
SWL	160,000	160,000	30,000	30,000
DWL	200,000	200,000	60,000	60,000
2D	350,000	350,000	NA	NA
2DT	700,000	700,000	NA	NA
Lighting	HIRL	HIRL	MIRL	MIRL
Marking	Precision	Precision	Nonprecision	Basic
Approach Aids	PAPI-4, REILs	PAPI-4, MALS, MALSR	None	None
Instrument Approach Procedures	GPS, HI-VOR	ILS, GPS	GPS	VOR

Services Provided: Jet A & 100LL Fuel; hangars and tiedowns; aircraft maintenance

MIDLAND AIRPARK AIRPORT (MDD)

Distance from ODO .... 16 mi ENE
Airport NPIAS Classification .... GA
FAA Asset Study Classification .... Regional
Elevation .... 2,805' MSL
Weather Reporting AWOS-3
ATCT .... No
Annual Operations 41,010
Based Aircraft 50

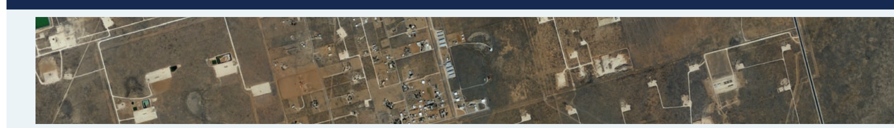
Primary Runway	7/25	16/34
Length	5,571	3,977
Width	75	75
Pavement Strength (pounds)		
SWL	18,500	18,500
DWL	N/A	N/A
Lighting	MIRL	MIRL
Marking	Basic/Nonprecision	Basic/Nonprecision
Approach Aids	PAPI-2; VASI	PAPI-2
Instrument Approach Procedures	GPS; VOR/DME	GPS

Services Provided: Jet A & 100LL Fuel; hangars and tiedowns; aircraft maintenance

KEY

ASOS	Automated Surface Observing System
AWOS	Automated Weather Observing System
ATCT	Air Traffic Control Tower
DWL	Dual Wheel Loading
GA	General Aviation
GPS	Global Positioning System
HIRL	High Intensity Runway Lights
MALS	Medium Intensity Approach Lighting System
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	Medium Intensity Runway Lights
MSL	Mean Sea Level
N/A	Not Applicable
NPIAS	National Plan of Integrated Airport Systems
PAPI	Precision Approach Path Indicator
SWL	Single Wheel Loading
VASI	Visual Approach Slope Indicator
VOR	Very High Omnidirectional Range
VOR/DME	Very High Omnidirectional Range with Distance Measuring Equipment

SKYWEST INC AIRPORT (7T7)

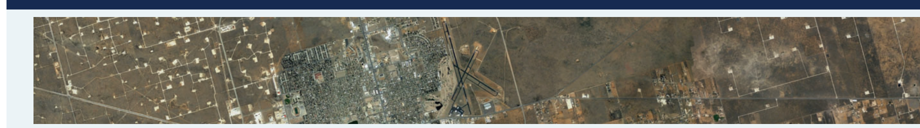


Distance from ODO .... 16 mi ESE
Airport NPIAS Classification .... N/A
FAA Asset Study Classification .... N/A
Elevation .... 2,805' MSL
Weather Reporting .... No
ATCT .... No
Annual Operations 9,600
Based Aircraft 34

Primary Runway	16/34	6/24
Length	5,000	2,800
Width	42	45
Pavement Strength (pounds)		
SWL	12,500	N/A
DWL	N/A	N/A
Lighting	Nonstandard	None
Marking	Nonstandard	Nonstandard
Approach Aids	None	None
Instrument Approach Procedures	None	None

Services Provided: 100LL Fuel; hangars and tiedowns; aircraft maintenance

ANDREWS COUNTY AIRPORT (E11)



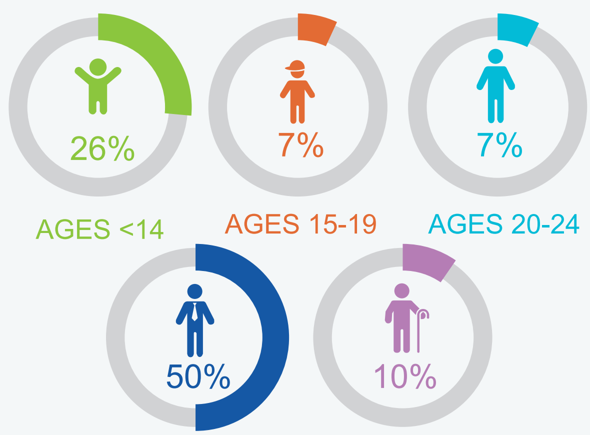
Distance from ODO .... 26 mi NNW
Airport NPIAS Classification .... GA
FAA Asset Study Classification .... Local
Elevation .... 3,174' MSL
Weather Reporting AWOS-3
ATCT .... None
Annual Operations 18,249
Based Aircraft 19

Primary Runway	16/34	2/20	11/29
Length	5,816	3,893	3,048
Width	75	75	75
Pavement Strength (pounds)			
SWL	23,000	23,000	17,000
DWL	37,000	N/A	N/A
Lighting	MIRL	MIRL	N/A
Marking	Nonprecision	Basic	Basic
Approach Aids	PAPI-4	PAPI-4	None
Instrument Approach Procedures	GPS	None	None

Services Provided: Jet A & 100LL Fuel; tiedowns; aircraft maintenance

Exhibit 13
VICINITY AIRPORTS

POPULATION BY AGE



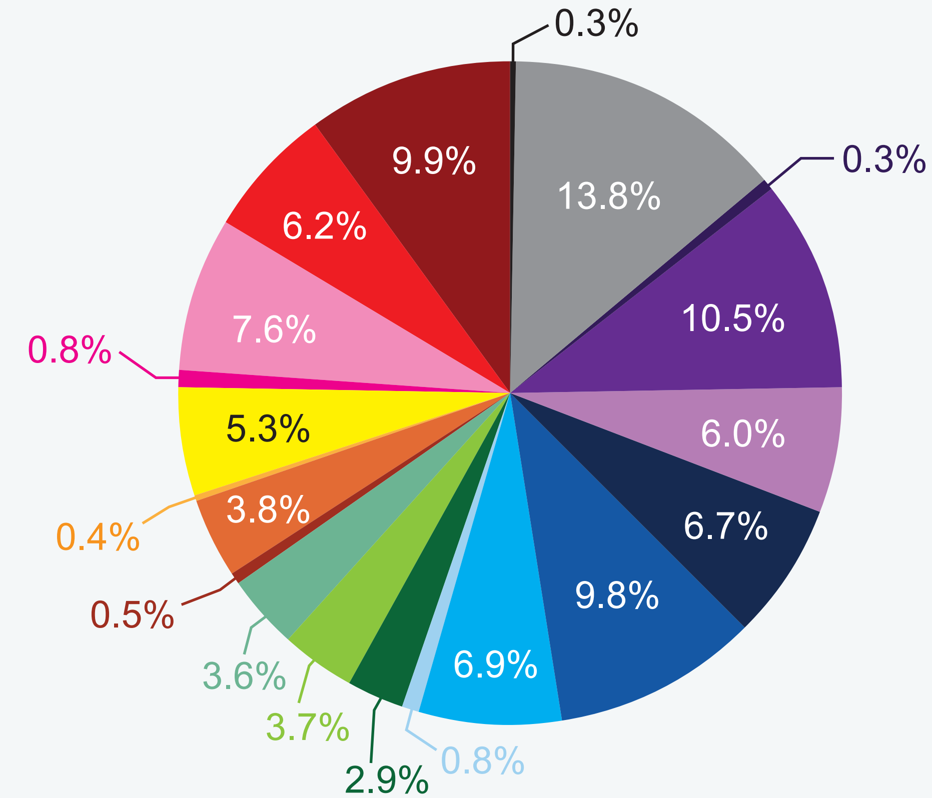
MEDIAN AGE 30.5

ECTOR COUNTY POPULATION

2020	167,765
2030	187,014
2040	205,758
2050	224,650

1.2% Growth

EMPLOYMENT BY SECTOR



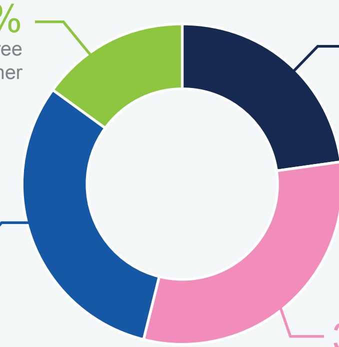
9,029	Government
5,653	Other Services, Except Government
6,885	Accommodation and Food Service
744	Arts, Entertainment, and Recreation
4,789	Health Care and Social Assistance
373	Educational Services
3,464	Administrative and Waste Management
447	Management and Enterprises
3,248	Professional and Technical Services
3,322	Real Estate and Leasing
2,664	Finance and Insurance
763	Information
6,296	Transportation and Warehousing
8,900	Retail
6,078	Wholesale Trade
5,495	Manufacturing
9,584	Construction
267	Utilities
12,515	Mining (Oil & Gas)
86	Forestry, Fishing, and Related Activities
	Farm Employment

Total Employment 90,863

MAJOR EMPLOYERS

- Ector County I.S.D.
- Medical Center Hospital
- Halliburton
- NexTier Complete Solutions
- City of Odessa
- Saulsbury Companies
- Odessa Regional Medical Center
- Ector County
- HEB
- University of Texas Permian Basin

EDUCATION



HOUSEHOLDS

$63,096
MEDIAN HOUSEHOLD INCOME (2020)

$176,900
MEDIAN HOME VALUE (2020)

Note: Data is reflective of Ector County in 2020 unless otherwise noted
Sources: Envision Odessa; City of Odessa Economic Development Department; Woods & Poole Complete Economic and Demographic Data, 2021

Facility planning requires a definition of demand that may be expected to occur during the useful life of the facility's crucial components. For ODO, this involves projecting aviation demand for a 20-year timeframe. In this report, forecasts of registered aircraft, based aircraft, based aircraft fleet mix, annual airport operations, and forecasts of airport peaking characteristics are projected.

The forecasts generated may be used for a multitude of purposes, including facility needs assessments and environmental evaluations. The forecasts will be submitted to TxDOT/FAA for review and approval to ensure accuracy and reasonable projections of aviation activity. The intent of the projections is to enable the airport to make facility improvements to meet demand in the most efficient and cost-effective manner possible.

It should be noted that aviation activity can be affected by numerous outside influences on a local, regional, and national level. As a result, forecasts of aviation demand should be used only for advisory purposes. It is recommended that planning strategies remain flexible enough to accommodate any unforeseen facility needs.

FORECASTING APPROACH

Typically, the most accurate and reliable forecasting approach is derived from multiple analytical forecasting techniques. Analytical forecasting methodologies typically consist of regression analysis, trend analysis and extrapolation, market share or ratio analysis, and smoothing. Through the use of multiple forecasting techniques based upon each aviation demand indicator, an envelope of aviation demand projections can be generated.

Regression analysis can be described as a forecasting technique that correlates certain aviation demand variables (such as passenger enplanements or operations) with economic measures. When using regression analysis, the technique should be limited to relatively simple models containing independent variables for which reliable forecasts are available (such as population or income forecasts).

Trend analysis and extrapolation is a forecasting technique that records historical activity (such as airport operations) and projects this pattern into the future. Oftentimes, this technique can be beneficial when local conditions of the study area are differentiated from the region or other airports.

Market share or ratio analysis can be described as a forecasting technique that assumes the existence of a top-down relationship between national, regional, and local forecasts. The local forecasts are presented as a market share of regional forecasts, and regional forecasts are presented as a market share of national forecasts. Typically, historical market shares are calculated and used as a base to project future market shares.

Smoothing is a statistical forecasting technique that can be applied to historical data, giving greater weight to the most recent trends and conditions. Generally, this technique is most effective when generating short-term forecasts.

NATIONAL GENERAL AVIATION TRENDS

The current edition of the FAA *Aerospace Forecasts, Fiscal Years 2021-2041* forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

The COVID-19 pandemic has been the biggest factor affecting aviation since March 2020. The effect of the pandemic on the aviation industry has been most devastating to the commercial airline operators, who are still working to recover from staggering losses and add capacity back into networks. However, other segments of the aviation industry, including general aviation such as charters, air taxi, and fractionals, were not impacted quite so much as the airlines. In fact, they appear to have maintained pre-pandemic levels and, in many cases, showed increases in activity. Long-term, the strengths and capabilities developed over the past decade will become evident again. There is confidence that U.S. airlines have finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits.

The long-term outlook for general aviation is promising, as growth at the high-end offsets continuing retirements at the traditional low end of the segment. The active general aviation fleet is forecast to remain relatively stable between 2021 and 2041. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period. **Table 11** details the primary general aviation demand indicators as forecast by the FAA.

TABLE 11 | FAA General Aviation Forecast

Demand Indicator	2021	2041	CAGR
General Aviation (GA) Fleet			
Total Fixed Wing Piston	139,065	116,905	-0.86%
Total Fixed Wing Turbine	25,790	35,780	1.65%
Total Helicopters	10,215	13,390	1.36%
Total Other (experimental, light sport, etc.)	30,800	42,715	1.65%
Total GA Fleet	***205,870***	***208,790***	***0.07%***
General Aviation Operations			
Local	12,743,768	14,392,959	0.61%
Itinerant	13,199,029	15,737,728	0.88%
Total GA Operations	***25,942,797***	***30,130,687***	***0.75%***
CAGR: compound annual growth rate (2021-2041)			

Source: FAA Aerospace Forecast - Fiscal Years 2021-2041

In 2021, the FAA estimated there were 139,065 piston-powered, fixed-wing aircraft in the national fleet. The total number of piston-powered aircraft in the fleet is forecast to decline by -0.9 percent from 2021-2041, resulting in 116,905 by 2041. This reflects a decline of -0.9 percent annually for single engine pistons and -0.4 percent for multi-engine pistons.

Total turbine aircraft are forecast to grow at an annual growth rate of 1.7 percent through 2041. The FAA estimates there were 25,790 turbine-powered aircraft in the national fleet in 2021, and there will be 35,780 by 2041. This includes annual growth rates of 0.6 percent for turboprops, 2.3 percent for business jets, and 1.4 percent for turbine helicopters. **Exhibit 15** presents the historical and forecast U.S. active general aviation aircraft.

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 25.9 million in 2021 to 30.1 million in 2041, with an average increase of 0.8 percent per year as growth in turbine, rotorcraft, and experimental hours offset a decline in fixed-wing piston hours. This includes annual growth rates of 0.6 percent for local general aviation operations and 0.9 percent for itinerant general aviation operations.

GENERAL AVIATION AIRCRAFT SHIPMENTS AND REVENUE

The 2007-2009 economic recession had a negative impact on general aviation aircraft production, and the industry was slow to recover. Aircraft manufacturing declined for three straight years from 2008 through 2010. Since this time, aircraft manufacturing has stabilized and returned to growth. According to General Aviation Manufactures Association (GAMA), there is an expected rebound in aircraft demand once the impact of the COVID pandemic has passed and belief that innovations in electric propulsion and supersonic technologies will increase the sector's global reach. Despite the industry's fourth quarter rebound, the pandemic took its toll on 2020 shipments and billings. The least affected segment, piston airplanes (including both single engine and multi-engine aircraft), saw deliveries drop just 0.9 percent year over year to 1,312 units, but turboprop shipments declined 15.6 percent to 443 and business jet deliveries fell 20.4 percent to 644 aircraft. **Table 12** presents currently available historical data related to general aviation aircraft shipments.

Worldwide shipments of general aviation airplanes declined in the year 2020 with a total of 2,399 units delivered around the globe, compared to 2,658 units in 2019, but still surpassed the 2,325 units in 2017. Worldwide general aviation billings were the highest in 2014. In 2020, there was a decline in new aircraft shipments with a total of $20,029 billion compared to the previous year of $23,515 billion. North America continues to be the largest market for general aviation aircraft and leads the way in the manufacturing of piston, turboprop, and jet aircraft. The Asia-Pacific region is the second largest market for piston-powered, while Europe is the second leading in turboprop and business jets.

TABLE 12 | Annual General Aviation Airplane Shipments Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1043	80	279	438	7,170
1998	2,457	1508	98	336	515	8,604
1999	2,808	1689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,129
2016	2,268	890	129	582	667	21,092
2017	2,324	936	149	563	676	20,197
2018	2,441	952	185	601	703	20,515
2019	2,658	1,111	213	525	809	23,515
2020	2,399	1,155	157	443	644	20,029

SEP - Single-Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet

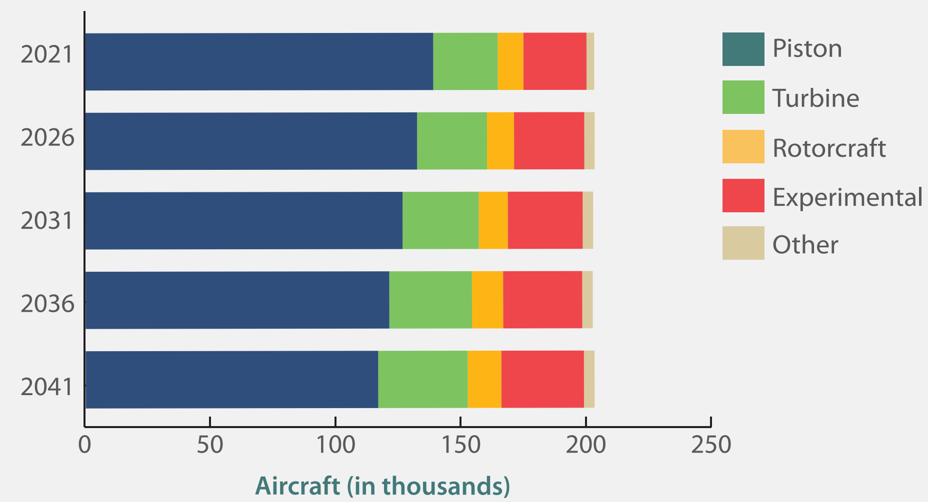
Source: General Aviation Manufacturers Association, 2020 Annual Report

Business Jets | Business jet deliveries decreased from 809 units in 2019 to 644 units in 2020, the second largest drop since the 2008-2009 economic recession. The North American market accounted for 66 percent of business jet deliveries, which is a 1.1 percent decrease in market share compared to 2019.

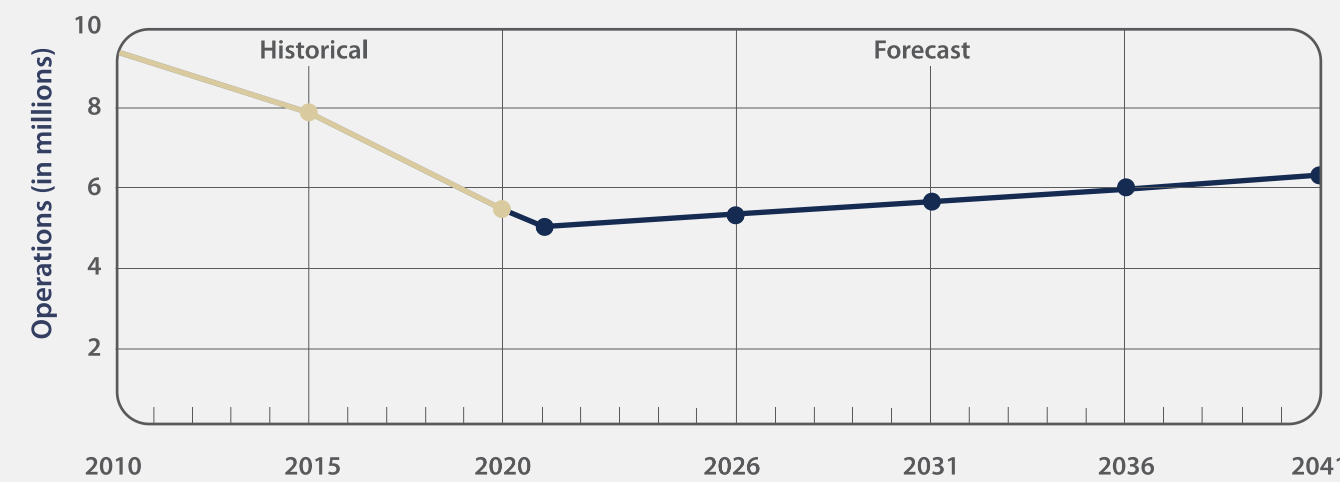
Turboprops | Turboprop shipments were down from 525 in 2019 to 443 in 2020. North America's market share of turboprop aircraft, however, increased by 4.6 percent in the last year. The European market also increased, while Latin America, Middle East Africana, and Asia-Pacific markets decreased their market share.

Pistons | In 2020, piston airplane shipments fell to 1,312 units compared to 1,324 units in the prior year. North America's market share of piston aircraft deliveries dropped 1.5 percent from the year 2019. The Asia-Pacific market experienced a positive rate in market share during the past year, while Europe, Latin-America, and Middle East saw a decline.

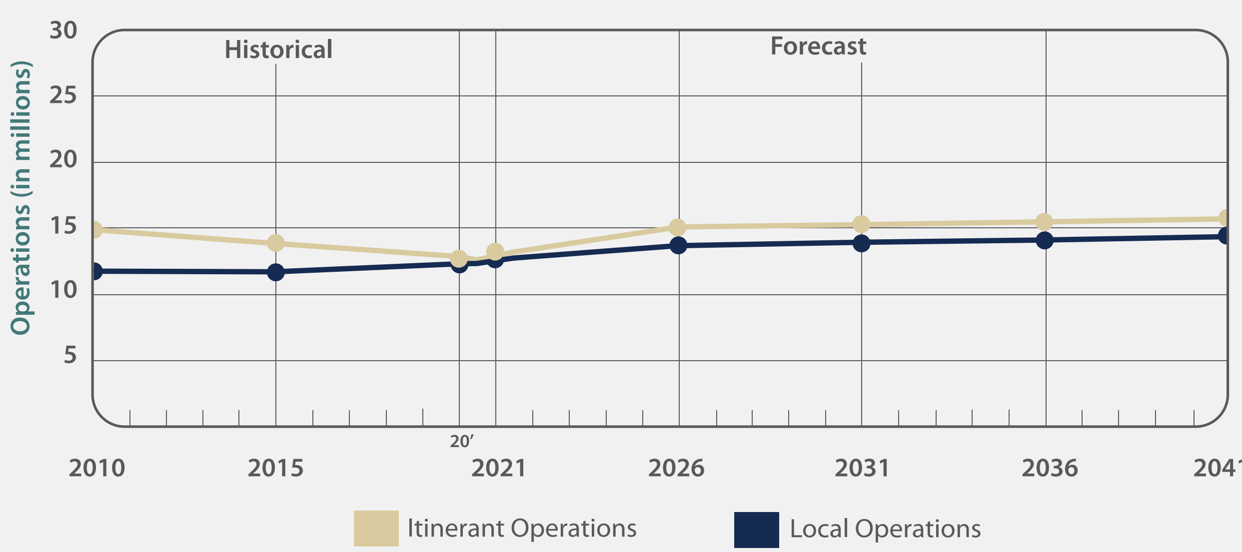
U.S. Active General Aviation Aircraft



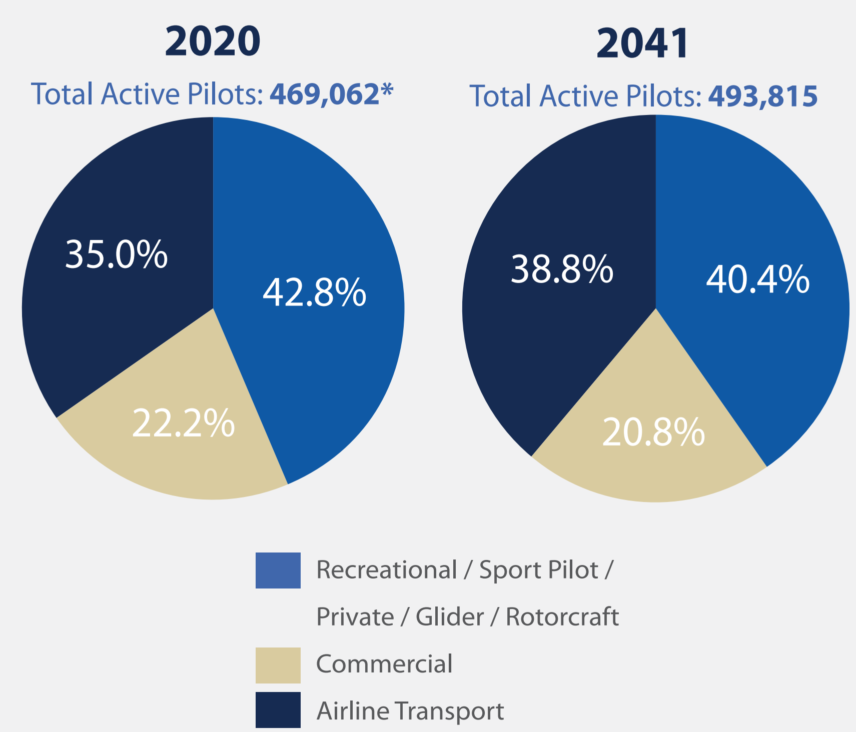
U.S. Air Taxi Operations



U.S. General Aviation Operations



Active Pilots By Certificate



Excludes Student Pilot Certificates

Source: FAA Aerospace Forecasts FY2021-2041

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U.S. Pilot Population

As detailed in **Exhibit 15**, there were 469,062 active pilots certificated by the FAA at the end of 2020. All pilot categories, except for private, rotorcraft- and recreational-only certificates, continued to increase. Except for student pilots and airline transport pilots (ATP), the number of active general aviation pilots is projected to decrease about 2,654 (down 0.04 percent annually) between 2020 and 2041. The ATP category is forecast to increase by 27,407 (up 0.7 percent annually). Sport pilots are predicted to increase by 2.7 percent annually over the forecast period, while both private and commercial pilot certificates are projected to decrease at an average annual rate of 0.4 and 0.1 percent, respectively, until 2041. The FAA has currently suspended the student pilot forecast.

RISKS TO THE FORECASTS

While the FAA is confident that its forecasts for aviation demand and activity can be reached, this is dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic has also presented a new risk without clear historical precedent. The long-term impact of COVID-19 on the aviation industry will not be understood until the full spread or intensity of the human consequences, as well as the breadth and depth of possible economic fallout, is known.

AIRPORT SERVICE AREA FORECASTS

Before aviation demand can be determined for an airport, it is necessary to first identify the airport's role. As stated in the previous section, ODO is classified in the NPIAS as a Regional GA airport, meaning its primary role is to support interstate and some long-distance flying, as well as to serve general aviation needs in the service area. These needs include a diverse range of private general aviation flying activities and include all segments of the aviation industry except commercial air carriers. GA represents the largest component of the national aviation system and includes activities, such as pilot training, recreational flying, and the use of turboprop and jet aircraft for business and corporate use.

ODO was also included in the 2010 *Texas Airport System Plan* (TASP). At a state level, the TASP classifies ODO as a Business/Corporate (BC) facility, which is an airport that provides community access by business jets. The TASP further classifies ODO into a "regional" functional category, meaning it supports higher performance aircraft as compared to other nearby GA facilities.

The next step in defining an airport's demand is to identify its service area. The service area is a generalized geographical area where a potential market for airport services, including based aircraft, exists. Several factors help determine the airport service area, including transportation networks, access to other GA airports, quality of aviation facilities, and distance and travel time between users and facilities.

The service area for a Regional GA airport like ODO typically extends up to a 30-nm radius around the airport but can stretch beyond this. The proximity and level of GA services are largely the defining factors when describing the GA service area. There are four airports located within 30 nm of ODO, three of which are included in the NPIAS. These are: Midland International Air and Space Port (MAF) located 10 miles east of ODO, Midland Airpark Airport (MDD) located 16 miles east/northeast, and Andrews County Airport (E11) located 26 miles north/northwest. The non-NPIAS airport located within the vicinity of ODO is the privately owned Skywest Inc. Airport located 16 miles east/southeast.

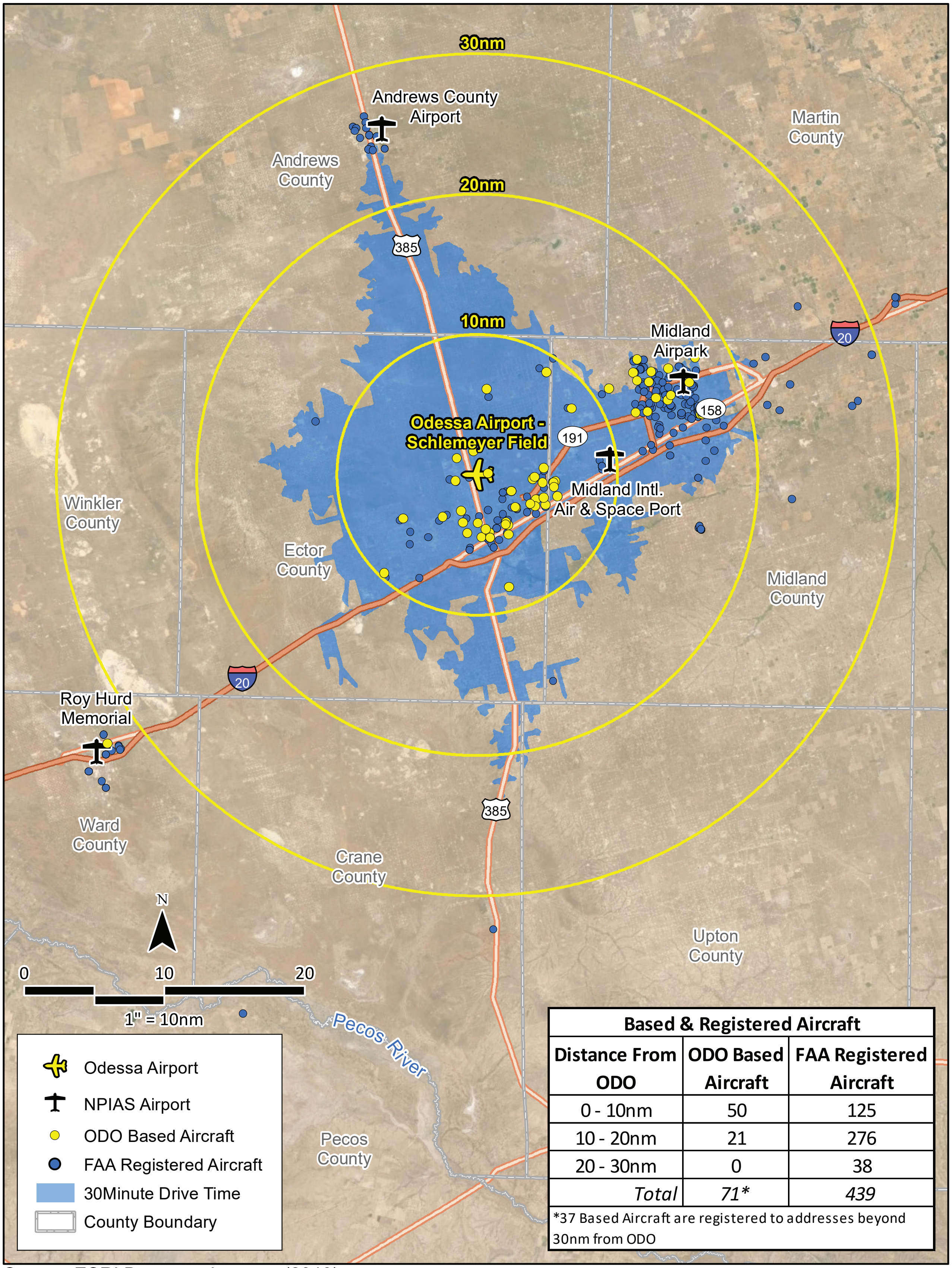
There are two primary demand components that must be addressed in order to define the ODO GA service area. The first is the airport's ability to attract based aircraft. Convenience is generally the determining factor in an aircraft owner's decision to base at a particular airport, with proximity to their residence or business being the key incentive. **Exhibit 16** depicts a 30-minute drive time isochrone from ODO, which encompasses a significant portion of Ector County and extends north into Andrews County and east into Midland County. The exhibit also illustrates based and registered aircraft in the region. As can be seen, there are 71 based aircraft within 30 nm of ODO, with the airport's other based aircraft registered to addresses beyond the 30 nm radius.

The second demand segment to consider is itinerant aircraft operations. In most instances, pilots will choose to utilize airports nearer their intended destination; however, this is also contingent on the airport's capabilities to accommodate the aircraft operator. As a result, airports offering quality services and facilities are more likely to attract itinerant operators in the region.

ODO offers an appealing alternative to pilots in the Midland-Odessa area who want to avoid congestion at MAF, as well as convenient access to Interstate 20. The airport is also highly competitive when compared to other GA facilities in the region, with three runways capable of accommodating business jets, instrument approaches, and a full-service FBO. In addition to ODO's available facilities, the city is the largest in the county and offers a number of hotels and restaurants for visitors. Therefore, the airport's primary service area is defined as the Odessa MSA, which is comprised of Ector County.

REGISTERED AIRCRAFT FORECAST

Historical registered aircraft counts for Ector County from 2002 to 2022 are presented in **Table 13**. Aircraft registrations have fluctuated from a low of 98 aircraft to a peak of 198. Over the last 20 years, registrations in the county have declined from 186 registrations in 2002 to 98 in 2021. The declining trend is likely, at least partly, a result of the FAA's changed aircraft registration requirements that were issued in 2010. The FAA terminated the registration of all aircraft registered before October 1, 2010, over a three-year period, and required re-registration to retain U.S. civil aircraft status. As a result, previously registered aircraft that may have been sold, scrapped/destroyed, or registered to multiple addresses were dropped from the database.



Based & Registered Aircraft

Distance From ODO	ODO Based Aircraft	FAA Registered Aircraft
0 - 10nm	50	125
10 - 20nm	21	276
20 - 30nm	0	38
Total	*71**	*439*

*37 Based Aircraft are registered to addresses beyond 30nm from ODO

Source: ESRI Basemap Imagery (2019), FAA Registered Aircraft Database

TABLE 13 | Ector County, TX Registered Aircraft

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	UAV	Other	Total
2002	141	9	9	2	2	0	23	186
2003	129	5	14	2	1	0	22	173
2004	131	7	13	2	1	0	21	175
2005	131	7	17	1	1	0	20	177
2006	141	12	4	0	2	0	19	178
2007	151	13	7	1	3	0	17	192
2008	150	15	10	2	3	0	17	197
2009	146	18	10	1	2	0	15	192
2010	149	17	9	2	3	0	15	195
2011	148	17	10	3	4	0	16	198
2012	137	18	15	2	5	0	12	189
2013	117	18	13	3	4	0	7	162
2014	123	15	15	5	3	0	6	167
2015	120	13	10	5	2	1	4	155
2016	113	12	11	5	3	1	2	147
2017	106	12	9	4	2	1	1	135
2018	88	12	9	5	2	0	1	117
2019	76	11	8	8	3	0	1	107
2020	71	12	7	8	4	0	2	104
2021	71	8	6	6	4	0	3	98
2022*	74	8	6	6	3	0	2	99

UAV – Unmanned Aerial Vehicle
*Fleet mix reported through 05/11/2022

Source: FAA Registered Aircraft

As detailed in the table, most of the aircraft registered in Ector County are single engine piston aircraft, with 74 of the 99 registered aircraft falling into this category and accounting for 75 percent of the fleet mix. The next largest category is multi-engine piston aircraft, which comprise eight percent of the county's registered aircraft, followed by turboprops and jets at six percent each.

New registered aircraft forecasts have been prepared for Ector County, which will ultimately be used to determine projections for based aircraft at ODO over the next 20 years. Several regression forecasts were considered as well, including single- and multi-variable regressions examining registered aircraft's correlation with the service area population, employment, income, and gross regional product, and with U.S. active general aviation aircraft. None of the regressions produced a strong correlation (r^2 value over 0.9); therefore, the regression forecasts were not considered further.

Table 14 details several projections of registered aircraft for the service area, with a goal of presenting a planning envelope that shows a range of projections based on historic trends. The first set of forecasts is based on market share, which considers the relationship between registered aircraft located in Ector County and active aircraft within the United States. The next set of projections is based on a ratio of the number of aircraft per 1,000 county residents. **Exhibit 17** graphically depicts each of the projections.

TABLE 14 | Registered Aircraft Forecast - Ector County, TX

Year	Service Area Registrations[1]	U.S. Active Aircraft[2]	Market Share of U.S. Aircraft	Service Area Population[3]	Aircraft per 1,000 Residents
2002	186	211,244	0.0880%	122,199	1.52
2003	173	209,606	0.0825%	122,739	1.41
2004	175	219,319	0.0798%	124,163	1.41
2005	177	224,257	0.0789%	125,378	1.41
2006	178	221,942	0.0802%	127,476	1.40
2007	192	231,606	0.0829%	130,459	1.47
2008	197	228,664	0.0862%	133,064	1.48
2009	192	223,876	0.0858%	136,930	1.40
2010	195	223,370	0.0873%	137,075	1.42
2011	198	220,453	0.0898%	139,642	1.42
2012	189	209,034	0.0904%	144,495	1.31
2013	162	199,927	0.0810%	149,656	1.08
2014	167	204,408	0.0817%	154,588	1.08
2015	155	210,031	0.0738%	159,903	0.97
2016	147	211,794	0.0694%	157,858	0.93
2017	135	211,757	0.0638%	156,951	0.86
2018	117	211,749	0.0553%	161,960	0.72
2019	107	210,981	0.0507%	166,223	0.64
2020	104	204,980	0.0507%	167,765	0.62
2021	98	205,870	0.0476%	169,665	0.58
2022	99	206,590	0.0479%	171,601	0.58
Constant Market Share of U.S. Active Aircraft - Low Range (CAGR 0.11%)					
2027	99	207,030	0.0479%	181,240	0.55
2032	99	207,140	0.0479%	190,847	0.52
2042	100	208,911	0.0479%	209,421	0.48
Increasing Market Share of U.S. Active Aircraft - Return to Historic High (CAGR 3.34%)					
2027	121	207,030	0.0583%	181,240	0.67
2032	143	207,140	0.0690%	190,847	0.75
2042	189	208,937	0.0904%	209,421	0.90
INCREASING MARKET SHARE OF U.S. ACTIVE AIRCRAFT - MID RANGE (CAGR 1.96%) - SELECTED FORECAST					
2027	110	207,030	0.0530%	181,240	0.61
2032	121	207,140	0.0584%	190,847	0.63
2042	145	208,937	0.0692%	209,421	0.69
Constant Ratio Projection per 1,000 County Residents - Low Range (CAGR 1.06%)					
2027	105	207,030	0.0505%	181,240	0.58
2032	110	207,140	0.0532%	190,847	0.58
2042	121	208,937	0.0579%	209,421	0.58
Increasing Ratio Projection per 1,000 County Residents - 10-Year Average (CAGR 2.76%)					
2027	115	207,030	0.0555%	181,240	0.63
2032	132	207,140	0.0637%	190,847	0.69
2042	169	208,937	0.0808%	209,421	0.81
CAGR: Compound Annual Growth Rate					

Source: FAA Aircraft Registration Database; FAA Aerospace Forecasts- Fiscal Years 2021-2041; Woods and Poole (2021).

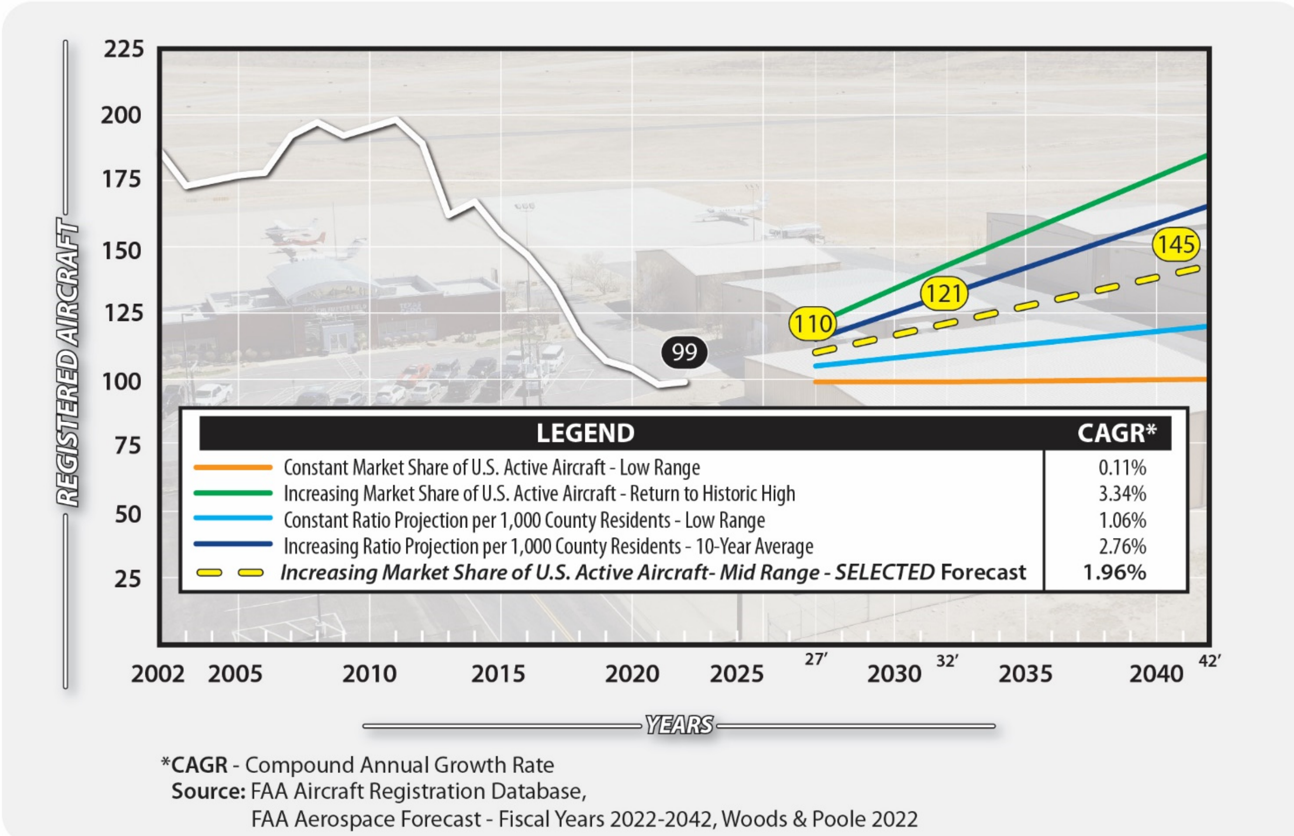


Exhibit 17 – Ector County Registered Aircraft Projections

Market Share Projections

- **Constant Market Share** – The low range market share forecast maintains the 2022 market share of county residents (0.0479%) at a constant throughout the planning period. The result is virtually no growth in registrations over the 20-year planning period, with 100 aircraft registrations in the county by 2042, reflective of a 0.11 percent compound annual growth rate (CAGR).

- **Increasing Market Share** – Two increasing market share forecasts were also considered. The first evaluated a scenario based on the county's historic high market share, which was 0.0904 percent in 2012. A return to this produces much more growth, with 189 aircraft projected by the end of the planning period (3.34 percent CAGR). A mid-range market share forecast was also considered, with a less aggressive growth rate of 1.96 percent, which produced a forecast of 145 registered aircraft in the county by 2042.

Ratio Projections

- **Constant Ratio** – In 2022, there were 0.58 registered aircraft per 1,000 county residents. Carrying this ratio forward through the plan years results in a CAGR of 1.06 percent, or 121 aircraft by 2042.

- **Increasing Ratio** – Over the last 10 years, the county's registered aircraft to population ratio has fluctuated between 0.58 and 1.08, or an average of 0.81 aircraft per 1,000 people. Applying this average to the planning period results in a more aggressive growth scenario, with 169 registered aircraft by 2042. This equates to a CAGR of 2.76 percent.

Selected Forecast

The registered aircraft projections result in a range between 100 and 189 registered aircraft in Ector County by 2042, with the constant market share representing the low end and the increasing market share – return to historic high representing the high end of the range. Each of the forecasts has been evaluated for reasonableness. Both the constant market share and constant ratio forecasts show very slow growth in county-registered aircraft, and both are deemed unlikely based on the county's historic levels of registered aircraft. The historic high market share and 10-year average ratio projections resulted in much more aggressive growth, but both likely overstate the growth potential in county-registered aircraft. Therefore, the most reasonable forecast is the mid-range increasing market share projection, and this projection will be carried forward as the selected forecast for service area registered aircraft. It shows an increase from 99 registered aircraft in 2022 to 110 in 2027, 121 in 2032, and 145 in 2042, reflecting a 1.96 percent CAGR.

BASED AIRCRAFT FORECAST

Nationally, based aircraft records have been historically inconsistent. Airports were not required to report their based aircraft totals to the FAA until recently, and any data that was provided was not validated. Now, however, based aircraft counts are included on a registry that the FAA updates and maintains with validated information. According to the FAA's database, ODO has 88 based aircraft, a count which was last validated on May 20, 2021. However, records maintained and confirmed by FBO staff show 108 based aircraft at the airport as of April 2022, which will serve as the base year count for forecasting purposes.

Like the registered aircraft forecasts, two types of projections have been made for based aircraft at ODO – market share and ratio projections. The market share is based on the airport's percentage of based aircraft as compared to registered aircraft in the service area, while the ratio projection is based on the number of based aircraft per 1,000 county residents. The FAA TAF forecast is also included for comparison purposes. An additional forecast based on the TAF growth rate has also been included. The results of these analyses are detailed in **Table 15** and depicted graphically in **Exhibit 18**.

TABLE 15 | Based Aircraft Forecasts

Year	ODO Based Aircraft	Ector County Registrations	Market Share	Ector County Population	Aircraft Per 1,000 Residents
2022	108	98	110.2%	171,601	0.63
Constant Market Share – Low Range (CAGR 1.96%)					
2027	121	110	110.2%	181,240	0.67
2032	133	121	110.2%	190,847	0.70
2042	159	145	110.2%	209,421	0.76
Increasing Market Share (CAGR 2.40%)					
2027	124	110	112.7%	181,240	0.68
2032	139	121	115.1%	190,847	0.73
2042	173	145	120.0%	209,421	0.83
Decreasing Market Share (CAGR 0.93%)					
2027	115	110	105.2%	181,240	0.64
2032	121	121	100.1%	190,847	0.63
2042	130	145	90.0%	209,421	0.62
Constant Ratio per 1,000 Residents (CAGR 1.00%)					
2027	114	110	104.0%	181,240	0.63
2032	120	121	99.3%	190,847	0.63
2042	132	145	91.2%	209,421	0.63
Increasing Ratio per 1,000 Residents (CAGR 1.89%)					
2027	120	110	108.9%	181,240	0.66
2032	132	121	108.8%	190,847	0.69
2042	157	145	108.7%	209,421	0.75
FAA TAF (CAGR 1.46%)					
2027	137	110	124.9%	181,240	0.76
2032	147	121	121.5%	190,847	0.77
2042	167	145	115.6%	209,421	0.80
FAA TAF GROWTH RATE (CAGR 1.46%) – SELECTED FORECAST					
2027	116	110	105.6%	181,240	0.64
2032	125	121	103.2%	190,847	0.65
2042	144	145	99.5%	209,421	0.69

Sources: Airport records; FAA TAF; Woods & Poole CEDDS 2021

Market Share Projections

- **Constant Market Share** – In 2022, the airport had 108 based aircraft, which equates to 110.2 percent of the market share of registered aircraft in Ector County. Carrying this percentage throughout the plan years results in a steady increase in based aircraft, with 159 based aircraft projected by the end of the planning period and equating to a 1.96 percent CAGR.

- **Increasing Market Share** – An increasing market share forecast was also evaluated and considered a scenario where ODO held 120.0 percent market share of the service area. This resulted in a more dramatic increase in based aircraft to 173, or 2.40 percent CAGR, by the end of the planning period.

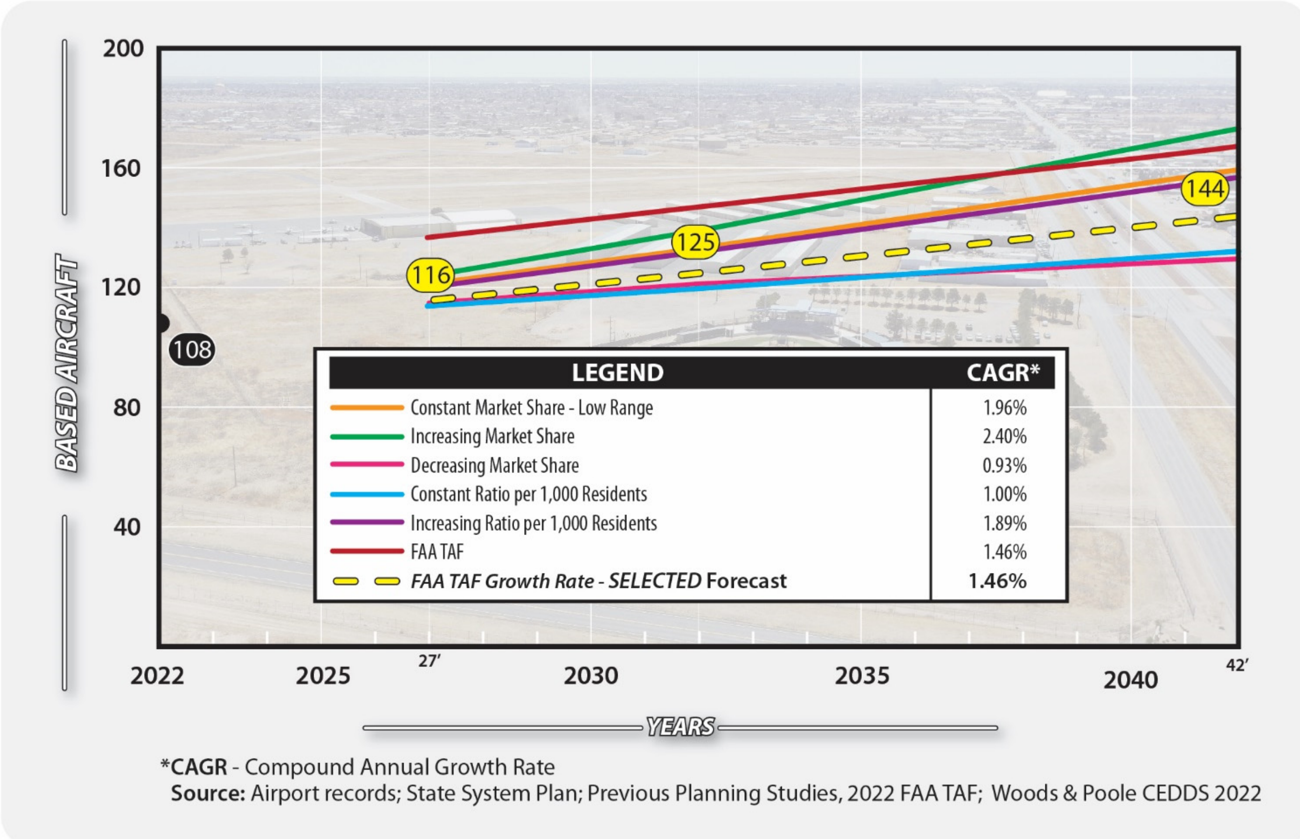


Exhibit 18 – Based Aircraft Projections

- **Decreasing Market Share** – While ODO currently holds greater than 100 percent of the market share, it is not unreasonable to consider a scenario in which that number drops. A decreasing market share forecast was evaluated, based on a gradual decrease to 90.0 percent market share. With an increase in countywide registrations anticipated, a decrease in market share still results in growth, albeit slower, with 130 based aircraft forecast by 2042.

Ratio Projections

- **Constant Ratio** – In 2022, the ratio of based aircraft per 1,000 county residents stood at 0.63. Maintaining this at a constant through 2042 resulted in a growth rate of 1.00 percent, or 132 based aircraft.

- **Increasing Ratio** – An increasing ratio scenario was also evaluated that considered a ratio of 0.75 based aircraft per 1,000 residents in 2042. Applying this figure to the end of the planning period results in 157 based aircraft at the airport by 2042, at a CAGR of 1.89 percent.

TAF Projection

- **TAF** – As a point of comparison, the FAA TAF projections for based aircraft at ODO have also been included. The TAF shows growth in based aircraft at a rate of 1.46 percent, with 167 based aircraft projected by the end of the planning period.

- **TAF Growth Rate** – As stated, the TAF projection resulted in a CAGR of 1.46 percent. An additional forecast was prepared that applied this growth rate to the existing based aircraft count of 108, which resulted in 144 based aircraft by 2042.

Selected Forecast

The forecasts produced a planning envelope ranging from 130 to 173 based aircraft at the airport by 2042. Discussions with airport personnel indicate that at least one tenant who currently maintains multiple aircraft at ODO has immediate plans to add more aircraft. This, combined with the anticipated increase in population and county registered aircraft, justifies a growth scenario with steady increases in based aircraft. Therefore, the TAF growth rate forecast has been selected as the preferred projection. With a CAGR of 1.46 percent, this forecast shows an increase of 36 based aircraft by the end of the planning period, for a total of 144 aircraft based at ODO by 2042.

Based Aircraft Fleet Mix

The type of aircraft based at an airport is another important consideration when planning for the future. Currently, the fleet mix at ODO consists of 86 single engine piston aircraft, seven multi-engine, six turboprops, eight jets, and one aircraft classified as 'other.' Given that the total number of based aircraft at the airport is projected to increase over the planning period, it is necessary to project how the fleet mix will change over this time. A forecast of the evolving fleet mix will ensure that adequate facilities are planned to accommodate these aircraft in the future.

The fleet mix projection for ODO was determined by comparing the airport's existing fleet mix to national general aviation fleet mix trends. The forecast for the active U.S. GA fleet shows increasing trends in turbine and jet aircraft, with piston aircraft declining over the next 20 years. Multi-engine piston aircraft are anticipated to ultimately be phased out altogether. Growth is expected in experimental and light sport aircraft as well. The GAMA has high optimism that innovations in electric propulsion and supersonic technologies will increase in the sector's global reach, which will result in the growth of experimental and light sport aircraft.

Table 16 details the fleet mix projection prepared for ODO. While these forecasts take into account national trends, the fleet mix at ODO is anticipated to continue to consist primarily of piston aircraft over the planning period, with the addition of more turboprops, jets, and helicopters over the next 20 years.

TABLE 16 | Based Aircraft Fleet Mix

	EXISTING		FORECAST					
Aircraft Type	**2022**	**%**	**2027**	**%**	**2032**	**%**	**2042**	**%**
Single Engine Piston	86	80%	92	79%	99	79%	109	76%
Multi-Engine Piston	7	6%	5	4%	3	2%	1	1%
Turboprop	6	6%	8	7%	9	7%	12	8%
Jet	8	7%	9	8%	11	9%	15	10%
Helicopter	0	0%	1	1%	2	2%	4	3%
Other	1	1%	1	1%	1	1%	3	2%
Totals	**108**	**100%**	**116**	**100%**	**125**	**100%**	**144**	**100%**

Source: Airport records; Coffman Associates analysis

GENERAL AVIATION OPERATIONS

General aviation operations are classified as either local or itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations or operations that remain in local airspace that originate and conclude at the same airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use, since business aircraft are not generally used for large scale training activities.

As a non-towered airport, operational estimates for ODO are derived from several sources, including the FAA TAF and the FAA Form 5010, *Airport Master Record*. The TAF reflects 79,460 total operations in 2022, while the *Airport Master Record* shows 78,000 total operations. An additional calculation to estimate annual operations was also conducted using Equation 15 in FAA's "Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-Towered Airport Data." This equation factors in regional population and based aircraft data to develop a baseline operations count. When this data was input, the result was 36,344 annual operations. While this count is lower than the estimates provided in Form 5010 or the TAF, it is likely a more accurate reflection of annual operations at ODO, according to the airport sponsor and county officials. Therefore, it has been selected for use as the base year operational count from which itinerant and local GA operational forecasts will be developed.

Itinerant GA Operations Forecast

The *Airport Master Record* reports that approximately 33 percent of the airport's total activity is in the form of itinerant operations. This percentage was applied to the estimated annual operational total of 36,344, yielding 12,115 annual itinerant operations in the base year.

Several forecasts for itinerant GA operations have been prepared, as presented in **Table 17** and on **Exhibit 19**. Like the previous projections, market share and ratio comparisons have been made. For the market share evaluations, ODO's annual itinerant operations have been compared to total U.S. itinerant general aviation operations. The ratio projections are based on total operations per based aircraft, or OPBA. The FAA TAF forecast for itinerant operations has also been included for comparison purposes.

TABLE 17 | General Aviation Itinerant Operations

Year	ODO Itinerant Operations	U.S. ATCT GA Itinerant Operations	ODO Share %	ODO Based Aircraft	OPBA
2022	12,115	14,060,610	0.0862%	108	112
Constant Market Share (CAGR 0.62%)					
2027	13,100	15,177,147	0.0862%	116	113
2032	13,200	15,372,725	0.0862%	125	106
2042	13,700	15,876,766	0.0862%	144	95
Increasing Market Share – Mid Range (CAGR 1.37%)					
2027	13,600	15,177,147	0.0896%	116	117
2032	14,300	15,372,725	0.0931%	125	115
2042	15,900	15,876,766	0.1000%	144	110
INCREASING MARKET SHARE – HIGH RANGE (CAGR 2.08%) – SELECTED FORECAST					
2027	14,200	15,177,147	0.0934%	116	122
2032	15,500	15,372,725	0.1006%	125	124
2042	18,300	15,876,766	0.1150%	144	127
Constant OPBA Ratio (CAGR 1.46%)					
2027	13,000	15,177,147	0.0857%	116	112
2032	14,000	15,372,725	0.0911%	125	112
2042	16,200	15,876,766	0.1020%	144	112
FAA TAF Forecast (CAGR 4.94%)					
2027	27,741	15,177,147	0.1828%	116	239
2032	29,039	15,372,725	0.1889%	125	233
2042	31,807	15,876,766	0.2003%	144	220

Sources: FAA Airport Master Record 5010; FAA Aerospace Forecast 2021-2041; FAA TAF

Market Share Projections

In 2022, with 12,115 itinerant operations, the airport held 0.0862 percent of the market share of national itinerant GA operations. The first forecast carries this market share forward as a constant through the planning period, resulting in 13,700 operations by 2042 and a CAGR of 0.62 percent. Two increasing market share forecasts were also evaluated. The first of these considered an increase to 0.1000 percent of the market share by 2042, which resulted in 15,900 itinerant operations by the end of the planning period and represents the mid-range market share projection. A more aggressive growth scenario was also evaluated, based on an increase to 0.1150 percent market share. This produced a CAGR of 2.08 percent, or 18,300 itinerant GA operations by the end of the planning period.

Operations Per Based Aircraft Projection

Another forecasting methodology utilized considers the number of itinerant operations occurring at ODO compared to the number of based aircraft at the airport. In 2022, there were 112 itinerant operations per based aircraft. When this figure is carried through the planning period, the result is a 1.46 percent increase in itinerant GA operations, with 16,200 itinerant operations by 2042.

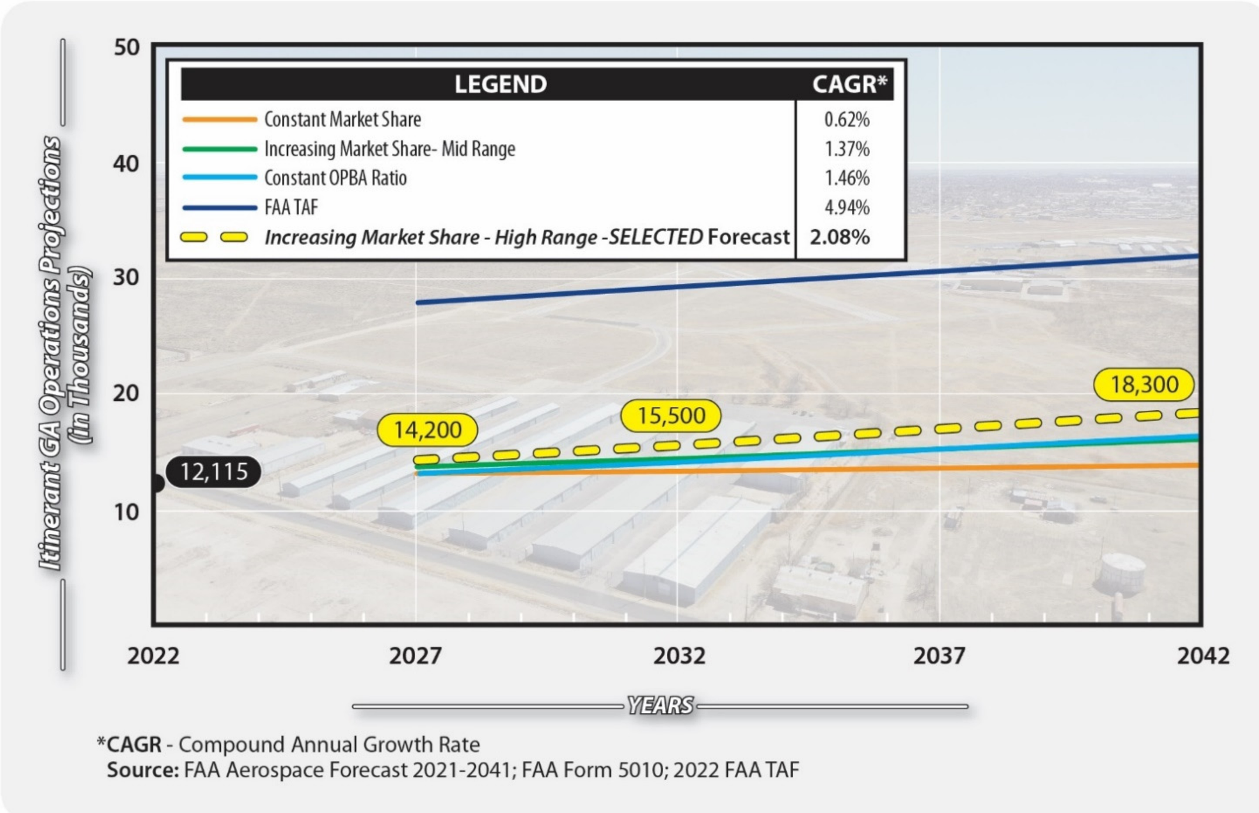


Exhibit 19 – Itinerant GA Operations Projections

Selected Forecast

Including the TAF projections, the forecasts prepared resulted in a range between 13,700 and 31,807 annual itinerant GA operations at ODO. The high-range increasing market share forecast, reflective of a 2.08 percent CAGR, has been selected as the most reasonable projection. While this growth rate is higher than what is predicted nationally for itinerant operations over the next 20 years, this projection is justified by the current level of itinerant activity at the airport, as well as what is occurring around the region. Odessa is one of the fastest growing cities in Texas, with significant contributions to the state's economy from the energy sector. It is reasonable to assume that itinerant GA operations will increase pursuant with population and industrial/economic growth in West Texas. Additionally, it is not unreasonable to assume some level of itinerant activity from flights bound for MAF that elect to utilize ODO instead.

Local GA Operations Forecast

Like the forecasts prepared for itinerant GA operations, projections for local GA operations have been made. These forecasts are detailed in **Table 18** and on **Exhibit 20**. Local GA operations account for approximately 67 percent of total operations. As mentioned previously, a local operation is one that stays within the airport's traffic pattern, such as training operations or touch-and-goes. In 2022, there were an estimated 24,229 local GA operations at the airport, which translated to a market share of 0.1848 percent and 224 operations per based aircraft.

TABLE 18 | General Aviation Local Operations

Year	ODO Local Operations	U.S. ATCT GA Local Operations	ODO Share %	ODO Based Aircraft	Local Ops per Based Aircraft
2022	24,229	13,111,431	0.1848%	108	224
Constant Market Share (CAGR 0.51%)					
2027	25,300	13,679,977	0.1848%	116	218
2032	25,700	13,927,030	0.1848%	125	206
2042	26,800	14,480,805	0.1848%	144	186
INCREASING MARKET SHARE – MID RANGE (1.49%) – SELECTED FORECAST					
2027	26,700	13,679,977	0.1948%	116	230
2032	28,500	13,927,030	0.2049%	125	228
2042	32,600	14,480,805	0.2250%	144	226
Increasing Market Share – High Range (CAGR 2.03%)					
2027	27,500	13,679,977	0.2011%	116	237
2032	30,300	13,927,030	0.2174%	125	243
2042	36,200	14,480,805	0.2500%	144	251
Constant OPBA Ratio (CAGR 1.46%)					
2027	26,000	13,679,977	0.1901%	116	224
2032	28,000	13,927,030	0.2010%	125	224
2042	32,400	14,480,805	0.2237%	144	224
FAA TAF Forecast (CAGR 4.96%)					
2027	55,484	13,679,977	0.4056%	116	478
2032	58,124	13,927,030	0.4173%	125	466
2042	63,770	14,480,805	0.4404%	144	442

Sources: FAA Aerospace Forecast 2021-2041; FAA TAF

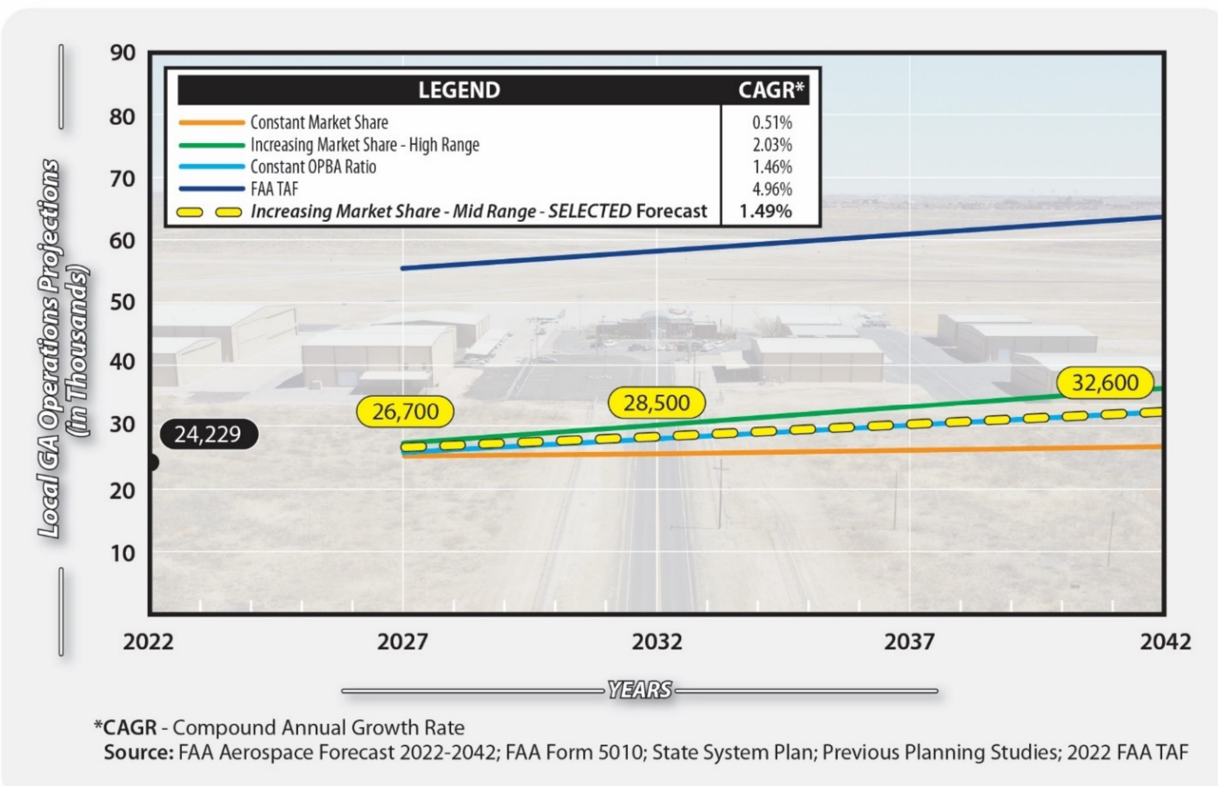


Exhibit 20 – Local GA Operations Projections

Market Share Projections

In the first forecast, the constant market share of 0.1848 percent was carried through the plan years. This resulted in 26,800 operations by 2042, for a CAGR of 0.51 percent, which represents the low range of the projections. The next two forecasts evaluated increasing market share scenarios, with the mid-range projection considering an increase to 0.2250 percent of the market share. This resulted in a 1.49 percent CAGR, or 32,600 local operations by 2042. A second increasing market share forecast considered a more aggressive growth scenario, with the airport holding 0.2500 percent of the market share. This produced a total of 36,200 local operations by the end of the planning period, reflective of a 2.03 percent CAGR.

Operations Per Based Aircraft Projection

With 108 based aircraft in 2022, the OPBA for local operations stands at 224. Maintaining this figure as a constant through the next 20 years results in a CAGR of 1.46 percent, which equates to 32,400 local GA operations by 2042.

Selected Forecast

The FAA TAF estimates local operations to reach 63,770 by 2042. The planning envelope that results from the forecasts above ranges from 26,800 to 63,770 local operations by the end of the planning period. Like the itinerant forecasts, the most reasonable forecast lies between the two extremes. In this case, the mid-range increasing market share is the selected projection, resulting in 32,600 local GA operations by 2042—an increase of nearly 8,400 local operations over the next 20 years. Nationally, local GA operations are anticipated to grow at about 0.50 percent. While the selected forecast predicts a stronger growth rate for ODO, the projection is reasonable due to local and regional trends in this type of operation, particularly for airports that support flight training operations, such as ODO.

AIR TAXI OPERATIONS FORECAST

The air taxi category can be classified as a subset of the itinerant operations category and includes aircraft involved in on-demand passenger charter, fractional ownership aircraft operations, small parcel transport, and air ambulance activity. While not typically a significant percentage of total airport operations, air taxi operations can be conducted via more sophisticated aircraft, ranging from multi-engine piston aircraft up to large business jet aircraft. As a result, it is important to factor these types of operations at airports that experience substantial amounts of air taxi operations.

Neither the FAA TAF nor the Form 5010 *Airport Master Record* report any air taxi operations at ODO. However, according to AirportIQ, a data center that collects detailed aviation activity at nontowered airports, ODO does experience air taxi operations. While the 2022 dataset is incomplete, a total number of air taxi operations for the base year was extrapolated and resulted in 664 air taxi operations. The FAA national air taxi forecast projects a 1.1 percent CAGR increase in air taxi operations between 2021 and 2041. The primary reasons for this increase are the technological advancements of the electric vertical take-off and landing aircraft (eVTOL) and the continued national growth in the business jet segment of the air taxi category. The facilities and FBO services available at ODO are accommodating to operators of business jets. Therefore, it is reasonable to expect the business jet component of air taxi activity to increase moderately over time at ODO.

Like the previous operations forecasts, several market share projections were developed that considered different growth scenarios. With 664 annual air taxi operations in 2022, ODO held 0.0132 percent of total national air taxi operations. Carrying this percentage forward throughout the planning period resulted in a CAGR of 1.18 percent, or 840 air taxi operations by 2041. Two increasing market share forecasts were calculated based on mid- and high range scenarios. The mid-range growth scenario produced a projection of 1,240 air taxi operations by 2042, at a CAGR of 3.17 percent. The high range scenario considered a more aggressive growth rate of 4.46 percent, which resulted in 1,590 annual air taxi operations at ODO by the end of the planning period.

A fourth projection was developed based on the 20-year growth rate in air taxi operations that has been forecast by the FAA. Between 2022 and 2042, this type of activity is anticipated to grow at a CAGR of 1.18 percent. Applying this growth rate to the base year air taxi operations at ODO results in an increase to 840 operations by the end of the planning period.

Table 19 details each of the forecasts completed for air taxi operations throughout the long-term planning horizon. Some level of growth in annual air taxi operations is anticipated at ODO over the next 20 years, in line with national trends and local/regional economic activity. As such, the mid-range market share projection has been selected as the most reasonable forecast for air taxi operational growth at ODO. At a CAGR of 3.17 percent, this forecast shows steady growth over the planning period, with 1,240 air taxi operations projected by 2042.

TABLE 19 | Other Air Taxi Operations

Year	ODO Air Taxi Operations	U.S. Air Taxi Operations	ODO Market Share
2022	664	5,014,824	0.0132%
Constant Market Share (CAGR 1.18%)			
2027	670	5,041,488	0.0132%
2032	760	5,707,729	0.0132%
2042	840	6,358,549	0.0132%
INCREASING MARKET SHARE – MID-RANGE (CAGR 3.17%) - SELECTED FORECAST			
2027	750	5,041,488	0.0143%
2032	930	5,707,729	0.0154%
2042	1,240	6,358,549	0.0175%
Increasing Market Share - High Range (CAGR 4.46%)			
2027	820	5,041,488	0.0162%
2032	1,090	5,707,729	0.0191%
2042	1,590	6,358,549	0.0250%
U.S. 20-Year Forecast Growth Rate (CAGR 1.18%)			
2027	700	5,041,488	0.0139%
2032	750	5,707,729	0.0131%
2042	840	6,358,549	0.0132%

Sources: FAA Form 5010; FAA Aerospace Forecast 2021-2041

MILITARY OPERATIONS FORECAST

It is not uncommon for military aircraft to utilize civilian airports for training or other purposes. However, forecasting military operations is challenging due to their national security nature and the fact that missions can change daily, making it difficult to project future operations based on historical data. Thus, it is not unusual for the FAA to flatline military operations projections. In the case of ODO, the FAA does not reflect any military activity at the airport, as reflected in the 2022 TAF, nor is any projected in the future. For this study, military operations at ODO are projected to remain at zero through the planning period.

ANNUAL INSTRUMENT APPROACHES

An annual instrument approach (AIA) is defined by the FAA as "an approach to an airport with intent to land by an aircraft in accordance with IFR flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum approach altitude." An aircraft must follow one of the published instrument approach procedures at an airport in order to qualify as an instrument approach. Practice or training approaches do not count as AIAs, nor do instrument approaches that occur in visual conditions.

In low visibility conditions or poor weather conditions, pilots can only complete flight training operations under instrument flight rules (IFR). Local operations are not typically performed during IFR conditions. As a result, an estimate of the total number AIAs can be made based on a percentage of itinerant operations regardless of poor weather conditions. An estimate of 2.5 percent of total itinerant (general aviation, air taxi, and military) operations is utilized to forecast AIAs at ODO, as presented in **Table 20**.

TABLE 20 | Annual Instrument Approaches

Year	Annual Instrument Approaches	Itinerant Operations	Ratio
2022	300	12,115	2.50%
2027	360	14,200	2.50%
2032	390	15,500	2.50%
2042	460	18,300	2.50%

Source: FAA Form 5010; Coffman Associates analysis

PEAK PERIOD FORECASTS

Forecasts of peak activity at an airport are important in determining facility requirements for the future. The peaking periods used to develop the capacity analysis and facility requirements are as follows: peak month, design day, busy day, and design hour. **Peak month** refers to the calendar month in which traffic activity is highest. The **design day** is the average day in the peak month, while the **busy day** is reflective of the busiest day of a typical week during the peak month. Finally, **design hour** refers to the peak hour within the design day.

Because ODO is not equipped with an airport traffic control tower, precise operational data is not available for establishing true peaking characteristics. For this reason, estimated peaking characteristics have been developed based on knowledge of other general aviation airports with control towers. For this study, the peak month was estimated at ten percent of the annual operations, which resulted in 3,701 operations during the peak month of the base year. By the end of the planning period, 52,100 operations are projected to occur during the peak month. The design day is estimated by dividing the peak month by the average number of days in a month, and the busy day is calculated at 1.25 times the design day. The design hour is estimated at 15 percent of the design day. Peak period forecasts are presented in **Table 21**.

TABLE 21 | Peak Period Forecasts

	YEAR			
	2022	2027	2032	2042
Annual	37,008	41,700	44,900	52,100
Peak Month	3,701	4,170	4,490	5,210
Design Day	119	135	145	168
Design Hour	18	20	22	25
Busy Day	149	167	178	203

Sources: FAA TAF, Coffman Associates analysis

FORECAST COMPARISON TO THE TERMINAL AREA FORECAST

A summary of the selected forecasts is presented on **Exhibit 21**. The FAA reviews the forecasts presented in this aviation planning study for comparison to the *Terminal Area Forecast*. The forecasts are considered consistent with the TAF if they meet the following criteria:

- Forecasts differ by less than 10 percent in the 5-year forecast period and 15 percent in the 10-year forecast period, or
- Forecasts do not affect the timing or scale of an airport project, or
- Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems*.

If the forecasts exceed these parameters, they may be sent to FAA headquarters in Washington, D.C. for further review. **Table 22** presents the direct comparison of the planning forecasts prepared in this study with the TAF published in March 2022. The selected operations forecast is outside of the FAA TAF tolerance for both the 5- and 10-year forecast periods due to the discrepancy between the FAA's forecast operations (79,460) and the baseline operations forecast used in this report, which was derived from the FAA's Equation 15. In terms of based aircraft, the 5- and 10-year forecasts are outside the TAF tolerance, at 16.60 percent and 16.18 percent difference, respectively. This discrepancy is likely a result of the TAF count of based aircraft in 2022 being greater than what is actually reported by the airport. Because the planning study forecasts are built on this base year total, it is reasonable that a greater difference will result in the forecast years.

TABLE 22 | Forecast Comparison to the *Terminal Area Forecast*

	Base Year	FORECAST			CAGR
	2022	2027	2032	2042	2022-2042
Total Operations					
Selected Forecast	37,008	41,700	44,900	52,100	1.7%
2022 FAA TAF	79,460	83,225	87,163	95,577	0.9%
% Difference	72.90%	66.48%	64.00%	58.88%	
Based Aircraft					
Selected Forecast	108	116	125	144	1.4%
2022 FAA TAF	125	137	147	167	15.6%
% Difference	14.59%	16.60%	16.18%	14.79%	

CAGR - Compound annual growth rate

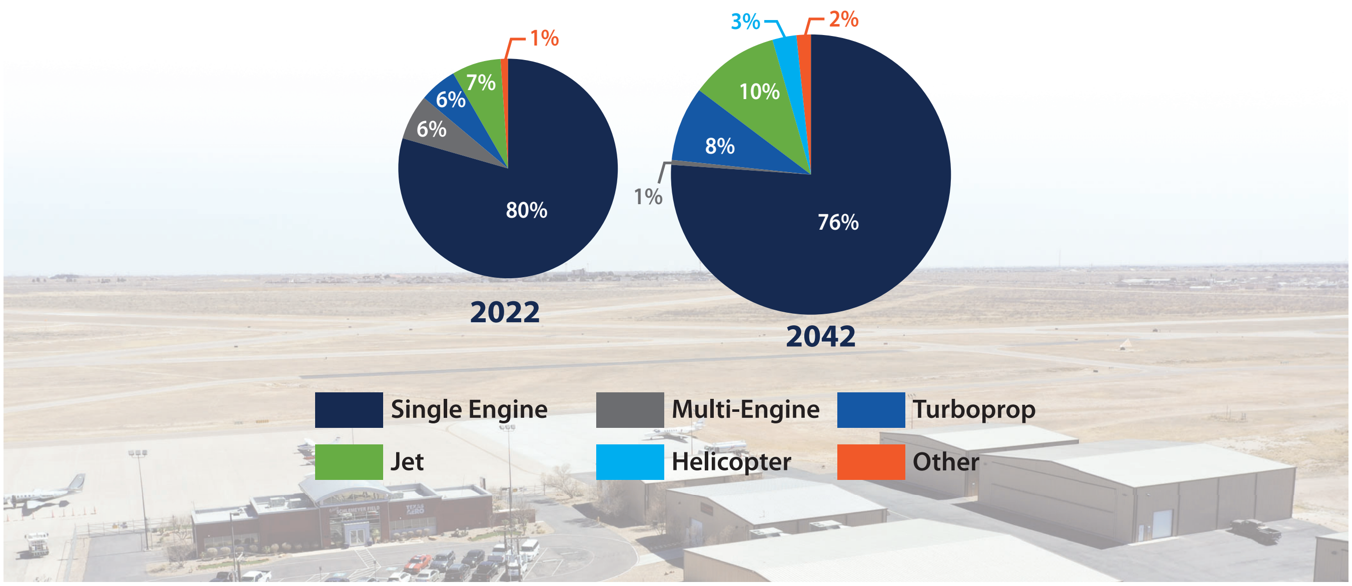
Source: Coffman Associates analysis

CRITICAL AIRCRAFT

The critical aircraft is defined as an aircraft conducting at least 500 itinerant operations at an airport or the most regularly scheduled aircraft in commercial service. When planning for future airport facilities, it is important to consider the demands of aircraft operating at the airport currently or anticipated to operate in the future. Caution must be exercised to ensure that short-term development does not preclude the long-term needs of the airport. Thus, a balance must be struck between the facility needs of aircraft currently operating at an airport versus those projected to operate.

	BASE YEAR	2027	2032	2042
BASED AIRCRAFT				
Single Engine	86	92	99	109
Multi-Engine	7	5	3	1
Turboprop	6	8	9	12
Jet	8	9	11	15
Helicopter	0	1	2	4
Other	1	1	2	2
TOTAL BASED AIRCRAFT	**108**	**116**	**125**	**144**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Other Air Taxi	664	750	930	1,240
General Aviation	12,115	14,200	15,500	18,300
Military	0	0	0	0
Total Itinerant*	***12,779***	***15,000***	***16,400***	***19,500***
Local				
General Aviation	24,229	26,700	28,500	32,600
Military	0	0	0	0
Total Local*	***24,229***	***26,700***	***28,500***	***32,600***
Total Annual Operations	**37,008**	**41,700**	**44,900**	**52,100**
ANNUAL INSTRUMENT APPROACHES (AIA)	**300**	**360**	**390**	**460**
PEAKING				
Total Annual Operations	37,008	41,700	44,900	52,100
Peak Month	3,701	4,170	4,490	5,210
Design Day	119	135	145	168
Design Hour	18	20	22	25
Busy Day	149	167	178	203

BASED AIRCRAFT



*Figures have been rounded

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or, more commonly, is a composite aircraft representing a collection of aircraft with similar characteristics. The critical aircraft is defined by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 22**.

Aircraft Approach Category (AAC) | A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

Aircraft in AAC A and B are further distinguished between those weighing more or less than 12,500 pounds. Those under 12,500 pounds are classified as “small” or (s). The applicable design standards for the airport are different based on the “small” classification.

Airplane Design Group (ADG) | The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristic). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free area (TOFA), apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG) | A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the design aircraft. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the TSA, TOFA, taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances, are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

Exhibit 23 presents the aircraft classification of the most common aircraft in operation today.

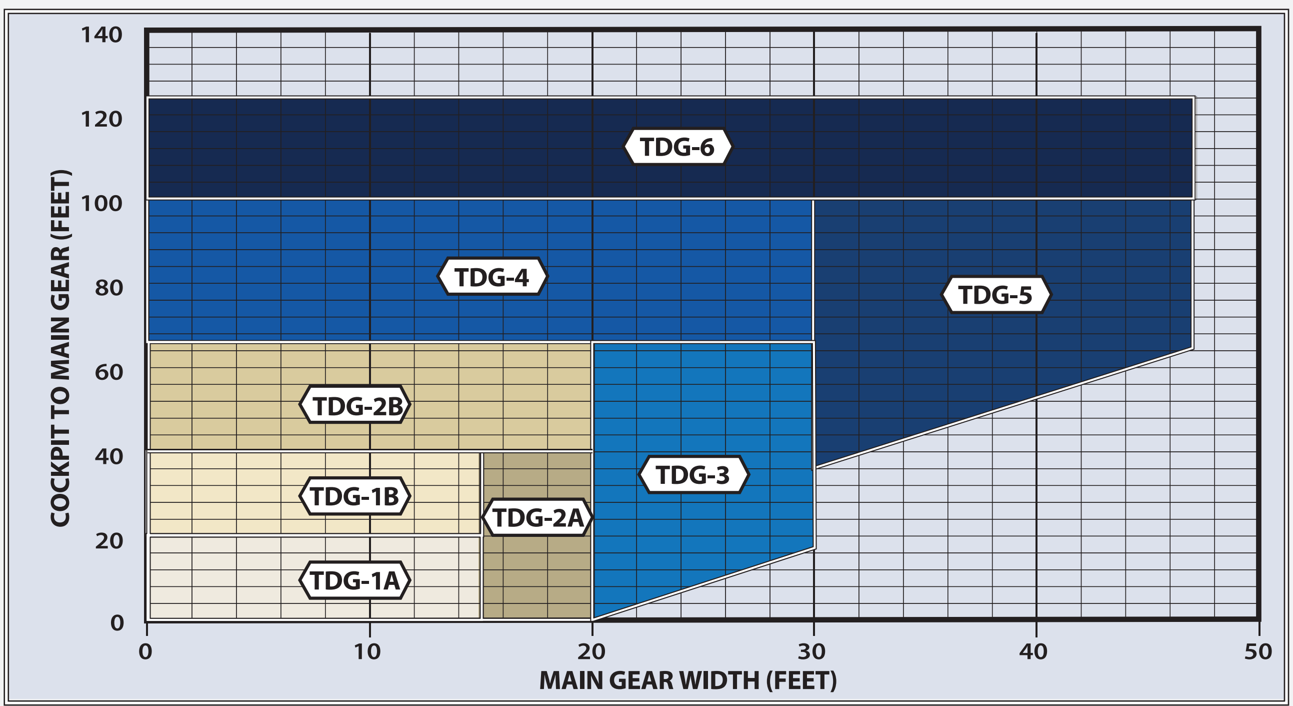
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20≤30	49≤79
III	30≤45	79≤118
IV	45≤60	118≤171
V	60≤66	171≤214
VI	66≤80	214≤262

VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13B, Airport Design

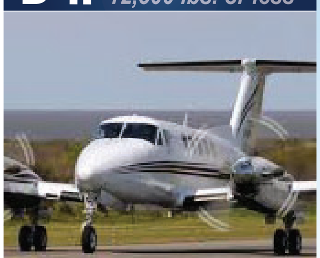
A-I

Aircraft	TDG
Beech Baron 55	1A
Beech Bonanza	**1A**
Cessna 150, 172	1A
Eclipse 500	1A
Piper Archer, Seneca	1A

B-I

Aircraft	TDG
Beech Baron 58	**1A**
Beech King Air 90	1A
Cessna 421	1A
Cessna Citation CJ1 (525)	1A
Cessna Citation 1(500)	2
Piper Cheyenne III	2

B-II *12,500 lbs. or less*



Aircraft	TDG
Cessna 441 Conquest	1A
Beech Super King Air 200	**2**
Cessna Citation CJ2 (525A)	2

B-II *over 12,500 lbs.*

Aircraft	TDG
Falcon 10, 20, 50	1B
Hawker 800, 800XP, 850XP, 4000	1B
Cessna Citation CJ4 (525C)	**1B**
Beech Super King Air 350	2
Beech 1900	2
Falcon 900, 2000	2
Cessna Citation CJ3(525B), Bravo (550), V (560)	2

A/B-III

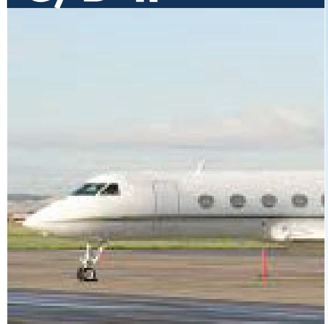
Aircraft	TDG
Bombardier Dash 7 (A-III)	3
Bombardier Dash 8	3
Bombardier Global 5000, 6000, 7000, 8000	**2**
Falcon 6X, 7X, 8X	2
ATR 72	2

Note: Aircraft pictured is identified in bold type.

C/D-I

Aircraft	TDG
Lear 25, 31, 45, 55, **60**	**1B**
Israeli Westwind	1B
Learjet 35, 36 (D-I)	1B
Piaggio Avanti II	2

C/D-II



Aircraft	TDG
Cessna Citation VII, X+	1B
Lear 70, 75	1B
Gulfstream II	1B
CRJ-200	1B
Gulfstream III	2
ERJ-135, 140, 145	2
CRJ-700	2
Gulfstream IV, 350, 450 (D-II)	2

C/D-III *less than 150,000 lbs.*

Aircraft	TDG
Gulfstream V	2
CRJ-900, 1000	2
Boeing 737-700, BBJ	3
ERJ-170, 175, 190, 195	3
Gulfstream G500, 550, 600, **650 (D-III)**	**2**
MD-81, 82, 87 (D-III)	4

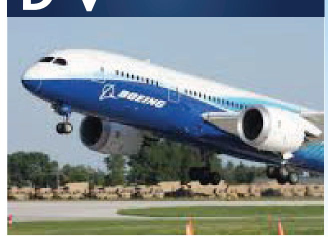
C/D-III *over 150,000 lbs.*

Aircraft	TDG
Airbus A319-100, 200	3
Boeing 737 -800, 900, BBJ2 (D-III)	**3**
MD-83, 88 (D-III)	4

C/D-IV

Aircraft	TDG
Airbus A300-100, 200, 600	5
Boeing 757-200	4
Boeing 767-300, **400**	**5**
MD-11	6

D-V



Aircraft	TDG
Airbus A330-200, 300	5
Boeing 787-8, 9	**5**
Airbus A340-500, 600	6
Boeing 747-100 - 400	5
Boeing 777-300	6

AIRPORT AND RUNWAY CLASSIFICATION

Airport and runway classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Airport Reference Code (ARC) | An airport designation that signifies the airport's highest Runway Design Code (RDC) minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

Runway Design Code (RDC) | A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component. The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile); 1,600 (¼-mile); 2,400 (½-mile); 4,000 (¾-mile); and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component should read "VIS" for runways designed for visual approach use only.

Approach Reference Code (APRC) | A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component.

The APRC for a runway is established based upon the minimum runway-to-taxiway centerline separation. Each of the runways at ODO has a partial-parallel taxiway. Taxiway G is located 400 feet from the Runway 11-29 centerline. Both runway ends have a non-precision approach with ¾-mile visibility minimums. Based on these conditions, the APRC for Runway 11-29 is D/IV/4000 and D/V/4000. Runway 2-20 also has a partial-parallel taxiway (Taxiway D) that has a runway/taxiway separation distance of 300 feet. Runway 20 has a non-precision approach with 1-mile visibility minimums. Based on these conditions, the APRC for Runway 2-20 is B/III/4000 and D/II/4000. Taxiway G also serves as a partial-parallel taxiway on the west side of Runway 16-34, with a separation of 300 feet. There are no published instrument approaches to this runway; thus, the APRC is B/III/4000 and D/II/4000.

Departure Reference Code (DPRC) | A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to take-off operations. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC but is composed of two components: AAC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

The current runway/taxiway centerline separation between Taxiway G and Runway 11-29 of 400 feet results in a DPRC of D/IV and D/V. For Runways 2-20 and 16-34, the 300-foot separation between them and their associated partial-parallel taxiways results in a DPRC of B/III and D/II for each runway.

AIRPORT CRITICAL AIRCRAFT

As stated previously, it is critical to have an accurate understanding of the types of aircraft that operate at the airport currently and are expected to use the airport in the future. Aircraft type can have a significant impact on airport design criteria and the type of facilities necessary to accommodate the aircraft that are utilizing the airport most frequently.

The most recent annual data was obtained from the FAA's Traffic Flow Management System Counts (TFMSC), a database maintained by the FAA to monitor the type of aircraft and frequency of usage at airports. Typically, information is added to the database when pilots file flight plans and/or when flights are detected by the National Airspace System (NAS) on radar. The TFMSC includes data for general aviation, commercial service (air carrier and air taxi), and military aircraft. Although the program can identify the aircraft operating under IFR-filed flight plans and/or on radar, it does not account for all aircraft operating without a flight plan due to limited radar coverage. Thus, it is likely the airport experiences additional operations that are not recorded in the TFMSC. Despite this likelihood for incomplete operational data, the TFMSC is a valuable resource for identifying the primary aircraft users and type of aircraft operating at the airport on a regular basis. Additionally, the TFMSC does provide an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. **Exhibit 24** details the TFMSC operational mix at ODO since 2012.

Existing and Ultimate Critical Aircraft

A TFMSC report was prepared to identify the primary aircraft types operating at ODO. The data is limited as the TFMSC reports just 3,962 operations in 2021, the last full year of available data, which is only a small percentage of the total operations occurring at the airport. Most of the operations (49 percent) reported in the TFMSC are by aircraft in B-II, which includes representative aircraft such as the Citation V/Sovereign and the King Air 200/300/350 series. Aircraft in B-I are the next most frequent operators, according to the data, with 1,300 operations in 2021, followed by aircraft in C-II with 284 operations. AAC B aircraft have exceeded 500 annual operations at ODO since 2012. Therefore, for the purposes of this study, AAC B aircraft will be considered the critical AAC. Reported operations within ADG II are also well above the operational threshold; therefore, the representative critical ADG is II. Based on historic information provided in the TFMSC, it is reasonable to identify B-II as the primary runway's existing critical aircraft, with the King Air 200/300/350 serving as the representative aircraft.

In terms of the ultimate critical aircraft, it is important to consider the growth potential that exists at ODO now and over the next 20 years, as well as that of the city and region. The City of Odessa and the surrounding area have experienced significant growth, and this trend is expected to continue. Nationally, trends are moving towards larger and faster jets, and ODO already accommodates operations by AAC C/D aircraft. Airfield design standards for AAC C and D aircraft are grouped together within FAA's Airport Design

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	A36 Bonanza	0	0	0	6	0	2	2	0	2	0
	Cirrus Vision Jet	0	0	0	0	0	0	4	4	20	52
	Eclipse 400/500	6	2	4	20	16	12	24	10	28	16
	Epic Dynasty	2	8	18	8	6	6	2	0	6	4
	Kodiak Quest	4	0	2	2	2	2	0	2	14	2
	Lancair Evolution/Legacy	2	0	0	0	8	4	0	0	0	2
	Piper Malibu/Meridian	56	20	92	42	36	56	216	192	110	110
	Socata TBM 7/850/900	42	30	18	26	38	22	28	34	44	50
	Total	**112**	**60**	**134**	**104**	**106**	**104**	**276**	**242**	**224**	**236**
A-II	Cessna Caravan	4	2	2	4	0	0	4	6	2	20
	De Havilland Twin Otter	0	0	0	2	0	0	0	2	0	0
	Pilatus PC-12	332	274	230	180	264	176	162	148	92	110
	Total	**336**	**276**	**232**	**186**	**264**	**176**	**166**	**156**	**94**	**130**
A-III	De Havilland Dash 7	0	0	0	0	0	0	0	0	2	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**
B-I	Aero Commander 680	0	0	0	0	0	0	2	0	0	0
	Beech 99 Airliner	0	0	0	0	2	0	0	0	0	0
	Beechjet 400	18	10	26	10	12	14	14	20	12	18
	Cessna 425 Corsair	4	10	16	6	2	22	18	24	4	8
	Citation CJ1	8	26	134	96	64	68	62	86	52	90
	Citation I/SP	24	18	30	56	32	10	46	36	26	18
	Citation M2	0	0	0	0	0	0	20	78	42	78
	Citation Mustang	90	152	12	6	10	26	26	10	28	48
	Falcon 10	0	0	0	2	0	24	34	16	4	8
	Hawker 1000	0	0	0	0	0	0	14	0	0	0
	Honda Jet	0	0	0	0	2	0	2	10	6	18
	King Air 90/100	180	716	574	690	936	1,036	1,936	1,842	1,172	942
	L-29 Delfin	0	0	0	0	0	2	0	0	0	0
	Mitsubishi MU-2	8	52	38	4	10	22	8	2	4	0
	Phenom 100	10	2	6	22	20	26	66	26	20	42
	Piaggio Avanti	2	2	54	72	18	66	68	78	16	16
	Piper Cheyenne	64	34	46	16	8	32	24	16	18	6
	Premier 1	6	8	2	14	16	10	14	28	12	8
	T-27 Tucano	0	0	0	2	0	2	0	0	0	0
	Total	**414**	**1,030**	**938**	**996**	**1,132**	**1,360**	**2,354**	**2,272**	**1,416**	**1,300**
B-II	Aero Commander 690	16	20	18	0	6	10	14	6	2	8
	Air Tractor	0	0	0	2	0	0	0	0	0	0
	Cessna Conquest	14	22	36	10	34	2	32	42	12	14
	Challenger 300	20	4	12	14	8	12	12	50	12	54
	Citation CJ2/CJ3/CJ4	18	24	22	62	30	30	198	228	114	118
	Citation II/SP/Latitude	82	202	276	308	194	234	354	530	408	466
	Citation V/Sovereign	306	378	402	548	550	472	470	506	274	332
	Citation X	4	8	14	6	2	8	6	20	14	0
	Citation XLS	46	8	40	42	52	38	54	46	42	62
	Dornier 328	0	0	0	0	20	0	0	0	0	6
	Embraer EMB-110/120	0	0	0	2	2	0	0	0	0	0
	Falcon 20/50	10	2	4	112	140	162	174	316	156	148
	Falcon 2000	0	6	10	6	0	4	14	12	24	18

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
B-II	Falcon 900	2	0	0	0	0	2	6	10	2	14
	Hawker 4000	0	2	0	0	0	0	0	0	0	0
	King Air 200/300/350	242	308	336	494	656	696	584	712	478	496
	King Air F90	16	14	46	130	114	142	134	132	40	10
	Phenom 300	130	174	130	142	108	180	118	130	76	132
	Pilatus PC-24	0	0	0	0	0	0	0	0	0	6
	Swearingen merlin	8	4	10	34	44	4	10	8	4	38
	Total	**914**	**1,176**	**1,356**	**1,912**	**1,960**	**1,996**	**2,180**	**2,748**	**1,658**	**1,922**
B-III	Bombardier Global Express	0	0	0	0	0	0	0	0	0	2
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
C-I	Learjet 20 Series	0	4	2	0	0	0	0	0	0	0
	Learjet 31	16	0	8	0	2	4	2	2	2	6
	Learjet 40 Series	30	24	50	34	40	158	210	140	30	30
	Learjet 50 Series	10	6	26	96	36	40	50	38	4	4
	Learjet 60 Series	6	2	10	4	2	10	42	14	18	34
	Westwind II	2	0	0	8	6	6	2	6	2	2
	Total	**64**	**36**	**96**	**142**	**86**	**218**	**306**	**200**	**56**	**76**
C-II	Challenger 600/604	0	2	8	4	12	12	10	16	4	2
	Citation III/VI	2	6	42	36	110	120	124	90	68	24
	Embraer 500/450 Legacy	0	0	0	0	0	4	2	2	10	6
	Embraer ERJ-135/140/145	0	0	0	0	2	0	0	0	2	0
	Gulfstream 100/150	0	0	4	6	4	14	108	16	68	94
	Gulfstream 280	0	0	0	0	6	8	8	14	72	118
	Gulfstream G-III	0	0	0	0	2	2	0	0	0	0
	Hawker 800 (Formerly Bae-125-800)	4	12	12	12	6	16	10	24	30	22
	Learjet 70 Series	0	0	0	0	2	0	8	14	14	18
	Total	**6**	**20**	**66**	**58**	**144**	**176**	**270**	**176**	**268**	**284**
C-III	Boeing 737 (200 thru 700 series)	0	0	2	0	0	0	0	0	0	0
	Total	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
C-IV	C-130 Hercules	0	0	0	0	2	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**
D-I	F-22 Raptor	0	0	0	2	0	0	0	0	0	0
	Learjet 35/36	8	18	20	12	12	22	18	34	14	10
	T-38 Talon	2	0	0	0	0	0	0	0	0	0
	Total	**10**	**18**	**20**	**14**	**12**	**22**	**18**	**34**	**14**	**10**
D-II	Gulfstream 200	2	2	10	2	0	10	6	0	0	2
	Gulfstream 450	0	0	6	2	2	8	2	8	0	0
	Total	**2**	**2**	**16**	**4**	**2**	**18**	**8**	**8**	**0**	**2**
D-III	Gulfstream 500/600	0	2	0	0	2	4	4	4	0	0
	Total	**0**	**2**	**0**	**0**	**2**	**4**	**4**	**4**	**0**	**0**

Exhibit 24
HISTORICAL TURBOPROP AND JET OPERATIONS

ARC CODE SUMMARY

ARC CODE	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	112	60	134	104	106	104	276	242	224	236
A-II	336	276	232	186	264	176	166	156	94	130
A-III	0	0	0	0	0	0	0	0	2	0
B-I	414	1,030	938	996	1,132	1,360	2,354	2,272	1,416	1,300
B-II	914	1,176	1,356	1,912	1,960	1,996	2,180	2,748	1,658	1,922
B-III	0	0	0	0	0	0	0	0	0	2
C-I	64	36	96	142	86	218	306	200	56	76
C-II	6	20	66	58	144	176	270	176	268	284
C-III	0	0	2	0	0	0	0	0	0	0
C-IV	0	0	0	0	2	0	0	0	0	0
D-I	10	18	20	14	12	22	18	34	14	10
D-II	2	2	16	4	2	18	8	8	0	2
D-III	0	2	0	0	2	4	4	4	0	0
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

APPROACH CATEGORY

AC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A	448	336	366	290	370	280	442	398	320	366
B	1,328	2,206	2,294	2,908	3,092	3,356	4,534	5,020	3,074	3,224
C	70	56	164	200	232	394	576	376	324	360
D	12	22	36	18	16	44	30	46	14	12
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

DESIGN GROUP

DG	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
I	600	1,144	1,188	1,256	1,336	1,704	2,954	2,748	1,710	1,622
II	1,258	1,474	1,670	2,160	2,370	2,366	2,624	3,088	2,020	2,338
III	0	2	2	0	2	4	4	4	2	2
IV	0	0	0	0	2	0	0	0	0	0
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

Source: TFMSC 2012-2021 - Data normalized annually

Exhibit 24 (Continued)
HISTORICAL TURBOPROP AND JET OPERATIONS

standards, and the TFMSC reports 372 combined operations by AAC C/D aircraft in 2021. Operations by these aircraft have been trending up over the last 10 years, and in 2018 they exceeded the 500 operations threshold. While ADG II aircraft have been the most frequent operators at ODO over the last 10 years, it is not unreasonable to anticipate larger airplanes in design group III to operate in the future, especially if pavement strengths are increased on the runways (to be discussed in the next section). Additionally, the NPIAS classifies ODO as a Regional Airport, and the TASP classifies it as a Business/Corporate airport. These designations are given to airports which have a high level of business jet/turbojet activity, and which should be planned and designed to accommodate growth in these segments. For these reasons, the ultimate critical aircraft is set within ARC C-III, represented by a Gulfstream V.

As mentioned in the Inventory section, for primary runways that provide less than 95 percent wind coverage for specific crosswind components, a crosswind runway may be justified. Based on wind data sourced from the on-airport ASOS, the primary runway at ODO provides for less than 95 percent crosswind coverage in the 10.5 and 13 knot conditions, which will be further explained and expanded upon later in the Runway Orientation portion of the Facility Requirements section. As such, a crosswind or secondary runway designed to B-II standards is justified. Therefore, the existing and ultimate critical aircraft for the crosswind runway at ODO is within ARC B-II and represented by the King Air 200/300/350.

Existing and Ultimate Airfield Design

Each runway at an airport is assigned an RDC. The RDC relates to specific FAA design standards that should be planned in relation to each runway, regardless of whether or not the airport currently meets the appropriate design standards (to be discussed in the next section).

Runway 11-29 has historically been considered the airport's primary runway. It measures 6,200 feet long by 100 feet wide with an APRC and DPRC capable of accommodating up to ARC D-V aircraft. Both runway ends provide a GPS LPV approach with visibility minimums down to ¾-mile. The existing ARC for ODO is B-II, and the resulting RDC for Runway 11-29 is B-II-4000 and the existing TDG is 2A. Based on the ultimate critical aircraft (C-III), planning for the primary runway should reflect RDC C-III-2400 design standards, which accounts for the potential for the airport to pursue visibility minimums down to ½-mile.

ODO also has two other runways, Runway 2-20 and Runway 16-34, both of which are designed to B-II standards. As mentioned, the FAA will support a crosswind runway if the primary runway provides less than 95 percent wind coverage; however, they will not support two crosswind runways, or a crosswind and a secondary runway, unless operational demand warrants it. This is not the case at ODO, as evidenced by the lack of federal funding support for maintaining Runway 2-20. However, based on current wind data, Runway 2-20 provides better crosswind coverage than Runway 16-34. The alternatives analysis will consider the pros/cons of maintaining the current three-runway system or decommissioning one runway. This study will also evaluate whether Runway 11-29 should remain as the primary runway or if Runway 2-20 or Runway 16-34 should be designated the primary. Whichever runway is maintained as the crosswind should be designed to B-II-5000 standards in the existing and ultimate condition. Another option is for Ector County to self-fund the maintenance of an 'additional' runway (the third runway not considered 'primary' or 'crosswind'), like what occurs now with Runway 2-20. If the decision is made to maintain all three runways, the 'additional' runway should be designed to meet B-II standards now and in the future.

All taxiways are at least 35 feet wide, meeting TDG 2A standards. These taxiways should continue to be designed to TDG 2A standards.

Table 23 summarizes the airport and runway classification currently and in the future for each of the runways. The next section, Facility Requirements, will outline the airside and landside elements necessary to meeting the aviation needs that have been determined in this forecasting effort.

TABLE 23 | Airport and Runway Classifications

	EXISTING	ULTIMATE
Airport Reference Code (ARC)	B-II	C-III
PRIMARY RUNWAY		
Airport Design Aircraft	King Air 200/300/350	Gulfstream V
Runway Design Code (RDC)	B-II-4000	C-III-2400
Approach Reference Code (APRC)	D/IV/4000 D/V/4000	D/IV/2400 D/V/2400
Departure Reference Code (DPRC)	D/IV D/V	D/IV D/V
Taxiway Design Group (TDG)	2A	2A
CROSSWIND RUNWAY		
Airport Design Aircraft	King Air 200/300/350	Same
Runway Design Code (RDC)	B-II-5000	Same
Approach Reference Code (APRC)	B/III/4000 D/II/4000	Same
Departure Reference Code (DPRC)	B/III D/II	Same
Taxiway Design Group (TDG)	2A	Same
ADDITIONAL (NON-AIP ELIGIBLE) RUNWAY[1]		
Airport Design Aircraft	King Air 200/300/350	Same
Runway Design Code (RDC)	B-II-VIS	Same
Approach Reference Code (APRC)	B/III/4000 D/II/4000	Same
Departure Reference Code (DPRC)	B/III D/II	Same
Taxiway Design Group (TDG)	2A	Same

[1] These standards apply only if the County elects to self-fund maintenance of a third runway

Source: FAA AC 150/5300-13B; Coffman Associates analysis

As detailed in previous sections, an airport contains both airside and landside facilities. Airside facilities consist of the runways, taxiways, approach and departure facilities, navigational aids, lighting, markings, and signage that assist in the ground movement of aircraft. Landside facilities provide the interface between air and ground transportation and include the terminal building, hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities.

Cost-effective, safe, efficient, and orderly development of an airport should rely more upon actual demand than a time-based forecast figure. Thus, in order to develop a plan that is demand-based rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections.

It is important to consider that, over time, the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important to plan for these milestones so that airport officials can respond to unanticipated changes in a timely fashion. As a result, these milestones provide flexibility while potentially extending this plan's useful life if aviation trends slow over the period.

The most important reason for utilizing milestones is to allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as the schedule can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program.

The milestones utilized in the study are:

- Short-Term: 0-5 Years
- Intermediate-Term: 6-10 Years
- Long-Term: 11-20+ Years

AIRSIDE FACILITY REQUIREMENTS

RUNWAY SAFETY AREAS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions that could affect the safe operation of aircraft. These surfaces include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ).

It is important that the RSA, ROFA, and ROFZ remain under direct ownership of the airport sponsor to ensure that these areas remain free of obstacles and can be readily accessed by maintenance and safety personnel. The airport should also own or maintain sufficient land use control over RPZs to ensure that the area remains obstacle free. Alternatives to owning RPZs include maintaining positive control through avigation easements or ensuring proper zoning measures are taken to maintain compatible land use.

Existing safety areas for each of the runways at ODO are depicted on **Exhibit 25**. For planning purposes, the primary runway should be designed to meet C-III-2400 standards in the ultimate condition, and the crosswind and/or additional runway should be planned to B-II-5000 design standards. While Runway 11-29 currently serves as the airport's primary runway, the alternatives in the next section will evaluate scenarios in which other runways are considered the primary. This includes the evaluation of any potential safety area impacts and mitigative actions to correct non-standard conditions.

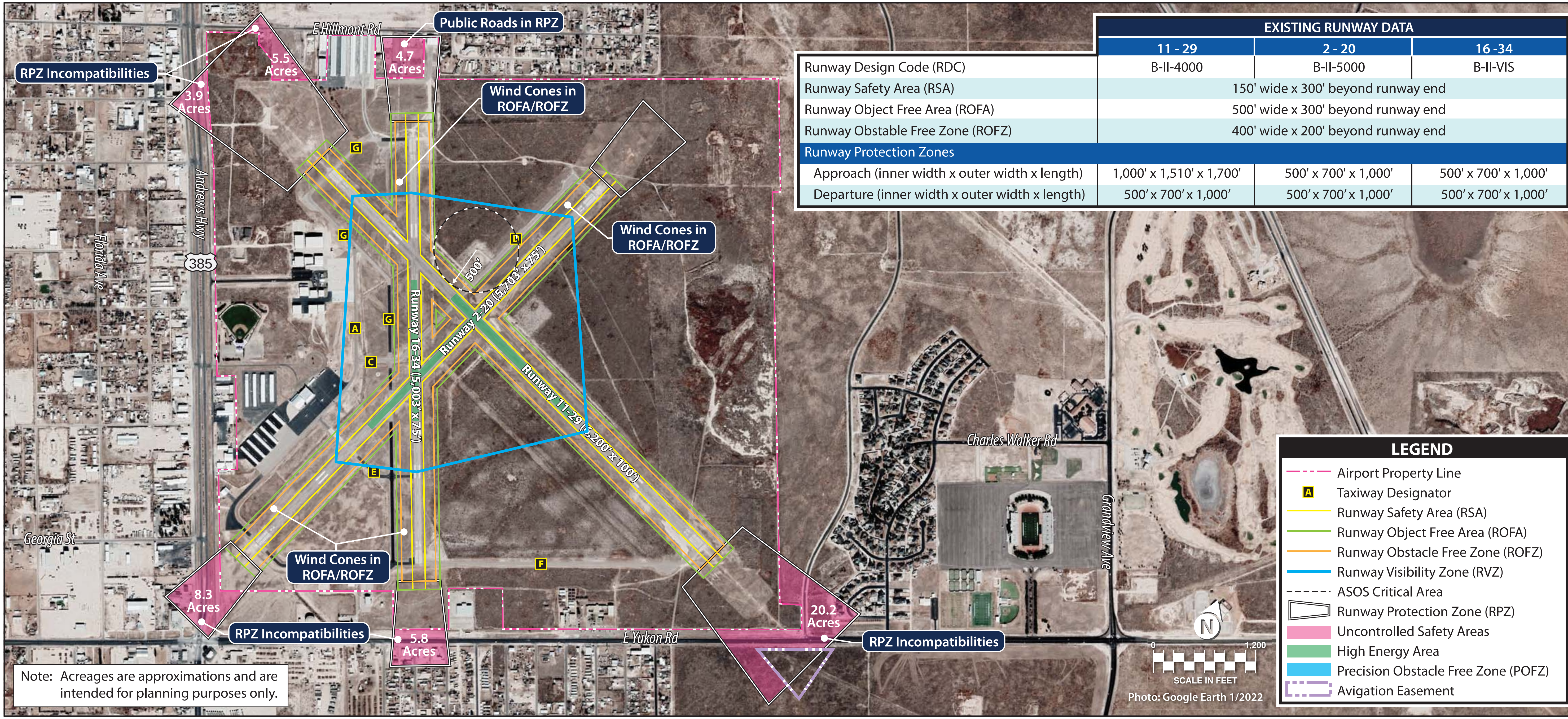
Runway Safety Area (RSA)

The RSA is an established surface surrounding a runway that is designed or prepared to increase safety and decrease potential damage if an aircraft undershoots, overshoots, or makes an excursion from the runway. The RSA is centered upon the runway centerline, and its dimensions are based upon the established RDC. The FAA states within AC 150/5300-13B that the RSA must be cleared and graded and cannot contain hazardous surface variations. In addition, the RSA must be drained either by grading or storm sewers and capable of supporting snow removal and ARFF equipment, as well as the occasional passage of aircraft without damaging the aircraft. The RSA must remain free of obstacles, other than those considered fixed by function, such as runway lights.

The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program*. The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally obligated airports…shall conform to the standards contained in Advisory Circular 150/5300-13B, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

The standard RSA dimensions for each of the runways in the existing condition are 150 feet wide and extending 300 feet beyond each end of the runway. These dimensions will also apply in the ultimate condition for the crosswind and/or additional runway. However, the RSA dimensions for the primary runway will increase in the ultimate RDC C-III-2400 condition, at 500 feet wide and extending 1,000 feet beyond each end of the runway.

At ODO, the RSA for all runways in the existing condition is fully contained within airport property and free of obstructions, in accordance with FAA design standards. The next section of the report will evaluate different runways functioning as the primary runway and meeting C-III-2400 design standards. Potential RSA obstructions/deficiencies associated with the primary runway will be examined, as well as mitigative actions that would be necessary.



EXISTING RUNWAY DATA	11 - 29	2 - 20	16 -34
Runway Design Code (RDC)	B-II-4000	B-II-5000	B-II-VIS
Runway Safety Area (RSA)	150' wide x 300' beyond runway end		
Runway Object Free Area (ROFA)	500' wide x 300' beyond runway end		
Runway Obstable Free Zone (ROFZ)	400' wide x 200' beyond runway end		
Runway Protection Zones			
Approach (inner width x outer width x length)	1,000' x 1,510' x 1,700'	500' x 700' x 1,000'	500' x 700' x 1,000'
Departure (inner width x outer width x length)	500' x 700' x 1,000'	500' x 700' x 1,000'	500' x 700' x 1,000'

	ULTIMATE PRIMARY RUNWAY
Runway Design Code (RDC)	C-III-2400
Runway Safety Area (RSA)	500' wide x 1,000' beyond runway end
Runway Object Free Area (ROFA)	800' wide x 1,000' beyond runway end
Runway Obstable Free Zone (ROFZ)	400' wide x 200' beyond runway end
Runway Protection Zones	
1/2-mile Approach RPZ (inner width x outer width x length)	1,000' x 700' x 2,500'
1/2-mile Departure RPZ (inner width x outer width x length)	1,700' x 500' x 1,010'
3/4-mile Approach RPZ (inner width x outer width x length)	1,000' x 1,510' x 1,700'
3/4-mile Departure RPZ (inner width x outer width x length)	500' x 1,010' x 1,700'

	ULTIMATE CROSSWIND / ADDITIONAL RUNWAY
Runway Design Code (RDC)	B-II-5000
Runway Safety Area (RSA)	150' wide x 300' beyond runway end
Runway Object Free Area (ROFA)	500' wide x 300' beyond runway end
Runway Obstable Free Zone (ROFZ)	400' wide x 200' beyond runway end
Runway Protection Zones	
Approach (inner width x outer width x length)	500' x 700' x 1,000'
Departure (inner width x outer width x length)	500' x 700' x 1,000'

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Runway Object Free Area (ROFA)

The ROFA can be described as a two-dimensional surface area that surrounds all airfield runways. This area must remain clear of obstructions, with an exception to those that are deemed "fixed by function," such as runway lighting systems. This safety area does not have to be level or graded as the RSA does. However, the ROFA must be clear of any penetrations of the lateral elevation of the RSA. Much like the RSA, the ROFA is centered upon the runway centerline, and its size is determined based upon the established RDC.

ROFA design standards for all three runways measure 500 feet wide and extend 300 feet beyond the end of each runway in the existing condition, and for the crosswind and additional runways in the ultimate condition. The ROFA dimensions increase for the ultimate RDC C-III-2400 design standards for the primary runway, at 800 feet wide and extending 1,000 feet beyond the end of each runway.

In the existing condition, the ROFA associated with each runway is fully contained on airport property, but obstructions are present, as noted on **Exhibit 25**. The wind cones adjacent to Runways 2-20 and 16-34 are located within the ROFA, which is a non-standard condition. Consideration should be given to relocating the wind cones outside of the ROFA.

The next section of the report will evaluate different runways functioning as the primary runway and meeting C-III-2400 design standards. Potential ROFA obstructions/deficiencies associated with the primary runway will be examined, as well as mitigative actions that would be necessary.

Obstacle Free Zones (OFZ)

The Runway Obstacle Free Zone (ROFZ) can be defined as a portion of airspace centered about the runway, and its elevation at any point is equal to the elevation of the closest point on the runway centerline. The function of the ROFZ is to ensure the safety of aircraft conducting operations by preventing object penetrations to this portion of airspace. Potential penetrations to this airspace also include taxiing and parked aircraft. Any obstructions within this portion of airspace must be mounted on frangible couplings and be fixed in its position by its function.

The ROFZ extends 200 feet past each end of the runway on the runway centerline. The ROFZ width for runways accommodating large aircraft is 400 feet. This applies to the existing and ultimate condition at ODO. The wind cones adjacent to Runways 2-20 and 16-34 are located within the existing and ultimate ROFZ and should be relocated.

The Precision Obstacle Free Zone (POFZ) is defined as "a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide." The POFZ is only in effect when the following operational conditions are met:

I. Vertically guided approach
II. Reported ceiling below 250 feet and/or visibility less than ¾-statue mile
III. An aircraft on final approach within two miles of the runway threshold

When these conditions are met, aircraft holding for take-off must hold in such a position so that neither the fuselage nor the tail of the aircraft penetrates the POFZ. However, the wings of the aircraft can penetrate the surface. Currently, no runway end has lower than ¾-statue mile visibility, so a POFZ is not in effect. In the ultimate condition, visibility minimums lower than ¾-mile are planned for the primary runway; therefore, the POFZ would be in effect if the operational conditions above are met.

Runway Protection Zone (RPZ)

An RPZ is a trapezoidal area centered on the extended runway centerline beginning 200 feet from the end of the runway. This safety area has been established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ dimensions are based upon the established RDC and the approach visibility minimums serving the runway. While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13B, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements.
- Irrigation channels, as long as they do not attract birds.
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.
- Above-ground fuel tanks associated with back-up generators for unstaffed NAVAIDS.

In September 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*, which states that airport owner control over RPZs is preferred. Airport owner control over RPZs may be achieved through:

- Ownership of the RPZ property in fee simple;
- Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
- Possessing sufficient land use control authority to regulate land use in the jurisdiction containing the RPZ;
- Possessing and exercising the power of eminent domain over the property; or
- Possessing and exercising permitting authority over proponents of development within the RPZ (e.g., where the sponsor is a State).

AC 150/5190-4B further states that “control is preferably exercised through acquisition of sufficient property interest and includes clearing RPZ areas (and keeping them clear) of objects and activities that would impact the safety of people and property on the ground.” The FAA does recognize that land ownership, environmental, geographical, and other considerations can complicate land use compatibility within RPZs. Regardless, airport sponsors are to comply with FAA Grant Assurances, including but not limited to Grant Assurance 21, Compatible Land Use. Sponsors are expected to take appropriate measures to “protect against, remove, or mitigate land uses that introduce incompatible development within RPZs.” For proposed projects that would shift an RPZ into an area with existing incompatible land uses, such as a runway extension or construction of a new runway, the sponsor is expected to have or secure sufficient control of the RPZ, ideally through fee simple ownership. Where existing incompatible land uses are present, the FAA expects sponsors to “seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses” through acquisition, land exchanges, right-of-first-refusal to purchase, agreement with property owners on land uses, easements, or other such measures. These efforts should be revisited during master plan or ALP updates, and periodically thereafter, and documented to demonstrate compliance with FAA Grant Assurances. If new or proposed incompatible land uses impact an RPZ, the FAA expects the airport to take the above actions to control the property within the RPZ, along with adopting a strong public stance opposing the incompatible land uses.

For new incompatible land uses that result from a sponsor-proposed action (i.e., an airfield project such as a runway extension, a change in the critical aircraft that increases the RPZ dimension, or lower minimums that increase the RPZ dimension), The airport sponsor is expected to conduct an Alternatives Evaluation. The intent of the Alternatives Evaluation is to "proactively identify a full range of alternatives and prepare a sufficient evaluation to be able to draw a conclusion about what is ‘appropriate and reasonable.’" For incompatible development off-airport, the sponsor should coordinate with the Airports District Office (ADO) as soon as they are aware of the development, with the alternatives evaluation conducted within 30 days of becoming aware of the development within the RPZ. The following items are typically necessary in an Alternatives Evaluation:

- Sponsor’s statement of the purpose and need of the proposed action (airport project, land use change or development)
- Identification of any other interested parties and proponents
- Identification of any federal, state, and local transportation agencies involved
- Analysis of sponsor control of the land within the RPZ
- Summary of all alternatives considered including:
  - Alternatives that preclude introducing the incompatible land use within the RPZ (e.g., zoning action, purchase, and design alternatives such as implementation of declared distances, displaced thresholds, runway shift or shortening, raising minimums)
  - Alternatives that minimize the impact of the land use in the RPZ (e.g., rerouting a new roadway through less of the RPZ, etc.)
  - Alternatives that mitigate risk to people and property on the ground (e.g., tunnelling, depressing and/or protecting a roadway through the RPZ, implementing operational measures to mitigate any risks, etc.)
- Narrative discussion and exhibits or figures depicting the alternative
- Rough order of magnitude cost estimates associated with each alternative, regardless of potential funding sources
- A practicability assessment based on the feasibility of the alternative in terms of cost, constructability, operational impacts, and other factors.

Once the Alternatives Evaluation has been submitted to the ADO, the FAA will determine whether or not the sponsor has made an adequate effort to pursue and give full consideration to appropriate and reasonable alternatives. **The FAA will not approve or disapprove the airport sponsor's preferred alternative; rather, the FAA will only evaluate whether an acceptable level of alternatives analysis has been completed before the sponsor makes the decision to allow or not allow the proposed land use within the RPZ.**

In summary, the RPZ guidance published in September 2022 shifts the responsibility of protecting the RPZ to the airport sponsor. The airport sponsor is expected to take action to control the RPZ or to demonstrate that appropriate actions have been taken. It is ultimately up to the airport sponsor on whether or not to permit existing or new incompatible land uses within an RPZ, with the understanding that they still have grant assurance obligations, and the FAA retains the authority to review and approve or disapprove portions of the ALP that would adversely impact the safety of people and property within the RPZ.

RPZs include both approach and departure RPZs. The approach RPZ is a function of Aircraft Approach Category (AAC) and approach visibility minimums associated with the approach runway end. The departure RPZ is a function of the AAC and departure procedures associated with the runway. For a particular runway end, the more stringent RPZ requirements (usually associated with the approach RPZ) will govern the property interests and clearing requirements that the airport sponsor should pursue. None of the runways at ODO have displaced thresholds, so the approach and departure RPZs on each runway occur in the same location 200 feet from the end of each runway. For planning purposes, the approach RPZ was used to create the most restrictive condition. The existing RPZs at ODO are presented on **Exhibit 25** and detailed further in **Table 24**.

TABLE 24 | Runway Protection Zones (RPZ) Summary

RPZ	Visibility Minimums	Uncontrolled RPZ	Notes/Incompatibilities
EXISTING CONDITION			
Runway 11	¾ mile	9.4 acres	Portions of the RPZ extend beyond airport property and are uncontrolled; businesses and a residence present; Andrews Highway and Hillmont Road traverse the RPZ.
Runway 29	¾ mile	20.2 acres	Approximately 20.2 acres within the RPZ are uncontrolled, with approximately 2.9 acres protected by a County-owned easement. RPZ contains residential land uses and encompasses E. Yukon Road and other public roadways.
Runway 2	Visual	8.3 acres	A portion of the RPZ is uncontrolled; RPZ contains businesses and encompasses Andrews Highway.
Runway 20	1-mile	N/A	Fully contained on airport property; free of incompatible land uses.
Runway 16	Visual	4.7 acres	A portion of the RPZ is uncontrolled; RPZ contains businesses/hangars.
Runway 34	Visual	5.8 acres	A portion of the RPZ is uncontrolled; residential and business land uses in RPZ; RPZ encompasses E. Yukon Road and other public roadways.
Note: Acreages are approximations			

Source: Coffman Associates analysis

As detailed in the table, all but one of the existing condition RPZs extend off airport property, with the exception being the Runway 20 RPZ which is fully contained on airport property and free of incompatible uses. Each of the off-airport RPZs also contains incompatible land uses including residences, businesses, and public roads. In the ultimate condition, the RPZ associated with the primary runway end offering approach minimums down to ½ mile will increase in size, potentially introducing new incompatible land uses in the RPZ. As detailed previously, the FAA will expect the airport sponsor to conduct an Alternatives Evaluation if there is a change to the runway environment, including the introduction of lower approach minimums that would alter the size of the RPZ. Options in the next section will evaluate different scenarios to mitigate incompatible land uses within existing and ultimate RPZs.

RUNWAY ORIENTATION

A runway's designation is based upon its magnetic headings, which are determined by the magnetic declination for the area. The magnetic declination in the area of ODO is 5° 53'E. Primary Runway 11-29 has a true heading of 121°/301°. Adjusting for the magnetic declination, the current magnetic heading of the runway is 115°/295°. Thus, the current runway designation should be maintained in the short-term but should be redesignated as Runway 12-30 in approximately 8-10 years. The other two runway designations (Runway 2-20 and Runway 16-34) should also be maintained, as detailed in **Table 25**.

TABLE 25 | Runway Designations

Runway	True Heading	Magnetic Heading	Desired Runway ID
Runway 11-29	121/301	115/295	11/29*
Runway 2-20	030/210	024/204	2/20
Runway 16-34	165/345	159/339	16/34
Magnetic Declination: 5° 53' E ± 0° 21' changing by 0° 7' W per year; rounded to 6° *Runway 11-29 should be redesignated as Runway 12-30 in approximately 8-10 years			

Sources: Airnav.com; NOAA

FAA Advisory Circular 150/5300-13B, *Airport Design*, recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of not exceeding a 10.5-knot (12 mph) component for ARC A-I and B-I; 13-knot (15 mph) component for ARC A-II and B-II; 16-knot (18 mph) component for ARC A-III, B-III, C-I through C-III, and D-I through D-III; and a 20-knot (23) component for ARC A-IV through E-VI.

Exhibit 4, presented previously, details the associated wind coverage. As stated previously, in all weather conditions, Runway 11-29 provides for 77.51 percent coverage in 10.5-knot crosswind conditions, 87.44 percent coverage in 13-knot crosswind conditions, and greater than 95 percent coverage in 16-knot and higher crosswind conditions. As shown on the exhibit, the other two runways provide better crosswind coverage than Runway 11-29, and all three runways combined provide greater than 98 percent coverage in the 10.5-knot condition.

Based on this information, a crosswind runway at ODO is justified for federal funding assistance; however, a third runway is not. An additional runway is defined as a runway that is not the primary or crosswind, and the FAA will generally not participate in funding for maintenance for additional runways[21]. Such is the case with Runway 2-20 at ODO, which is funded by Ector County. As part of this study, an analysis of the

[21] FAA AIP Handbook, https://www.faa.gov/airports/aip/aip_handbook/?Chapter=Appendix#PG02

necessity of maintaining an additional runway has been included. Each of the runways was examined in relation to one another to determine the combined crosswind coverage of a two-runway system. **Exhibit 26** details the results of this analysis for all weather and IFR conditions. Based on these findings, the preferred combination is Runway 11-29 and Runway 2-20, which offers a combined wind coverage of 96.37 percent in 10.5-knot crosswind conditions and greater than 99 percent coverage for 13-knot and higher conditions. Other considerations, such as local land uses and constraining factors, could influence which runway is best served as the crosswind as well. Alternatives in the next section will include options to maintain the three-runway system currently available or to decommission one of the runways.

RUNWAYS 11/29 & 2/20									
ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	77.51%	87.44%	95.67%	98.94%	Runway 11-29	71.61%	81.90%	92.39%	97.43%
Runway 2-20	87.00%	93.43%	97.86%	99.44%	Runway 2-20	92.18%	95.87%	98.22%	99.24%
All Runways	96.37%	99.02%	99.82%	99.98%	All Runways	97.13%	98.98%	99.62%	99.92%

RUNWAYS 11/29 & 16/34									
ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	77.51%	87.44%	95.67%	98.94%	Runway 11-29	71.61%	81.90%	92.39%	97.43%
Runway 16-34	86.87%	92.30%	97.06%	99.13%	Runway 16-34	78.84%	87.43%	95.26%	98.63%
All Runways	91.83%	96.18%	98.69%	99.79%	All Runways	83.63%	91.67%	96.88%	99.47%

RUNWAYS 16/34 & 2/20									
ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 16-34	86.87%	92.30%	97.06%	99.13%	Runway 16-34	78.84%	87.43%	95.26%	98.63%
Runway 2-20	87.00%	93.43%	97.86%	99.44%	Runway 2-20	92.18%	95.87%	98.22%	99.24%
All Runways	95.25%	97.85%	99.21%	99.76%	All Runways	95.77%	98.21%	99.17%	99.61%

Exhibit 26 – Dual Runway Wind Coverage

RUNWAY LENGTH REQUIREMENTS

AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for ODO is 95.3 degrees Fahrenheit (F), which occurs in July. The airport elevation is 3,004 feet mean sea level (MSL). The longest runway, Runway 11-29, has a gradient of 0.10 percent, which conforms to FAA design standards for gradient.
Airplanes operate on a wide variety of available runway lengths. Many factors will govern the sustainability of runway lengths for aircraft, such as elevation, temperature, wind, aircraft weight, wing flap settings,

runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that maximize the sustainability of the runway length. Policies such as area zoning and height and hazard restricting can protect an airport's runway length. Airport ownership (fee simple easement) of land leading to the runway ends reduces the possibility of natural growth or man-made obstructions. Planning of runways should include an evaluation of aircraft types expected to use the airport now and in the future. Future planning should be realistic and supported by the FAA-approved forecasts and should be based on the critical aircraft (or family of aircraft).

General Aviation Aircraft

Most operations occurring at ODO are conducted using smaller GA aircraft weighing less than 12,500 pounds. Following guidance from AC 150/ 5325-4B, to accommodate 95 percent of these small aircraft with less than 10 passenger seats, a runway length of 4,600 feet is recommended. For 100 percent of these small aircraft, a runway length of 5,000 feet is recommended. For small aircraft with 10 or more passenger seats, 5,000 feet of runway length is recommended.

The airport is also utilized by aircraft weighing more than 12,500 pounds, including small- to medium-sized business jet aircraft. Runway length requirements for business jets weighing less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated runways (wet). Business jets tend to need greater runway length when landing on a wet surface because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets consider a grouping of airplanes with similar operating characteristics. The AC provides two separate "family groupings of airplanes," each based upon their representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those making up 100 percent of the national fleet. **Table 26** presents a partial list of common aircraft in each aircraft grouping. A third group considers business jets weighing more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

TABLE 26 | Business Jet Categories for Runway Length Determination

Aircraft	MTOW (lbs.)
75 Percent of the National Fleet	
Lear 35	20,350
Lear 45	20,500
Cessna 550	14,100
Cessna 560XL	20,000
Cessna 650 (VII)	22,000
IAI Westwind	23,500
Beechjet 400	15,800
Falcon 50	18,500
75-100 Percent of the National Fleet	
Lear 55	21,500
Lear 60	23,500
Hawker 800XP	28,000
Hawker 1000	31,000
Cessna 650 (III/IV)	22,000
Cessna 750 (X)	36,100
Challenger 604	47,600
IAI Astra	23,500
Greater than 60,000 Pounds	
Gulfstream II	65,500
Gulfstream IV	73,200
Gulfstream V	90,500
Global Express	98,000
Gulfstream 650	99,600
MTOW: Maximum Takeoff Weight	

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Table 27 presents the results of the runway length analysis for business jets developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,800 feet is recommended. This length is derived from a raw length of 5,727 feet that is adjusted, as recommended, for runway gradient and consideration of landing length needs on a contaminated runway (wet and slippery). To accommodate 100 percent of the business jet fleet at 60 percent useful load, a runway length of 7,600 feet is recommended.

TABLE 27 | Runway Length Requirements

Fleet Mix Category	TAKEOFF LENGTHS		LANDING LENGTHS	Final Runway Length
	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment (+360')	Wet Surface Landing Length for Jets (+15%)*	
75% of fleet at 60% useful load	5,727	5,787	5,500	5,800
100% of fleet at 60% useful load	7,475	7,535	5,500	7,600
75% of fleet at 90% useful load	8,606	8,666	7,000	8,700
100% of fleet at 90% useful load	8,606	8,666	7,000	8,700

*Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet condition.

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at an airport. This could be documented activity by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 8,700 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 8,700 feet is recommended.

Another method to determine runway length requirements for aircraft at ODO is to examine aircraft flight planning manuals under conditions specific to the airport. Several aircraft were analyzed for take-off length requirements at a design temperature of 95.3 degrees F at a field elevation of 3,004 feet MSL with a 0.10 percent runway grade. **Table 28** provides a detailed runway length analysis for several of the most common turbine aircraft in the national fleet. This data was obtained from Ultra-Nav software, which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load from 60 percent to 100 percent.

The analysis shows that the current length of 6,200 feet available on Runway 11-29 is adequate for all but one of the business jets analyzed at 60 percent useful load. At 70 percent useful load, three more aircraft are limited, and progressively more jets become weight-restricted at 80 percent and greater useful loads, with many not capable due to climb limitations at 100 percent useful loads.

TABLE 28 - Business Aircraft Takeoff Length Requirements

		TAKEOFF LENGTH REQUIREMENTS (FEET)				
		Useful Load				
Aircraft Name	MTOW	60%	70%	80%	90%	100%
Pilatus PC-12	9,921	2,521	2,741	2,973	3,217	3,473
King Air C90GTi	10,100	3,000	3,221	3,466	3,710	3,954
King Air 200 GT	12,500	4,099	4,238	4,362	4,475	4,581
Citation CJ3	13,870	3,412	3,678	3,974	4,334	4,735
Citation Sovereign	30,300	3,581	3,844	4,114	4,425	4,789
King Air 350	15,000	4,239	4,406	4,576	4,909	5,282
Gulfstream 450	74,600	5,321	5,874	6,485	7,128	7,872
Lear 40	21,000	5,186	5,811	6,538	7,318	8,113
Falcon 2000	35,800	5,548	6,029	6,557	7,212	8,610
Challenger 604/605	48,200	5,893	6,492	7,193	7,956	8,740
Gulfstream 650	99,600	5,663	6,280	6,960	7,826	8,789
Gulfstream 550	91,000	5,647	6,319	7,272	8,263	9,234
Gulfstream V	90,500	5,257	6,085	6,995	8,104	9,371
Beechjet 400A	16,300	4,752	5,130	5,508	Climb Limited	Climb Limited
Citation II (550)	13,300	3,745	4,179	4,650	5,159	Climb Limited
Citation 560 XLS	20,200	4,016	4,337	4,687	5,063	Climb Limited
Citation X	35,700	5,324	5,853	6,438	Climb Limited	Climb Limited
Citation III	21,500	5,067	5,601	Climb Limited	Climb Limited	Climb Limited
Citation (525) CJ1	10,600	4,228	4,681	5,141	Climb Limited	Climb Limited
Citation (525A) CJ2	12,375	3,723	4,024	4,351	4,708	Climb Limited
Lear 60	23,500	6,263	6,854	7,521	8,425	Climb Limited

Green figures are less than or equal to the longest runway length available at ODO; orange figures are greater than that length (6,200')
'Climb Limited' indicates the input data is outside the operating limits of the aircraft planning manual.
MTOW - Maximum Takeoff Weight

Source: Ultranav software

Table 29 presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 25, CFR Part 135, and CFR Part 91k. CFR Part 25 operations are those conducted by individuals or companies which own their aircraft. CFR Part 135 applies to all for-hire charter operations, including most fractional ownership operations. CFR Part 91k includes operations in fractional ownership which utilize their own aircraft under direction of pilots specifically assigned to said aircraft. Part 91k and Part 135 rules regarding landing operations require operators to land at the destination airport within 60 percent of the effective runway length. An additional rule allows for operators to land within 80 percent of the effective runway length if the operator has an approved destination airport analysis in the airport's program operating manual. The landing length analysis conducted accounts for both scenarios.

The landing length analysis shows that all Part 25 and Part 91k operations, as well as most aircraft operating under Part 135, can land on the available runway length at ODO during dry runway conditions. During wet or contaminated runway conditions, Part 25 operations can land on Runway 11-29; however, fewer aircraft are able to meet the landing length requirements under Part 91k and Part 135.

TABLE 29 | Turbine Aircraft Landing Length Requirements

Aircraft Name	MLW	LANDING LENGTH REQUIREMENTS (FEET)					
		Dry Runway Condition			Wet Runway Condition		
		Part 25	80% Rule	60% Rule	Part 25	80% Rule	60% Rule
King Air 350	15,000	2,974	3,718	4,957	3,420	4,275	5,700
Gulfstream V	75,300	2,979	3,724	4,965	3,426	4,283	5,710
Falcon 2000	33,000	3,325	4,156	5,542	3,824	4,780	6,373
Citation Sovereign	27,100	2,989	3,736	4,982	3,833	4,791	6,388
Lear 40	19,200	3,079	3,849	5,132	3,967	4,959	6,612
Citation (525) CJ1	9,800	3,104	3,880	5,173	4,205	5,256	7,008
Citation CJ3	12,750	3,191	3,989	5,318	4,338	5,423	7,230
Citation III	19,000	3,208	4,010	5,347	4,559	5,699	7,598
Challenger 604/605	38,000	3,017	3,771	5,028	4,781	5,976	7,968
Citation (525A) CJ2	11,500	3,362	4,203	5,603	4,852	6,065	8,087
Gulfstream 550	75,300	2,958	3,698	4,930	5,400	6,750	9,000
Gulfstream 650	83,500	4,130	5,163	6,883	5,503	6,879	9,172
Citation 560 XLS	18,700	3,632	4,540	6,053	5,770	7,213	9,617
Citation X	31,800	4,109	5,136	6,848	5,851	7,314	9,752
Gulfstream 450	66,000	3,472	4,340	5,787	6,063	7,579	10,105
Beechjet 400A	15,700	No Data	No Data	No Data	No Data	No Data	No Data
King Air C90GTi	9,600	1,653	2,066	2,755	No Data	No Data	No Data
Citation II (550)	12,700	2,783	3,479	4,638	No Data	No Data	No Data
King Air 200 GT	12,500	1,330	1,663	2,217	No Data	No Data	No Data
Pilatus PC-12	9,921	2,483	3,104	4,138	No Data	No Data	No Data

Green figures are less than or equal to the longest runway length available at ODO; orange figures are greater than that length (6,200')
MLW – Maximum Landing Weight
N/A – Not Applicable. Turboprop aircraft landing lengths are not adjusted for wet runway conditions.

Source: Ultranav software

Runway Length Summary

Many factors are considered when determining appropriate runway length for safe and efficient operations of aircraft at ODO. The airport should strive to accommodate business jets and turboprop aircraft to the greatest extent possible as demand would dictate. Runway 11-29 is the longest runway available at 6,200 feet, and it can accommodate many of these aircraft under moderate loading conditions, even during hot temperatures and at high percentage useful loads. At near maximum takeoff weights (MTOWs), some aircraft do have runway length requirements that exceed the available length on Runway 11-29, and many are climb limited.

Justification for any runway extension to meet the needs of turbine aircraft would require regular use on the order of 500 annual itinerant operations. This is the minimum threshold required to obtain FAA grant funding assistance. The existing critical aircraft, the King Air 200/300/350, can operate at 100 percent useful load. The ultimate critical aircraft, the Gulfstream V, requires a longer runway than what is currently available when operating at 80 percent and greater useful loads. While the majority of the business jets analyzed can operate on the existing runway length with up to 80 percent useful loads, it is important to plan for the eventuality of larger C/D aircraft operating more frequently at ODO. As such, alternatives in the next section will evaluate options for extending the primary runway up to 7,000 feet.

RUNWAY WIDTH

Runway width design standards are based primarily on the airport's critical aircraft but can also be influenced by the visibility minimums of published instrument approach procedures. At 100 feet wide, Runway 11-29 exceeds existing B-II-4000 design standards which call for a runway width of 75 feet. Runways 2-20 and 16-34 are both 75 feet wide, which meets the existing design standards for these runways. In the ultimate condition of C-III-2400 for the primary runway, the standard runway width increases to 100 feet. As such, the primary runway should be planned at 100 feet wide, with the crosswind and/or additional runway planned at 75 feet wide.

RUNWAY PAVEMENT STRENGTH

Airport pavements must be able to withstand repeated operations by aircraft of significant weight; therefore, the strength rating of a runway is an important consideration in facility planning. While runways are assigned a specific strength rating, it does not preclude aircraft weighing more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of the aircraft to determine if a runway can support their aircraft safely. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating. On the other hand, the airport sponsor has an obligation to properly maintain the runway and protect the useful life of the runway, typically for 20 years. According to the FAA publication, *Airport/Facility Directory*, "Runway strength rating is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights in excess of the published figures." The directory goes on to say that those aircraft exceeding the pavement strength should contact the airport sponsor for permission to operate at the airport.

The current runway strength rating on Runway 11-29 is reported at 30,000 pounds SWL, which is adequate to accommodate the majority of aircraft that currently operate at the airport. However, as detailed in the TFMSC (see **Exhibit 24**), the airport is also used by larger, heavier aircraft that have MTOWs of greater than 30,000 pounds. For example, the Challenger 600/604, a C-II aircraft, has an MTOW of 48,200 pounds with dual-wheel main landing gear, while the ultimate critical aircraft (Gulfstream V) has an MTOW of 90,500 pounds DWL. Runways 2-20 and 16-34 both have reported pavement strengths of 14,000 pounds SWL. The King Air 350, which has been identified as the existing critical aircraft for these runways, has an MTOW of 15,000 pounds on dual-wheel main landing gear.

Consideration should be given to strengthening the primary runway to 100,000 pounds DWL by the long term to better accommodate heavier aircraft. Consideration should also be given to increasing the pavement strength on the crosswind and/or additional runway to 30,000 pounds DWL to accommodate a wider range of B-II aircraft.

RUNWAY LINE-OF-SIGHT AND GRADIENT

The FAA has instituted various line-of-sight requirements to facilitate coordination among aircraft and between aircraft and vehicles that are operating on active runways. This allows departing and arriving aircraft to verify the location and actions of other aircraft and vehicles on the ground that could create a conflict.

Line-of-sight standards for an individual runway are based on whether or not there is a parallel taxiway available. When a full-length parallel taxiway is available, thus facilitating faster runway exit times, then any point five feet above the runway centerline must be mutually visible with any other point five feet above the runway centerline that is located at less than half the length of the runway. All runways meet the line-of-sight standard.

The surface gradient of a runway affects aircraft performance and pilot perception. The surface gradient is the maximum allowable slope for a runway. For runways designated for approach categories A and B, the maximum longitudinal grade is 2.0 percent. The maximum longitudinal grade for runways in approach category C, D, and E is 1.5 percent; however, longitudinal grades exceeding 0.8 percent are not acceptable within the lesser of the following criteria:

- In the first and last quarter of the runway length; or
- The first and last 2,500 feet of the runway length.

At ODO, each runway meets the longitudinal gradient standard for approach category B. However, when evaluating a scenario in which one of the runways transitions to aircraft design group C, stricter gradient standards will apply, particularly for the runway ends. Using survey data collected from the United States Geological Survey (USGS),[22] the following calculations were conducted.

- Runway 11 – When measuring 1,550 feet from the Runway 11 end, there is a gradient of 0.15 percent, which meets the standard for category C.
- Runway 29 – When measuring 1,550 feet from the Runway 29 end, there is a gradient of 0.01 percent, which meets the standard for category C.
- Runway 2 – When measuring 1,425.75 feet from the Runway 2 end, there is a gradient of 0.47 percent, which meets the standard for category C.
- Runway 20 – When measuring 1,425.75 feet from the Runway 20 end, there is a gradient of 1.28 percent, which exceeds the standard for category C.
- Runway 16 – When measuring 1,250.75 feet from the Runway 16 end, there is a gradient of 0.79 percent, which meets the standard for category C.
- Runway 34 – When measuring 1,250.75 feet from the Runway 34 end, there is a gradient of 0.50 percent, which meets the standard for category C.

At 1.28 percent, the last quarter of Runway 2-20 (measuring in from the Runway 20 end) exceeds the allowable grade in a group C environment. This is the only runway that does not meet the standard for aircraft design group C. In order to meet gradient standards on Runway 20, this runway end would need to be lowered by approximately seven feet.

[22] Lidar data from USGS was analyzed to determine ground elevation along each runway, with a variance allowance of one meter. An 18b ground survey should be conducted to more accurately determine longitudinal gradient for the runway.

SEPARATION STANDARDS

Runway/Taxiway Separation

The design standard for the separation between runways and parallel taxiways is a function of the critical aircraft and the instrument approach visibility minimum. The separation standard for all runways in the existing condition is 240 feet from the runway centerline to the parallel taxiway centerline. Partial parallel Taxiway G, which serves Runway 11-29, is separated from the runway by 400 feet. Taxiway D, where it extends parallel to Runway 2-20, has a separation of 300 feet, as does Taxiway G where it is parallel to Runway 16-34. This additional separation above the standard 240 feet provides an additional safety margin for pilots and aircraft, and these taxiways should be maintained in their existing locations.

In the ultimate C-III-2400 condition, the separation standard increases to 400 feet from the primary runway centerline to a parallel taxiway. The separation standard for parallel taxiways serving the ultimate crosswind and/or additional runway remains at 240 feet. The alternatives in the next section will examine various options to ensure the standard runway-taxiway separation is met for the primary runway.

Holding Position Separation

Holding position markings are placed on taxiways leading to runways. When approaching the runway, pilots should stop short of the holding position marking line. FAA design standards call for hold lines to be 200 feet from runway centerline for B-II runways with approach minimums no lower than ¾-mile, and 250 feet from runway centerline for C-III runways with approach minimums lower than ¾-mile. The FAA also recommends that hold lines be parallel with the runway so that a pilot is fully perpendicular to the runway with a clear, unobstructed view of the entire runway length. If a 90-degree angle intersection with the runway is not practicable, a +/- 15-degree margin is allowable.

At ODO, all hold lines leading to Runway 11-29 are 250 feet from the runway centerline and are perpendicular to the runway, meeting FAA design standards. Hold lines serving Runway 2-20 are at least 200 feet from the runway centerline and are perpendicular, with the exception of the markings on Taxiway G where it crosses Runway 2-20. These holding position markings are approximately 300 feet from the centerline and are outside the allowable margin for intersection angles. Similarly, taxiways leading to Runway 16-34 are marked with hold lines that meet the separation standard of 200 feet and are positioned 90 degrees from the runway centerline, except for those on Taxiway C. These markings are located approximately 280 feet from centerline but fall outside the allowable +/- 15-degree margin. The next section, Alternatives, will consider various options to correct nonstandard conditions as they pertain to taxiways in the ultimate condition.

Aircraft Parking Area Separation

According to FAA AC 150/5300-13B, aircraft parking positions should be located to ensure that aircraft components (wings, tail, and fuselage) do not:

1. Conflict with the object free area for adjacent runway or taxiways:
    a. Runway Object Free Area (ROFA)
    b. Taxiway Object Free Area (TOFA)
    c. Taxilane Object Free Area (TLOFA)

2. Violate any of the following aeronautical surfaces and areas:
    a. Runway approach or departure surface
    b. Runway Visibility Zone (RVZ)
    c. Runway Obstacle Free Zone (ROFZ)
    d. Navigational aid equipment critical areas

Marked aircraft parking positions at ODO are located on the north ramp, the south ramp, and the south T-hangar ramp. Aircraft parking also occurs on the FBO/terminal ramp, though there are no marked positions. **Exhibit 27** depicts these areas, along with the existing ROFA, TOFA, and TLOFA (TOFA and TLOFA standards are described in greater detail in the next section). While marked parking is not included on the FBO/terminal ramp, any aircraft parked within the orange or pink shaded areas would become obstructions. On the north ramp, the pavement has deteriorated and several of the marked parking areas are no longer visible; those that are visible are clear of the TOFA and TLOFA. The south ramp and south T-hangar ramp do contain marked aircraft parking positions that are located within either the TOFA or the TLOFA, indicated in red on the exhibit. The parking positions should be removed/relocated so that parked aircraft do not obstruct these safety areas. Additionally, a portion of a T-hangar located on the south ramp is located within the TLOFA, and the taxilane centerline marking should be relocated so that this safety area is not obstructed by the hangar.

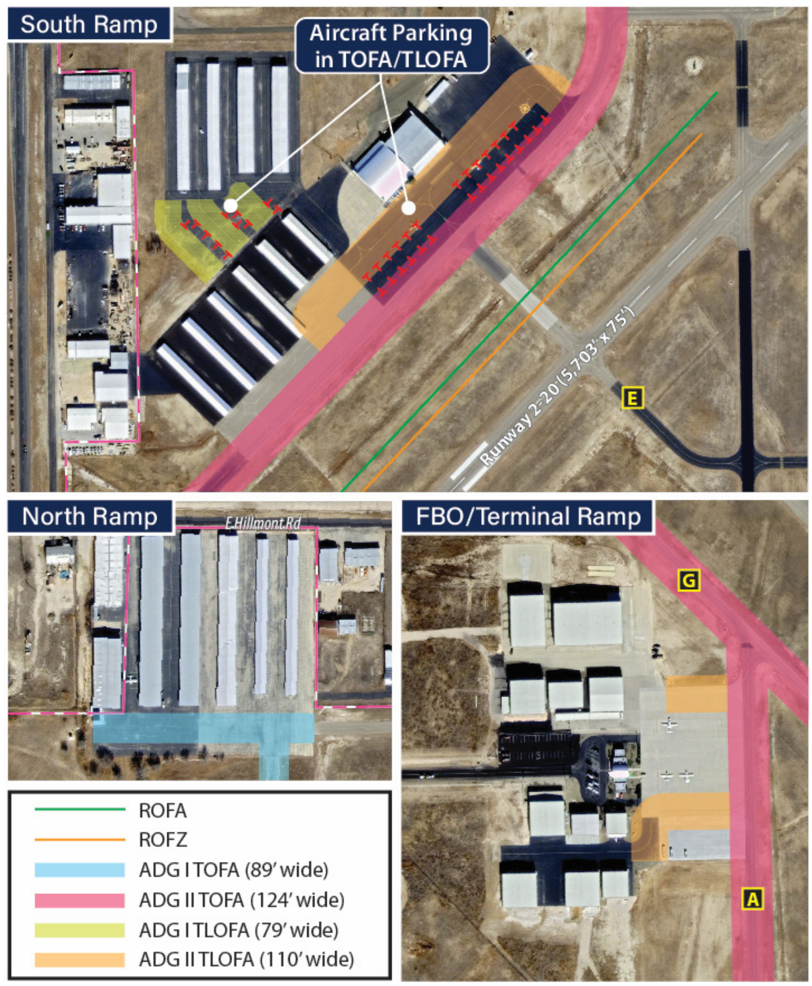


Exhibit 27 – Aircraft Parking Separation

TAXIWAYS

The design standards associated with taxiways are determined by the Taxiway Design Group (TDG) or the ADG of the critical design aircraft. As determined previously, the applicable ADG for all runways at ODO is ADG II at present, with an anticipated shift to ADG III in the ultimate condition. **Table 30** presents the various taxiway design standards related to ADG II and III. The table also shows those taxiway design standards related to TDG. The TDG standards are based on the Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance of the critical design aircraft expected to use those taxiways. Different taxiway and taxilane pavements can and should be planned to the most appropriate TDG design standards based on usage.

TABLE 30 | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	***ADG II***	***ADG III***
Taxiway and Taxilane Protection		
Taxiway Safety Area width (TSA)	79’	118’
Taxiway Object Free Area width (TOFA)	124’	171’
Taxilane Object Free Area width (TLOFA)	110’	158’
Taxiway and Taxilane Separation		
Taxiway Centerline to Parallel Taxiway Centerline	102’	144’
Taxiway Centerline to Fixed or Moveable Object	62’	85.5’
Taxilane Centerline to Parallel Taxilane Centerline	94’	138’
Taxilane Centerline to Fixed or Moveable Object	55’	79’
Wingtip Clearance		
Taxiway Wingtip Clearance (feet)	23’	27’
Taxilane Wingtip Clearance (feet)	16’	20’
STANDARDS BASED ON TDG	***TDG 1A/1B***	***TDG 2A/2B***
Taxiway Width Standard	25’	35’
Taxiway Edge Safety Margin	5’	7.5’
Taxiway Shoulder Width	10’	15’
ADG: Airplane Design Group | TDG: Taxiway Design Group | Note: All dimensions in feet		

Source: FAA AC 150/5300-13B, *Airport Design*

The current design for taxiways serving all runways is TDG 2A, based upon the Beechcraft King Air 200/300/350, which dictates a width of 35 feet. The entire taxiway system at ODO is at least 35 feet wide. Certain portions of the landside area that are utilized exclusively by small aircraft, such as the T-hangar areas, should adhere to TDG 1A/1B standards.

All taxiway widths on the airfield should at least be maintained unless financial constraints dictate. As such, the width could remain until such time as rehabilitation is needed and financial resources to support such are not available. FAA grant availability can only be provided if the project meets eligibility thresholds as determined by the FAA.

At ODO, the existing TOFA for taxiways serving each of the runways is 124 feet wide, with an increase to 171 feet wide when the airport transitions to C-III. The TLOFA varies depending on the type of aircraft using the taxilane. Both the TOFA and the TLOFA should be cleared of objects except for those needed for air navigation or aircraft ground maneuvering purposes. The TOFAs associated with the airfield taxiways are clear of obstructions; however, as mentioned previously, several of the aircraft parking positions on the south ramp and south T-hangar ramp are located within a TOFA or TLOFA.

Taxiway and Taxilane Design Considerations

FAA AC 150/5300-13B, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation included in the current AC, as well as previous FAA safety and design recommendations.

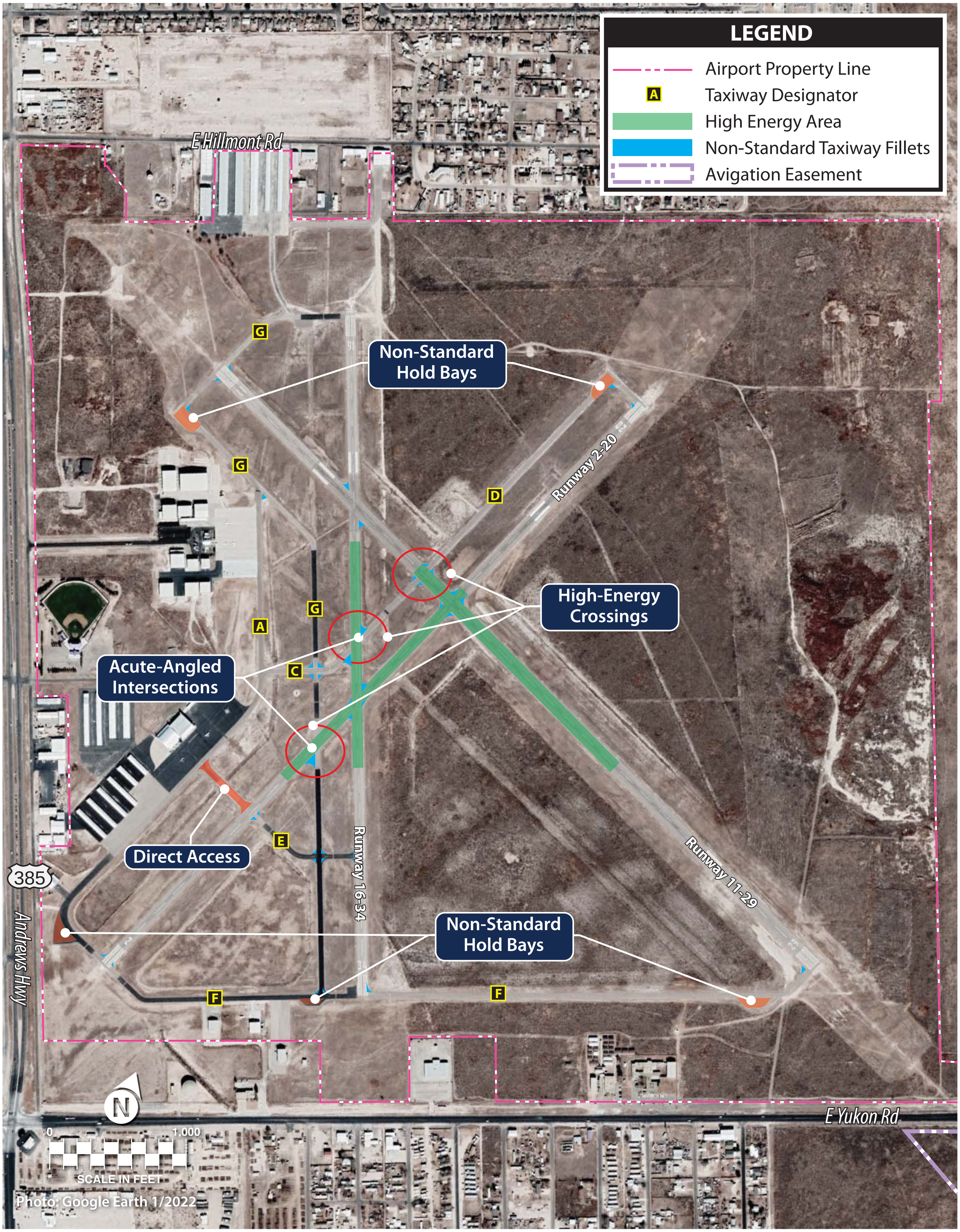
1. **Taxiing Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgmental oversteering," which is where the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.
2. **Curve Design**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.
3. **Three-Path Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot with a maximum of three choices of travel. Ideally, these are right, left, and a continuation straight ahead.
4. **Channelized Taxiing**: To support visibility of airfield signage, taxiway intersections should be designed to meet standard taxiway width and fillet geometry.
5. **Designated Hot Spots and Runway Incursion Mitigation (RIM) Locations**: A hot spot is a location on the airfield with elevated risk of a collision or runway incursion. For areas the FAA designates as a hot spot or RIM location, mitigation measures should be prioritized.
6. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
7. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three-path" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.
   - *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
   - *Increase Visibility*: Right-angle intersections, both between taxiways and runways, provide the best visibility. Acute-angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.

- *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
- *Direct Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

8. **Runway/Taxiway Intersections**
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for an acute-angled exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs, so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage. The construction of high-speed exits is typically only justified for runways with regular use by jet aircraft in approach categories C and above.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.
9. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout or no-taxi island that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

The taxiway system at ODO generally provides for the efficient movement of aircraft, and there are no FAA-designated hot spots at the airport. However, there are several non-standard taxiway geometry conditions, as detailed on **Exhibit 28**, including:

- Taxiway E provides direct access to Runway 2-20 from the south ramp.
- Taxiway D crosses Runways 11-29 and 16-34 in their high-energy areas, as does Taxiway G where it crosses Runway 2-20.
- Taxiway G has an acute-angled intersection with Runway 2-20, and Taxiway C with Runway 16-34. These intersections are outside the +/- 15-degree margin discussed previously.


LEGEND
Airport Property Line
A Taxiway Designator
High Energy Area
Non-Standard Taxiway Fillets
Avigation Easement
E Hillmont Rd
Non-Standard Hold Bays
High-Energy Crossings
Acute-Angled Intersections
Direct Access
Non-Standard Hold Bays
Runway 2-20
Runway 11-29
Runway 16-34
385
Andrews Hwy
E Yukon Rd
G
D
A
C
E
F
0
1,000
SCALE IN FEET
Photo: Google Earth 1/2022

- The holding bays serving each runway end are non-standard. The FAA now considers these designs to be wide expanses of pavement and has set new standards for holding bay design.
- Taxiway fillet geometry is non-standard. Taxiway fillets are areas of additional pavement designed to maintain the taxiway edge safety margin (TESM) and serve to widen taxiways at the inside of turns. This increases the safety margin for taxiing aircraft when pilots are navigating turns.

In the alternatives chapter, potential solutions to these non-standard conditions will be presented. Analysis in the next chapter will also consider improvements which could be implemented on the airfield to minimize runway incursion potential, improve efficiency, and conform to FAA standards for taxiway design.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are devices that provide pilots with guidance and position information when utilizing the runway system. Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of an airport and provide additional safety to pilots and passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger aircraft when visibility is good.

Instrument Approach Aids

ODO has three published instrument approach procedures and a circling VOR-A approach. Runway 11-29 has non-precision LPV (GPS) approaches to both ends that provide visibility minimums down to ¾-mile. In support of the ¾-mile LPV approach, both ends of Runway 11-29 are equipped with a medium intensity approach lighting system (MALS) that enhances safety at the airport, especially during inclement weather or nighttime activity. Runway 20 offers an LNAV (GPS) approach with visibility minimums down to 1-mile. Runway 2 and Runway 16-34 are visual runways with no instrument approach capability.

Analysis in the next chapter will consider improvements necessary for enhancing instrument approach capabilities at the airport, with the primary runway proposed to offer visibility minimums down to ½-mile. In order to achieve a ½-mile LPV approach, a MALSR, which is a MALS that includes runway alignment indicator lights, is necessary. As mentioned in the Runway Protection Zone section, lower approach minimums can increase the size of the RPZ, thereby causing new incompatible land uses to be introduced. The alternatives in the next section will evaluate various options for mitigating incompatible land uses in the RPZ(s) associated with the proposed lower approach minimums.

Visual Approach Aids

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. All runway ends at ODO are equipped with visual approach aids that provide pilots with an indication of being above, below, or on the correct descent glidepath. These systems include PAPI-4s on Runway 11-29, PAPI-2s on Runway 16-34, and VASIs on Runway 2-20. In the ultimate condition, PAPI-4s should be provided on the primary runway, and the crosswind and/or additional runway should be equipped with PAPI-2s.

Runway end identification lights (REILs) are flashing lights located at the runway threshold that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway threshold and distinguish runway end lighting from other lighting on the airport and in the approach areas. None of the runways are equipped with REILs. Consideration should be given to installing REILs on any runway end that is not equipped with a more sophisticated approach light system (i.e., MALS, MALSR).

As mentioned, a medium-intensity approach lighting system (MALSR) is recommended for a ½-mile LPV (GPS) approach. MALSRs consist of a combination of steady burning light bars and flashers that provide pilots with visual information on runway alignment, height perception, roll guidance, and horizontal references to support the visual portion of an instrument approach. The Alternatives section will depict options for installing a MALSR on any runway end providing a ½-mile approach.

Airfield Marking, Lighting, and Signage

All three runways have non-precision markings, which is consistent with the available instrument approach capabilities of the runway system. If and when the airport is provided with visibility minimums lower than ¾-mile, the runway end offering the improved approach would need to be equipped with precision markings with the addition of touchdown zone markings. Current runway markings should be maintained until such time that a ½-mile approach is implemented.

Runway and taxiway lighting systems serve as the primary means of navigation in reduced visibility and nighttime operations. Currently, all runways are equipped with MIRL, a common runway lighting system that can be activated via a pilot-controlled system. This system should be maintained through the planning period. The taxiways are equipped with green taxiway centerline reflectors. Consideration should be given to upgrading to medium intensity taxiway lighting (MITL) on all taxiways.

Airfield signage serves as another means of navigation for pilots. Airfield signage informs pilots of their location on the airport, as well as directs them to major airport facilities, such as runways, taxiways, and aprons. Lighted location and directional signs are installed on the airfield. This system is adequate and should be maintained through the planning period.

Weather Facilities

ODO is equipped with a lighted wind cone and segmented circle located near the intersection of Runway 11-29 and Taxiway D. The wind cone provides pilots with information about wind conditions, while the segmented circle provides traffic pattern information to pilots. Supplemental wind cones are located at the ends of Runways 2, 20, 16, and 34 and on top of a T-hangar on the south ramp. As mentioned previously, the wind cones situated near the runway ends are located inside the ROFA/ROFZ in the existing and ultimate conditions and should be relocated outside these safety areas.

The airfield is also equipped with an ASOS, co-located with the segmented circle and lighted wind cone near the intersection of Runway 11-29 and Taxiway D. The ASOS transmits on-site weather condition information to pilots and should be maintained in its existing location throughout the planning horizon.

Airside facility requirements are summarized on **Exhibit 29**.

LANDSIDE FACILITY REQUIREMENTS

Elements included within this section include general aviation terminal facilities, aircraft hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities.

TERMINAL BUILDING REQUIREMENTS

The terminal facilities provide space for a variety of activities and pilot services. Existing GA terminal facilities at ODO are contained in a 4,100-square-foot (sf) building, which houses a lobby, pilots' lounge and snooze room, flight planning room, conference room, offices, kitchen, and restrooms.

The number of itinerant passengers expected to use terminal services during the design hour are taken into consideration to estimate terminal facility needs. These requirements are based upon a range of designated square feet per design hour passenger, which is typically between 90 and 125 sf. For this study, a planning standard of 100 sf was used to estimate the space required. To determine the number of design hour passengers, the number of itinerant design hour operations is multiplied by the number of passengers expected on the aircraft. Design hour itinerant operations have been estimated at 15 percent of the design day itinerant operations occurring at the airport. As most of the aircraft operating at the airport allow for multiple passengers, a multiplier of 3.0 was established for the short-term, growing to 5.0 by the long-term. This is a reasonable multiplier as the airport regularly accommodates itinerant operations, including air taxi, by aircraft with seating capacities of four to 10 passengers – a trend which is expected to continue throughout the planning period.

Table 31 details current and projected terminal building requirements over the planning period. As can be seen, in terms of size, the existing terminal facility is adequate to accommodate airport users through the intermediate term. However, by the end of the long-term planning horizon, an additional 600 sf of space may be required.

TABLE 31 | GA Terminal Services Requirements

	Available	Short Term	Intermediate Term	Long Term
Design Hour Itinerant Operations	6	7	8	9
Multiplier		3.0	3.5	5.0
Design Hour Itinerant Passengers		22	28	47
Total Building Space (sf)	**4,100**	**2,200**	**2,800**	**4,700**

Source: Coffman Associates analysis

EXISTING	SHORT-TERM	LONG-TERM
Primary Runway		
B-II-4000	C-III-2400	C-III-2400
6,200' x 100'	6,500' x 100'	7,000' x 100'
30,000 lbs SWL	Increase to 50,000 lbs DWL	Increase to 100,000 lbs DWL
Standard RSA, ROFA, ROFZ	Maintain	Maintain
Portions of both RPZs uncontrolled and contain incompatibilities	Acquire avigation easements; consider corrective measures for incompatibilites	Maintain corrected condition
Crosswind Runway		
B-II-5000	B-II-5000	B-II-5000
5,703' x 75'	Maintain	Maintain
14,000 lbs SWL	Increase to 30,000 lbs DWL	Maintain
Standard RSA; wind cones in ROFA/ROFZ	Maintain RSA; relocate wind cones	Maintain corrected condition
Portions of both RPZs uncontrolled and contain incompatibilities	Acquire avigation easements; consider corrective measures for incompatibilites	Maintain corrected condition
Additional Runway (Not Eligible for Funding)		
B-II-VIS	Consider runway closure or maintain at B-II-5000	Consider runway closure or maintain at B-II-5000
5,003' x 75'	Maintain if runway remains	Maintain if runway remains
14,000 lbs SWL	Increase to 30,000 lbs DWL if runway remains	Maintain
Standard RSA; wind cones in ROFA/ROFZ	Remove wind cones	N/A
Portions of both RPZs uncontrolled and contain incompatibilities	Acquire avigation easements; consider corrective measures if runway remains	Maintain corrected condition if runway remains
Taxiways		
All taxiways at least 35' wide, meeting TDG 2A standards	Maintain	Maintain
Standard runway/taxiway separation	Maintain	Maintain
TOFA/TLOFA obstructions on the south ramp and south T-hangar ramp	Consider corrective measures	Maintain corrected condition
Direct access from south ramp to Runway 2-20 via Taxiway E	Consider corrective measures	Maintain corrected condition
High-energy crossings	Consider corrective measures	Maintain corrected condition
Acute-angled runway/taxiway intersections	Consider corrective measures	Maintain corrected condition
Non-standard holding bays on each runway end	Consider corrective measures	Maintain corrected condition
Non-standard taxiway fillet geometry	Consider corrective measures	Maintain corrected condition
Navigational and Approach Aids		
LPV GPS (11, 29), RNAV GPS (20), circling VOR	Consider lower minimums on primary runway	Maintain
MALS (11, 29)	Install MALSR on runway with 1/2-mile approach	Maintain
PAPI-4 (11, 29); VASI (2, 20); PAPI-2 (16, 34)	PAPI-4s on primary runway; PAPI-2s on crosswind/additional runway; REILs on any runway without an ALS	Maintain
Lighting, Marking, Signage, and Weather Facilities		
Rotating beacon	Maintain	Maintain
MIRL	Maintain	Maintain
Taxiway Reflectors	Install MITL	Maintain
Non-precision markings	Precision markings on primary runway; maintain other markings	Maintain
Standard holding position markings except on acute-angled taxiways	Maintain standard hold lines; include standard hold lines on new taxiway pavement	Maintain
Lighted airfield and directional signage	Maintain	Maintain
ASOS	Maintain in existing location	Maintain
Lighted wind cone and segemented circle; supplemental wind cones	Relocate supplemental wind cones located in ROFA/ROFZ	Maintain corrected condition

KEY

ALS - Approach Lighting System
ASOS - Automatic Surface Observing System
GPS - Global Positioning System
LPV - Localizer Performance Vertical Guidance
MALSR - Medium Intensity Approach Lighting System with Runway Alignment
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
PAPI - Precision Approach Path Indicator
REILs - Runway End Identifier Lights
RNAV - Area Navigation
ROFA - Runway Object Free Area
ROFZ - Runway Obstacle Free Zone
RPZ - Runway Protection Zone
RSA - Runway Safety Area
SWL - Single Wheel Landing Gear Type
TDG - Taxiway Design Group
TLOFA - Taxilane Object Free Area
TOFA - Taxiway Object Free Area
VASI - Visual Approach Slope Indicator
VIS - Visual
VOR - Very High Frequency Omni-Directional Range

AIRCRAFT STORAGE HANGARS, APRON, AND VEHICLE PARKING REQUIREMENTS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tiedowns.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, actual hangar construction should be based upon actual demand trends and financial investment conditions.

There are a variety of aircraft storage options typically available at an airport, including shade hangars, T-hangars, linear box hangars, executive/box hangars, and bulk storage conventional hangars. Shade hangars are the most basic form of aircraft protection and are common in warmer climates. These structures provide a roof covering, but no walls or doors.

T-hangars are intended to accommodate one small single engine piston aircraft or, in some cases, one multi-engine piston aircraft. T-hangars are so named because they are in the shape of a "T," providing a space for the aircraft nose and wings, but no space for turning the aircraft within the hangar. Basically, the aircraft can be parked in only one position. T-hangars are commonly "nested" with several individual storage units to maximize hangar space. In these cases, taxiway access is needed on both sides of the nested T-hangar facility. T-hangars are popular with aircraft owners with tighter budgets as they tend to be the least expensive enclosed hangar space to build and lease. There are 15 T-hangars at ODO offering 187 individual units, or approximately 222,100 sf of T-hangar storage space.

Executive hangars are another hangar type commonly used for GA aircraft storage. These hangars provide additional storage space, usually with a footprint between 2,500 and 10,000 sf. Spaces this size allow for increased aircraft maneuverability and can provide for the storage of multiple aircraft within one hangar. Some executive hangars also have space for a small office. There are six executive hangars comprising approximately 37,700 sf of storage space at ODO.

Conventional hangars are the large, clear span hangars typically located facing the main aircraft apron at airports. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as an FBO. ODO has eight conventional hangars offering approximately 102,400 sf of storage space. For planning purposes, executive and conventional hangars have been grouped together to develop an overall total for future capacity needs.

Planning for future aircraft storage needs is based on typical owner preferences and standard sizes for hangar space. For determining future aircraft storage needs, a planning standard of 1,200 square feet per single engine piston aircraft and 1,500 sf per multi-engine piston aircraft is utilized for T-hangars. For executive/conventional hangars, a planning standard of 3,000 sf is utilized for turboprop aircraft; 5,000 sf is utilized for business jet aircraft storage needs; and 1,500 sf is utilized for helicopter storage needs. In addition, since portions of executive/conventional hangars are also used for aircraft maintenance and servicing, requirements for service hangar area were estimated using a planning standard of 250 sf.

In total, there is approximately 396,400 sf of aircraft storage capacity at ODO. With 108 aircraft currently based at the facility and more anticipated to base at the airport by the end of the planning period, expansion of hangar facilities should be planned. **Table 32** details the estimated hangar space requirements over the planning period. Over the long-term, an additional 81,800 sf of hangar space is estimated to be needed, with additional capacity needed for each storage type. Options to include these additional facilities will be explored in the next section. Construction of new hangars should be phased to meet existing demand and not tied to a particular date or timeframe. Construction can be undertaken by either the airport sponsor or private developer.

TABLE 32 | Aircraft Storage Requirements

	Current	Short Term	Intermediate Term	Long Term
Based Aircraft	108	116	125	144
T-hangar Units	187	191	196	206
T-hangar Area (sf)	222,100	226,300	231,700	243,100
Executive/Conventional Hangar area (sf)	140,100	152,600	167,100	199,100
Service Hangar Space	34,200	29,000	31,300	36,000
Total Aircraft Storage (sf)	**396,400**	**407,900**	**430,100**	**478,200**

Source: Coffman Associates analysis

Parking apron and parking position requirements have also been calculated. Parking aprons should provide space for locally based aircraft that are not in storage hangars, as well as itinerant aircraft and those that are used for training and air taxi operations. An industry planning standard of 650 square yards (sy) per local aircraft, 800 sy per itinerant aircraft, and 1,600 sy per large turboprop/jet aircraft was applied to determine required aircraft apron space. Aircraft parking position requirements have been calculated at three percent of based aircraft for local operations and 25 percent of busy day itinerant operations for transient GA operations. As jet operations are anticipated to increase over the planning period, there may be demand for more turbine aircraft parking positions.

Table 33 details parking apron and position requirements over the planning period. ODO currently has approximately 57,600 sy of aircraft parking apron available, with 53 marked parking positions. As detailed in the table, additional apron pavement is needed during the short-term, with approximately 32,800 additional sy anticipated to be required by the long-term. Additional marked aircraft parking will also be needed beginning in the short-term, with 54 more aircraft parking positions estimated to be needed over the next 20 years. The alternatives to follow will consider new apron space to meet this projected demand.

TABLE 33 | Aircraft Apron and Parking Requirements

	Current	Short Term	Intermediate Term	Long Term
AIRCRAFT PARKING				
Local Positions	25	35	38	43
Transient GA Positions	28	29	32	38
Corporate Jet Positions	0	7	11	16
Helicopter Positions	0	3	5	10
Total Aircraft Parking Positions	**53**	**74**	**85**	**107**
Total Apron Area (sy)	**57,600**	**59,700**	**70,100**	**90,400**
VEHICLE PARKING				
Terminal Spaces	22	17	22	36
Based Owner/Terminal Overflow	31	29	31	36
Total Vehicle Parking	**53**	**46**	**53**	**72**

Source: Coffman Associates analysis

Vehicle parking spaces for airport users have also been evaluated. Currently, the airport offers 22 paved parking spaces in front of the terminal, including two handicapped spaces, as well as 31 additional spaces in a lot immediately to the west. Parking space requirements were based upon estimated existing and future itinerant traffic, as well as based aircraft at the airport. This planning study assumes that 25 percent of based aircraft will require a vehicle parking space. **Table 33** details vehicle parking requirements for the airport. An additional 19 vehicle parking spaces are estimated to be needed by the long-term to accommodate local and transient airport users.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

ODO does not have an aircraft rescue and firefighting (ARFF) building or equipment located on the airfield. Because the airport is a GA airport, the FAA does not require ARFF services to be provided. The airport is anticipated to remain a GA airport through the planning period, so on-site ARFF facilities are not planned.

AVIATION FUEL STORAGE

Fuel at ODO is stored in three fuel tanks. There are two Jet A tanks with capacities of 12,000 gallons each, and one 100LL storage tank with a capacity of 10,000 gallons. Based on historic fuel flowage records from the last three years, the airport pumped an average of 450,711 gallons of Jet A and 122,342 gallons of 100LL annually. Dividing the total fuel flowage by the total number of operations provides a ratio of fuel flowage per operation. Between 2019 and 2021, the airport pumped approximately 117.7 gallons of Jet A per turbine operation and 3.7 gallons of 100LL per piston operation. It is anticipated that, over the course of the planning period, the Jet A flowage ratio will increase slightly as the airport accommodates larger jets, and the AvGas flowage ratio will remain static.

Maintaining a 14-day fuel supply would allow the airport to limit the impact of a disruption of fuel delivery. Currently, the airport has enough static fuel storage to meet the 14-day supply criteria for both Jet A and 100LL fuel. Based on these usage assumptions and projected design day operations, additional storage for Jet A is projected to be needed by the intermediate period, while 100LL storage is adequate over the planning period. **Table 34** summarizes the forecasted fuel storage requirements through the planning period.

TABLE 34 | Fuel Storage Requirements

			PLANNING HORIZON		
	Available	Current Need*	Short Term	Intermediate Term	Long Term
Jet A					
Daily Usage (gal.)		1,235	1,484	1,822	2,631
14-Day Supply (gal.)	24,000	17,300	20,800	25,500	36,800
Annual Usage (gal.)		450,711	541,600	664,900	960,200
100LL					
Daily Usage (gal.)		335	376	400	452
14-Day Supply (gal.)	10,000	4,700	5,300	5,600	6,300
Annual Usage (gal.)		122,342	137,100	146,000	164,900

*Current need reflects average of last three years' fuel flowage.

Sources: Historic fuel flowage data provided by the airport; fuel supply projections prepared by Coffman Associates.

Planning should also consider an additional tank to store unleaded aviation fuel (100UL). The FAA has recently approved the use of 100UL in piston-powered aircraft, although unknowns regarding infrastructure and distribution remain. Nevertheless, the alternatives will include placeholders for these facilities.

UTILITIES

The availability and capacity of the utilities serving the airport are important factors in determining the development potential of the airport property, as well as the land immediately adjacent to the facility. Ultimately, the availability of water, gas, sewer, and power sources are of primary concern when assessing available utilities. Given the forecast potential for future landside facility growth, the utility infrastructure serving the airport may need to be expanded to serve future development.

PERIMETER FENCING AND GATES

Perimeter fencing is used at airports primarily to secure the aircraft operational area and reduce wildlife incursions. The physical barrier of perimeter fencing has the following functions:

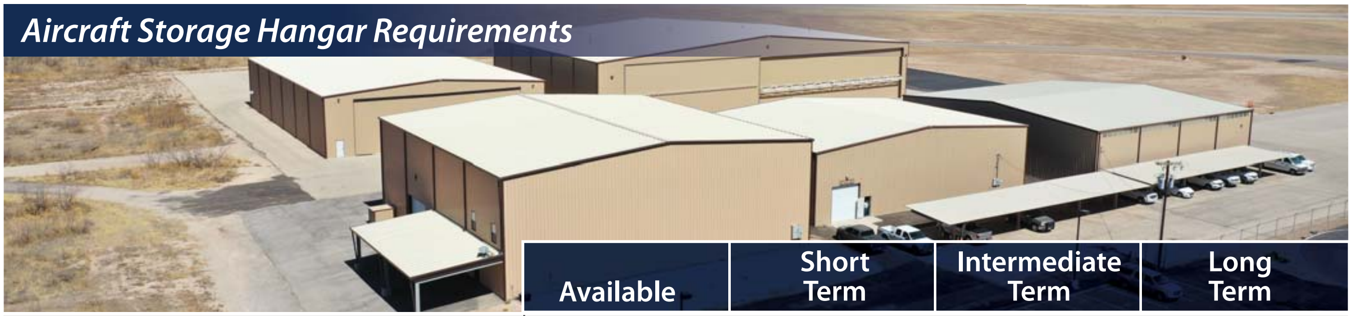
- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area.
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary.
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion-detection equipment and closed-circuit television (CCTV).
- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.
- Demonstrates the intent of an intruder by their overt action of gaining entry.
- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection.
- Creates a psychological deterrent.
- Optimizes the use of security personnel, while enhancing the capabilities for detection and apprehension of unauthorized individuals.
- Demonstrates a corporate concern for facility security.
- Limits inadvertent access to the aircraft operations area by wildlife.

ODO is fully enclosed by fencing. This consists of an eight-foot wildlife resistant fencing with three-strand barbed wire. Security gates limit access to the airfield. All fencing and gates should be maintained throughout the planning period. It should be noted that, in spite of the fencing, wildlife including coyotes have managed to access the airfield. The airport is currently working with a wildlife control specialist to remove the animals and prevent future access.

LANDSIDE FACILITY REQUIREMENTS SUMMARY

A summary of the landside facilities projected to be needed at ODO is presented on **Exhibit 30**.

Aircraft Storage Hangar Requirements



	Available	Short Term	Intermediate Term	Long Term
T-Hangar Units (#)	187	191	196	206
T-Hangar Area (sf)	222,100	226,300	231,700	243,100
Executive/Conventional Hangar Area (sf)	140,100	152,600	167,100	199,100
Service/Maintenance Area (sf)	34,200	29,000	31,300	36,000
Total Hangar Storage Area (sf)	396,400	407,900	430,100	478,200

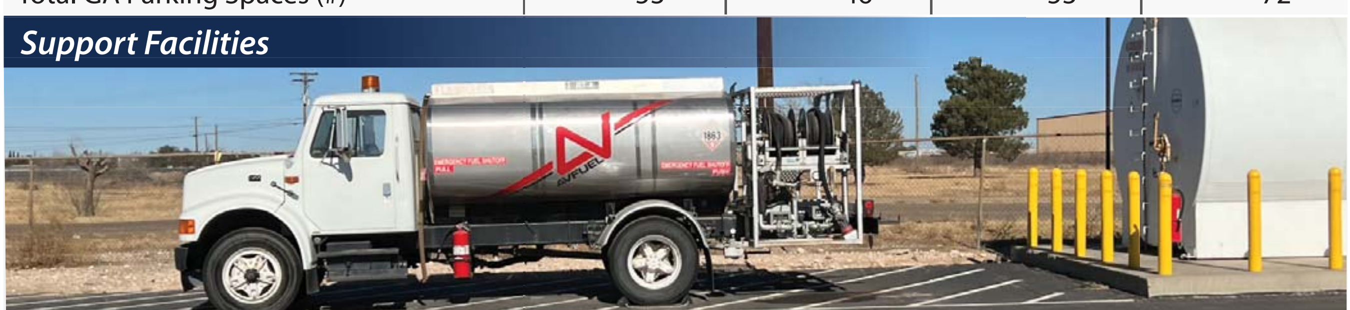
Aircraft Parking Apron

	Available	Short Term	Intermediate Term	Long Term
Aircraft Parking Positions (#)	53	74	85	107
Total Apron Area (sy)	57,600	59,700	70,100	90,400

General Aviation Terminal Facilities and Parking

	Available	Short Term	Intermediate Term	Long Term
Building Space (sf)	4,100	2,200	2,800	4,700
Total GA Parking Spaces (#)	53	46	53	72

Support Facilities



	Available	Short Term	Intermediate Term	Long Term
14-Day Fuel Storage - 100LL (gal.)	10,000	5,300	5,600	6,300
14-Day Fuel Storage - Jet A (gal.)	24,000	20,800	25,500	36,800

SUMMARY

This chapter has outlined the safety design standards and facilities required to meet potential aviation demand projected at ODO for the next 20 years. The short-term roughly corresponds to a five-year timeframe, the intermediate term is approximately 10 years, and the long-term is 20 years.

In the next section, potential improvements to the airside and landside systems will be examined through a series of development alternatives. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal and state grant funds. Other projects of local concern will also be presented. Ultimately, an overall development plan that presents a vision beyond the 20-year scope of this Airport Layout Plan will be developed for ODO.