CHAPTER 3: FACILITY REQUIREMENTS

Ed Carlson Memorial Field – South Lewis County Airport
2022-23 ALP Update for 2017 Airport Master Plan

This chapter translates the updated (2022-2042) aviation demand forecasts into facility improvements by assessing the adequacy of the existing facilities in meeting the forecast demand during the planning period. This chapter also reviews and analyzes facility compliance with current Federal Aviation Administration (FAA) standards and design guidance. Any deviations from the standards will be documented and analyzed.

Improvements or new facilities are identified for the near- (2027), mid- (2032), and long-term (2042) timeframes, which align with the forecast timeframes. It's important to note that future improvements are tied to actual aviation demand and not projected timeframes since airport development should be demand-driven.

Table 3A summarizes the projected aircraft operations and the associated design codes (Aircraft Approach Category + Airplane Design Group) by forecast timeframe.

Table 3A. Planning Activity Levels

	Near-term 2027	Mid-term 2032	Long-term 2042
Number of Operations	15,835	16,845	17,919
AAC/ADG	A-I (small)	A-I (small)	A-I (small)

Source: Chapter 2 Forecasts (2022-2042)

This chapter will also review and analyze facility compliance with FAA standards and recommendations. Any deviations from the standards will be documented and analyzed. Requirements identified in this chapter will provide the framework for identifying possible long-term development concepts for the Airport in the next chapter.

PLANNING CRITERIA

The development and use of planning criteria ensure that recommended improvements align with the goals and objectives of the air transportation system, appropriate aviation industry segments, and the airport sponsor's vision. The sources from which the planning criteria are drawn include:

- FAA – FAA design guidelines found in FAA Advisory Circular (AC) 150/5300- 13B, *Airport Design* provide the planning criteria, with respect to the current as well as future critical or design aircraft, for the runway, taxiways, and apron areas.
- Transportation Security Administration (TSA) – Although TSA does not regulate general aviation airports like South Lewis County Airport, they do provide guidance for security at general aviation airports. The guidelines provided by the TSA are tailored to an airport's size and risk level.
- Washington State Aviation System Plan (WASP) – Provides a distribution of airports by classification as well as recommendations and direction on how to meet the state's long-term commercial and general aviation needs.
- Business Aviation Industry – The National Business Aviation Association (NBAA) represents the industry and provides recommendations for airports' facilities and services to accommodate business aviation needs.
- Transportation Research Board – Airport Cooperative Research Program (ACRP) – The ACRP, sponsored by FAA, provides research driven assessments of airport facilities and operational issues.
- Lewis County and Airport Users – Planning Advisory Committee members, other meeting participants, and survey respondents provided input specific to Ed Carlson Memorial Field – South Lewis County Airport. The local airport community is an important source since its operational issues, community relationships, and future vision for the airport help shape the list of future facility needs.

AIRPORT ROLE

Understanding an airport's role in the national, state, and regional aviation systems is an important component in developing the planning criteria.

The National Plan of Integrated Airport Systems (NPIAS) (2023-2027) classifies the South Lewis County Airport (TDO) as a general aviation (GA) facility. The NPIAS 2023-2027 Narrative divided the general aviation airports into four categories based on existing activity measures such as the number and types of based aircraft (i.e., aircraft that are stored at an airport), as well as the volume and types of flights. The five categories used for GA airports are national, regional, local, basic, and unclassified. The document classifies TDO as a local airport. A local airport is defined as one that *"Provides communities with access to local and regional markets."*

WASP classifies TDO as a Community Service Airport. Community service airports are classified as such after meeting the following threshold criteria:

- Twenty or more based aircraft
- Paved runway

According to WASP, "Community Service Airports serve small to medium-sized communities and are busy enough to warrant aviation support services such as fuel sales." Typically, Community Service Airports are owned by a public entity and have 30-minute (driving time) service area coverage.

The WASP designates a role for each airport within the system, helping to distinguish between the various levels of service and activities associated with each airport across the state. WASP defined six different roles or classifications for the 138[1] airports considered in the statewide system. These six classifications are:

- Commercial Service – 16
- Rural Essential – 38
- Community Service – 23
- Regional Service – 19
- Local Service – 33
- Seaplane Bases – 9

The WASP recommends a set of performance metrics for the statewide airports. These metrics for each airport category are divided into the following facility related measures: Airport Capacity, Land Use, Land Use Control, Weather Services, Obstructions, and Physical Condition of Infrastructure. **Table 3B** provides a comparison between the WASP performance objectives for Community Service airports and existing conditions at TDO.

Table 3B: WASP Performance Objectives and Existing Conditions

WASP Metrics	Recommended Minimum for a Community Service Airport	Existing Condition
Airport Capacity	Airfield capacity <80% and sufficient aircraft storage capacity	✓
Land Use	Adoption of Overlay Zones 1-6	- (see note)
Land use Control	Land Use Control of Part 77 Surfaces	✓
Weather Services	Not required	-
Obstructions	Clear runway safety area and threshold siting surface for primary runway ends	- (see note)
Physical Condition of Infrastructure	Runways PCI >65 (AC) or >55 (PCC)	✓

Source: WASP, 2017, Chapter 6, Classification and Airport Metrics for Community Service Airports

Note: Lewis County Airport Overlay Zoning (LCC Chapter 17.80) defines protections for Part 77 airspace surfaces but does not include WSDOT-defined Airport Safety Zones (1-6). The 2017 ALP depicts a future 379-foot displaced threshold for Runway, 6 with a threshold siting surface to clear and existing obstacle (vehicles traveling on the Jackson Highway). This recommendation will be reviewed with AGIS survey data to verify required clearances.

AIRSIDE DEMAND/CAPACITY ANALYSIS

As indicated in Chapter Two, Forecasts, the airport is expected to serve nearly 18,000 operations annually by 2042. This level of flight activity combined with the current runway-taxiway configuration is not expected to create any significant airfield capacity issues during the current planning period. Assessing the capacity of the airfield is important to identify whether any improvements are needed to accommodate forecast demand.

[1] This number is currently lower due to recent airport closures.

The capacity analysis is based on FAA AC 150/5060-5, *Airport Capacity and Delay*. Additionally, ACRP Report 79 updated by the Transportation Research Board (TRB) in 2016 provides a Prototype Airfield Capacity Spreadsheet Model that is "built on base calculations following the theory in the FAA Airfield Capacity Model (ACM) and applies variable separation, spacing and clearance standards following the guidelines included in FAA JO 7110.65, *Air Traffic Control*, and FAA EM-78-8A, *Parameters of Future ATC Systems Relating to Airport Capacity/Delay*." The spreadsheet model provided by the TRB was used to calculate single runway airfield capacity at TDO. The estimated ASV is slightly reduced from the maximum (223,000) for single runway ASV based on adjustments to the fleet mix that includes small percentages of multi-engine aircraft.

Two measures of capacity have been used in airport planning:

- **Hourly capacity:** considers the throughput during a typical busy hour. Factors such as percentage of arrivals, runway crossings, and taxiway exit locations are considered to arrive at an hourly number of aircraft that can use the airfield without undue delays.
- **Annual Service Volume (ASV):** estimates the number of aircraft operations that can be accommodated in one year. This measure is used to program additional runways, and/or modified taxiway exits.

In calculating the Airport's ASV, the projections of annual operations by the fleet mix specified in Chapter Two were used. The analysis considered various factors including airfield layout, meteorological conditions, runway conditions, runway use, aircraft mix, percent arrivals, percent touch-and-goes, and exit taxiway locations. The demand characteristics that are relevant to calculating airfield capacity are the mix of aircraft types that utilize the airport in the design hour along with the percentage of arrivals and the percentage of touch-and-go operations as well as the percentage of IFR operations. Aircraft types are classified according to size as shown below.

- **Class A:** Small single engine aircraft weighing less than 12,500 pounds
- **Class B:** Small twin engine aircraft weighing less than 12,500 pounds
- **Class C:** Aircraft weighing between 12,500 pounds and 300,000 pounds
- **Class D:** Aircraft weighing more than 300,000 pounds

Based on the TRB methodology, the ASV for TDO is calculated at 213,000 operations. With operations forecast to reach 17,919 by 2042, the Airport will be at approximately 9% of its annual capacity by the end of the 20-year planning period. The model indicates hourly capacity to be 74 operations per hour for visual (VFR) conditions and 62 operations per hour for instrument (IFR) conditions.

Airfield capacity improvements should generally be planned and programmed when the airport reaches 60% of its capacity. Construction of these improvements should begin before or upon reaching 80% of capacity. As indicated above, no annual or hourly capacity issues are identified for Runway 06/24 for the current 20-year planning period.

AIRSIDE DESIGN STANDARDS

FAA design standards listed in AC 150/5300-13B, *Airport Design*, guide the planning and development of airside facilities at the Airport. The FAA is responsible for the overall safety of civil aviation in the United States and all of the design standards in AC 150/5300-13B are primarily driven by safety. Other factors that influence the use of design standards are efficiency and utility.

The changes that affect the safety and efficiency of aviation are constantly evolving as the aviation industry continues its development. AC 150/5300-13B – *Airport Design* (dated March 2022) is the most recent version of the airport design AC issued by FAA, which dates back to the 1980s. A primary focus of the 2022-2042 plan update is to evaluate changes in design standards or guidance that have occurred since the 2017 approval of the Airport Layout Plan (ALP) drawing by FAA.

The previous version of the AC (150/5300-13A) was in effect when the previous airport master plan and ALP drawings were developed. AC 150/5300-13B introduces new points of emphasis and several revised design standards that will be reflected on the updated ALP drawing set being prepared as part of this minor plan update. This section will provide a brief summary of some of these new concepts and discuss their application to TDO.

CRITICAL AIRCRAFT AND FAA DESIGN GUIDANCE

The existing and future critical aircraft is determined based on the activity described in Chapter 2, Aviation Forecasts. The critical aircraft establishes existing and future airport planning & design standards organized in series of code categories. The groupings are applied to specific runways, taxiways and taxilanes to guide future planning, design, and development of the Airport. FAA design criteria are determined by the physical characteristics of the critical aircraft. The primary airfield design groupings sharing common aircraft-specific components include:

- Airport Reference Code (ARC) – See note below
- Runway Design Code (RDC)
- Approach and Departure Reference Code (APRC and DPRC)
- Taxiway Design Group (TDG)

Note: Current FAA airport planning standards have eliminated use of the Airport Reference Code (ARC) as the primary designation for airfield categories, in favor of Runway Design Code (RDC). The FAA now uses Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG) to categorize aircraft and facilities. The ADG and AAC and visibility components of the current/future Runway 6-24 RDC (A/B-I small) are identical to the components used to define 'ARC' in the 2017 Master Plan Update.

The planning and design of airfield facilities is primarily based on the types of aircraft using or forecast to use the airport. The critical aircraft is intended to represent the most demanding aircraft using the Airport on a regular basis (defined by FAA as ≥ 500 annual operations). This designation does not mean that larger aircraft cannot operate on the runway, but it does define the design guidance to be used for FAA-funded improvements.

The 2017 ALP identifies an Aero Commander 690 and a King Air (multi-engine turboprops) as the existing and future critical aircraft with RDC B-I and B-II. Both the Aero Commander 690 and the majority of King Air models produced have operating weights below 12,500 pounds (small aircraft). The forecast prepared for this plan update does not include sufficient ADG II activity to support the previously identified change in critical aircraft. However, specific long-term improvement intended to accommodate these aircraft may be maintained as development reserves if determined appropriate by Lewis County.

The FAA-approved aviation activity forecasts for TDO presented In Chapter 2, identifies the Cessna 182 (RDC: A-I small) as a representative single-engine piston aircraft for both the current and future critical aircraft. The aircraft manufacturer (Cessna) lists the C-182 approach speed as 60 knots, which is well within **AAC A** (<91 knots); a 36-foot wingspan (**ADG I** <49 feet); and a maximum operating weight below 12,500 pounds, which is classified by FAA as a "**small**" airplane. These designations are consistent with the FAA Aircraft Characteristics Database (2018 update).

Characteristics of the design aircraft, such as approach speed, wingspan, tail height, main gear width, cockpit to main gear length, aircraft weight, and takeoff and landing distances influence the dimensions of airfield facilities and protected surfaces. The taxiway design standard applies physical characteristics of the aircraft's landing gear configuration and overall dimensions. Definitions for the FAA design standards are provided throughout the chapter. For detailed information on determining specific design standards see FAA AC 150/5300-13B, *Airport Design*.

Table 3C shows the various aircraft characteristics and the related design components that they influence. It is important to note that the design aircraft may be a specific aircraft type, or a composite of aircraft characteristics.

Table 3C. Aircraft Characteristics and Design Components

Aircraft Characteristics	Design Components
Approach Speed	RSA, ROFA, RPZ, runway width, runway-to-taxiway separation, runway-to-fixed object
Landing and Takeoff Distance	Runway Length
Cockpit to Main Gear Length (CMG)	Fillet design, apron area, parking layout
Outer to Outer Main Gear Width (MGW)	Taxiway width, fillet design
Wingspan/Tail Height	Taxiway and taxilane OFA, aircraft parking configuration, hangar locations, taxiway-to-taxiway separation, runway to taxiway separation

Source: FAA AC 150/5300-13B

RUNWAY DESIGN CODE (RDC)

The RDC defines specific runway dimensional standards based on a composite of aircraft-specific and runway-specific factors. The RDC inputs include two critical aircraft characteristics: approach speed (AAC) and wingspan/tail height (ADG), and the approach visibility minimums of a specific runway end. The approach visibility refers to the minimum visibility required for aircraft operation, expressed by runway visual range (RVR) values in feet. RVR values represent feet of forward visibility that have statute mile equivalents (e.g., 2400 RVR = ½-mile). **The existing and future RDC for Runway 6/24 is A/B-I-5000.**

AAC is depicted by letter A through E and relates to the approach speed of the design aircraft. ADG is depicted by a Roman numeral I through VI and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. It is noted that AC 150/5300-13B combines AAC A and B into a common design category for each ADG grouping. Runway visibility minimums are expressed in RVR equipment measurements. For runways that are designed for visual approach use only, this component would read "VIS."

Table 3D summarizes the range of RDC classifications in common usage, which is similar to the ARC designation previously used by FAA. This information is essential in understanding the airside requirements and what drives the airside component of the development alternatives in the next chapter.

Table 3D. Runway Design Code (RDC) Classifications

Approach Category (AAC)		
AAC	Approach Speed	
A	Less than 91 knots	
B	91 knots to 120 knots	
C	121 knots to 140 knots	
D	141 knots to 165 knots	
E	Approach speed 166 knots or more	
Airplane Design Group (ADG)		
Group #	Tail Height (ft)	Wingspan (ft)
I	< 20’	< 49’
II	20’ to < 30’	49’ to < 79’
III	30’ to < 45’	79’ to < 118’
IV	45’ to < 60’	118’ to < 171’
V	60’ to < 66’	171’ to < 214’
VI	66’ to < 80’	214’ to < 262’
Approach Visibility Minimums		
RVR (ft)	**Flight Visibility Category (statute mile)**	
5000	Not lower than 1 mile	
4000	Lower than 1 mile but not lower than ¾ mile (1.2km)	
2400	Lower than ¾ mile but not lower than ½ mile (0.8 km)	
1600	Lower than ½ mile but not lower than ¼ mile (0.4 km)	
1200	Lower than ¼ mile (0.4 km)	

Source: FAA AC 150/5300-13B

There are two non-precision instrument approach procedures published for the Airport (RNAV - GPS for Runway 6 and Runway 24). These procedures provide approach visibility minimums as low as one mile for Approach Category A and B aircraft. This approach capability corresponds to "Not Lower than 1 mile" visibility minimums dimensional standards listed for ADG A/B-I (small). It should be noted that many of the smaller aircraft using the airport are not equipped to use these approaches and rely on Visual Approach Procedures. The dimensional standards for visual approaches on ADG A/B-I (small) runways are the same.

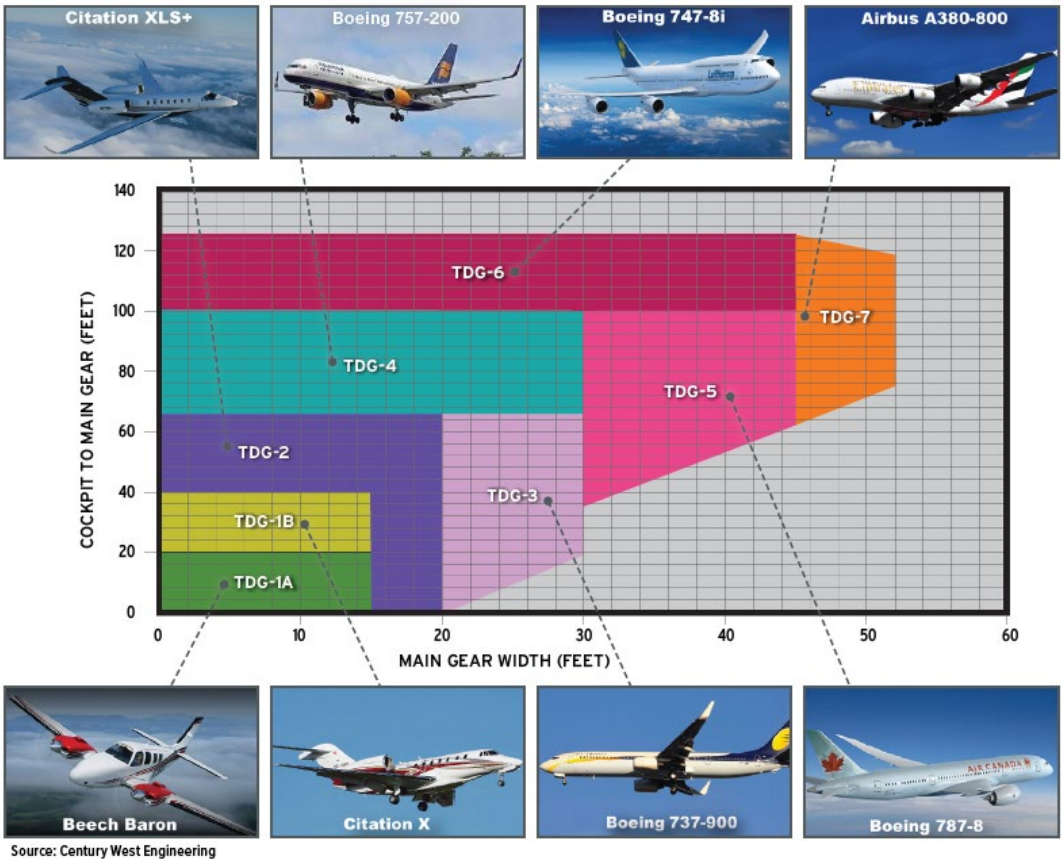
TAXIWAY DESIGN GROUP (TDG)

The TDG is used to define taxiway dimensions based on physical aircraft characteristics. The TDG is based on aircraft dimensions, including landing gear distance from the cockpit to the main gear (CMG) and main gear width (MGW) (see **Exhibit 3A**). These dimensions affect an aircraft's ability to safely maneuver on airport taxiways and dictate pavement fillet design.

The current and future critical aircraft (Cessna 182) is listed in the FAA Aircraft Characteristics Database as **TDG 1A**. A review of other common general aviation aircraft types that would be expected to operate at TDO indicates that TDG 1A is common:

- Single-engine piston (Cessna 206, Beechcraft Bonanza, Cirrus SR22)
- Multi-engine piston (Beechcraft Baron 58; Diamond DA62, Cessna 421)
- Single-engine turboprop (Cessna Caravan, Daher/TBM 900, Pilatus PC-12)
- Multi-engine turboprop (King Air 90, de Havilland Twin Otter)
- Small jet (Cessna Citation CJ1, Hawker 400XP)

Exhibit 3A. Taxiway Design Group



Source: Century West Engineering

The parallel taxiway (Taxiway A) and its four 90-degree connector taxiways (A1-A4) were reconstructed and reconfigured in 2019 based on FAA ADG I and TDG 1A standards. Taxiway A exceeds the FAA A/B-I runway separation standard for both small (150 feet) and large (225 feet) aircraft. The current runway-to-taxiway separation is 272 feet.

The tiedown apron and adjacent hangar taxilanes are intended to accommodate small single-engine aircraft (TDG 1A). Sections of the main apron loop taxilane do not meet ADG I design criteria (object free area – centerline to fixed or movable object) for adjacent hangars and parked aircraft.

The four hangar taxilanes that connect to the parallel taxiway do not meet the ADG I taxilane object free area (TLOFA) standard (79 feet). The actual taxilane clearances (distance between opposing hangars) range from approximately 61 to 72 feet. The western-most hangar taxilane is not centered between the two adjacent hangars; this taxilane is in poor condition and is identified for reconstruction (centered, widened) on the 2017 ALP. A less-than-standard TLOFA essentially means that the FAA-defined OFA clearance is provided for aircraft up to a specific wingspan. For example, a TLOFA of 68 feet protects aircraft wingspans up to 40 feet, which is less than the 49-foot wingspan used to define the 79-foot TLOFA for ADG I.

RUNWAY REQUIREMENTS

NUMBER AND ORIENTATION OF RUNWAYS

The number of runways on a field is typically driven by activity levels and/or wind coverage. Busy airports often provide parallel runways to accommodate their high activity levels while minimizing delay. The current and forecast activity levels at TDO are easily accommodated by a single runway.

The preferred orientation of runways is a function of wind velocity, combined with the ability of aircraft to operate under given conditions. FAA has defined the maximum allowable direct crosswind (90-degrees) for small aircraft as 10.5 knots and 13 knots for larger general aviation aircraft. The 10.5-knot crosswind component corresponds to the current and future critical aircraft A-I (small). The FAA recommends that primary runways accommodate at least 95% of wind conditions. When this level of wind coverage is not provided, the FAA recommends consideration of a crosswind runway. Recent onsite weather observation data are not available for the Airport. In cases where the required data are not available, the FAA requires use of wind data from the nearest available airport(s) in developing a wind rose for the ALP drawing.

An updated analysis of wind coverage was performed for Runway 6/24 using data from Chehalis-Centralia Airport (14 NM NW). The results of the wind analysis summarized in **Table 3E** indicate that the runway meets FAA wind coverage requirements. The updated wind rose will be added to the ALP drawing set.

Table 3E. All Weather Wind Coverage Analysis

Crosswind Component	10.5 knots	13 knots
Wind Coverage	96.73%	98.30%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center, Chehalis-Centralia Airport.
Period of Record: 2013-2022

RUNWAY LENGTH

Runway 6-24 is the Airport's only runway. It has an effective length of 4,479 feet, which is less than its previous 5,000-foot length before relocated thresholds were established to comply with FAA design standards for obstacle clearance slope and runway safety area. In its current configuration, the runway has paved overruns at both ends (Rwy 6: 360'/Rwy 24: 160'). These areas are marked with yellow chevrons and are not included in the usable runway length dimension.

As previously stated, the Airport is classified by the WASP as a Community Service Airport where a runway length of 3,200 feet is recommended as the minimum performance level for system planning. Runway length requirements for master planning purposes are based on existing and forecast airport user needs and the County's long-term vision.

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, specifies the use of the 5-Step procedure for determining runway length requirements for purposes of airport design.

It is important to note that, for small aircraft with a maximum takeoff weight (MTOW) of 12,500 pounds or less and larger aircraft with an MTOW of more than 12,500 pounds (up to and including 60,000 pounds), the use of the runway length curves specified by AC 150/5325-4B generates runway lengths based on local conditions. The runway length requirements are influenced by various variables that include the airport's elevation (374 feet), the effective runway gradient (0.41%) and the Mean Maximum Temperature of the hottest month (78.8 Degrees F). **Table 3F** illustrates the results of the runway length analysis.

The analysis shows that the existing effective runway length of 4,479 feet is sufficient to serve small airplanes (less than 12,500 lbs.), which are the primary users of the runway today. The runway length justified based on existing and forecast activity is 3,630 feet, noted in **Table 3F**.

The ALP for the 2017 Master Plan Update depicts an ultimate runway length of 6,200 feet to protect long-term operational capabilities for the Airport. This runway length was determined by the operational requirements of 75% of the large airplane fleet (aircraft weighing 12,500 to 60,000 lbs.) operating at 90% of useful load (listed in Table 3F). As noted in Table 3F, the existing runway length is also not sufficient to serve large airplanes at either 60% or 90% of their useful load. The 2017 master plan noted that large airplanes using the current runway must take a weight penalty of around 50% of their useful load under these weather conditions. This category of large aircraft consists primarily of multi-engine turboprops and business jets.

The 6,200-foot runway length depicted on the 2017 ALP exceeds the requirements of the current and future critical aircraft, but it is recommended to be maintained as a runway extension reserve.

Table 3F. FAA Runway Lengths

Airport elevation	374 feet
Mean daily maximum temperature of the hottest month	78.80 F.
Maximum difference in runway centerline elevation	20 feet
Length of haul for airplanes of more than 60,000 pounds	500 miles
Dry runways	
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	310 feet
Small airplanes with approach speeds of less than 50 knots	830 feet
Small airplanes with less than	10 passenger seats
75% of these small airplanes	2,510 feet
95% of these small airplanes	3,040 feet
100% of these small airplanes	3,630 feet
Small airplanes with 10 or more passenger seats	4140 feet
Large airplanes of 60,000 pounds or less	
75 % of these large airplanes at 60% useful load	4,830 feet
75% of these large airplanes at 90% useful load	6,200 feet
100% of these large airplanes at 60% useful load	5,320 feet
100% of these large airplanes at 90% useful load	7,730 feet
Airplanes of more than 60,000 pounds	Approximately 5140 feet

Source: Chapter 2 of AC 150/5325-4B, Runway Length Requirements

RUNWAY WIDTH

The current width (150 feet) of Runway 6-24 exceeds the FAA width standard for all aircraft approach speed and minimum approach visibility categories for ADG I, II, and III. For ADG I runways (AAC A-C) with visibility minimums as low as ¾-mile, the standard width is 60 feet, increasing to either 75 or 100 feet for visibility minimums lower than ¾-mile for small or large airplanes. For ADG II runways with the same capabilities, the standard width is 75 feet, with an increase to 100 feet for visibility minimums lower than ¾-mile. It is noted that the ability to obtain approach visibility minimums below ¾-mile typically requires a precision instrument approach and an approach lighting system (ALS).

The 2017 Master Plan Update noted that when the runway was rehabilitated in 2003, the FAA funded the 75-foot width for a B-II runway and Lewis County funded the outer 37.5 feet on either side. In keeping with the previous ALP, it is the County's intent to maintain the runway at the current width. Based on the updated critical aircraft designations referenced in the 2023 FAA forecast approval letter, the FAA-eligible runway width may now be limited to 60 feet. This could significantly increase the County's cost of maintaining the current width.

The County acknowledges that by exceeding the standard runway width, FAA participation will be limited to those eligible portions of a runway project that are justified by the RDC in effect at the time a grant offer is made. A narrowing of a runway involves a variety of factors including runway edge light placement and drainage. The amount the FAA chooses to fund and the portion the County decides to fund will be evaluated in detail during project implementation (pre-design). The current runway width depicted on the 2017 FAA-approved ALP drawing will be maintained on the updated ALP.

Runway 6-24 accommodates limited jet operations and therefore does not require blast pads, per FAA design guidance. However, the paved overruns at both ends of the runway effectively serve as blast pads and exceed the blast pad dimensional standard for ADG I and II runways.

RUNWAY PAVEMENT

Runway 6-24 has a pavement strength rating of 25,000 pounds for Single (S) wheel loading. No Dual (D) wheel strength rating is provided. According to the WSDOT IDEA pavement database, the last runway pavement maintenance project (fog seal) is listed for 2010 (estimated). However, a review of available aerial photography indicates the runway was seal coated with repainted markings in the 2019 time period that coincided with the parallel taxiway reconstruction. The runway pavement appears to be in good or fair condition. The existing pavement strength exceeds the 12,500-pound design weights typically used for small single-engine and multi-engine aircraft, and it has the ability to accommodate heavier single-wheel and dual wheel aircraft activity.

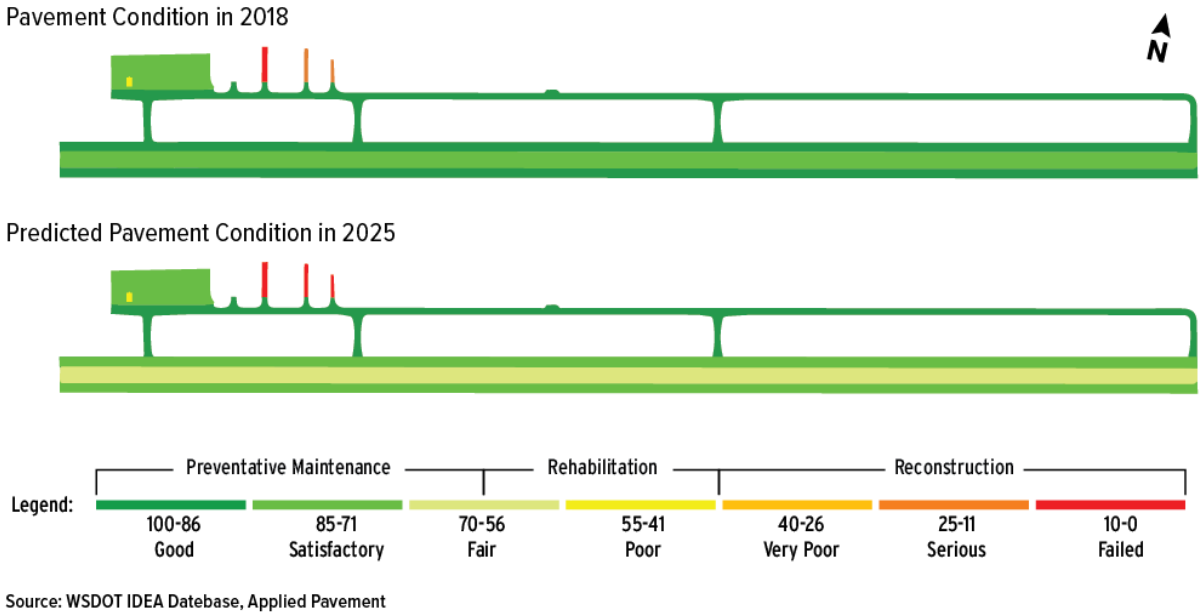
The most recent airfield pavement inspection at the Airport was completed by Washington State Department of Transportation Aviation Division (WSDOT) in March of 2018. The inspection provided both current and predicted pavement condition index (PCI) values for the various pavement sections on the airfield. The PCI value is a numerical rating of the pavement condition that ranges from 0 to 100, with 0 being the worst possible condition and 100 being the best possible condition.

The 2018 inspection indicated that TDO's runway pavement had a PCI rating of 74 (inner 75 feet) and 89 (the outer 37.5-foot sides of runway). The predicted PCI ratings in 2025 (assuming no interim maintenance) were 62 and 80 for these sections. An updated pavement inspection is planned by WSDOT for 2023 or 2024. However, based on available data, it appears that the runway will require rehabilitation early in the current 20-year planning period.

WASP 2017 recommends that runway pavements at all Community Airports have a PCI greater than 65 for asphalt concrete surfaces. The WSDOT Idea database (2018 inspection) recommended a major rehabilitation of the inner 75 feet of the runway in 2024.

Continuous maintenance of the pavement is necessary to reach its useful life and maintain operational safety for users. Additionally, the decision as to whether to decrease the width of the runway may influence the timing of any future rehabilitation projects.

Exhibit 3B. Pavement Conditions



Source: WSDOT IDEA Datebase, Applied Pavement

TAXIWAYS REQUIREMENTS

TAXIWAY WIDTH

Runway 6-24 is served by a full-length north parallel taxiway (Taxiway A), with a 272-foot runway to taxiway centerline separation. Four 90-degree connecting/exit taxiways are located on the north side of the runway (A1, A2, A3, A4 – from west to east). Taxiways A1 and A4 are located at Runway 6 and Runway 24 ends, respectively; A2 is at the east end of the building area and A3 is just east of midfield.

FAA Advisory Circular AC 150/5300-13B defines taxiway design based on Taxiway Design Group (TDG), which is determined by the overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance for the critical aircraft. The TDG 1A standard width is 25 feet with 10-foot shoulders. This standard was used in the recent taxiway The parallel taxiway provides access to the main apron, fueling area, on-airport aircraft hangar areas, and one through-the-fence (TTF) access taxiway.

Additionally, the Airport owns 14 acres south of the runway that could potentially be developed for aviation-related facilities and services. Prior to developing that area, further planning analysis will be required to determine the best use of the land. This area is designated on the Airport Layout Plan (ALP) as “Future Aviation Development.”

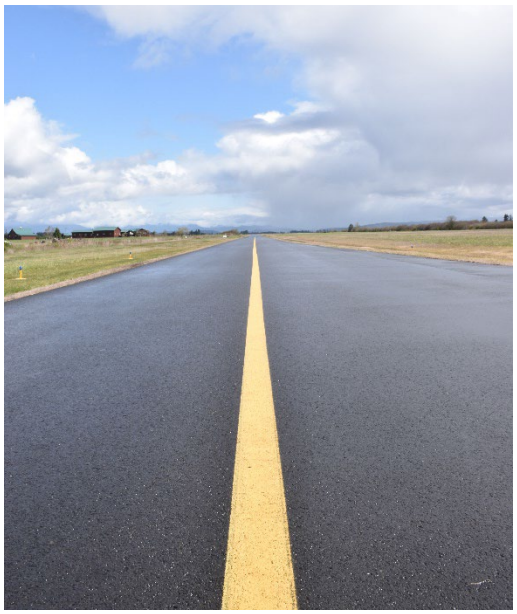
TAXIWAY AND TAXILANE PAVEMENT

The parallel taxiway and four exit taxiways were inspected by WSDOT in March of 2019 (PCI rating of 100) in conjunction with the reconstruction. The predicted rating for 2022 was 97. These sections will be inspected in 2023/2024, with expected PCIs in the low-to-mid 90s. **Table 3G** provides a summary of the predicted 2022 PCI ratings for the main taxiways and taxilanes based on their most recent inspections. The hangar and apron taxilanes were inspected in 2018.

Table 3G. Taxiways/Taxilanes Pavement Ratings (2022 estimate)

Taxiway/Taxilane Pavement	PCI	Condition
Taxiway A, A1 - A4	97	Excellent
Taxilanes between Hangars	4-5	Poor
Main Apron Taxilanes	76	Satisfactory

Source: WSDOT Airport Pavement Management System Study, 2018, 2019



Based on their current condition, the parallel taxiway and exit taxiways will not require rehabilitation until the second half of the 20-year planning period. The hangar taxilanes are in very poor condition and will require near-term reconstruction. The main apron will require rehabilitation in the current 20-year planning period. The planned replacement and relocation of the aircraft fueling system in 2023 will result in some changes in apron and taxilane configuration. These items will be addressed in the landside alternatives evaluation. The taxilane serving the northwest side of the Airport has a gravel surface and was previously recommended for paving.


NO VEHICLES

TAXIWAY SEPARATIONS AND INTERSECTIONS

The runway and parallel taxiway have a centerline-to-centerline separation of 272 feet, which exceeds the most common FAA ADG I and II standards used for GA runways. The current separation was determined through design and approved by FAA in the 2019 taxiway reconstruction project. No changes are recommended.

The required minimum runway to taxiway separation distance for A/B-I (small aircraft) is 150 feet for approach visibility minimums not lower than ¾-mile, and 200 feet for visibilities lower than ¾-mile. The standard for A/B-I runways ranges from 225 to 250 feet; the standard for A/B-II runways ranges from 240 to 300 feet. It is noted that the lowest approach visibility minimums for the two existing instrument approaches is 1-mile. The current taxiway separation is adequate to support a reduction in approach visibility minimums without any taxiway modification.

The taxiway and taxilane object free areas (TOFA & TLOFA) are based on the ADG of the most critical aircraft using the taxiway/taxilane. For ADG I aircraft, the TOFA is 89 feet and the TLOFA is 79 feet. These standards are applied to all major taxiways at the Airport, and all existing taxilanes. As noted earlier in the chapter, several existing hangar and apron taxilanes do not meet ADG I TLOFA obstacle (wingtip) clearance standards. The parallel taxiway and all exit taxiways meet ADG I TOFA standards.

All of the exit taxiways (A1-A4) have 90 degree connections to the runway, consistent with current FAA design guidance. All of the taxiways have aircraft hold line markings located 200 feet from runway centerline, which is the setback required to clear the large airplane runway Obstacle Free Zone (OFZ) standard (400 feet) and exceeds the small airplane OFZ standard (250 feet).

Current FAA design guidance discourages direct taxiway access between aircraft aprons and runways. The main apron directly abuts Taxiway A at the Taxiway A1 connection that leads directly to the Runway 6 threshold. Adding a diversion area that limits aircraft taxiing in a straight line between the apron and Taxiway A1 may be considered, particularly in conjunction with the future reconfiguration of the apron's aircraft fueling area and tiedowns. FAA taxiway guidance is intended to require pilots to make turns prior to accessing the runway to increase their situational awareness of approaching an active runway.

OTHER AIRFIELD DESIGN STANDARDS

This section examines several additional design standards that are outlined by the FAA and should be considered in the planning and design of airports. **Table 3H** provides a summary of the FAA design standards that are related to the current and future RDC for TDO. The table also presents the existing dimensions at TDO. As previously mentioned, the current and future RDC at TDO is A-I (small aircraft). For reference, the next larger design category (ADG II) is presented for comparison.

Table 3H. Design Standards Matrix

	Existing Runway 6-24	A/B-I (Small/Regular) Visibility not lower than 1 mi	A/B-II Visibility not lower than 1 mi
Other Runway Requirements			
Runway Width	150 feet	60 feet	75 feet
Runway Safety Area			
Width	150	120	150
Length beyond Runway End	300	240	300
Runway Object Free Area			
Width	400	250	500
Length Beyond Runway End	240	240	300
Runway Obstacle Free Zone			
Width	400	250/400	400
Length beyond Runway End	200	200	200
Runway to Parallel Taxiway Centerline	272	150/225	240
Runway Centerline to Parking Hold line	200	125/200	200
Other Taxiway Requirements			
Taxiway Width	25 feet	Based on TDG 25 for TDG 1	Based on TDG 35 feet for TDG 2
Taxiway Object Free Area Width	89	89	124
Taxiway Safety Free Area Width	49	49	79
Taxiway Centerline to Fixed or Movable Object	44.5	44.5	62

Source: AC 150/5300-13B

Runway Safety Area (RSA): The identification of the existing as well as the future RSA at an airport is important in order to ensure that it is located on airport property and is properly cleared and graded to meet FAA standards. The RSA is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA should be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations.

The A/B-I (small aircraft) dimensional standard for RSA that is applied to Runway 6-24 is 120 feet wide (60 feet on each side of the runway centerline) and extends 240 feet beyond each runway end. Additional FAA standards include gradient, object clearing, and surface compaction.

Runway 6-24 meets the RSA standard for A/B-I and A/B-II small and large aircraft. The outer edges of the runway are 75 feet from the centerline, which exceeds/meets the A/B-I and A/B-II RSA width standard. The full-width paved overruns at each end of the runway also represent a portion of the extended RSA footprint.

The existing RSA clear area appears to have been designed to meet A/B-II RSA standards.

Runway Object Free Area (ROFA): Like the RSA, the ROFA is centered on the runway centerline, extends beyond the runway ends and is determined by the critical aircraft design category and approach visibility minimums. The ROFA for Runway 6-24 is the same length as the RSA (runway length plus 240 feet at each runway end) but is wider (250 feet).

The OFA must remain clear of objects at the RSA elevation, but it does not have surface compaction requirement. It's important to note that changing Instrument Approach Visibility to less than ¾ mile would increase the ROFA requirements.

Runway Obstacle Free Zone (OFZ): The runway OFZ is a defined volume of airspace centered above the runway centerline. It is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The standard OFZ for RDC A/B-I (small) aircraft is 250 feet wide and extends 200 feet beyond each runway end. The OFZ must remain clear of objects other than frangible NAVAIDs. The Runway 6-24 OFZ surface is clear of objects. It is noted that the OFZ width standard for large airplanes (above 12,500 pounds) is 400 feet, which is currently protected for Runway 6-24 (aircraft hold positions for Taxiways A1-A4).

Runway Protection Zone (RPZ): The purpose of the RPZ is enhancing the protection of people and property on the ground. The RPZ is a trapezoidal area centered about the extended runway centerline and beginning 200 feet from the runway end. Lewis County should have full control of the RPZ through fee simple ownership and/or easements. All objects should be clear of the RPZ but limited uses are permitted. There are currently two roads in the RPZ on the west end – Buckley Road and the Jackson Highway. The 2017 ALP drawing does not depict any future changes to the existing road conditions in the Runway 6 RPZ. A recommended 379-foot displaced threshold for Runway 6 intended to improve obstruction clearance (vehicles traveling on the roads) for the approach would create a second (arrival) RPZ for Runway 6. An avigation easement is depicted on the 2017 ALP for the future Runway 6 arrival RPZ. The existing and future RPZs for Runway 24 both extend over adjacent private property. The 2017 ALP identifies this area as future property acquisition.

Inner Approach OFZ: An Inner-transitional Approach OFZ is not required at TDO. For runways with an approach lighting system, an Inner-approach OFZ is required. The Inner-approach OFZ is airspace centered on the approach area at the same width as the Runway OFZ, beginning at 200 feet from the runway end, and extending at a 50:1 slope out 200 feet past the light unit in the approach lighting system. An Inner-transitional Approach OFZ is only required for precision instrument approach runways with less than ¾-mile visibility and is located along the sides of the Runway OFZ and Inner-approach OFZ.

Surface Gradient: The maximum allowable longitudinal grade on the existing runways is 2.0%, which is associated with Aircraft Approach Category A and B. The runway has a percent gradient of 0.41% which is well below the acceptable 2.0%.

HELICOPTER OPERATIONS

There is no officially designated helipad or heliport on the airfield so helicopters may arrive on the runway approach and hover-taxi to park on the apron or refuel. Based on the forecasts in Chapter 2, the number of helicopter operations is currently at 1,246 annual operations and is expected to reach 1,410 operations by 2042. Based on the current and forecast helicopter activity, a helipad is not required. However, as fixed wing and rotorcraft operations grow, the County may want to consider designating a separate area for helicopter parking.

NAVIGATIONAL AIDS

The airport's navigational aids include visual and instrument approach aids. Existing visual aids include a rotating beacon that sits atop a 60-foot tower west of the airport office, visual glide slope indicators (VGSI) on both runway ends, and lighted wind cones.

Runway 6 is equipped with a Visual Approach Slope Indicator (VASI); Runway 24 is equipped with a Precision Approach Path Indicator (PAPI). Two wind indicators are located at the runway ends on its north side. The wind indicator near the Runway 6 end is lighted.

Replacement of these systems with current generation LED systems is recommended for consistency with the 2019 LED taxiway edge lighting and airfield signage project. In addition to requiring less energy to create the same light output, FAA indicates that the life of PAPI lamps are typically extended from 2,000 hours to 40,000 hours when converting from conventional incandescent to LED.

The visual aids associated with Runway 6-24 are in fair condition. The useful life for airfield lighting and electrical systems is assumed to be 20 years, although some systems remain reliable and functional for longer periods. For aging systems, the availability of technical support and parts often impacts reliability. The existing VASI and PAPI systems on Runway 6-24, and the airport beacon will pass their useful life in the current 20-year planning period and should be planned for replacement with LED systems.

Instrument approaches are either precision or non-precision approaches. Precision instrument approach aids provide an exact alignment and descent path for an aircraft on final approach to a runway while non-precision instrument approach aids provide only runway alignment information and pilots control the aircraft descent.

The Airport does not have any ground-based electronic navigational aids. The two instrument approach procedures that are published for the Airport utilize satellite navigation (SATNAV) technology that do not require any ground-based systems. These approaches provide vertical guidance and runway alignment information that support visibility conditions as low as 1-mile. As the SATNAV technology continues to advance, it is expected that approaches will be able to support visibility minimums comparable to precision instrument runways. The 2017 WASP recommends that Community Service Airports, such as TDO, provide non-precision instrument approaches with a 1-mile visibility minimum.

AIRFIELD LIGHTING, MARKINGS AND SIGNAGE

The Medium Intensity Runway Lighting (MIRL) system and Runway End Identifier Lighting (REIL) on Runway 6-24 were installed in 2003. The MIRL and REILs are in good operating condition, but with an estimated 20-year life for electrical components, replacement should be planned for in the current 20-year planning period. As noted earlier, replacing the existing lighting systems with LED units is recommended for consistency with the LED taxiway edge lighting system. The LED system will reduce energy use and provide a longer life span for bulbs.

Taxiway A and Taxiways A1-A4 are equipped with LED Medium Intensity Taxiway Lighting (MITL) that was installed as part of the 2019 taxiway construction project.

Runway 6-24 has non-precision instrument (NPI) markings that are consistent with its current NPI approach capabilities. The parallel taxiway and the four connecting taxiways have centerline and hold area markings. The area located along the south edge of the main apron abutting the parallel taxiway is marked with a yellow dashed line that distinguishes the edge of the taxiway. The main apron has taxilane centerline striping and tiedown markings that vary in condition. All markings comply with FAA AC 150/5340-1M, *Standards for Airport Markings*. The runway and taxiway markings are in good condition; the apron markings are in fair condition. All markings will require periodic repainting during the current 20-year planning period.

WEATHER REPORTING SYSTEMS

The Airport does not have onsite weather reporting. The nearest available airport weather data is provided by an Automated Weather Observing System (AWOS) located 14 miles northwest at Chehalis-Centralia Airport. The Chehalis AWOS provides weather conditions with hourly updates or when weather conditions change significantly. The instrument approaches at TDO currently require use of the Chehalis altimeter setting (reported through its AWOS). If the Chehalis altimeter setting is not available, pilots are required to use the Kelso Airport altimeter setting and increase the approach descent minimums to compensate for the additional distance between TDO and the weather observation site. Airport management reports that local weather conditions can vary significantly within short distances. The addition of weather observation at TDO is expected to improve flight safety for visual flight activity in the “Interstate 5 Corridor” and reliability for instrument flight activity at TDO.

The need for an onsite weather reporting system at TDO was identified in the 2017 Master Plan Update and the project has since been included in the airport’s FAA 5-year CIP. The AWOS-3 is standard for GA airports as it provides altimeter, temperature, dew point, density altitude, visibility, wind direction and speed, and cloud/ceiling data. Airports located in areas with significant thunderstorm activity may opt for the AWOS–3PT, which adds thunderstorm and lightning reporting.

LANDSIDE FACILITIES

Existing landside facilities at TDO include aircraft hangars, aircraft parking, aviation fuel storage/dispensing, the airport office, vehicle access and parking. The capacity of each of these areas was examined in relation to the projected demand to identify facility needs during the planning period.

All of the Airport's existing landside facilities are located on the north side of the runway-taxiway system, near the west end of Runway 6-24. All landside facilities are accessible from Taxiway A. An off-airport residential airpark with several hangars is located north of the Airport. The airpark users access the Airport via a private taxiway that connects to Taxiway A, east of the terminal area. This connection is the only through-the-fence (TTF) access point defined for the Airport. All off-airport (TTF) facilities are privately owned and are not included in the facility requirements assessment.

AIRPORT OFFICE/PILOT LOUNGE

The airport building is located near the west end of the main apron. The building provides a pilot lobby area, restroom, and airport manager office. The west end of the building houses a small wastewater treatment facility. The building is directly adjacent to the aircraft fueling facility.

Future airport administration space requirements are considered in the planning process and added to the GA terminal requirements provided below.

GA TERMINAL FACILITIES

The 2017 Airport Master Plan Update estimated GA terminal space requirements for a pilot lounge, flight planning room, management, storage, vending machines and various other needs. The space requirements defined in the master plan do not change significantly based on the 2022-2042 aviation activity forecasts approved by FAA for this plan update, so the projections are maintained as previously presented.

The estimation of the terminal facilities needs was based on the number of airport users that are expected to use these facilities during the design hour. Industry practices are to provide 120 square feet per design hour itinerant passenger. The number of passengers is determined by multiplying design hour itinerant operations by the number of passengers per aircraft (occupancy factor). An increasing occupancy factor was used (1.2 in 2013 to 1.6 in 2032) to account for the current trend of larger, more sophisticated aircraft using the Airport.

Table 3I illustrates the GA terminal area facilities requirements. Currently, the airport office building provides 728 square feet of space for a pilot lounge area and airport administrative office. The GA terminal needs could be served by a future FBO facility, a new centralized facility, or possibly a combination of FBO and airport office building area.

Table 3I. Terminal Area Facilities Requirements

	Current	Near-term 2017	Mid-term 2022	Long-term 2032
Design Hour Operations	13	14	15	16
Design Hour Itinerant Operations (73% of total)	10	11	11	12
Occupancy Factor	1.2	1.3	1.4	1.6
Design Hour Itinerant Passengers	12	14	15	19
Required Space (sq ft)	1,440	1,680	1,800	2,280

Source: WHPacific

HANGAR REQUIREMENTS

Aircraft hangars at the Airport provide storage for most based aircraft. With limited hangar space available, transient aircraft and some locally based aircraft use the main apron for outside storage. There are two County owned multi-unit hangars and the remaining hangars are privately owned on ground leases. Hangars at the Airport consist of conventional/community hangars and T-hangars.

Hangar use is a function of the local climate conditions, security concerns, owner preferences and space availability. Lease prices are also a factor a determining factor. Currently, most of the aircraft at TDO are housed in hangars and this trend is expected to continue through the planning period due to climatic concerns as well as the general aviation trend of moving towards bigger, more expensive aircraft.

The hangar space analysis performed in the 2017 Master Plan Update has been updated for consistency with the FAA-approved 2022-2042 aviation activity forecasts, but all space use assumptions are maintained. The hangar space analysis assumes that all based aircraft will use hangar space if and when the space is available. Additionally, the analysis assumes that 90 percent of based single engine aircraft will require T-hangar space with the remaining 10 percent in addition to 100 percent of multi-engine aircraft and helicopters will require conventional hangar space.

The space requirements were calculated based on industry practices of providing 1,250 square feet per based aircraft in T-Hangar, 1,500 square feet for single engine aircraft and 2,500 square feet for multi-engine aircraft in conventional hangars. Additionally, portions of conventional hangars are usually used for aircraft maintenance and servicing. Accordingly, a planning standard of 15% of the total hangar space needs was added to the required space. **Table 3J** illustrates the additional hangar space needs at the Airport for the planning period.

Table 3J. Hangar Storage Requirements

	Existing	Near-term	Mid-term	Long-term
BASED AIRCRAFT				
Single Engine	39	40	41	42
Multi-engine	0	1	1	2
Jet	0	0	0	0
Helicopter	2	2	2	3
Total	**41**	**43**	**44**	**47**
HANGAR POSITIONS				
T-hangar	28	29	30	32
Conventional	13	14	14	15
Total	**41**	**43**	**44**	**47**
HANGAR AREA REQUIREMENTS (sq ft)				
T-hangar Area	35,000	36,250	37,500	40,000
Conventional Hangar Area	29,000	31,500	31,500	34,000
Maintenance Area	5,025	5,025	5,400	5,775
Total Area	**69,025**	**72,775**	**74,400**	**79,775**

Source: WHPacific; Updated by Century West Engineering

The existing hangar space at the Airport is fully used which means that approximately 10,750 square feet (difference between long term and current need) of additional hangar space would be required to accommodate the forecast increase in based aircraft. Tenant hangar needs may vary, particularly for maintenance hangars, so these estimates should be used as general guides.

AIRCRAFT APRON

As mentioned in Chapter 1, Inventory, the Airport has one contiguous apron area located at the west end of the airfield. This asphalt paved apron area is 420 feet long by 140 feet wide or 6,533 square yards. There are no tiedown anchors on the apron itself. According to airport management, the apron area is used by two locally based aircraft in addition to transient aircraft.

The apron area should provide sufficient space for the parking of transient aircraft as well as locally based aircraft that are not housed in hangars. This analysis assumes that the needed hangar space will be provided in a timely manner to accommodate the demand. Failure to provide sufficient hangar space would increase the apron area requirements. For planning purposes, it is assumed that 15% of locally based aircraft will require space on the parking apron due to some aircraft requiring both hangar storage and parking apron space.

Transient apron space is determined by estimating the percentage of busy-day operations that will require tiedown space at a given time. A planning criterion of 360 square yards per based aircraft and 500 square yards per transient aircraft was used to determine the apron requirements. These dimensions take into account the space needed for aircraft circulation and wingtip clearances (TLOFA) but depend on layout and other ramp circulation needs. Consequently, the development alternatives should consider the apron area requirements as the minimum requirement with additional circulation, as needed, for varying layouts.

Table 3K presents the apron space analysis for the planning period. As shown, the apron area is not adequate for the current demand. This is evident in the use of the grass area north of the runway for aircraft tiedowns. Additional apron space must be provided and tiedowns in the grass north of the airfield must be removed as they fall within the runway object free area.

Regular pavement maintenance for the apron is necessary. The apron was reconstructed in 2008. Maintenance work such as crack seal, fog seal is recommended in the near-term and every five to eight years thereafter.

Table 3K. Apron Space Requirements

Operations	Existing	2027	2032	2042
Annual operations	15,835	16,322	16,845	17,919
Peak Month	2,692	2,775	2,864	3,046
Design Day (Average Day of Peak Month)	87	90	92	98
Itinerant Operations (73% of Design Day)	64	66	67	72
ITINERANT AIRCRAFT				
Itinerant Aircraft Landing	32	33	33	36
Aircraft Simultaneously Parked (50%)	16	17	17	18
BASED AIRCRAFT				
Total Based Aircraft	41	43	44	47
Based Aircraft Parking	6	7	7	7
REQUIRED POSITIONS				
Total Aircraft Parked	22	24	24	25
APRON AREA REQUIREMENTS (SQUARE YARDS)				
Itinerant Aircraft Apron Area	8,000	8,500	8,500	9,000
Based Aircraft Apron Area	1,800	2,100	2,100	2,100
Total Apron Area Required	9,800	10,600	10,600	11,100
CAPACITY VS. DEMAND				
Existing Terminal Area Apron Available (square yards)	6,533	6,533	6,533	6,533
Additional Apron Required	3,267	4,067	4,067	4,567

Source: WHPacific; Updated by Century West Engineering

AVIATION BUSINESSES AND SERVICES

FIXED BASE OPERATOR

There is no Fixed Base Operator (FBO) at the Airport, but Lewis County provides 100LL aviation gasoline (AVGAS) at a self-serve 24/7 fueling station adjacent to the airport office. Other services provided by the Airport include airport management, aircraft parking, courtesy transportation, a meeting area in the airport office building (L- shaped lounge area), and restrooms. Aircraft maintenance services are provided by an airport tenant.

The addition of a new GA terminal/administration building has been identified by airport management as a long-term goal. The recent removal of an older building behind the main apron and the 2023 relocation of the aircraft fuel island to the west end of the apron provides adequate development area for this type of building and a conventional hangar for aircraft maintenance.

FUEL STORAGE

The Airport is completing a replacement project in 2023 for its aircraft fueling system. A new double-wall above ground storage tank (12,000 gallons) and 24-hour pump system for aviation gasoline (AVGAS) will be located near the west end of the main apron. The new tank will be compatible with both current 100LL and future unleaded FAA-approved AVGAS blends. The new fueling area will have space to accommodate multiple storage tanks, if needed. The addition of jet fuel may be considered (based on demand and system costs). The existing fuel station building will be removed and the apron pavement will be patched.

Two underground aviation fuel storage tanks are located under the main apron. One of the tanks has been deactivated for several years. The second tank (10,000 gallons), which stores 100LL fuel, has been properly lined to comply with environmental regulations. The second tank will be decommissioned by the Airport when the new fuel system becomes operational. Options for mitigating the existing underground tanks will be determined by the Airport.

In general, it is recommended that GA airports keep at least a two-week supply of fuel at its storage facility, although effective storage volumes are determined by normal and seasonal demand and delivery schedules. TDO's new 12,000-gallon storage tank capacity of AVGAS appears to be sufficient for the planning period based on historical annual fuel sales volume. Jet A fuel is not provided at the Airport but is available at Chehalis-Centralia Airport.

AIRCRAFT MAINTENANCE SERVICES

Maintenance services are generally provided by FBOs and as previously mentioned, Lewis County's Airport Business Plan has recognized the need for attracting an FBO to the Airport. However, an A&P mechanic with a hangar at the Airport is presently providing aircraft maintenance services.

VEHICLE ACCESS, PARKING, AND SECURITY

Vehicle access to the Airport is provided by multiple unpaved road connections to the Jackson Highway. The main entrance road, located on the north side of the main apron, provides primary access to the terminal area facilities (apron and hangars). An access loop roadway is located adjacent to the airport building. Additional roads provide access to the adjacent skydiving drop zone and vehicle parking area and adjacent hangars. The 2017 ALP recommends limiting and consolidating road connections to the Jackson Highway. Upgrades to airport fencing and access gates are also recommended in the terminal area.

Limited unmarked parking is available at the airport office building. Airport management indicates that airport tenants often drive onto the aircraft apron and taxiway to access the hangar area. Others drive on the main access north of the hangars. "No Parking" signs were required in some areas to keep traffic from congesting aircraft movement areas. Hangar tenants typically park inside or adjacent to their hangars on the grass.

It is recommended that designated vehicle parking areas be developed in the terminal area. The future construction of the new terminal/ administration building or aircraft parking/hangar areas should also

include vehicle parking. The number of parking spaces would be calculated based on the expected demand which is subject to many variables including the presence of an FBO and the type of services provided in the new terminal.

AIRPORT SUPPORT

The airport support section will address emergency services, airport maintenance, fencing, utilities, and ground transportation.

EMERGENCY SERVICES

Emergency services include firefighting and law enforcement for the Airport. The Lewis County Sheriff's Department provides law enforcement support. Firefighting support is provided by both a volunteer fire department and additional support from the Lewis County Fire Department, District #2.

The emergency service equipment and staff are adequate to serve the emergency service needs of the Airport throughout the planning period. Based on FAA regulations, TDO is not required to provide Aircraft Rescue and Fire Fighting (ARFF) since the Airport does not have the commercial passenger service that would require a Part 139 certificate.

AIRPORT MAINTENANCE

Routine airport maintenance is performed by Lewis County staff and contract services. Mowing the Airport's expansive infield grass areas is normally conducted four times per year—typically May, June, July, and August.

The addition of an expanded equipment building for airport maintenance equipment storage has previously been recommended.

AIRPORT SECURITY

General aviation airports have very different security needs and limited resources in comparison to airports with airline service. Recognizing the differences, the TSA created an office focused specifically on security issues affecting general aviation. To guide airport sponsors like TDO in determining what security enhancements they should consider, the TSA published Security Guidelines for General Aviation Airports (IP A-001) in May 2004. The document contains an "Airport Characteristics Measurement Tool" that uses points to assess security risks for different airport characteristics.

Table 3L summarizes the results of the Ed Carlson Memorial Field – South Lewis County Airport assessment, which totals 14 points for the existing condition and 21 points for the future.

Table 3L. GA Airport Security Assessment –TDO

Security Characteristics	*Existing Conditions*	*Future Conditions*
Location		
Within 30 nm of mass population areas	5	5
Based Aircraft		
26-100 based aircraft	2	2
Based aircraft over 12,500 lbs	-	3
Runways		
Runway length less than 5,000 feet, greater than 2,001 feet	4	4
Asphalt or concrete runway	1	1
Operations		
Flight training	3	3
Rental aircraft	-	4
Total	15	22

Source: TSA Security Guidelines for GA Airports, Consultant

Based on the current and future score of TDO on the GA Airport Security Assessment, the TSA recommends the following:

- Perimeter Control
- Protective Lighting Systems
- Personnel and vehicle Identification Systems
- Airport Community Watch program

Presently, the Airport is without ramp lighting or any exterior lighting at the airport entrance or any auto access points.

FENCING AND GATES

Fencing and gate improvements should be made to enhance airport security. Currently, perimeter fencing around the Airport is limited and primarily includes four-foot fencing to keep cattle out. There are currently no gates limiting access to airport operational areas. The 2017 Master Plan update recommended upgraded airport fencing and gates to enhance security.

UTILITIES AND DRAINAGE

UTILITIES

Currently, the Airport has limited onsite wastewater service and treatment capabilities for its tenants. Extending the existing sewage collection system should be considered to connect tenants.

The following was noted in the 2017 master plan update:

Airport users stated their dissatisfaction with the public water system and the lack of water availability. These issues should be addressed in the short term and have a significant effect on the airport maintaining its users and attracting future users and businesses. Additionally, the development of utilities must take into account the airport's future plans of attracting a FBO as well as commercial and industrial activities. The utilities needs of these entities/businesses must be taken into account when planning and calculating the utility needs at the Airport.

DRAINAGE

Additional development at the Airport will require an examination for stormwater impacts. Additional paved surfaces generally require development of stormwater detention or retention structures to prevent an increase in stormwater flows/intensities off the airport property. Overall, there is adequate area for the development of stormwater features in areas outside the runway/taxiway safety areas and near proposed development.

The planned development of approximately 14 acres of land on the southwest corner of the Airport for aircraft hangars will involve significant drainage issues related to wetlands and stormwater management.