

Lake Wales Municipal Airport Master Plan Update Lake Wales, Florida

September 2022

Prepared for:
The City of Lake Wales, Florida



Trusted Experts | Innovative Results

Table of Contents

Chapter 1: Background

1.0	Introduction	1-1
1.1	Airport Location.....	1-1
1.2	Role of the Airport in the Community.....	1-3
1.3	Aeronautical Role	1-3
1.3.1	National Plan of Integrated Airport Systems (NPIAS)	1-3
1.3.2	Florida Aviation System Plan	1-5
1.4	Ownership and Management	1-5
1.5	Development History	1-5
1.6	Master Plan Update	1-6
1.7	Airport Layout Plan (ALP) Drawing Set Update.....	1-6
1.8	Goals and Objectives of the Master Plan.....	1-7
1.8.1	Goals	1-7
1.8.2	Objectives	1-7
1.9	Master Plan Review and Approval	1-8

Chapter 2: Inventory and Description of Existing Facilities

2.0	Introduction	2-1
2.1	Runways.....	2-1
2.2	Taxiways.....	2-5
2.3	Instrument Approaches.....	2-5
2.3.1	Published Approaches for Lake Wales Municipal.....	2-5
2.4	Airfield Markings and Signage	2-6
2.5	Electronic, Visual, and Satellite Aids to Navigation	2-11
2.5.1	Runway End Identifier Light (REIL).....	2-11
2.5.2	Airport Beacon (ABN).....	2-11
2.5.3	Precision Approach Path Indicator (PAPI).....	2-11
2.6	Automated Weather Observing System (AWOS)	2-12

2.7	Existing Airspace	2-12
2.7.1	Local Procedures and Voluntary Noise Abatement	2-15
2.8	Commercial Passenger Terminal Facilities.....	2-15
2.9	General Aviation Facilities	2-15
2.9.1	Aircraft Storage Facilities	2-15
2.9.2	Aircraft Parking Aprons.....	2-16
2.9.3	General Aviation Terminal	2-16
2.10	Support Facilities	2-16
2.10.1	Aircraft Rescue and Firefighting.....	2-16
2.10.2	Airport Maintenance.....	2-16
2.10.3	Fuel Storage	2-17
2.10.4	Aircraft Maintenance	2-17
2.11	Access, Circulation, and Parking	2-17
2.12	Airport Fencing and Access Gates	2-17
2.13	Utilities.....	2-18
2.14	Non-aeronautical Facilities	2-18

Chapter 3: Regional Setting and Land Use

3.0	Introduction	3-1
3.1	Political Boundaries and Jurisdictions	3-1
3.2	Zoning and Land Use	3-1

Chapter 4: Forecasts of Aviation Activity

4.0	Overview	4-1
4.1	Review of Aviation Forecasts.....	4-1
4.1.1	2013 Airport Master Plan.....	4-2
4.1.2	Florida Aviation System Plan	4-2
4.1.3	FAA Terminal Area Forecasts	4-3
4.2	Industry Trends and Forecasting Approach	4-4
4.3	Projections of Based Aircraft	4-5
4.4	Selected Based Aircraft Forecast.....	4-5

4.5	Projected Based Aircraft Fleet Mix.....	4-7
4.6	Lake Wales Airport Based Aircraft Fleet Mix	4-8
4.7	Projections of Annual Aircraft Operations.....	4-8
4.7.1	Historic Growth.....	4-9
4.7.2	National General Aviation Activity Growth.....	4-9
4.7.3	Florida Aviation System Plan	4-9
4.7.4	Operations per Based Aircraft (OPBA).....	4-9
4.7.5	Selected Forecast of Aircraft Operations.....	4-10
4.8	Types of Aircraft Operations.....	4-10
4.8.1	Local versus Itinerant Split.....	4-11
4.8.2	Military Operations.....	4-11
4.8.3	Operational Fleet Mix	4-11
4.8.4	Peak Activity Estimates	4-12
4.8.5	Comparison to FAA Terminal Area Forecasts	4-13
4.9	Summary of Activity Forecasts	4-14

Chapter 5: Facility Requirements

5.0	Introduction	5-1
5.1	Emerging Trends	5-1
5.1.1	Next Generation.....	5-1
5.1.2	Unmanned Aircraft Systems (UAS)	5-1
5.1.3	Emergency Planning.....	5-1
5.1.4	Sustainability.....	5-2
5.1.5	Regional Access/Multi-Modal	5-2
5.2	Demand Capacity Analysis.....	5-3
5.3	Dimensional Criteria Standards	5-6
5.4	Runway Clear Areas and Separation Standards	5-9
5.5	Runway Requirements	5-9
5.5.1	Runway Orientation	5-10
5.5.2	Runway Length.....	5-11
5.5.3	Runway Width.....	5-15
5.5.4	Runway Pavement Design Strength and Condition	5-15
5.5.5	Runway Lighting.....	5-16
5.5.6	Runway Marking and Signage.....	5-16
5.6	Taxiway Requirements.....	5-16
5.6.1	Taxiway Dimensional Standards	5-16
5.6.2	Taxiway Condition.....	5-17

5.6.3	Future Taxiways and Taxilanes	5-17
5.7	Electronic, Visual, and Satellite Aids to Navigation	5-17
5.7.1	Runway End Identifier Light (REIL).....	5-17
5.7.2	Airport Beacon (ABN).....	5-17
5.7.3	Precision Approach Path Indicator (PAPI).....	5-18
5.7.4	Segmented Circle and Wind Cones.....	5-18
5.7.5	Automated Weather Observing System (AWOS)	5-18
5.8	Airspace Requirements	5-18
5.9	General Aviation Facility Requirements	5-19
5.9.1	Aircraft Storage Facilities	5-19
5.9.2	Transient Aircraft Parking Aprons.....	5-19
5.9.3	Terminal Facilities	5-20
5.10	Support Facilities	5-20
5.10.1	Aircraft Rescue and Firefighting.....	5-20
5.10.2	Airport Maintenance.....	5-20
5.10.3	Fuel Storage	5-20
5.10.4	Aircraft Maintenance	5-21
5.11	Access, Circulation, and Parking	5-21
5.12	Utilities.....	5-21
5.13	Non-aeronautical Facilities	5-22

Chapter 6: Environmental Overview

6.0	Introduction	6-1
6.1	Air Quality	6-1
6.2	Climate	6-1
6.3	Department of Transportation Act, Section 4 (f).....	6-1
6.4	Hazardous Materials, Solid Waste, and Pollution Prevention.....	6-2
6.5	Land Use.....	6-2
6.6	Noise and Noise-Compatible Use.....	6-2
6.7	Visual Effects (Including Light Emissions)	6-3
6.8	Biological Resources (Including Fish, Wildlife, and Plants)	6-3
6.8.1	State-Listed Species	6-3

6.8.2	Federally-Listed Species	6-3
6.8.3	Visual Observations	6-4
6.9	Coastal Resources	6-4
6.10	Farmlands.....	6-4
6.11	Historical, Architectural, Archeological, and Cultural Resources	6-4
6.12	Natural Resources and Energy Supply	6-5
6.13	Socioeconomic, Environmental Justice, and Children’s Environmental Health and Safety Risks	6-5
6.14	Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers	6-5
6.14.1	Wetlands	6-6
6.14.2	Floodplains.....	6-6
6.14.3	Surface Waters and Groundwater	6-6
6.14.4	Wild and Scenic Rivers	6-9
6.15	Environmental Reviews.....	6-9

Chapter 7: Alternative Development and Evaluation

7.0	Introduction	7-1
7.1	Evaluation of Alternatives	7-1
7.1.1	Alternatives Development	7-2
7.1.1.1	West Side Development	7-3
7.1.1.2	East Side Development.....	7-7
7.1.1.3	Paramotor Operating Area	7-12
7.2	Selection of Recommended Alternatives	7-14
7.2.1	Preferred Development Alternative	7-17

Chapter 8: Airport Layout Plan

8.0	Introduction	8-1
8.1	ALP Sheets Description.....	8-1
8.1.1	Title Sheet (Sheet 1).....	8-1
8.1.2	Data Sheet (Sheet 2)	8-2
8.1.3	Ultimate Airport Layout Plan Drawing (Sheet 3)	8-2
8.1.4	Terminal Area Plan (Sheet 4)	8-2
8.1.5	Future FAR Part 77 Airspace Surface (Sheet 5).....	8-2
8.1.6	Airport Airspace Profiles (Sheet 6).....	8-3

8.1.7	Inner Portion of the Approach Surface Drawings (Sheets 7 and 8)	8-3
8.1.8	Airport Land Use Drawing (Sheet 9)	8-3
8.1.9	Airport Property Map (Sheet 10)	8-3
8.2	Obstacle Action Plan	8-4
8.3	FAA Review and Approval of the ALP	8-4

Chapter 9: Capital Improvement Plan

9.0	Introduction	9-1
9.1	Potential Funding Sources	9-1
9.1.1	Federal Funding	9-1
9.1.2	State Funding	9-2
9.1.3	Local Funding	9-2
9.1.4	Private Funding	9-3
9.2	Recommended Airport Capital Improvement Program	9-3
9.2.1	Near-Term Airport Implementation Plan (2022-2026)	9-4
9.2.2	Intermediate-Term Airport Implementation Plan (2027-2031)	9-4
9.2.3	Long-Term Airport Implementation Plan (2032-2042)	9-6

Appendices

Appendix A: State-Listed Species Report

Appendix B: Federally-Listed Species Report

List of Tables

Chapter 1: Background

Table 1-1	Airport Data	1-1
Table 1-2	Development History	1-5

Chapter 2: Inventory and Description of Existing Facilities

Table 2-1	Runway Data	2-3
Table 2-2	Runway Pavement Condition Index (PCI)	2-3
Table 2-3	Taxiway Data	2-5
Table 2-4	Aircraft Rescue and Firefighting	2-16
Table 2-5	Fuel Storage	2-17

Chapter 4: Forecasts of Aviation Activity

Table 4-1	2013 Airport Master Plan	4-2
Table 4-2	Florida Aviation System Plan 2035	4-3
Table 4-3	2011 FAA Terminal Area Forecasts	4-3
Table 4-4	2020 FAA Terminal Area Forecasts	4-4
Table 4-5	Comparison of Based Aircraft Projections	4-5
Table 4-6	Forecast of Nation's Active Fleet	4-7
Table 4-7	Forecast of Based Aircraft Fleet Mix	4-8
Table 4-8	Comparison of Operational Forecasts	4-10
Table 4-9	Type of Operations	4-11
Table 4-10	Projected Operational Fleet Mix	4-12
Table 4-11	Forecast Peak Activity	4-13
Table 4-12	Comparison of Forecasts	4-13
Table 4-13	Summary of Activity Forecasts	4-14

Chapter 5: Facility Requirements

Table 5-1	Aircraft Mix	5-4
Table 5-2	Airfield Capacity Levels	5-5
Table 5-3	Aircraft Approach Category (ACC)	5-6
Table 5-4	Airplane Design Group (ADG)	5-6
Table 5-5	Visibility Minimums	5-8
Table 5-6	Runway Design Standards	5-8
Table 5-7	Taxiway Design Standards TDG-2	5-9
Table 5-8	Clear Area and Separation Standards	5-9
Table 5-9	Runway Wind Coverage	5-11
Table 5-10	Runway Length Requirements	5-12
Table 5-11	Airplanes That Make Up 75 Percent Of The Fleet	5-13
Table 5-12	Airplanes That Make up the Remaining 25 Percent Of The Fleet	5-14

Chapter 7: Alternatives Development and Evaluation

Table 7-1	West Side Development Alternative 1 Project Costs	7-5
Table 7-2	West Side Alternative Hangar and Ramp Space.....	7-5
Table 7-3	West Side Development Alternative 2 Project Costs	7-7
Table 7-4	East Side Development Alternative 1 Project Costs.....	7-9
Table 7-5	East Side Development Alternative 2 Project Costs.....	7-10
Table 7-6	Alternatives Analysis Factors and Categories.....	7-17

Chapter 9: Capital Improvement Plan

Table 9-1	Near-Term (2022-2026) Potential Projects and Costs	9-4
Table 9-2	Intermediate-Term (2027-2031) Potential Projects and Costs	9-5
Table 9-3	Long-Term (2032-2042) Potential Projects and Costs.....	9-5

List of Exhibits

Chapter 1: Background

Exhibit 1-1 Location Map.....	1-2
Exhibit 1-2 NPIAS Map.....	1-4

Chapter 2: Inventory and Description of Existing Facilities

Exhibit 2-1 Existing Facilities.....	2-2
Exhibit 2-2 PCI Report.....	2-4
Exhibit 2-3 GPS Approach – Runway 6	2-7
Exhibit 2-4 GPS Approach – Runway 24	2-8
Exhibit 2-5 VOR/DME-B Circling Approach.....	2-9
Exhibit 2-6 Existing Marking and Signage Plan.....	2-10
Exhibit 2-7 General Airspace Categories	2-13
Exhibit 2-8 Regional Airspace	2-14

Chapter 3: Regional Setting and Land Use

Exhibit 3-1 Political Boundaries and Jurisdictional Map.....	3-2
Exhibit 3-2 Zoning Map.....	3-3
Exhibit 3-3 Future Land Use Map	3-4

Chapter 4: Forecasts of Aviation Activity

Exhibit 4-1 Monthly Fuel Sales from 2017-2020	4-6
Exhibit 4-2 Fuel Sales Breakdown from 2017-2020.....	4-6

Chapter 5: Facility Requirements

Exhibit 5-1 Dassault Falcon 900.....	5-7
Exhibit 5-2 Beechcraft King Air B100.....	5-7

Chapter 6: Environmental Overview

Exhibit 6-1 Wetlands Inventory Map.....	6-7
Exhibit 6-2 Floodplain Map.....	6-8

Chapter 7: Alternatives Development and Evaluation

Exhibit 7-1 West Side Alternative 1	7-4
Exhibit 7-2 West Side Alternative 2	7-6
Exhibit 7-3 East Side Alternative 1.....	7-8
Exhibit 7-4 East Side Alternative 2.....	7-11

Exhibit 7-5 Paramotor Operating Area – Northeast Alternative	7-13
Exhibit 7-6 Paramotor Operating Area – Southeast Alternative	7-15
Exhibit 7-7 Southwest Alternative.....	7-16
Exhibit 7-8 Preferred Alternative.....	7-18

Chapter 9: Capital Improvement Plan

Exhibit 9-1 CIP Projects.....	9-5
-------------------------------	-----

Chapter 1: Background

1.0 Introduction

This master plan update was commissioned by the City of Lake Wales for the purpose of providing a comprehensive plan for the future development of the Lake Wales Municipal Airport (X07). The plan provides an assessment of existing and forecasted aviation demand and includes a description of the facilities required to meet that demand. **Table 1-1** summarizes key airport data which is further discussed in the following sections.

Table 1-1 – Airport Data

Airport Name	Lake Wales Municipal Airport
Owner	City of Lake Wales
Identifier	KX07
FAA Site Number	03288.*A
FAA NPIAS Number	12-0040
NPIAS Service Level Category	General Aviation Basic Service
Airport Reference Code	B-II
Airport Elevation	127 feet
Airport Reference Point Latitude	27° 53' 37.7" N
Airport Reference Point Longitude	81° 37' 13.4" W

1.1 Airport Location

The Airport lies within the City of Lake Wales limits. Positioned in the center of Polk County, the City comprises of nearly 20 square miles of land located approximately 47 miles southwest of Orlando and 50 miles east of Tampa. Bordering counties include Pasco, Sumter, Lake and Orange Counties to the north; Osceola County to the east; Okeechobee, Highlands, Hardee and Manatee Counties to the south; and Hillsborough County to the west.

The Airport is on the west side of the City just south of State Road 60. The current airport property consists of 545 acres of land with an airfield elevation of 127 feet above mean sea level. Public access to the Airport is via Airport Road, a part of Polk County's dedicated road system, which runs south off State Road 60. A location map, **Exhibit 1-1**, depicts the location of the airport in its regional setting.

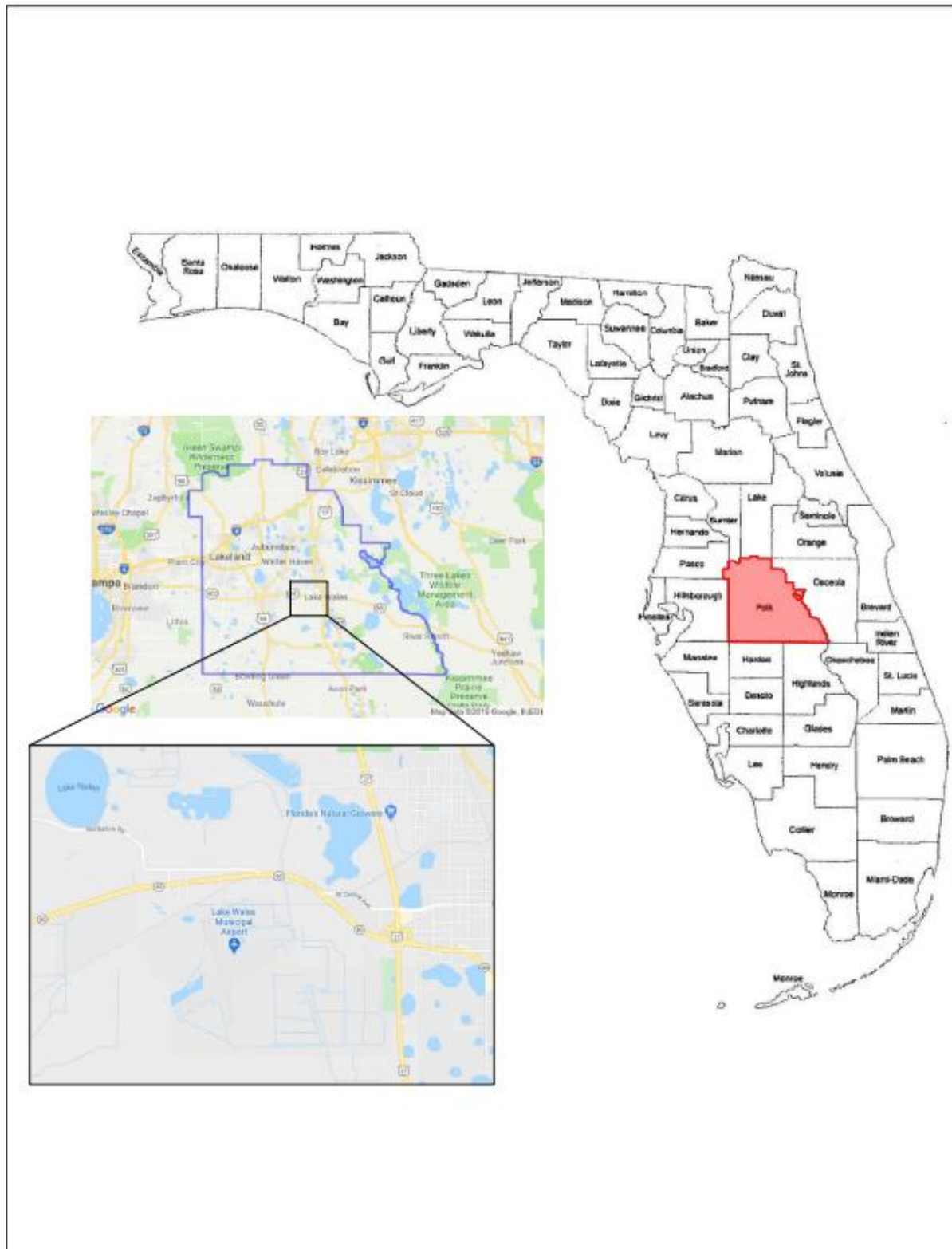


Exhibit 1-1 – Location Map

1.2 Role of the Airport in the Community

Lake Wales Municipal Airport is a major asset for the community and has the potential to strengthen its position as an economic engine for the City of Lake Wales. In addition, X07 is an effective transportation tool used by some local businesses to increase the efficiency of their operations. The City's vision for the Airport's future is to provide a safe, first-class general aviation airport facility capable of becoming and remaining self-sustaining by attracting revenue-producing aeronautical and non-aeronautical businesses.

1.3 Aeronautical Role

The aeronautical role of an airport defines its purpose within the national, regional, and local area. In its current role, the airport focuses entirely on serving the needs of general aviation. The airport accommodates several tenants including a focus on recreational activity such as skydiving and paramotors, which is a type of ultralight recreational aviation.

Fixed and rotary wing flight training, as well as robust parachute activity, are the primary drivers of this airport's general aviation activity. Roughly 80 percent of the airport's annual operations are related to parachuting operations and flight training activities from flight schools both on the field and from other area airports.

General aviation operations by corporate and business users are present at the airport. The airport estimates that four percent of its annual general aviation operations are business-related. Approximately fifteen percent of the airport's based aircraft are owned by local businesses. The airport also attracts transient or visiting general aviation aircraft. While the airport does not have any based military aircraft, it does accommodate some transient military operations that account for a small amount of the total annual activity at the airport. There is significant interest in developing better facilities for itinerant traffic.

1.3.1 National Plan of Integrated Airport Systems (NPIAS)

Lake Wales Municipal Airport is designated by the Federal Aviation Administration as a publicly owned, public-use facility. Under the Airport and Airways Improvement Act, the Secretary of Transportation is required to publish a national plan for the development of public-use Airports. This National Airport Development Plan is published through the National Plan of Integrated Airport Systems (NPIAS). The Lake Wales Municipal Airport is included in the National Plan of Integrated Airport Systems (NPIAS) and includes all commercial service, relievers [high capacity general aviation (GA) airports in metropolitan areas], and select GA airports. Congress bases an airport's eligibility for funding on that airport's Service Level and Role, as defined by the NPIAS.

Airports are divided into two categories that reflect the type of service provided to the community. The service levels also represent statutory funding categories associated with the airport grant program.

- A. Commercial Service Airports are publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled passenger aircraft service. Commercial service airports are either:
 - (1) Primary - an airport that enplanes more than 10,000 passengers annually; or
 - (2) Nonprimary - an airport that enplanes between 2,500 and 10,000 passengers annually.

B. General Aviation Airports while not specifically defined are considered to be airports not classified as commercial service.¹

The most recent NPIAS (2019-2023) classifies Lake Wales as a General Aviation (GA) Basic service airport. The term GA is broad, applying to the operation of primarily civilian aircraft for purposes other than commercial passenger transport (i.e. personal, business, and instructional flying). GA airports fulfill the role of a community airport providing a means for private general aviation flying and linking the community to the national airport system. Some important roles GA airports can play in linking rural communities to the national airport system can also include their importance with respect to medical emergencies and evacuations; and the role the airport plays in emergency or disaster preparedness in the communities served by the airport. The FAA criteria for a basic airport include having 10+ based aircraft and being located more than 30 miles from the next nearest NPIAS airport. **Exhibit 1-2** identifies Lake Wales Municipal amongst other Florida Airports listed in the NPIAS.

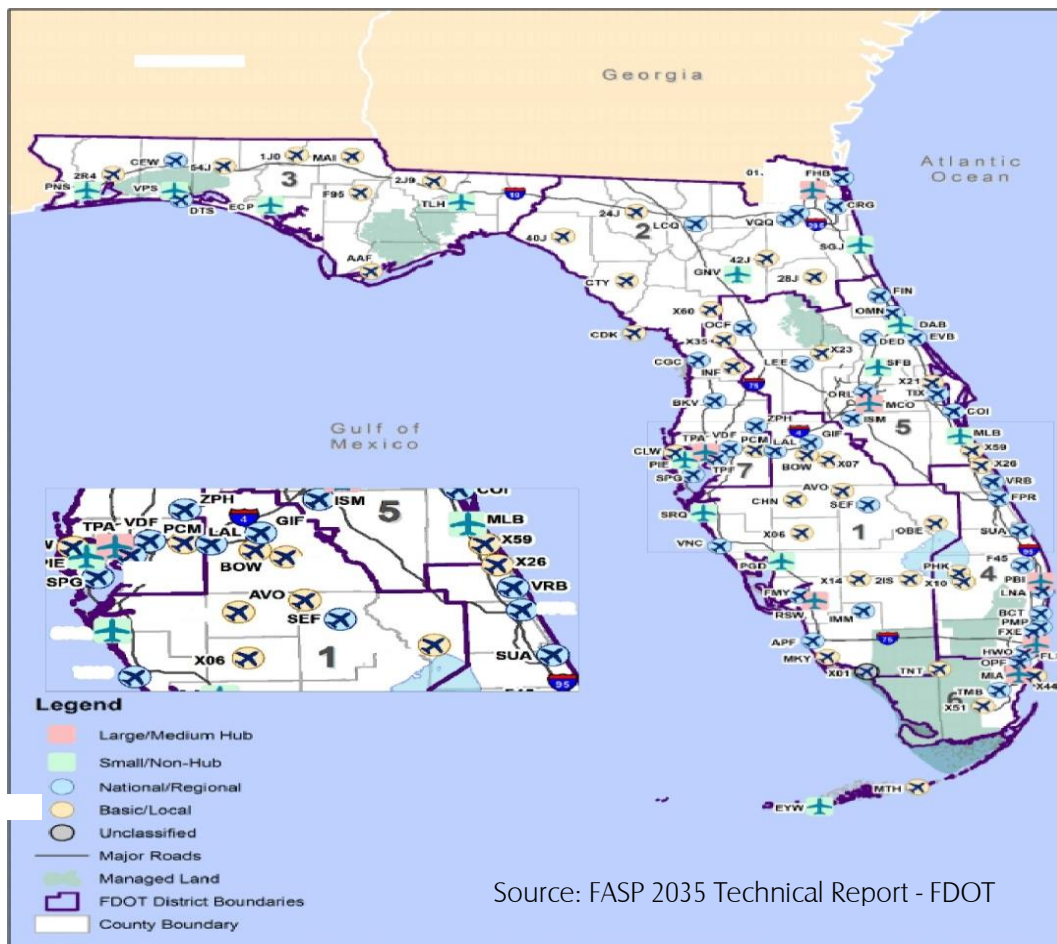


Exhibit 1-2 – NPIAS Map

¹ FAA Order 5090.5 Formulation of the NPIAS and ACIP September 3, 2019

1.3.2 Florida Aviation System Plan

The Florida Aviation System Plan (FASP) 2035 is the Florida Department of Transportation's (FDOT's) strategic 20-year plan for developing the state's 129 public airports. The current FASP classifies X07 as a general aviation airport primarily serving the flight training, tourism, and recreational/sport aviation market segments.

1.4 Ownership and Management

The Airport is owned and operated by the City of Lake Wales with responsibility of the facilities falling under the City's Public Services Department, which reports directly to the City Manager. There is an Airport Authority of seven appointed members that advise the Commissioners on Airport matters. On-site management is provided by the Fixed Base Operator (FBO) who, at the appointment of the City Manager, serves as the de facto Airport manager and facilitates day-to-day operations of the airport facility.

1.5 Development History

The initial development of the airfield began in 1928 by the City of Lake Wales. During World War II, the Airport became an auxiliary field to the Sarasota Army Airfield. During that time the Army Corps of Engineers improved the facility, and it was known as the Lake Wales Army Airfield for training replacement fighter pilots. After the war effort, the airfield became a civilian airport again. **Table 1-2** shows the projects that have been completed since 2000.

Table 1-2 – Development History

Year Completed	Project
2003	Taxiway Bravo Rehabilitation
2005	Runway 17-35 PAPI-2
2007	Runway 6-24 MIRLs Rehabilitation
2008	Design and Build AWOS-III
2008	Environmental Assessment for Runway 6-24
2009	Rehabilitate MITLs
2011	Perimeter Fencing and Apron Lighting
2011	Runway 17-35 Safety Area Improvements
2013	Master Plan Update
2015	Airfield Improvements including Taxiway Alpha Realignment, Runway 24 Safety Area Improvements, and Airport Road Rehabilitation
2018	Runway 6 and Taxiway Alpha Extension and Runway 6-24 Rehabilitation
2019	Taxiway Bravo Construction and Taxiway Alpha East Rehabilitation

1.6 Master Plan Update

A Master Plan Update provides details regarding the City of Lake Wales's envisioned strategic development plan for the airport, the proposed development program and anticipated capital expenditure outlays. The FAA recommends that airport owners update their Airport Master Plans periodically (every 5 to 10 years) to document the existing and future operational capability of the airport, to enhance safety, or to identify needed facility and capital improvements. A key component of the Airport Master Plan is the development of aviation activity forecasts. These forecasts lay a foundation for future planning and must be approved by the FAA. Aviation forecasts can be found in Chapter 5 of this report. Both the FAA and Florida DOT require airports to have approved aviation forecasts and airport layout plans. FAA and FDOT must approve these two items and also review master plans in order for the airport to be eligible for federal and state grant funding.

This update of the Master Plan covers a 20-year planning period that is presented in three separate planning horizons: Near-Term (0 to 5 years), Intermediate-Term (6 to 10 years), and Long-Term (10 to 20 years). The Intermediate and Long-Term planning periods are typically considered strategic in nature and serve to identify future anticipated actions by the airport owner or airport development activities that would satisfy anticipated, but unquantifiable future levels of aviation activity, or associated commercial needs of the airport's users.

This Airport Master Plan Update Report documents the City's vision and overall plan for the airport; proposes an airport development program; and identifies anticipated capital expenditure outlays. The update of this Master Plan and ALP Drawing Set takes a selective and targeted approach to airport planning that focuses on the identification of viable and prudent options that allow the City of Lake Wales to attain the highest and best use of airport property.

1.7 Airport Layout Plan (ALP) Drawing Set Update

One of the key products of a Master Plan is a collection of drawings that comprise the ALP Drawing Set that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning. The ALP creates a blueprint for airport development by depicting proposed facility improvements and provides a guideline by which the Airport Sponsor (the City of Lake Wales) can ensure that development follows airport design standards and safety requirements and is consistent with airport and community land use plans.

The primary drawing in this set is the Airport Layout Plan (ALP) that graphically depicts current and future airport facilities. The remaining drawings are considered supplemental and are appended to the ALP. The FAA-approved ALP enables the Airport Sponsor and the FAA to plan for facility improvements at the airport and to anticipate budgetary and procedural needs.

An airport must keep its ALP Drawing Set current and follow that plan, since those are grant assurance requirements of the Airport Improvement Program (AIP) and previous airport development programs, including the 1970 Airport Development Aid Program (ADAP) and Federal Aid Airports Program (FAAP) of 1946, as amended.

For AIP funding eligibility purposes, the FAA recommends that ALPs be updated:

- On an as-needed basis, or at least every 2 to 5 years
- After completion of a major construction project
- To identify new airport development projects
- To include potential future airport development projects that may be needed later.

The approved ALP allows the FAA to protect the airspace required for facility or approach procedure improvements. An ALP Drawing Set is included in this Master Plan Report and can be found in Chapter 9.

1.8 Goals and Objectives of the Master Plan

The ultimate objective of this planning process is to provide a modern, safe, and efficient aviation facility for the citizens of the city and the users of the airport. The City's goals and objectives for this update of the Airport Master Plan and Airport Layout Plan are described in the following sections.

1.8.1 Goals

The overall goals of this Airport Master Plan Update are:

- Improve the capability for the Lake Wales Municipal Airport to safely accommodate a broader range of general aviation aircraft operations and increased levels of overall aircraft activity.
- Promote the orderly and efficient development of aviation-related and non-aviation-related facilities.
- Plan for airport facilities and services that meet customer needs.
- Enhance the airport's ability to self-sustain and serve as an economic generator within the local economy.

1.8.2 Objectives

The following are the global objectives of the Airport Master Plan Update:

- **Safety:** Develop facilities according to FAA standards.
- **Efficiency:** Maximize the development of space, consider airfield traffic flow, minimize conflicts between operations, and provide efficient ground access.
- **Economics:** Provide a plan that takes into consideration benefits versus costs, reasonable construction costs, and a reasonable financing plan. The plan also considers opportunities for generating airport revenue, as well as generating healthy competition for businesses on the airport.
- **Expansion:** Provide a development plan that anticipates the expansion of facilities to accommodate growth.
- **Balance:** Future airport facilities should be consistent with the Airplane Design Group and the runway/taxiway capability. In addition, the capacity of each facility should be in balance with that of other facilities as appropriate.
- **Consistency:** Provide a development plan that is consistent with the airport vision, community goals and plans, the ALP, established minimum standards, and the FAA grant assurances.

The following are the specific objectives of the Airport Master Plan Update:

- Review and update the airport's overall facility development plan to allow the City to respond to existing and future airport facility needs and/or enhance revenue generation opportunities.
- Identify and prioritize airport development projects for the short term given the limited availability of federal, state, and local funds.
- Evaluate facility layout alternatives that would serve to maximize the long-term development of aviation and industrial development facilities at the airport.

1.9 Master Plan Review and Approval

The recommendations contained in this master plan represent the views, policies, and development plans of the City of Lake Wales, and the Florida Department of Transportation (FDOT) and do not necessarily represent the views of the FAA.²

This master plan will be reviewed by the Airport, the public, FDOT, and the FAA. Their comments will be incorporated into the narrative and plans. The City of Lake Wales formally votes to approve and adopt the revised master plan at the completion of the review process.

Acceptance of the master plan by the FAA does not constitute a commitment on the part of the FAA to participate in any development depicted in the plan. The FAA reviews all elements of the master plan to ensure that sound planning techniques have been applied. However, the FAA only reviews and formally approves the following elements of the master plan: forecasts of demand, selection of the critical aircraft, and the Airport Layout Plan (ALP).

It is important to note that the FAA will perform these activities in close coordination with the FDOT Aviation Office. As such, the FAA also relies heavily on the FDOT Aviation Office to review the draft deliverables to ensure that they comply with FAA and state standards and guidelines. The master plan must also be compatible with the Florida Aviation System Plan (FASP). While the FAA only approves parts, the FDOT Aviation Office is in a position to provide comments and approve all elements of the airport master plan. This affords greater control of the process, ensuring a higher quality work product.

² Refer to Section 205 of Advisory Circular 150/5070-6B *Airport Master Plans*

Chapter 2: Inventory and Description of Existing Facilities

2.0 Introduction

The Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and the Florida Department of Transportation (FDOT) “*Guidebook for Airport Master Planning*,” outline the steps in the development of an airport master plan. The initial step, Existing Conditions, is the collection of data pertinent to the airport and the area it serves. The objective of the inventory task at the Lake Wales Municipal Airport (X07) is to provide background information for subsequent phases of analysis.

The development of a master plan for X07 required the collection and evaluation of data relating to the airport and surrounding area and was obtained through on-site investigations of the airport; interviews with the airport management, fixed base operators, and representatives of the various City offices; and collection and analyses of previous reports and studies. Data was also obtained from secondary sources at the federal, state, and local levels.

The data and information presented herein reflect information compiled in September 2020 when the Master Plan Update was initiated. Any material changes to the existing conditions will be updated and incorporated into the master planning process as necessary over the course of the project to ensure the accuracy of key findings and recommendations.

Information presented in this section serves as a resource for analyses contained in subsequent sections. The Existing Facilities Plan, **Exhibit 2-1**, shows the current layout of the airfield.

2.1 Runways

The airport has two hard-surfaced runways: primary Runway 6-24 and crosswind Runway 17-35. **Table 2-1** summarizes relevant runway data and associated facilities.

The primary runway, Runway 6-24, recently underwent a 1,401-foot extension in 2018 from its previous length of 3,999 feet. The Runway 6-24 is currently 5,400 feet in length and 100 feet in width. Constructed of asphalt, the most recent improvements to the pavement surface were completed in 2018. In addition to the 1,401-foot extension, the 3,999 feet of existing runway pavement was rehabilitated in 2018. In 2019, FDOT published a pavement report for Lake Wales Municipal Airport based on surveys and fieldwork conducted in 2017. The Pavement Condition Index (PCI) assigned to Runway 6-24 was 100% which is considered a good rating. A technical evaluation to determine the Pavement Classification Number (PCN) which tells the strength of the runway was conducted in 2016. The PCN numerical value indicated the load-carrying capacity of pavement in terms of a standard single wheel load at a tire pressure of 181 psi. The PCN for pavement is reported as a five-part number where the following codes are ordered and separated by forward slashes: Numerical PCN value / Pavement type / Subgrade category / Allowable tire pressure / Method used to determine the PCN. The PCN for Runway 6-24 was classified as 6/F/B/Y/T. Referencing Appendix F in Advisory Circular AC 150/5335-5C, this correlates to Runway 6-24 accommodating a single wheel type main gear aircraft up to 23,000 pounds or a dual wheel type main gear aircraft up to 35,000 pounds. No PCN testing was done after the overlay and extension in 2018 and it is anticipated that the PCN value will increase at the next evaluation interval. This load rating is adequate



to service repetitive operations by all B-II aircraft as well as many of the smaller and lighter C-II aircraft that make up the fleet mix.

Runway 17-35 is the crosswind runway that has a published length of 3,860 feet and a width of 75 feet. The entire length of this runway was overlaid with asphalt in 1997. The FDOT pavement study assigned PCI ratings of 58% that show the asphalt surface to be in fair condition. The PCN for Runway 17-35 was classified as 8/F/B/Y/T. This correlates to Runway 17-35 accommodating a single wheel type main gear aircraft up to 29,000 pounds or a dual wheel type main gear aircraft up to 45,000 pounds.

The runways intersect at approximately 3,321 feet from the Runway 6 threshold and approximately 2,469 feet from the Runway 17 threshold.

Table 2-1 – Runway Data

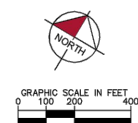
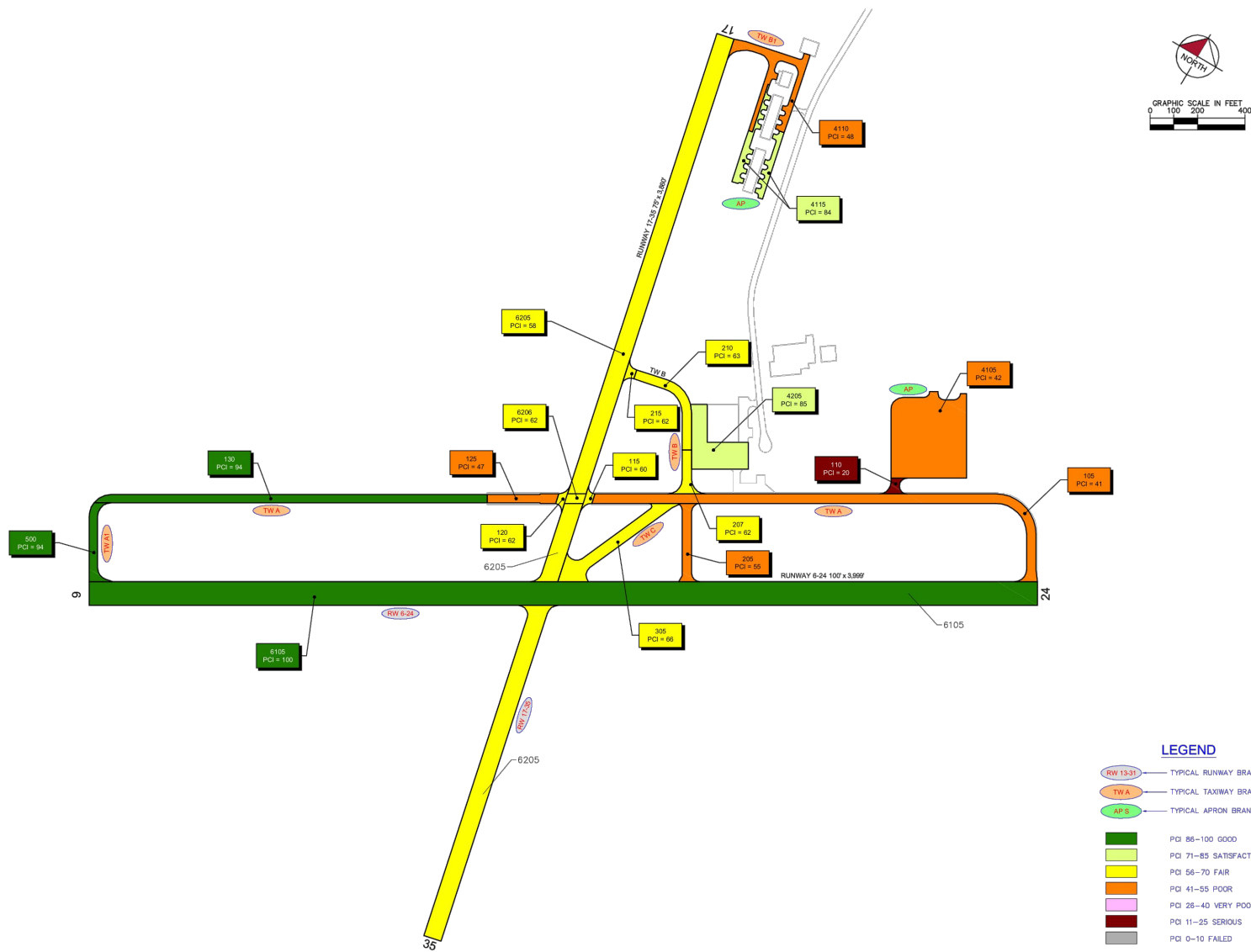
	Runway 06-24	Runway 17-35
Length	5,400'	3,859'
Width	100'	75'
Surface Material	Asphalt	Asphalt
Pavement Strength	SW 23K/DW 35K	SW 29K/DW 45K
Approach Slope Ratio	34:1	20:1
Approach Aids	PAPI	PAPI
Lighting	MIRL	None
Marking	Non-Precision	Visual

In 2019, FDOT published a Statewide Airfield Pavement Management Program report for Lake Wales Municipal Airport based on surveys and fieldwork conducted in 2017. The evaluation developed a Pavement Condition Index (PCI) to quantify the condition of the pavement based on the visible distresses on the surface. The results of the FDOT PCI Report are shown in **Exhibit 2-2**. **Table 2-2** summarizes the results for both runways. Action required is triggered when a section within the branch facility falls below the FDOT minimum service level.

Table 2-2 – Runway Pavement Condition Index (PCI)

Element	Runway 6-24	Runway 17-35
Area Weighted PCI	100	58
PCI Range	100	58-62
Average Condition Rating	Good	Fair
FDOT Minimum Service Level	75	75
Action Required	No	Yes

Medium intensity runway lights (MIRL) are the most common type of runway edge lighting at general aviation airports. These types of lights are used to support instrument approaches. At X07, Runway 6-24 is equipped with MIRLs and Runway 17-35 is currently unlit.



LEGEND

- RW 13-31 TYPICAL RUNWAY BRANCH ID
- TW A TYPICAL TAXIWAY BRANCH ID
- AP S TYPICAL APRON BRANCH ID

	PCI 86-100 GOOD
	PCI 71-85 SATISFACTORY
	PCI 56-70 FAIR
	PCI 41-55 POOR
	PCI 26-40 VERY POOR
	PCI 11-25 SERIOUS
	PCI 0-10 FAILED

SECTION NO. 1
PCI NO. 1

RUNWAY LENGTHS DEPICTED IN THIS DRAWING ARE FOR PAVEMENT MANAGEMENT PURPOSES ONLY AND MAY NOT MATCH PUBLISHED RUNWAY LENGTHS.

2.2 Taxiways

X07 is served by a system of taxiways that provide access between the runways, the Fixed Base Operator (FBO), aircraft tie-down areas, and hangars.

Taxiway Alpha serves as the full-length parallel taxiway to Runway 6-24. The eastern half of Taxiway A connects the approach end of Runway 24 to a point just east of the runway intersection. During the FDOT pavement study in 2017, this portion of Taxiway A was assigned a PCI of 41% which is considered a poor rating. The western portion of Taxiway A connects the approach end of Runway 6 to a point just west of the runway intersection. During the FDOT pavement study in 2017, this portion of Taxiway A was assigned a PCI of 94% which is considered a good rating. Since the FDOT pavement study was conducted, the western portion of Taxiway A was extended as part of the Runway 6-24 extension project and the eastern portion of Taxiway A was reconstructed in 2019. The entire Taxiway A has a pavement width of 40 feet and has a runway centerline to taxiway centerline separation of 400 feet.

Taxiway B was recently constructed in 2019. Taxiway B is a full-length parallel taxiway to Runway 17-35. The asphalt taxiway width is 35 feet and has a runway centerline to taxiway centerline separation of 200 feet. The most recent FDOT pavement study was conducted prior to the construction of Taxiway B, but it is in excellent condition due to the fact that it was recently completed in 2019. **Table 2-3** summarizes the Taxiway information.

Table 2-3 – Taxiway Data

Taxiway	Length (Ft.)	Width (Ft.)	Surface	Lighting	Marking
"A"	5,400'	40	Asphalt	Yes	Yes
"B"	3,859'	35	Asphalt	Yes	Yes

2.3 Instrument Approaches

During times of inclement weather, instrument approaches enable pilots to safely descend into the Airport environment for landing. There are several different instrument approaches that can be established, each with specific limitations. As the height of clouds and visibility deteriorate, the necessity for instrument approaches increases. When the cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is greater than three statute miles, the conditions are considered visual and pilots can operate under visual flight rules (VFR). In VFR conditions, no published approaches are required for an aircraft to safely land at an airport. However, once the cloud ceiling is less than 1,000 feet AGL and/or the visibility is less than three statute miles, pilots must operate under instrument flight rules (IFR). Additional air traffic control services are provided to pilots during IFR conditions. During the arrival phase, instrument approaches are what allow a pilot to safely navigate to and land on a runway.

2.3.1 Published Approaches for Lake Wales Municipal

There are two basic categories for instrument approaches: precision and non-precision. Both precision and non-precision approaches provide course guidance to the runway centerline they serve. The degree of horizontal guidance and vertical guidance increases with the sophistication of the instrument approach aid.

All instrument approaches have heights published that dictate how low a pilot can descend without the runway environment in sight before having to abandon the approach and try again. For precision approaches, this is called the decision height and for non-precision approaches, it is referred to as the minimum descent altitude (MDA). Both heights are published in the number of feet above the intended runway's touchdown zone elevation. In addition, every instrument approach has minimum visibility requirements, measured in feet or miles, at which an instrument approach can be attempted. For either type of approach, if visual contact cannot be made before the decision height or missed approach point, then the aircraft must execute a missed approach and either try again or go to an alternate airport.

Currently, Lake Wales Municipal has published straight-in, non-precision instrument approaches to both ends of Runway 6-24. Both are area navigation (RNAV) procedures based on Global Positioning Satellites (GPS). GPS is a satellite-based navigation system that consists of a network of satellites known as a constellation. This constellation provides a celestial reference for determining the position of any point on or above the Earth's surface. By analyzing the time delays of signals received from these satellites, air-based receivers are able to determine latitude, longitude, and altitude.

For each end of Runway 6-24, there are both localizer performance (LP) and lateral navigation (LNAV) minimums established. On the Runway 6 end, these approaches provide an MDA of 373 feet above the Runway 6 threshold elevation (500 feet above mean sea level) and one-mile visibility for all aircraft types. On the Runway 24 end, the approaches are published at 453 feet above the Runway 24 threshold elevation (580 feet above mean sea level) and one-mile visibility. Slightly higher visibility minimums apply to the larger and higher performance aircraft on approach to Runway 24.

The RNAV/GPS also provides circling approach minimums which define the MDA and visibility minimums for the different aircraft categories to remain clear of obstacles. The difference is that the circling approach, with its higher minimums, allows an aircraft to approach and establish visual contact with the Airport environment in less than visual conditions. Once in the vicinity, the pilot can then maneuver the aircraft to set up a final approach and land on any runway end, unless specific restrictions are published.

At Lake Wales Municipal there is also a stand-alone circling approach published which is based on the Lakeland VHF Omni-Directional Radar Beacon (VOR) and Distance Measuring Equipment (DME). The VOR is a ground-based electronic navigation aid transmitting signals called radials. The DME portion allows pilots to determine their distances to or from the Lakeland VOR, which is 21.4 nautical miles to the northwest of the Airport. While the VOR/DME circling approach has slightly higher minimums than the RNAV/GPS circling approaches, they provide some ability for aircraft not equipped with GPS navigation equipment to make approaches in less than VFR conditions. **Exhibits 2-3** through **2-5** present the current published approach charts for the Airport.

2.4 Airfield Markings and Signage

Runway marking schemes used for runways are a direct function of the approach category for each runway threshold and the existence of displaced thresholds. Runway 6-24 has non-precision instrument procedure markings and Runway 17-35 has visual approach markings. Lighted hold position signs and hold position markings are located at each runway/taxiway intersection. Refer to the Existing Sign and Marking Plan, **Exhibit 2-6**.

WAAS CH 49023 W06A	APP CRS 062°	Rwy Idg TDZE Apt Elev	3999 127 127
--	------------------------	-----------------------------	---

RNAV (GPS) RWY 6 LAKE WALES MUNI (X07)

RNP APCH.

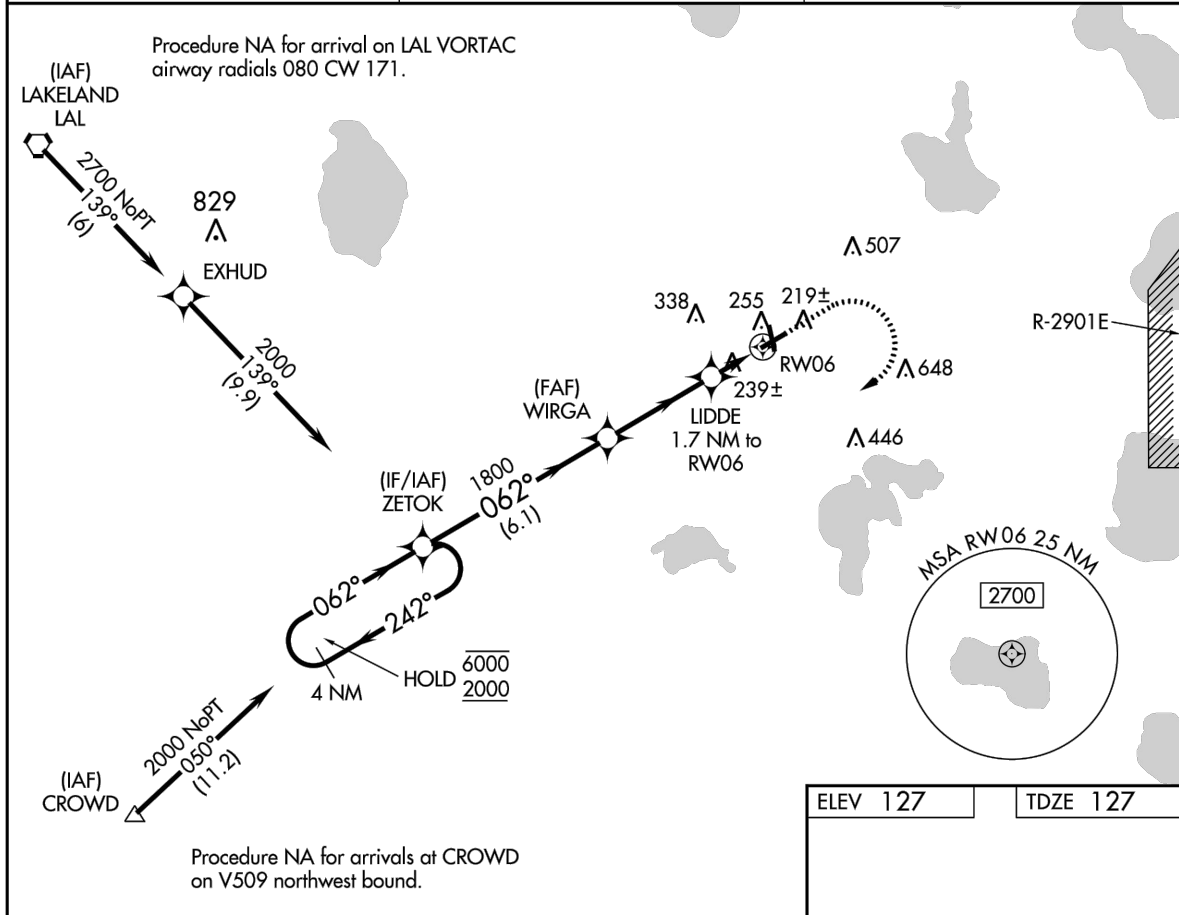
T Circling Rwy 6, 17, 24 NA at night. Rwy 6 helicopter visibility reduction below 1 SM NA. Straight-in Rwy 6 NA at night. When local altimeter setting not received, use Bartow altimeter setting and increase all MDA 40 feet, and increase LP and LNAV Cats C and D visibility $\frac{1}{8}$ SM.

MISSED APPROACH: Climb to 1000 then climbing right turn to 2000 direct ZETOK and hold.

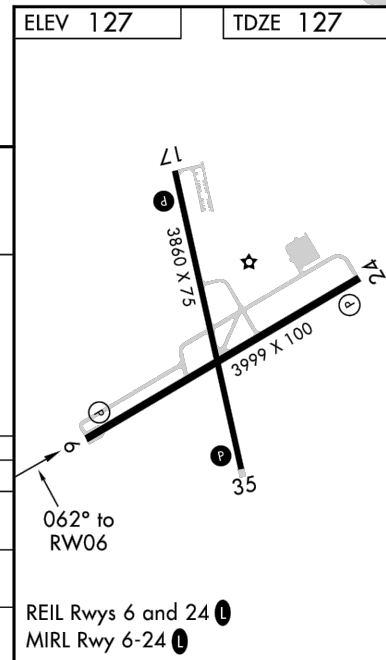
AWOS-3
124.225

MIAMI CENTER
134.55 257.7

UNICOM
122.8 (CTAF) L



4 NM Holding Pattern		ZETOK	1000	2000	ZETOK
6000 2000		242° 062°	062°	1800	700
		6.1 NM	3.4 NM	1.7 NM	
CATEGORY	A	B	C	D	
LP MDA	500-1		373 (400-1)		
LNAV MDA	520-1	393 (400-1)	520-1 $\frac{1}{8}$	393 (400-1 $\frac{1}{8}$)	
CIRCLING	560-1 433 (500-1)	620-1 493 (500-1)	620-1 $\frac{1}{2}$ 493 (500-1 $\frac{1}{2}$)	680-2 553 (600-2)	



LAKE WALES, FLORIDA
Orig-C 20JUN19

27°54'N-81°37'W

LAKE WALES MUNI (X07) **RNAV (GPS) RWY 6**

SE-3, 18 JUN 2020 to 16 JUL 2020

SE-3, 18 JUN 2020 to 16 JUL 2020

LAKE WALES, FLORIDA

AL-6516 (FAA)

19283

WAAS CH 40323 W24A	APP CRS 243°	Rwy Idg TDZE 127 Apt Elev 127
--	------------------------	---

RNAV (GPS) RWY 24

LAKE WALES MUNI (X07)

▼ DME/DME RNP-0.3 NA. Procedure NA at night. When local altimeter setting not received, use Bartow altimeter setting and increase all MDA 40 feet.
▲ NA Rwy 6, 24 helicopter visibility reduction below 1 SM NA.

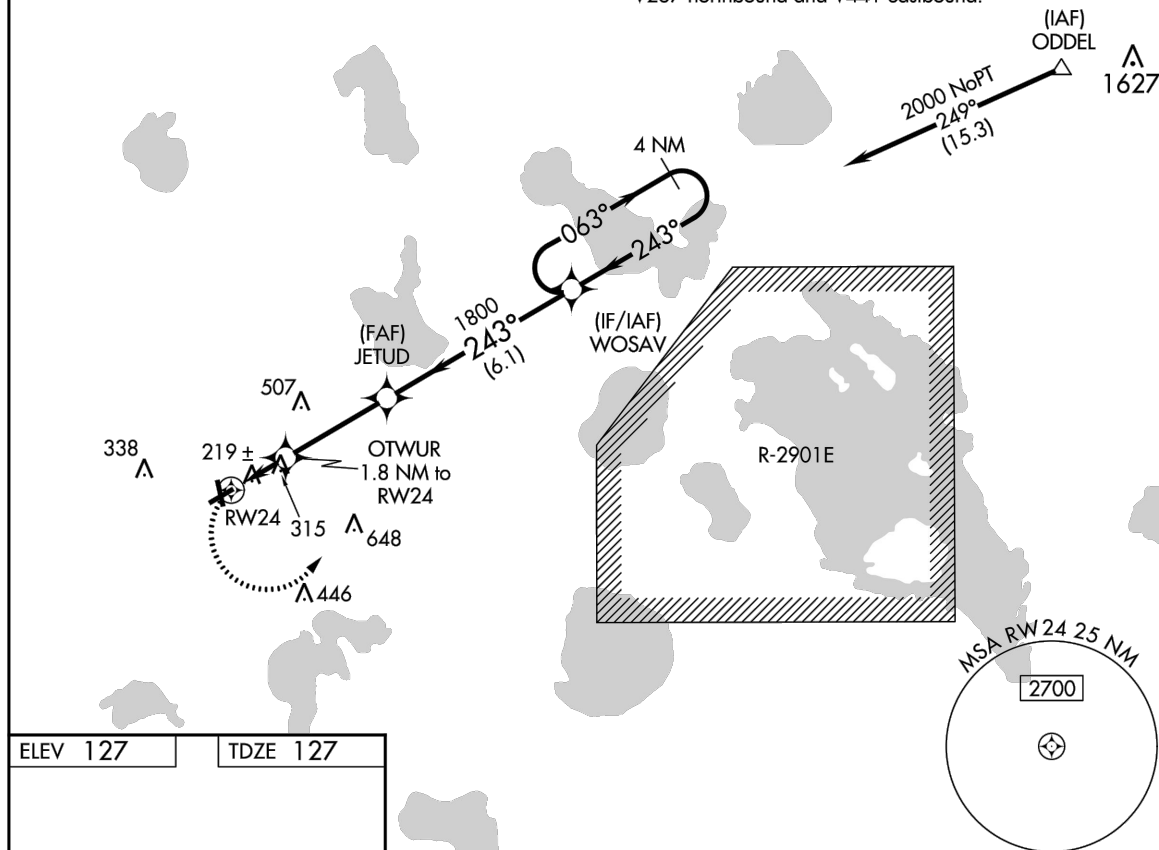
MISSED APPROACH: Climbing left turn to 2000 direct WOSAV and hold.

AWOS-3
124.225

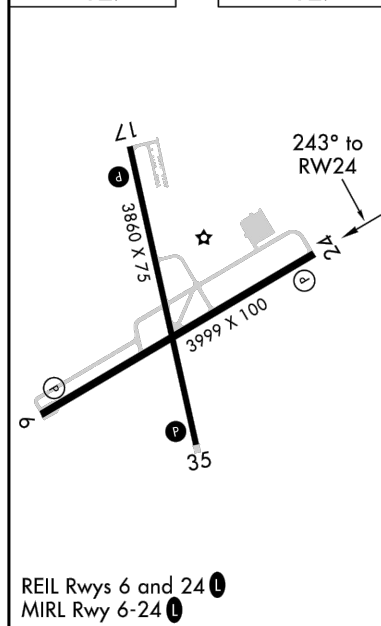
MIAMI CENTER
134.55 257.7

UNICOM
122.8 (CTAF) 1

Procedure NA for arrivals at ODDEL on V267 northbound and V441 eastbound.

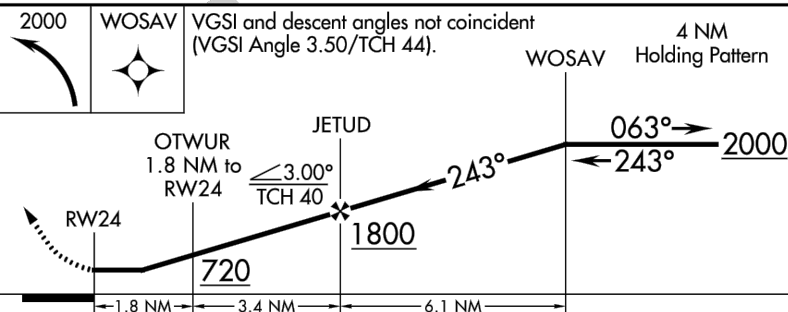


ELEV 127 TDZE 127



REIL Rwy 6 and 24
MIRL Rwy 6-24

LAKE WALES, FLORIDA
Orig-A 25MAY17



CATEGORY	A	B	C	D
LP MDA	580-1 453 (500-1)	453 (500-1)	580-1½ 453 (500-1½)	580-2 453 (500-2)
LNAV MDA	580-1 453 (500-1)	453 (500-1)	580-1½ 453 (500-1½)	580-2 453 (500-2)
CIRCLING	580-1 453 (500-1)	620-1 493 (500-1)	620-1½ 493 (500-1½)	680-2 553 (600-2)

LAKE WALES MUNI (X07)

RNAV (GPS) RWY 24

27° 54'N-81° 37'W

SE-3, 18 JUN 2020 to 16 JUL 2020

SE-3, 18 JUN 2020 to 16 JUL 2020

VORTAC LAL 116.0 Chan 107	APP CRS 104°	Rwy Idg TDZE Apt Elev N/A N/A 127
---	------------------------	---

VOR/DME-B

LAKE WALES MUNI (X07)

▽ When local altimeter setting not received, use Bartow altimeter setting and increase all MDA 40 feet. Procedure NA at night.
▲ NA

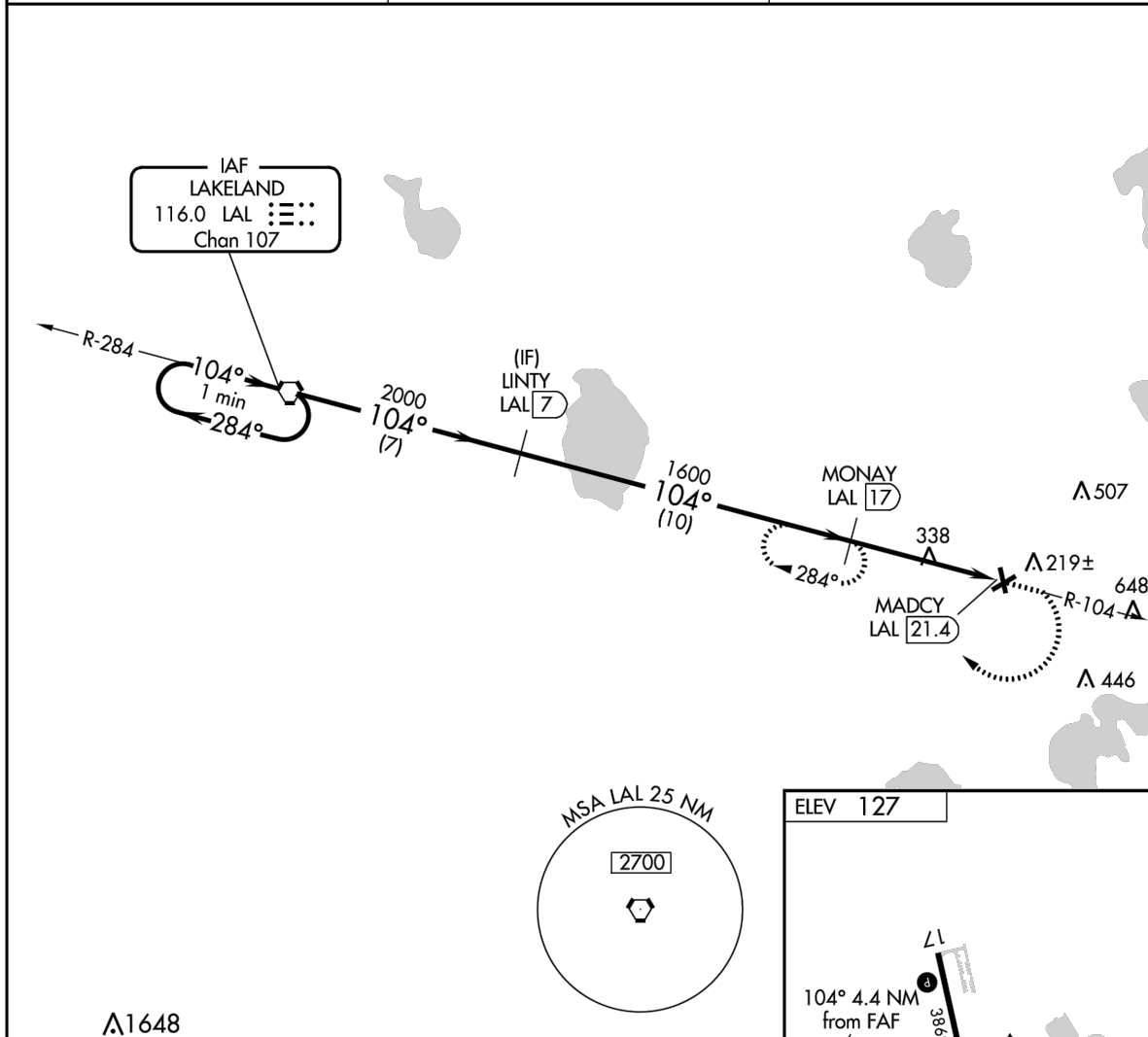
MISSED APPROACH: Climb to 700 then climbing right turn to 1600 on LAL VORTAC R-104 to MONAY/LAL 17 DME and hold.

AWOS-3
124.225

MIAMI CENTER
134.55 257.7

UNICOM
122.8 (CTAF) 0

SE-3, 18 JUN 2020 to 16 JUL 2020



SE-3, 18 JUN 2020 to 16 JUL 2020

CATEGORY	One Minute Holding Pattern			
	A	B	C	D
CIRCLING	620-1 493 (500-1)	620-1 ¼ 493 (500-1 ¼)	620-1 ½ 493 (500-1 ½)	680-2 553 (600-2)

LAKE WALES, FLORIDA
Amdt 3 25AUG11

27°54'N-81°37'W

LAKE WALES MUNI (X07)
VOR/DME-B



2.5 Electronic, Visual, and Satellite Aids to Navigation

Lighting, signage, and navigation aids on an airport increase the utility of an airfield by increasing visibility and enhancing safety. Lighting is typically focused on the runways and taxiways and is usually paired with appropriate airfield signage.

NAVAID systems are visual and instrument-based. Pilots are responsible for interpreting and using such systems without Air Traffic Control (ATC) assistance during landing operations.

2.5.1 Runway End Identifier Light (REIL)

A Runway End Identifier Light (REIL) consists of a flashing white high-intensity light installed at each approach end corner of a runway. The lights are directed toward the approach zone, enabling the pilot to identify the runway threshold. These lights consist of two synchronized flashing unidirectional or omnidirectional (360 degree) lights, one on each side of the runway threshold.

The function of the REIL is to provide rapid and positive identification of the end of the runway. REIL systems are effective for identification of a runway surrounded by a preponderance of other lighting or lacking contrast with surrounding terrain. This system is usually installed at non-towered airports and can be activated by a specified radio frequency published on aeronautical charts. Currently, unidirectional REILs are installed at the approach ends of Runway 6-24. Pilots can activate the REILS via radio on the CTAF Frequency 122.8.

2.5.2 Airport Beacon (ABN)

The airport beacon (ABN) helps pilots identify the airport at night. The beacon is operated from dusk to dawn, and is always on during IFR operations if the ceiling is less than 1,000 feet and/or the ground visibility is less than 3 statute miles. The beacon has a vertical light distribution to make it most effective from 1° to 10° above the horizon, although it can be seen well above or below this range. The beacon may be an omnidirectional capacitor discharge device, or it may rotate at a constant speed, which produces the visual effect of flashes at regular intervals. The combination of light colors from an airport beacon indicates the type of airport. The beacon at Lake Wales rotates at a constant speed and flashes white and green indicating it is a civilian land airport. This white/green rotating beacon is installed northwest of the fuel farm apron near the public parking lot.

2.5.3 Precision Approach Path Indicator (PAPI)

A Precision Approach Path Indicator (PAPI) is a light array positioned beside the runway. Runway 6-24 is equipped with a four-light unit. This unit consists of four equally spaced light units color-coded to provide a visual indication of an aircraft's position relative to the designated Glide Slope (GS) for the runway. Runway 17-35 utilizes an abbreviated system consisting of two light units. The specific location of these NAVAIDs has been determined considering a number of factors including: obstruction clearance, Threshold Crossing Height (TCH), presence of an instrument-generated glideslope, and type of aircraft using the runway.

2.6 Automated Weather Observing System (AWOS)

An AWOS is a computerized system that automatically measures one or more weather parameters, analyzes the data, prepares a weather observation that consists of the parameter(s) measured, provides dissemination of the observation and broadcasts the observation to pilots in the vicinity of the airport, typically using an integral very high frequency (VHF) radio or an existing navigational aid (NAVAID), or Automatic Terminal Information Service (ATIS).

An AWOS III is installed at X07. The AWOS III system measures and reports the following information: wind data (speed, direction, and gusts), temperature, dew point, altimeter, visibility, density altitude, and cloud height and sky condition.

Pilots can access the AWOS weather information via radio using the frequency 124.225 MHz or via phone at (863)-678-1334. However, this data is not uploaded to the National Airspace Data Interchange Network (NADINS).

2.7 Existing Airspace

The FAA designates 6 classes of airspace for the Air Traffic Control system that are designed to facilitate efficiency and safety in both the enroute and terminal environments. The first, Class A airspace, overlies the entire airport system, beginning at 18,000 feet above mean sea level (AMSL) and covering the high enroute traffic system that much of aviation relies on. Every airport is then designated with a certain type of airspace, designed to accommodate the traffic flow and needs of that individual location. The largest airports, such as Orlando and Tampa, are classified as Class B airports. These are the busiest airports that are more restricted and controlled due to the congested airspace. Airports with high traffic flows that don't require the size and operations of these larger airports, are designated as Class C airspace. The Sarasota and Daytona Beach airports lie within Class C airspace, which is suitable to handle their traffic volume without any wasted resources. Class D airspace exists to serve airports that have a medium traffic flow, that can be handled with just a control tower for that airport alone. The Lakeland airport lies within Class D airspace just to the West of Lake Wales Municipal. Airports that do not have a control tower, but still lie within controlled airspace, are established inside Class E airspace. Class E airspace also exists in many enroute areas in-between airports, and allows for aircraft communication with Air Route Traffic Control Centers (ARTCC) for navigation and increased safety throughout the flight. Finally, Class G airspace exists around small airports that do not play a large role in the commercial airspace system. **Exhibit 2-7** depicts a generalized view of the different airspace classifications and their relationships.

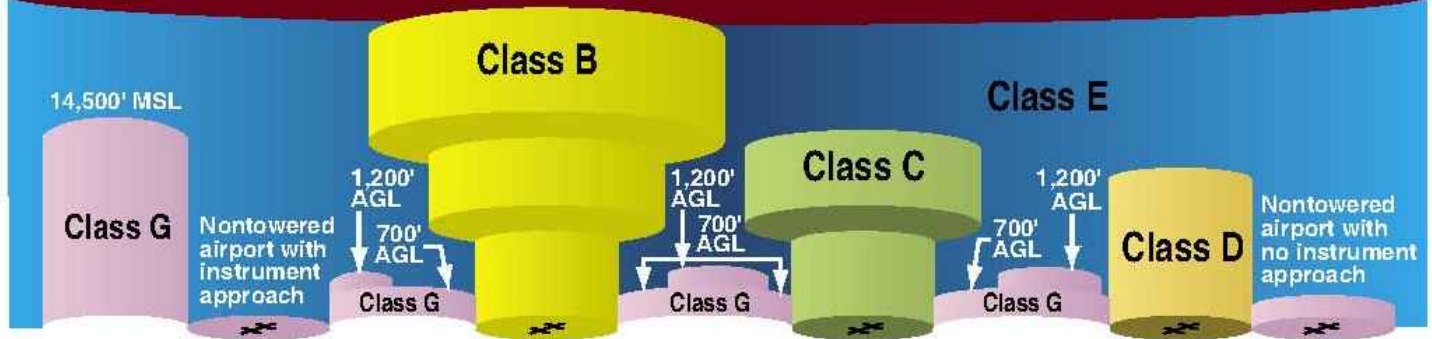
Lake Wales Municipal does not have a control tower, and lies immediately within Class G airspace from the surface up to 699 feet, and then Class E airspace from 700 feet up to the Class A airspace that begins at 18,000 feet. **Exhibit 2-8** depicts the airspace around the Lake Wales airport as depicted on the FAA Aeronautical Sectional chart. Since there is no control tower, pilots use the CTAF (Common Traffic Advisory Frequency, also called the UNICOM) to communicate with other traffic both in the air and on the ground. Because of its proximity to Class E airspace, pilots can take advantage of nearby Air Traffic Control Centers that help the transition from the airport to the enroute portion of flight. This is especially useful because Lake Wales Municipal lies within the upper corner of a Military Operations Area (MOA) beginning at 7,000 feet, which is an area of increased military traffic, and is also relatively close to a series of Restricted Areas, which prohibit air traffic. The controlled Class E airspace and available ATC resources allow pilots to navigate around or through these special airspaces as necessary.

Airspace Classification

(Not To Scale)

Class A

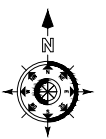
18,000' MSL



	Class A	Class B	Class C	Class D	Class E	Class G
Entry Requirements	ATC clearance	ATC clearance	Prior two-way communications	Prior two-way communications	Prior two-way communications*	Prior two-way communications*
Minimum Pilot Qualifications	Instrument Rating	Private or Student certification—local restrictions apply.	Student certificate	Student certificate	Student certificate	Student certificate
Two-Way Radio Communications	Yes	Yes	Yes	Yes	Yes, under IFR flight plan*	Yes*
Special VFR Allowed	No	Yes	Yes	Yes	Yes	N/A
VFR Visibility Minimum	N/A	3 statute miles	3 statute miles	3 statute miles	3 statute miles**	1 statute mile†
VFR Minimum Distance from Clouds	N/A	Clear of clouds	500' below, 1,000' above, 2,000' horizontal	500' below, 1,000' above, 2,000' horizontal	500' below, 1,000' above, 2,000' horizontal	Clear of clouds†
VFR Aircraft Separation	N/A	All	IFR aircraft	Runway operations	None	None
Traffic Advisories	Yes	Yes	Yes	Workload permitting	Workload permitting	Workload permitting
Airport Application	N/A	• Radar • Instrument approaches • Weather • Control tower • High density	• Radar • Instrument approaches • Weather • Control tower	• Instrument approaches • Weather • Control tower	• Instrument approaches • Weather	• Control tower

*Exception: temporary tower or control tower present
 **True only below 10,000 feet
 † True only during day at or below 1,200 feet AGL (see 14 CFR part 91)

AGL—above ground level
 FL—flight level
 MSL—mean sea level



As a non-towered airport, the CTAF (also called the UNICOM or Aeronautical Advisory Station) is used for communication between the aircraft operating to and from the airfield. The Class E airspace over Lake Wales Municipal enables aircraft to transition between the airfield and the enroute environment. There are also a number of Military Operations Areas (MOA) and Restricted Areas to the south and east of the airfield. The only one that overlaps the Airport is the Lake Placid North MOA, which has a floor of 7,000 feet AMSL when it is active.

2.7.1 Local Procedures and Voluntary Noise Abatement

There are no noise abatement procedures at Lake Wales.

2.8 Commercial Passenger Terminal Facilities

There are no commercial passenger terminal facilities at X07. Consistent with its role as a general aviation airport, there are no plans to develop any commercial passenger terminal facilities within the planning horizon of this airport master plan update. Commercial passenger terminal facilities should not be confused with general aviation terminal facilities often provided by Fixed Base Operations (FBOs) or airport sponsors.

2.9 General Aviation Facilities

General aviation aircraft require a wide array of services and facilities often depending on aircraft fleet mix, facility climate, as well as frequency and type of operations. These facilities include fuel, maintenance, bathrooms, storage hangars and similar services. Services and facilities are often provided by the airport owner, and some are provided by private businesses such as FBO's.

2.9.1 Aircraft Storage Facilities

Generally, aircraft owners prefer to have their aircraft stored in hangars for security and protection against wind and other adverse weather conditions. Aircraft hangars vary from open storage sun shades (roof only) to full-service corporate hangars. The size of the hangar and door height determine the size of aircraft that can be accommodated.

Hangars are commonly classified into four groups: Conventional Hangar, T-Hangar, Executive Hangar, and Corporate Hangar.

A conventional hangar is a square or rectangular-shaped building capable of accommodating one or more aircraft. Conventional hangars are sometime referred to as "box hangars." T-Hangars on the other hand, are a grouping of hangars in a square or rectangular-shaped building. The floor plan of a T-Hangar bay is shaped as a tee with a wide space for the wing and a narrow space for the tail. T-Hangars are designed primarily for storing individual aircraft, where conventional hangars may also include other uses such as FBO, corporate hangars, or aircraft maintenance facility.

At X07 there are three conventional hangars and two T-Hangar buildings. The T-Hangars are subdivided into sixteen units.

2.9.2 Aircraft Parking Aprons

The function of an apron is to accommodate aircraft during loading and unloading of passengers and/or cargo. Activities such as fueling, maintenance, and short/long term parking take place on an apron. The layout of the apron generally depends on aircraft parking positions and movement patterns between these parking positions, hangars, and support facilities.

2.9.3 General Aviation Terminal

General aviation terminal buildings provide essential services for passengers and pilots, as well as a facility for transfer of passengers and flight crews to and from the aircraft. Buildings can range from a small room for flight planning and a bathroom to a large multi-room building that provides multiple uses. A terminal building or administrative building often provides the first impression of an airport to visitors.

At X07 there is currently one FBO located at the airport that provides minimum terminal services. The Jump Florida Skydiving FBO is housed in the large hangar building at the end of Airport Road. This building also houses the Airport Managers office, Pilots Lounge, Flight Planning Room and restrooms.

2.10 Support Facilities

Support facilities at X07 encompass a broad set of functions that facilitate smooth and efficient airport operations.

2.10.1 Aircraft Rescue and Firefighting

X07 is not a 14 CFR Part 139 certificated airport. Therefore, on-airport aircraft rescue and firefighting (ARFF) services are not required.

X07 is under the jurisdictional responsibility of the City of Lake Wales Fire Department. X07 is served primarily by Lake Wales City Fire Department Station 1. Each station is staffed with a minimum of three personnel. The Lake Wales Fire Department is an all-hazards trained fire department and has the capability of responding to emergencies at X07.

Table 2-4 – Aircraft Rescue and Firefighting

Fire Station	Location	Distance from Airport
Lake Wales City Fire Department Station 1	253 W. Central Ave.	2.2 miles
Polk County Fire Rescue Station 26	2902 FL-60 E.	4.9 miles
Lake Wales City Fire Department Station 2	600 Chalet Suzanne Rd.	7.0 miles

2.10.2 Airport Maintenance

Airport maintenance staff provides routine maintenance on the airport. Support is also provided by the City of Lake Wales Public Works Department as needed.

2.10.3 Fuel Storage

The availability of fuel is a major factor when aircraft owners decide where to base aircraft. On the west side of the tiedown apron are two above ground aviation fuel storage tanks. Each tank holds 10,000 gallons and are composed of double wall construction. One tank contains 100LL Avgas and the other Jet A. To conduct aircraft fueling, aircraft pull directly up to the tanks as there are no fueling trucks at the Airport. The card reading machine to operate the self-service pumps is located with the Avgas tank, which is the one closest to Taxiway A. Both tanks are considered to be in fair condition.

Table 2-5– Fuel Storage

Facility	Type of Fuel	Capacity	Ownership	Self-Service	Brand
Tank	100 LL	10,000 GAL	City of Lake Wales	Yes	Titan
Tank	Jet A	10,000 GAL	City of Lake Wales	Yes	Titan

2.10.4 Aircraft Maintenance

At the present time, there are no aircraft maintenance facilities on the airport.

2.11 Access, Circulation, and Parking

The singular point of access into the airport is South Airport Road which is accessible from State Road 60. South Airport Road is a paved two-lane road that dead ends into General Aviation Terminal. The General Aviation Terminal has a paved parking lot with 21 spaces. There are no internal roads inside the AOA and all vehicular movements are made by using the taxiway network.

2.12 Airport Fencing and Access Gates

The primary purpose of airport fencing is to prevent intrusions by wildlife or people onto airport property. Airport fencing provides increased safety and security for the airport.

Currently the active airfield is enclosed by a combination of security fencing and vegetative/natural barriers. As recommended by the FAA, FDOT, and Transportation Security Administration (TSA), the security fencing around the airfield consists of six-foot-high chain link fence with three strands of barb wire on top.

There are two electric gates both of which use proximity cards for access. These electric gates include a 24-foot cantilever gate between the automobile parking and aircraft parking apron at the general aviation terminal and a 16-foot cantilever gate off Airport Road for access to the hangars on the north side of the airfield. There is also a pedestrian gate located just south of the general aviation terminal building at the corner of the automobile parking lot. The perimeter fencing also includes a number of other locked swing gates, which do not have an electric opening system. These gates are in various locations around the perimeter for maintenance or other uses, including access to fire hydrants off Airport Road. Most of these gates are not used very often.

A number of floodlights have been installed around the Airport facilities for both security and convenience. For the general aviation terminal and hangar buildings, the floodlights are mounted to the side of each facility. For the terminal automobile parking lot and tiedown apron area, the floodlights are mounted on masts 38 feet above the ground.

2.13 Utilities

All of the electric power for airport facilities is provided by the overhead distribution lines that run south down Airport Road from the main transmission lines along State Road 60. These distribution lines run down the east side of Airport Road to the campground where they turn to run along the backside of the campground leasehold and then down behind the Florida Army National Guard Facilities. The lines come into the area behind the tiedown apron and electrical vault. All of the electrical power for the airfield facilities west of Airport Road is via underground extensions of the overhead lines. Progress Energy provides all electric service to the Airport.

Currently water service is provided to all the buildings on airport property. For the four hangar buildings on the north side of the airfield, the water service is limited to outdoor hose spigots because none of these facilities have restrooms or sinks. The general aviation terminal building was recently taken off septic tank and tied into the sanitary sewer lines that run along the west side of Airport Road. The water service is provided by City of Lake Wales Utilities Department via a small domestic on-airport well and water treatment facility which is located just east of the electrical vault.

All of the existing aviation and non-aviation parcels on the northeast of the Airport have access to fire hydrants. The hydrant system, as well as any other non-domestic water service is provided by the non-potable well and water storage system located on the east side of the Airport property, behind the Florida Army National Guard. This facility was constructed as part of the rebuilding effort after the 2004 hurricane season in order to provide the proper fire flow to the new facilities.

2.14 Non-aeronautical Facilities

There are two non-aviation parcels located at the Airport on the east side (landside) of Airport Road. On the north end across from the four hangars the former campground area. This 2.3-acre parcel is considered a temporary use of the land by the City of Lake Wales. The other parcel is further south off Airport Road, almost across from the general aviation terminal. The Florida Army National Guard occupies this 7.2 acre site which has a couple of buildings, automobile parking lot, and various paved vehicle/equipment storage areas.

Chapter 3: Regional Setting and Land Use

3.0 Introduction

The purpose of this chapter is to describe the regional setting of X07 and the land use patterns that surround it. This information is critical because the impact of airport planning decisions can extend beyond the airport property line. In addition, the surrounding political boundaries and jurisdictions, and well as established land uses and zoning restrictions can limit future proposed airport developments.

3.1 Political Boundaries and Jurisdictions

X07 is located within the boundaries and jurisdiction of the City of Lake Wales, which is located on the eastern side of Polk County. The City of Lake Wales is also the owner and operator of X07. The Political Boundaries and Jurisdictions Map, **Exhibit 3-1**, shows the existing City and County limits within the Airport Vicinity.

3.2 Zoning and Land Use

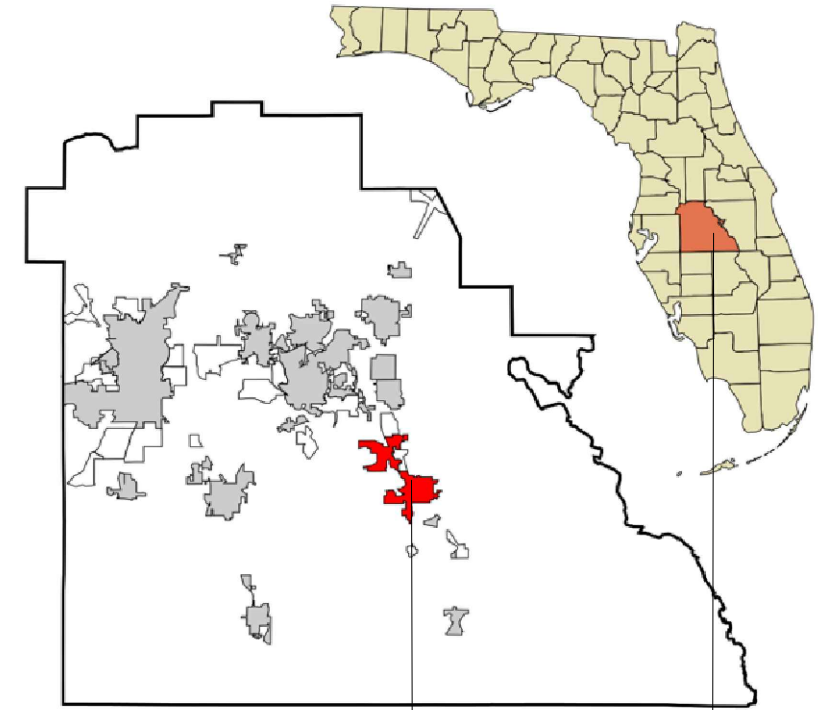
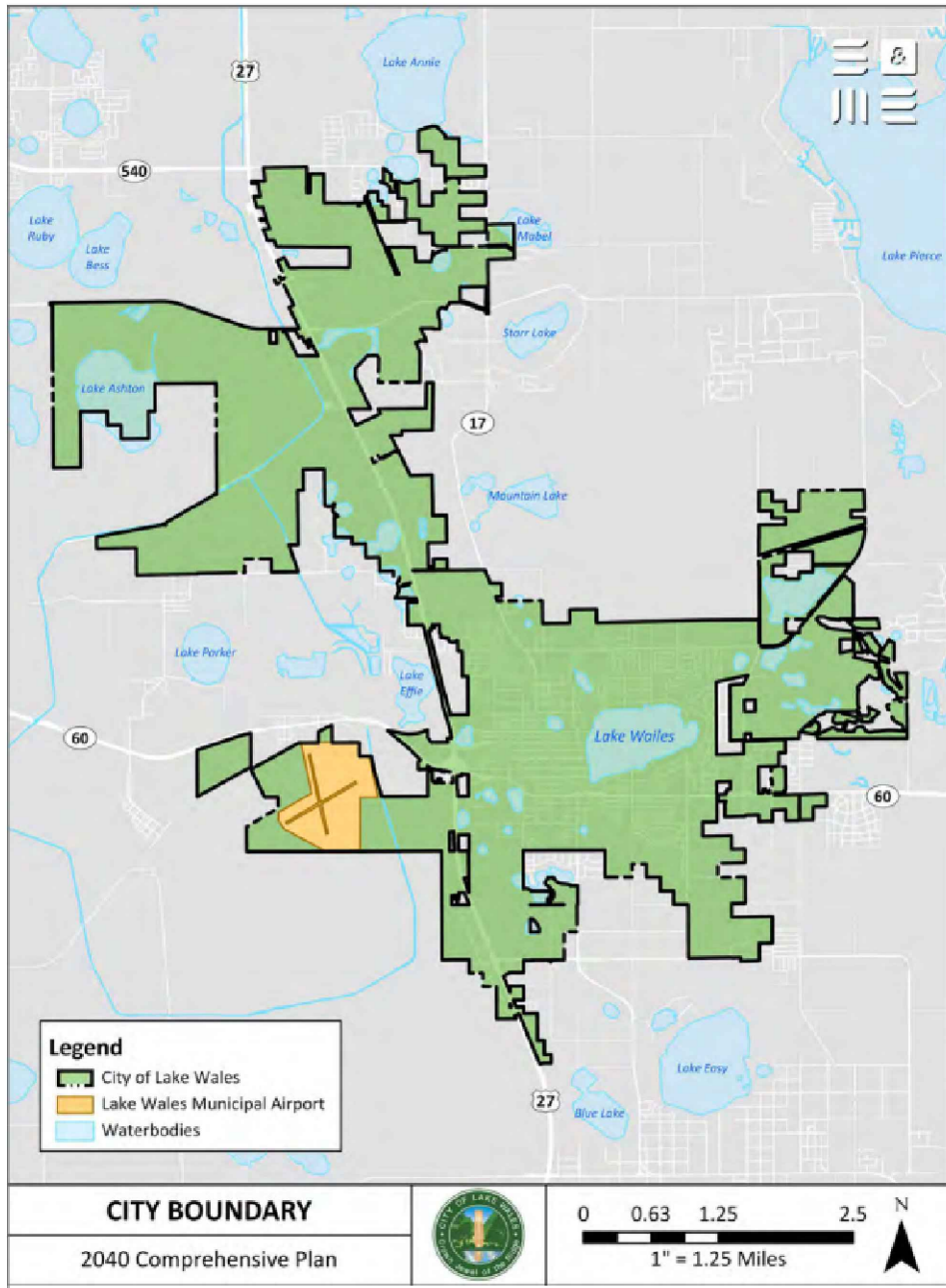
The City of Lake Wales is given the legislative authority to establish, amend, and enforce land development regulations by Florida Statute 163.3202, and the City's zoning classifications implement the land use policies and objectives in the City's comprehensive Plan. The zoning districts are utilized to promote land use compatibility as a means of protecting the health, safety, and general welfare of the City and its citizens. **Exhibit 3-2** shows the zoning classifications on and around the airport property.

The current zoning of the airport and the adjacent business park is designated as Light Industrial (I-1). The purpose of the I-1, Light Industrial Zoning District is to provide sites in appropriate locations for light industrial operations which do not generate objectionable on- or off-site impacts including odors; smoke; dust; refuse; electromagnetic interference; or noise (in excess of that customary to loading, unloading, and handling of goods and materials beyond the lot on which the facility is located); or which would have an adverse impact on the city's wastewater treatment system; or result in hazardous environments for workers or visitors. Consistent with the city's comprehensive plan, the I-1 zoning district is intended to implement comprehensive plan policies for managing light industrial land uses. This district is not intended to accommodate heavy industrial activities.

Most of the adjacent land is zoned as Conservation. The purpose of this zone is to provide for the use and protection of wetlands and habitats that are recognized as significant by the City. This also provides a natural flood storage area as well as a buffer between urban areas and airport operations.

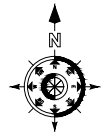
Future land use categories are described in the City of Lake Wales Comprehensive 2040, adopted February 2021. According to the comprehensive plan, the airport property encompasses the following land uses: industrial. The Future Land Use Map, **Exhibit 3-3**, shows the land uses surrounding the airport.

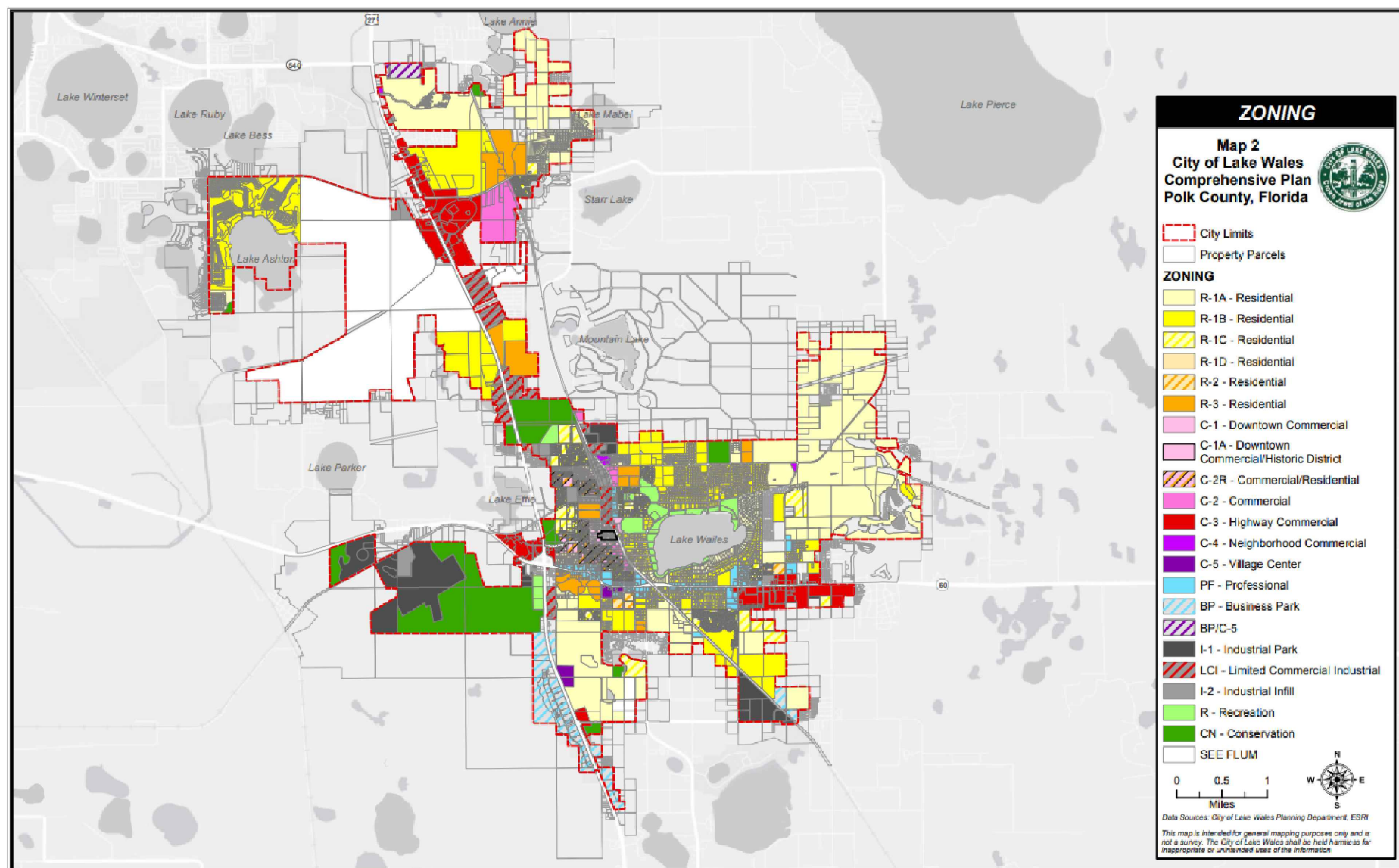
Industrial: Industrial uses typically include warehousing, wholesaling/distribution, heavy equipment repair, assembly, processing, motor vehicle impoundment facilities, construction offices, and outdoor storage.



**CITY OF
LAKE WALES**

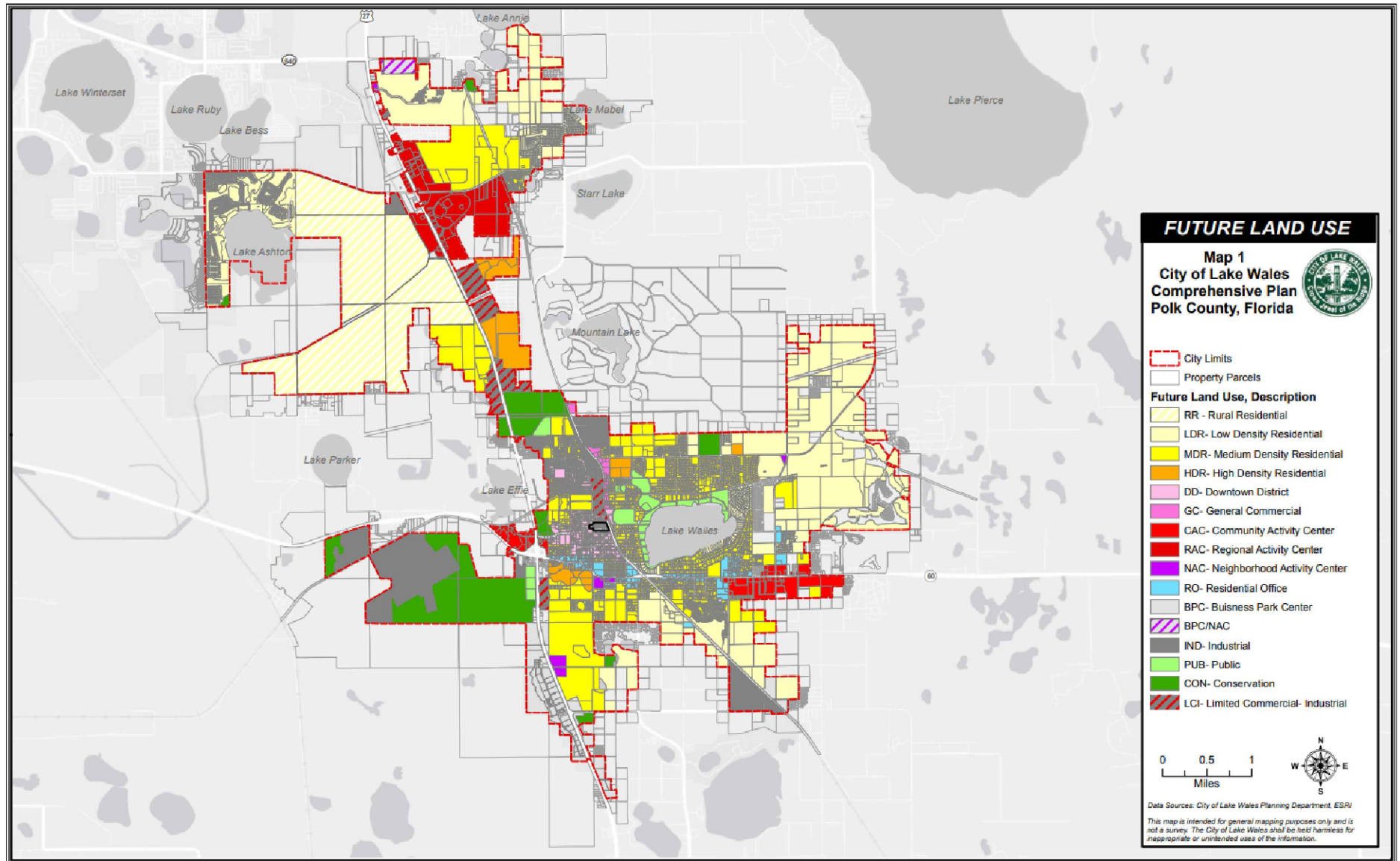
POLK COUNTY, FL





Path: V:\600189.2_LakeWales\Maps\Markups\02_Map_Zoning.mxd

Date: 4/30/2014



Date: 4/30/2014

Chapter 4: Forecasts of Aviation Activity

4.0 Overview

This chapter presents projections of aviation activity that will be used as the basis for facility planning at the Lake Wales Municipal Airport. Aviation forecasts should be realistic, based upon the latest available data, and supported by the information presented in the study. In addition, forecasts of aviation activity provide the basis for evaluating the adequacy of existing airport facilities and their capability to handle increased traffic levels or different types of traffic. Forecasts are the foundation for effective decisions in airport planning, including if or when improvements are needed, the level of anticipated capital improvements, and the timing of the necessary investments. Therefore, the forecast should be adjusted periodically based on actual aviation activity and after any significant change in a driver of aviation activity.

As of the creation of this forecast, it is understood that the COVID-19 pandemic is a lead driver of change in aviation activity throughout the US and the world. The effects of the COVID-19 pandemic are still unfolding and have dramatically impacted worldwide aviation operations. These are unprecedented times, and the aviation industry as a whole must learn to adapt to the “new normal”. Since March of 2020, all sectors of aviation including commercial operations and general aviation operations have dramatically reduced. Existing aviation forecasts are no longer valid and must be reassessed. The assumptions and conclusions in this chapter are based on a variety of data sources including past forecasts, historical data, the Florida State Aviation System Plan, FAA Terminal Area Forecast, and has taken into account recent events using current airport data.

General Aviation (GA) airport forecasts are typically based on historical data and broadly accepted industry and governmental estimates of aviation activity, and the primary socio-economic drivers of GA activity. The standard planning period for an airport master plan is 20 years. Since this study was primarily conducted with base information from 2020, forecasts are presented for 2020, 2025, 2030, and 2040 as the key planning periods are generally considered at the five, ten, and twenty-year horizons. The forecast for based aircraft and operations use current 2020 airport data per month to assess impacts of the COVID-19 pandemic on key planning forecasts. The development of the forecasts also includes analyses of historic data and industry trends from the Federal Aviation Administration (FAA) and the Florida Department of Transportation (FDOT). This has been supplemented by information obtained during interviews with airport management, tenants, and users to derive a more complete picture of current and future operational activities and emerging trends at the Lake Wales Municipal Airport.

4.1 Review of Aviation Forecasts

County airport records and a count made during this study confirmed 18 based aircraft at the Lake Wales Municipal Airport in 2020. Likewise, an estimate of the activity at the airport was established at 20,075 annual operations through discussions with airport management, analysis of historical operations per based aircraft, review of aircraft fuel sales, and the information gathered from surveys and interviews with the operators on the airfield. This included noting the significant number of parachute operations and flight training activities, specifically touch and go operations, which are conducted nearly every day at the airport.

Five previous forecasts of aviation activity for Lake Wales Municipal Airport currently exist. These include the 2004 and 2013 Airport Master Plans, Florida Aviation System Plans 2025 and 2035 (FASP), and the

2020 FAA Terminal Area Forecasts (TAF). Although all of these studies were examined, only the most recent master plan and FASP are summarized below for comparison purposes. As previously stated, the effects of the COVID-19 pandemic have rendered previous forecasts questionable. This study will assess the applicability of current and past data as it relates to Lake Wales Municipal Airport.

4.1.1 2013 Airport Master Plan

The last planning document conducted specifically for the Lake Wales Municipal Airport was the 2013 Airport Master Plan. The number of based aircraft and total annual operations from that study are shown in **Table 4-1**.

Table 4-1 – 2013 Airport Master Plan

	Based Aircraft	Annual Operations
Base Year		
2011	22	22,206
Forecast		
2017	28	25,303
2022	31	28,212
2032	37	35,070

Source: 2013 Airport Master Plan

4.1.2 Florida Aviation System Plan

The Florida Aviation System Plan (FASP) helps guide FDOT with the development of Florida's public airports. This plan is necessary to ensure that airports work together effectively as a statewide transportation system, provide a link to the global air transportation network, and effectively interface with regional surface transportation. As such, the Aviation Office of FDOT maintains these activity forecasts for all publicly owned, public-use airports in the state.

The FASP 2035 is the latest version with forecasts through the year 2035. The FASP projects based aircraft using a top-down linear growth approach. It divides the state into planning regions, establishes an average growth rate for each, and then the based aircraft for each region is calculated. The aircraft are then allocated to the individual airports based upon its market share. Annual operations for the general aviation airports are projected by creating ratios between the total annual operations and total number of based aircraft. The current FASP projects Lake Wales Municipal Airport to have an average annual growth rate of 1.15 percent for based aircraft and 1.5 percent for annual operations. Data from FASP 2035 is listed in **Table 4-2**.

Table 4-2 – Florida Aviation System Plan 2035

	Based Aircraft	Annual Operations
Base Year		
2014	31	20,000
Forecast		
2020	35	21,546
2025	39	23,211
2035	50	26,937

Source: Florida Aviation System Plan 2035

4.1.3 FAA Terminal Area Forecasts

Terminal Area Forecasts (TAF) are the projections of aviation activity prepared by the FAA for the nation's airport facilities. These forecasts help the FAA with various planning and budget needs. The TAF includes forecasts for those airports which are active in the National Plan of Integrated Airport System (NPIAS), including non-towered facilities.

Forecasts using the FAA TAF data from 2011 documented in the 2013 MP report show constant based aircraft and operations at 16 and 20,000 respectfully. Forecasts in the FAA TAF are calculated utilizing several methods. Typically, projections are developed using regression analysis with various national economic indicators as the independent variables. **Table 4-3** depicts the based aircraft and annual aircraft operations published for Lake Wales Municipal Airport in the FAA TAF 2011.

Table 4-3 – 2011 FAA Terminal Area Forecasts

	Based Aircraft	Annual Operations
Base Year		
2011	16	20,000
Forecast		
2017	16	20,000
2022	16	20,000
2032	16	20,000

Source: 2013 Airport Master Plan

It is interesting to note that the current 2020 FAA TAF report for Lake Wales shows a turbulent trend in based aircraft between 2007 and 2019, while operations stayed constant at 20,000. According to this TAF report, based aircraft reached a high of 48 in 2007 and a low of 14 in 2011. It should be noted that the FAA TAF holds based aircraft and operations constant at 22 and 20,000 from 2020 through the end of this planning period.

Meetings with airport management confirmed that there are currently 18 based aircraft on the field. This is not a significant difference but should be noted. Annual operations stay constant at 20,000 during the same period while current operations are reported at 20,075. No explanation is given for the zero growth projections. **Table 4-4** depicts the based aircraft and annual aircraft operations published in the FAA 2020 TAF for Lake Wales.

Table 4-4 – 2020 FAA Terminal Area Forecasts

	Based Aircraft	Annual Operations
Base Year		
2020	22	20,000
Forecast		
2025	22	20,000
2030	22	20,000
2040	22	20,000

Source: FAA TAF 2020

4.2 Industry Trends and Forecasting Approach

General aviation encompasses all segments of the aviation industry except for the activity that is conducted by scheduled airlines or the military. Examples include pilot training, law enforcement flights, medical transportation, aerial surveys, aerial photography, spraying services, advertising, and various forms of recreation, not to mention business, corporate, and personal travel. Since the 2013 Airport Master Plan, there have been several changes in the general aviation industry.

Between 2003 and 2007, the industry experienced robust growth, largely due to advances in aircraft and navigation technologies, which created new product offerings and services during a period with an overall good economy. These included widespread use of Global Positioning Satellites (GPS) applications in the cockpit, for airport navigational aids, and instrument approaches. This period also resulted in the emergence of very light jet aircraft and the introduction of an entirely new category; the light-sport aircraft. These new product offerings and services bolstered every segment of the general aviation industry. Unfortunately, by the end of 2008, there was little to no growth in the general aviation industry. Most segments of the industry experienced losses as the overall economy continued to decline through the Great Recession. The very light jet industry was hit hardest as nearly every manufacturer went bankrupt.

Each year the FAA prepares projections in their Aerospace Forecasts for a number of the leading aviation and aerospace indices. According to the 2020 FAA Aerospace Forecasts, the long-term outlook for general aviation is relatively stable, 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 decline slightly by 0.9 percent between 2020 and 2040 (rounding up to an average of 1 percent change annually). With slowing growth in both GDP and corporate profits, there is predicted continued growth of the turbine and rotorcraft fleets. The largest segment of the fleet – fixed-wing piston aircraft continues to shrink over the forecast. Against the marginally declining fleet, the number of general aviation hours flown is projected to increase by 16 percent (an average of 0.7 percent per year) during the same period. This growth in turbine, rotorcraft, and experimental hours more than offsets the decline in fixed-wing piston hours.

The January 2020 coronavirus (COVID-19) outbreak in China gained the world's attention and, in February, began to directly affect the U.S. As of the preparation of this forecast, the virus and its economic impacts were just emergent, and the range of possible outcomes are so wide that we have used the most current airport data and applied this data to traditional forecasting methods. This has been done in an effort to create accurate meaningful aviation forecasts for planning and development.

As described in later sections, several approaches were applied to forecast aviation activity. Today, general aviation growth relies on many factors including the level of services offered, competitive pricing, airfield characteristics, local area attractiveness, and pilots' perception of these amenities. As a result, these forecasts assume that the City of Lake Wales, City staff, airport management, fixed base operators (FBOs), and other tenants will actively support all aviation activity and initiate the appropriate measures to proactively maintain the airport.

4.3 Projections of Based Aircraft

The number of aircraft owners projected to use Lake Wales Municipal Airport as their base is an important consideration when planning facilities. The based aircraft forecast will directly influence the type and number of aircraft storage facilities and apron tiedowns needed. Projections of based aircraft also provide one indication of the anticipated growth in flight activity that is expected to occur at the airport. For the Lake Wales Municipal Airport, growth in the number of based aircraft is expected to occur during the planning period. **Table 4-5** shows the following methods that were considered for estimating this growth.

Table 4-5 – Comparison of Based Aircraft Projections

	Historic Growth	Statewide System Plan	FAA TAF	Adjusted Forecast for anticipated growth
	Base Year			
2020	18	36	22	18
	Forecast			
2025	15	40	22	21
2030	14	45	22	23
2040	11	56	22	29

Source: Hoyle Tanner, 2021

4.4 Selected Based Aircraft Forecast

A common technique for projecting the number of based aircraft is to simply apply the historic growth rate experienced over a set timeframe. As described, the number of based aircraft has decreased from the count of 22 in 2011 to the current level of 18 in 2020. This negative growth results in an average annual growth rate of .978 over the past 9 years. However, when this rate is applied to the 2020 aircraft count, the result is 11 based aircraft by the end of the planning period. This is not realistic as current events are to be considered outliers and current industry rebound and State growth rates show that the region has continually been in a positive Annual growth rate, we will use the State average annual growth rate for this forecast. **Table 4-5** shows a comparison between updated historic data, current FASP 2035, current FAA, and current based aircraft forecast adjusted for the State average annual growth rate of 1.023.

It should be noted that Lake Wales is expecting to add more hangar space within the next year. The airport is currently in the permitting process of adding a new corporate hangar building. This will lead to the addition of four additional based aircraft when the hangar is complete, which is expected towards the end of 2021.

Lake Wales's self-serving fuel price per gallon is often the least expensive in the region. There are a number of aircraft based at neighboring airports that come to Lake Wales to fill their tanks before returning to their home field. A review of fuel sales from 2017 to 2020 shows fluctuation between gallons of fuel sold. Fuel sales reached a peak in 2018 with 69,074 gallons of fuel sold. While there was a decrease in fuel sales during 2019, the airport was able to make a recovery during 2020 even though the year was affected by the COVID-19 pandemic. It can be assumed that 2020 fuel sales would have closely matched 2018 if the pandemic did not occur. **Exhibit 4-1** depicts the monthly fuel sales from 2017 through 2020. **Exhibit 4-2** shows the split between gallons of Jet-A and 100LL fuel sold from 2017 through 2020.

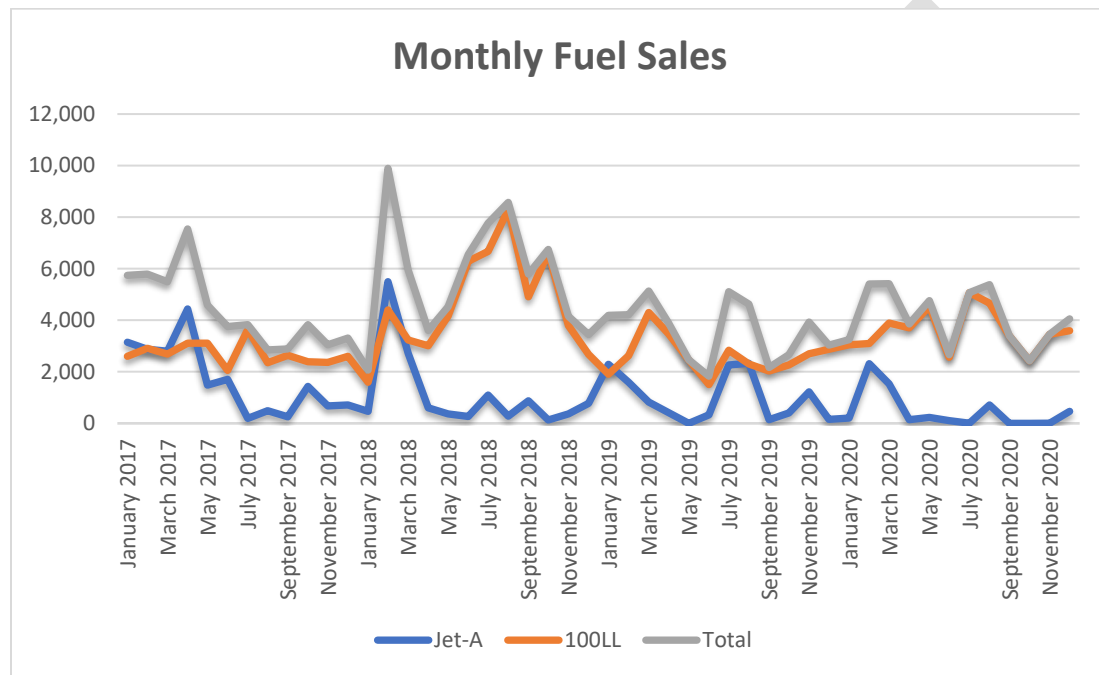


Exhibit 4-1 – Monthly Fuel Sales from 2017-2020

Source: Hoyle Tanner, 2021

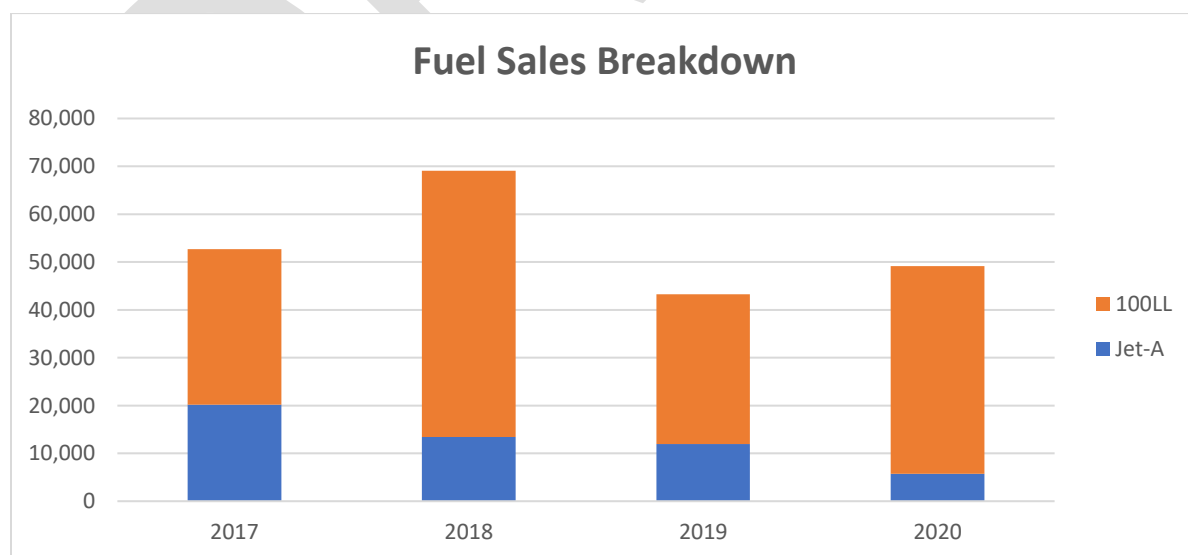


Exhibit 4-2 – Fuel Sales Breakdown from 2017-2020

Source: Hoyle Tanner, 2021

These conditions combined with competitive land and hangar lease rates, comparable services, and a welcoming airfield environment make the Lake Wales Airport a true competitor for the business of the area's general aviation aircraft population. It is realistic to expect an additional 11 based aircraft at Lake Wales over the next 20 years. Based upon the addition of new corporate hangers by the end of 2021 and the constant state growth rate, X07 can reach the forecasted number by the end of the planning period.

4.5 Projected Based Aircraft Fleet Mix

Projecting the mix of the based aircraft fleet is necessary since different aircraft require different facilities. The future based aircraft fleet mix was determined by studying the projections of the national fleet and comparing that to the aircraft types currently at the Lake Wales Airport.

Every year, the nation's active general aviation fleet is published as part of the FAA Aerospace Forecasts. In 2018 there were 211,749 active general aviation aircraft (0.0 percent change from 2017). The total active general aviation fleet changes from an estimated 212,335 in 2019 to 210,380 aircraft by 2040 (decline of 0.9 percent). While the FAA provides counts for several aircraft categories, they have been simplified into the five shown in **Table 4-6**.

Table 4-6 – Forecast of Nation's Active Fleet

	2020 Fleet Mix	2040 Fleet Mix	Average Annual Growth Rate
Single-Engine	61.5 %	49.6 %	-0.8 %
Multi-Engine (piston)	6.1 %	5.5 %	-0.4%
Jet (turboprop & turbine)	11.6 %	17.4 %	2 %
Rotorcraft	4.7 %	6.8 %	1.7 %
Other (experimental, light sport, etc.)	16.2 %	20.7 %	1.8%

Source: 2020 FAA Aerospace Forecasts

These projections suggest a noticeable growth in the jet category. Several reasons exist to support this anticipated growth. The use of business aircraft by smaller companies has escalated as various charter, lease, time-share, partnership, and fractional ownership agreements have emerged. Businesses continue to use general aviation transport because it provides safe, efficient, flexible, and reliable transportation. Fractional ownership offers consumers a more efficient use of time by providing faster point-to-point travel times and the ability to conduct business while flying, as well as minimum enplaning and deplaning hassles.

The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports located closer to one's final destination. This is one of the main objectives behind NASA's Small Aircraft Transportation System (SATS). Although the VLJs, which began flying in 2007, have not had the success as originally anticipated, the FAA is still expecting VLJs to become utilized in the future. The FAA Aerospace Forecast projects that VLJs, as well as other jet aircraft models, are expected to replace a number of piston aircraft in the future, especially those typically in the multi-engine group. Hence the reason the multi-engine group shows no growth. In fact, the FAA predicts a decline in the multi-engine piston fleet which is offset by the expected increase in multi-engine turboprop aircraft.

Finally, while growth in the single-engine category seems small, there is a significant increase in the number of Light-Sport Aircraft (LSA) expected across the nation. The FAA Aerospace Forecast expects LSA to grow by 3.4 percent annually, adding approximately 2,730 new aircraft by 2040. The popularity of these aircraft is important to consider given current fuel prices and the desirable flying conditions in Florida for such aircraft.

Lake Wales airport is a business and recreational use facility, supporting recreational/sport and business/recreational (skydiving) services. The future use of the airport is to a multitude of general aviation services to the community.

4.6 Lake Wales Airport Based Aircraft Fleet Mix

The existing based aircraft fleet mix at the Lake Wales Airport is 67 percent single-engine, 6 percent multi-engine, 0 percent jet, 11 percent rotorcraft, and 16 percent other. Throughout the planning period, the mix of aircraft is expected to remain predominately single-engine.

Perhaps the more significant growth with respect to planning consideration is the increasing numbers of Light-Sport aircraft that will eventually be based at the airport. While a number are shown during the 20-year planning period, this figure is considered somewhat conservative for the intermediate and long-term planning periods.

Additionally, as predicted by the FAA, turbojet technology is at the point where it is truly feasible for jet aircraft to be considered as replacements to the more traditional piston fleet and are predicted by the end of this planning period. Likewise, due to its flexibility, utilization, and popularity, additional rotorcraft are also expected to be based at the airport in the near future.

Table 4-7 – Forecast of Based Aircraft Fleet Mix

	2020	2025	2030	2040
Single-Engine	12	14	15	19
Multi-Engine (piston & turboprop)	1	1	1	2
Jet	0	0	0	0
Rotorcraft	2	2	3	3
Other (gliders, LSA, Powered Parachute.)	3	4	4	5
Total	18	21	23	29

Source: Hoyle Tanner, 2021

As with most airports, the single and multi-engine categories are predominantly comprised of Beech, Cessna, Cirrus, Mooney, and Piper models. Likewise, most turboprops and multi-engine aircraft tend to include the Beech King Air series; Cessna models, such as the 337 Skymaster and 414 Chancellor; or the Piper Seminole and Seneca aircraft.

4.7 Projections of Annual Aircraft Operations

General aviation operations are divided into the categories of local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern or are within sight of the airport. This covers an area within a 20 nautical mile radius of the airfield. Local operations are

most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft.

Recreational flying and training activities make up the majority of the local operations. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch-and-go training procedures are considered two operations (one arrival and one departure) and are local operations. Itinerant general aviation operations are typically comprised of private, business/corporate, and air charter transportation flights. A discussion on the split between these types of operations is included in a subsequent section.

4.7.1 Historic Growth

As with the based aircraft forecasts, the first projection considered extrapolating the future levels of aircraft operations employing the historic growth. As stated previously, the historic level of annual operations are estimates given there is no air traffic control tower at the airfield. Because of this, the historic annual operations are based on the estimate made for 2002 and 2018 as part of the two previous master plans and the more recent estimate of activity for this study. The average annual growth between these two estimates is 0.23 percent. If this rate were used to project future operations, the activity would reach 20,179 by 2040 as shown in **Table 4-8**.

4.7.2 National General Aviation Activity Growth

General aviation operations at those airports with either an FAA or federal contract air traffic control tower are documented in the 2019 FAA Aerospace Forecasts. Between 2010 and 2019, general aviation operations at these facilities were fairly constant at .3% growth. The FAA predicted that this .3% growth rate will continue into the foreseeable future. However, with the effects of the 2020 pandemic looming in the future, it is difficult to predict how recent events will affect this forecast. It is noted that the FAA TAF shows operations constant at 20,000 through the planning period. While this number seems significantly low, it is included in the average and considered to be a possible reflection of level growth due to the national effects of the pandemic.

4.7.3 Florida Aviation System Plan

The FASP 2035 is the latest version with forecasts through the year 2035. The FASP divides the state into planning regions, establishes an average growth rate for each, and then the operations for each region are calculated. Total Operations are then allocated to the individual airports based upon its market share. Lake Wales is located in the Central Region. Annual operations for the general aviation airports are projected by creating ratios between the total annual operations and the total number of based aircraft. Overall, the current FASP from 2018 predicts a total of 26,937 operations in 2035.

4.7.4 Operations per Based Aircraft (OPBA)

Another forecast was generated by assigning a representative level of operations for each based aircraft. Lake Wales is listed as a Basic General Aviation airport. For non-towered airports, this methodology is recommended by the FAA to project the level of activity using the forecast of based aircraft. For basic general aviation airports in the NPIAS, the FAA recommends using 250 operations per based aircraft. Applying this figure to the current based aircraft count results in 4,500 annual operations for 2020. This

number is much lower than current operations estimated by interviews with local airport management, Local operations counts, and comparison with historic fuel sales. If the new activity estimate for 2020 (20,075) is divided by the current based aircraft count (18) the result is 1,116 operations per based aircraft. This is significantly higher than the operations per based aircraft suggested by the FAA for the category that the airport is designated as in the NPIAS. However, this is not unreasonable for an airport with a service mix such as flight training, parachute operations, and light sport activity that is common at Lake Wales. Further examination of the Florida State System plan forecasts showing 625 OPBA and FAA TAF forecasts showing 909 OPBA show a wide variety of estimates. Therefore, it is realistic to use a calculated average of operations based on all four analyses. The results are shown in **Table 4-8**.

Table 4-8 – Comparison of Operational Forecasts

	Historic Growth	Estimated Operations per Based Aircraft	Statewide System Plan	2020 FAA TAF
2020	20,075	20,075	21,546	20,000
2025	20,108	17,713	23,211	20,000
2030	20,131	15,625	25,005	20,000
2040	20,179	12,159	29,019	20,000

Source: Hoyle Tanner, 2021

4.7.5 Selected Forecast of Aircraft Operations

While each of the operation forecasts shown in **Table 4-8** is based on accepted methodologies, the reliability depends on the data that was used to generate the projection. This is always a challenge at non-towered airports where no official activity logs exist. For the purpose of this forecast, we must determine whether or not there are any constraints to growth embedded in the individual projections of future activity. The most up-to-date information related to the significant growth in based aircraft, types of aircraft operations and operators, and current aeronautical activity were used to determine based aircraft. This data, along with historical operational data, were used to determine updated operations per based aircraft. Therefore, the Calculated Operation Per Based Aircraft methodology was used for this forecast.

While the selected forecast of operations exceeds those of the national and statewide projections, neither of these other studies recognized the significant growth that is occurring at the Lake Wales Municipal Airport. As described in previous sections, this growth is expected to continue given the demand for facilities at the airport, varied aircraft operators on the field, fuel prices, and parachuting activity. In short, the selected projection of activity is considered the most realistic with respect to the current demand and unmet potential of the airfield.

4.8 Types of Aircraft Operations

The following sections address the types of aviation activity that will make up the forecasted operations. This includes a breakout of the local and itinerant operations. Further analyses include determining the operational aircraft fleet mix and estimates of the activity peaks for the planning period.

4.8.1 Local versus Itinerant Split

There are only a few sources where the activity has been split between local and itinerant operations. A review of the FAA TAF for Lake Wales shows a 70/30 split staying constant since 1994. Data has shown that this is realistic therefore, this split will remain constant for the term of this study.

4.8.2 Military Operations

As previously stated, it is determined through meetings with airport management that the US Coast Guard and Army National Guard units utilize the airfield for training purposes. It is estimated that military operation activity is approximately 201 operations per year. This accounts for approximately 1% of the total operations.

Table 4-9 – Type of Operations

	Local Operations		Itinerant Operations		Military	Total	
Base Year							
2020	14,053	70%	5,822	29%	201	1%	20,075
Forecast							
2025	15,366	70%	6,366	29%	219	1%	21,951
2030	16,553	70%	6,858	29%	236	1%	23,647
2040	19,211	70%	7,959	29%	274	1%	27,444

Source: Hoyle Tanner, 2021

4.8.3 Operational Fleet Mix

Operational fleet mix is an important factor in determining the needs for airfield improvements. While the airport supports all types of aircraft, a majority of the current operations are conducted by single-engine aircraft. Because there are no records kept on the actual operational mix, the current operational fleet mix percentages were developed based on information provided by airport management, and other airport users.

Information from the 2019 FAA Aerospace Forecasts was then utilized to project how the operational fleet mix would change over the next 20 years. Apart from the multi-engine aircraft category, the FAA anticipates increases in the operation of all general aviation aircraft. As described previously for the active fleet, the most significant growth is expected in the jet and rotorcraft categories.

The active general aviation mix was subjectively analyzed based upon the current operational fleet mix for the airport and the trends expected to occur locally. For the most part, the projections reflected in **Table 4-10** follow the national trend.

Table 4-10 – Projected Operational Fleet Mix

	2020	2025	2030	2040
Single-Engine	13,383	14,634	15,765	18,296
Multi-Engine (piston & turboprop)	1,115	1,219	1,314	1,525
Jet	0	0	0	0
Rotorcraft	2,231	2,439	2,627	3,049
Other (includes gliders)	3,346	3,659	3,941	4,574
Total	20,075	21,951	23,647	27,444

Source: Hoyle Tanner, 2021

Essentially, single-engine aircraft will continue to conduct a majority of the activity. Following the industry, national, and local trends, considerable growth in rotorcraft and light sport aircraft activity will occur over the planning period.

4.8.4 Peak Activity Estimates

Annual projections provide a good overview of the activity at an airport. However, these projections may not reflect the operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times. Therefore, this forecast has been developed to show operations for the peak month, the average day in the peak month, and the peak hour of the peak day.

Based on historic fuel sales, the Lake Wales Airport typically experiences the highest traffic levels during the month of March. Much of this is due to the activity generated by the Experimental Aircraft Association's (EAA) annual Sun 'n Fun Fly-In held at the Lakeland Linder Regional Airport. This event, which is second only to the EAA's AirVenture Convention held in Oshkosh, Wisconsin, attracted a record 642,000 people during the week-long event in 2019. Lake Wales is one of many surrounding airports in Florida that helps facilitate aircraft activity during this busy event.

It has been estimated that activity during the peak month is approximately 48 percent greater than the other months. Therefore, operations during the peak month can account for up to 11.8 percent of the overall annual operations. It is expected that this peaking characteristic will continue throughout the planning period.

The values for average day peak month and for the peak hour were then calculated using the methodology in FAA Advisory Circular 150/5360-13A, "Airport Terminal Planning." Under this methodology, the average day peak month is derived by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month. For April, 30 days were utilized. There is no data available to determine the peak hour operations at the airport. Therefore, it was estimated that 15 percent of the average day peak month would best represent the number of peak hour operations. The calculations of peak activity are included in **Table 4-11**.

Table 4-11 – Forecast Peak Activity

	Total Annual Operations	Peak Month	Average Day Peak Month	Peak Hour (ADPM)
Base Year				
2020	20,075	1,870	62	9
Forecast				
2025	21,951	2,045	68	10
2030	23,647	2,203	73	11
2040	27,444	2,557	85	13

Source: Hoyle Tanner, 2021

4.8.5 Comparison to FAA Terminal Area Forecasts

If an airport is included in the FAA Terminal Area Forecasts, any new aviation activity forecasts need to be reviewed and approved by the agency before they can be applied to further analyses. During this review, the FAA looks to see if the based aircraft and annual operations forecasts differ from the TAF by less than ten percent in the five-year and 15 percent in the ten-year planning period. A comparison of the selected forecasts to those in the 2020 FAA TAF is included in **Table 4-12**.

Table 4-12 – Comparison of Forecasts

	Selected Forecasts	2020 FAA TAF	FAA TAF Adjusted	Difference
Based Aircraft				
Base Year (2019)	18	22		18%
5 Year (2024)	21	22		5%
10 Year (2029)	23	22		5%
Annual Operations				
Base Year (2019)	20,075	20,000		0%
5 Year (2024)	21,951	20,000		10%
10 Year (2029)	23,647	20,000		18%

Source: Hoyle Tanner, 2021

It is significant to point out that the Based Aircraft Database shows X07 to have 18 Based aircraft. This means that the FAA TAF is off by 2 based aircraft. If this were to be adjusted the forecast would be within the acceptable limits. Further, it is realistic to expect modest growth during the planning period while the TAF shows the number of based aircraft remaining at 22 each year, through 2045, but gives no reason for why no growth is shown.

With respect to operations, the selected forecasts show growth, however the 10-year forecast exceeds the FAA threshold. As is true for numerous general aviation airports in the FAA TAF, the projection of annual operations is static. In the case of the Lake Wales Airport, the operations are set at 20,000

throughout the entire TAF planning period. While this number seems accurate for the base year (2020), growth is expected, and a static operational growth rate is not realistic. In this case, the growth predicted for Lake Wales exceeds the threshold because the FAA forecast is not increasing.

4.9 Summary of Activity Forecasts

Table 4-13 presents an overview of the selected forecasts. In summary, the data and methods used to forecast aviation demand for the airport are consistent with those used by the FAA and other general aviation airports around the nation. The forecasts presented in this study are considered to reasonably reflect the activity anticipated at the Lake Wales Municipal Airport through 2040 given the information analyzed and available during this study.

Table 4-13 – Summary of Activity Forecasts

	2020	2025	2030	2040
Based Aircraft				
Single-Engine	12	14	15	19
Multi-Engine (piston & turboprop)	1	1	1	2
Jet	0	0	0	0
Rotorcraft	2	2	3	3
Other (gliders, balloons, etc.)	3	4	4	5
Total	18	21	23	29
Operations				
Local	14,053	15,366	16,553	19,211
Itinerant	5,822	6,366	6,858	7,959
Military	201	219	236	274
Total	20,075	21,951	23,647	27,444
Peak Activity				
Peak Month Operations	1,870	2,045	2,203	2,557
Average Day Operations	62	68	73	85
Peak Hour Operations	9	10	11	13

Source: Hoyle Tanner, 2021

Chapter 5: Facility Requirements

5.0 Introduction

This chapter evaluates and establishes the improvements necessary at Lake Wales Municipal Airport (X07) to maintain a safe and efficient facility while accommodating the demand expected during the 20-year planning period. The facilities should be developed to enhance General Aviation activities, foster business aviation, promote sustainability, and ultimately lead to financial independence. Comparing the existing airfield condition to the growth predicted by the aviation forecasts in the previous chapter will guide the decisions for runway, taxiway, apron, terminal, and other facility requirements at X07.

5.1 Emerging Trends

Proper facility planning must account for emerging trends within the industry by considering how these trends affect the aviation industry and the airport. The following section will focus on emerging trends that have been identified as the most relevant to Lake Wales Municipal Airport.

5.1.1 Next Generation

The National Airspace System (NAS) is being transformed by Next Generation Air Transportation System (NextGen) initiatives. NextGen is the FAA's plan for modernizing the national air transportation system. NextGen initiatives may affect airspace as well as on- and off-airport obstruction management requirements. The NextGen initiatives are based on GPS satellite navigation and enhanced communications systems that will improve efficient access to the airspace and airports of the National Airspace System.

5.1.2 Unmanned Aircraft Systems (UAS)

Over the past several years, UAS operations have become more widespread and the uses have diversified beyond recreational use. As businesses begin to rely more heavily on UAS for commercial operations, airports across the country must account for UAS operations as they plan future facilities. Moreover, the FAA has developed the Unmanned Aircraft Systems (UAS) Integration Pilot Program (IPP) to work with state, local, and tribal governments to understand drone advancements and how to safely incorporate them into the airspace system. On the local levels, many airports have begun developing operating protocols for UAS operations at and around their facilities. As the uses of UAS continue to grow, they will also continue to demand more of the operating airspace on and above airports.

5.1.3 Emergency Planning

General aviation airports play a vital role in serving their local communities through disaster preparedness and response. Hurricanes pose the largest natural disaster threat to Florida communities. Airports are not immune from the devastating impacts that a hurricane can have on infrastructure including hangars,

essential navigation equipment, and other airfield facilities. In fact, X07 is quite familiar with this situation as the airport suffered catastrophic infrastructure loss in 2004 when it was in the direct path of three different hurricanes and was forced to rebuild. Based on not only the potential threats a hurricane can have on an airport but also on the important role an airport can play for the community during and after a hurricane, airports must have a sound emergency plan in place. With reference to the vital role an airport has on their community during a natural disaster, there are countless historical examples of how general aviation airports have helped when responding to a disaster or crisis. From housing utility trucks to employees, an airport has great potential to play an integral role in relief efforts. When looking at existing and future facility needs, considerations must be made for how the facility is used and will be used during these times.

Another, more recent example is the role an airport plays in the containment of an infectious disease. During the COVID-19 pandemic, airports were relied upon heavily to put into place emergency measures that would reduce the risk of spreading the infection. Understanding how these events may impact the day-to-day operations and providing appropriate response tools will allow the airport to return to normal operations quicker.

5.1.4 Sustainability

Sustainable infrastructure and investments are crucial to protecting Florida's natural environments and resources. The FDOT has developed the Airport Sustainability Guidebook for Florida Airports to use as a resource when establishing planning documents. The Guidebook aims to provide guidance for implementing sustainability initiatives as part of the Airport's future and will be used as a reference to encourage sustainable development while planning future facilities. According to the Guidebook, some of the benefits for sustainable development include:

- Reduction of operating costs
- Better utilization of airport assets
- Protection from fluctuating energy costs
- Enhanced community support
- Reduced environmental impacts
- Efficient use of Airport Improvement Program (AIP) and FDOT funding
- Increased resourcefulness

5.1.5 Regional Access/Multi-Modal

As the world continues to become more connected, airports will continue to play an integral role in linking various regions and multiple modes of transportation. Appropriate planning between all stakeholders can make an airport the multimodal interchange point for a region. Facilities should be planned within the context that airports are not singularly used for air transportation but are part of a broader multimodal transportation network. From ride share amenities to taxis and rental cars, airports need to consider all relevant transportation modes while planning GA terminal buildings and other infrastructure needs.

5.2 Demand Capacity Analysis

Airfield capacity is expressed in terms of the number of aircraft operations that can be conducted in a given period of time. Capacity is most often expressed as annual capacity (or annual service volume) and hourly capacity (or throughput capacity) for a particular runway and taxiway configuration.

The determination of airfield capacity is essential to the evaluation of the adequacy of the runway and taxiway system to meet existing and future airport activity demand levels. Hourly capacities under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR), and the Annual Service Volume (ASV) for the airport were developed using methods specified in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*.

A demand/capacity analysis for the existing airfield configuration was conducted using the methodology contained in Chapter 2 of the AC, commonly referred to as the FAA's "handbook methodology." This methodology uses a series of tables, graphs, and equations to calculate an airfield's hourly and annual capacity. It is generally used in situations where airfield capacity is not a constraining factor. The following paragraphs provide a discussion of the handbook methodology and present the results of the analysis.

An airport's capacity is generally measured in terms of the number of aircraft operations (landings and takeoffs) the runway and taxiway system can accommodate on an hourly or annual basis. The calculation for airfield capacity is a function of the number of available runways and the specific runway/taxiway configuration for a given airport. Airfield capacity was determined using two principal measures, Annual Service Volume (ASV) and hourly capacity.

Calculation of an airfield's hourly capacity and ASV depends upon the following physical and operational factors:

- **Meteorological Conditions** - The percentage of time that the cloud ceiling or horizontal visibility is below certain minimums.
- **Aircraft Fleet Mix (Mix Index)** - The percentage of operations conducted by aircraft within certain weight, engine, and wake turbulence classifications.
- **Runway Use** - The percentage of time each runway use configuration is used.
- **Percent Touch-and-Go** - The percent of touch-and-go operations in relation to total aircraft operations.
- **Percent Arrivals** - The percent of arrivals in relation to departures.
- **Exit Taxiway Locations** - The number and locations of exit taxiways for landing aircraft

Hourly capacity is defined as the maximum number of aircraft operations that can be accommodated by the airfield system in one hour. It is used to assess the airfield's ability to accommodate peak hour operations.

ASV is defined as a reasonable estimate of an airport's annual capacity. As the number of annual operations increases and approaches the airport's ASV, the average delay incurred by each operation

increases. When the number of annual aircraft operations exceeds the ASV, moderate to severe congestion will occur and the average delay per aircraft operation will increase exponentially. ASV is used to assess the adequacy of the airfield design, including the number and orientation of runways.

Delay is typically expressed in minutes per aircraft operation. When annual operations are equal to the ASV, the average delay per aircraft operation can be up to four minutes depending upon the fleet mix using the airport. Traditionally, one to four minutes of average delay per aircraft operation is used in ASV calculation. This can be considered as an acceptable level of delay. The FAA considers delays of 6 minutes or more to be significant. When the average annual delays per aircraft operation reaches four to six minutes, the airport is approaching its practical capacity and is generally considered congested.

Delay can be translated into hours of annual delay and easily converted into dollar estimates to be used as a basis for comparison. Aircraft operational delay costs or savings are often used as the measure for comparing various airfield development alternatives.

Aircraft separation significantly impacts both airfield and airspace capacity. Reduced separation typically increases airfield capacity since the resulting closer spacing between aircraft means more aircraft can use the airport during a specified time period. Conversely, increased separation typically reduces capacity. A variety of factors determine the required minimum aircraft separation, including prevailing weather conditions, flight rules, and the specific aircraft type.

The FAA's handbook methodology uses the term "Mix Index" to describe an airport's fleet mix. The FAA defines the Mix Index as the percentage of Weight Class C operations plus three times the percentage of Weight Class D operations.

$$\text{Mix Index (\%)} = \text{Class C Operations/Total} + 3 \times \text{Class D Operations/Total}$$

The aircraft mix is the relative percentage of operations conducted by each of the four classes of aircraft (A, B, C, and D) and their relationship to terms used in wake turbulence standards. **Table 5-1** describes the four classes of aircraft as used in ASV calculations.

Table 5-1 – Aircraft Mix

Aircraft Class	Maximum Certificated Takeoff Weight	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small
B		Multi	
C	12,500 – 300,000	Multi	Large
D	Over 300,000	Multi	Heavy

Source: AC 150/5060-5 Airport Capacity and Delay

The aircraft fleet mix was taken from the data given in the previous chapter. Based on the data, it is estimated that Weight Class A and Class B comprise approximately 99.7% percent of aircraft operations,

Weight Class C aircraft comprise 0.3% percent of aircraft operations, and Weight Class D aircraft do not operate at the Airport and represent zero percent of the aircraft operations.

Based on the estimated mix index of 0.3% and X07 airfield configuration, it was determined that the ASV is approximately 230,000 annual operations. The hourly capacity of the airfield is 98 operations per hour in VFR conditions and 59 hourly operations in IFR conditions. The forecast for the airport indicates that the activity throughout the planning period will reach 27,444 annual operations which is well below the ASV of 230,000 annual operations. Therefore, the capacity of the existing airfield system will not be reached, and the airfield can meet operational demands without adverse effects to aircraft operations and without significant operational delay.

The percent at which an airfield is operating can be shown by comparing the calculated ASV to the existing or forecast level of operations. Based upon FAA Order 5090.3B, "Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)," an airport should begin to address capacity-related issues once the operational demand exceeds 60 percent of the ASV. The capacity levels for the Lake Wales Municipal Airport are shown in **Table 5-2**

Table 5-2 – Airfield Capacity Levels

Year	Annual Operations	Annual Service Volume ¹	Capacity Level
Base Year			
2020	20,075	230,000	8.7%
Forecast			
2025	21,951	230,000	9.5%
2030	23,647	230,000	10%
2040	27,444	230,000	12%

¹FAA Advisory Circular 150/5060-5 with estimated mix index of 2.4%

While the airport does not quite reach the 60 percent of capacity threshold, it should be noted that the runway capacity for the airfield is well below its potential. Using the most general FAA calculations for an airfield configuration like Lake Wales', the ASV could be as high as 230,000 annual operations. The specific calculations for Lake Wales Airport are much lower than this level.

The facility requirements analysis shows that the X07 should not experience any runway-related capacity problems during the planning period. Recommendations will concentrate on developing the appropriate facilities to improve safety and service considerations rather than the operational capacity of the airfield. It should be noted that this is only with respect to runway occupancy times and the number of operations the runway system can accommodate each year. This does not include other airport facilities such as aircraft parking, hangar, general aviation terminal space, automobile parking, or utilities which are addressed in subsequent sections.

5.3 Dimensional Criteria Standards

Airport design standards provide basic guidelines for a safe, efficient, and economic airport system. The Runway Design Code (RDC) provides the information needed to determine which standards apply to a specific element of the runway. The first element of the RDC is the Aircraft Approach Category (ACC) which is defined based on the aircraft's approach speed and describes the operational characteristics of the aircraft. **Table 5-3** describes the five approach speed categories as defined by the FAA.

Table 5-3 – Aircraft Approach Category (ACC)

Category	Approach Speed (knots)
A	< 91
B	91 – 121
C	121 – 141
D	141 – 166
E	> 166

Source: FAA AC 150/5300-13A Change 1

The second element of the RDC is the Airplane Design Group (ADG) which is defined by the aircraft's wingspan and tail height. The ADG represents the basic physical characteristics of the aircraft. **Table 5-4** describes the six design group categories as defined by the FAA.

Table 5-4 – Airplane Design Group (ADG)

Design Group	Wingspan (feet)	Tail Height (feet)
I	< 49	< 20
II	49 – 79	20 – 30
III	79 – 118	30 – 45
IV	118 – 171	45 – 60
V	171 – 214	60 – 66
VI	214 – 262	66 – 80

Source: FAA AC 150/5300-13A Change 1

Current fleet mix and operations analysis shows that Runway 06-24 provides the proper design criteria to accommodate B-II aircraft, which includes many of the light to medium sized business jets. Examples of these jet aircraft include a number of the Cessna Citation and Raytheon Hawker models, as well as the Dassault Falcon series of business jets. For planning purposes, the medium sized Dassault Falcon 900, pictured in **Exhibit 5-1**, series of business jets have been selected as the representative current critical aircraft. While there are a number of other business jet models with an ARC of B-II using the airfield, the Falcon series has been selected due to its heavier weight and higher tail height. Many of the Falcon

aircraft, including the heavier 900 series, have maximum allowable takeoff weights around 45,500 pounds with a dual wheel landing gear configuration.



Exhibit 5-1 – Dassault Falcon 900

Runway 17-35 provides the proper design criteria to accommodate B-I aircraft. While larger aircraft do use the runway on occasion, this practice is limited and only at the pilot's discretion. This is not expected to change throughout the course of this planning period. The Beechcraft King Air B100, which is pictured in **Exhibit 5-2**, is considered the representative existing and future critical aircraft for Runway 17-35. This aircraft, which has a maximum allowable takeoff weight of 11,800 pounds, was selected since it represents the aircraft that utilize the runway.



Exhibit 5-2 – Beechcraft King Air B100

The third element of the RDC is the visibility minimums for the lowest instrument approach procedure developed for the airport. **Table 5-5** below depicts the instrument runway visibility minimums in feet and statute miles. If a runway is designated Visual the visibility is greater than 3 miles.

Table 5-5 – Visibility Minimums

RVR (feet)	Visibility Minimums (miles)
5,000	> 1
4,000	1 – 0.75
2,400	0.75 – 0.5
1,600	0.5 – 0.25
1,200	< 0.25

Source: FAA AC 150/5300-13A Change 1

The following sections describe the fundamental airfield design standards for safe, efficient, and economic aircraft operations. Airfield design standards are determined by a careful analysis of the aircraft characteristics for which the airfield will be designed. Airfield geometry designs based on only existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. On the other hand, airfield designs that are based on large aircraft never likely to operate at the airport are not economical.

The current RDC for Runway 6-24 is classified as B-II-4000 and the current RDC for Runway 17-35 is classified as B-I-Visual. In **Table 5-6** the dimensional standards for B-II and B-I are outlined and compared with the current infrastructure at X07.

Table 5-6 – Runway Design Standards

Element	Standard B-II	Runway 6- 24	Standard B-I	Runway 17- 35
Runway Width (feet)	75	100	60	75
Runway Shoulder Width (feet)	10	10	10	10
Blast Pad Width (feet)	95	None	80	None
Blast Pad Length (feet)	150	None	100	None
Crosswind Component (knots)	13	13	10.5	10.5

The Taxiway Design Group (TDG) is defined by the undercarriage dimensions of the aircraft. The TDG describes the ground operating characteristics of the aircraft. The current TDG is classified as TDG-2. In **Table 5-7**, the dimensional standards for TDG-2 are outlined and compared with the current infrastructure at X07. Design Group 2 taxiways need to be 35 feet wide, have a 79-foot wide Taxiway Safety Area (TSA), and 131-foot wide Taxiway Object Free Area (TOFA).

Table 5-7 – Taxiway Design Standards TDG-2

Element	Standard	Taxiway A	Taxiway B
Taxiway Width (feet)	35	35	35
Taxiway Shoulder Width (feet)	15	15	15
Taxiway Safety Area (feet)	79	79	79
Taxiway Object Free Area (feet)	131	131	131

5.4 Runway Clear Areas and Separation Standards

There are specific areas beyond the ends and off the sides of the runways that the FAA requires to be clear. The Runway Safety Area (RSA) is defined as the prepared and suitable ground surrounding the runway to reduce the risk of damage to aircraft in the event of an overshoot, undershoot, or excursion from the runway.

The Runway Object Free Area (ROFA) and Taxiway Object Free Area (TOFA) is an area surrounding the centerline that restricts protruding objects that may damage the aircraft.

The Runway Protection Zone (RPZ) is an area beyond the runway ends that restricts the land use for the protection of people and property.

The size of these areas is defined by the RDC and the ADG. The size of the clear areas increases as the airport serves larger aircraft and/or the instrument approach procedures become more precise. **Table 5-8** lists the FAA standards for the specific clear areas.

Table 5-8 – Clear Area and Separation Standards

Element	Standard B-II	Runway 6- 24	Standard B-I	Runway 17-35
RSA Length Beyond End	300	600	240	240
RSA Width	150	300	120	120
ROFA Length Beyond End	300	300	240	240
ROFA Width	500	500	400	400
RPZ Inner	500	500	500	500
RPZ Outer	700	700	700	700
RPZ Length	1000	1000	1000	1000
Runway to Taxiway Separation	240	400	225	200

5.5 Runway Requirements

Existing and potential runway configurations were examined with respect to dimensional criteria, orientation, length, width, and pavement design strength.

5.5.1 Runway Orientation

Local prevailing meteorological conditions such as wind direction, cloud ceiling heights, and visibility have a direct influence on the development of an airport's single runway orientation, or an airport's system of runways. Ideally, any single runway should be aligned with the prevailing winds that, to varying degrees, have a direct effect on all aircraft. Generally, the smaller the aircraft, the more it is affected by the wind, particularly crosswind components. The crosswind component is the resultant vector of the runway direction and existing wind that acts at a right angle to the runway. For operational safety considerations, pilots desire to use runways that, to the greatest extent practicable, offer the greatest headwinds and least crosswinds. Each aircraft (by factory design) has a maximum recommended demonstrated crosswind velocity limit, which is the crosswind component for which adequate control of the airplane was demonstrated during takeoff and landing.

Runway wind coverage, as used in airport planning, measures the percent of time crosswind components are below maximum acceptable velocity limits. When measuring runway wind coverage, the most critically affected aircraft (aircraft having the smallest crosswind operational limit that will utilize the runway), must be considered.

FAA Advisory Circular (AC) 150/5300 13A, *Airport Design*, recommends that at least 95 percent crosswind coverage be provided by the primary runway at any airport. If the runway wind coverage is less than 95 percent, an additional runway(s) should be provided, with an orientation such that the combination of all runways provides 95 percent or better wind coverage. The most desirable runway orientation provides the greatest runway wind coverage with the least crosswind component.

The number of runways required at an airport depends upon factors such as wind coverage, capacity requirements, and occasionally environmental considerations. The following meteorological categories were used to provide information and guidance for the analysis of the operational impact of winds on the airport's existing and future runway system:

- **All Weather** - All observed ceiling heights and horizontal visibility reported.
- **Visual Meteorological Conditions (VMC)** - Observed local conditions when cloud base ceiling heights were reported to be greater than, or equal to, 1,000 feet above ground level (AGL) and horizontal visibility was reported to be greater than, or equal to, 3 statute miles. Flight operations during these conditions may be conducted under Visual Flight Rules (VFR).
- **Instrument Meteorological Conditions (IMC)** - Observed conditions when ceiling height was reported less than 1,000 feet AGL and/or horizontal visibility was reported to be less than 3 statute miles.

The surface observation data for X07 as used for this Airport Master Plan Update was obtained from the National Oceanic and Atmospheric Administration (NOAA), and the National Climatic Data Center (NCDC). The Lakeland Linder International Airport weather station recorded a total of 151,074 surface observations for the 10-year period 2010 through 2019 that were categorized as representing "All

Weather Conditions." Approximately 70 percent were reported for VMC and approximately 6 percent were reported for IMC.

Table 5-9 indicates that Runway 6-24 by itself provides wind coverage that exceeds the FAA requirement of 95 percent even with the most demanding crosswind component of 10.5 knots. Therefore, no additional runways are required on the basis of wind coverage.

Table 5-9 – Runway Wind Coverage

Meteorological Condition	Observations	Runway	Wind Coverage Crosswind Component (Knots)	
			10.5	13
All-Weather	151,074	6/24	97.77%	98.86%
		17/35	96.77%	98.25%
Visual Meteorological Conditions (VMC)	106,175	6/24	97.14%	98.56%
		17/35	95.68%	97.66%
Instrument Meteorological Conditions (IMC)	8,299	6/24	95.91%	97.70%
		17/35	96.21%	97.92%

5.5.2 Runway Length

Runway length requirements for the airport were determined using FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. The principal parameters necessary to determine runway length are the airport elevation and the mean daily maximum temperature of the hottest month. The airport elevation is 126.7 feet mean sea level (MSL). Based on the NOAA's 1981-2010 Climate Normals for Bartow Executive Airport, it was determined that the mean daily maximum temperature of the hottest month occurs in both July and August at 92.1 °F.

The results of the runway length analysis are shown in **Table 5-10**. It is clear that the existing runway length is satisfactory for aircraft below 12,500-pound maximum gross takeoff weight but even moderately loaded heavier aircraft require lengths exceeding those currently available.

Table 5-10 – Runway Length Requirements

Percentage of the Fleet	Un-Adjusted	Takeoff Adjustment ¹	Landing Adjustment ²
Small Aircraft (≤ 12,500 lbs)			
Less than 10 passenger seats			
95% of the Fleet	3,100	N/A	N/A
100% of the Fleet	3,600	N/A	N/A
10 or more passenger seats	4,175	N/A	N/A
Aircraft with MTOW more than 12,500 up to 60,000 lbs			
75% of the fleet at 60% useful load	4,650	4,670	5,348
75% of the fleet at 90% useful load	6,800	6,820	7,820
100% of the fleet at 60% useful load	5,500	5,520	6,325
100% of the fleet at 90% useful load	8,500	8,520	9,775

Estimated according to AC 150/5325-4B Runway Length Requirements for Airport Design

¹Adjusted based on runway centerline high and low points

²Applicable to turbojet-powered airplanes only

³Useful Load is the difference between the maximum allowable structural gross weight and the operating empty weight.

Table 5-11 is an extract from the Advisory circular that lists the airplanes that have a maximum gross takeoff weight between 12,500 pounds up to 60,000 pounds that are considered part of the 75% of the jet fleet used to determine runway length requirements. **Table 5-12** lists the larger aircraft that make up the remaining 25% of the fleet of aircraft under 60,000 pounds used in the runway length calculations.

Table 5-11 – Airplanes That Make Up 75 Percent Of The Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bae	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501 Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A
Cessna	550 Citation Bravo	Learjet	40/45
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	Raytheon	390 Premier
Cessna	552 Citation	Raytheon Hawker	400/400 XP
Cessna	560 Citation Encore	Raytheon Hawker	600
Cessna	560/560 XL Citation Excel	Sabreliner	40/60
Cessna	560 Citation V Ultra	Sabreliner	75A
Cessna	650 Citation VII	Sabreliner	80
Cessna	680 Citation Sovereign	Sabreliner	T-39

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

Table 5-12 – Airplanes That Make Up the Remaining 25 Percent Of The Fleet

Manufacturer	Model
Bae	Corporate 800/1000
Bombardier	600 Challenger
Bombardier	601/601-3A/3ER Challenger
Bombardier	604 Challenger
Bombardier	BD-100 Continental
Cessna	S550 Citation S/II
Cessna	650 Citation III/IV
Cessna	750 Citation X
Dassault	Falcon 900C/900EX
Dassault	Falcon 2000/2000EX
Israel Aircraft Industries (IAI)	Astra 1125
IAI	Galaxy 1126
Learjet	45 XR
Learjet	55/55B/55C
Learjet	60
Raytheon/Hawker	Horizon
Raytheon/Hawker	800/800 XP
Raytheon/Hawker	1000
Sabreliner	65/75

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

Currently, Runways 6-24 and 17-35 accommodate all of the based aircraft at the airport, and most of the itinerant aircraft using the airport with little or no operational restrictions like take-off weight restrictions.

The existing 5,400-foot length of the primary Runway 6-24 accommodates the turbine aircraft that use the airport and the types of aircraft that are anticipated to use the airport in the future. A runway length of 5,000 feet is commonly accepted as a minimum length for all-weather turbine aircraft operations among aircraft owners.

The existing length of Runway 17-35 is considered adequate for the entire planning period. At 3,860 feet, this runway length is capable of accommodating nearly every aircraft within the runway's RDC designation

of B-I. This includes the Beechcraft King Air B100 which is the representative B-I aircraft based at the airport. The King Air B100 as well as other B-I aircraft such as the Beechcraft King Air 90s, Cessna 310s, and Cessna 414/425 type models all can operate at their maximum allowable takeoff weight in the hottest conditions on 3,860 feet.

Based on the runway length requirements shown in **Table 5-10**, aircraft with a design code of B-II will require additional runway length as the number of their operations and/or trip distances increase. Using the FAA methodology for aircraft between 12,500 pounds but less than 60,000 pounds, the recommended length required at the Lake Wales Municipal Airport to serve 75% of the fleet at 60% useful is 5,384 feet. Therefore, the runway length is adequate to meet the demands of the operational fleet throughout the planning period.

With a superior wind coverage of up to 98.86% in all weather conditions, it is determined that Runway 6-24 should be designated as the primary runway at X07. Runway 17-35 should be designated as the crosswind runway to accommodate smaller aircraft with lower demonstrated crosswind components. Therefore, future extensions to Runway 17-35 are not considered in this Airport Master Plan.

5.5.3 Runway Width

The existing 100-foot width of Runway 6-24 exceeds the minimum width standards of 75 feet for a B-II runway. Runway 6-24 in its existing condition is more than adequate for the expected aircraft at the airport and to remain at its designation of a B-II runway. It is recommended that the current width of Runway 6-24 should be preserved throughout the planning period.

Runway 17-35 has a width of 75 feet which exceeds the 60-foot runway width requirement for runways with an B-I design code. The current width of Runway 17-35 should also be preserved throughout the planning period.

5.5.4 Runway Pavement Design Strength and Condition

Pavement strength of runways and taxiways must be sufficient to support the repetitive landings, takeoffs, and movement of the design aircraft as well as the occasional use by heavier aircraft. In 2019, FDOT published the statewide Airfield Management Program report that included a detailed Pavement Evaluation Report for the Lake Wales Municipal Airport based on surveys and fieldwork conducted in 2017. The Pavement Condition Index (PCI) assigned to Runway 6-24 was 100% which is considered a good rating. Additionally, a technical evaluation to determine the Pavement Classification Number (PCN) which tells the strength of the runway was conducted in 2019. The PCN numerical value indicated the load-carrying capacity of pavement in terms of a standard single wheel load at a tire pressure of 181 psi. The PCN for pavement is reported as a five-part number where the following codes are ordered and separated by forward slashes: Numerical PCN Value / Pavement type / Subgrade category / Allowable tire pressure / Method used to determine the PCN. The PCN for Runway 6-24 was classified as 6/F/B/Y/T Referencing Appendix F in Advisory Circular AC 150/5335-5C, this correlates to Runway 6-24 accommodating a single wheel type main gear aircraft up to 23,000 pounds or a dual wheel type main gear aircraft up to 35,000

pounds. This load rating is adequate to service repetitive operations by all B-II aircraft as well as many of the smaller and lighter C-II aircraft that make up the fleet mix in **Tables 5-11** and **5-12**.

For Runway 17-35, the FDOT pavement study assigned PCI ratings of 58% that show the asphalt surface to be in fair condition. Rehabilitation of the Runway 17-35 surface will be required within the next three to five years. Similar to the primary runway, Runway 17-35 was evaluated for its weight-bearing capacity as part of the 2016 PCN study. The PCN for runway 17-35 was classified as 8/F/A/Y/T. This correlates to Runway 17-35 accommodating a single wheel type main gear aircraft up to 29,000 pounds or a dual wheel type main gear aircraft up to 45,000 pounds.

Based on the PCN values, pavement strength for both runways is sufficient for the planning period. To prolong the useful life of the pavements, the airport should at minimum follow the recommendations in the FDOT Pavement Management Report, and plan for routine pavement maintenance to address normal wear. FDOT Pavement Management Report can be referenced at <https://www.fdot.gov/aviation/pavement.shtml>

5.5.5 Runway Lighting

Both runways have Medium Intensity Runway Lights (MIRL) that meet the current operational needs of the airport. Runway 6-24 lighting was rehabilitated in 2018 is in good condition. Runway 17-35 lighting is towards the end of its useful life should be updated at the same time the runway is rehabilitated.

5.5.6 Runway Marking and Signage

A sign and marking plan sheet has been created as part of this master plan update. It provides the airport manager with an easily referenced graphical depiction of the signs and markings existing on the airport. This sheet can be posted on a website or provided to pilots to assist with familiarization with the airport layout. Pavement markings typically require repainting every 5-10 years in Florida and whenever rehabilitation or reconstruction of pavement occurs. Specifically, Runway 6-24 was marked in 2018 during the rehabilitation and extension and Runway 17-35 has not been remarked since 2012. Pavement marking should be included as part of the airport's airfield maintenance program.

5.6 Taxiway Requirements

The airport's taxiway network is essential to providing access to the runways and circulation between the hangars and aprons across the airport. The following section will discuss the taxiways that exist at the airport as well as future plans for rehabilitation and construction.

5.6.1 Taxiway Dimensional Standards

The airfield geometry at X07 currently has two taxiways, Taxiway Alpha which is a parallel taxiway for Runway 6-24, and Taxiway Bravo which is a parallel taxiway for Runway 17-35. Both Taxiways are

designed to provide the proper width and safety-related setbacks required for Design Group II aircraft. Design Group II taxiways need to be 35 feet wide, have a 79-foot wide Taxiway Safety Area (TSA), and 131-foot wide Taxiway Object Free Area (TOFA). In addition, Design Group II taxilanes require an object free area of 115 feet wide. The TSA, TOFA, and taxilane object free areas are all centered on the centerline alignment they are associated with to provide the proper wingtip clearance and setbacks required for safe ground operations.

5.6.2 Taxiway Condition

Pavement inspection and ratings were conducted by the FDOT and are included in the 2019 FDOT pavement report. In the pavement report, Taxiway Alpha is divided into sections. The western portion of Taxiway Alpha has a PCI of 94 which means it's in good condition. This portion of Taxiway Alpha was constructed in 2016. The eastern portion of Taxiway Alpha was given a PCI rating of 41 which is a poor condition. However, this portion of Taxiway Alpha was reconstructed in 2018 shortly after the pavement evaluation was conducted in 2017. In addition to those two portions, Taxiway Alpha was also extended along with Runway 6-24 in 2018. Therefore, no immediate improvements are required for Taxiway Alpha.

Similarly, Taxiway Bravo was recently constructed in 2019 and this pavement is in excellent condition and will not require any improvements in the immediate future.

5.6.3 Future Taxiways and Taxilanes

Based on the potential future demand for additional hangar space, a new taxiway system may be needed to connect these facilities with the existing layout. Any additional recommendations regarding the layout will be found in the alternatives section if needed.

5.7 Electronic, Visual, and Satellite Aids to Navigation

A number of electronic, visual, and more recently satellite aids exist to help pilots find the airport and land in less than perfect visual conditions and at night. These common tools are identified below.

5.7.1 Runway End Identifier Light (REIL)

Runway End Identifier Lights (REILs) are located at each end of Runway 6-24 and were constructed in 2018. As operations at X07 increase, REILs should be planned for both Runway 17-35 ends as well to help pilots more easily identify the ends of the runway.

5.7.2 Airport Beacon (ABN)

A rotating beacon identifies a civil aviation airport that has lighted runways. At X07, the green and white rotating airport beacon is located southeast of the apron near the public parking lot. The green and white

light colors signify to aviators that X07 is a lighted land airport. The rotating beacon and tower are beyond the 20-year useful life and should be replaced in the short-term planning period.

5.7.3 Precision Approach Path Indicator (PAPI)

In 2018, new 4-box LED PAPIs were constructed at both ends of Runway 6-24. Likewise, 4-light PAPIs should be provided to both ends of Runway 17-35. The 4-light PAPI provides precise glideslope information and is recommended by the FAA for runways with electronic guidance (including straight-in non-precision approaches) and/or jet aircraft operations.

5.7.4 Segmented Circle and Wind Cones

A segmented circle serves to alert pilots of the airfield location as well as traffic pattern direction. It also serves as a centralized location for housing an airport-lighted wind cone. A segmented circle and lighted wind cone should be constructed at X07 and is planned for the southwest quadrant of the airport. This project would also include clearing a small area adjacent to the segmented circle location in order to enhance runway visibility.

5.7.5 Automated Weather Observing System (AWOS)

An AWOS-III is currently located in the southeast quadrant of the airport, just south of the Runway 24 touchdown point. The AWOS system is not connected to the National Airspace Data Interchange Network (NADIN) systems, rather the automated collection system provides the local weather and the air traffic control tower operators upload it into the national system manually. AWOS transmittal services are disabled during those hours when the ATCT is in operation because the ATCT is considered the primary source of local weather information during those times.

FAA Order 6560.20B Siting Criteria for Automated Weather Observing Systems (AWOS) establishes the siting criteria for AWOS installation at airports and heliports.

The AWOS sensors shall not violate runway or taxiway object free areas, runway or taxiway safety areas, obstacle free zones, or instrument flight procedures surfaces in AC 150/5300-13, *Airport Design*, or FAA Handbook 8260.3, TERPS.

5.8 Airspace Requirements

The airspace around X07 is not anticipated to change during the planning period although improvements to instrument approaches can be expected as NextGen upgrades to the NAS continue to unfold.

5.9 General Aviation Facility Requirements

General aviation aircraft typically require a wide array of services and facilities. The particular facilities needed at an airport are dependent upon the type of aircraft, climate, and the frequency and type of operations. Some general aviation facilities are provided by the airport owner, and some are provided by private entities such as an FBO operator.

An FBO operator can provide a multitude of services and facilities. For example, aircraft fueling, parking, aircraft storage, aircraft maintenance, aircraft rental, and flight training.

General aviation encompasses a variety of users and activities. As a result, the variety of general aviation facilities needed include aircraft storage facilities, transient parking aprons, terminal facilities, automobile parking areas, and vehicle access from adjacent roads.

5.9.1 Aircraft Storage Facilities

Demand for hangar space is driven by three primary factors: security, local climate, and the type of based aircraft. Typically, airports that frequently experience severe weather conditions have the highest demand for hangar facilities. Additionally, the desire to avoid prolonged direct exposure to the sun will increase hangar demand. The higher overall value of based aircraft also increases the demand for hangar storage.

Due to the frequency of hurricanes, severe thunderstorms resulting in damaging hail, and the relentless Florida sun, additional aircraft storage facilities are recommended at X07. Storage facilities can generally be classified into four general categories: T-hangars, conventional hangar, executive box hangar, and corporate hangar.

Key issues related to future hangar development include the availability of buildable space and priority for accommodation. Development of future general aviation aircraft storage facilities should also take into account the various types of new general aviation aircraft; for example, very light jet and light-sport aircraft. Aircraft storage facilities may also be provided for overnight or short-term storage of transient aircraft.

At X07, there are currently 4 hangars and 16 T-hangar units. All of these are currently occupied and there is a waitlist of individuals that are interested in renting a hangar when one becomes available. Based on this demand, the City of Lake Wales should design more hangars. Alternatives for the development of storage facilities at X07 are discussed in Chapter 7.

5.9.2 Transient Aircraft Parking Aprons

Transient aircraft parking aprons provide parking for visiting aircraft. The transient aircraft parking apron should be visible from the airfield to assist the pilots in wayfinding and should be located near the amenities provided in a terminal facility. The size of the apron is generally based on the typical busy day.

Pavement strength for the transient aprons should be designed to accommodate the largest or heaviest aircraft that could reasonably be expected to remain overnight.

The main transient aircraft apron is located east of the terminal building, adjacent to the fuel farm. There is a smaller transient aircraft apron connected to the terminal building. As the demand for aircraft parking spots grows, there will be a future need for additional transient aircraft apron space. Alternatives for the development of transient aircraft aprons at X07 are discussed in Chapter 7.

5.9.3 Terminal Facilities

General aviation terminal facilities provide a “meet and greet” location at the airport. A single terminal building may serve as the terminal and also house various airport-related businesses. The general aviation terminal may also house the administrative functions of the airport. As discussed in Chapter 2, current terminal facilities are sufficient to accommodate the demand throughout the planning period at X07.

5.10 Support Facilities

Support facilities encompass a broad range of functions that ensure the smooth, efficient, and safe operation of the airport.

5.10.1 Aircraft Rescue and Firefighting

Operators of Part 139 airports must provide aircraft rescue and firefighting (ARFF) services during air carrier operations that require a Part 139 certificate. ARFF is not required at general aviation airports. Due to the significant costs associated with the facility, equipment, training, and personnel, an ARFF facility is not recommended for X07. The City of Lake Wales Fire Department currently provides emergency response services. The Main Station is located in the Municipal Services Center on W. Central Avenue, just east of the intersection of U.S. 27 and W. Central Avenue. This places the station at three driving miles from the airport.

5.10.2 Airport Maintenance

Airport maintenance is provided by the airport staff and supported by the City’s public works department and outside contractors as needed. There is currently a maintenance garage located in the northwest quadrant of the airport that houses airport maintenance equipment. At the time of this report, facilities and equipment are sufficient for the planning period.

5.10.3 Fuel Storage

Currently, the fuel storage is located in the northeast quadrant of the airport, adjacent to Taxiway Alpha. The current above-ground fuel tanks were commissioned in the mid-1990s and have exhausted their useful life. These fuel tanks should be replaced as soon as possible.

The current location of the fuel farm is acceptable for future demand. This accommodates the ability of self-serve fueling for the projected fleet mix utilizing X07 throughout the planning period. Currently, fuel delivery trucks utilize Taxiway Alpha to access the fuel farm. It is recommended that alternatives for ground vehicle access to the fuel farm are considered in Chapter 7.

5.10.4 Aircraft Maintenance

Aircraft maintenance is generally provided by an FBO or aeronautical business located at the airport. Currently, there are no aircraft maintenance providers located at X07. The airport should consider supporting aircraft maintenance needs in the future.

The general requirements for aircraft maintenance facilities include the following:

- Aircraft maintenance hangar with sufficient workspace for any aircraft upon which maintenance is being performed.
- Suitable storage and shop space for equipment and tools.
- Office space, customer lounge, restrooms, and telephone.
- Apron area with pavement type and strength adequate to support the expected aircraft fleet.
- Adequate automobile parking and access.
- Proximity to the engine run-up area to reduce taxiing times and fuel costs.

5.11 Access, Circulation, and Parking

As described in Chapter 2, the singular point of access into the airport is South Airport Road which is accessible from State Road 60. The General Aviation Terminal has a paved parking lot with 21 spaces. Discussions with airport staff have indicated that additional parking spots are necessary for current and future demand. Additional discussions with airport management have raised concern over the singular access point to the airport. An additional access point would support emergency services, as well as provide access to the northwest quadrant of the airport to support aeronautical activities. Alternatives for this access point will be discussed in Chapter 7. There are no internal roads inside the Airport Operations Area (AOA) and all vehicular movements are made by using the taxiway network. Future consideration should be given to separating aircraft and ground vehicle movements in the AOA.

5.12 Utilities

Existing infrastructure is sufficient to supply the needed utilities in the proposed development areas around the airport. Discussions with airport tenants have raised the concern regarding the potential safety issues posed by the overhead powerlines. Due to the high level of sky diving activity on the airfield, consideration should be given to moving the overhead powerlines along Airport Road underground.

5.13 Non-aeronautical Facilities

Non-aeronautical revenue land use facilities are important as they contribute to the airport's sustainability and revenue flow. At the Lake Wales Municipal Airport, these facilities include a former campground and several buildings are occupied by the Florida Army National Guard. Future consideration will be given to other non-aeronautical uses of the airport.

Chapter 6: Environmental Overview

6.0 Introduction

The purpose of the environmental overview in the airport master plan is to assist the sponsor to thoroughly evaluate airport development alternatives and to provide information that will help expedite subsequent environmental processing. According to FAA Order 5050.1F environmental issues should be identified and considered early in the planning process to ensure efficient, timely and effective environmental review. However, the National Environmental Policy Act (NEPA) process is not intended to be completed as part of the Master Plan update; it is meant to provide an overview of the process and lay the groundwork for determining the environmental needs of future projects. When considering environmental factors in the master planning process, not all twenty-three impact categories listed in FAA Order 5050.4B need to be addressed. Instead, FAA Order 5050.4B should be consulted as a guide to identify potential environmental impacts specific to the airport that should be considered as planning continues. The environmental factors considered in this chapter are consistent with the Florida Department of Transportation (FDOT) 2020-2021 Guidebook for Airport Master Planning.

6.1 Air Quality

The Clean Air Act requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six principal pollutants which can be harmful to public health and the environment. These pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution and sulfur dioxide. The EPA monitors levels to determine if areas are considered as “attainment” or “non-attainment” areas. As of 2020, the entire State of Florida achieved “attainment” status which means that the entire state meets the NAAQS. Existing activities affecting air quality include mainly aircraft operations and vehicle operations. The forecasted aircraft operations and other infrastructure development at X07 should not have any considerable impact on air quality, however, future emissions should not exceed the *de minimus* standards following the FAA’s Aviation Emission and Air Quality Handbook, Version 3, Update 1.

6.2 Climate

Lake Wales Municipal Airport (X07) has an elevation of 127 feet above mean sea level and is located between the Gulf of Mexico and the Atlantic Ocean on Florida’s Central Ridge. The average high temperature is 93 degrees Fahrenheit in both July and August, while the average low is 49 degrees Fahrenheit in January. Rainfall in this area occurs during all seasons; however, it is more abundant during the summer when daily showers are common. Historic data shows an average 50 inches of rainfall on an annual basis.

6.3 Department of Transportation Act, Section 4 (f)

Section 4(f) of the USDOT Act of 1966 (Title 49, USC, Section 303) dictates that special consideration of park and recreation lands, wildlife and waterfowl refuges and historic sites be given on transportation

development projects. Review of the airport location utilizing the Florida Department of Environmental Protection GIS Mapping revealed there are no 4(f) resources located on or bordering X07. It is anticipated future projects at the airport will not affect any 4(f) resource.

6.4 Hazardous Materials, Solid Waste, and Pollution Prevention

Regulation of hazardous materials is regulated by numerous federal laws and regulations. The Resource Conservation and Recovery Act (RCRA) of 1976 gives EPA the authority to control hazardous waste in all phases including generation, transportation, treatment, storage and disposal. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 which is also known as the “superfund” Act provides a federal “superfund” to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents and spills and any other emergency release of pollutants or contaminants.

X07 owns two 10,000-gallon self-service above ground fuel tanks that are in fair condition. There have been no documented fuel tank discharges at X07. Hazardous materials such as weed killing chemical used for property maintenance are stored on-site. Other substances such as petroleum, oils and liquids that support aircraft and ground vehicle maintenance are also stored in the various locations on the airport.

A review of the State of Florida “Contamination Location Map” indicates there are no known Brownfield or other “superfund” contamination sites in or around X07.

6.5 Land Use

Review of the City of Lake Wales Future Land Use Map indicates X07 is located in a region designated as industrial. The land off-airport has a land use designation of conservation. It is not expected that any future projects on airport land would result in any impacts to land uses and/or require a change to the local comprehensive plan and/or zoning map. Projects off airport may require further analysis to determine any potential affects to the bordering conservation land.

6.6 Noise and Noise-Compatible Use

Compatible uses around airports are primarily dictated through the use of adequate zoning and construction standards. Ideally the municipality where the airport is located will create airport specific development zones or zoning to encourage compatible aeronautical and non-aeronautical development on and abutting the airport. Typically, residential uses are not considered compatible nor are schools, churches, libraries and other typically noise sensitive uses. Some communities have requirements that new residential construction within specified approach zones and distances from the airport be built with noise reduction technology that guarantees a minimum outside to inside decibel reduction.

Considering the proximity and alignment of Runway 06-24 with the downtown area of Lake Wales any approach to Runway 24 would bring aircraft directly over the most populated areas of the City and increase the potential for airspace obstructions and noise impacts to the community. An approach

developed to Runway 06 however would ensure aircraft remain over largely unpopulated rural areas with limited airspace threats.

6.7 Visual Effects (Including Light Emissions)

In accordance with FAA Order 5050.4B airport development projects shall “consider the extent to which any lighting associated with an airport action will create an annoyance among people in the vicinity of the installation.” X07 is in a sparsely populated area with few communities surrounding the airport property. Development within the Airport boundary will have little visual change to the surrounding area.

6.8 Biological Resources (Including Fish, Wildlife, and Plants)

6.8.1 State-Listed Species

A report was generated utilizing the Florida Natural Areas Inventory online mapping for the purposes of identifying the potential State-protected species. Reports are generated based on a “matrix unit” that is equal to one square mile; X07 lies within the center of four matrix units, therefore, the list provided is not specific to the airport, but includes all of the habitats surrounding it as well. Within the report, species are given one of the following ratings:

- DOCUMENTED - There is a documented occurrence in the FNAI database of the species or community within the Matrix Unit.
- DOCUMENTED-HISTORIC - There is a documented occurrence in the FNAI database of the species or community within the Matrix Unit; however, the occurrence has not been observed/reported within the last twenty years.
- LIKELY - The species or community is known to occur in the vicinity, and is considered likely within the Matrix Unit because:
 - documented occurrence overlaps this and adjacent Matrix Units, but the documentation isn’t precise enough to indicate which of those Units the species or community is actually located in; or
 - there is a documented occurrence in the vicinity and there is suitable habitat for that species or community within this Matrix Unit.
- POTENTIAL - The Matrix Unit lies within the known or predicted range of the species or community based on expert knowledge and environmental variables such as climate, soils, topography, and landcover.

The report indicates one protected species with a rating of “Likely”, the Wood Stork (*Mycteria americana*) with a listing of threatened. Additionally, a total of 55 species with a rating of “Potential” have been identified within 4 square miles of X07, including birds, plants/trees, lichens, insects, reptiles, mammals, and amphibians (**Appendix A**).

6.8.2 Federally-Listed Species

The US Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPAC) online tool was used on June 16, 2021, to generate an updated list of federal threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within

the boundary of X07 (Consultation Code: 04EF2000-2021-SLI-0840). A total of 33 federally protected species were identified consisting of mammals, birds, reptiles, plants and lichens. No critical habitats were identified within the boundary of X07 (**Appendix B**).

6.8.3 Visual Observations

Advantage Consulting, LLC. conducted monthly wildlife observations as a part of a Wildlife Hazard Assessment at X07 between the months of July 2020 and June 2021. These reports noted the following protected species observed at X07:

Florida Sandhill Crane, *Grus canadensis pratensis*
Wood Stork, *Mycteria americana*
Florida Burrowing Owl, *Athene cunicularia floridana*
Gopher Tortoise, *Gopherus polyphemus*
American Alligator, *Alligator mississippiensis*

Due to the known presence of State- and Federally-protected species, depending on the location and type of future projects at the airport, the potential for impacts to such species will need to be evaluated in more detail.

6.9 Coastal Resources

The airport is located inland located approximately 47 miles southwest of Orlando and 50 miles east of Tampa. This impact category does not apply to X07.

6.10 Farmlands

Important farmlands include all pasturelands, croplands, and forests (even if zoned for development) designated by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) as prime, unique, or statewide or locally important lands. Prime farmland is land having the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimal use of fuel, fertilizer, pesticides, or products. Unique farmland is land used for producing high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture necessary to produce high quality crops or high yields of them economically. Statewide and locally important farmland is land that has been designated as “important” by either a state government (State Secretary of Agriculture or higher office) or by county commissioners or an equivalent elected body. There are no prime or unique farmlands on or adjacent to X07.

6.11 Historical, Architectural, Archeological, and Cultural Resources

It is undetermined at this time whether State historical, architectural, archeological, and cultural resources exist within or surrounding the airport. Coordination with the State Historic Preservation Office will be required when planning future projects at X07.

In the State of Florida consultation takes place with six federally recognized tribal governments. Two tribes currently reside and have tribal lands in the state: the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida. Although the Muscogee Creek Nation, the Poarch Band of Creek Indians, the Seminole Nation of Oklahoma, and the Mississippi Band of Choctaw Indians do not currently have reservation lands in the state, they lived in Florida at one time and have a direct historical and cultural association with the state. They, therefore, are tribes that are culturally affiliated with the state of Florida. Native American coordination will be required when planning future projects at X07.

A review of the National Park System's National Register of Historic Places revealed there are no Nationally Registered Historic Properties or Districts within or surrounding the airport.

6.12 Natural Resources and Energy Supply

Electrical power is supplied by Duke Energy through overhead power cables running along Airport Road. The power is needed for the airfield lighting, hangar and building lighting, fuel farm operation and other miscellaneous requirements. The existing infrastructure is adequate to serve the existing and future development needs of X07. Water and sewer service is provided by the City of Lake Wales. There is currently an 8-inch gravity sewer along the western side of Airport Road that collects wastewater from the hangars and businesses on property. A duplex lift station was recently constructed but is not yet in service and will be placed into service once adequate demand is in place. A 12-inch potable water line also runs along Airport Road and provides water to the various buildings on the airport. Fire suppression is provided through a 16-inch fire line that is connected to the on-site fire suppression tank located to the east of the Army National Guard leasehold. Identification of the approximate number of other resources such as water, asphalt, aggregate, and wood a project would use in the construction, operation, and maintenance of a project and identification where the suppliers are located would require project specific evaluation.

6.13 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

Typically, improvements to airports are focused on business and economic activity, as well as retaining existing businesses within and around the airport. It is not anticipated future projects at X07 would change business and economic activity in the community; impact public service demands; induce shifts in population movement and growth, or other factors identified by the public.

6.14 Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

The Florida Water Resources Act of 1972 resulted in the creation of five regional water management districts and established a permit system for allocating water use. X07 is located within the jurisdictional boundary of the Southwest Florida Water Management District (SWFWMD). Development projects must be coordinated with SWFWMD in order to properly permit construction and operation of surface water management systems. A SWFWMD permit authorizes activities that are not harmful to the water resources and are consistent with public interest.

The State of Florida has codified special ruling as it relates to stormwater runoff on airports. Rule 62-330.449 Florida Administrative Code (FAC) General Permit for Construction, Operation, Maintenance, Alteration, Abandonment, or Removal of Airport Airside Stormwater Management Systems. Paragraph one of 62-330.449 states (1) A general permit is granted to the owner of a public or private airport for the construction, alteration, abandonment, removal, operation, and maintenance of stormwater management systems that serve permanently paved airside activities, which, for the purposes of this rule, are defined as those components of an airport used for aircraft taxiing, landing, takeoff, loading, unloading, service materials storage and service equipment parking. X07 should request use of this General Permit in all applicable future development projects. The following sections focus on aspects of the water resources process that are relevant to the Federal, State and local reviewing agencies and authorities that govern water resources.

6.14.1 Wetlands

A wetland is an area that is flooded or saturated by ground or surface water frequently or for prolonged periods that support vegetation typically adapted for life in saturated soils. Wetlands serve a critical role in the ecosystem by improving water quality and providing flood protection. As equally important is the role wetlands play in providing habitat to nesting birds, fish, mammals and reptile species. Review of the U.S. Fish and Wildlife Service National Wetlands Inventory online mapping revealed there are freshwater wetlands and ponds within the boundary of X07 as shown in **Exhibit 6-1**. Depending on the location and type of future projects at the airport an Environmental Resource Program (ERP) permit through the Southwest Florida Water Management District (SWFWMD) may be required. Coordination with the Army Corps of Engineers (ACOE) and Florida Fish and Wildlife Commission (FWC) may also be necessary when impacting wetlands. Wetland mitigation may be needed depending on the impacts proposed to wetlands. Mitigation allows for the permitted authority to impact wetlands by offsetting the impacts with activities such as wetland creation, enhancement or preservation.

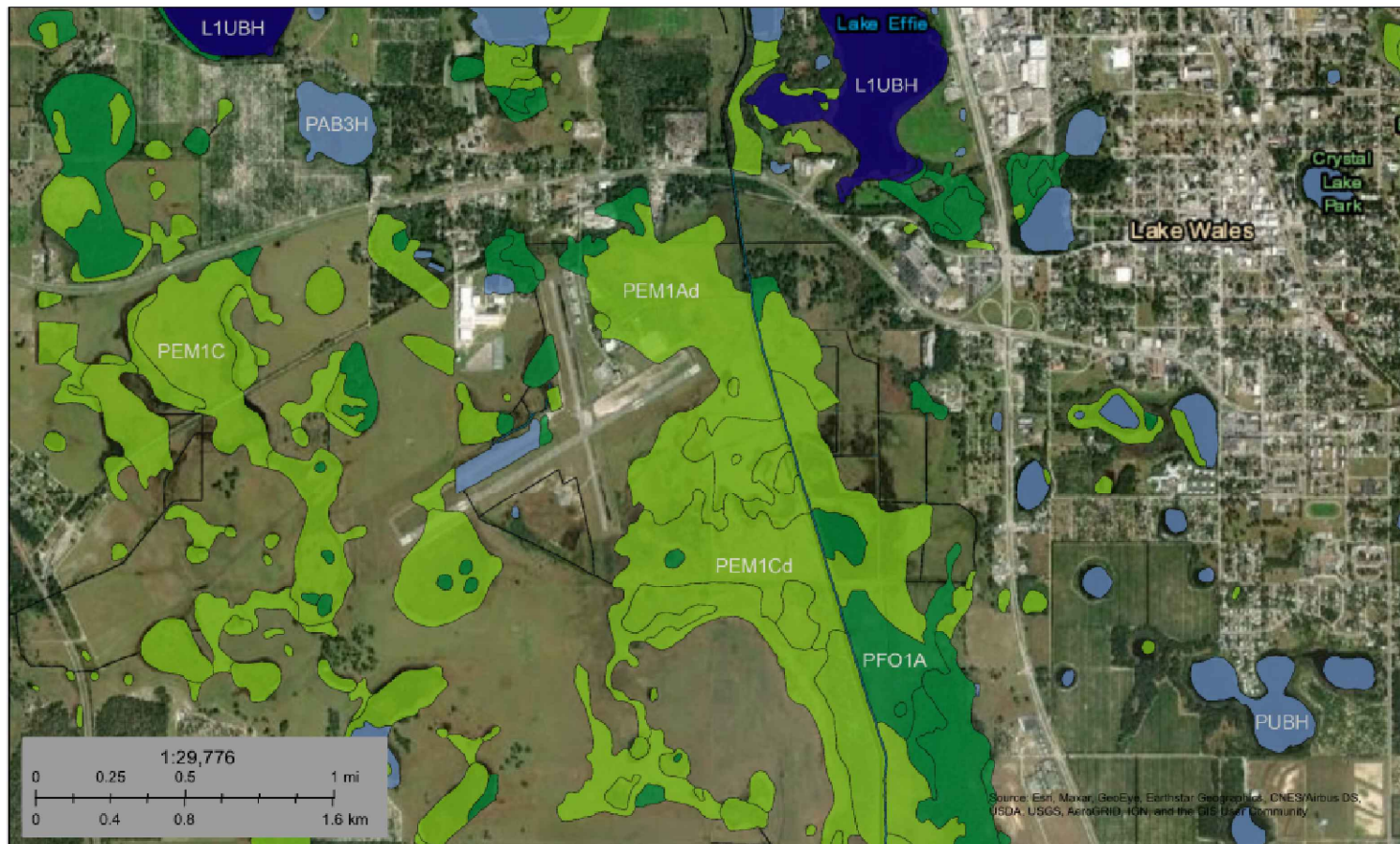
6.14.2 Floodplains

A floodplain is a dry or semi-dry land area where water collects after a rain event. These areas provide temporary natural storage for stormwater runoff and help to recharge the aquifer. Review of FEMA flood maps revealed parts of X07 are located within a FEMA Flood Zone AE. The flood zone map is shown in **Exhibit 6-2**. Depending on the location of future projects at the airport the potential for impacts to floodplains will need to be evaluated. SWFWMD rules require that “cup for cup” volumetric compensation for floodplain impacts be provided.

6.14.3 Surface Waters and Groundwater

Surface waters on airport property include swales, ditches and depressional areas used for the storage and conveyance of stormwater runoff. Future projects may use the existing surface waters or develop new surface waters to convey runoff away from the project locations and into the ultimate treatment or discharge point.

X07 National Wetlands Inventory Map



June 15, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Floodplain Mapping Application



Dependent on the future projects at X07, water quality and groundwater will be addressed through the National Pollutant Discharge Elimination System (NPDES) Construction General Permitting. It is not anticipated that future projects would require a Section 401 water quality certificate (WQC) as there are no navigable waters that would be affected by any potential projects due to the inland location of X07.

6.14.4 Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 declared that certain rivers shall be preserved in free-flowing condition and that their immediate environments be protected for the benefit and enjoyment of the present and future generations. The State of Florida has 49.2 miles of river designated as Wild and Scenic and which consists of Wekiva River and the Loxahatchee River. None of these rivers are located near X07.

6.15 Environmental Reviews

All development projects must endure the appropriate level of review. One of the three levels of environmental review categories outlined in FAA Orders 1050.1F and 5050.4B should be addressed for any recommended development from this Master Plan. The three levels of review are Categorical Exclusions (CATEX), Environmental Assessment (EA) and Environmental Impact Statement (EIS). The three levels are further described below:

CATEGORICALLY EXCLUDED ACTIONS: Projects that has an insignificant impact on the human environment.

ACTIONS NORMALLY REQUIRING AN ENVIRONMENTAL ASSESSMENT (EA): Projects that normally require an EA are actions that have been found to sometimes have minor or uncertain environmental impacts.

ACTIONS NORMALLY REQUIRING AN ENVIRONMENTAL IMPACT STATEMENT (EIS): Projects that are found to have significant impacts to the quality of the human environment.

Chapter 7: Alternatives Development and Evaluation

7.0 Introduction

This chapter of the Airport Master Plan Update describes the development of airport facilities and improvement projects, previously identified in Chapter 5 – Facility Requirements which are anticipated to be undertaken over the course of the 20-year airport master planning period. The potential facility developments and airport improvements are anticipated to be developed over time, and as demand dictates. Potential facility and airport improvements were identified based upon comments and suggestions offered by the public, airport users, and stakeholders through the Public Involvement Program.

An organized approach to identifying and evaluating alternative development options is essential for effective planning. The key elements of this process are:

- Identification of alternative ways to address the facility requirements identified in the previous chapter.
- Evaluation of the alternatives, individually, and collectively to gain a thorough understanding of the strengths, weaknesses, and other implications of each alternative.
- Selection of the best (preferred) alternative.

The major areas of focus for the alternative's developments are as follows:

- Airside
 - Hangar Development and Ramp Space
 - Fuel Farm Access
 - Separation of users
- Landside
 - Airport Access Points
 - Non-Aeronautical Development

The description and evaluation of alternative plans for proposed development at Lake Wales are described in detail in the following sections followed by a summary of preferred alternatives for future development.

7.1 Evaluation of Alternatives

A number of considerations impact facility development alternatives that would best utilize existing airport land. An important but less tangible consideration came from the feedback during the public information program. Airport users and local residents expressed a desire to improve the image of the airport and attract and accommodate more business activity, while at the same time supporting the existing aeronautical businesses and promoting continued recreational and instructional use of the airport.

In this chapter, the evaluation criteria of development alternatives have been divided into four broad categories: operational performance, best planning tenets and other factors, environmental factors, and fiscal factors.

- **Operational Performance** – How well the airport functions as a system can be evaluated from several perspectives, including:
 - Capacity
 - Capability
 - Efficiency
- **Best Planning Tenets and Other Factors** – The study determines the relative strengths and weaknesses of the alternatives. The common core or planning tenets that proposed development alternatives must meet are:
 - Conforms to best practices for safety and security
 - Conforms to the intent of applicable FAA design standards
 - Provides for highest and best on- and off-airport land use
 - Allows for forecast growth throughout the planning period
 - Provides for growth beyond the planning horizon, as applicable
 - Provides the flexibility to adjust to unforeseen changes
 - Conforms to the airport sponsor's strategic vision
 - Conforms to appropriate local, regional, and state transportation and other plans
 - Technically feasible
 - Socially and politically feasible
 - Satisfies user needs
- **Environmental Factors** – Potential environmental effects of the alternatives are an important consideration. The impact categories defined in FAA Order 1050.1, *Environmental Impacts: Policies and Procedures* and FAA Order 5050.4, FAA Airports guidance for complying with NEPA, offer significant insight about the likely impacts of various alternatives. Specific projects will require different levels of NEPA review effort, provided extraordinary circumstances are absent, with the least impactful projects eligible to receive a Categorical Exclusion (CATEX) determination and more significant projects with more potential human environmental impacts requiring an Environmental Assessment (EA) or if warranted, an Environmental Impact Statement (EIS).
- **Fiscal Factors** – Airport development projects are expensive and must be adequately funded if they are to meet the capability and efficiency expectations of the Sponsor and the flying public. Preparing rough cost estimates is a very effective way to compare alternatives and should be done in all alternatives analyses. Cost estimates should account for any special differences among alternatives.

7.1.1 Alternatives Development

Six alternatives were proposed based on the major areas of focus mentioned in Section 7.0. This study evaluates a “No Action” alternative for each category, as well as at least one alternative where the current facilities are changed. A preferred build-out will later be selected based upon the alternatives listed in this section.

7.1.1.1 West Side Development:

Alternative 1:

Most of the recent development at the airport has been centered around the east side of the airport (east of Runway 17-35). The lack of airfield access and environmental factors such as wetland and other low-lying areas have limited development on other areas of the airport property. Previous master plans as well as this current master plan show future development on the west side of the airport (west of Runway 17-35). This alternative includes the construction of a partial parallel taxiway to Runway 17-35, T-Hangars, box hangars, and ramp space. Based on the demand for T-hangars at general aviation airports, including X07, the alternative focuses on maximizing future T-hangar capacity. The development also includes a new access road and adequate vehicular parking for all hangar areas. The first phase of this development will take place in the long-term (10-year and beyond) planning horizon with the remaining portion being constructed beyond the 20-year planning horizon of this study. Developing this area will provide growth beyond the planned horizon and increase capacity at the airport. This alternative is depicted graphically in **Exhibit 7-1**.

A breakdown comparing the hangar space provided by this alternative to the other West side alternative is tabulated in **Table 7-2**. This alternative focuses on adding T-Hangars adjacent to Runway 17 as well as along Taxiway Alpha West. In addition to the T-Hangars, this alternative proposes to add corporate hangars and ramp space along Taxiway Alpha West.

Furthermore, this alternative proposes to construct an additional access point for the airport. This access point would allow vehicles to be able to directly enter the northwest quadrant of the airport. The northwest quadrant of the airport has the most potential for hangar development and having a direct access road would encourage growth in this area. If hangar development were to occur in this area, having an additional access road would increase safety on the airport so users would not need to cross Runway 17-35 to access these hangars.

In addition, this alternative offers 9.7 acres of space dedicated to non-aeronautical development. Non-aeronautical development will allow the airport to generate revenue in land that would otherwise likely remain undeveloped. The area could be used as a business park for local businesses that do not need access to the airfield.

There will be a major effect on biotic resources by this alternative. The development areas, which potentially contain wetlands, will need to be cleared of any trees and vegetation in the area. The area will also need to be filled to bring the site up to grade to alleviate any flooding concerns. This can be done at once or in phases as the area is built out. As a result of this alternative, there will be an overall increase in annual operations at the Lake Wales Municipal Airport since there will be more aircraft based at the airport.

The estimated total cost for this development within the planning horizon of the study is \$17,403,618. The individual project costs for this alternative are shown in Table 7-1 below.



Table 7-1 – West Side Development Alternative 1 Project Costs

Project ID	Description	Cost Estimate	Planning Period
10A	Access Road (Alternative 1)	\$2,434,219	10-20 years
11	Taxiway Charlie	\$1,094,483	10-20 years
12	T-Hangars (Phase I)	\$13,874,916	10-20 years
13	T-Hangars (Phase II)	\$13,874,916	20+ years
14A	Apron and Corporate Hangars (Alternative 1)	\$42,592,386	20+ years
	Total West Side Alternative 1 Costs	\$73,870,920	

Alternative 2:

This alternative is similar to Alternative 1, with the major change being a shift in focus from T-hangar development to box hangar development. Larger box hangars, sometimes referred to as corporate hangars, are more attractive to individuals and businesses that own jet aircraft. One of the main benefits of having more jet aircraft based at the airport is the potential increase in jet fuel sales which would add to the revenue of the airport. This alternative also consists of the ramp space as well as vehicular parking for all hangars and a new access road. This alternative is shown graphically in **Exhibit 7-2** and will encourage airport growth and increase operations.

A breakdown of the hangar and ramp space provided by this alternative compared to the other alternatives is tabulated in **Table 7-2**. The proposed aircraft parking ramp adjacent to Taxiway Alpha West would provide plenty of space for transient operations as well as primary users.

Similar to the previous alternative, this alternative includes the construction of a new access road. This access road would provide a direct and safe route to the northwest quadrant of the airport. This road will also connect the planned airfield development with the 18.3 acres of non-aeronautical development proposed by this option.

Table 7-2 – West Side Alternative Hangar and Ramp Space

	T-Hangars	Corporate Hangars	Aircraft Parking Apron
Alternative 1	128 units	9 units	46,500 SY
Alternative 2	0 units	33 units	65,560 SY

There will be a major effect on biotic resources by this alternative. The development areas, which potentially contain wetlands, will need to be cleared of any trees and vegetation in the area. The area will also need to be filled to bring the site up to grade to alleviate any flooding concerns. This can be done at once or in phases as the area is built out. As a result of this alternative, there will be an overall increase in annual operations at the Lake Wales Municipal Airport since there will be more aircraft based at the airport.

The estimated total cost for this development within the planning horizon of the study is \$11,725,312. The individual project costs for this alternative are shown in Table 7-3 below. Like the first alternative the first phase of this development will take place in the long-term (10-year and beyond) planning horizon with the remaining portion being constructed beyond the 20-year planning horizon of this study.



Table 7-3 – West Side Development Alternative 2 Project Costs

Project Number	Description	Cost Estimate	Planning Period
11	Taxiway Charlie	\$1,094,483	10-20 years
15	Box Hangars (Alternative 2)	\$8,198,598	10-20 years
10B	Access Road (Alternative 2)	\$2,432,231	10-20 years
16	Box Hangars (Along Taxiway Alpha)	\$11,526,459	20+ years
14B	Apron (Alternative 2)	\$6,622,457	20+ years
	Total West Side Alternative 2 Costs	\$29,874,227	

Alternative 3: No Action

This alternative represents the “No Action” alternative. The “No Action” does not propose any new changes to the existing hangar or ramp layout on the west side of the airport. All hangars will remain in their current location and no additional hangars will be added. Likewise, no changes or addition will be made to the ramps at the Lake Wales Municipal Airport. However, general maintenance can be done to the ramps to keep them in a safe and operational condition.

There are no biotic resources impacted by this alternative. The “No Action” Alternative does not conform to the strategic vision of the airport or satisfy user needs. This alternative will prohibit the airport from reaching its projected forecast and the economic development of the airport because there will be more demand for hangars than what currently exists. This alternative is the most cost-efficient since no changes are being made.

7.1.1.2 East Side Development

Alternative 1:

As stated above the east side of the airfield (East of Runway 17-35 and North of Runway 6-24) is where all the current development has taken place over the years. This area of the airport still has room for development and the goal of this alternative is to maximize build out on the east side of the airport before moving to the west side as presented in the West Side Development alternative above. The timeframe for the East Side Development is short term (5-year) and intermediate term (5 to 10 years) in the planning horizon. This alternative focuses on meeting the airport’s goals in terms of development, separation of users, and creating a safer airfield environment. This alternative is depicted graphically in **Exhibit 7-3**.

This alternative proposes to add four new box hangars to the east side of the airport. These box hangars will attempt to maximize the undeveloped areas adjacent to Taxiway Alpha East and Taxiway Bravo North while still allowing space for a run-up area to be constructed for Runway 24. A run-up area would be beneficial for the airport as new hangar development encourages more jet traffic at the airport. A run-up area would allow for smaller aircraft (Design Group I) to have a dedicated area to run-up their engines while allowing an unobstructed path for jets to continue to use the runway. As the airport continues to develop, a run-up area will be crucial in reducing congestion while entering Runway 24 and will allow for more efficient operations.



This alternative consists of constructing an access road to the existing fuel farm. Currently, delivery trucks needing access to the fuel farm are required to drive on Taxiway Alpha and the aircraft parking apron. Constructing a dedicated road for delivery trucks to access the fuel farm would increase safety by limiting how often aircraft and vehicles will be driving on the same portions of pavement. This alternative would not require the relocation of any existing facilities.

This alternative proposes to allocate 33.5 acres of airport property for future non-aeronautical development.

Additionally, this alternative proposes to add additional vehicular parking along airport road for the existing T-Hangars adjacent to Taxiway Bravo North. Currently, users of these T-Hangars must drive their cars on the active taxilane in order to access their hangars. Constructing a dedicated parking lot for these users would result in an overall safer environment where vehicles are not driving on the same pavement as aircraft.

This alternative proposes to construct additional parking in the main airport parking lot by expanding the lot north of the existing general aviation terminal and adjacent businesses. Presently, the airport parking lot is at capacity on a regular basis and cars are often forced to park along airport road when spaces run out. The area north of the existing businesses is undeveloped and would be an ideal place to add additional parking.

There will be an effect on biotic resources by this alternative. The development areas will need to be cleared of any trees and vegetation in the area. This can be done at once or in phases as the area is built out. As a result of this alternative, there will be an overall increase in annual operations at the Lake Wales Municipal Airport since there will be more aircraft based at the airport. The proposed buildout of this area will cost approximately \$6,332,137 and will create new economic opportunities and additional revenue streams for the airport. **Table 7-4** below breaks down the costs for each of the projects related to this alternative:

Table 7-4 – East Side Development Alternative 1 Project Costs

Project ID	Description	Cost Estimate
1	North T-Hangar Parking Lot	\$110,000
2A	FBO Parking Lot Expansion (Alternative 1)	\$100,000
3	Hangar Access Road and Parking (Loop)	\$258,310
4	Runup Area	\$428,745
5	Corporate Hangars with Aprons	\$5,435,082
	Total Alternative 1 Costs	\$6,332,137

Alternative 2:

Alternative 2 for the east side development shares similarities to Alternative 1 except for the run-up area and the addition of aircraft parking apron expansion near the FBO building. Alternative 2 proposes to construct a 14-unit T-Hangar building in lieu of the run-up area proposed by the previous alternative. The proposed T-Hangars are shown east of the existing aircraft parking apron. This option maximizes the potential hangar space development within the existing layout of the east side of the airport. T-Hangar

development will help generate revenue for the airport moving them closer to self-sufficiency while facilitating growth of the airport. This alternative is depicted graphically in **Exhibit 7-4**.

There will be an effect on biotic resources by this alternative. The development areas will need to be cleared of any trees and vegetation in the area. This can be done at once or in phases as the area is built out. As a result of this alternative, there will be an overall increase in annual operations at the Lake Wales Municipal Airport since there will be more aircraft based at the airport. The proposed buildout of this area will cost approximately \$13,898,614 and will create new economic opportunities and additional revenue streams for the airport. **Table 7-5** below breaks down the costs for each of the projects related to this alternative:

Table 7-5 – East Side Development Alternative 2 Project Costs

Project ID	Description	Cost Estimate
1	North T-Hangar Parking Lot	\$110,000
2B	FBO Parking Lot Expansion (Alternative 2)	\$130,000
3	Hangar Access Road and Parking (Loop)	\$258,310
4	Rehabilitate FBO Taxiway	\$155,000
5	Corporate Hangars with Aprons	\$5,435,082
6	FBO Apron Expansion Phase I	\$1,052,643
7	FBO Apron Expansion Phase II	\$419,795
8	Hangar Access Road and Parking (Extension to T-Hangars)	\$134,923
9	T-Hangars	\$6,202,861
	Total Alternative 2 Costs	\$ 13,898,614

Alternative 3: No Action

This alternative represents the “No Action” alternative. The “No Action” does not propose any new changes to the existing hangars or parking layout on the east side of the Airport. The “No Action” alternative proposes no change to the existing pavement at the Runway 24 end. Planes will continue to use the Runway to run-up before taking off. The “No Action” does not propose any new access to the fuel farm area. Vehicles will continue to access the fuel farm by entering through the main access gate and driving on Taxiway Alpha. This alternative does not resolve the safety concern which exists with vehicles regularly driving on the active taxiway. The “No Action” proposes no change to the existing operations of the skydive and paramotor activity at the airport. While this is the most cost-efficient option, this alternative does not resolve the safety concern which exists with the airspace being shared by traditional aircraft, personal aircraft, and skydivers. The “No Action” alternative proposes not to build a new parking area for the existing hangars adjacent to Taxiway Bravo North. Selecting this option does not offer a solution for the safety issue that occurs when vehicles are using the same space as planes. The “No Action” alternative proposes not to construct additional parking for the airport. The parking lot will remain as-is and cars will park along airport road as necessary.



There are no biotic resources impacted by this alternative. The “No Action” Alternative does not conform to the strategic vision of the airport or satisfy user needs. This alternative will prohibit the airport from reaching its projected forecast and the economic development of the airport because there will be more demand for hangars than what currently exists. This alternative is the most cost-efficient since no changes are being made.

7.1.1.3 Paramotor Operating Area

Being a federally obligated airport (accepted federal funding), the City of Lake Wales must operate the airport in a fair and reasonable manner to all aeronautical activities, including skydiving and paramotor operations. This alternative proposes to develop separate dedicated operating areas for the various recreational aeronautical activity space.

Alternative 1:

The first site is in the northeast quadrant of the airport and would be approximately 12.0 acres as shown in **Exhibit 7-5**. This alternative supports the separation of recreational aeronautical activities from traditional airport use which is one of the main changes requested by users as part of the tenant survey associated with this master plan. Two recreational activity businesses, Jump Florida Skydiving and Aviator Paramotor, operate at the airport and need dedicated space to safely perform their daily operations. This proposed separation consists of demolishing the abandoned campground in the northeast quadrant of the airport and constructing an 800-foot turf area for paramotor takeoff and landings. Additionally, an area immediately north of this location will be graded and maintained as a dedicated landing zone for skydivers. Creating this separation of fixed wing aircraft from recreational users will allow for safer operations at the airport.

Based on discussions with the existing users there are some potential issues associated with the proposed alternative recreation aeronautical activity area. The first being the existing area is surrounded by large trees, buildings and powerlines which pose a safety risk to skydivers and paramotors. Additionally, the surrounding topography promotes turbulence which interferes with the operation of a paramotor. Also, the area also does not allow 360 degree launches and would require paramotors cross the runway ends to follow a southern flight path. Operating south of the airport is preferred since the area south of the airport is mainly undeveloped cow pasture which is ideal for paramotors to operate over. From the perspective of the skydiving users a drop zone located in the center of the airfield provides a safer alternative since this makes the skydivers more visible and keeps them outside of the flight patterns.

Taking this user feedback into consideration two alternative locations on the southside of the airfield were evaluated for paramotor operations as part of this alternative. It was determined that the skydiving drop zone operation should remain at the current location, north of Runway 24 and south of Taxiway Alpha.

There will be a major effect on biotic resources by this alternative. The development area, which potentially contain wetlands, will need to be cleared of any trees and vegetation in the area. The area will also need to be filled to bring the site up to grade to alleviate any flooding concerns.



Alternative 2:

The sites are in the southeast and southwest quadrants of the airport as shown on **Exhibit 7-6** and **Exhibit 7-7** respectively. The southeast site would be in a low lying (wet) area that would require a significant amount of fill material and potentially wetland mitigation to make it suitable for use. This area is also close to the AWOS and would push the paramotor traffic close to Runway 35 when the winds are out of the east. The proposed southwest site is better suited for paramotor operations and eliminates all the concerns in the north and southeast airfield sites. This site would require the least amount of work to become operational. It has no major obstructions and is close to the current paramotor training area. The area would also allow for 360-degree towing operations which are needed for student training flights. This area would require a gravel or asphalt millings access road to be built to allow better access to the site.

There will be a minimal effect on biotic resources by this alternative. Some clearing and minor grading will need to be done to construct the access road to the site.

Alternative 3: No Action

This alternative represents the “No Action” alternative. The “No Action” does not propose any new changes to the recreational aeronautical operating areas on the airfield.

There is no effect on biotic resources by this alternative since no infrastructure changes are being done. Airport safety may be compromised since there will continue to be a mixture of fixed wing aircraft and recreational user traffic using the airspace and airfield. This is the most cost-effective alternative.

7.2 Selection of the Recommended Alternatives

The selection of the development alternatives is based upon how well the development meets the needs of the airport and users in terms of safety and growth. According to Chapter 5 *Facility Requirements*, all of the existing hangar facilities at the airport are occupied and there is a waitlist of individuals that are interested in renting a hangar as soon as one becomes available. With the recent extension of Runway 6-24, the demand for facilities development around the airport will continue to increase. In turn, the boost in overall operations will further the need for increased safety improvements such as the separation of users and improved vehicular traffic routes.

In addition to meeting the needs, the alternative must have public support and be financially feasible. The desire for airport improvements was expressed during the public information gathering sessions. The estimate of probable development cost for each alternative will dictate which alternative is attainable and in what timeframe.

Environmental impacts are also a major component in the federal approval of development projects. These impacts will be discussed and their effect on the development will be represented in the estimate of probable costs, as permitting and mitigation can be significant if avoidance is not possible.



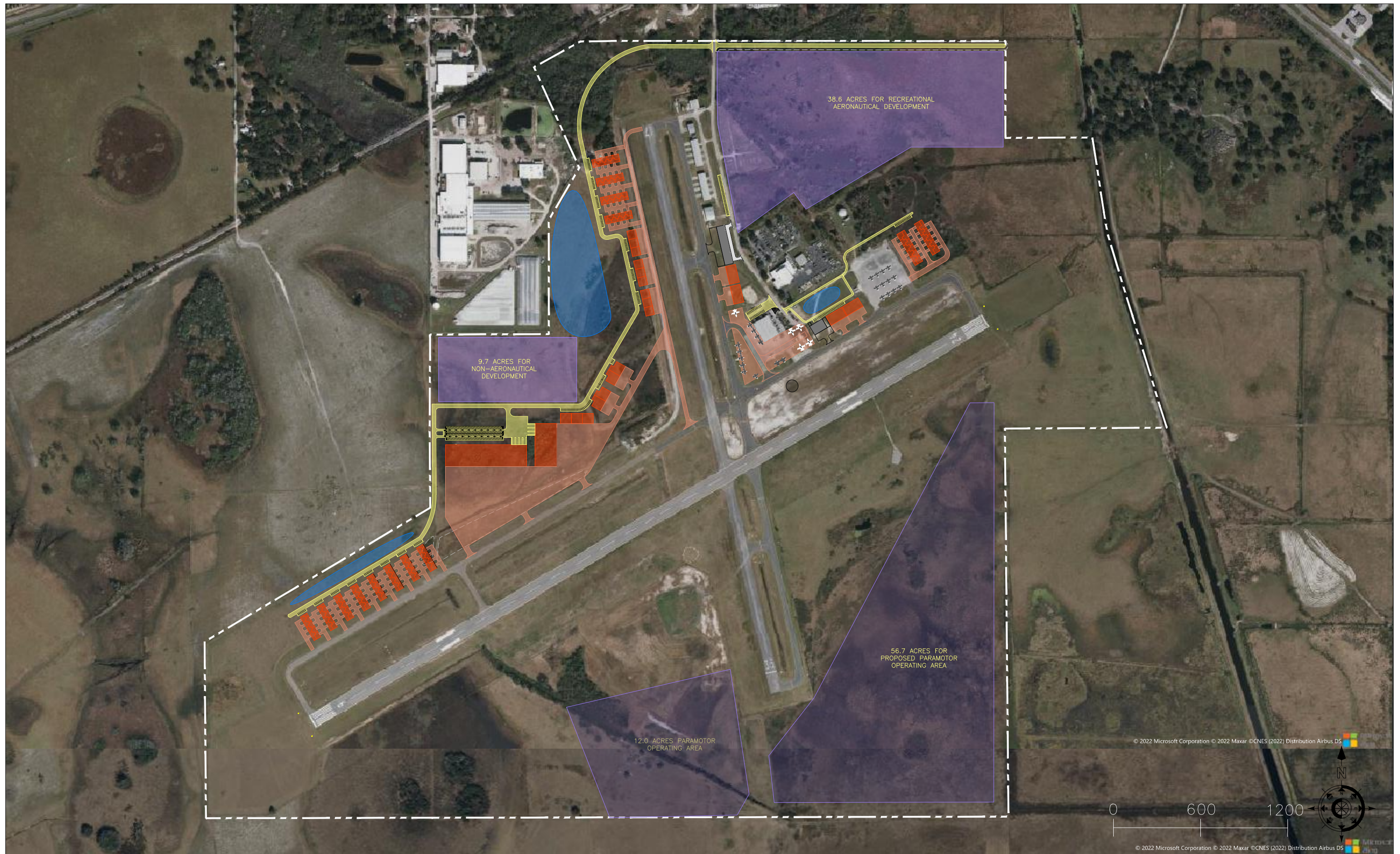


Table 7-6 – Alternatives Analysis Factors and Categories

		No Action	Biotic Resource Effect	Revenue Generation	Safety Improvement	Operational Improvement	Planning Period Cost (2020 Dollars)
West	1		✓	✓	✓	✓	\$17,403,618
West	2		✓	✓	✓	✓	\$11,725,312
West	3	✓					\$0.00
East	1		✓	✓	✓	✓	\$6,332,137
East	2		✓	✓	✓	✓	\$13,898,614
East	3	✓					\$0.00
Paramotor	1		✓				
Paramotor	2		✓		✓	✓	
Paramotor	3	✓					

7.2.1 Preferred Development Alternative

The preceding sections have identified and analyzed a number of planning alternatives for the future development of the Lake Wales Municipal Airport. The alternatives presented focused on meeting facility needs at the airport while maintaining operational efficiency and safety standards. The preferred alternatives reflected in **Exhibit 7-8** will be utilized as the basis for the development of the new ALP drawing set for the airport.



Chapter 8: Airport Layout Plan

8.0 Introduction

The Airport Layout Plan (ALP) is a scaled set of drawings that depict existing and proposed land and facilities necessary for the operation and future development of X07. The ALP is a key communication and agreement document between the City of Lake Wales, the Federal Aviation Administration (FAA), and the Florida Department of Transportation (FDOT). The drawings represent an understanding among these three parties regarding the current and future operation and development of the airport.

The five primary functions of the ALP may be summarized as follows:

1. An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP provides a guideline by which the airport sponsor can ensure that development maintains airport design standards and safety requirements and is consistent with airport and community land use plans.
2. The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.
3. The approved ALP enables the airport sponsor and the FAA to plan for facility improvements at the airport. It also allows the FAA to anticipate budgetary and procedural needs. The approved ALP will also allow the FAA to protect the airspace required for facility or approach procedure improvements.
4. The ALP can be a working tool for the airport sponsor, including its development and maintenance staff.
5. An approved ALP is necessary for the airport to receive financial assistance under the terms of the Airport and Airway Improvement Act of 1982, as amended, and to be able to impose and use Passenger Facility Charges. An airport must keep its ALP current and follow that plan, in accordance with grant assurance requirements of the AIP and previous airport development programs, including the 1970 Airport Development Aid Program (ADAP) and Federal Aid Airports Program (FAAP) of 1946, as amended.

8.1 ALP Sheets Description

There are 10 ALP drawing sheets that accompany this master plan update. They are described below and included at half scale at the end of the chapter.

8.1.1 Title Sheet (Sheet 1)

A separate cover sheet, with approval signature blocks, space for an FAA approval stamp, airport location maps, and other pertinent information as required by the local FAA Airports District Office (ADO).

8.1.2 Data Sheet (Sheet 2)

A separate sheet documenting the information that is graphically shown on the Airport Layout Plan drawing. The airport data sheet provides the following information:

- Wind Rose and percent coverage tables
- Airport Data Table
- Runway Data Table
- Taxiway Data Table
- Declared Distances Table
- Modifications to Standards Table

8.1.3 Ultimate Airport Layout Plan Drawing (Sheet 3)

The ALP depicts the existing and ultimate airfield layout over the 20-year planning period at X07 and includes the FAA approval stamp. Once approved by the FAA and FDOT, the ALP serves as official guidance for the City of Lake Wales in making future decisions on funding of airfield improvements or other requests for development on Airport property.

8.1.4 Terminal Area Plan (Sheet 4)

This plan consists of a drawing that presents a large-scale depiction of areas with significant terminal facility development. Such a drawing is typically an enlargement of a portion of the ALP. In the case of X07, the terminal area plan focuses on the development shown around the existing Airport Terminal Building.

8.1.5 Future FAR Part 77 Airspace Surface (Sheet 5)

Title 14 CFR Part 77, Objects Affecting Navigable Airspace, defines this as a drawing depicting obstacle identification surfaces for the full extent of all airport development. Part 77 was established to promote safe operations of aircraft in the airspace surrounding the airport by establishing imaginary surfaces which cannot be penetrated by any natural or manmade object. The imaginary surfaces are established based on the airfield geometry, runway category and approach type. The imaginary surfaces to be protected from obstructions include:

Primary Surface

The primary surface is a rectangular area symmetrically located about the runway centerline and extending a distance of 200 feet beyond each runway end. The elevation of the primary surface is the same elevation as the nearest point of the runway.

Horizontal Surface

The horizontal surface is an oval shaped area situated 150 feet above the published airport elevation. Its dimensions are determined by circles, either 5,000 feet or 10,000 feet in radius depending on the sophistication and utility of the runway, which are centered about the midpoint of each end of the primary surface. These circles are then connected by lines of tangent to enclose the limits of the horizontal surface.

Conical Surface

The conical surface is a sloped area originating at the edge of the horizontal surface and extending outward and upward at a slope of 20:1 for a horizontal distance of 4,000 feet.

Transitional Surfaces

These surfaces extend outward and upward at right angles to the runway centerline and centerline extended at a slope of 7:1 from the sides of the primary surface as well as from the sides of the approach surface. Transitional surfaces for those portions of the prevision approach, which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface at right angles to the Runway centerline.

Approach Surface

This surface begins at the ends of the primary surface and slopes upward at a predetermined ratio while at the same time flaring out horizontally. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and outer width are determined by the runway service category and existing or proposed instrument approach capabilities.

8.1.6 Airport Airspace Profiles (Sheet 6)

This drawing depicts profile views of the CFR Part 77 obstacle identification surface, the threshold siting approach surface, and the instrument departure surface for each runway end.

8.1.7 Inner Portion of the Approach Surface Drawings (Sheets 7 and 8)

Two drawings containing the plan and profile view of the inner portion of the approach surface to the end of each runway and a tabular listing of all surface penetrations. The drawings depict the obstacle identification approach surfaces contained in 14 CFR Part 77, Objects Affecting Navigable Airspace. The drawings also depict other approach surfaces, including the threshold-siting surface, those surfaces associated with United States Standards for Instrument Procedures (TERPS), or those required by the local FAA office or state agency.

8.1.8 Airport Land Use Drawing (Sheet 9)

A drawing depicting the land uses and zoning within and around the airport property boundary.

8.1.9 Airport Property Map (Sheet 10)

A drawing depicting the airport property boundary, the various tracts of land that were acquired to develop the airport, and the method of acquisition. This drawing is only required for those airports that have acquired land with Federal funds or through an FAA-administered land transfer program; however, it may be useful to all airport sponsors. If any obligations were incurred as a result of obtaining property or an interest therein, they should be noted. Obligations that stem from a Federal grant or an FAA-administered land transfer program, such as surplus property programs, should also be noted. The drawing should also depict easements beyond the airport boundary. An airport property map is not a

substitute for an Exhibit A unless it is prepared in accordance with AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects. An Exhibit A provides a detailed account of the property owned by the airport. It is a formal drawing required for the submission of grants applications. A property map is a general overview depicting approximate limits of property bounds. It is far less intensive to verify and produce.

8.2 Obstacle Action Plan

On August 8, 2015, the FAA issued a memo titled “Reminder of Responsibilities for FAA Personnel and Airport Sponsors for Protecting Approach and Departure Surfaces”. The memo was focused on importance of establishing and maintaining clear approach and departures surfaces. The memo states verbatim that *“An airport sponsor that has unmitigated obstacles is expected to develop an Obstacle Action Plan (OAP) that details how and when each of the surfaces will be cleared and maintained. This plan needs to include all approach and departure surfaces, not just the 20:1 surface.”* As part of this master plan update the OAP is included on of Sheets 7 and 8. The obstructions to the existing and future approaches are identified in a table along with the proposed mitigation effort.

8.3 FAA Review and Approval of the ALP

The ALP drawing set review and approval process goes through multiple submissions.

- Preliminary ALP Submittal
 - Submitted to the Airport to ensure the ALP includes the proper sheets and projects before submission to the FAA and FDOT.
- Draft ALP Submittal
 - Submitted to the FAA ADO and FDOT for review and comment along with the ALP checklists.
- Final ALP Submittal
 - Revised based on the FAA, FDOT, and any additional airport sponsor comments and submitted to the sponsor, FDOT, and the FAA with the associated documentation (e.g., Narrative Report, Master Plan) for distribution.

Since many projects shown on an ALP have not received formal environmental or airspace approval, the ALP may be approved as “conditional.” Conditional approval is typical for an ALP as it includes long-term plans that are likely beyond the horizon of environmental (three years) and airspace review. Conditional approval also includes noting that development not yet shown in the ALP is subject to FAA environmental and airspace approval as well.

Chapter 9: Capital Improvement Plan

9.0 Introduction

The Capital Improvement Plan (CIP) represents a schedule and cost estimate for implementing the Development Plan, which has been recommended as a result of the analysis of data generated through the master plan process. Scheduling of improvements has been divided into three phases: near-term (2022-2026), intermediate-term (2027-2031) and long-term (2032-2042). The CIP must be viewed as a constantly evolving document. Additionally, planning for X07 should remain flexible and incorporate annually updated estimates of costs and priorities. This approach is consistent with the Joint Automated Capital Improvement Program (JACIP) planning process implemented by the Florida Department of Transportation (FDOT) and the Federal Aviation Administration (FAA).

In general, the planning effort undertaken for the update of the Airport Master Plan indicates that priorities should be established as follows:

- Ensure that all existing airfield elements are adequate and provide for safe and efficient aircraft operations
- Develop additional aviation facilities to meet anticipated aviation needs and demand
- Develop facilities that promote area economic growth and airport revenue generation

Under this general priority list, and in consideration of the Alternative Development and Evaluation presented in Chapter 7 of this Airport Master Plan Update, it is possible to prepare a recommended implementation plan for the airport. However, as stated previously, airport facilities should be developed on an as-needed basis, as demand dictates. This approach favors prudent fiscal planning. It should also be noted that unforeseen changes in project priorities or the availability of federal, state, and/or local funding would affect the implementation plan and proposed phasing in the CIP.

9.1 Potential Funding Sources

Funding for capital projects is derived from a combination of sources. Typically funds for airport projects come primarily from federal (FAA) and state (FDOT) grants. Another source of funding includes from the private sector. As part of the both the FAA and FDOT grant programs City of Lake Wales provides local matching funds to supplement the federal and state grants. Sometimes other funds, such as economic development transportation grants, are available for airport development projects. There is strong support among airport tenants and users to seek additional funding for a variety of airport projects. The CIP is structured in a manner that presents a logical, balanced sequence of improvements, while attempting to reflect available funding from the federal, state, private and local levels.

9.1.1 Federal Funding

The Airport Improvement Program (AIP) provides funds for airport development and planning. Funding for this program was authorized in 1982 with the passage of the Airport and Airway Improvement Act. AIP funds originate from the Airport and Airway Trust fund, which draws support from user fees, fuel taxes and other revenue sources. These funds are distributed under appropriations set by Congress to all airports in the U.S. that have certified eligibility. Funding of federal project is subject to the eligibility guidelines established in the Airport Improvement Program Handbook, FAA Order 5100.38D. The AIP

program does not cover the full amount of a project. The federal share is based on the sponsor type. For General Aviation (GA) airports, such as Lake Wales Municipal Airport, the AIP will fund up to 90 percent of eligible project costs. The remaining 10 percent is funded by the local municipality and State DOT. FAA funds are usually reserved for construction or rehabilitation of runways and taxiways, non-exclusive use aprons, navigational aids, federal air traffic control towers, passenger terminal buildings (non-revenue areas only), primary airport access roads and land acquisition.

The AIP funds general aviation airport through two methods: General Aviation (GA) entitlement funds and Discretionary funds. Each year the FAA allots entitlement funds based on the airport's classification that can be accrued over a four-year period. X07 is a general aviation airport without scheduled commercial air service and therefore the federal non-primary entitlement is currently \$150,000 per year. If the accrued entitlement funds are not used after the four-year period, the funds expire and return to the general fund. The general fund provides additional discretionary funds to projects with costs exceeding the available entitlement funds. Discretionary funding is allocated based on priority as identified in the National Plan of Integrated Airport Systems (NPIAS). Projects that rate a higher priority will get higher consideration for available funding.

9.1.2 State Funding

The FDOT Aviation Office provides funds for eligible projects and also provide matching funds for FAA grants. FDOT eligibility criteria is much broader than FAA's, including hangars, general aviation terminal buildings, parking lots and projects referred to as economic development projects. On projects where no federal funding is available, projects eligible for state funding receive up to 80 percent of the total project costs with the remaining 20% being covered by City of Lake Wales. When federal funding is available, FDOT provides up to 80% of the remaining costs not covered by the FAA, which equates to 8 percent. The remaining 2 percent is covered by City of Lake Wales on FAA eligible projects.

Separate from the AIP, in an effort to promote economic development, the FDOT provides up to 50 percent of the costs to build on-airport, revenue-producing capital improvements such as industrial park facilities, maintenance hangars, and fuel farms at general aviation airports. FDOT coordinates the program funds with X07 using the Joint Airport Capital Improvement Program (JACIP). Additional details on eligibility of State funding for projects can be found in the Florida Aviation Project Handbook accessed here: <http://www.dot.state.fl.us/aviation/flpub.shtm>.

9.1.3 Local Funding

Recipients of AIP funds are referred to as "sponsors" by the FAA. Sponsors must be legally, financially and otherwise able to carry out the assurances and obligations of the grant agreement. Financially, sponsors are required to match federal and/or state grants to eligible projects with the proportional amount known as the "Local Share". The local share may be generated from the airport's enterprise fund, commercial loans, or other creative financing avenues.

The City of Lake Wales has operated and developed the airport using a private enterprise business model since the property was acquired from the federal government. The city acts as a landlord by leasing airport property to private individuals and businesses. The city does not operate any airport businesses or otherwise provide aeronautical services, rather private businesses provide aeronautical services to the flying public. As the airport sponsor, the city develops airport operational infrastructure primarily with

funds from the FAA and FDOT, using revenue from land leases and fuel flowage fees (the only sources of revenue for the airport) to pay for the airport operational expenses such as staff salary and benefits, liability insurance, utilities, contract mowing and maintenance, and other airport related expenditures. The balance of the budget between revenues and expenses along with any additional available funding make up the local share for such CIP projects. The goal is for the airport to be financially self-sustaining and to limit the burden on local communities to support capital improvement projects. Currently the airport gains revenue through land leases and fuel sales. Land for hangars and apron area is leased to airport users.

9.1.4 Private Funding

Projects not eligible for AIP or State funding must either be funded by City of Lake Wales, by private entities, such as airport businesses or private developers, or through alternative funding sources. There are several areas where private development sources can contribute needed improvements to the Airport. These include FBO facilities, hangars, automobile parking and utilities. Due to the potential high costs associated with these facilities public-private partnerships (P3) are a good alternative to meeting project costs. Public-private partnerships are often used for specific projects when the airport would like to have increase control over a project development but not have or is not willing to commit the funds necessary to construct the project. The P3 agreements are often used for hangar and other similar projects that result in a final product (such as a building) that the airport can lease to the developer to use for a pre-determined amount of time before it reverts to the County. This avenue provides a practical tool for managing the financial burden to the airport for development while allowing them to increase the lease revenue through use of a ground lease. P3 agreements are also used in cases where a private entity pays the matching share needed for an FDOT grant (typically for a hangar) in return for long term lease considerations on the subject facility.

9.2 Recommended Airport Capital Improvement Program

Scheduling of improvements has been divided into three phases: near-term (2022-2026), intermediate-term (2027-2031) and long-term (2032-2042). The near-term projects consist mainly of rehabilitation of existing infrastructure, programmed JACIP items, and developing the east side of the airport. The intermediate-term projects continue with apron expansion and hangar construction. The long-term projects include items the city may select for inclusion in the JACIP and implement as priorities as funding allows.

Projects are presented in individual fiscal years based on their priority assuming an unconstrained, unlimited budget. Project costs are based upon the 2019 FDOT Pavement Evaluation Report, the current version of the JACIP, and an estimated probable cost.

Each CIP project moving forward needs to follow the proper planning and procurement procedures in accordance with the AIP Handbook in order to be considered FAA eligible. Proper design of the infrastructure may initially increase the cost but is necessary in order to limit future maintenance and rehabilitation costs.

9.2.1 Near-Term Airport Implementation Plan (2022-2026)

The near-term development projects are primarily focused on improving the east side of the airport. Specifically, the development projects identified as near-term solutions are projects that are cost effective and provide a quick return on investment for the airport. These projects include apron expansion, hangar construction, and vehicular access/parking. Constructing these projects in the near-term timeframe will allow for the airport to generate more revenue that can be utilized for future growth.

The near-term maintenance and pavement projects are based mainly on immediate needs as identified in the 2019 FDOT Pavement Evaluation Report for X07 augmented by the current JACIP. These projects are classified based on the condition of their pavement with the most immediate needs being listed first. Additionally, when an apron or taxiway is designated to be rehabilitated, it will be redesigned to meet the current standards as necessary and as outlined in the future airport layout plan. The financial priorities reflected in the 2019 FDOT Pavement Evaluation Report will limit the city's preferred near-term development opportunities as most available local matching funds will be required to meet the rehabilitation and reconstruction needs identified in the pavement report.

The projects shown in **Exhibit 9-1** and listed in **Table 9-1** have been programmed in the JACIP but projects will be constructed based on available funding and may be postponed if funds are not available.

Table 9-1 – Near-Term (2022-2026) Potential Projects and Costs

Project ID	Project Description	Project Costs	Potential Funding Source			
			Federal	State	Local	Private
6	FBO Apron Expansion (Phase I)	\$ 931,542.00	\$ 838,388.00	\$ 46,577.00	\$ 46,577.00	\$ -
5A	Corporate Hangars (North)	\$ 2,717,541.00	\$ -	\$ 3,847,846.00	\$ -	\$ (1,130,305.00)
2B	FBO Parking Lot Expansion	\$ 100,414.00	\$ -	\$ 80,332.00	\$ 20,083.00	\$ -
1	T-Hangar Parking Lot (North)	\$ 59,363.00	\$ -	\$ 47,490.00	\$ 11,873.00	\$ -
3	Hangar Access Road and Parking (Phase I)	\$ 206,561.00	\$ -	\$ 165,248.00	\$ 41,312.00	\$ -
4	Taxilane Bravo Rehabilitation	\$ 160,000.00	\$ 144,000.00	\$ 8,000.00	\$ 8,000.00	\$ -
15	T-Hangar Taxilanes Reconstruction	\$ 650,000.00	\$ 585,000.00	\$ 32,500.00	\$ 32,500.00	\$ -
16	Runway 17-35 Rehabilitation	\$ 1,000,000.00	\$ -	\$ 800,000.00	\$ 200,000.00	\$ -
16	Runway 17-35 Lighting and Signage	\$ 500,000.00	\$ -	\$ 400,000.00	\$ 100,000.00	\$ -
Totals		\$ 6,325,421.00	\$ 1,567,388.00	\$ 5,427,993.00	\$ 460,345.00	\$ (1,130,305.00)

Source: Hoyle Tanner, 2022

9.2.2 Intermediate-Term Airport Implementation Plan (2027-2031)

The intermediate-term projects are focused on continuing the proposed development on the east side of the airport based upon the needs identified in the 2019 FDOT Pavement Evaluation Report for X07, the programmed projects within current JACIP, and development depicted on the future airport layout plan. All of the existing development at the airport as well as the development proposed in the near-term implementation plan is concentrated on the east side. Therefore, the preference of the airport would be to continue building out this quadrant before moving on to develop other areas. **Table 9-2** depicts the proposed airport improvements for the intermediate-term improvements.

PROJECT ID	PROJECT DESCRIPTION
1	T-Hangar Parking Lot (North)
2B	FBO Parking Lot Expansion
3	Hangar Access Road and Parking (Phase I)
4	Taxilane Bravo Rehabilitation
5A	Corporate Hangars (North)
5B	Corporate Hangars (East)
6	FBO Expansion (Phase I)
7	FBO Apron Expansion (Phase II)
8	Hangar Access Road and Parking (Phase II)
9	T-Hangars (East)
10A	Corporate Hangars (West Phase I) & Airport Access Road
11	Taxiway Charlie Construction
12	T-Hangars (West Phase I)
15	T-Hangar Taxilanes Reconstruction
16	Runway 17-35 Rehabilitation, Lighting and Signage
17	Runway 35 Runway Safety Area Improvements
18	Runway 6-24 Rehabilitation
19	Taxiway Alpha Rehabilitation
20	Taxiway Bravo Rehabilitation
21	West Corporate Hangars (Phase I)

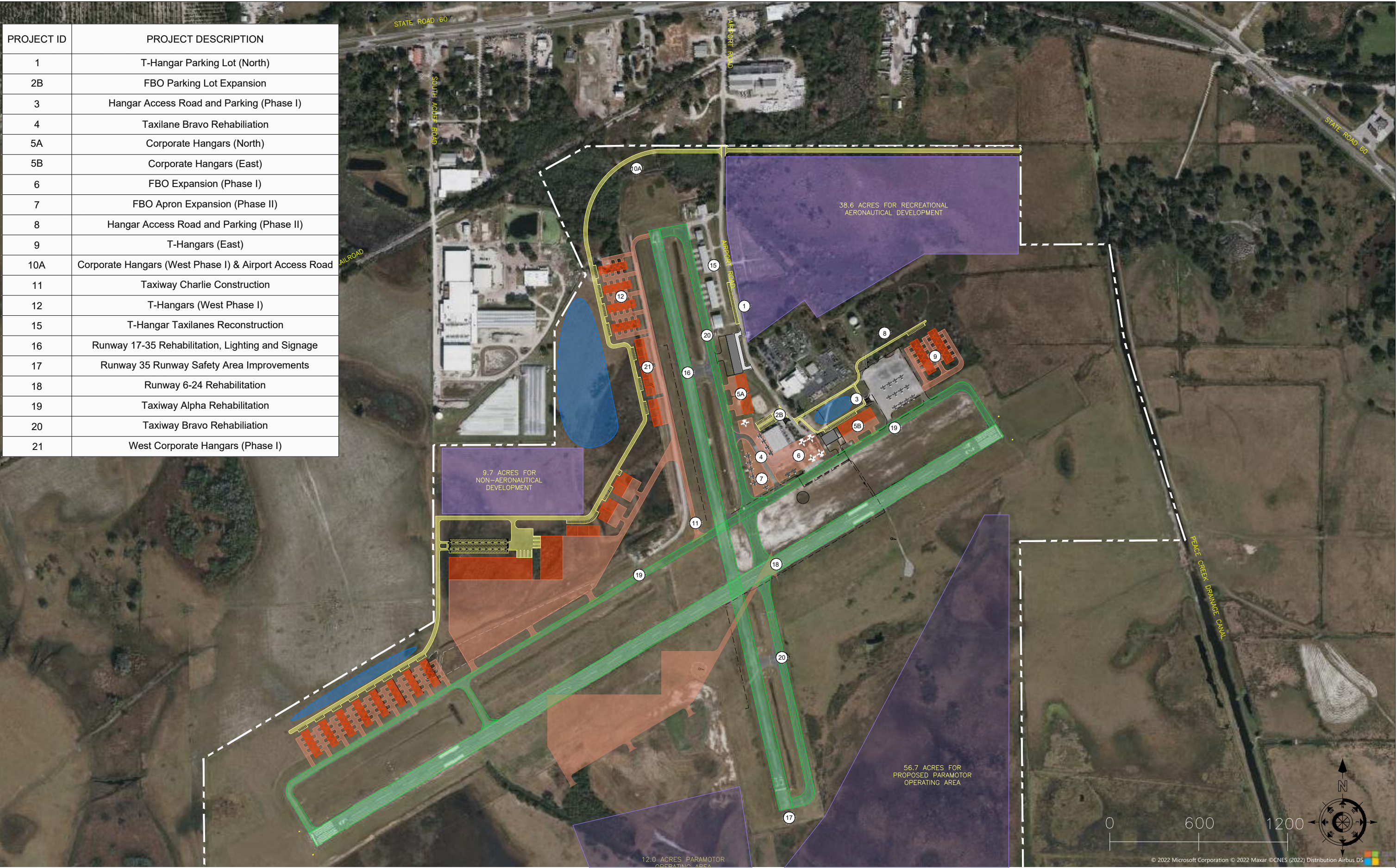


Table 9-2 – Intermediate-Term (2027-2031) Potential Projects and Costs

Project ID	Project Description	Project Costs	Potential Funding Source			
			Federal	State	Local	Private
7	FBO Apron Expansion (Phase II)	\$ 350,795.00	\$ 315,716.00	\$ 17,539.50	\$ 17,539.50	\$ -
5B	Corporate Hangars (East)	\$ 2,717,541.00	\$ -	\$ 3,847,846.00	\$ -	\$ (1,130,305.00)
9	T-Hangars (East)	\$ 6,202,861.00	\$ -	\$ 4,962,289.00	\$ 1,240,572.00	\$ -
8	Hangar Access Road and Parking (Phase II)	\$ 106,173.00	\$ -	\$ 84,938.00	\$ 21,235.00	\$ -
17	Runway 35 Runway Safety Area Improvements	\$ 1,500,000.00	\$ 1,350,000.00	\$ 75,000.00	\$ 75,000.00	\$ -
Totals		\$ 10,877,370.00	\$ 1,665,716.00	\$ 8,987,612.50	\$ 1,354,346.50	\$ (1,130,305.00)

Source: Hoyle Tanner, 2022

9.2.3 Long-Term Airport Implementation Plan (2032-2042)

As the airport continues to strive for self-sufficiency, the long-term implementation plan proposes to begin developing the west side of the airport. This includes both hangar and apron space which will provide more opportunity for the airport to generate revenue through an increase in tenants.

Additionally, it is anticipated that several areas of the airport including Runway 6-24, Taxiway Alpha, and Taxiway Bravo will be due for pavement and electrical maintenance. These pavement surfaces were recently constructed or rehabilitated within the last 5 years and will be nearing the end of their operational service life by this time period.

The long-term projects are depicted on the future airport layout plan. This section assumes an unconstrained budget so it is likely that some of the near-term and intermediate-term projects will be postponed or pushed due to lack of available funding. This may also impact the long-term plans for the airport. **Table 9-3** depicts the proposed airport improvements for the long-term implementation plan.

Table 9-3 – Long-Term (2032-2042) Potential Projects and Costs

Project ID	Project Description	Project Costs	Potential Funding Source			
			Federal	State	Local	Private
11	Taxiway Charlie Construction	\$ 900,208.00	\$ -	\$ 720,166.00	\$ 180,042.00	\$ -
12	T-Hangars (West Phase I)	\$ 12,060,000.00	\$ -	\$ 9,648,000.00	\$ 2,412,000.00	\$ -
10A	Corporate Hangars (West Phase I)	\$ -	\$ -	\$ -	\$ -	\$ -
10A	Airport Access Road	\$ 2,799,351.00	\$ -	\$ 2,239,481.00	\$ 559,870.00	\$ -
18	Runway 6-24 Rehabilitation	\$ 3,000,000.00	\$ 2,700,000.00	\$ 150,000.00	\$ 150,000.00	\$ -
19	Taxiway Alpha Rehabilitation	\$ 2,000,000.00	\$ 1,800,000.00	\$ 100,000.00	\$ 100,000.00	\$ -
20	Taxiway Bravo Rehabilitation	\$ 1,500,000.00	\$ 1,350,000.00	\$ 75,000.00	\$ 75,000.00	\$ -
Totals		\$ 22,259,559.00	\$ 5,850,000.00	\$ 12,932,647.00	\$ 3,476,912.00	\$ -

Source: Hoyle Tanner, 2022