Stillwater OKLAHOMA
stillwaterok.gov

Together, Investing in Municipal Excellence

CITY COUNCIL MEETING AGENDA
JUNE 2, 2025

723 S. Lewis Street, Room 1122 B
Stillwater, OK 74074
5:30 PM

Mayor Will Joyce, Vice Mayor Amy Dzialowski, Councilors Kevin Clark, Christie Hawkins, & Tim Hardin

1. Call Meeting to Order
2. Pledge of Allegiance
3. Proclamations and Presentations

a.	International Day of Play Proclamation
b.	National Gun Violence Awareness Day Proclamation
c.	Recognition of Terry and Nancy Monroe, Murphy's Department Store

4. Consent Docket

Items listed on the consent docket are routine administrative matters that may be approved without discussion. The Council will take action on these items collectively with a single vote. The requested City Council action is indicated for each item listed. Should a Councilor elect to discuss, amend, revise, or table any item listed on the consent docket, the item will be moved to the section of the agenda titled "Items Removed from the Consent Docket" for consideration and possible action. Additionally, a Councilor or the City Manager may simply ask the Mayor to remove an item from the consent docket prior to action by the City Council and no action will be taken on the removed item at this meeting.

a.	Approve May 19, 2025 regular session meeting minutes	
b.	Approve budget amendments to reflect receipt and appropriation of insurance proceeds related to property damage.	Christy Cluck
c.	Approve Contract Extension #1 to the Operation/Maintenance Agreement for Lakeside Memorial Golf Course with Henderson Golf Management, LLC in the amount of $120,000 for July 1, 2025 – June 30, 2026.	Christy Driskel

d.	Approve budget amendment to close out the 3rd Street Bridge project.		Jared Thulin
e.	Approval of revised Local Government Certification documents for Payne County Youth Services to apply for the 2025 Emergency Solutions Grant Program.		Shelly Crynes
f.	Approve FY26 Oklahoma Municipal Assurance Group (OMAG) policies for property and general liability insurance coverage in the amount of $1,158,700.	CC-25-82	Christy Cluck
g.	Accept an electric easement to grant Stillwater Electric Utility access for maintenance of utility services at 704 S. Hester Street.	CC-25-83	Joshua Brown
h.	Approve the application of Oklahoma State University for a right of way Occupancy Permit as recommended by the Development Services Director pursuant to City Code Sec. 37-205(c)	CC-25-84	David Barth
i.	Approve a change order to the Lippert Brothers, Inc contract for the Airport Terminal Building and Improvements project Work Package 2 sewer line relocation, in the amount of $260,419 for trash/debris removal, haul-off and disposal and associated budget amendments; authorize the City Manager to sign the change order document.	CC-25-85	Kellie Reed

5. Public Comment on Items not Scheduled for Public Hearings

Stillwater City Code, Section 2-53(a) & (b), provides that taxpayers or residents of the city, or their authorized legal representatives, may address the Council at a regularly scheduled meeting on **any item of business listed on the meeting agenda** provided they have submitted a written request prior to the meeting either online at Request to speak form or via the form found in the lobby outside Council chambers.

6. Items Removed from the Consent Docket

Items removed from the consent docket are placed on this section of the agenda for discussion, revision, amendment and/or tabling prior to action by the City Council. The City Council may take action, including a vote or series of votes, on items removed to this section of the agenda after the requested discussion, revision or amendment.

7. Public Hearings

The Council will hear public comments, discuss, and take action including a vote or series of votes on each item listed as presented or as amended by the City Council unless the agenda entry specifically states that no action will be taken.

a.	Receive public comment for a Map Amendment	CC-25-86	Henry Bibelheimer

	to rezone 1002 S. Husband Street from Two-Family Residential (RT) to Commercial Business (CB).		

b.	Receive public comment regarding a request for a Specific Use Permit to allow for churches and other religious institutions at property addressed as 1307 N. Husband Street in the Small Lot Single Family Residential (RSS) district.	Memo To Withdraw	Henry Bibelheimer

8. General Orders

The City Council will hear a staff presentation, discuss, and take action including a vote or series of votes on each item listed as presented or as amended or revised by the City Council unless the agenda entry specifically states that no action will be taken. The requested action is indicated in each agenda entry but may be amended or revised prior to action by the City Council.

a.	Presentation, discussion, and consideration of adoption of the Stillwater Regional Airport Master Plan.	CC-25-87	Kellie Reed

9. Resolutions

The City Council will hear a staff presentation, discuss, and take action including a vote or series of votes on each resolution listed as presented or as amended or revised by the City Council.

a.	RESOLUTION NO. CC-2025-8: A RESOLUTION OF THE STILLWATER CITY COUNCIL ADOPTING AN OPERATING BUDGET FOR THE FISCAL YEAR 2025-26.

b.	RESOLUTION NO. CC-2025-9: A RESOLUTION OF THE CITY COUNCIL ADOPTING THE UPDATED MASTER PLAN FOR STILLWATER REGIONAL AIRPORT

10. Ordinances

The City Council will hear a staff presentation, discuss, and take action including a vote or series of votes on each ordinance listed as presented or as amended or revised by the City Council.

First Read

a.	ORDINANCE NO. 3571: ORDINANCE TO REZONE 1002 SOUTH HUSBAND STREET FROM TWO-FAMILY RESIDENTIAL (RT) TO COMMERCIAL BUSINESS (CB).

Second Read

a.	ORDINANCE NO. 3570: AN ORDINANCE TO REZONE PROPERTIES ADDRESSED AS 1017 AND 1023 S. HUSBAND STREET FROM TWO-FAMILY RESIDENTIAL (RT) TO COMMERCIAL BUSINESS (CB) DISTRICT.

11. Reports from Officers and Boards

Announcements and remarks of general interest may be made by Councilors, City Manager or City Attorney. Items of City business that may require discussion or action including a vote or series of votes are listed

below.

a.	Miscellaneous items from the City Attorney
b.	Miscellaneous items from the City Manager
c.	Miscellaneous items from the City Council

12. Questions and Inquiries
13. Adjourn

On May 30, 2025 at 9:30 a.m., a true and correct copy of this agenda was posted on the kiosk outside City Hall, 723 S. Lewis Street, Stillwater, OK.

The City of Stillwater encourages participation from all citizens. If participation at any public meeting is not possible due to a disability, please notify the City Manager's office at least 48 hours prior to the meeting by calling 405.742.8243.

- Meetings are televised on AT&T U-verse channel 99 and Optimum channel 14.
- Find meeting agendas and minutes online at Agendas and Minutes
- Official minutes are archived in the City Clerk's office.

Proclamation

Stillwater OKLAHOMA

stillwaterok.gov

Together, Investing in Municipal Excellence

WHEREAS, play is a fundamental part of every child's development, supporting learning, creativity, well-being, and social connection; and,

WHEREAS, the United Nations has declared June 11 as the International Day of Play, a global celebration recognizing play as a right for all children and a vital part of healthy childhoods and thriving communities; and,

WHEREAS, the City of Stillwater acknowledges that play is not only essential for the growth and happiness of children but also strengthens family bonds and brings people together across generations and backgrounds; and,

WHEREAS, StillWonder, a Stillwater-based organization rooted in STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, is dedicated to nurturing the development of young children through imaginative, interactive, and exploratory play experiences that spark curiosity and creativity; and,

WHEREAS, the City of Stillwater proudly supports StillWonder and their efforts to provide learning opportunities through inclusive and meaningful play that enriches the lives of children and families and prepares young minds for future success; and,

WHEREAS, the International Day of Play provides an opportunity for our community to come together in support of childhood, innovation, and the lifelong value of play.

NOW, THEREFORE, I, William H. Joyce, Mayor of Stillwater, Oklahoma, do hereby proclaim June 11, 2025, as "International Day of Play," in Stillwater, and encourages all residents to support efforts that ensure every child has the opportunity to play, grow, and thrive in a world of imagination and discovery.

_____

WILLIAM H. JOYCE, MAYOR

ATTEST:

_____

TERESA KADAVY, CITY CLERK

Proclamation

Stillwater OKLAHOMA

stillwaterok.gov

Together, Investing in Municipal Excellence

WHEREAS, in an average year, 802 Oklahomans die by guns and 1,196 are wounded, making Oklahoma the 13th highest rate of gun deaths in the US; and,

WHEREAS, the City of Stillwater remains committed to promoting public safety and fostering a community where all residents feel secure; and,

WHEREAS, in January 2013, Hadiya Pendleton was tragically shot and killed at age 15; and people across the United States will observe National Gun Violence Awareness June 6-8, 2025, wearing orange in honor of Hadiya and all victims of gun violence, as well as in solidarity with their loved ones; and,

WHEREAS, the initiative to wear orange was inspired by Hadiya's friends to honor her life, choosing orange because it is the color hunters wear to protect themselves and others, symbolizing the value of every human life; and,

WHEREAS, on June 1, 2022, Dr. Stephanie Husen, Dr. Preston Phillips, Amanda Glenn, and William Love were tragically killed at St. Francis Hospital in Tulsa, and the Husen family has encouraged communities throughout Oklahoma to participate in National Gun Violence Awareness Day in tribute to Dr. Husen, an Oklahoma State University College of Osteopathic Medicine graduate; and,

WHEREAS, anyone can take part by pledging to wear orange on Friday, June 6, 2025, to raise awareness of gun violence and support responsible gun ownership, with the goal of keeping our children, families, and community safe.

NOW, THEREFORE, I, William H. Joyce, Mayor of the City of Stillwater, on behalf of the City Council and Stillwater residents, hereby proclaim Friday, June 6, 2025, as National Gun Violence Awareness Day in the City of Stillwater.

_____

WILLIAM H. JOYCE, MAYOR

ATTEST:

_____

TERESA KADAVY, CITY CLERK

Proclamation

Stillwater OKLAHOMA

stillwaterok.gov

Together, Investing in Municipal Excellence

WHEREAS, Murphy's Department Store has been a cornerstone of Stillwater's downtown for 99 years, serving generations of residents with quality merchandise, trusted service, and a true sense of community; and,

WHEREAS, since 1981, Terry and Nancy Monroe have owned and operated Murphy's, carrying forward its proud legacy with dedication, vision, and a deep love for the City of Stillwater, while tirelessly volunteering with numerous community organizations; and,

WHEREAS, in 1995, the Monroes hired Becky Moore as store manager, and her long-standing leadership has contributed significantly to the continued success and spirit of the store; and,

WHEREAS, in the late 1990s, Terry Monroe successfully secured a Main Street grant to update the store's façade and, in a particularly memorable project, constructed a $10,000 ADA-compliant restroom—a humorous yet impactful milestone that exemplified his commitment to accessibility and downtown revitalization, complete with guided tours and its own ribbon cutting ceremony; and,

WHEREAS, under Terry and Nancy's leadership, Murphy's has been more than a store — it has been a gathering place, a symbol of local pride, and a testament to the importance of family-owned business in shaping the heart of a community; and,

WHEREAS, in 2025, Murphy's Department Store will close its doors after nearly a century in business, and as it does, the City of Stillwater reflects with deep gratitude on the legacy Terry and Nancy leave behind.

NOW, THEREFORE, I, William H. Joyce, Mayor of the City of Stillwater, do hereby honor and express heartfelt appreciation to Terry and Nancy Monroe for their extraordinary contributions to the Stillwater community through their lifelong dedication to local business, civic engagement, and the enduring spirit of Murphy's Department Store.

WILLIAM H. JOYCE, MAYOR

ATTEST:

TERESA KADAVY, CITY CLERK

IN ACCORDANCE WITH THE OKLAHOMA OPEN MEETING LAW
THE AGENDA WAS POSTED MAY 16, 2025 AT 10:00 A.M.
AT THE MUNICIPAL BUILDING, 723 SOUTH LEWIS, STILLWATER, OKLAHOMA

MINUTES
STILLWATER CITY COUNCIL
REGULAR MEETING
COUNCIL HEARING ROOM
723 S. LEWIS
MAY 19, 2025

PRESENT: **MAYOR WILLIAM H. JOYCE, COUNCILORS CHRISTIE HAWKINS, KEVIN CLARK AND TIM HARDIN**
ABSENT: **VICE MAYOR AMY DZIALOWSKI**

1. CALL MEETING TO ORDER

Mayor Joyce called the meeting to order at 5:30 p.m.

2. PLEDGE OF ALLEGIANCE

The Stillwater City Council led the audience in the Pledge of Allegiance.

3. PROCLAMATIONS/PRESENTATIONS

a. Bicycle Safety Month Proclamation

Mayor Joyce read the proclamation declaring May as Bicycle Safety Month. Shelby Keller, Chair of the Bicycle Pedestrian Ad Hoc Committee, accepted the proclamation. Ms. Keller thanked the Council and the community for their support.

4. CONSENT DOCKET

a. Approve May 5, 2025 regular meeting minutes
b. Approve Agreement Extension with DIRECTV, LLC to replace an expired agreement with Southwestern Bell Telephone Company for payment to the City of 5% of gross revenues from subscribers for providing video services.
c. Approve budget amendment to close out the Husband Street Bridge project.
d. Award Bid#12-2025 to Civil Builders, LLC for the design and construction of a new traffic pattern indicator (TPI) and segmented circle; approve associated budget amendment and authorize the City Manager to sign related documents.
e. Approve budget amendments reflecting receipt and appropriation of $30,000 Lucky Day grant for Oklahoma Virtual Library pilot program
f. Approve Extension Agreement to City Vehicle Fuel Services Contract (BID #18-2024) with OnCue Marketing, LLC for an additional one-year term beginning July 1, 2025 through June 30, 2026 ; and authorize the City Manager to sign the Agreement.
g. Approve Extension Agreement to the Citywide Custodial Services Agreement (BID # 24-2024) with KLG Enterprises LLC doing business as Alliance Maintenance for an additional one-year term beginning July 1, 2025 through June 30, 2026 in the amount of $46,980 (Electric Administration/Distribution and Stillwater Energy Center - $30,960; Public Works - $10,980; Fire Administration - $5,040); and authorize the City Manager to sign the agreement.
h. Accept new public infrastructure for a water line and fire hydrant that serves the new Walmart Fuel Station at 4575 West 6th Avenue.

MOTION BY COUNCILOR CLARK, SECOND BY COUNCILOR HAWKINS TO APPROVE THE CONSENT DOCKET AS PRESENTED.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, CLARK-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH FOUR YEA VOTES.

5. PUBLIC COMMENT ON AGENDA ITEMS NOT SCHEDULED FOR PUBLIC HEARING

There were no requests to speak on agenda items not scheduled for public hearing.

6. ITEMS REMOVED FROM CONSENT DOCKET

None.

7. PUBLIC HEARINGS

a. Receive public comment regarding a Map Amendment (MA25-03) to rezone properties addressed as 1017 and 1023 S. Husband Street from Two-Family Residential (RT) to Commercial Business (CB) district.

Project Manager Joshsua Brown presented the report.

Mayor Joyce opened the public hearing.

Stephen Gose, Gose and Associates, 113 E. 8th, spoke on behalf of the applicant and answered Counci's questions.

Cory Williams, Progressive Development, 621 S. Husband Street, spoke on his behalf, explained the proposed development that is planned and answered Council's questions.

Janet Rogers, 1006 S. Husband, spoke against the rezoning and the planned development.

Mayor Joyce closed the public hearing.

Mayor Joyce stated if this is rezoned the public needs to realize that any commercial business could come to this area and establish a business.

City Attorney Kimberly Carnley stated that she appreciated that the proposed development concept has been presented but there has not been an application filed for the proposed development and staff has had no internal review of that.

Planning Commission recommended approval with a vote of 4-0.

MOTION BY COUNCILOR HAWKINS, SECOND BY COUNCILOR HARDIN TO ACCEPT THE PLANNING COMMISSION'S RECOMMENDATION TO APPROVE THE MAP AMENDMENT (MA25-03) TO REZONE PROPERTIES ADDRESSED AS 1017 AND 1023 S. HUSBAND STREET FROM TWO-FAMILY RESIDENTIAL (RT) TO COMMERCIAL BUSINESS (CB) DISTRICT.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, CLARK-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH FOUR YEA VOTES.

b. Receive public comment regarding the proposed operating budget for fiscal year 2025-2026 and consider action to incorporate changes presented during the public hearing and/or other changes

identified by the Council and return to the Council for review at a future meeting or direct staff to proceed with adoption of the budget as proposed in the attached schedule at a future meeting.

Assistant City Manager and Finance Director Christy Cluck presented the proposed operating budget for fiscal year 2025-2026. She reported that there has been one change since the budget was presented on April 21, 2025. That change is an increase of $140,000 to the contract for services account in the SEDA Destination Marketing funds for the increase in the Visit Stillwater contract approved by the SEDA Trustees at the May 5, 2025 meeting. Ms. Cluck answered Council's questions.

Mayor Joyce opened and closed the public hearing as no one was present to speak.

MOTION BY COUNCILOR CLARK, SECOND BY COUNCILOR HAWKINS TO DIRECT STAFF TO PROCEED WITH ADOPTION OF THE BUDGET BY RESOLUTION AT THE JUNE 2, 2025 MEETING AS PRESENTED IN THE ATTACHED SCHEDULE.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, CLARK-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH FOUR YEA VOTES.

Councilor Clark left the Council Chamber at 5:53 p.m.

8. GENERAL ORDERS

a. Action awarding General Obligation Limited Tax Bonds, Series 2025 in the sum of $8,750,000 by the City of Stillwater, Oklahoma to the lowest and best bidder.

Chris Gander, Municipal Financial Advisor, explained the process of getting bids and stated all the bids were very close but he recommends going with TD Security.

MOTION BY COUNCILOR HAWKINS, SECOND BY COUNCILOR HARDIN TO AWARD THE GENERAL OBLIGATION LIMITED TAX BONDS, SERIES 2025, IN THE SUM OF $8,750,000 BY THE CITY OF STILLWATER, OKLAHOMA TO TD SECURITIES, THE LOWEST AND BEST BIDDER.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH THREE YEA VOTES.

Councilor Clark did not participate on this item.

9. RESOLUTIONS

a. Resolution No. CC-2025-7: A resolution providing for the issuance of General Obligation Limited Tax Bonds, Series 2025 in the sum of $8,750,000 by the City of Stillwater, Oklahoma, authorized at an Election duly called and held for such purpose; prescribing form of bonds; providing for registration thereof; providing levy of an annual tax for the payment of principal and interest on the same; and fixing other details of the issue.

Mr. Gander stated this resolution authorizes the issue of the debt and the money will be received June 27, 2025.

MOTION BY COUNCILOR HAWKINS, SECOND BY COUNCILOR HARDIN TO ADOPT RESOLUTION NO. CC-2025-7 AS PRESENTED.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH THREE YEA VOTES.

Councilor Clark did not participate on this item.

Councilor Clark returned to the Council Chamber at 5:56 p.m.

10. ORDINANCES

a. First Reading

Ordinance No. 3570: An ordinance to rezone properties addressed as 1017 and 1023 S. Husband Street from Two-Family Residential (RT) to commercial business (CB) District.

MOTION BY COUNCILOR CLARK, SECOND BY COUNCILOR HAWKINS TO ADVANCE ORDINANCE NO. 3570 TO SECOND READ AS PRESENTED.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, CLARK-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH FOUR YEA VOTES.

b. Second Reading

Ordinance No. 3568: An ordinance amending Stillwater Code of Ordinances Chapter 35, "Stormwater Quality And Management," Article I, "In General," Section 35-1, "Definitions"; Chapter 35, "Stormwater Quality And Management," Article II, "Drainage And Sedimentation," Division 1, "Generally," Section 35-25, "Impairment Of Drainage Facilities"; Repealing All Ordinances To The Contrary; And Providing For Severability

Ordinance No. 3569: An ordinance amending Stillwater Code Of Ordinances Chapter 18, "Environment," Article III, "Miscellaneous Nuisances," Division 1, "Generally," Section 18-71, "Public Nuisances Designated"; repealing all ordinances to the contrary; and providing for severability

Ordinance No. 3568 and Ordinance No. 3569 were tabled to the June 16, 2025 City Council meeting.

11. REPORTS FROM OFFICERS & BOARDS

a. Miscellaneous items from the City Attorney: None.
b. Miscellaneous items from the City Manager:
    - City Manager Brady Moore announced that staff are continually looking for opportunities and gathering input from residents to improve safety, efficiency, and overall quality of life in our community. It has been brought to our attention that the downtown traffic signals on Main at 7th, 8th, and 9th Avenues sometimes significantly delay drivers when there is little to no cross traffic. Staff plan to conduct a trial four-way stop condition at these three intersections by temporarily setting the signals into all-red flashing mode. Also, you may have seen the traffic counters around 9th and Main. These are to help us assess whether the change impacts traffic volume. This trial will help us determine a more permanent solution. The City will make sure to message on our website and social media before beginning the trial and before implementing any permanent changes. As always, we welcome community input during the trial and will report back after the trial is complete.
c. Miscellaneous items from the City Council:
    - Councilor Hardin asked residents to save the date and join us for "Fly-Day Food Trucks" on June 13th, from 11 a.m. to 2 p.m., at Stillwater Regional Airport. Enjoy food from some of your favorite food trucks, with airside dining at the old OSU Flight Center, 1818 Wright Drive.

- Councilor Clark announced that the Stillwater Art Integration has kicked off the utility box art program. The contest is open to all community members, and this year's theme is "Stillwater Strong." This beautification and graffiti abatement initiative was a great success last year and we look forward to seeing more art submissions.
- Councilor Hawkins announced that City Hall will be closed on Monday, May 26 in observance of Memorial Day. As we pause to reflect, may we honor and remember the brave men and women who gave their lives in service to our country. Please remember, trash and recycling services will run on their regular schedule.
- Mayor Joyce asked residents to please save the date as Stillwater Community United will celebrate Juneteenth at Southern Woods Park on Saturday, June 21st from 11 a.m. to 2 p.m. All community members are invited to gather for games, music, free food and drinks, and entertainment for the whole family. For more information, go to: visitstillwater.org/swocommunityunited. City Hall will be closed in observance of Juneteenth on Wednesday, June 19. Trash, recycling, and yard waste will be collected as usual.

i. Discussion about scheduling items for future meetings.

12. QUESTIONS & INQUIRIES

None.

13. ADJOURN

MOTION BY COUNCILOR HARDIN, SECOND BY COUNCILOR HAWKINS TO ADJOURN THE MAY 19, 2025 REGULAR MEETING OF THE STILLWATER CITY COUNCIL.

ROLL CALL VOTE: JOYCE-YEA, HAWKINS-YEA, CLARK-YEA, HARDIN-YEA.
NAY-NONE. MOTION CARRIED WITH FOUR YEA VOTES.

The May 19, 2025 regular meeting of the Stillwater City Council adjourned at 6:02 p.m.

_____ _____

WILLIAM H. JOYCE, MAYOR
STILLWATER CITY COUNCIL

TERESA KADAVY
CITY CLERK

DRAFT

The City of Stillwater OKLAHOMA

Department of Finance
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.372.0025
Web: stillwater.org

Budget Amendment Request

For Budget Year 2025

Date: 05/06/2025

Department: Finance **Requested by:** Christy Cluck

Explanation:

Revenue:
Increase revenue projections for receipt of insurance proceeds.

	Account Name	Account Number (xxxxxxx-xxxxx)	Project Number	Current Budget Amount	Amount of Change	New Budget Amount
Increase:	Insurance Proceeds - Police	1016025 - 62001		$ 9,289	$ 3,270	$ 12,559
	Insurance Proceeds - Public Works	1014841 - 62001		$ 1,798	$ 4,072	$ 5,870
	Insurance Proceeds - Engineering	1014015 - 62001		$ 0	$ 2,792	$ 2,792
		-				$ 0
		-				$ 0
Decrease:		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0

Net Change: (will usually result in a total increase or decrease) $ 10,134

Reviewed by Department Manager: _____ **Date:** _____

Reviewed by Finance: _____ **Date:** _____

Approved by CMO: _____ **Date:** _____

Approved by City Council: ☐ Yes ☐ No **Date:** _____

Processed by Finance: _____ **Date:** _____

Set ID: _____ **Date Sent to SA&I:** _____

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Department of Finance
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.372.0025
Web: stillwater.org

Budget Amendment Request

For Budget Year 2025

Date: 05/06/2025

Department: Finance **Requested by:** Christy Cluck

Explanation:

Expenditures:
Appropriate funds for repair of damage to vehicles. Repairs funded by insurance proceeds received in FY25.

	Account Name	Account Number (xxxxxxx-xxxxx)	Project Number	Current Budget Amount	Amount of Change	New Budget Amount
Increase:	Repair Vehicles - Police	1016025 - 53018		$ 45,086	$ 3,270	$ 48,356
	Repair Vehicles - Public Works	1014841 - 53018		$ 8,218	$ 4,072	$ 12,290
	Repair Vehicles - Engineering	1014015 - 53018		$ 0	$ 2,792	$ 2,792
		-				$ 0
		-				$ 0
Decrease:		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0

Net Change: (will usually result in a total increase or decrease) $ 10,134

Reviewed by Department Manager: _____ **Date:** _____

Reviewed by Finance: _____ **Date:** _____

Approved by CMO: _____ **Date:** _____

Approved by City Council: ☐ Yes ☐ No **Date:** _____

Processed by Finance: _____ **Date:** _____

Set ID: _____ **Date Sent to SA&I:** _____

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OPERATION/MAINTENANCE AGREEMENT
FOR
LAKESIDE MEMORIAL GOLF COURSE

THIS AGREEMENT, entered into this 10th day of July, 2024 for the management and operation of Lakeside Memorial Golf Course between the City of Stillwater, Oklahoma, a municipal corporation, hereinafter referred to as "Stillwater" and Henderson Golf Management, LLC, an Oklahoma Limited Liability Company, hereinafter referred to as "Henderson Golf".

WITNESSETH:

WHEREAS, the City of Stillwater is a municipal corporation established under the constitution and laws of the State of Oklahoma; and

WHEREAS, Henderson Golf Management, LLC is a limited liability company established under the constitution and laws of the State of Oklahoma; and

WHEREAS, Stillwater is the record owner of a parcel of land and buildings located at 5201 North Washington Street, Stillwater, Oklahoma commonly known as "Lakeside Memorial Golf Course" (hereinafter referred to as "Lakeside"); and

WHEREAS, it is the intention of Stillwater and Henderson Golf to enter into an agreement whereby Henderson Golf will operate and maintain Lakeside Memorial Golf Course.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING AND THE MUTUAL COVENANTS AND AGREEMENTS HEREINAFTER SET FORTH, THE CITY OF STILLWATER AND HENDERSON GOLF DO HEREBY AGREE AS FOLLOWS:

ARTICLE I
SCOPE, POSSESSION, TERM, DEBT LIMITATION

1.1 SCOPE – OPERATION & MAINTENANCE

Henderson Golf shall operate and maintain Lakeside in accordance with the terms and conditions set forth in this Agreement and any executed amendment thereto.

1.2 POSSESSION

Stillwater shall deliver possession of Lakeside, including the clubhouse, a residential structure, and all out buildings to Henderson Golf. Henderson Golf shall have the right to utilize said facilities and equipment to execute its obligations set forth in this Agreement during the term thereof. Henderson Golf acknowledges that this Agreement is not a lease and that its right to possession and use of said facilities is limited by the terms of this Agreement.

1.3 TERM

This Agreement shall commence on September 1, 2024 and expire on June 30, 2025 unless earlier terminated as set forth herein. This Agreement may be extended for two (2) additional one-year terms by written agreement of the parties prior to expiration of the then current term. Each additional term shall correspond with Stillwater's fiscal calendar year as follows:

Optional Extension Year Two Term: July 1, 2025 through June 30, 2026

Optional Extension Year Three Term: July 1, 2026 through June 30, 2027

Any option to extend this Agreement must be made in writing and signed by the City of Stillwater.

1.4 DEBT LIMITATION

Henderson Golf acknowledges that any monetary obligation assumed by Stillwater after June 30, 2025 is subject to the debt limitation(s) set forth in the Oklahoma Constitution. Henderson Golf acknowledges that this Agreement extends beyond one or more fiscal years and pursuant to constitutional debt limitations there is no guarantee that funding will be available to service this agreement after June 30, 2025. In the event that no appropriation is made that is sufficient to service this agreement, then this agreement shall be null and void. The City of Stillwater shall notify Henderson Golf in writing of any such non-allocation of funds at the earliest possible date.

ARTICLE II
OPERATION OF LAKESIDE BY HENDERSON GOLF

2.1 NAMING & LOGO

The name and logo of Lakeside shall remain unchanged. The official name of Lakeside shall continue to be ***Lakeside Memorial Golf Course***. Nothing in this Agreement shall be construed as creating or assigning any naming rights or logo design rights to Henderson Golf. However, Henderson Golf may at its option choose to add language to promotional and informational materials to indicate or announce that the course is ***"operated by Henderson Golf"***. Any proposals by Henderson Golf to add such language are subject to the prior written approval of the Stillwater City Manager and if approved, added language shall appear in publications and materials below the official name of the golf course and in a type and size smaller than the official name of the golf course.

2.2 UTILITIES

Henderson Golf is solely responsible for all utilities, including but not limited to water, gas, and electricity, necessary to operate Lakeside on a daily basis. Provided however that Stillwater shall provide supplemental water to Henderson Golf in times of drought as set forth in Paragraph 3.3 of this Agreement.

2.3 TELEPHONE & INFORMATION TECHNOLOGY ("IT")

Stillwater shall continue to provide at no expense to Henderson Golf the current telephone and IT systems that are in place at Lakeside. Telephone and IT are to be used by Henderson Golf solely for matters necessary to the operation of Lakeside. Stillwater reserves the right to revoke these services if it at any time it deems that telephone and/or IT are being used for any purpose other than those specifically provided for herein. A schedule of telephone and IT equipment provided for Henderson Golf's use pursuant to this Agreement is attached as Exhibit A. The equipment in this paragraph is provided for Henderson Golf's use in operation of Lakeside only and nothing in this paragraph shall be construed as a transfer of ownership or title.

2.4 SECURITY

Henderson Golf is solely responsible for security at Lakeside including any costs thereof. Henderson Golf shall provide sufficient lighting and security personnel during off-hours. Henderson Golf may designate an authorized representative to reside in the residential structure located on Lakeside property in order to meet the security personnel requirement.

2.5 GOLF RATES, FEES, & SPECIALS

Henderson Golf shall in collaboration with Stillwater City Manager set the rates and fees for all activities and services at Lakeside. All rates and fees charged shall be consistent with those rates and fees charged by other municipal golf courses in Oklahoma. In establishing rates and fees, Henderson Golf may also take into consideration the rates and fees being charged by other golf courses in Stillwater, Oklahoma. A schedule of base and/or seasonal rates and fees shall be created once approved by both parties.

Henderson Golf may at its discretion offer specials, discounts, or coupons to various groups in order to increase rounds of golf played at Lakeside provided that any specials shall be offered and executed in a non-discriminatory manner.

2.6 MARKETING & PROMOTIONS

Henderson Golf shall be responsible for marketing and promotion of Lakeside through various media sources including but not limited to the official website, email, social media, and print media. The official website for Lakeside shall continue to be www.stillwatergolf.org. Henderson Golf shall submit updates and content recommendations for the official website to Stillwater for approval and publishing.

2.7 GOLF PROGRAMMING

Henderson Golf shall provide at a minimum golf programming as follows: junior or youth golf programs, tournaments, golf pro instruction, player development programs and instruction, league play, and management of daily play.

2.8 GOLF SCHOLARSHIP PROGRAM

Henderson Golf shall continue the Golf Scholarship Program that is currently in place at Lakeside. Henderson Golf shall identify recipients and offer scholarships to increase access to golf programs by underprivileged and low-income youth or junior golfers.

2.9 STILLWATER PUBLIC SCHOOL GOLF PROGRAMS

Henderson Golf shall continue to work in collaboration with Stillwater and Stillwater public schools to offer Lakeside facility and course privileges to Stillwater public school golf teams.

2.10 PRO-SHOP SALES

Henderson Golf shall be solely responsible for operation of the pro-shop during the term of this Agreement including but not limited to pricing, ordering inventory, retail sales and sales tax compliance. Henderson Golf is required to comply with all relevant state laws and city ordinances in operation of the pro-shop. Henderson Golf shall provide Stillwater a copy of its valid Oklahoma sales tax permit.

2.11 CLUBHOUSE FOOD & BEVERAGE

Henderson Golf shall be solely responsible for clubhouse food and beverage operations during the term of this Agreement including but not limited to pricing, ordering inventory, sales and sales tax compliance. Henderson Golf is solely responsible for all expenses related to Clubhouse food and beverage. Stillwater shall have no financial obligation for food and beverage orders or purchases during the term of this Agreement. Henderson Golf is required to comply with all relevant state laws and city ordinances in connection with clubhouse food and beverage operations. Henderson Golf shall provide Stillwater a copy of its valid Oklahoma sales tax permit and Payne County health inspection report.

Henderson Golf may at its option explore opportunities to expand the current food and beverage offerings at Lakeside. Any proposals to expand food and beverage services offered including but not limited to the option to offer a full-service bar including high point beer and/or liquor requires prior written approval of Stillwater.

Henderson Golf may contract with third-parties to offer clubhouse food and beverage services. Contracts with third-parties are subject to the prior written approval of Stillwater.

2.12 LICENSING & PERMIT COMPLIANCE

Henderson Golf shall at its own expense secure all necessary licensing and permitting required to operate Lakeside and all of its facilities and ancillary activities such as retail, food and beverage, and beer and alcohol sales. All required permits and licensing shall be in place and effective as of September 1, 2024.

2.13 TRACKING OF LAKESIDE STATISTICS

Henderson Golf shall track statistics including but not limited to rounds of golf played, tournament and league participation, and demographic data. Henderson Golf shall provide this information to Stillwater upon request.

ARTICLE III

MAINTENANCE OF LAKESIDE BY HENDERSON GOLF

For purposes of this Article "Facilities" shall mean any buildings or other city-owned structures or assets. "Golf Course" shall mean the grounds where the game of golf is played, comprised of a series of holes, each consisting of a teeing ground, a fairway, the rough and other hazards, and a green with a flagstick and hole.

3.1 FACILITIES MAINTENANCE

Henderson Golf shall maintain Lakeside facilities during the term of this Agreement at a high level and in a manner that Lakeside is returned in the same or better condition as it was as of the commencement of this Agreement. Henderson Golf shall be responsible for all regular custodial cleaning of all Lakeside facilities.

Henderson Golf shall be responsible for routine maintenance items including but not limited to painting, light bulb replacement as needed, and minor plumbing issues (e.g. clogged pipes).

Stillwater shall be responsible for major repairs of city-owned buildings and assets including repairs of structural or roof issues on buildings, any major plumbing and electrical issues requiring installation and/or re-routing of pipes or wiring, and any major appliance repairs or replacement. Major repairs shall be defined as required repairs costing more than $1,500.

3.2 GOLF COURSE MAINTENANCE

Henderson Golf shall maintain Lakeside grounds during the term of this Agreement at a high level and in a manner that Lakeside is returned in the same or better condition as it was as of the commencement of this Agreement.

Acknowledgement of Present Condition of the Golf Course

The parties to this Agreement understand and acknowledge that Stillwater has a significant investment and interest in maintaining the present condition of the golf course. The parties to this Agreement have inspected and assessed the present condition of Lakeside golf course. Henderson Golf acknowledges and warrants that it has inspected the present condition of the course and understands that it is responsible for returning the golf course grounds in the same or better condition at the end of the term of this Agreement.

Maintenance Requirements

Henderson Golf shall maintain the golf course in accordance with Exhibit D. Henderson Golf shall ensure the golf course is maintained at a high level at all times to ensure safe playing conditions and that the present condition of the course remains or improves.

GCSAA Class "A" Superintendent Required

Henderson Golf shall employ a Superintendent who shall professionally manage all aspects of caring for the turfgrass and all landscaped grounds of the golf course. The superintendent shall be a member of the Golf Course Superintendents Association of America (GCSAA) and shall hold a valid and current Class "A" designation.

3.3 WATER

Henderson shall pay for all water used in maintenance and operation of the golf course grounds. Stillwater shall provide supplemental water at no additional cost to Henderson Golf during times of drought. For purposes of this Agreement, it will be deemed to be a "drought" when the holding pond water level drops below the effective level of the intake for the irrigation pumps.

ARTICLE IV
COMPENSATION

4.1 COMPENSATION

Stillwater shall pay Henderson Golf an annual sum of One Hundred Twenty Thousand and no/100 Dollars ($120,000.00) for operation and maintenance of Lakeside. Stillwater shall pay this amount in monthly payments in the amount of Ten Thousand and no/100 Dollars ($10,000.00) payable to Henderson Golf Management, LLC. This paragraph is expressly subject to the debt limitation(s) set forth in the Oklahoma Constitution as set forth in Paragraph 1.4 of the Agreement.

4.2 REPORTING

Henderson Golf shall submit an annual financial report to the City Council during a regular City Council Meeting on a form mutually agreed upon and approved by City Council no later than December 31, 2024. Said annual report shall be due on or before December 31, 2024, or December 31 of any exercised optional extension term, and shall, at minimum, contain the following details:

a. Operating expenses;

b. Revenue;

c. Capital improvement expenditures and end of fiscal year balance in the capital improvement fund;

d. Participant involvement;

e. Problem resolution; and

f. Goals for next fiscal year

4.3 REVENUE SHARING

Henderson Golf shall pay Stillwater a percentage of the revenues earned for operation of Lakeside based on Table 4.2A below. Revenue sharing applies for each year in which Henderson Golf's gross revenue exceeds $900,000. This includes all gross revenues earned for operation of the golf course, clubhouse, pro shop, food and beverage, and any professional services rendered in connection with this Agreement. Henderson Golf shall retain all accounting records related to the operation of Lakeside for the duration of this Agreement and Stillwater shall have the right to audit such records at any time pursuant to Paragraph 5.2. The revenue sharing provided for under this provision shall be distributed on an annual basis prior to the end of the fiscal year.

TABLE 4.2A
REVENUE SHARING

Gross Annual Revenue	Percentage of Revenue due to City of Stillwater
$900,001 – $1,000,000	3%
$1,000,001 – $1,250,000	5%
$1,250,001 and above	10%

4.4 NO MINIMUM REVENUE GUARANTEE

Henderson Golf acknowledges and understands that there is no minimum revenue guarantee for the operation and maintenance of Lakeside. Stillwater shall have no obligation under any circumstance to make any payments to Henderson Golf above and beyond what is provided for here in Article IV.

ARTICLE V
GENERAL PROVISIONS

5.1 PERSONNEL

Henderson Golf shall provide all administrative, instructional, and custodial personnel necessary to provide the programs authorized under this agreement. Said personnel shall be under the exclusive direction and control of Henderson Golf, and shall not be considered employees or agents of Stillwater under any circumstance. Any and all volunteers participating in programs authorized by this agreement shall likewise be considered under the exclusive direction and control of Henderson Golf and not employees or agents of Stillwater under any circumstance. Henderson Golf shall conduct an extensive pre-employment criminal background investigation of all personnel and volunteers. Said background investigation process shall be subject to periodic review and approval by the City Manager. Henderson Golf shall be an equal opportunity employer and shall not discriminate on the basis of race, color, religion, sex, national origin, age, marital or veteran's status, political affiliation, handicapped status, or any other legally protected status.

5.2 AUDIT, PUBLIC DISCLOSURE LAW COMPLIANCE

Stillwater shall have the right to audit all financial records kept by Henderson Golf pertaining to the operation of Lakeside upon written notice. Henderson Golf shall make said records available for audit purposes as authorized herein within a reasonable time of receipt of such request. Henderson Golf acknowledges that Lakeside is a public facility and that the records thereof are subject to public disclosure in accordance with the Oklahoma Open Records Act, 51 O.S. 24.A.1, *et seq*. Should Henderson Golf elect to hold public forums or organize a board or committee to advise on programming or operations, said gathering or entity shall be conducted in accordance with the Oklahoma Open Meetings Act, 25 O.S. §301, *et seq*

5.3 ENTRY

Stillwater shall have the right to enter Lakeside at any time, after reasonable notice to Henderson Golf, for purposes of inspection, maintenance, repair, or to make alterations. In emergency situations right of entry is immediate.

5.4 INSURANCE & INDEMNITY

Henderson Golf shall maintain a general liability insurance policy in minimum amounts equal to the liability limits for political subdivisions set forth in the Oklahoma Governmental Tort Claims Act, 51 O.S. §151, et seq., and shall name the City of Stillwater, its officers, employees, and agents, as additional insured in such amounts, during the term of this agreement.

Henderson Golf further agrees to hold harmless and indemnify the City of Stillwater, its officers, employees, and agents or invitees for any liability occasioned by the intentional act or negligence of Henderson Golf officers, employees or agents while conducting operations authorized herein in or upon the premises, facilities, or buildings during the term of this agreement.

In addition to the foregoing, Henderson Golf shall maintain Workers' Compensation insurance in the statutory amounts.

Henderson Golf shall provide proof of all insurance coverage mandated by this agreement to the City Manager before entering onto Lakeside under this Agreement and shall thereafter provide such proof to the City Manager during the term of this agreement upon request.

STILLWATER DOES NOT PROVIDE ANY INSURANCE COVERAGE TO OR ON BEHALF OF

HENDERSON GOLF UNDER THIS AGREEMENT AND SHALL NOT BE LIABLE TO HENDERSON GOLF OR ANY THIRD PARTY FOR LOSS OR DAMAGE RESULTING FROM ANY ACTIVITY UNDER THIS AGREEMENT.

5.5 SIGNS

Henderson Golf shall not affix nor otherwise place any sign on the exterior portion of the premises and/or buildings without first obtaining written consent from Stillwater. Stillwater may refuse consent to any proposed signage that is in Stillwater's opinion too large, deceptive, unattractive or otherwise inconsistent with or inappropriate to the premises and building. Henderson Golf shall repair all damage to the premises and building resulting from the attachment or removal of signs installed by Henderson Golf. Nothing in this provision shall be construed to prohibit Henderson Golf from utilizing existing signage and banner locations and altering the text and or symbols thereon as long as such alterations are specifically for the purposes as set forth herein.

5.6 DEFAULT

In the event Henderson Golf should default in the performance of any obligation hereunder on its part to be performed, Stillwater agrees to give Henderson Golf fifteen (15) days notice in writing of such default. Upon receipt of written notice of such default, Henderson Golf will work with Stillwater in good faith to correct issues that have caused said default and Henderson Golf shall have a period of thirty (30) days to take appropriate corrective action(s). In the event Henderson Golf shall fail to cure any default within the time allowed under this paragraph, Stillwater may terminate this agreement as set forth in Section 5.12 herein below, and if possession of the building and premises are not surrendered, Stillwater may enter said premises and remove Henderson Golf from possession thereof. Stillwater shall have, in addition to the remedies herein provided, any other right or remedy available to Stillwater on account of any Henderson Golf default, either in law or equity. Stillwater shall use reasonable efforts to mitigate its damages.

5.7 ASSIGNMENT OR SUBLEASE

Henderson Golf may not assign this Agreement or sublet any portion of Lakeside, or grant any concession or license within Lakeside, without the prior written consent of the Stillwater. Any such assignment or subletting without such written consent shall be void, and Stillwater shall have the option in such event to terminate this Agreement.

5.8 NOTICE

Any notice required or permitted under this agreement shall be deemed sufficiently given or served if sent by United States certified mail, return receipt requested, addressed as follows:

Stillwater: City Clerk/ City of Stillwater
723 South Lewis/P.O. Box 1449
Stillwater, Oklahoma 74076

Henderson Golf: Henderson Golf Management, LLC
4001 Fairfax Drive
Edmond, OK 73034

5.9 WAIVER

No waiver of any default of Stillwater or Henderson Golf hereunder shall be implied from any omission to take any action on account of such default if such default persists or is repeated, and no express waiver shall affect any default other than the default specified in the express waiver and that only for the time and to the extent therein stated. One or more waivers by Stillwater or Henderson Golf shall not be construed as a waiver of a subsequent breach of the same covenant, term or condition.

5.10 HEADINGS

The headings used in this agreement are for the convenience of the parties only and shall not be considered in interpreting the meaning of any provision thereof.

5.11 GOVERNING LAW

5.12 TERMINATION

This agreement is expressly terminable by either party providing sixty (60) days written notice to the other.

5.13 EMERGENCY ENTRY

The Stillwater City Manager shall have the right to enter the premises and assume operational control of Lakeside without notice at any time the City Manager deems Lakeside facilities or golf course grounds have been damaged or are in imminent danger of being damaged or destroyed, irrespective of what or who caused the damage or imminent danger of damage.

5.14 NON-DISCRIMINATION

Henderson Golf shall manage its operations in accordance with all federal and state anti-discrimination statutes and laws and shall not deny access to any person based on race, ethnicity, national origin, gender, familial status, age, disability or any other protected status.

5.15 SURRENDER OF THE PREMISES

At the expiration of the Term of the Agreement or other termination of this Agreement, Henderson Golf shall quit and surrender the premises and any city-owned assets in as good a state and condition as at the commencement of this Agreement, reasonable use and wear and tear thereof and damages by the elements excepted. Any equipment that Henderson Golf purchased during the term of this Agreement for Lakeside may be removed at the option of Henderson Golf.

5.16 FINAL AGREEMENT

This Agreement terminates and supersedes all prior understandings or agreements on the subject matter hereof. This Agreement may be modified only by a further writing that is duly executed by both Stillwater and Henderson Golf.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

HENDERSON GOLF MANAGEMENT, LLC

By: Michael Henderson, Managing Member

State of Oklahoma)
) ss
County of Oklahoma)

Subscribed and sworn to me before this 10th day of July, 2024 by

RYLEE LIGHT NOTARY PUBLIC 22012526 Expires 15 Sep 2026 STATE OF OKLAHOMA

Notary Public

(seal)
My Commission Expires: 15 Sept 2026
My Commission Number: 22012526

CITY OF STILLWATER, OKLAHOMA
A Municipal Corporation

William H. Joyce, Mayor

CITY OF STILLWATER PAYNE COUNTY, OKLAHOMA ATTEST (Seal)

Teresa Kadavy, City Clerk

Approved as to form and content this 5 day of Aug 2024

Kimberly Camley, City Attorney

OPERATION/MAINTENANCE AGREEMENT
CITY OF STILLWATER LAKESIDE MUNICIPAL GOLF COURSE

EXHIBIT LIST

August 25, 2017

EXHIBIT	DESCRIPTION
A	Schedule of telephone and IT equipment
B	Pro-Shop Sales Inventory (February 1, 2017)
C	Clubhouse Food & Beverage Inventory (February 1, 2017)
D	Golf Course Maintenance Requirements
E	Grounds Equipment & Golf Carts
F	Maintenance Parts & Materials Inventory

EXHIBIT A

Henderson Golf may make the use of the following City of Stillwater IT equipment located at the golf course during the term of this agreement:

(8) Dell Optiplex 7010 PC's
(1) Dell Dimension 3100 PC
(1) Toro Irrigation Custom Computer (City may be keeping / maintaining)
(2) 17" POS Touchscreen LCD Monitors
(6) 22" Dell Widescreen LCD Monitors
(1) 19" Dell LCD Monitor
(1) 15" Dell LCD Monitor
(1) 24" Viewsonic Widescreen LCD Monitor (On Toro system – City may keep / maintain)
(1) HP Black & White Laser Printer
(1) HP Color Laser Printer
(2) Receipt printers
(2) barcode readers
(2) Cash drawers
(2) Dell 2824 Switches
(1) Netgèar 5-port 10/100 switch

The City of Stillwater will remove and retain the following IT equipment:

(1) Cisco 2960S switch
(1) NetVanta 3200 T1 Router
(1) Eaton 5px1500rt UPS
(5) Cisco 6941 VOIP phone sets
(1) Cisco 8945 VOIP phone

EXHIBIT B

This page intentionally left blank. Exhibit B will be inserted upon completion of final inventory in February, 2018.

EXHIBIT C

This page intentionally left blank. Exhibit C will be inserted upon completion of final inventory in February, 2018.

Exhibit D

1. IRRIGATION – EQUIPMENT REQUIRED TO IRRIGATE ALL AREAS OF THE GOLF COURSE AND THE CLUBHOUSE GROUNDS

Scheduling - The entire Golf Course shall be irrigated as necessary in quantity and frequency consistent with seasonal requirements in order to support proper and vigorous growth of the turf. Additional hand watering shall be done to insure proper moisture levels of greens. The use of a hand held moisture meter is required while watering greens. Watering shall be done at night or other appropriate times so as not to interfere with golf play. Irrigation coverage shall be reviewed daily.

Maintenance - Vendor shall be responsible for the repair and/or replacement of all heads, wiring, electronics, computer systems, sensors, pumps, and pipe as needed to maintain the proper operation of the entire Golf Course irrigation system (including greens, tees, fairways, roughs, planters, flower beds, etc.) on an on-going basis. All replacement parts must meet or exceed original equipment installed. All repairs shall be approved by the City prior to any repair work. Any damage caused to the irrigation system including pumping station and control components, utilities, or structures, by the Vendor, shall be replaced or repaired at no expense to the City. All excavations shall be cordoned off to protect the public and filled in within 48 hours or less. At no time shall excavations be left open and unattended without proper barricades.

Duration - Irrigation maintenance includes system startup and proper winterization of irrigation system and pump house for the irrigation system on the Golf Course. Any damage incurred to the irrigation system, pump house components or related items through the improper winterization, improper maintenance or negligence of the Vendor will be replaced by the Vendor with original manufactured equipment and calibrated by an approved qualified technician at no additional expense to the City. All equipment shall be maintained in and in working condition within two (2) weeks of needed repair unless otherwise approved by the City. All repairs shall be brought to the attention of the City. Any third party vendors needed to repair components must first receive approval and provide the proper insurance before beginning work.

The Vendor shall be responsible for spring start-up and fall winterization of the entire system.

Trimming - Bi-monthly edging and trimming shall take place on all irrigation heads, isolation valves, splice boxes, and quick couplers.

Drainage Systems - All existing drain lines and fixtures should be maintained in working order at all times. Drain line risers are edged and trimmed monthly.

2. MISCELLANEOUS ITEMS

FENCES - Necessary repairs or replacement of all fences, gates and locking devices needed for the protection of the Golf Courses or equipment should be done immediately. All components shall meet or exceed current material specifications.

WET LANDS - Vendor shall clean all surface drains and culverts in wetland areas and throughout the Golf Course. All drainage structures must be kept free of debris at all times.

3. ENVIRONMENTAL COMPLIANCE AND RECORDKEEPING

Environmental Compliance / Sustainability Program - The Vendor shall comply with all City, local, State and Federal laws, regulations, policies and programs. City emergency pollution response procedures or equal must be adopted and followed. The Vendor is required to participate in the City's environmental compliance and Phase II Storm Water Management programs. Any costs associated with the proper disposal of environmental waste will be the responsibility of the Vendor.

Access to all facilities must be made available for environmental audit and review by City staff. Any environmental occurrence must be reported to the City immediately and/or as required by state and federal law.

The Vendor shall be responsible for maintaining all required licenses, certifications (i.e.: certified pesticide application), permits or other requirements for proper operation and maintenance of the Golf Course.

The City is actively involved in a sustainability program with the intent of reducing the negative environmental impact of golf maintenance and operations. The Vendor will be requested to cooperate with these existing programs.

Record Keeping & Reporting - The Vendor shall keep records of all maintenance practices on the Golf Course in such a fashion that the City can, at any time, audit records to determine that the terms of the contract are met, including but not limited to, pesticide application logs, fertilization applications, water use, hazardous and non-hazardous waste removal documents, fuel delivery and use, or others as requested.

4. MOWING

Greens, practice putting greens, and turf nursery shall be mowed seven (7) days per week during the active growing season by triplex type greens mowers. Frequency and height of cut should be 0.110" to 0.135" but may be modified, with prior approval by the City, as deemed necessary April through October. Early spring and end of season greens may be mowed as needed with height of cut not to exceed 0.145. The practice of alternate mowing patterns must be followed. Greens shall be mowed before daily course play begins.

Collars and aprons shall be mowed at least three (3) times per week during the active growing season, less during periods of dormancy. Collars and aprons height of cut shall be between 0.450 and 0.5 inches and shall be mowed with triplex greens mowers..

All tee areas shall be mowed with triplex greens mowers (alternating patterns) and grass clippings collected from the playing surface every other day, during the active growing season and less often during period of reduced growth. Height of cut shall be .450 to 0.5".

Fairways shall be mowed a minimum of three (3) times per week during the active growing season. Fairways are maintained at a height of 0.5" during the spring months and 0.75" on or about Labor Day.

Rough areas shall be mowed a minimum of twice one (2) time per week during the active growing season and less frequent during periods of slow growth. Roughs shall be maintained at a height of 2.0" during the growing season.

5. FERTILIZING

Types and analysis of fertilizers to be applied to greens, practice putting green(s), and turf nursery shall be determined from the results of soil nutrient testing and growing conditions. Approximately five (5) pounds of actual nitrogen per 1000 sq. ft. may be applied during the growing season. In general, greens shall be fertilized monthly with #1/2 lb. of N&K/1,000 sq. ft. (March through October) with a slow release fertilizer. Additional foliar application of 0.1 lb. N/1,000 sq. ft. shall be applied bi-weekly (March-April-May-Sept-Oct). Weekly foliar applications of 0.1 lb. N/1,000 sq. ft. June, July and August may also be applied. The application of micro nutrients shall be dictated by soil analysis results and recommendations. Applications of potassium are 5-7 pounds annually.

All tee areas shall be fertilized a minimum of three (4) times per year using a 1 to 1 N to K ratio applied at one and one-quarter (1-¼) lb. of Nitrogen per 1,000 sq. ft. The application of micro nutrients shall be dictated by soil analysis results and recommendations.

All fairways shall be fertilized a minimum of two (2) times per year with a 1 to 1 N to K fertilizer at an annual rate of 5.0 lbs. OF N&K/1,000 sq. ft. The application of micro nutrients shall be dictated by soil analysis results and recommendations.

Roughs between fairway and cart path and 40 ft. opposite side shall be fertilized at same rate as fairways.

6. AERIFICATION

Core aerify all greens, practice putting green(s) and turf nursery two times per year during the growing season. Remove cores; apply topdressing with 100% angular sand and drag until holes are completely filled. Spot topdressing may be applied to repair damage from ball marks or any other damage. Light topdressing may be done in conjunction with verticutting during the growing season. This shall be carried out with a minimum of interference with course play and with prior approval by the City.

Dry-jecing greens annually or deep tine aerify with using one-half inch (½") tines, with 2 X 2 spacing to an 8" to 10" depth in early spring. Application shall be done with an approved topdressing spreader. This shall be carried out with a minimum of interference with course play and with prior approval by the City

At a minimum, all tee areas are to be aerified once per year using 5/8" hollow tines at 2 X 2 spacing or use of an Aerway spiker once a year. An increased frequency of aerification may be required to promote turf health, using the appropriate equipment.

All fairways and rough shall be aerified one (1) time per year. Use of an Aerway spiker is allowed working compacted areas 2 times. If hollow tines are used cores are to be chopped, dragged, and tufts blown. Spot aerification may be done any time to relieve compaction. This shall be carried out with a minimum of interference to course play and with prior approval by the City.

7. TOPDRESSING

Topdressing specification and subsequent samples of the sand for greens, practice putting greens and nurseries shall be provided to the City for approval prior to application. .

All tee areas shall be and top dressed monthly during the growing season with an approved as needed to recover divots.

8. WEED CONTROL

All greens, practice putting green(s) and turf nursery are maintained free of foreign grasses and weeds for a smooth playable surface. This will be achieved through both pre and post-emergence chemical applications. Applications will be done in a timely manner to minimize damage to course playability

All tee areas, fairways, and rough shall be kept free of weeds and undesirable grasses by the proper application of herbicides. Spot treatments with contact herbicide shall be performed as needed.

All planters, perennial or annual flower beds, perennial grass beds and landscaped beds shall be maintained and free of weeds and unwanted grasses whether by mechanical or chemical means. Adequate amounts (3" min.) of wood mulch should be maintained in beds at all times to prevent weed and grass infestation and maintain aesthetics

9. CHEMICALS AND PESTICIDES

This section applies to all Golf Course grounds including the maintenance of greens, tees, fairways, roughs, and right away.

All chemical and pesticide applications shall be made during the very early morning hours when golfers are not present.

Pesticide and chemicals shall be applied in accordance with all applicable laws and regulations, during proper weather conditions, and with all notifications and postings

The Vendor shall not use chemicals that require a special permit unless otherwise approved by the City.

10. INSECTICIDES

All greens, practice putting green(s) and turf nursery shall be treated on a preventative basis. An IPM (Integrated Pest Management) program will govern rates and timing of applications

Applications on tee areas shall be carried out on a preventive basis for white grubs. An IPM (Integrated Pest Management) program will govern rates and timing of applications.

All fairways are to be treated on a preventative basis for white grubs. An IPM (Integrated Pest Management) program will govern rates and timing of applications

Applications on roughs shall be carried out on a curative "as needed' basis. An IPM (Integrated Pest Management) program will govern rates and timing of applications.

11. FUNGICIDES

A preventative fungicide program with a minimum of 11 applications during the season and a minimum of 4 additional applications for the prevention of Take-all Patch and Fairy Ring shall be instituted on all greens, for prevention of all applicable diseases associated with bentgrass surfaces. An IPM (integrated Pest Management) program will govern rates and timing of applications.

Applications on tees, fairways, and roughs shall be carried out on a curative "as needed' basis. An IPM (Integrated Pest Management) program will govern rates and timing of applications.

12. GREENS

Cup Locations - Change cup locations on all greens and practice putting greens every day during the active season. Cup locations are moved at least twenty feet from the previous placement. Vendor must use hole target rings to help maintain a clean cup edge.

Grain Control - Verticutting shall be done a minimum of two (2) times from April to May and again at least two (2) times from September to October and shall be coordinated to compliment aerification and topdressing schedules. Combing and brushing may also be done.

Repair - Repair ball marks daily. Divots or any other damaged turf on all greens and practice putting greens should be repaired immediately.

Proper moisture levels shall be maintained with use of a moisture meter. Hand watering during the day shall be used to spot water greens as needed.

Bermuda grass encroachment should be managed around edges of bent grass greens.

Growth regulators should be used on a regular schedule throughout the growing season.

13. TEES – ALL AREAS USED FOR TEEING SURFACE

Set-up - Tee markers and all tee equipment shall be moved daily for proper teeing and to control turf wear. All tee and fairway yardage markers and GAM markers shall be trimmed monthly. Move green and tee markers to preserve hole yardage integrity.

14. FAIRWAYS, TEES, DRIVING RANGE TEE, and COLLARS

A minimum of four applications of primo max or similar growth regulator with 1/10 lb of N and 15 lbs per acre of a ferrous sulfate product shall be applied to the fairways, tees and collars during the growing season.

Driving range tee box shall be over seeded in fall with perennial at a rate of 600 lbs per acre with a minimum of 1 lb of N-P-K in fall.

Driving range shall be top-dressed on a three week interval to smooth teeing surface during growing season.

15. SAND BUNKERS

Maintenance - All sand bunkers (bunkers) shall be raked a minimum of four (4) times per week, edged and trimmed monthly, and sand added as needed to maintain a semi-soft dry smooth condition. Bunkers shall be maintained free of weeds, grasses and debris. Care shall be taken to maintain the design outline of the bunker to insure the integrity of the bunker shape. If integrity cannot be maintained the edges shall be rebuilt to the original design.

Depth - The depth of sand shall be checked on a regular basis and shall be an average depth of six inches (6") of soft, playable sand at all times.

Materials – Sand used to construct new and/or replenish existing bunkers shall meet the specifications of the City.

16. BERMUDA GRASS CHIPPING GREEN

Bermuda grass chipping green shall be aerified 3 times per year with ½ inch tines on a two (2) x two (2) inch spacing. Plugs shall be removed and top dressed with same sand used on greens.

Green shall be sprayed on same program as bentgrass greens. Additional granular fertilizer should be applied in the amount of 5lb N and K per season.

Green shall be managed similar to bentgrass greens when topdressing, and verticutitng.

Mowing height shall be raised at Labor day to .175 and remain at that height until March 15.

17. PLANTERS, FLOWER BEDS AND LANDSCAPES

Trimming - The plant material (trees, shrubbery, perennial plants, flowers and ground covers) in planters, landscaped beds shall be trimmed for appearance and protected from wind, insect damage, and disease as needed or determined by the City.

New Trees - All trees planted within the twenty-four (24) month period previous to the commencement of this contract shall be maintained in good health by the Vendor. Trees shall be trimmed to improve appearance and to remove dying or dead branches. As directed by the City and as needed due to weather conditions, owner supplied water bags shall be reinstalled around the base of trees and filled with water for the remainder of the growing season. With City approval, guy wires and stakes shall be removed from those trees of sufficient size and establishment to be able to stand unassisted.

Mulch - Trees shall be mulched in accordance with the current practice by the City. Mulched areas around the base of trees shall be maintained at an adequate level (min. 3") and shall be kept free of weeds, unwanted grasses and litter.

Pruning - All ornamental trees are pruned for protection from wind and pests as well as for appearance. Large trees will be trimmed as needed to protect the public from injury or prevent damage to park facilities. Once identified by the City as a hazardous, all dangerous trees or limbs are to be removed promptly for public safety. All pruning, trimming or cutting will be done to International Society of Arboriculture standards. Unless damaged, no trees are to be removed without prior approval of the City.

Watering - All trees are watered as necessary to provide adequate moisture for proper growth.

18. GENERAL

Large area mowers should not be used within one foot of the trunk of all trees.

Girdling- Damage from string-line trimmers will not be tolerated. If the health of a tree is compromised as a result of Vendor's maintenance practices, it will be replaced as negotiated by the Owner.

Litter Control - Policing for debris and overall appearance of the Golf Course shall be done on a regular basis for the removal of litter (paper, leaves, cans, bottles, branches, etc.)

Weed eating- Creeks and all buildings and areas mowers cannot mow shall be weed eated on a three week rotation during the growing season.

Cart path edging- Cart path edges shall be edged on a three week rotation during the growing season.

Clubhouse grounds- Clubhouse grounds including flower beds shall be mowed, edged and trimmed weekly during the mowing season.

Leaves shall be mulched and blown away during the fall months on greens, tees, and fairways during the fall months.

Fescue areas under trees shall be over seeded with a blend of turf type fescue and bluegrass blend in fall and spring with proper starter fertilizer.

Trees shall be removed from dam as required by NRCS.

Bent grass nursery shall be maintained for repairs to greens.

Right away along Richmond and Washington Street shall be mowed one a week during growing season.

Property consists of a total of 160 acres. It contains the following:

19 - SR1020 creeping bent grass greens- 120,000 square feet

1- 007 creeping bentgrass nursery- 5,000 square feet

1- Bermuda grass chipping green- 7,500 square feet

25 Acres of fairways, tees, and collars

100 Acres of rough and right away.

The Vendor shall employ a GCSAA Superintendent member (Superintendent) who shall hold a valid and current Class "A" DESIGNATION from the Golf Course Superintendents' Association of America (GCSAA).

Exhibit E

JOHN DEERE

P&K Equipment Inc
604 Eastgate
Stillwater, OK 74074
405.743.4050
Fax: 405.743.4089
Cell: 405.747.0621

June 27, 2017

Mike Buxton
405-614-3077
cwbymkb@gmail.com

Dear Mike,

Following is a listing of the equipment quotes that you requested. These are values that a buyer would purchase this equipment for.

➢	E Gator	W0E4X2E001108		$200
➢	E Gator	W0E4X2E001572		$200
➢	Turf Gator	W00TURF019199		$750
➢	Turf Gator	W00TURF019125	(on blocks)	$100
➢	Turf Gator	W00TURF019196		$750
➢	2500	TC250AG010467		$200
➢	2500	TC2500G015194		$200
➢	2500	TC250AG010476		$200
➢	2500	TC2500G011300	(on blocks)	$200
➢	2500	TC250AG010462		$200
➢	(3) standard 11 blade reels			$50
➢	(3) thatchaway reels			$50
➢	(3) standard verticut reels			$50
➢	3235	TC3235T040204		$750
➢	3235	TC3235T040194		$750
➢	2030	VG2030A030127	(on blocks)	$250
➢	2030	TC2030A035388	(on blocks)	$250
➢	2030	TC2030A035389		$1,000
➢	HD200			$500
➢	4400	LV3300H442030		$2,000
➢	4610	LV4610P265706		$3,000
➢	1200A	TC1200A136780		$2,500
➢	997	DM997SC022307		$2,500
➢	3682	28800907		$500
➢	721XR	14690703	(on blocks)	$50
➢	800	M0800AC010435		$500

➢ 800	TC800AC040323	$500
➢ 800	TC800AC040322	$500
➢ 220B	M0220BX016481	$50
➢ 220A	M00220A040139	$50
➢ PF120B	16272284B	$12,500
➢ Foley	31I63201297	$2,500
➢ 200	313000251	$1,500

Please do not hesitate to contact me if you have any further questions or need additional information on this matter. Thank you once again for the opportunity to do business with your course.

Sincerely,

Alan Nietenhoefer, Golf/Turf Manager
P&K Equipment Inc

Justice Golf Car Co Inc OKC
(405) 634-0571
9300 S. I -35 Service Rd.
Oklahoma City, OK 73160

Quote No. 12463
Date: 06/27/17
Page No. 1

Sold To Lakeside Golf Club
5201 N. Washington
Stillwater, OK 74075

Ship To Shawn Anderson
Justice Golf Car Co., Inc
9300 S. I-35 Service Rd.
Oklahoma City, OK 73160

Cust 2786 Ship date ASAP Ship via Company Truck
Salesman Terms Net on receipt

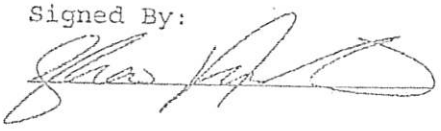
Quantity	Unit	Item Number	Description	Price	Unit	Extension
60	EACH	PARTS	2012 Precedent electrics	1250.00	EACH	75,000.00
1	EACH	PARTS	2013 Club Car range unit	2000.00	EACH	2,000.00
1	EACH	PARTS	2005 Club Car Cafe expres	1250.00	EACH	1,250.00
3	EACH	PARTS	2005 DS with cargo box	650.00	EACH	1,950.00

This is the actual cash value of the golf car & utility vehicle fleet at Lakeside Golf Course in Stillwater, Oklahoma.

Value assumes the equipment is in good overall condition, both mechanically and cosmetically, less normal wear and tear.

This is NOT an offer to purchase the fleet.

Signed By:



* * * Q U O T E * * *
Str: 1 Reg: 12 Drw: 12 Usr:CC 11:54

Sale Amt	80,200.00
Sales Tax	.00
Total	80,200.00

EXHIBIT F

Item	Number of Items	Unit of Measurement	Unit Price	Total Item Value
Irrigation Inventory				
Toro Gear drives	11	Units	$ 95.00	$ 1,045.00
2" compression	9	Units	$ 8.00	$ 72.00
2.5 "compression	9	Units	$ 13.00	$ 117.00
3" compression	7	Units	$ 18.00	$ 126.00
2.5 " couplers	12	Units	$ 2.03	$ 24.36
3" couplers	8	Units	$ 3.00	$ 24.00
2-2.5 " couplers	10	Units	$ 9.99	$ 99.90
2x3" couplers	10	Units	$ 2.00	$ 20.00
2x2" bushing	10	Units	$ 2.14	$ 21.40
2x1.5" bushing	20	Units	$ 2.15	$ 43.00
2x 2.5 adapter	20	Units	$ 2.50	$ 50.00
3" saddle	1	Units	$ 50.64	$ 50.64
4" barrel sleave	2	Units	$ 95.00	$ 190.00
4" saddle	1	Units	$ 79.00	$ 79.00
diaphrams Toro	10	Units	$ 75.00	$ 750.00
Toro siliniods	10	Units	$ 35.00	$ 350.00
3" tees	10	Units	$ 3.50	$ 35.00
3"els	10	Units	$ 300.00	$ 3,000.00
1" hunter valve	1	Units	$ 105.00	$ 105.00
2" hunter valve	1	Units	$ 65.99	$ 65.99
2" tees	10	Units	$ 4.14	$ 41.40
6 " harco fittings	5	Units	$ 100.00	$ 500.00
2.5" els	12	Units	$ 2.00	$ 24.00
2.5 tees	8	Units	$ 7.84	$ 62.72
3" stick pipe	20	Units	$ 20.00	$ 400.00
4 inch drainage pipe	3	Units	$ 20.00	$ 60.00
1" pipe	8	Units	$ 12.00	$ 96.00
Irrigation Total				$ 7,452.41
Fertilizer Inventory				
15-0-15	20	Bags	$ 22.00	$ 440.00
Extreme green 20	38	Bags	$ 21.50	$ 817.00
Super cal	15	Bags	$ 13.00	$ 195.00
21-0-0	80	Bags	$ 12.50	$ 1,000.00

Golf Inventory
6.28.17

Item	Number of Items	Unit of Measurement	Unit Price	Total Item Value
08-3-5 nature safe	15	Bags	$ 20.00	$ 300.00
15-2-15	12	Bags	$ 62.80	$ 753.60
long iron	2	30 gallon drums	$ 249.00	$ 498.00
8-16-16 fertilizer	11	Bags	$ 55.00	$ 605.00
ferrous suflate	8	Bags	$ 20.00	$ 160.00
epsom salt	3	Bags	$ 15.00	$ 45.00
Fertilizer Total				**$ 4,813.60**
Chemical Inventory				
spray dye	1	Cases		$ -
Headway	1	Link Pack	$ 4,060.00	$ 4,060.00
Primo	1	Link Pack	$ 2,740.00	$ 2,740.00
Ronstar G	11	Bags	$ 50.00	$ 550.00
007 spray	4	Cases	$ 79.00	$ 316.00
Tupersan	5	Bags	$ 93.92	$ 469.60
Seacal	7.5	Gallons	$ 50.00	$ 375.00
Ronstar flo	2.5	Gallons	$ 412.50	$ 1,031.25
Gulf stream	5	Gallons	$ 75.00	$ 375.00
Breeze	5	Gallons	$ 75.00	$ 375.00
Forte	1	Gallons	$ 240.00	$ 240.00
Dursban	2.5	Gallons	$ 196.00	$ 490.00
Avid	3	Gallons	$ 150.00	$ 450.00
tank cleaner	3	Quarts	$ 13.00	$ 39.00
defoamer	5	Quarts	$ 15.00	$ 75.00
Barricade	5	Bags	$ 75.00	$ 375.00
Koban	2	Cases	$ 100.00	$ 200.00
Chrolistar	2	Cases	$ 150.00	$ 300.00
Subdue	2	Gallons	$ 199.00	$ 398.00
Bensumec	8	Jugs	$ 328.00	$ 2,624.00
Offset	3	Gallons	$ 65.04	$ 195.12
Hertitage	2	Cases	$ 250.00	$ 500.00
Freehand	1	Bags	$ 150.00	$ 150.00
Lexicon	0	Cases		$ -
Dac-action	3	Cases	$ 300.00	$ 900.00
Triplet	1	Gallons		$ 69.00
Chemical Total				$ 17,296.97
INVENTORY TOTAL				$ 29,562.98

EXTENSION OF AGREEMENT #1
OPERATION/MAINTENANCE AGREEMENT
FOR LAKESIDE MEMORIAL GOLF COURSE

THIS AGREEMENT is made and entered into on this ___ day of _____, 2025 by and between the City of Stillwater and Henderson Golf Management, LLC.

WITNESSETH

WHEREAS, City of Stillwater ("Stillwater") and Henderson Golf Management, LLC ("Henderson") entered into a written Agreement on or about the 10th day of July 2024; and

WHEREAS, Paragraph 1.3 of said Agreement provides that the parties may extend the term of the Agreement for an additional one-year term through execution of an extension agreement ("Extension Agreement").

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING AND THE MUTUAL COVENANTS AND AGREEMENTS HEREINAFTER SET FORTH, STILLWATER AND HENDERSON AGREE:

1. Term of Agreement. The parties agree to extend the Operation/Maintenance Agreement dated July 10, 2024 for an additional one-year term beginning July 1, 2025 and ending on June 30, 2026.

2. Effect of Contract Provisions. All provisions contained within the Agreement dated July 10, 2024 shall remain in full force and effect during the extension period and shall be binding on the parties hereto.

IN WITNESS WHEREOF, the parties have caused this agreement to be fully executed in duplicate, each copy of which shall constitute an original.

HENDERSON GOLF MANAGEMENT, LLC

By: Michael Henderson, Managing Member

State of Oklahoma)
) ss
County of Payne)

Subscribed and sworn to me before this 28th day of May, 2025 by Michael Henderson, Managing Member, Henderson Golf Management, LLC.

Notary Public

(seal)
My Commission Expires: 15 Sept 2026
My Commission Number: 22012526

CITY OF STILLWATER, OKLAHOMA
A Municipal Corporation

William H. Joyce, Mayor

(seal)
ATTEST:

Teresa Kadavy, City Clerk

The City of Stillwater OKLAHOMA

Budget Amendment Request

For Budget Year 2025

Department of Finance
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.372.0025
Web: stillwater.org

Date: 05/27/2025

Department: Transportation **Requested by:** Jared Thulin

Explanation:

Expenditures:
This amendment returns the unspent appropriations from the project to the fund balance of the Transportation Sales Tax Fund.

	Account Name	Account Number (xxxxxxx-xxxxx)	Project Number	Current Budget Amount	Amount of Change	New Budget Amount
Increase:		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
Decrease:	Bridge-3rd St/Construct Contrc	2604035 - 54009	19TR04260	$ 453,771	($ 225,177)	$ 228,594
	Bridge-3rd St/Other Contracts	2604035 - 54010	19TR04260	$ 10,360	($ 10,360)	$ 0
	Bridge-3rd St/Easement&ROW	2604035 - 54014	19TR04260	$ 3,288	($ 3,288)	$ 0
		-				$ 0
		-				$ 0

Net Change: (will usually result in a total increase or decrease) ($ 238,825)

Reviewed by Department Manager: _____ **Date:** 5/27/2025

Reviewed by Finance: _____ **Date:** _____

Approved by CMO: _____ **Date:** _____

Approved by City Council: ☐ Yes ☐ No **Date:** _____

Processed by Finance: _____ **Date:** _____

Set ID: _____ **Date Sent to SA&I:** _____

--Print on Yellow Paper--

MEMORANDUM

DATE: May 29, 2025

TO: City Council

SUBJECT: Local Government Certification documents for Payne County Youth Services to apply for the 2025 Emergency Solutions Grant Program

On May 5, 2025, City Council approved authorizing the Mayor to sign the Local Government Certification documents for Payne County Youth Services to apply for the 2025 Emergency Solutions Grant Program. Payne County Youth Services has benefited for many years from funding from the Housing and Urban Development (HUD) Agency for its day-to-day operations in Stillwater. The City of Stillwater is the local government sponsor for this grant application. The associated report and certification documents reflected that PCYS would be seeking $75,000 in grant funds. Subsequent to that approval, PCYS was advised that additional grant funds may be available and as such has requested grant funds in the amount of $150,000. A revised local government certification to reflect that amount is needed for the grant application. Support for additional funding aids funding for residents in the areas of emergency shelter, administration, rapid re-housing, outreach, and prevention services. The grant application deadline is May 30, 2025. This agenda item acknowledges and approves the revised local government certifications for the grant application.

ENVIRONMENTAL REVIEW RECORD FOR EXEMPTIONS/RELEASE OF FUNDS

Oklahoma Department of Commerce/Office of Community Development
Emergency Solutions Grant Program
Environmental Review or Activity/Project that is Exempt or Categorically Excluded Not Subject to Section 58.5
Pursuant to 24 CFR Part 58.34(a) and 58.35(b)
REQUEST FOR RELEASE OF FUNDS AND CERTIFICATION

Contractor Name: Payne County Youth Services, Inc.	Funds Requested: $150,000
Address: 2224 W 12th Ave, Stillwater, OK 74074	Date of Request: May 5, 2025
Project Description (Brief): Emergency Solutions Grant (ESG)	

I have reviewed and determined that the above-mentioned project is a Categorically Excluded activity (subject to §58.5) per 24 CFR §58.35(a) as follows: (Place checkmark by each requirement to verify that Applicant's project does not include any item listed)

☑	58.35(a) (1). Acquisition, repair, improvement, reconstruction, or rehabilitation of public facilities and improvements (other than buildings) when the facilities and improvements are in place and will be retained in the same use without change in size or capacity of more than 20 percent (e.g., replacement of water or sewer lines, reconstruction of curbs and sidewalks, repaving of streets);
☑	58.35(a) (2). Special projects directed to the removal of material and architectural barriers that restrict the mobility of and accessibility to elderly and handicapped persons;
☑	58.35(a) (3). Rehabilitation of buildings and improvements when the following conditions are met:
☑	58.35(a) (3) (i.) In the case of a building for residential use (with one to four units), the density is not increased beyond four units, the land use is not changed, and the footprint of the building is not increased in a floodplain or in a wetland;
☑	58.35(a) (3) (ii). In the case of multifamily residential buildings: (A) Unit density is not changed more than 20 percent; (B) The project does not involve changes in land use from residential to non-residential; and (C) The estimated cost of rehabilitation is less than 75 percent of the total estimated cost of replacement after rehabilitation.
☑	58.35(a) (3) (iii). In the case of non-residential structures, including commercial, industrial, and public buildings: (A) The facilities and improvements are in place and will not be changed in size or capacity by more than 20 percent; AND (B) The activity does not involve a change in land use, such as from non-residential to residential, commercial to industrial, or from one industrial use to another.
☑	58.35(a) (4) (i) An individual action on up to four dwelling units where there is a maximum of four units on any one site. The units can be four one-unit buildings or one four-unit building or any combination in between; or
☑	58.35(a)((ii) An individual action on a project of five or more housing units developed on scattered sites when the sites are more than 2,000 feet apart and there are not more than four housing units on any one site. 58.35(a) (iii) Paragraphs (a) (4) (i) and (ii) of this section do not apply to rehabilitation of a building for residential use (with one to four units) (see paragraph (a) (3) (i) of this section).
☑	58.35(a) (5). Acquisition (including leasing) or disposition of, or equity loans on an existing structure, or acquisition (including leasing) of vacant land provided that the structure or land acquired, financed, or disposed of will be retained for the same use.
☑	58.35(a) (6). Combinations of the above activities.

Signature of Authorized Official: _____

Name & Title of Authorized Official: William H. Joyce, Mayor

Date: May 5, 2025

REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	4.f. CC-25-82
Previous/Related Action:	
Background/Issue:	City of Stillwater (City) property and general liability insurance expires on June 30, 2025. The City utilizes Oklahoma Municipal Assurance Group (OMAG) as advisor and broker for property and general liability insurance. OMAG works exclusively with cities in Oklahoma, providing significant expertise on insurance and liability. OMAG also provides many value-added services. During FY25, the City benefited from the following: • access to attorneys with employment law expertise; • administration of tort claims; • administration of property damage claims; • no cost training sessions to staff; • roof evaluation services; and • property appraisal services. The quotes for FY26 from OMAG for the entirety of property and general liability needs for the City, Stillwater Utilities Authority (SUA), Stillwater Economic Development Authority (SEDA), and Stillwater Public Works Authority (SPWA) total $1,158,700. This total does not include Airport liability, which will be purchased as a separate policy and brought to the Council for approval at a later date. Deductibles remain the same per occurrence: Tort Claims - $25,000, Property Claims - $50,000, Automobile Claims - $1,000, and Mobile Equipment Claims - $500.
Proposal/Solution:	Staff recommends engaging with OMAG for City, SUA, SEDA, and SPWA property and general liability insurance needs for FY26.
Financial Source/Impact:	Funds are budgeted for property and general liability insurance in FY26 and no additional budget appropriation is required.
Related Strategic Priority:	#1 EFFECTIVE SERVICES & ACCOUNTABLE GOVERNMENT
Recommended Action/Motion:	Motion to approve FY26 Oklahoma Municipal Assurance Group (OMAG) policies for property and general liability insurance coverage in the amount of $1,158,700.
Prepared By:	Christy Cluck, Assistant City Manager/Finance Director

Reviewed By:	Christy Cluck
	Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. Stillwater GLA250005903-05 Dec Page 20250522
2. Stillwater PRO250005803 Dec Page 20250509

3650 S. Boulevard • Edmond, OK 73013 • omag.org
405.657.1400 • 800.234.9461 • FAX 405.657.1401

Municipal Liability Protection Plan

Declarations Page

1. PLAN MEMBER: **City of Stillwater** AGREEMENT NUMBER : **GLA250005903**
   Mailing Address: 723 S Lewis Street
   Stillwater, Oklahoma 74074
2. Plan Period From 7/1/2025 **to** 7/1/2026 **12:01 A.M. Central Standard Time**
3. The Coverage afforded by this agreement is only with respect to the following coverages as are indicated by specific limits of coverage, for which a premium is charged.

COVERAGE

		PREMIUM
GENERAL LIABILITY (PARTS I, IV, V and VII)		
A. Bodily Injury	B. Property Damage	$314,388
C. Personal Injury	D. Errors and Omissions	
[ ] Prior Acts Coverage		
AUTOMOBILE LIABILITY (PART II)		
E. Bodily and Personal Injury	F. Property Damage	$93,433
[X] Hired and Non-owned Automobile Coverage		$161
AUTOMOBILE & EQUIPMENT PHYSICAL DAMAGE (PART III)		
G. Automobile Physical Damage		$157,632
1. Comprehensive		
2. Specified Perils		
3. Collision		
H. Equipment Physical Damage – Per equipment schedule		
[X] Mobile Equipment		$4,914
[X] Auto/Misc. Equipment Blanket Limit: $1,000,000		$1,500
[ ] Mobile Equipment Leased/Rented Limit:		
[X] Hired Auto Physical Damage Limit: $150,000		
CYBER BREACH RESPONSE (VI)		
K. First Party & Liability		$1,350
		Total Premium
		$573,378

4. **Limits of Liability for claims which are subject to the GOVERNMENTAL TORT CLAIMS ACT:**
   $25,000 Each Property Damage Loss Per Occurrence **Coverages B, F**
   $25,000 Sanitary Sewer Overflows Loss Per Occurrence regardless of number of claims or claimants **Coverage C**
   $125,000 Each Other Loss Per Occurrence **Coverages A, C, D, E**
   Limits of liability for claims which are not subject to the OKLAHOMA GOVERNMENTAL TORT CLAIMS ACT:
   $1,000,000 Each Other Loss Per Occurrence **Coverages C, D**
   Aggregate limits of liability, regardless of theory of liability
   $1,000,000 Aggregate Per Occurrence **Coverages A, B, C, D, E, and/or F**
   $75,000 Sanitary Sewer Overflows Annual Aggregate **Coverage C**
   $2,000,000 Annual Aggregate **Coverages C, D**
   $50,000 Annual Aggregate Combined Single Limit **Coverage K**
   $2,500,000 Pool Annual Aggregate Limit **Coverage K**

5. **DEDUCTIBLES**
   Coverages A, B, E, F: No Deductible, except Sanitary Sewer Overflows and Electrical Disruptions, which are subject to the Deductible of C & D.
   Coverages C, D: **$25,000** Per Occurrence, except Law enforcement/Jail Related Claims which are subject to a **$5,000** Deductible or the above-mentioned standard Deductible, whichever is greater
   Coverages G, H: Per Schedule
   Coverage K: **$2,000** Per Occurrence

6. This agreement is composed of this Declaration Page, the MLPP Document, Schedules, Forms and Endorsements, if any.

3650 S. Boulevard • Edmond, OK 73013 • omag.org
405.657.1400 • 800.234.9461 • FAX 405.657.1401

Issue Date: May 22, 2025

Municipal Liability Protection Plan

ADDITIONAL NAMED PLAN MEMBERS

Stillwater Utility Authority
Stillwater Economic Development Authority
Stillwater Public Works Authority

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Municipal Liability Protection Plan

City/Town:

Mortgagee, Loss Payee and/or Additional Interest Schedule

Banc of America Public Capital Corp, P.O. Box 4431 Atlanta, GA 30302-4431	**Certificate Category** Loss Payee
BOK Financial Equipment Finance, Inc. 5956 Sherry Lane, Suite 1000 Dallas, TX 75225	**Certificate Category** Loss Payee
Enterprise Fleet Management Trust 9315 Olive Blvd Saint Louis, MO 63132	**Certificate Category** Loss Payee
United Rentals (Branch Q23) 3520 N Perkins Rd Stillwater, OK 74075-2227	**Certificate Category** Certificate Holder

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Municipal Property Protection Plan

Declarations Page

1. PLAN MEMBER: **City of Stillwater** AGREEMENT NUMBER: **PRO250005803**
   Mailing Address: 723 S Lewis Street
   Stillwater, Oklahoma 74074

2. Plan Period From 12:01 A.M. Central Standard Time at the address of the Plan Member
   From 7/1/2025 to 7/1/2026
3. The Plan Member is a(n) Municipality
4. The Coverage afforded by this agreement is only with respect to the following coverages as are indicated by specific limits of coverage, for which a premium is charged.

COVERAGE			PREMIUM
COMMERCIAL PROPERTY COVERAGE			
Buildings and Business Personal Property, per schedule		Limit: $299,660,491	$521,296
Mobile Equipment, per schedule		Limit: $	$
Leased/Rented Equipment		Limit: $	$
Miscellaneous Equipment, per schedule		Limit: $	$
Fine Arts, per schedule		Limit: $	$
EXCESS COVERAGE			
Business Income	$4,150,000 per occurrence	$4,150,000 per location	$10,375
Accounts Receivable	$2,475,000 on premises	$2,485,000 off premises	$6,188
Valuable Papers	$475,000 on premises	$490,000 off premises	$1,188
Theft/Disapp/ Destr	$230,000 inside	$240,000 outside	$7,320
Earth Movement (Subject to $100,000 Deductible)		Excess Limit: $49,000,000	$38,955
EQUIPMENT BREAKDOWN COVERAGE			
Electrical Power Generating Equipment, per schedule			Included
TOTAL PREMIUM			$585,322

5. LIMITS, per Supplemental Coverage Declarations, Equipment Breakdown Declarations and other schedules.
6. DEDUCTIBLES, per Supplemental Coverage Declarations, Equipment Breakdown Declarations and other schedules.
7. This agreement is composed of this Declaration Page, Equipment Breakdown Declarations, Schedules, Forms and Endorsements, if any.

Issue Date: **May 9, 2025**

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Municipal Property Protection Plan

ADDITIONAL NAMED PLAN MEMBERS

Stillwater Economic Development Authority
Stillwater Public Works Authority
Stillwater Utility Authority

SCHEDULE OF FORMS

A. Property

Supplemental Coverage Declarations

Property Coverage Form

Replacement Cost

Earth Movement Coverage Form

Flood Coverage Form

B. Equipment Breakdown

Equipment Breakdown Declarations

Equipment Breakdown Insuring Agreement Form

General Conditions

Equipment Breakdown Coverage Form

Exclusion of Certain Computer-Related Losses

Municipal Sales Tax Revenue Coverage Form
Business Income Coverage Form Excluding Extra Expense
Extra Expense Coverage Form
Mobile Equipment, Vehicle Equipment, and Miscellaneous Equipment Coverage Form
Builders Risk coverage Form
Leasehold Interest Coverage Form
Exclusion-Certain Computer Related Losses Due to Dates or Times (Property Coverages)
Terrorism Coverage Form
Joint or Disputed Loss Agreement
Theft Disappearance and Destruction coverage Form
Crime General Conditions
Equipment Breakdown Coverage Form
General Conditions

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Municipal Property Protection Plan

Equipment Breakdown

Coverages	Limits
Equipment Breakdown Limit	$299,660,491, not to exceed $25,000,000 per occurrence
Property Damage	Included
Business Income ***	$200,000
Contingent Business Income	$25,000
Extra Expense ***	Combined with Business Income
Service Interruption ***	Combined with Business Income
Perishable Goods ***	$100,000
Ordinance & Law	$25,000
Demolition and ICC	$250,000
Expediting Expenses	$250,000
Hazardous Substances	$250,000
CFC Refrigerants	$250,000
Newly Acquired Locations	$500,000
Data Restoration	$100,000
Sanitary Sewer Overflow	$25,000 per occurrence/ $100,000 per aggregate

Coverages	Deductibles
Combined	$50,000

Other Conditions

- Extended Business Income: 5 Days
- Newly Acquired Locations: 90 Days
- Unless the interruption exceeds 24 hours we will not pay for any loss under Service Interruption or the Service Interruption component of Perishable Goods.
- 'Covered equipment' does not include any transformers associated with the generation of power. - IC Engine Units over 15 years will be valued at Actual Cash value.

*** Business Interruption, Extra Expense, Service Interruption, Perishable Goods, or any other indirect coverage not available on any Power Generation unit/facility. ***

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Municipal Property Protection Plan

City/Town: **City of Stillwater** AGREEMENT NUMBER: **PRO250005803**

Mortgagee, Loss Payee and/or Additional Interest Schedule

REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	4.g. CC-25-83
Previous/Related Action:	None
Background/Issue:	Presley, LLC owns property addressed as 704 S. Hester Street. This request is for acceptance of an electric easement that will cover electric utility service to a new duplex. This will allow access for the City of Stillwater to maintain electric utility services at this site. The electric easement dedicated consists of 25 square feet (0.0006 acres) more or less.
Proposal/Solution:	
Financial Source/Impact:	There is no additional financial impact from the acceptance of this easement.
Related Strategic Priority:	#4 CONNECTED SPACES
Recommended Action/Motion:	Motion to accept the electric easement and authorize the Mayor to execute the document.
Prepared By:	Joshua Brown, Project Manager
Reviewed By:	David Barth Brady Moore Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. Electric Easement 704 S Hester St

ELECTRIC EASEMENT

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, Presley, LLC, an Oklahoma limited liability company, certifies that it owns and possesses all rights, title, and interest to the following described real property situated in Payne County, State of Oklahoma, to-wit:

> THE EAST NINETY-FIVE (95) FEET OF LOTS THREE (3) AND FOUR (4), AND ALL OF LOT FIVE (5), IN BLOCK "K" ORIGINAL TOWN, NOW CITY OF STILLWATER, PAYNE COUNTY, STATE OF OKLAHOMA, ACCORDING TO THE RECORDED PLAT THEREOF.

and further that the undersigned, in consideration of the sum of One Dollar ($1.00), in hand paid and other good and valuable consideration, for them, their heirs, successors, executors, administrators, and assigns do hereby grant, bargain, sell, and convey unto the City of Stillwater, Oklahoma, a Municipal Corporation, its successors and assigns, an easement for the installation, operation and maintenance of electric lines through, over, under, and across the portions of the above-described property dedicated on said recorded plat or instrument, for the purpose heretofore stated as follows:

> THE WEST (5) FEET OF THE NORTH (5) FEET OF SAID LOT FIVE (5

The easement contains 25 square feet or 0.0006 acres more or less and is subject to all recorded easements and rights of way thereof.

with the right of ingress and egress to and from same, for the purpose of permitting Stillwater to construct and maintain utilities through, over, under, and across said property, together with all necessary and convenient appurtenances on the premises; and to use and maintain the same and of affording, its officers, agents, employees, and all persons under contract with it, the right to enter upon the premises and strip of land for the purpose of surveying, excavating for, laying, constructing, operating, repairing, relaying and maintaining said utilities, and for the further purpose of enabling Stillwater to do any and all convenient things incident to the construction, operation, repairing, and maintaining of said utilities.

Except as herein granted, the grantors shall continue to have the full use and enjoyment of the properties herein granted or described for appropriate purposes. At no time shall the grantors commit a use, occupation or enjoyment thereof that might cause a hazardous condition and no building, structure or obstruction shall be located or constructed on said easement by the grantors, their successors or assigns, nor shall the grantors allow said easement to be encumbered in any way so that the City of Stillwater shall not be afforded access to said electric line(s) at any and all times.

RECEIVED
By alexandria.maged at 10:59 am, May 21, 2025

Presley, LLC
an Oklahoma Limited Liability Company

Taylor Sokolosky, Manager

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

Before me, a Notary Public in and for said County and State on this 25 day of April, 2025 , personally appeared, Taylor Sokolosky, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Manager and acknowledged to me that he/she executed the same as his/her free and voluntary act and deed and as the free and voluntary act and deed of such LLC, for the uses and purposes therein set forth.

Given under my hand and seal the day and year last above written.

NOTARY PUBLIC

My Commission Expires:
My Commission Number:
(SEAL)

CHARLES PARRISH
MY COMM EXPIRES 05/29/2027
NOTARY PUBLIC
COMM # 19005424
STATE OF OKLAHOMA

STATE OF OKLAHOMA)
) ss.
COUNTY OF PAYNE)

NOW, on this_____ day of _____, 2025 , the City Council of the City of Stillwater, State of Oklahoma, a municipal corporation, acting for and in behalf of said municipal corporation, during regular session, does hereby approve and accept from the named Grantor this delivered electric line easement and directs the Mayor and Clerk of said City of Stillwater to indicate the same by their signatures and seal of the City of Stillwater, State of Oklahoma.

_____
WILLIAM H. JOYCE, MAYOR
CITY OF STILLWATER, OKLAHOMA

(SEAL)

ATTEST:

_____
TERESA KADAVY, CITY CLERK
CITY OF STILLWATER, OKLAHOMA

Approved as to form and legality this_____ day of _____, 2025.

_____
KIMBERLY CARNLEY, CITY ATTORNEY
CITY OF STILLWATER, OKLAHOMA

REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	4.h. CC-25-84
Previous/Related Action:	None
Background/Issue:	Chapter 37, Article IV establishes requirements and aligns with the City's goal of ensuring utility companies/providers that are occupying, or desires to occupy, public rights of way (ROW) are in compliance with the City's ROW occupancy management code provision. City Code Section 37-205(c) requires each entity that occupies, or desires to occupy, the public ROW within the City to first register as an occupant and seek the approval of the City Council. It is important to note that if permission is granted for occupancy of the right-of-way, final approval to construct in the right-of-way will be after review of the Occupancy Right-of-Way Construction Permits with required engineered plans pursuant to Section 37-207. Oklahoma State University is requesting to install approximately 820 linear feet of chilled waterlines and approximately 250 feet of hot waterlines within the public right-of-way.
Proposal/Solution:	Development Services Director recommends approval of Oklahoma State University to occupy the public right-of-way.
Financial Source/Impact:	This approval requires fees collected for registration and for occupancy of the right-of-way according to the established fee schedule.
Related Strategic Priority:	#2 MOTIVATED MANAGEMENT #4 CONNECTED SPACES
Recommended Action/Motion:	Motion to approve Development Services Director's recommendation to approve Oklahoma State University as a Right-of-Way Occupant.
Prepared By:	David Barth, Director of Development Services
Reviewed By:	David Barth Brady Moore Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. OCCROW Permit Application _ License OSU 5-29-2025
2. 2340822 ERP1 - OSU Human Performance & Nutricion Research Institute-reduced

Community Development Department
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.742.8220
Web: stillwaterok.gov

OCCUPANCY PERMIT APPLICATION

Per Ch. 37, Section 37-205: Each rights-of-way occupant with more than one hundred (100) linear feet of facilities shall apply for an occupancy permit.

Per Ch. 37, Sec. 37-204(b): Application fee of $200.00 is to be submitted with application.

Occupancy Permit #: AEC1045 Date Issued: _____

☐ Occupancy Fee
Per Ch. 37, Sec. 37-206(a)
Amount Paid: $ 200.00

☐ Inspection Fee and Service Charge
Per Ch. 37, Sec. 37-206(b)
Date Paid: 05.29.2025

Per Sec. 37-205(a)(1) and (2):

Name of the Owner/Operator of the facility:	Oklahoma State Univeristy
Form of Business:	HIgher Education
Mailing Address:	Long Range Facilities Planning 506 Scott Hall Stillwater, OK 74078
Company's Main Phone Number:	(405)744-1062
Primary Contact:	Phil Thomas, Director
Primary Contact Email Address:	phil.thomas@okstate.edu
Primary Contact's Phone Numbers: Office and Cell	W (405)744-1018 C (405)612-7060

Linear Feet of Facility: _____

Applicant may present a copy of a "Certificate of Convenience and Necessity" issued pursuant to Oklahoma Administrative Code (OAC), Section 165:55, in lieu of paragraphs (1) through (10) below.		
Applicant Sign Off	**The following are required for processing and completion of this application. These documents must be original with signatures, where applicable.**	**City Sign Off**
	Evidence of compliance with the provisions of title 63 Oklahoma Statutes, Sections 142.1, *et seq.*, the "Oklahoma Underground Facilities Damage Prevention Act," as amended	

	Occupant's Registration Number: _____ as-built maps and all other information required by Section 37-213. ☐ System Map ☐ As-Built Plans ☐ Initial Plan Submittal	
	Demonstration of the applicant's technical ability to construct and operate the proposed or existing facilities, including identification of key personnel	
	A demonstration of the applicant's legal qualifications to construct and operate any proposed or existing facilities, including but not limited to a demonstration that the applicant has the necessary authority under Oklahoma law to construct a facility. The applicant shall not be issued an occupancy permit if it files materially misleading information in its application or intentionally withholds information that the applicant lawfully is required to provide	
	A statement prepared by a certified public accountant regarding the applicant's financial ability to complete any construction proposed, and to meet any time frame proposed. (If an applicant is a joint venture or partnership, the same information shall be provided for each participant in the joint venture or partnership.)	
	A statement of the applicant's prior experience in facility ownership and construction, and an identification of each locality in which the applicant or any of its principals have, or have had, a license, franchise or other authorization or any interest therein, including the name, address and phone number of each local authority, and references from each authority	
	If relying on the financial or technical resources of another person/affiliate, proof is required under paragraphs (5) and (7)	
	Existing or proposed agreements entered with any other person relating to any facilities installed, to be owned, operated, managed or leased by the applicant	
	The amount of linear feet of the rights-of-way occupied by facilities owned, operated, managed or leased by the ROW occupant at June 30, 20_____: _____ LF	
	The technical standards that the applicant proposes to follow in constructing the facilities	
	An engineering site plan showing: • The proposed locations of the applicant's facilities, including any manholes or overhead poles, • The size, type and proposed depth of any conduit or other enclosures, and • The relationship of the system to all existing poles, utilities, sidewalks, pavement, telecommunication facilities and other improvements within the rights-of-way	
	Any additional information the City may require, which is reasonably necessary for ROW management	
	Proof of Insurance as required per Ch. 37, Section 37-210	
	REFERENCE: Sec. 37-206(a) and (b): Occupancy Fees AND Inspection Fee and Service Charge Sec. 37-210: Insurance Sec. 37-211: Indemnification Sec. 37-213: Record Maintenance	

RIGHTS-OF-WAY OCCUPANCY PERMIT APPLICATION Per Ch. 37, Section 37-205

I do hereby certify that I/We are in compliance with Article IV, Rights-of-Way Occupancy Management of the Stillwater City Code.

Chris Kuwitzky
Signature

5/29/2025
Date

Chris Kuwitzky, Senior Vice President and Chief Financial/Administrative Office
Print Name and Title

(COMPANY SEAL)

TO BE COMPLETED BY
CITY OF STILLWATER:

Verified as complete by: _____ Date: June 2, 2025
Signature

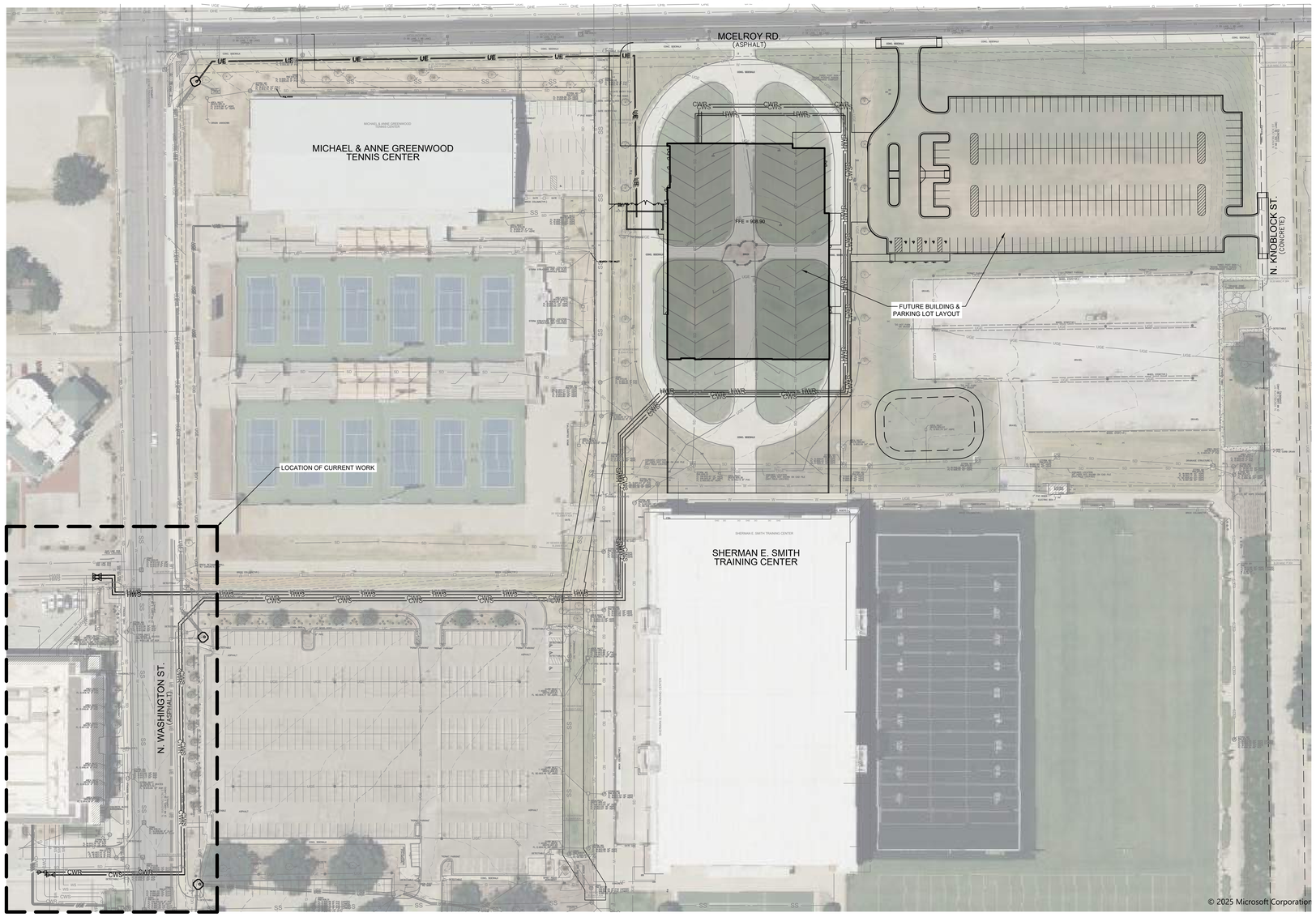
Development Services Director
Print Name and Title

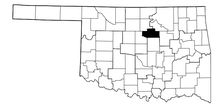
City Council Hearing Date: June 2, 2025 (Subject to Change)

CONSTRUCTION PLANS FOR

OSU BOONE PICKENS HUMAN PERFORMANCE INNOVATION COMPLEX
ERP 1: UTILITY ROUTING PHASE 1

OKLAHOMA STATE UNIVERSITY,
STILLWATER, OK 74075





GENERAL NOTES:

1. CONDUCT SITE CLEARING OPERATIONS TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS, OR OTHER OCCUPIED OR USED FACILITIES WITHOUT PERMISSION FROM AUTHORITIES HAVING JURISDICTION. STREETS AND ROADWAYS SHALL BE THOROUGHLY CLEANED AND/OR SWEPT ON A DAILY BASIS OR MORE FREQUENTLY AS REQUIRED BY THE GOVERNING AUTHORITY. RESTORE DAMAGED IMPROVEMENTS TO ORIGINAL CONDITION AS ACCEPTABLE TO PARTIES HAVING JURISDICTION.
2. THE CONTRACTOR SHALL PROVIDE DUST CONTROL MEASURES IN ACCORDANCE WITH LOCAL AUTHORITIES.
3. ALL STREET SURFACES, DRIVEWAYS, CULVERTS, ROADSIDE DRAINAGE DITCHES, AND OTHER STRUCTURES THAT ARE DISTURBED OR DAMAGED IN ANY MANNER AS A RESULT OF CONSTRUCTION SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. UNLESS SPECIFIED OTHERWISE, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARDS, SPECIFICATIONS, AND REGULATIONS OF OKLAHOMA STATE UNIVERSITY.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS, PERMIT FEES, LICENSES, LICENSE FEES, TAP FEES, ETC.
6. ALL ELEVATIONS IN PAVED AREAS ARE TOP OF FINISHED PAVEMENT UNLESS OTHERWISE NOTED.
7. RELOCATION OF ANY UTILITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE APPROPRIATE UTILITY COMPANY AND/OR REGULATORY AGENCY. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM ENGINEER BEFORE ANY UTILITY RELOCATION.
8. NO DIMENSION MAY BE SCALED. REFER UNCLEAR ITEMS TO THE ENGINEER FOR INTERPRETATION.

EXCAVATION NOTIFICATION

1. ALL CONTRACTORS SHALL NOTIFY UTILITY COMPANIES AND GOVERNMENT AGENCIES IN WRITING OF THE INTENT TO EXCAVATE NO LESS THAN 72 HOURS PRIOR TO SUCH EXCAVATION (EXCLUSIVE OF SATURDAYS, SUNDAYS, AND HOLIDAYS).
2. CONTRACTORS TO CALL 811 (OR VISIT CALL811.COM) TO REQUEST UTILITY LOCATES. ONCE COMPLETION OF MARKINGS HAS BEEN CONFIRMED BY THE CONTRACTOR, NO AUTOMATED OR MECHANICAL EQUIPMENT SHOULD BE USED WITHIN TWO FEET ON EITHER SIDE OF THE MARKINGS (OR ANOTHER MORE STRINGENT TOLERANCE AS DIRECTED), AND EXISTING FACILITIES MUST BE EXPOSED BY HAND.
3. EXISTING UTILITY LOCATIONS SHOWN SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION. LOCATIONS OF UNDERGROUND UTILITIES ON THESE DRAWINGS ARE APPROXIMATE ONLY AND BASED ON ACTUAL FIELD LOCATIONS OF VISIBLE STRUCTURES AND PLAN COMPUTATIONS.

UNANTICIPATED SOIL CONDITIONS

1. IF UNSUITABLE BEARING MATERIALS ARE ENCOUNTERED AT THE SPECIFIED SUBGRADE DEPTHS, THE CONTRACTOR SHALL NOTIFY THE OWNER. SOIL SUBGRADES WHICH ARE UNSTABLE DUE TO INADEQUATE CONSTRUCTION DEWATERING OR EXCESSIVE SUBGRADE DISTURBANCE ARE NOT DEEMED UNSUITABLE SOILS.
2. FILL SOIL THAT IS NOT WITHIN +/- 2% OPTIMUM MOISTURE FOR COMPACTION OF THE PARTICULAR MATERIAL IN PLACE AS DETERMINED BY THE OWNER'S REPRESENTATIVE AND IS DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS SO THAT PROPER COMPACTION CANNOT BE REACHED SHALL NOT BE CONSTRUED AS UNSUITABLE BEARING MATERIAL.
3. THE CONTRACTOR SHALL FOLLOW A CONSTRUCTION PROCEDURE WHICH PERMITS VISUAL IDENTIFICATION OF FIRM NATURAL GROUND.
4. SURFACE RUNOFF: SURFACE WATER ON AND AROUND THE SITE SHALL BE COLLECTED INTO LOCAL SUMPS BY MEANS OF TRENCHES, PIPES, ETC., AND PUMPED INTO THE STORM WATER SYSTEM. USE APPROPRIATE FILTRATION OR SEDIMENTATION TO PREVENT PUMPING OF SUSPENDED SOLIDS INTO THE STORM SEWER. A PERMIT MUST BE OBTAINED FOR SUCH PUMPING.
5. DEWATERING OF TRENCHES AND EXCAVATIONS: TRENCHES AND EXCAVATIONS SHALL BE KEPT FREE OF STANDING WATER AT ALL TIMES. PUMPING IS TO BEGIN AS SOON AS WATER BEGINS TO ACCUMULATE AND IS TO CONTINUE UNTIL WATER IS REMOVED.

SITE ACCESSIBILITY

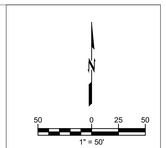
1. ALL FEATURES OF THIS PROJECT INCLUDING, BUT NOT LIMITED TO, SIDEWALKS, CURB RAMPS, ACCESSIBLE PARKING, AND ACCESSIBLE ROUTES SHALL COMPLY WITH THE APPLICABLE ACCESSIBILITY CODES [AMERICANS WITH DISABILITIES ACT (ADA) ACCESSIBILITY GUIDELINES; THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG) PUBLISHED IN THE FEDERAL REGISTER AUGUST 2023; INTERNATIONAL BUILDING CODE (IBC); ICC A117.1; ETC.]
2. WHERE SPATIAL LIMITATIONS OR EXISTING FEATURES WITHIN THE LIMITS OF THE PROJECT PREVENT FULL COMPLIANCE WITH THESE GUIDELINES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER UPON DISCOVERY OF SUCH FEATURES. THE CONTRACTOR SHALL NOT PROCEED WITH ANY ASPECT OF THE WORK WHICH IS NOT IN FULL COMPLIANCE WITH THESE GUIDELINES WITHOUT PRIOR, WRITTEN PERMISSION FROM THE ENGINEER. ANY WORK WHICH IS NOT PERFORMED WITHIN THESE GUIDELINES, FOR WHICH THE CONTRACTOR DOES NOT HAVE WRITTEN APPROVAL, SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
3. GENERAL SLOPE GUIDANCE:
   - 3.1. CROSS SLOPES SHALL NOT EXCEED 1:50 (2.0%). PREFERRED SLOPE IS 1.5%.
   - 3.2. RUNNING SLOPES SHALL NOT EXCEED 5% EXCEPT AT RAMPS. PREFERRED MAXIMUM SLOPE IS 4.5%.
   - 3.3. RAMP RUNNING SLOPES SHALL NOT EXCEED 1:12 (8.3%). PREFERRED MAXIMUM SLOPE IS 7.8%.
   - 3.4. SLOPES AT LANDINGS, ACCESSIBLE PARKING STALLS, AND ACCESSIBLE AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION. PREFERRED MAXIMUM SLOPE IS 1.5%.
   - 3.5. EXCEPTIONS WITHIN THE PUBLIC RIGHT-OF-WAY: WHERE THE ESTABLISHED ADJACENT STREET GRADE EXCEEDS 5%, RUNNING SLOPES PARALLEL TO THE STREET SLOPES SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET. CURB RAMP RUNNING SLOPE CAN EXCEED 8.3% TO LIMIT THE RESULTING THE RAMP LENGTH TO 15 FEET.

GEOTECHNICAL

1. NONE PROVIDED

SURVEY

1. EXISTING BOUNDARY AND TOPOGRAPHIC INFORMATION ARE SHOWN PER THE FIELD SURVEY PERFORMED BY WALLACE DESIGN COLLECTIVE DATED 05/08/25.



LOCATION MAP
SCALE: NTS

LEGEND

ABBREVIATIONS	
BC	BACK OF CURB
BL	BUILDING LINE
CL	CENTERLINE
EG	EXISTING GRADE
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
GL	GUTTER LINE
HP	HIGH POINT
INV	INVERT
LF	LINEAR FEET
LP	LOW POINT
RW	RIGHT-OF-WAY
SF	SQUARE FEET
SY	SQUARE YARDS
TBK	TOP OF BANK
TC	TOP OF CURB
TG	TOP OF GRATE
TOE	TOE OF BANK
TP	TOP OF PAVEMENT
TR	TOP OF RIM
TS	TOP OF SIDEWALK
TW	TOP OF WALL

LINETYPES	
	CENTERLINE
SF	SILT FENCE
	LIMITS OF CONSTRUCTION
660	PROPOSED MAJOR CONTOUR
661	PROPOSED MINOR CONTOUR
660	EXISTING MAJOR CONTOUR
661	EXISTING MINOR CONTOUR
	EASEMENT
X X	FENCE
	PROPERTY LINE
	LOT LINE
	BUILDING SETBACK
FO	FIBER OPTIC
OC	OVERHEAD COMMUNICATION
UC	UNDERGROUND COMMUNICATION
OE	OVERHEAD ELECTRIC
UE	UNDERGROUND ELECTRIC
G	NATURAL GAS
FM	SEWER FORCE MAIN
SS	SANITARY SEWER MAIN
SSL	SANITARY SEWER SERVICE
	DRAINAGE AREA, MAJOR
	DRAINAGE AREA, MINOR
	DRAINAGE FLOW PATH
SD	STORM DRAINAGE PIPE
F	FIRE LINE
W	WATER LINE
WSL	WATER SERVICE LINE
IRR	IRRIGATION LINE
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
WS	STEAM LINE

SYMBOLS	
	UTILITY POLE
	LIGHT POLE
	GUY ANCHOR
	ELECTRIC BOX
	ELECTRIC METER
	ELECTRIC TRANSFORMER
	A/C UNIT
	ELECTRIC MANHOLE
	GAS METER
	GAS VALVE
	OIL/GAS WELLHEAD
	VENT PIPE
	PIPELINE MARKER
	COMMUNICATION PEDESTAL
	COMMUNICATION MANHOLE
	SEWER CLEAN-OUT
S	SANITARY SEWER MANHOLE
	DOWNSPOUT
	ROOF DRAIN
	STORM DRAIN MANHOLE
	FIRE DEPARTMENT CONNECTION
	FIRE HYDRANT
	IRRIGATION CONTROL VALVE
	SHUT-OFF VALVE
	SPRINKLER HEAD
	WATER METER
	WATER VALVE
	YARD HYDRANT
	PIPE BOLLARD
	BENCHMARK
	ACCESSIBLE PARKING
	MAILBOX
	MONITORING WELL
	POTHOLE
	SIGN

CONTACTS:

ENGINEER:
WALLACE DESIGN COLLECTIVE, PC
JORDAN RODICH
123 N. MARTIN LUTHER KING. JR. BLVD
TULSA, OK 74103
918.584.5858

OWNER:
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

OSU UTILITIES:
BRANDON NEAL
DIRECTOR OF ENERGY SERVICES
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075
brandon.neal@okstate.edu

STORMWATER:
ZACKERY HENSON
723 S.LEWIS ST.
STILLWATER, OK 74074
stormwater@stillwaterok.gov

WASTE WATER:
JASON TYLER
723 S.LEWIS ST.
STILLWATER, OK 74074
405-372-2011
jason.tyler@stillwaterok.gov

BENCHMARKS:

BENCHMARKS PER TOPOGRAPHIC SURVEY COMPLETED BY WALLACE DESIGN COLLECTIVE DATED 05/08/25

BENCHMARK 1 MAG NAIL IN CURB ELEV: 910.02 N: 412855.31 E: 2243723.90	BENCHMARK 2 MAG NAIL IN DRIVE APRON ELEV: 905.31 N: 412875.26 E: 2244043.01	BENCHMARK 3 MAG NAIL IN SIDEWALK ELEV: 900.93 N: 412823.43 E: 2244278.13
BENCHMARK 4 MAG NAIL IN CURB A/C UNIT ELEV: 892.39 N: 412829.06 E: 2244634.32	BENCHMARK 5 MAG NAIL IN CURB ELEV: 899.90 N: 412637.09 E: 2244622.03	BENCHMARK 6 MAG NAIL IN CURB ELEV: 898.68 N: 412371.15 E: 2244625.35
BENCHMARK 7 MAG NAIL IN SIDEWALK ELEV: 906.48 N: 412308.90 E: 2244533.04	BENCHMARK 8 MAG NAIL IN SIDEWALK ELEV: 911.07 N: 412403.35 E: 2243814.81	BENCHMARK 9 MAG NAIL IN SIDEWALK ELEV: 907.35 N: 412379.41 E: 2243926.60
BENCHMARK 10 MAG NAIL IN CURB ELEV: 915.95 N: 412172.15 E: 2243356.39	BENCHMARK 11 MAG NAIL IN CURB ELEV: 910.68 N: 412196.98 E: 2243724.58	BENCHMARK 12 MAG NAIL IN CURB ELEV: 911.71 N: 411808.39 E: 2243287.99
BENCHMARK 13 MAG NAIL IN CONCRETE PAD ELEV: 909.14 N: 411678.34 E: 2243593.86	BENCHMARK 14 MAG NAIL IN CURB ELEV: 909.26 N: 411869.10 E: 2243762.72	

SHEET INDEX

SHEET NO.	SHEET TITLE
C1-00	Cover Sheet
C2-00	Survey
C2-01	Survey
C6-00	Utility Plan
C7-00	Plan & Profile
C8-00	Details

POPULOUS
Architecture - Interior Design - Landscape Design
Brand Activation - Wayfinding - Product Design
Event - Urban Design - Populous Design Build

Architect, Interior Design, & Site Design
Populous
4800 Main Street, Suite 300
Kansas City, MO 64112
816.221.1500

Local Architect
KKT Architects
2209 South Utica Place, Suite 200
Tulsa, OK 74114
918.744.4270

Civil & Structural Engineer
Wallace Design Collective
123 North Martin Luther King Jr. Boulevard
Tulsa, OK 74103
918.584.5858

MEP/FP Engineer
Ohsson
1717 South Boulder, Suite 600
Tulsa, OK 74119
918.376.4294

Technology, AV & Acoustics
Salas O'Brien
15008 Wright brothers Drive
Addison, TX 75001
972.239.1505

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2502 West Mechanic Street, Suite C
Harrisonville, MO 64701
816.872.6120

Pool Design
Aquatic Design Consultants
33400 Cold Water Rd.
Louisburg, KS 66053
913.937.0099

Food Service
S2O Consultants
530 N. Wood Street #C
Chicago, IL 60622
224.717.1999

Door Hardware
Studio 06 Consultants
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Overland Park, KS 66212
816.931.6425

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oklahoma ca1440
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REVISIONS

NO.	DATE	DESCRIPTION

FOR REFERENCE ONLY - NOT FOR CONSTRUCTION

PROJECT NAME
OKLAHOMA STATE UNIVERSITY - BOONE PICKENS HUMAN PERFORMANCE INNOVATION COMPLEX
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

ISSUED NAME
ERP 1: UTILITY ROUTING PHASE I

ISSUED DATE: 05/15/2025
ISSUED BY: WALLACE DESIGN COLECTIVE
PROJECT NUMBER: 23.5817
PAPER SIZE: E

SHEET NAME
COVER SHEET

SHEET NUMBER
C1-00

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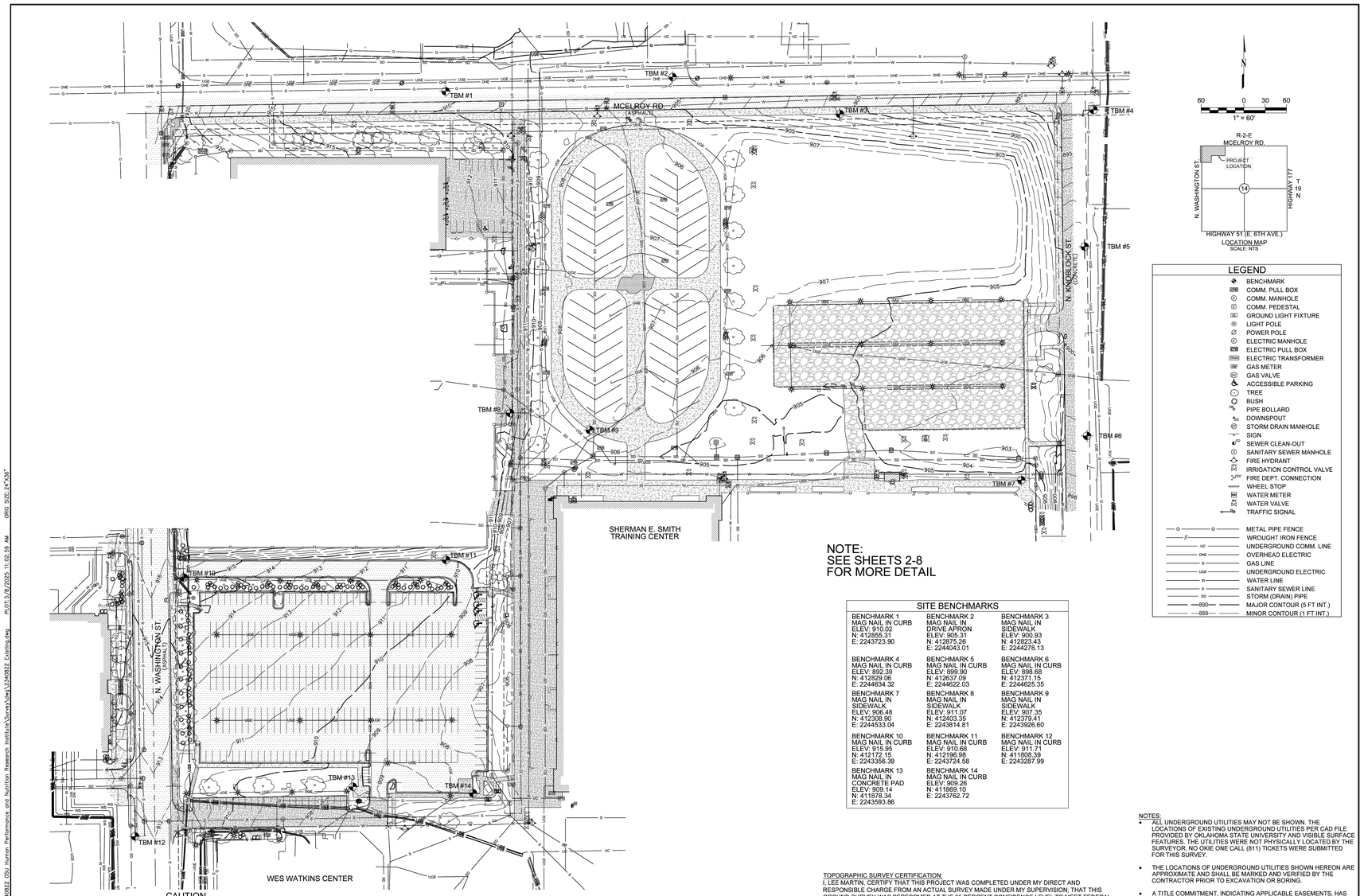
1/2/2025 2:55:22 PM



NOTE:
SEE SHEETS 2-8
FOR MORE DETAIL

LOCATION MAP
SCALE: NTS

LEGEND

- BENCHMARK
- COMM. PULL BOX
- COMM. MANHOLE
- COMM. PEDESTAL
- GROUND LIGHT FIXTURE
- LIGHT POLE
- POWER POLE
- ELECTRIC MANHOLE
- ELECTRIC PULL BOX
- ELECTRIC TRANSFORMER
- GAS METER
- GAS VALVE
- ACCESSIBLE PARKING
- TREE
- BUSH
- PIPE BOLLARD
- DOWNSPOUT
- STORM DRAIN MANHOLE
- SIGN
- SEWER CLEAN-OUT
- SANITARY SEWER MANHOLE
- FIRE HYDRANT
- IRRIGATION CONTROL VALVE
- FIRE DEPT. CONNECTION
- WHEEL STOP
- WATER METER
- WATER VALVE
- TRAFFIC SIGNAL

- METAL PIPE FENCE
- WROUGHT IRON FENCE
- UNDERGROUND COMM. LINE
- OVERHEAD ELECTRIC
- GAS LINE
- UNDERGROUND ELECTRIC
- WATER LINE
- SANITARY SEWER LINE
- STORM (DRAIN) PIPE
- 890 MAJOR CONTOUR (5 FT INT.)
- 889 MINOR CONTOUR (1 FT INT.)

SITE BENCHMARKS

BENCHMARK 1 MAG NAIL IN CURB ELEV: 910.02 N: 412855.31 E: 2243723.90	BENCHMARK 2 MAG NAIL IN DRIVE APRON ELEV: 905.31 N: 412875.26 E: 2244043.01	BENCHMARK 3 MAG NAIL IN SIDEWALK ELEV: 900.93 N: 412823.43 E: 2244278.13
BENCHMARK 4 MAG NAIL IN CURB ELEV: 892.39 N: 412829.06 E: 2244634.32	BENCHMARK 5 MAG NAIL IN CURB ELEV: 899.90 N: 412637.09 E: 2244622.03	BENCHMARK 6 MAG NAIL IN CURB ELEV: 898.68 N: 412371.15 E: 2244625.35
BENCHMARK 7 MAG NAIL IN SIDEWALK ELEV: 906.48 N: 412308.90 E: 2244533.04	BENCHMARK 8 MAG NAIL IN SIDEWALK ELEV: 911.07 N: 412403.35 E: 2243814.81	BENCHMARK 9 MAG NAIL IN SIDEWALK ELEV: 907.35 N: 412379.41 E: 2243926.60
BENCHMARK 10 MAG NAIL IN CURB ELEV: 915.95 N: 412172.15 E: 2243356.39	BENCHMARK 11 MAG NAIL IN CURB ELEV: 910.88 N: 412196.98 E: 2243724.58	BENCHMARK 12 MAG NAIL IN CURB ELEV: 911.71 N: 411808.39 E: 2243287.99
BENCHMARK 13 MAG NAIL IN CONCRETE PAD ELEV: 909.14 N: 411878.34 E: 2243593.86	BENCHMARK 14 MAG NAIL IN CURB ELEV: 909.28 N: 411869.10 E: 2243762.72	

NOTES:

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- THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND SHALL BE MARKED AND VERIFIED BY THE CONTRACTOR PRIOR TO EXCAVATION OR BORING.
- A TITLE COMMITMENT, INDICATING APPLICABLE EASEMENTS, HAS NOT BEEN PROVIDED, THEREFORE ALL EASEMENTS MAY NOT BE SHOWN HEREON.
- THE VERTICAL DATUM FOR THIS SURVEY BASED UPON GPS DATA (NAVD88).
- THE HORIZONTAL DATUM FOR THIS SURVEY BASED ON OKLAHOMA STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD83.
- LAST SITE VISIT: 04-03-2025

TOPOGRAPHIC SURVEY CERTIFICATION:
I, LEE MARTIN, CERTIFY THAT THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS GROUND SURVEY WAS PERFORMED AT THE 95 PERCENT CONFIDENCE LEVEL TO MEET FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE SPECIFICATIONS FOR TOPOGRAPHIC AND PLANIMETRIC MAPPING CONTAINED IN THE OKLAHOMA MINIMUM STANDARDS FOR THE PRACTICE OF LAND SURVEYING AS ADOPTED BY THE OKLAHOMA STATE BOARD OF LICENSURE FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS. THE ORIGINAL DATA WAS OBTAINED ON FEBRUARY 23, 2025; THAT THE SURVEY WAS COMPLETED ON APRIL 3, 2025; THAT CONTOURS CLOUDED AND NOTED MAY NOT MEET THE STANDARDS; AND ALL COORDINATES ARE BASED ON OKLAHOMA STATE PLANE COORDINATES, NORTH ZONE NAD83 (2011) AND ALL ELEVATIONS ARE BASED ON NAVD88.

SURVEY NOTE:
THIS SHEET IS FOR THE CONVENIENCE OF THE CONTRACTOR. IT IS INTENDED FOR GENERAL SURVEY INFORMATION ONLY. SURVEY INFORMATION WAS REPRODUCED BY ELECTRONIC TRANSFER FROM THE SURVEYOR. ORIGINAL SURVEY DRAWINGS AVAILABLE FROM THE SURVEYOR.

CAUTION
NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THE LOCATION AND ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES.

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oklahoma ca1460
exp: e-30-25

LEE MARTIN 2004 PROFESSIONAL LAND SURVEYOR STATE OF OKLAHOMA
5-3-25

OKLAHOMA STATE UNIVERSITY HUMAN PERFORMANCE AND NUTRITION RESEARCH INSTITUTE

STILLWATER, OKLAHOMA

REV	DESCRIPTION	DATE

PROJECT NO. 2340822

SHEET NAME
TOPOGRAPHIC SURVEY

SHEET NO. 1 OF 8

POPULOUS
Architecture - Interior Design - Landscape Design
Brand Activation - Wayfinding - Product Design
Event - Urban Design - Populous Design Build

Architect, Interior Design, & Site Design
Populous
4800 Main Street, Suite 300
Kansas City, MO 64112
816.221.1500

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Tulsa, OK 74114
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MEP/FP Engineer
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Tulsa, OK 74119
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224.717.1999

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Studio 66 Consultants
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918.584.5858
oklahoma ca1460
exp: e-30-25

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REVISIONS		
NO.	DATE	DESCRIPTION

PROJECT NAME
OKLAHOMA STATE UNIVERSITY - BOONE PICKENS HUMAN PERFORMANCE INNOVATION COMPLEX
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

ISSUED NAME
ERP 1: UTILITY ROUTING PHASE I

ISSUED DATE	ISSUED BY
05/15/2025	WALLACE DESIGN COLECTIVE
PROJECT NUMBER	PAPER SIZE
23.5817	E

SHEET NAME
SURVEY

SHEET NUMBER
C2-00

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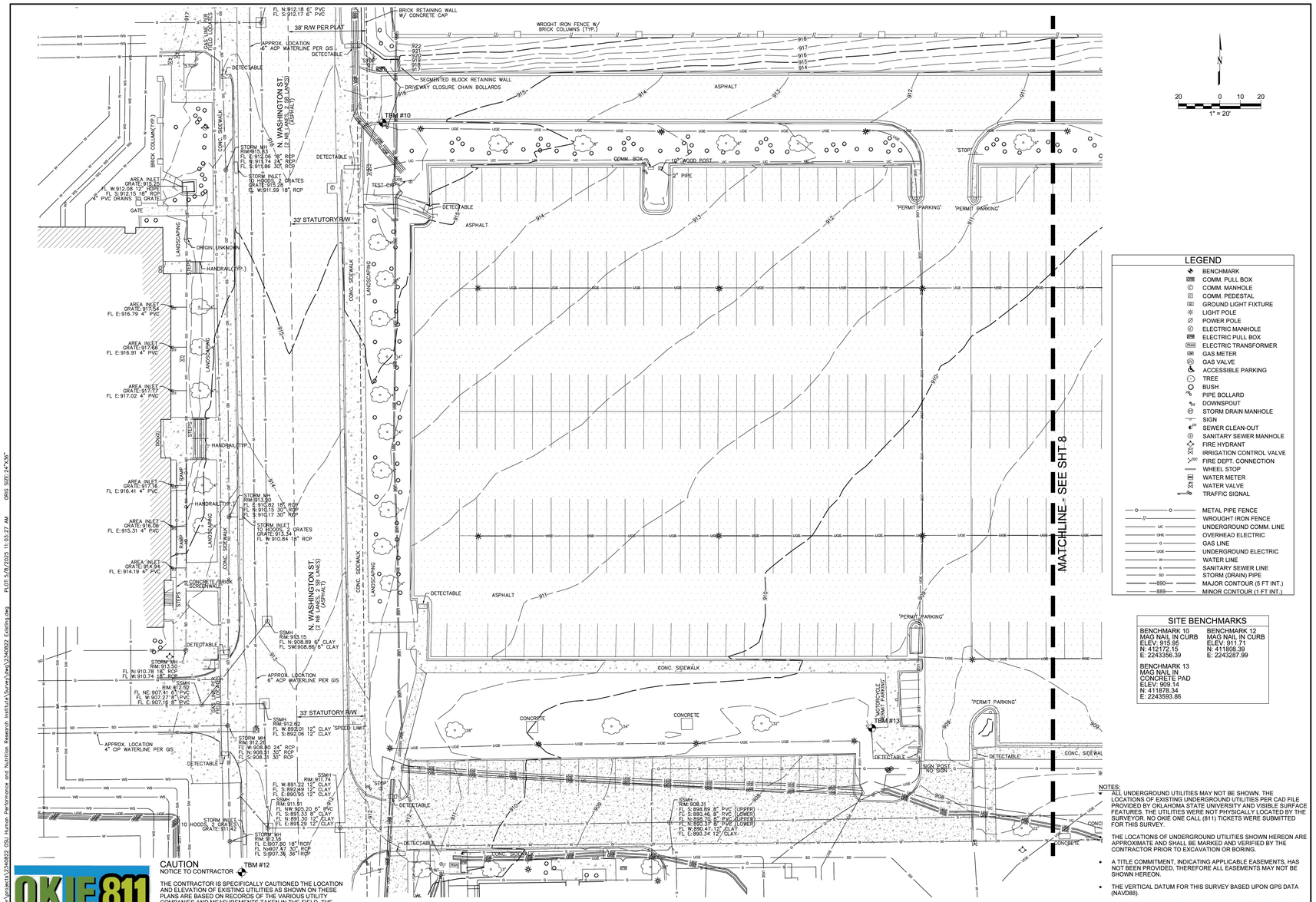

LEGEND

- BENCHMARK
- COMM. PULL BOX
- COMM. MANHOLE
- COMM. PEDESTAL
- GROUND LIGHT FIXTURE
- LIGHT POLE
- POWER POLE
- ELECTRIC MANHOLE
- ELECTRIC PULL BOX
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- UNDERGROUND ELECTRIC
- WATER LINE
- SANITARY SEWER LINE
- STORM (DRAIN) PIPE
- MAJOR CONTOUR (5 FT INT.)
- MINOR CONTOUR (1 FT INT.)

SITE BENCHMARKS

BENCHMARK 10	BENCHMARK 12
MAG NAIL IN CURB	MAG NAIL IN CURB
ELEV: 915.95	ELEV: 911.71
N: 4121272.15	N: 411808.39
E: 2243356.39	E: 2243287.99

BENCHMARK 13
MAG NAIL IN CONCRETE PAD
ELEV: 909.14
N: 411878.34
E: 2243593.86

NOTES:

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- LAST SITE VISIT: 04-03-2025

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TBM #12

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N
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oklahoma city, oklahoma 73104
405.236.5858
oklahoma ca1460
exp: 6-30-25

LEE MARTIN 2004 — PROFESSIONAL LAND SURVEYOR — STATE OF OKLAHOMA — 5315

OKLAHOMA STATE UNIVERSITY
HUMAN PERFORMANCE AND
NUTRITION RESEARCH INSTITUTE
STILLWATER, OKLAHOMA

REV	DESCRIPTION	DATE

PROJECT NO. 2340822
SHEET NAME
TOPOGRAPHIC SURVEY
SHEET NO. 7 OF 8

POPULOUS
Architecture - Interior Design - Landscape Design
Brand Activation - Wayfinding - Product Design
Event - Urban Design - Populous Design Build

Architect, Interior Design, & Site Design
Populous
4800 Main Street, Suite 300
Kansas City, MO 64112
816.221.1500

Local Architect
KKT Architects
2209 South Utica Place, Suite 200
Tulsa, OK 74114
918.744.4270

Civil & Structural Engineer
Wallace Design Collective
123 North Martin Luther King Jr. Boulevard
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MEP/FP Engineer
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Studio 66 Consultants
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816.931.6425

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oklahoma ca1460
exp: 6-30-25

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REVISIONS

NO.	DATE	DESCRIPTION

PROJECT NAME
OKLAHOMA STATE UNIVERSITY - BOONE PICKENS HUMAN PERFORMANCE INNOVATION COMPLEX
OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

ISSUED NAME
ERP 1: UTILITY ROUTING PHASE I

ISSUED DATE: 05/15/2025
ISSUED BY: WALLACE DESIGN COLECTIVE
PROJECT NUMBER: 23.5817
PAPER SIZE: E

SHEET NAME
SURVEY

SHEET NUMBER
C2-01

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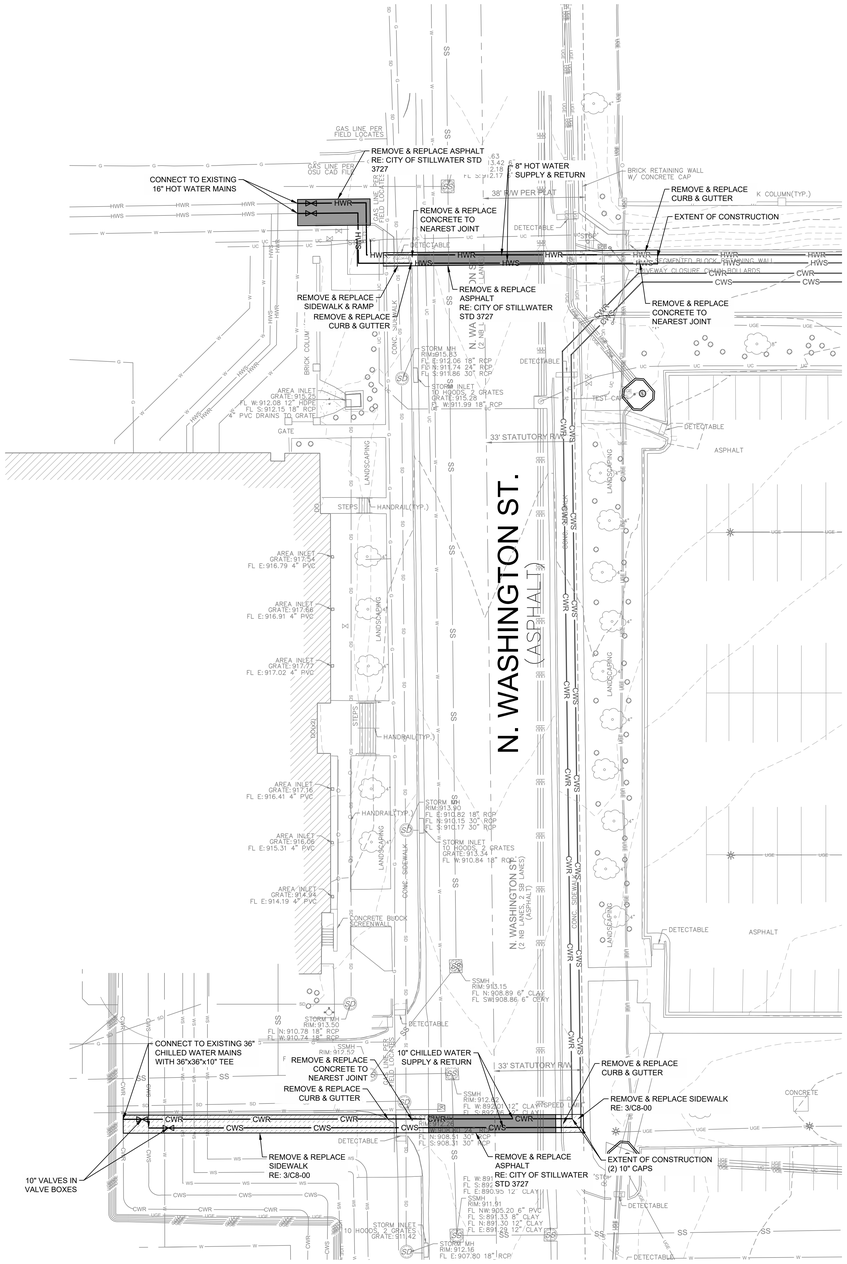
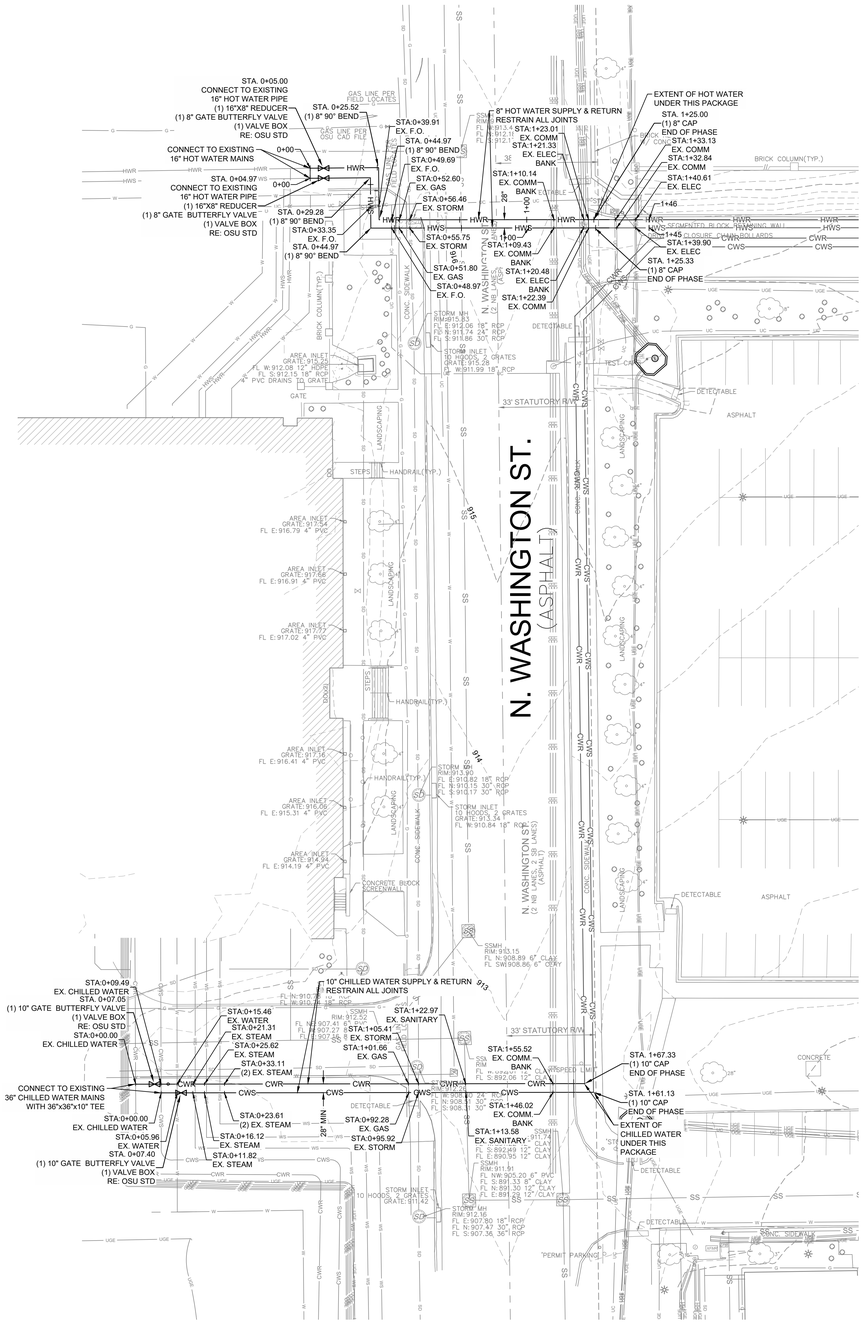
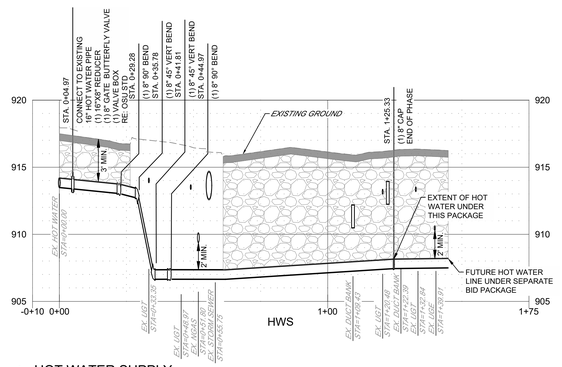
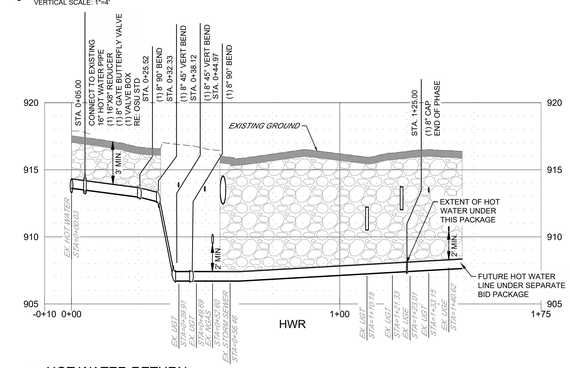

N. WASHINGTON ST. (ASPHALT)
CONNECT TO EXISTING 16" HOT WATER MAINS
REMOVE & REPLACE ASPHALT RE: CITY OF STILLWATER STD 3727
8" HOT WATER SUPPLY & RETURN
REMOVE & REPLACE CONCRETE TO NEAREST JOINT
REMOVE & REPLACE CURB & GUTTER
EXTENT OF CONSTRUCTION
REMOVE & REPLACE SIDEWALK & RAMP
REMOVE & REPLACE ASPHALT RE: CITY OF STILLWATER STD 3727
REMOVE & REPLACE CONCRETE TO NEAREST JOINT
CONNECT TO EXISTING 36" CHILLED WATER MAINS WITH 36"x36"x10" TEE
10" CHILLED WATER SUPPLY & RETURN
REMOVE & REPLACE CURB & GUTTER
REMOVE & REPLACE SIDEWALK RE: 3/C8-00
EXTENT OF CONSTRUCTION (2) 10" CAPS
REMOVE & REPLACE SIDEWALK RE: 3/C8-00
REMOVE & REPLACE ASPHALT RE: CITY OF STILLWATER STD 3727
10" VALVES IN VALVE BOXES
33' STATUTORY R/W
38' R/W PER PLAT
DETECTABLE
ASPHALT
CONCRETE
BRICK RETAINING WALL W/ CONCRETE CAP
K COLUMN(TYP.)
COMPOSITE BLOCK RETAINING WALL
CONCRETE SIDEWALK
LANDSCAPING
STEPS
HANDRAIL(TYP.)
CONCRETE BLOCK SCREENWALL
AREA INLET GRATE:915.83 FL E:912.08 12" HDPE FL S:912.15 18" RCP 4" PVC DRAINS TO GRATE
AREA INLET GRATE:916.54 FL E:916.79 4" PVC
AREA INLET GRATE:917.68 FL E:916.91 4" PVC
AREA INLET GRATE:917.77 FL E:917.02 4" PVC
AREA INLET GRATE:916.54 FL E:916.41 4" PVC
AREA INLET GRATE:916.06 FL E:915.31 4" PVC
AREA INLET GRATE:914.94 FL E:914.19 4" PVC
STORM MH RIM:915.83 FL E:912.06 18" RCP FL N:911.74 24" RCP FL S:911.66 30" RCP
STORM INLET 10 HOOD GRATES GRATE:915.29 FL W:911.99 18" RCP
STORM MH RIM:913.90 FL E:910.82 18" RCP FL N:910.15 30" RCP FL S:910.17 30" RCP
STORM INLET 10 HOOD GRATES GRATE:913.44 FL W:910.84 18" RCP
STORM MH RIM:913.50 FL N:910.78 18" RCP FL W:910.74 18" RCP
SSMH RIM:917.57
SSMH RIM:915.15 FL N:908.89 6" CLAY FL SW:908.86 6" CLAY
SSMH RIM:912.83 FL W:892.62 12" CLAY FL E:892.72 12" CLAY FL S:892.72 12" CLAY
SSMH RIM:911.91 FL N:903.30 8" PVC FL E:891.39 12" CLAY FL S:891.39 12" CLAY FL E:891.29 12" CLAY
STORM MH RIM:912.16 FL E:907.80 18" RCP
STORM INLET 10 HOOD GRATES GRATE:910.62
FL W:891.62 FL S:892.72 12" CLAY FL E:890.93 12" CLAY
FL N:908.51 30" RCP FL S:908.31 30" RCP
FL N:908.31 30" RCP
FL W:892.62 12" CLAY
FL S:892.72 12" CLAY
FL E:890.93 12" CLAY
FL N:903.30 8" PVC
FL E:891.39 12" CLAY
FL S:891.39 12" CLAY
FL E:891.29 12" CLAY
FL W:891.62
FL S:892.72 12" CLAY
FL E:890.93 12" CLAY
FL N:908.51 30" RCP





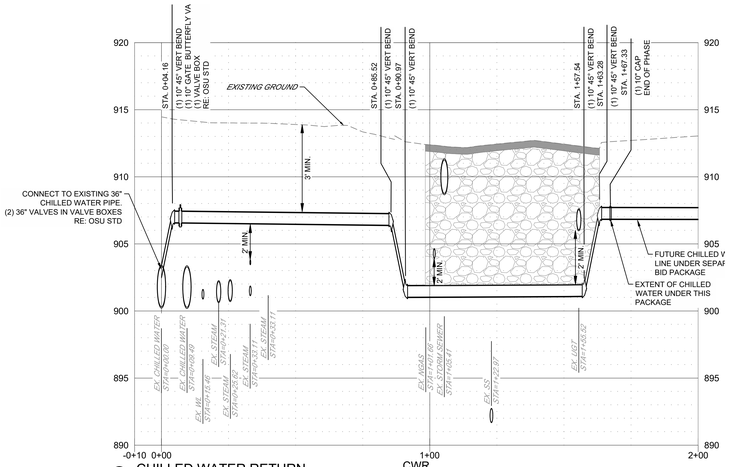
1 HOT WATER SUPPLY

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'



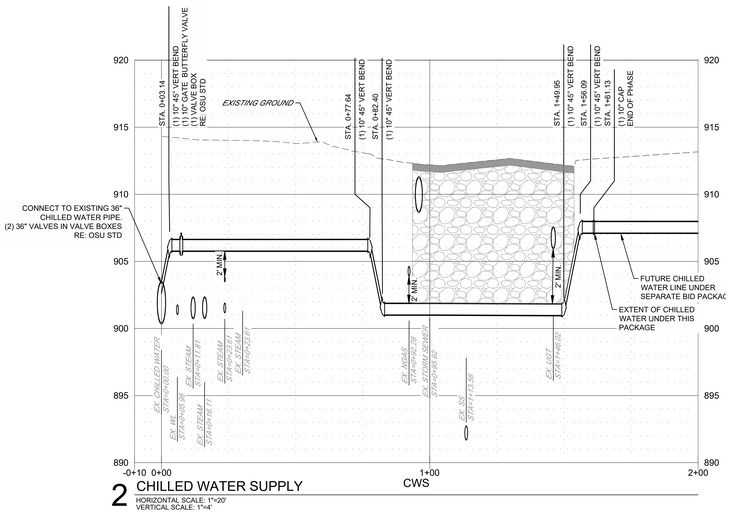
2 HOT WATER RETURN

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'



3 CHILLED WATER RETURN

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'



2 CHILLED WATER SUPPLY

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'

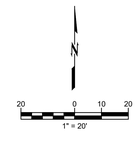
LEGEND

DOT TYPE "A" AGGREGATE BACKFILL COMPACTED TO 95% STANDARD PROCTOR DENSITY UNDER PAVED DRIVING SURFACE FULL DEPTH OF TRENCH (TYP)
RE: OSU STD

PAVEMENT TO BE REMOVED AND REPLACED REFER TO PLANS

SUMMARY OF QUANTITIES

ITEM DESCRIPTION	UNIT	QUANTITIES
10" CHILLED WATER PIPE	LF	329
8" HOT WATER PIPE	LF	251
10" GATE BUTTERFLY VALVE	EA	2
8" GATE BUTTERFLY VALVE	EA	2
VALVE BOX	EA	4
36"X36"X10" TEE	EA	2
16"X8" REDUCER	EA	2
8" 90° BEND	EA	4
10" 45° BEND	EA	10
8" 45° BEND	EA	4
10" CAP	EA	2
8" CAP	EA	2
RESTRAIN ALL JOINTS USING EBAA IRON MEGALUG MECHANICAL JOINT RESTRAINTS		



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Brand Activation - Wayfinding - Product Design
Event - Urban Design - Populous Design Build

Architect, Interior Design, & Site Design
Populous
4800 Main Street, Suite 300
Kansas City, MO 64112
816.221.1500

Local Architect
KKT Architects
2209 South Utica Place, Suite 200
Tulsa, OK 74114
918.744.4270

Civil & Structural Engineer
Wallace Design Collective
123 North Martin Luther King Jr. Boulevard
Tulsa, OK 74103
918.584.5858

MEP/FP Engineer
Olsson
1717 South Boulder, Suite 600
Tulsa, OK 74119
918.376.4294

Technology, AV & Acoustics
Salas O'Brien
15508 Wright brothers Drive
Addison, TX 75001
972.239.1505

Code / Life Safety
Forza Consultants
2502 West Mechanic Street, Suite C
Harrisonville, MO 64701
816.872.6120

Pool Design
Aquatic Design Consultants
33400 Cold Water Rd.
Louisburg, KS 66053
913.937.0099

Food Service
S2O Consultants
530 N. Wood Street #C
Chicago, IL 60622
224.717.1999

Door Hardware
Studio 66 Consultants
10051 Barkley street, Suite 502
Overland Park, KS 66212
816.931.6425

wallace design collective
wallace design collective, pc
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123 north martin luther king jr. blvd.
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REVISIONS		
NO.	DATE	DESCRIPTION

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PROJECT NAME
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OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

ISSUED NAME
ERP 1: UTILITY ROUTING PHASE I

ISSUED DATE
05/15/2025

DRAWN BY
WALLACE DESIGN COLECTIVE

PROJECT NUMBER
23.5817

PAPER SIZE
E

SHEET NAME
PLAN & PROFILE

SHEET NUMBER
C7-00

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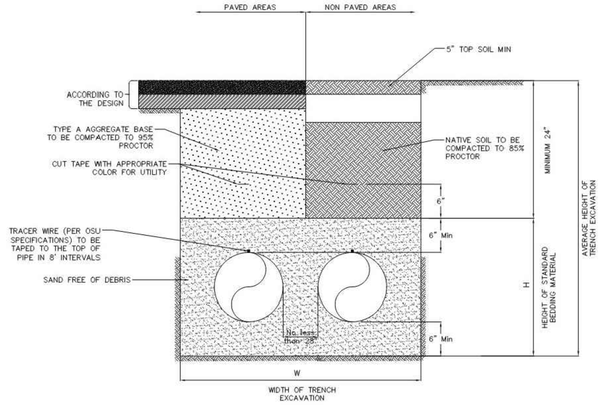
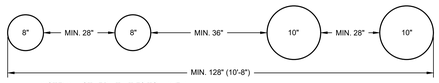
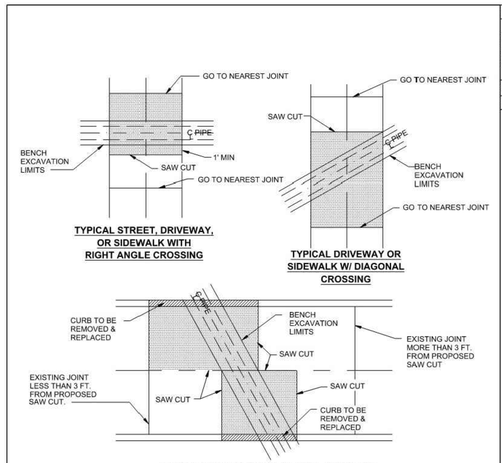


1 OSU - STANDARD PIPE BEDDING FOR CHILLED & HOT WATER
SCALE: NTS



NOTE: ALL OTHER UTILITIES TO HAVE A MINIMUM OF 5'-0" HORIZONTAL CLEARANCE

4 OSU - STANDARD PIPE SPACING FOR CHILLED & HOT WATER
SCALE: NTS



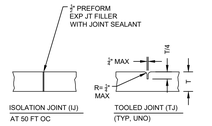
NOTES:
1. REMOVE AND REPLACE PAVEMENT WITHIN SHADED ARES BOUNDED BY SAW CUTS AND/OR CONSTRUCTION JOINTS.
2. FOR DIAGONAL CROSSING, REPLACE PAVEMENT USING SQUARED CUTS, AS SHOWN.
3. REMOVE AND REPLACE PAVEMENT TO CONSTRUCTION JOINT IF LESS THAN 3 FT. FROM PROPOSED SAW CUT.
4. FOR LONGITUDINAL INSTALLATIONS: REMOVE AND REPLACE PAVEMENT AND CURB TO EDGE OF STREET, IF THE SAW CUT IS LESS THAN 3 FT. FROM THE OUTSIDE EDGE OF THE PAVEMENT OR CURB. AVOID SAW CUTS IN THE EXISTING WHEEL LINE.
5. ALL CONSTRUCTION JOINTS SHALL BE REESTABLISHED IN ACCORDANCED WITH THE CITY OF STILLWATER STANDARDS FOR PORTLAND CEMENT CONCRETE PAVEMENT. WHEN A PAVEMENT SECTION IS REMOVED ALONG AN EXISTING LONGITUDINAL CONSTRUCTION JOINT, THE NEW PAVEMENT SHALL BE DOWELLED TO THE PAVEMENT ADJACENT TO THE JOINT.

NO.	DATE	BY	DESCRIPTION

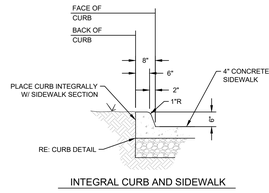
Pavement Cuts for Utilities
CITY OF STILLWATER STANDARDS

The City of Stillwater OKLAHOMA
Adopted: 5/31/2011
Issued: 8/02/2021
Detail No. 3727

2 STILLWATER - PAVEMENT CUTS FOR UTILITIES
SCALE: NTS



REFER TO TYPICAL PAVEMENT REQUIREMENTS FOR CONCRETE SPECIFICATIONS
SIDEWALK TO HAVE MAX 2% CROSS SLOPE
SIDEWALK FINISH SHALL BE A LIGHT BROOM FINISH, UNO
SIDEWALK THROUGH DRIVEWAYS SHALL BE MIN 6" THICK
SIDEWALK JOINT SPACING EQUAL TO SIDEWALK WIDTH, UNO
AGGREGATE BASE TO BE COMPACTED TO 98% STANDARD PROCTOR DENSITY
COMPACT SUBGRADE TO 95% STANDARD PROCTOR DENSITY
ISOLATION JOINTS REQUIRED WHERE SIDEWALK ABUTS CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, OTHER FIXED OBJECTS, OR EXISTING PAVEMENT



3 SIDEWALK
SCALE: NTS

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Populous
4800 Main Street, Suite 300
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oklahoma ca1460
exp: 6-30-25

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NO.	DATE	DESCRIPTION

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OKLAHOMA STATE UNIVERSITY
STILLWATER, OK 74075

ISSUED NAME
ERP 1: UTILITY ROUTING PHASE I

ISSUED DATE: 05/15/2025
ISSUED BY: WALLACE DESIGN COLECTIVE
PROJECT NUMBER: 23.5817
PAPER SIZE: E

SHEET NAME
DETAILS

SHEET NUMBER
C8-00

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REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	4.i. CC-25-85
Previous/Related Action:	• CC-23-155, October 2, 2023: Selection of Lippert Bros. as Construction Manager at Risk (CMAR) for Terminal, parking and parking access road. • CC-24-97, July 15, 2024: Approved the award of contracts by CMAR Lippert Bros. for Terminal Construction Work Package. • CC-24-107, August 5, 2024: Approved Amendment No. 1 to the CMAR Agreement with Lippert Bros. for the Terminal Construction and conversion to GMP. • CC-24-146, December 16, 2024: Approval of Amendment No. 2 to the CMAR Agreement • CC-25-10, January 13, 2025: Approval of corrections to Amendment No. 2 to the CMAR Agreement • CC-25-37, February 24, 2025: Approved the award by Lippert Bros., Inc. of contracts for PWP#3; approved Amendment #3, Exhibit A-1 and Exhibit C-3 to the CMAR Agreement for conversion of PWP#3 to a partial Guaranteed Maximum Price of $3,124,479; authorized the City Manager to execute Amendment #3, Exhibit A-1 and Exhibit C-3 to the CMAR Services Agreement and related documents; approved Amendment #9 to Olsson's Professional Services Agreement (PSA) for construction administration services for a not-to-exceed fee of $39,300; authorized the City Manager to execute Amendment #9 to Olsson's PSA and related documents; authorized the City Manager to execute the ONG Agreement for a fee of $229,250.47 and related documents; authorized total expenditures of $3,918,785 for PWP#3 roadway, drainage and detention construction work, CMAR markups and fees, construction administration, city-procured materials, fiber line materials and installation, gas utility relocation and contingency; and approve associated budget amendments • CC-25-46, March 10, 2025: Approved the award by Lippert Bros., Inc. of contracts for PWP#4; approved Amendment #4, Exhibit A-1 and Exhibit C-3 to the CMAR Agreement for conversion of PWP#4 to a partial Guaranteed Maximum Price of $61,638; approved Amendment 6F to McFarland's

	Professional Services Agreement (PSA) for construction administration services for a not-to-exceed fee of $10,860; authorized total expenditures of $72,498 for PWP#4 for Stillwater Airport beacon relocation, CMAR markups and fees, construction administration and contingency; authorized City Manager to sign related documents; and approved associated budget amendments.
Background/Issue:	• The City entered into a Construction Manager at Risk (CMAR) agreement with Lippert Brothers, Inc. on June 17, 2024 for the construction of the Stillwater Regional Airport terminal building and improvements, in accordance with the Oklahoma Construction Manager Act for Political Subdivisions, 61 O.S. 215-221. • Work Package #1, Work Package #2, Work Package #3, and Work Package #4 were previously approved by Council. Construction is underway. • As part of the access road and roundabout portion of the project, the CMAR identified additional costs to haul off trash/debris related to the Work Package 2 sewer line relocation.
Proposal/Solution:	A change order is necessary to cover the additional cost to remove, haul-off and dispose of trash/debris related to the road and roundabout sewer line relocation.
Financial Source/Impact:	The change order in the amount of $260,419 is being funded with a transfer from the Wastewater Fund since the work relates directly to the relocation of the sewer line.
Related Strategic Priority:	#2 MOTIVATED MANAGEMENT #4 CONNECTED SPACES
Recommended Action/Motion:	Motion to approve a change order to the Lippert Brothers, Inc contract for the Airport Terminal Building and Improvements project Work Package 2 sewer line relocation, in the amount of $260,419 for trash/debris removal, haul-off and disposal and associated budget amendments; authorize the City Manager to sign the change order document.
Prepared By:	Kellie Reed, Airport Director
Reviewed By:	Christy Cluck Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. Budget Amendment - Transfer In - 6.2.2025
2. Budget Amendment - Expenditure - 6.2.2025
3. Stillwater Airport - Phase 2 - Amendment No. 3 - Change Order #1

The City of Stillwater OKLAHOMA

Budget Amendment Request

For Budget Year 2025

Department of Finance
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.372.0025
Web: stillwater.org

Date: 05/22/2025

Department: Airport **Requested by:** Jared Thulin

Explanation:

Revenue:
Increase transfer-in to reflect transfer of funds to the project fund for debris removal related to the relocation of public utilities in connection with the Stillwater Regional Airport Terminal Building and Improvements project. Project funded from a transfer from the Wastewater Fund.

	Account Name	Account Number (xxxxxxx-xxxxx)	Project Number	Current Budget Amount	Amount of Change	New Budget Amount
Increase:	Transfer In	8200000 - 61000		$ 4,594,408	$ 260,419	$ 4,854,827
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
Decrease:		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0

Net Change: (will usually result in a total increase or decrease) $ 260,419

Reviewed by Department Manager: _____ **Date:** 5/28/25

Reviewed by Finance: _____ **Date:** _____

Approved by CMO: _____ **Date:** _____

Approved by City Council: ☐ Yes ☐ No **Date:** _____

Processed by Finance: _____ **Date:** _____

Set ID: _____ **Date Sent to SA&I:** _____

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The City of Stillwater OKLAHOMA

Budget Amendment Request

For Budget Year 2025

Department of Finance
723 S. Lewis Street/P.O. Box 1449
Stillwater, OK 74076-1449

Office: 405.372.0025
Web: stillwater.org

Date: 05/22/2025

Department: Airport **Requested by:** Jared Thulin

Explanation:

Expenditures:
Appropriate funds for debris removal related to relocation of public utilities in connection with the Stillwater Regional Airport Terminal Building and Improvement project. Funded from a transfer from Wastewater fund.

	Account Name	Account Number (xxxxxxx-xxxxx)	Project Number	Current Budget Amount	Amount of Change	New Budget Amount
Increase:	Phase 2 Utility Relocation	8207010 - 54009	25AP05820	$ 660,445	$ 260,419	$ 920,864
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
Decrease:		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0
		-				$ 0

Net Change: (will usually result in a total increase or decrease) $ 260,419

Reviewed by Department Manager: _____ **Date:** 5/28/25

Reviewed by Finance: _____ **Date:** _____

Approved by CMO: _____ **Date:** _____

Approved by City Council: ☐ Yes ☐ No **Date:** _____

Processed by Finance: _____ **Date:** _____

Set ID: _____ **Date Sent to SA&I:** _____

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KS F:\Finance\HUB Forms\Budget Amendment Form Last Updated: 04/05/2019

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Change Order

PROJECT: *(Name and address)*	CONTRACT INFORMATION:	CHANGE ORDER INFORMATION:
Stillwater Regional Airport New Terminal Building Project - Work Package 2 3304 N. Airport Industrial Access Rd. Stillwater, OK 74075	Contract For: General Construction Date: June 17, 2024	Change Order Number: 001 Date: May 29, 2025

OWNER: *(Name and address)*	ARCHITECT: *(Name and address)*	CONTRACTOR: *(Name and address)*
City of Stillwater 723 S. Lewis P.O. Box 1449 Stillwater, OK 74076-1449	Olsson Associates 11600 Broadway Extension, Suite 300 Oklahoma City, OK 73114	Lippert Bros., Inc. PO Box 17450 Oklahoma City, OK 73136

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)
Change Order for Trash and Debris on Work Package 2 (WP 2) in the amount of $260,419.00.

The original Guaranteed Maximum Price was	$	660,445.00
The net change by previously authorized Change Orders	$	0.00
The Guaranteed Maximum Price prior to this Change Order was	$	660,445.00
The Guaranteed Maximum Price will be increased by this Change Order in the amount of	$	260,419.00
The new Guaranteed Maximum Price including this Change Order will be	$	920,864.00

The Contract Time will be increased by Thirty-Eight (38) days.
The new date of Substantial Completion will be January 05, 2026

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Signature)*	CONTRACTOR *(Signature)*	OWNER *(Signature)*
	BY: T. M. Lippert, President	
(Printed name, title, and license number if required)	*(Printed name and title)*	*(Printed name and title)*
	5.29.25	
Date	*Date*	*Date*

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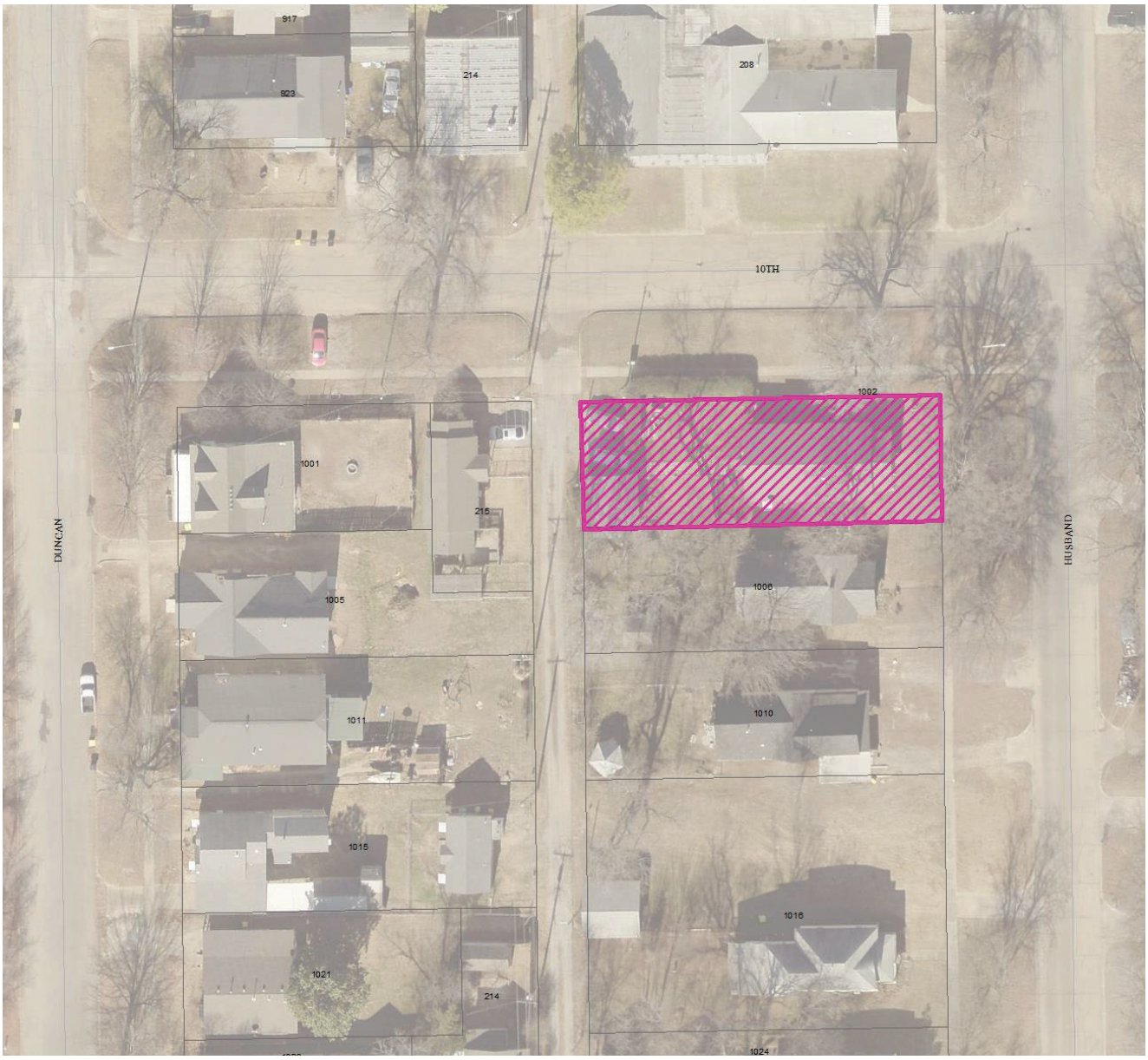
REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	7.a. CC-25-86
Previous/Related Action:	
Background/Issue:	The applicant requests review and approval of a Map Amendment to rezone the property addressed as 1002 South Husband Street from Two-Family Residential (RT) to Commercial Business (CB). The subject property is located on the southwest corner of the intersection at South Husband Street and West 10th Avenue. The subject property is currently zoned two-family residential with a single-family structure and accessory structure (detached garage). The property is located south of West 10th Avenue with Commercial Business zoning located north of the subject property. Two-Family Residential (RT) surrounds the property to the east, south, and west. Empire Slice House and Stonecloud Stillwater Patio & Taproom are located Northeast of the intersection of South Husband Street and West 10th Avenue in the Commercial Business zoned area.
Proposal/Solution:	Planning Commission recommended approval with a 3-0 vote on October 1, 2024. City Council voted 2-2 on October 21, 2024 resulting in a no decision.
Financial Source/Impact:	None
Related Strategic Priority:	#4 CONNECTED SPACES #5 UNIQUE CULTURE
Recommended Action/Motion:	Motion to accept the Planning Commission recommendation and approve the Map Amendment for the property addressed as 1002 South Husband Street.
Prepared By:	Henry Bibelheimer, Senior Planner
Reviewed By:	David Barth Brady Moore Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. Area Map - MA24-10
2. Zoning Comparison Chart, RT to CB
3. PC Minutes 10.1.24



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S

Stillwater OKLAHOMA
stillwaterok.gov

Project Type: Map Amendment (MA24-10)
Request: A change in zoning from Two-Family Residential (RT) to Commercial Buisness (CB)
Address: 1002 S Husband
Applicant: Cory Williams (Progressive Development)

Stillwater OKLAHOMA
stillwaterok.gov

ZONING COMPARISON CHART		
	RT (Residential Two-family)	**CB (Commercial Business)**
Min Lot Size	7,500 square feet	No min requirements
Min Lot Width/Depth	60/100 feet	No min requirements
Max Structure Height	35 feet	No min requirements
Min Front Yard	20 feet/10 feet from alley	No min requirements
Min Side Yard - boundary with:		
Residential district	5 feet	20 feet
Commercial district	15 feet	No min requirements
Industrial district	15 feet	No min requirements
Min Rear Yard - boundary with:		
Residential district	20 feet	25 feet
Any other district	20 feet	No min requirements
Max Lot Coverage	40 percent	100 percent
Landscaping/Screening (earth berms, shrubs, fences, decorative man-made materials, trees)	No requirements	Required when abutting RSS, RSL, RMH, RT or RM; 70% opaque up to 3-feet tall and 40% opaque up to 5-feet tall; 1+ story structure requires 6-foot high landscape buffer when adjacent to residential district
Permitted Uses by Right (Uses in *italic* are allowed in both zoning districts)	• Conventional single-family • Residential design manufactured home • Two-family (duplex)	• Arts and Entertainment • Bed and Breakfast, Hotel, Motel • Beverage Services • Boarding houses/Rooming houses • Educational Services • Financial Institutions and Services • Food Services • Free-Standing Self Service Facilities • Mixed Use • Multi-family • Parking Lots/Garages • Personal and Laundry Services • Professional and Administrative Office and Services • Public Administration and Service • Recreation • Retail Trade • Townhome • Unit (condominium) Ownership

STILLWATER PLANNING COMMISSION SUMMARY
REGULAR MEETING OF OCTOBER 1, 2024
IN ACCORDANCE WITH THE OKLAHOMA OPEN MEETING LAW, THE AGENDA WAS POSTED September 27, 2024 IN THE MUNICIPAL BUILDING AT 723 SOUTH LEWIS STREET

MEMBERS PRESENT
Jana Phillips, Chair
Riley Williams, Vice Chair
David Peters, Member

MEMBERS ABSENT
Mark Prather, Member
Mike Shanahan, Member

STAFF PRESENT
Kimberly Payne. Assistant City Attorney
Jacquelyn Porter, City Planner
Joshua Brown, Project Manager
Cindy Gibson, Administrative Services
Alexandria Maged, Administrative Assistant
Staff Absent

1. CALL MEETING TO ORDER.

Chair Phillips called the meeting of the Stillwater Planning Commission to order at 5:30 p.m.

2. ELECTION OF CHAIR

Chair Phillips asks for nominations. Commissioner Williams nominates Jana Phillips as Chair and Commissioner Peters supports nomination.

Commissioner Williams motions to reelect Jana Phillips as Chair, Commissioner Peters Seconds.

Roll Call:	Phillips	Shanahan	Prather	Williams	Peters
	Yes	Absent	Absent	Yes	Yes

Time: 1 minute

3. ELECTION OF VICE CHAIR

Chair Phillips nominates Riley Williams as Vice-Chair and Commissioner Peters supports nomination.

Chair Phillips motions to elect Commissioner Williams as Vice Chair, Commissioner Peters Seconds.

Roll Call:	Phillips	Shanahan	Prather	Williams	Peters
	Yes	Absent	Absent	Yes	Yes

Time: 1 minute

4. PUBLIC HEARING

a. Receive public comment regarding a request from Progressive Development Corp., LLC, for a MAP AMENDMENT (MA24-10) to rezone property addressed as 1002 S. Husband Street from Two-Family Residential (RT) to Commercial Business (CB) district.

Jaqueline Porter, City Planner presents the item and asks if there are any questions for staff; none respond.

Chair Phillips invites the applicant's representative to speak.

Mr. Stephen Gose, Gose & Associates, 113 E 8th Ave. comes to the podium:

- Here on behalf of the applicant.
- Staff presentation covered the item sufficiently.
- Comments that as this area develops, the applicant is trying to be able to utilize these properties more in line with the Commercial Business zoning that is already in the proximity.

Chair Phillips asks if there any questions; none respond.

Chair Phillips opens the public hearing and asks if there is anyone that would like to speak in favor of this item; none respond. Chair Phillips asks if there is anyone that wishes to speak in opposition of this item.

Mr. Griffin Pivateau, 1104 S Husband, comes to speak on the following:

- Lives one block down from subject property.
- Believes this area has great residential charm with the library, community center, and downtown close by.
- Feels the area has already been harmed by the businesses coming in down the street.
- Thinks by developing Husband it is preventing the development of Main St. which is one street over.
- Believes since Main St. is wider and has more parking it is better suited for business development.
- Since Husband St. is not as wide, the increase in parking there has essentially turned it into a one-way street.
- Residents have invested in this area and changing it to business will mitigate that investment.

Chair Phillips invites the applicant's representative back up to address some of the points raised.

Mr. Gose responds that they understand the residents' concerns about commercial business coming to the area, but the Stillwater Comprehensive Plan had projected this area to become commercial years ago; and with this projection, it encourages commercial businesses to come invest in this area.

Vice Chair Williams asks if the applicant is planning on keeping the existing building there for commercial business. Mr. Gose confirms that all the discussions with the developer indicates that they plan on using the exiting building; explains that the Payne County Democrats have been meeting there and that is what spurred this application, to allow a meeting area to be a use by right; and the applicant has a lot of other properties in this area and likes to reuse and preserve existing architecture if possible.

Chair Phillips asks if any onsite parking would be developed. Mr. Gose says with the Commercial Business district zoning there are not parking requirements, but the next item on the agenda is map amendment is being brought forward to put in additional parking for this area; and comments that the City is currently working on ways to add more parking to this area.

Chair Phillips asks if there are any further questions from the commissioners; none respond. Chair Phillips closes the public hearing and asks staff to present findings and alternatives.

Ms. Porter presents findings and alternatives, which are:

Findings:

1. The Land Development Code allows for rezoning of land via Map Amendments.
2. Commercial Business located adjacent to the property across West 10th Avenue.
3. The Comprehensive Plan calls for commercial uses in this area.

Alternatives:

1. Accept findings and recommend that the City Council approve the proposed map amendment as presented.
2. Find that the map amendment is not an appropriate use for the property based upon the impacts to the surrounding vicinity and do not recommend that the City Council approve the map amendment.
3. Find that additional information or discussion is needed prior to making a recommendation and table the request to a certain date.

Commissioner Peters comments that with Block 34 coming, there is going to be continued desire for commercial development in this area; and believes that with Main St. being one block north, the proximity of this area makes it more desirable for commercial businesses.

Vice Chair Williams points out that this item and the next item on the agenda block in a residential address on either side and is wondering what the landscaping or screening requirements would be. Mr. Porter returns to explain that any business that went in would trigger the requirements for screening between a commercial and residential district.

Vice Chair Williams states that he agrees with Commissioner Peters, that it looks like this area is going to have more and more upcoming commercial development.

Chair Phillips comments that she also agrees and states that the Comprehensive Plan projected this area to be commercial 20 years ago and these recent developments are starting to show that forethought come into play.

Vice Chair Williams motions to approve the Map Amendment as presented, Commissioner Peters seconds.

Roll Call:	Phillips	Shanahan	Prather	Williams	Peters
	Yes	Absent	Absent	Yes	Yes

Time: 15 minutes

b. Receive public comment regarding a request from Progressive Development Corp., LLC on behalf of Outer Banks, LLC for a MAP AMENDMENT (MA24-11), to rezone property addressed as 1010 S. Husband Street from Two-Family Residential (RT) to Commercial Business (CB) district.

Jaqueline Porter, City Planner presents the item and asks if there are any questions for staff; none respond.

Chair Phillips invites the applicant's representative to present.

Mr. Stephen Gose, Gose & Associates, 113 E 8th Ave. comes to the podium:

- Is here on behalf of the applicant.
- Reiterates the reasons from the first item
- Mentions that with the redevelopment, the buildings and surroundings will all be brought up to city standards.

- Additionally, on similar projects the City requires them to make improvements to the adjoining alley as well, all the way up to the nearest street corner, so they would be improving the local infrastructure as well.

Commissioner Peters noted that he has seen that the home on this address is already off the foundation. Mr. Gose confirms the applicant likes to save the homes while redeveloping if he can, so there are probably plans for the home to go elsewhere.

Chair Phillips asks if there are any questions for the applicant's representative; none respond.

Chair Phillips opens the public hearing. Chair Phillips asks if there is anyone that wishes to speak in in favor of this item; none respond. Chair Phillips asks if there is anyone that wishes to speak in opposition of this item.

Mr. Griffin Pivateau, 1104 S Husband, come to speak on the following:

- Would like to reiterate his previous sentiments.
- Requests that the commission consider pushing this inevitable development further towards City Hall where there is already more parking infrastructure in place.
- States that with the recent traffic and parking increase in this area, not only is it a hinderance to the residence but he does not believe emergency vehicles would be able to get through.

Chair Phillips closes the public hearing and asks staff to present find findings and alternative.

Ms. Porter presents findings and alternatives, which are:

Findings:

1. The Land Development Code allows for rezoning of land via Map Amendments.
2. Commercial Business located in the vicinity to the north of the subject property across West 10th Avenue.
3. The Comprehensive Plan calls for commercial uses in this area.

Alternatives:

1. Accept findings and recommend that the City Council approve the proposed map amendment as presented.
2. Find that the map amendment is not an appropriate use for the property based upon the impacts to the surrounding vicinity and do not recommend that the City Council approve the map amendment.
3. Find that additional information or discussion is needed prior to making a recommendation and table the request to a certain date.

Commissioner Peters reiterates that this has the same challenges as the previous property, and although he has sympathy for the residents, the changes in the neighborhood have been planned for 20 years.

Chair Phillips comments about that there has been an increase in parking around these street corners and if a citizen sees obstructions, they should reach out to local authorities so that the violators can be ticketed or towed if they are blocking safe access for emergency vehicles; and mentions again that the City does have options for citizens to request that the City limit parking to one side of the street if a street becomes too narrow from continual use of on street parking.

Chair Phillips moves to approve the map amendment as presented, Vice Chair Williams seconds.

Roll Call:	Phillips	Shanahan	Prather	Williams	Peters
	Yes	Absent	Absent	Yes	Yes

Time: 10 minutes

5. REPORTS FROM OFFICERS AND BOARDS:

   a. Review and approval of the Planning Commission 2025 meeting schedule.

Chair Phillips asks if there are any comments or concerns regarding the 2025 meeting schedule; none respond.

Commissioner Peters moves to accept the proposed schedule, Vice Chair Williams seconds.

Roll Call:	Phillips	Shanahan	Prather	Williams	Peters
	Yes	Absent	Absent	Yes	Yes

Time: 1 minute

6. ADJOURN

ADJOURNMENT. This regular meeting of the Stillwater Planning Commission was called for adjournment by Commissioner Peters, seconded by Vice Chair Williams at approximately 5:57 PM on October 1, 2024. The next regularly scheduled meeting will be held Tuesday, October 15, 2024 at 5:30 p.m. in the City Commission Hearing Room, Municipal Building, 723 South Lewis Street.

Prepared by – Alexandria Maged, Administrative Assistant
Reviewed by – Cindy Gibson, Administrative Services Manager

Approved by - Jana K Phillips
Stillwater Planning Commission

Stillwater OKLAHOMA
stillwaterok.gov

MEMORANDUM

DATE: May 27, 2025

TO: Stillwater City Council

FROM: David Barth, Director
Development Services

SUBJECT: Specific Use Permit for 1307 N. Husband Street

Staff has received a request from the applicant to withdraw the specific use permit application for 1307 N. Husband Street.

REPORT TO: CITY COUNCIL

MEETING DATE: JUNE 2, 2025

Agenda Item:	8.a. CC-25-87
Previous/Related Action:	• On August 3, 2020, City Council adopted Resolution 2020-14, authorizing Airport staff to make application for federal grant funding to complete a Master Plan Update (MPU) at the Stillwater Regional Airport. • On November 2, 2020 City Council awarded the contract for the MPU to Airport consultant Mead and Hunt for an amount not to exceed $619,593. • On June 6, 2021, the City of Stillwater/Airport accepted year 1 of a 2-fiscal year grant for the MPU in the amount of $277,777. • On July 11, 2022, City Council approved budget amendments reflecting the receipt and appropriation of grant funds and any required sponsor match which covered the remaining expenditures to complete the MPU. • Stillwater Regional Airport held two public meetings on September 8, 2022 and June 26, 2024 to present to the public and receive feedback on the Airport Master Plan.
Background/Issue:	• The last MPU was completed in 2008, well before the Airport began scheduled commercial airline service. • Stillwater Regional Airport's Master Plan is essential for the development and provides a detailed future facilities plan for needed improvements that accommodate anticipated aviation demand, along with a financial plan to support the implementation of the resulting long- term capital improvement program.
Proposal/Solution:	• As of May 5, 2025, Mead & Hunt in coordination with Stillwater Regional Airport has conducted revisions to the Master Plan based upon recommendations from the public, airport tenants, City of Stillwater, and the Federal Aviation Administration (FAA).
Financial Source/Impact:	No additional appropriations are necessary for this action.

Related Strategic Priority:	#2 MOTIVATED MANAGEMENT #4 CONNECTED SPACES
Recommended Action/Motion:	City Staff recommends City Council adopt the Master Plan for the Stillwater Regional Airport via Resolution No. CC-2025-9.
Prepared By:	Kellie Reed, Airport Director
Reviewed By:	Kellie Reed Christy Cluck Teresa Kadavy
Submitted By:	Brady Moore, City Manager

Attachments

1. SWO City Council Meeting 06022025
2. SWO ALP Set - Signed (1)
3. SWO MP FINAL05.05.2025 (1)

AIRPORT MASTER PLAN

Master Plan

City Council Presentation

SWO Stillwater REGIONAL AIRPORT

THE Mead & Hunt TEAM

Mead & Hunt
Tulsa, Oklahoma

McFarland Architects
Tulsa, Oklahoma

Leibowitz & Horton AMC
Greenwood Village, Colorado

Olsson
Tulsa, Oklahoma

A Master Plan Is…

- **Decision making tool to guide the orderly development of future physical airport facilities**
  - Layout of airport facilities meeting FAA design standards
  - Identifies and reserves space for future facilities
- **20-year strategic vision**
- **FAA tool for planning and programming**
  - Airport Layout Plan (ALP)
  - Airport Capital Improvement Plan (ACIP)
- **Informs follow-on NEPA documents**
- **Informs city/county land use planning and regional transportation plans**
- **Flexible to allow for uncertainties**
- **Supported by fact and logic**

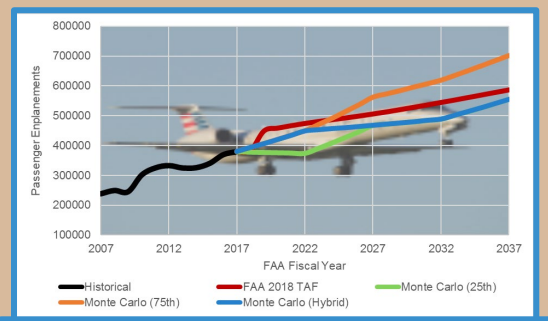
THE Mead & Hunt TEAM

SWO Stillwater REGIONAL AIRPORT

A Master Plan Is NOT…

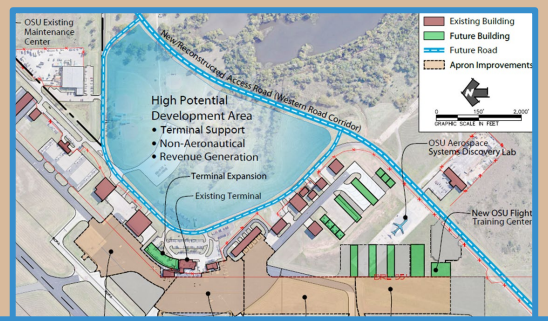
- **A business plan**
- **A strategic plan**
- **A noise study**
- **A regulatory document**
- **An FAA development mandate or guarantee of funding**
- **Rigid and inflexible**

Master Plan Focus Areas



Forecasts & Air Service

Terminal Building



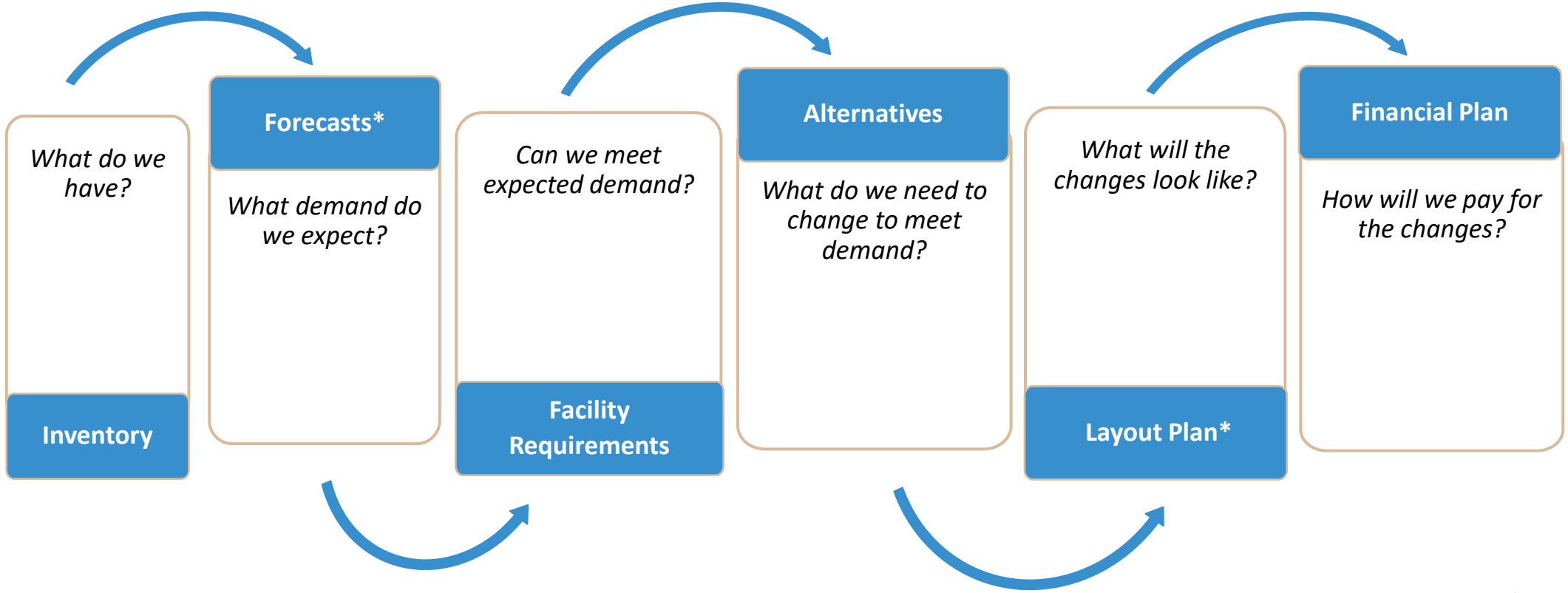
Terminal Area Improvement

Revenue Development

Stakeholder Engagement

Implementation

Master Plan Process



Forecast Key Metrics

- **Passenger Enplanements**
- **Aircraft Operations**
  - Commercial Service
  - General Aviation
- **Based Aircraft**
- **Critical Aircraft Analysis/Runway Design Code (RDC)**

Comparison of Approved Forecast and Actual Enplanements, FY 2020-2025

Enplanements	2020	2021	2022	2023	2024	2025	2020-2024 CAGR
Forecast	17,410	15,500	21,500	25,500	27,250	28,000	9.4%
Actual	17,410	16,457	27,120	34,398	35,253	? (35,650 Estimate)	19.2%

SOURCE: Stillwater Regional Airport.

- **SWO rebounded from COVID-19 pandemic much faster than the Study forecasts anticipated**
- **2023 and 2024 enplanements (34,398 and 35,253) exceeds 2030 forecast**
- **On pace to exceed the Study's 20-year enplanement forecasts by 2026**

Operations by Runway Design Code (RDC) Forecasts, 2020-2040

Runway 17/35					
RDC	A-I, A-II, B-I, B-II	C-I, C-II	D-I, D-II	B-III, C-III, C-IV, D-III	Total Operations
2020	47,330	1,278	4	50	48,662
2040	72,224	2,108	8	1,584	75,924

Runway 4/22			
RDC	A-I, A-II	B-I, B-II	Total Operations
2020	10,728	38	10,766
2040	17,704	106	17,810

SOURCES: Mead & Hunt.
FAA Aircraft Characteristics Database; FAA TFMSC.
NOTE: Military aircraft and helicopter operations not included.

Facility Requirements

- **Examine required airside and landside facilities**
- **Based on forecast demand and determined via FAA design standards**
  - Airside Requirements
    - Instrument Approach Procedures
    - FAA taxiway design standard deficiencies
  - Landside Requirements
    - Passenger terminal building, curbside, apron, and vehicle access and parking
    - Airport Traffic Control Tower (ATCT)
    - Aircraft Rescue and Fire Fighting (ARFF) building
    - Snow Removal Equipment (SRE) and airport maintenance facility
    - Small and large-scale aeronautical facilities

Terminal Building Requirements

AIRPORT MASTER PLAN

- **Assumptions**
  - Used by both scheduled commercial service passengers and chartered university athletic teams
  - Minimum of 2 gates/holdrooms
  - Minimum of 2 airlines occupancy
  - Apron accommodate 2 Boeing 737-800 aircraft simultaneously
- **2020 terminal building requirements = approximately 29,500 sf**
- **Existing terminal building = approximately 10,000 sf**
  - FBO Uses Approximately 1,000 sf
- **2040 terminal building requirements = approximately 32,000 sf**

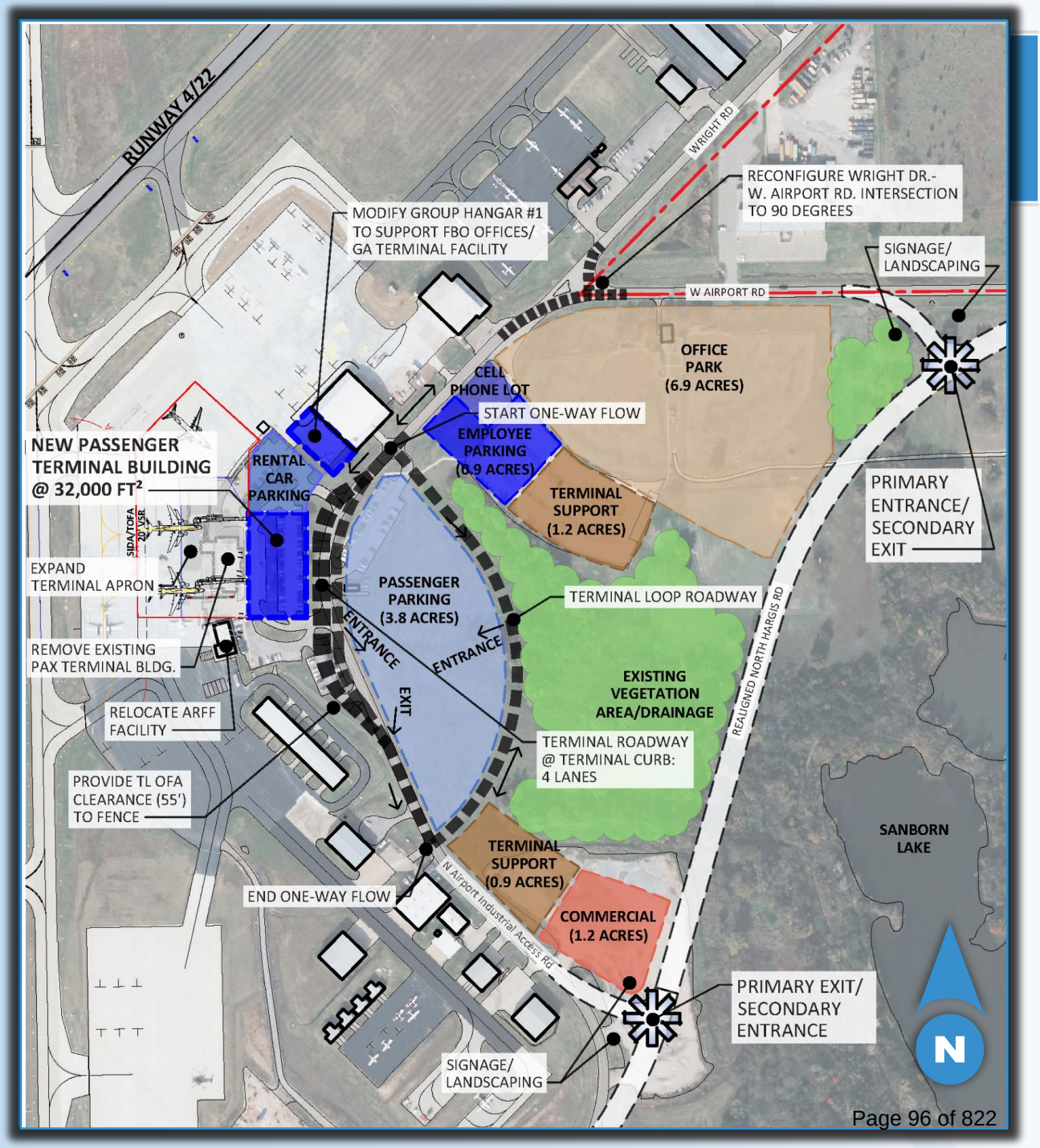
THE Mead & Hunt TEAM

SWO Stillwater REGIONAL AIRPORT

SOURCE: Mead & Hunt.

Terminal Alternatives

- **Concept 1**
- **Concept 1A**
- **Concept 2**
- **Concept 1 selected as preferred site**

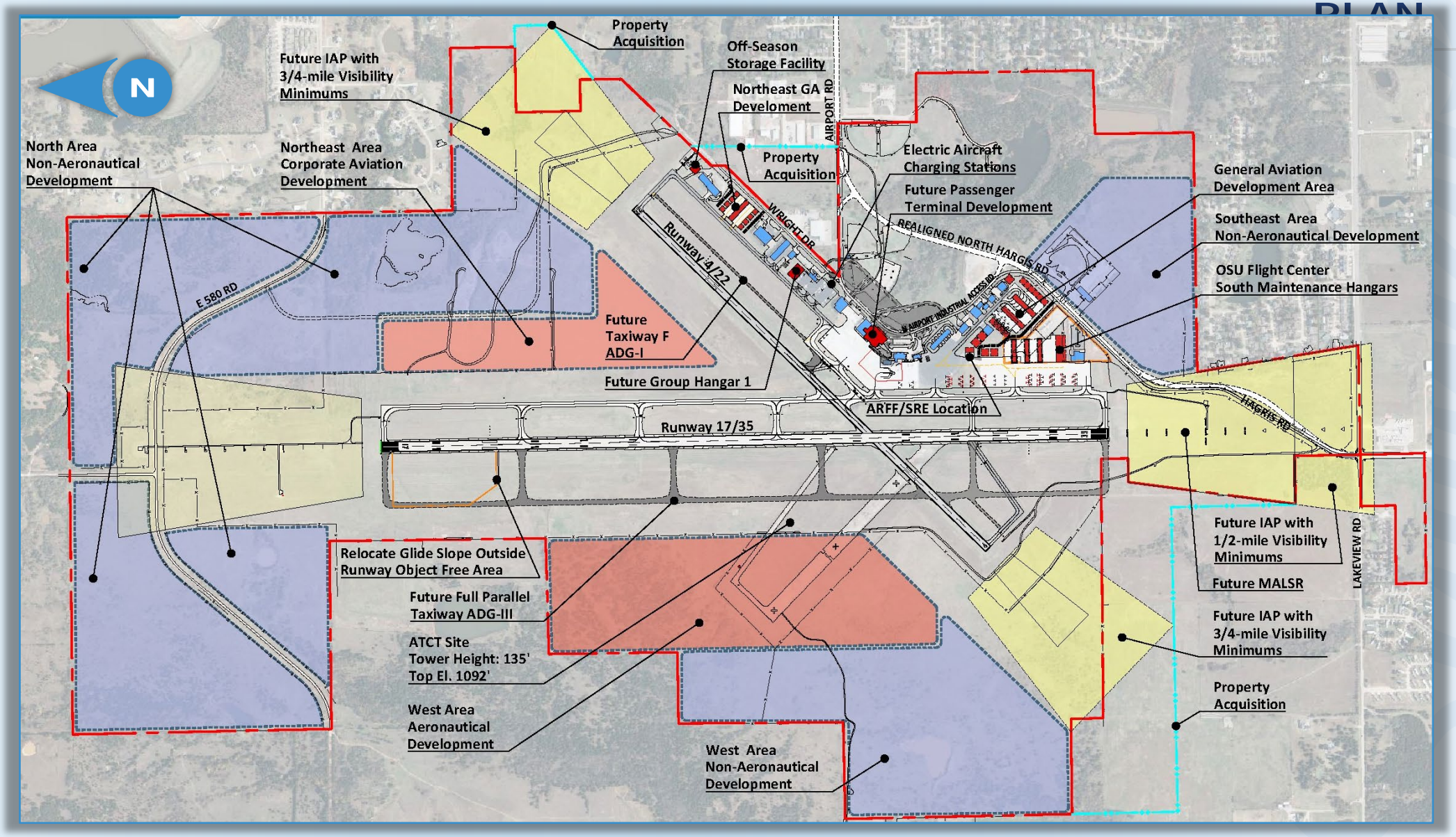


Terminal Building Floorplan

- Ticketing Lobby
- Airline Offices
- TSA/Secure Screening/ Baggage Makeup
- Holding Room
- Baggage Claim
- Circulation
- Restroom/Mechanical/ Storage
- Rental Car
- Concessions

Terminal Building

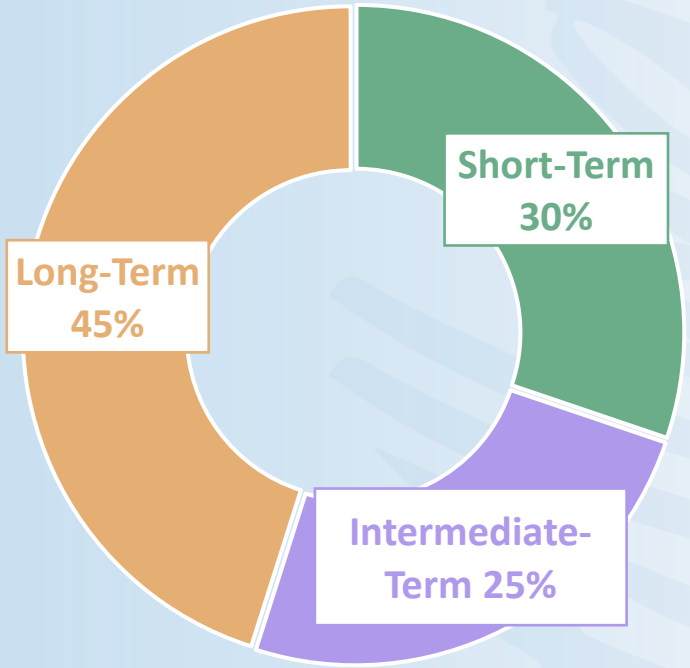
Conceptual Development Plan



Project Costs, by Phase

Phase	Cost*
Short-Term (0-5 Years)	$49,476,800
Intermediate- Term (6-10 Years)	$39,612,200
Long-Term (11-20 Years)	$72,285,900
Total	$161,374,900

NOTE: *2022 Dollars.



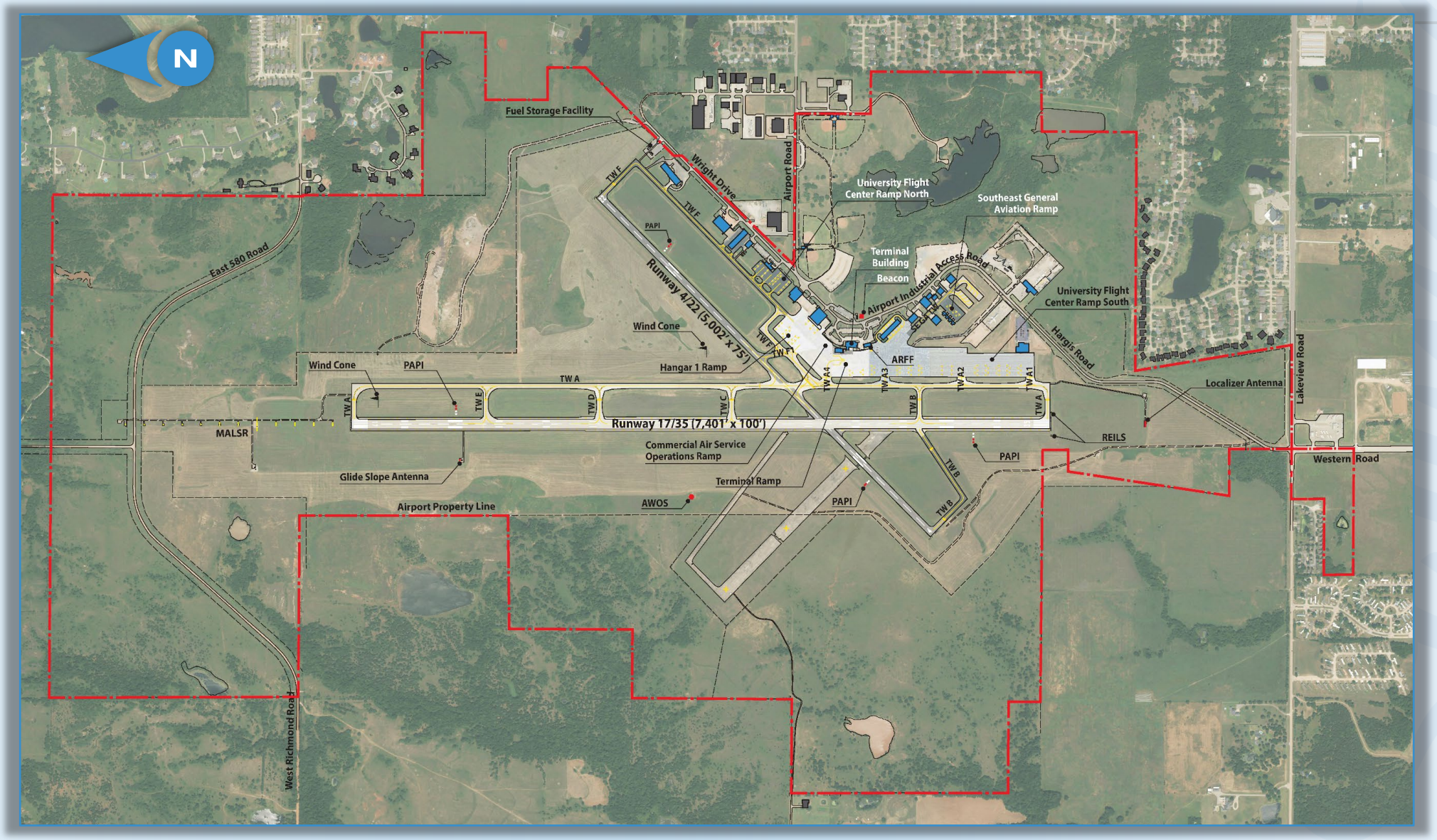
Financial Analysis Summary

- **Implementation of Capital Improvement Program (CIP) projects is feasible, given:**
  - Continued FAA discretionary support
  - Continued City financial support
  - Continued funding from other sources
    - State grants
    - OSU
    - Private third-party
    - Economic development
  - Continued congressional funding of the Airport Improvement Program (AIP)

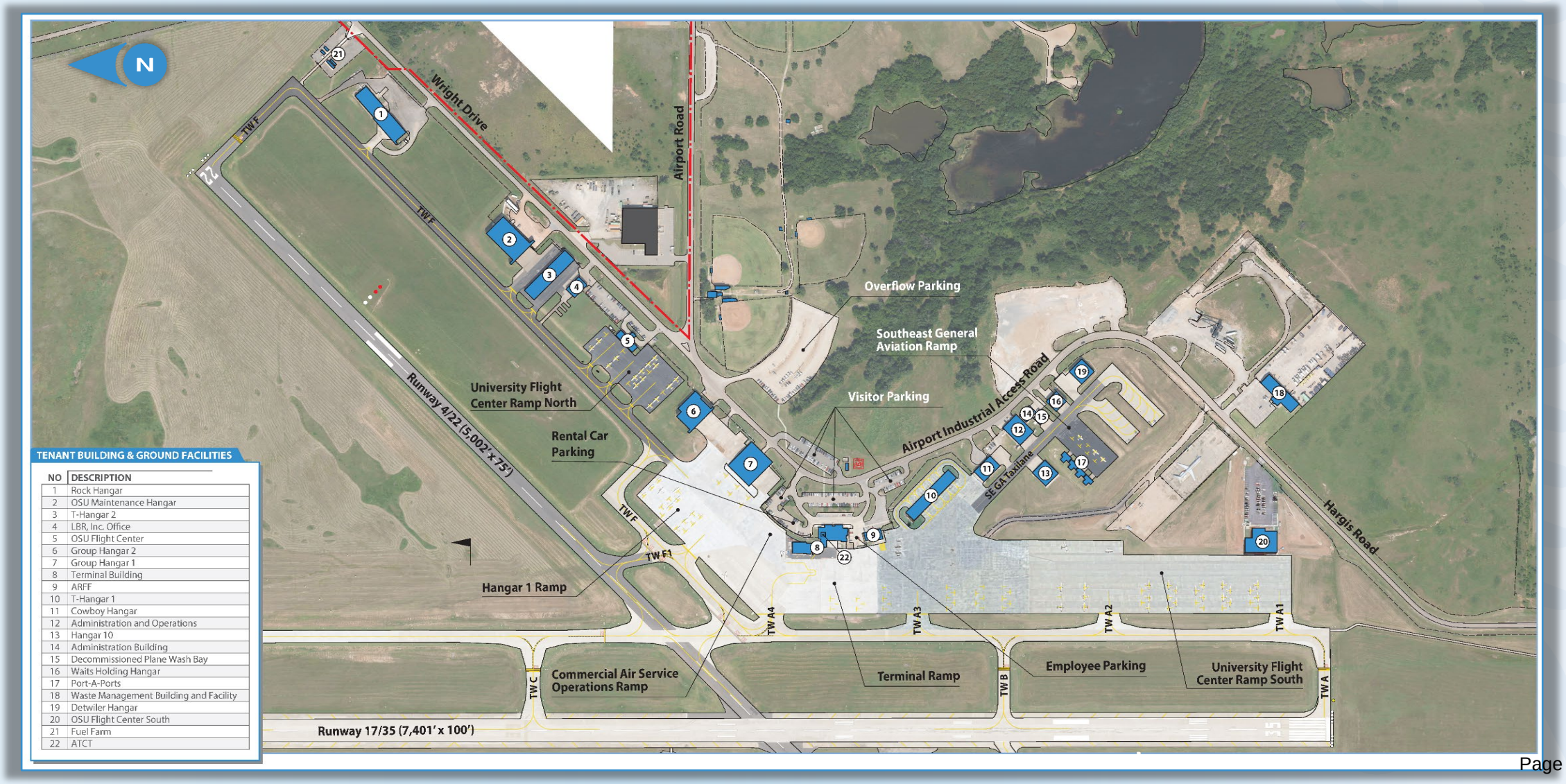
Questions?

Thank You!

Existing Airport Facilities



Existing Landside Facilities

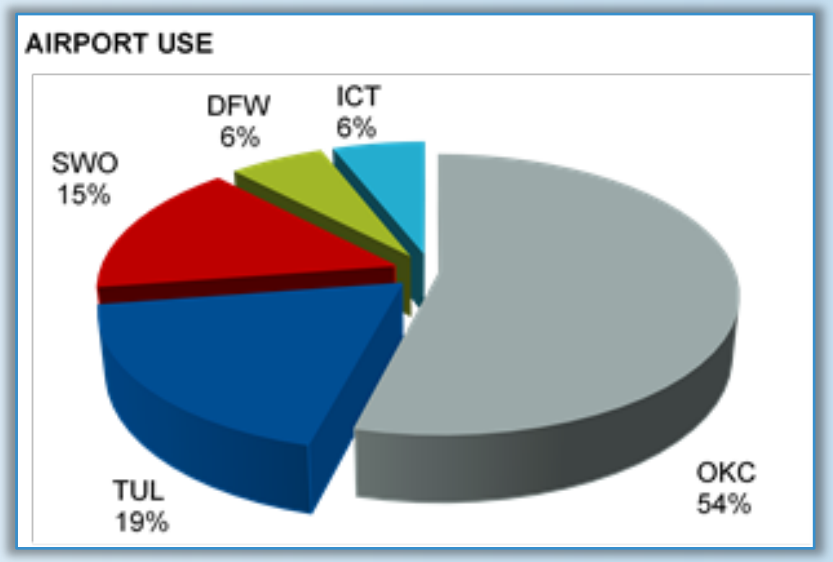


TENANT BUILDING & GROUND FACILITIES

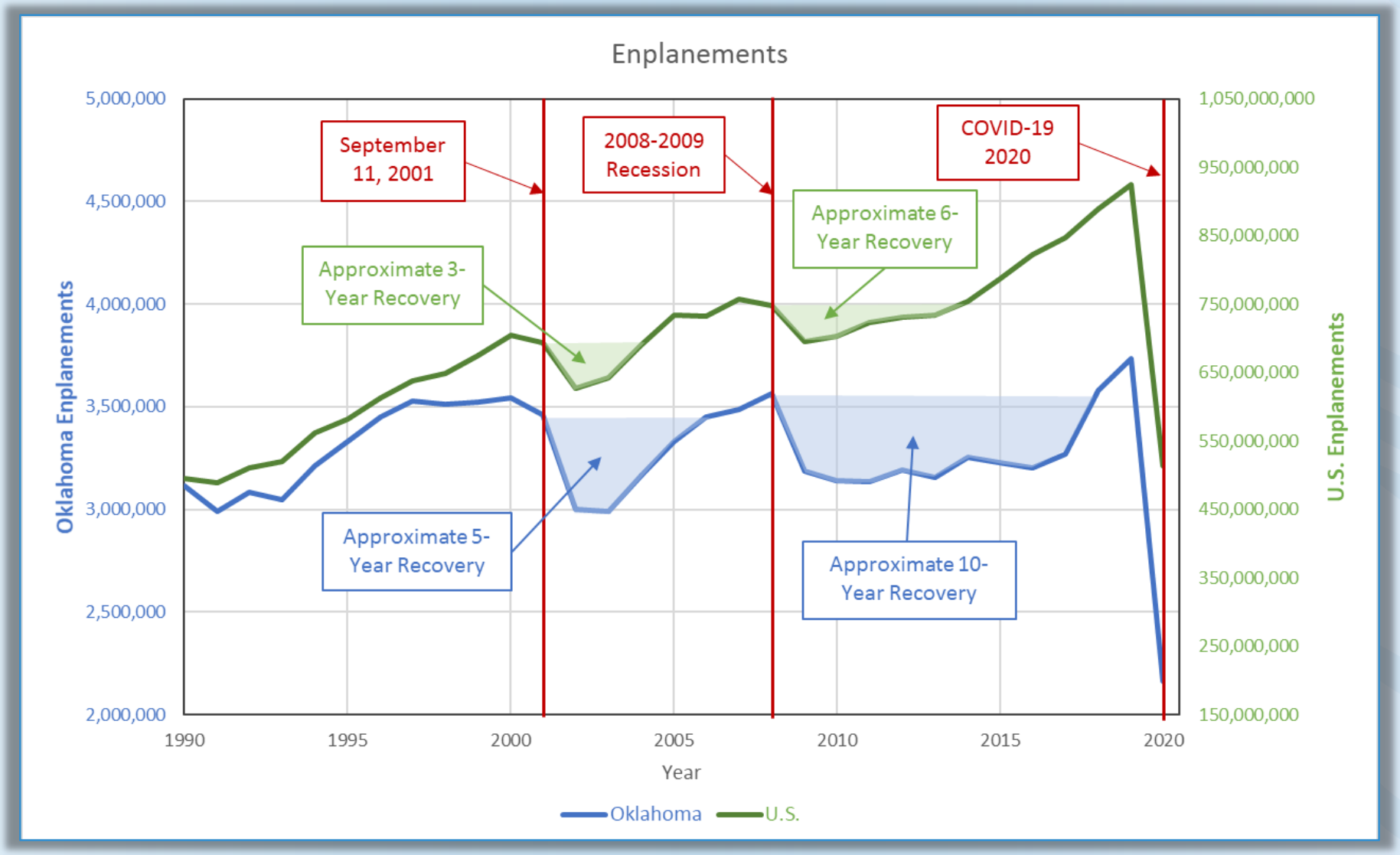
NO	DESCRIPTION
1	Rock Hangar
2	OSU Maintenance Hangar
3	T-Hangar 2
4	LBR, Inc. Office
5	OSU Flight Center
6	Group Hangar 2
7	Group Hangar 1
8	Terminal Building
9	ARFF
10	T-Hangar 1
11	Cowboy Hangar
12	Administration and Operations
13	Hangar 10
14	Administration Building
15	Decommissioned Plane Wash Bay
16	Waits Holding Hangar
17	Port-A-Ports
18	Waste Management Building and Facility
19	Detwiler Hangar
20	OSU Flight Center South
21	Fuel Farm
22	ATCT

Background – Passenger Catchment Area

- **It encompasses:**
  - 60 ZIP Codes
  - 250,782 population (2020)
- **15% of the area's air travelers used SWO for their trips.**



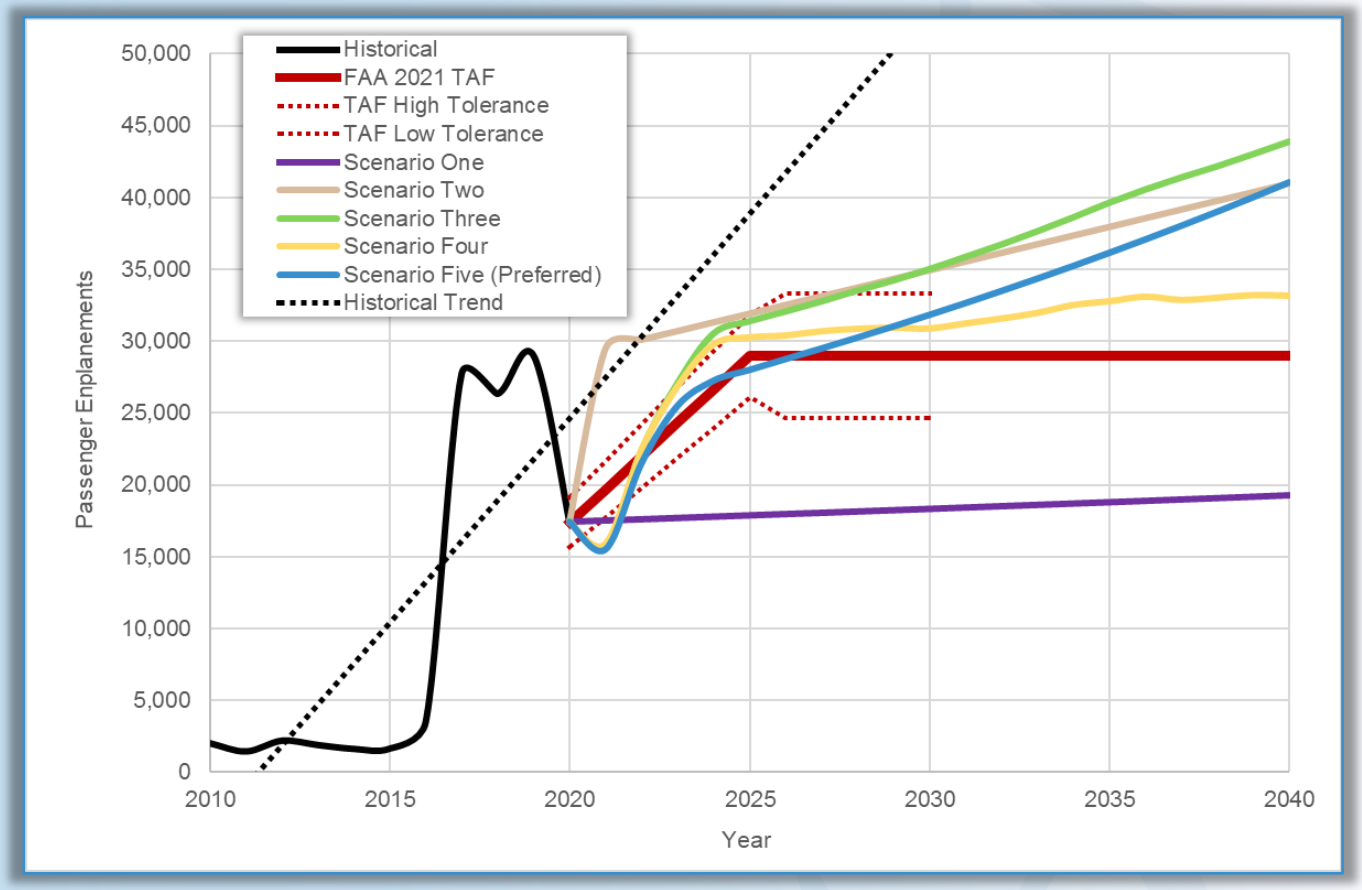
COVID Impacts



Approved Passenger Enplanement Forecasts, 2020-2040

AIRPORT MASTER PLAN

Activity	2020	2040	CAGR
Scheduled Service Enplanements	16,102	39,460	4.6%
Non-Scheduled Service Enplanements	1,308	1,600	1.0%
Total	**17,410**	**41,060**	**4.4%**



SOURCEs: Stillwater Regional Airport and Mead & Hunt.

Alternatives Assumptions

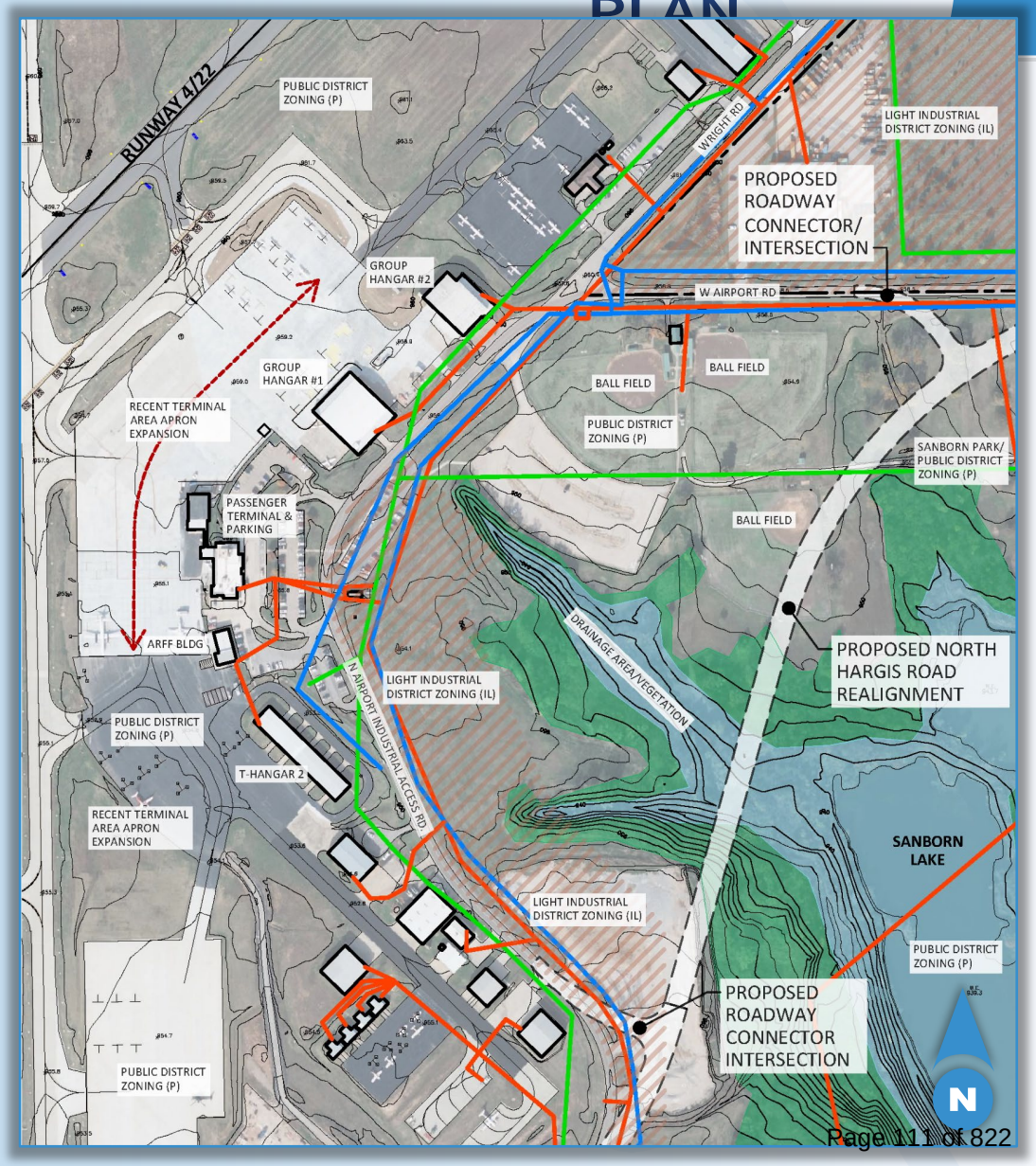
- **Develop and operate consistent with local, state, and federal regulations**
- **Accommodate all forecasted aviation activity safely and efficiently**
- **Improve airfield capacity**
- **Design in accordance with appropriate Runway Design Code (RDC)**
- **Maximize airfield utility during all weather conditions**
- **Adequate runway length**
- **Evaluate airport property for the highest and best use**
- **Compatible and complementary with off-airport land uses**

Alternatives Goals

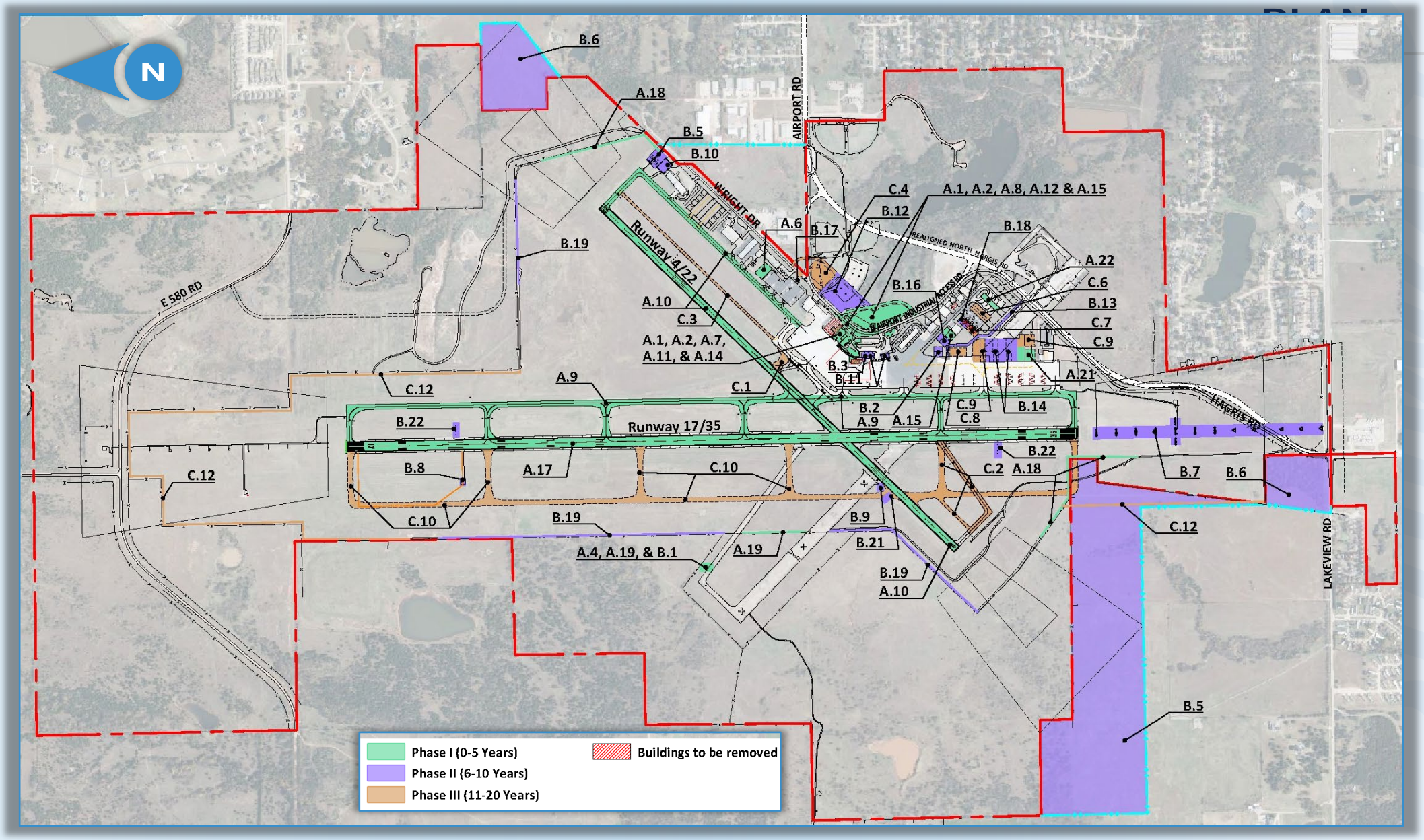
- **Plan and develop to capably accommodate the future needs of the City of Stillwater, Payne County, and the community.**
- **Program the construction of facilities when demand is realized (construction driven by demand, not forecasts).**
- **Plan to accommodate the forecast aircraft fleet safely and efficiently with the facilities needed to accommodate demand.**
- **Provide effective direction for future development through the adopted development program.**
- **Plan and develop to be environmentally compatible with the community.**
- **Integrate the needs of existing tenants with future airport development plans.**
- **Enhance fiscal self-sufficiency.**

Terminal Area Site Analysis/Existing Conditions

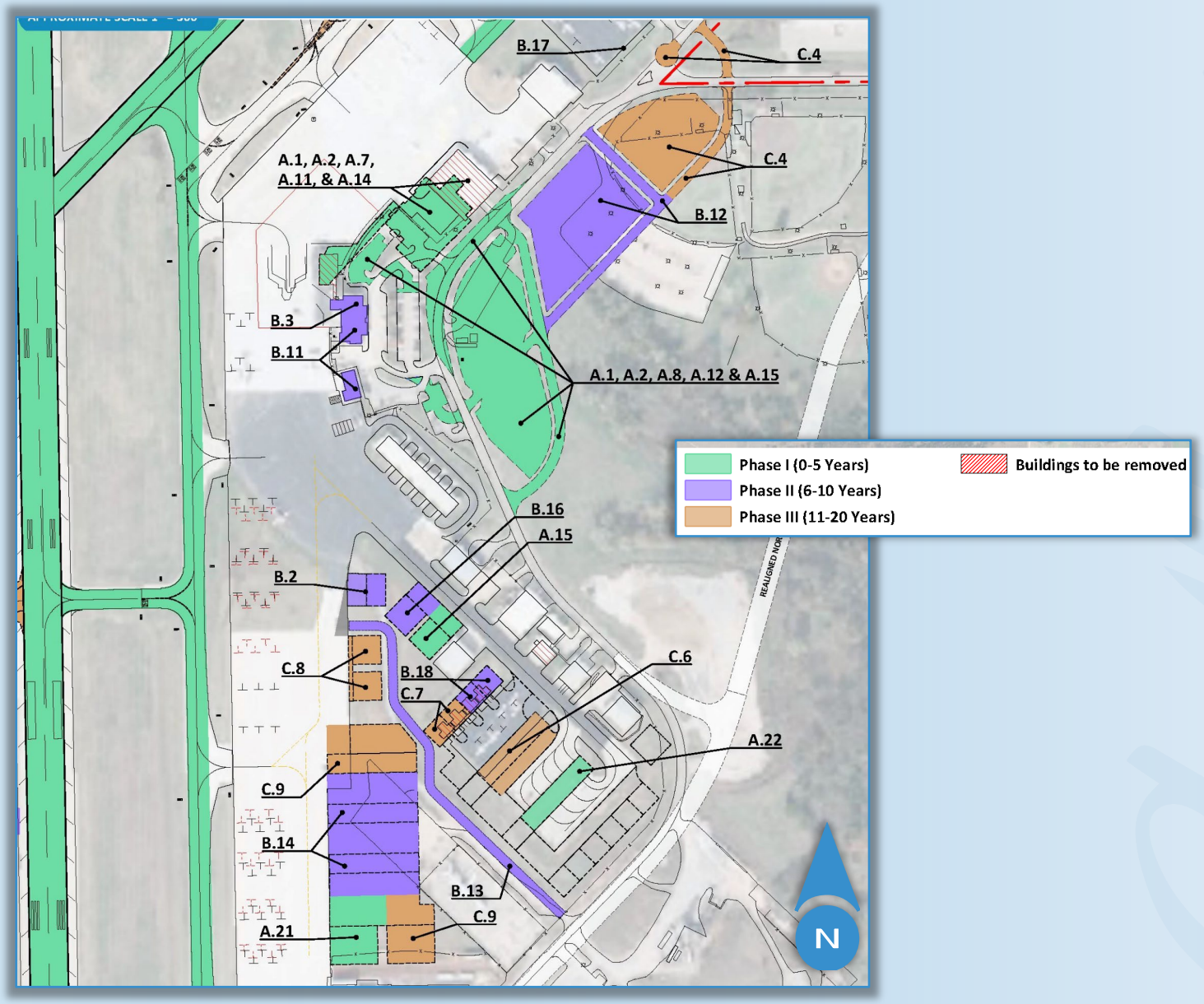
- **Planning Assessment Categories**
  - Vehicular Access/Parking
  - Utility Infrastructure
  - Topography
  - Stormwater Drainage/Detention
  - Vegetation
  - Airside/Landside Facilities & Interface
  - Land Use/Zoning
  - Passenger Terminal Building Visibility
  - Building Orientation/Solar Analysis

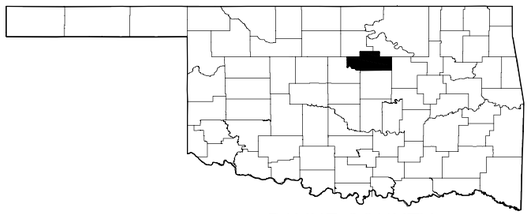


Airport Phasing Plan



Terminal Area Phasing Plan

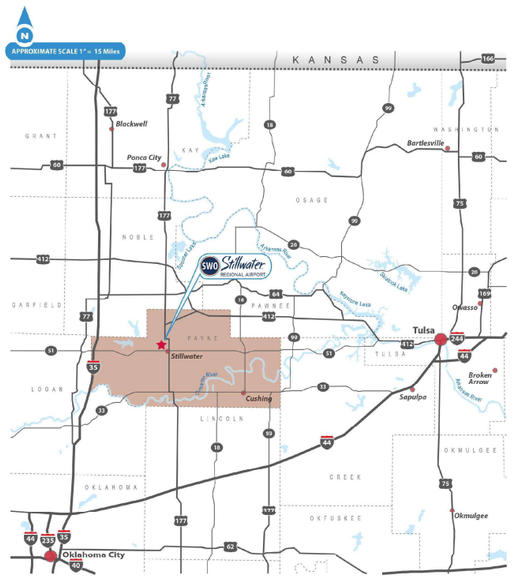




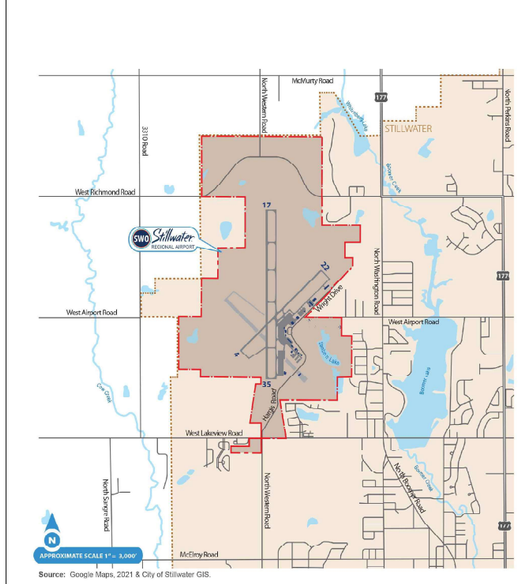
STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

LOCATION MAP



VICINITY MAP



Source: Google Maps, 2021 & City of Stillwater GIS.

AIRPORT LAYOUT PLAN SET

Sheet Number	Sheet Title	Revision
1	TITLE SHEET	
2	AIRPORT DATA	
3	AIRPORT LAYOUT PLAN	
4	AIRPORT AIRSPACE PLAN	
5	AIRPORT AIRSPACE PLAN RUNWAY 17 APPROACH	
6	AIRPORT AIRSPACE PLAN RUNWAY 35 APPROACH	
7	AIRPORT AIRSPACE RUNWAY 17-35 PROFILE	
8	AIRPORT AIRSPACE RUNWAY 4-22 PROFILE	
9	RUNWAY CENTERLINE PROFILES	
10	RUNWAY 17 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
11	RUNWAY 35 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
12	RUNWAY 4 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
13	RUNWAY 22 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
14	RUNWAY 17-35 DEPARTURE SURFACE PLAN & PROFILE	
15	RUNWAY 4-22 DEPARTURE SURFACE PLAN & PROFILE	
16	TERMINAL AREA PLAN	
17	AIRPORT LAND USE PLAN	
18	AIRPORT PROPERTY MAP	

FAA APPROVAL

FEDERAL AVIATION ADMINISTRATION
Southwest Region

Approved - Subject to Conditions in the Letter of Conditional Approval included in this electronic ALP

Glenn Bolas

Manager, Arkansas/Oklahoma
Airports District Office

SPONSOR APPROVAL

K R

Kellie Reed (Airport Director)
Stillwater Regional Airport

REVISIONS AND NOTES

NO.	DESCRIPTION	DATE	FIRM	BY

NOTES:
1. THIS DRAWING REFLECTS PLANNING STANDARDS SPECIFIC TO THIS AIRPORT, AND IS NOT A PRODUCT OF DETAILED ENGINEERING DESIGN ANALYSIS. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION DOCUMENTATION OR NAVIGATION.
2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.

Mead & Hunt
Mead and Hunt, Inc.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120
phone: 918-585-8844
meadhunt.com

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

ISSUED

NOT FOR CONSTRUCTION

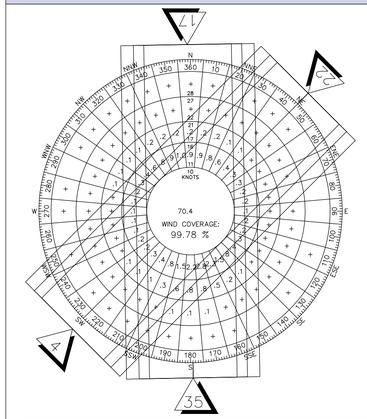
M&H NO.: 3261200-182363.01
DATE: MAY 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
DO NOT SCALE DRAWINGS

SHEET CONTENTS
TITLE SHEET

SHEET NO.
1

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\3261200\182363.01\TECH\CAD\AIRPORTLAYOUTPLAN\TITLE SHEET.DWG
5/5/2025 8:35:37 AM

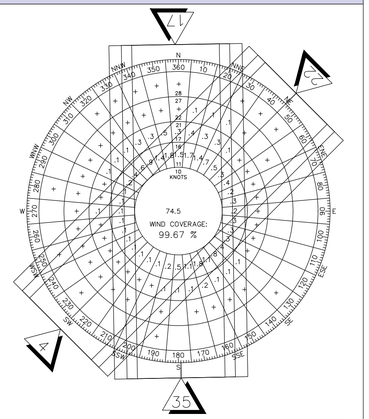
ALL WEATHER WIND ROSE



ALL WEATHER WINDROSE			
RUNWAY	10.5-KNOTS	13-KNOTS	16-KNOTS
17/35	95.63%	97.93%	99.40%
17	76.52%	77.89%	78.89%
35	64.38%	65.87%	66.96%
4/22	83.81%	91.45%	97.65%
4	69.77%	73.59%	77.13%
22	68.87%	74.99%	80.21%
COMBINED	97.78%	99.18%	99.78%

SOURCE: NOAA (ISD) STATION 723545. PERIOD OF RECORD 2011-2020

IFR WIND ROSE



IFR WEATHER WINDROSE			
RUNWAY	10.5-KNOTS	13-KNOTS	16-KNOTS
17/35	94.96%	97.43%	99.15%
17	67.05%	68.04%	69.57%
35	78.43%	80.23%	81.59%
4/22	85.84%	92.32%	97.77%
4	79.87%	84.72%	88.89%
22	64.12%	67.98%	71.73%
COMBINED	97.31%	98.92%	99.67%

SOURCE: NOAA (ISD) STATION 723545. PERIOD OF RECORD 2011-2020

NAVAID OWNERSHIP

RUNWAY	NAVAID	OWNER
RUNWAY 17	PAPI	STATE
	MALSR	FAA
	ILS	FAA
	MIRL	STATE
	RNAV (GPS	FAA
RUNWAY 35	PAPI	STATE
	REIL	STATE
	MIRL	STATE
RUNWAY 4	PAPI	STATE
	MIRL	STATE
RUNWAY 22	PAPI	STATE
	MIRL	STATE

AIRPORT DATA

	EXISTING	FUTURE
AIRPORT REFERENCE CODE	C-II	C-III
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	94 °F (JULY)	N/A
AIRPORT ELEVATION (AMSL NAVD88)	1000.3'	1000.3'
ELECTRONIC NAVIGATION AIDS	RNAV, VOR/DME, NDB,VORTAC, ILS/DME	RNAV, VOR/DME, NDB,VORTAC, ILS/DME
UNICOM (MHz)	122.95	122.95
CONTROL TOWER (MHz)*	125.35	125.35
AIRPORT REFERENCE POINT (ARP)-NAD 83	N36° 09' 41.0"	N36° 09' 41.0"
	W97° 05' 09.2"	W97° 05' 09.2"
MISCELLANEOUS FACILITIES	MALSR, PAPI, VASI, REIL, ASOS, WINDCONE,SEGMENTED CIRCLE, BEACON	MALSR, PAPI, VASI, REIL, ASOS, WINDCONE,SEGMENTED CIRCLE, BEACON
CRITICAL AIRCRAFT	CRJ 700	ERJ 175
AIRPORT MAGNETIC VARIATION (JUNE 2022)	3° 2' E ± 0° 22'	0° 6' W ANNUAL RATE OF CHANGE
NPIAS CATEGORY	NONHUB PRIMARY	NONHUB PRIMARY
STATE EQUIVALENT SERVICE ROLE	COMMERCIAL SERVICE	COMMERCIAL SERVICE
AIRPORT PROPERTY (ACRES)	1,488	1,602

MODIFICATION OF STANDARDS

NO.	DESCRIPTION	STANDARD	EXISTING	DISPOSITION	PROPOSED	APPROVED
1	NONE REQUIRED					
2						
3						
4						

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
PAPI OBSTACLE CLEARANCE SURFACE	PAPI	PAPI
VASI OBSTACLE CLEARANCE SURFACE	VASI	VASI
VERTICAL GUIDANCE SURFACE	VGS	VGS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE	X	X
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM	MALSR	MALSR
PRECISION APPROACH PATH INDICATOR (PAPI)		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		

RUNWAY DATA

	RUNWAY 17		RUNWAY 35		RUNWAY 4 ***		RUNWAY 22 ***	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
UTILITY/OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	UTILITY	OTHER THAN UTILITY	UTILITY
RUNWAY DESIGN CODE	C-II-2400	C-III-2400	C-II-4000	C-III-2400	A-I-VIS-SMALL	A-I-4000 SMALL	A-I-VIS-SMALL	A-I-4000 SMALL
APPROACH REFERENCE CODE	D/IV/2400	D/IV/2400	D/IV/4000	D/IV/2400	B/I(S)/4000	B/I(S)/4000	B/I(S)/4000	B/I(S)/4000
DEPARTURE REFERENCE CODE	D/IV	D/IV	D/IV	D/IV	B/I	B/I	B/I	B/I
STRENGTH BY WHEEL LOADING (IN 1000 LBS.)	S-100, D-157,DT-310	S-100, D-157,DT-310	S-100, D-157,DT-310	S-100, D-157,DT-310	S-34, D-60	S-34, D-60	S-34, D-60	S-34, D-60
STRENGTH BY PCN*	582/R/C/W/T	582/R/C/W/T	582/R/C/W/T	582/R/C/W/T	158/R/C/W/T	158/R/C/W/T	158/R/C/W/T	158/R/C/W/T
RUNWAY PAVEMENT SURFACE/CONDITION	CONCRETE/GOOD	CONCRETE/GOOD	CONCRETE/GOOD	CONCRETE/GOOD	ASPHALT/GOOD	ASPHALT/GOOD	ASPHALT/GOOD	ASPHALT/GOOD
RUNWAY SURFACE TREATMENT	GROOVED	GROOVED	GROOVED	GROOVED	NONE	NONE	NONE	NONE
EFFECTIVE RUNWAY GRADIENT %	0.46%	0.46%	0.46%	0.46%	0.48%	0.48%	0.48%	0.48%
RUNWAY WIDTH AND LENGTH	7,401' X 100'	7,401' X 100'	7,401' X 100'	7,401' X 100'	5,002'x 75'	5,002'x 75'	5,002'x 75'	5,002'x 75'
RUNWAY SHOULDER WIDTH	25'	25'	25'	25'	N/A	N/A	N/A	N/A
RUNWAY SAFETY AREA LENGTH BEYOND RW END	1000'	1000'	1000'	1000'	240'	240'	240'	240'
RUNWAY SAFETY AREA LENGTH PRIOR TO LANDING THRESHOLD	600'	600'	600'	600'	240'	240'	240'	240'
RUNWAY SAFETY AREA WIDTH	500'	500'	500'	500'	120'	120'	120'	120'
RUNWAY END COORDINATES	N36° 10' 20.32"	N36° 10' 20.32"	N36° 09' 07.14"	N36° 09' 07.14"	N36° 09' 19.33"	N36° 09' 19.33"	N36° 09' 54.60"	N36° 09' 54.60"
	W97° 05' 12.69"	W97° 05' 12.69"	W97° 05' 11.89"	W97° 05' 11.89"	W97° 05' 26.04"	W97° 05' 26.04"	W97° 04' 43.29"	W97° 04' 43.29"
RUNWAY END ELEVATIONS	1000.3'	1000.3'	966.0'	966.0'	960.9'	960.9'	985.7'	985.7'
RUNWAY LIGHTING TYPE	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL
RUNWAY PROTECTION ZONE DIMENSIONS (INNER WIDTH X LENGTH X OUTER WIDTH)	1,000' x 2,500 x 1,750'	1,000' x 2,500 x 1,750'	1,000' x 1,700 x 1,510'	1,000' x 2,500 x 1,750'	250' x 1000' x 450'	1,000' x 1,700 x 1,510'	250' x 1000' x 450'	1,000' x 1,700 x 1,510'
RUNWAY MARKING TYPE	PRECISION	PRECISION	PRECISION	PRECISION	BASIC	NON-PRECISION	BASIC	NON-PRECISION
14 CFR PART 77 APPROACH CATEGORY	PIR (50:1 SLOPE)	PIR (50:1 SLOPE)	D (34:1 SLOPE)	PIR (50:1 SLOPE)	A (V) (20:1 SLOPE)	A (NP) (34:1 SLOPE)	A (V) (20:1 SLOPE)	A (NP) (34:1 SLOPE)
14 CFR PART 77 APPROACH TYPE	PRECISION	PRECISION	NON-PRECISION	PRECISION	VISUAL	NON-PRECISION	VISUAL	NON-PRECISION
APPROACH VISIBILITY MINIMUMS	1/2- MILE	1/2- MILE	3/4-MILE	1/2-MILE	VISUAL	3/4-MILE	VISUAL	3/4-MILE
TYPE OF AERONAUTICAL SURVEY REQUIRED	VERTICALLY GUIDED	VERTICALLY GUIDED	VERTICALLY GUIDED	VERTICALLY GUIDED	NON-VERTICALLY GUIDED	VERTICALLY GUIDED	NON-VERTICALLY GUIDED	VERTICALLY GUIDED
RUNWAY DEPARTURE SURFACE	YES	YES	YES	YES	N/A	YES	N/A	YES
RUNWAY OBJECT FREE AREA LENGTH BEYOND RW END	1000'	1000'	1000'	1000'	240'	240'	240'	240'
RUNWAY OBJECT FREE AREA LENGTH PRIOR TO LANDING THRESHOLD	600'	600'	600'	600'	240'	240'	240'	240'
RUNWAY OBJECT FREE AREA WIDTH	800'	800'	800'	800'	250'	250'	250'	250'
OBSTACLE FREE ZONE LENGTH BEYOND RW END	200'	200'	200'	200'	200'	200'	200'	200'
OBSTACLE FREE ZONE WIDTH	400'	400'	400'	400'	250'	250'	250'	250'
THRESHOLD SITING SURFACE**	TYPE 5,6	TYPE 5,6	TYPE 5,6	TYPE 5,6	TYPE 2	TYPE 4	TYPE 2	TYPE 4
INNER APPROACH OBSTACLE FREE ZONE LENGTH	2,600'	2,600'	N/A	N/A	N/A	N/A	N/A	N/A
INNER APPROACH OBSTACLE FREE ZONE WIDTH	400'	400'	N/A	400'	N/A	N/A	N/A	N/A
INNER-TRANSITIONAL OBSTACLE FREE ZONE WIDTH	1,578'	1,600'	N/A	2,011'	N/A	N/A	N/A	N/A
PRECISION OBSTACLE FREE ZONE DIMENSIONS	200' X 800'	200' X 800'	N/A	200' X 800'	N/A	N/A	N/A	N/A
VISUAL AND INSTRUMENT NAVAIDS	LOC, GS,MALSR, PAPI	LOC, GS,MALSR, PAPI	PAPI, REILS	MALSR,PAPI	PAPI	PAPI	PAPI	PAPI
TOUCHDOWN ZONE ELEVATIONS	1000.3'	1000.3'	965.8'	965.8'	965.8'	965.8'	984.6'	984.6'
RUNWAY CL TO TAXIWAY CL SEPARATION	400'	400', 600'	400'	400', 600'	525'	240'	525'	240'
RUNWAY CL TO HOLDLINE SEPARATIONS	260'	260'	260'	260'	200'	200'	200'	200'
RUNWAY CL TO AIRCRAFT PARKING SEPARATIONS	790'	790'	790'	790'	540'	540'	540'	540'
VERTICAL AND HORIZONTAL DATUM	NAVD88, NAD83				NAVD88, NAD83			
CRITICAL AIRCRAFT	CRJ 700	ERJ 175	CRJ 700	ERJ 175	CESSNA 172	CESSNA 172	CESSNA 172	CESSNA 172
WINGSPAN	76.27'	85.33'	76.27'	85.33'	36.08'	36.08'	36.08'	36.08'
TAIL HEIGHT	24.83'	32.33'	24.83'	32.33'	8.92'	8.92'	8.92'	8.92'
APPROACH SPEED	135 KNOTS	142 KNOTS	135 KNOTS	142 KNOTS	62 KNOTS	62 KNOTS	62 KNOTS	62 KNOTS
MAIN GEAR WIDTH	16.39'	20.50'	16.39'	20.50'	8.4'	8.4'	8.4'	8.4'
COCKPIT TO MAIN GEAR	49.25'	41.33'	49.25'	41.33'	5.42'	5.42'	5.42'	5.42'
MAXIMUM TAKEOFF WEIGHT	72,750 LBS	82,700 LBS	72,750 LBS	82,700 LBS	2,600 LBS	2,600 LBS	2,600 LBS	2,600 LBS

NOTES: APPROACH VISIBILITY MINIMUMS ARE SHOWN FOR THE LOWEST APPROACH FOR EACH RUNWAY AND MAY ONLY BE APPLICABLE FOR CATEGORY A AIRCRAFT

* - PCN VALUE NOT AVAILABLE. PCR VALUE PROVIDED BY OKLAHOMA AERONAUTICAS COMMISSION, APRIL 2023.

** - THRESHOLD SITING SURFACES BASED ON A/C150-5300 13B

***-CURRENT RUNWAY CONFIGURATION EXCEEDS DESIGN CRITERIA FOR CRITICAL AIRCRAFT (B-I SMALL A/C).

DECLARED DISTANCES

ITEM	RUNWAY 17		RUNWAY 35		RUNWAY 4		RUNWAY 22	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
TAKEOFF RUN AVAILABLE (TORA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
TAKEOFF DISTANCE AVAILABLE (TODA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
LANDING DISTANCE AVAILABLE (LDA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '

EXISTING TAXIWAYS/TAXILANES SERVING RUNWAY 17/35

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY A	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	343'
TAXIWAY A1	90'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A2	90'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A3	60'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A4	100'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY B	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY C	55'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY D	55'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY E	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

ULTIMATE TAXIWAYS/TAXILANES SERVING RUNWAY 17/35

NAME	WIDTH	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY G	75'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

EXISTING TAXIWAYS/TAXILANES SERVING RUNWAY 4/22

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY B	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY F	50'	35'	N/A	II	2	79'	131'	7.5'	MITL	N/A	75'
TAXIWAY F1	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

ULTIMATE TAXIWAYS/TAXILANES SERVING RUNWAY 4/22

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY B	25'	25'	N/A	I	1a	49'	89'	5'	MITL	N/A	N/A
TAXIWAY F	25'	25'	N/A	I	1a	49'	89'	5'	MITL	N/A	N/A

NOTES

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2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.

REVISIONS

NO.	DESCRIPTION	DATE

Mead & Hunt

Mead and Hunt, Inc.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120
phone: 918-585-8844
meadhunt.com

SWO Stillwater REGIONAL AIRPORT

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

ISSUED

DRAFT

NOT FOR CONSTRUCTION

M&H NO.: 3261200-182363.01
DATE: APRIL 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
DO NOT SCALE DRAWINGS

SHEET CONTENTS
AIRPORT DATA

SHEET NO.
2

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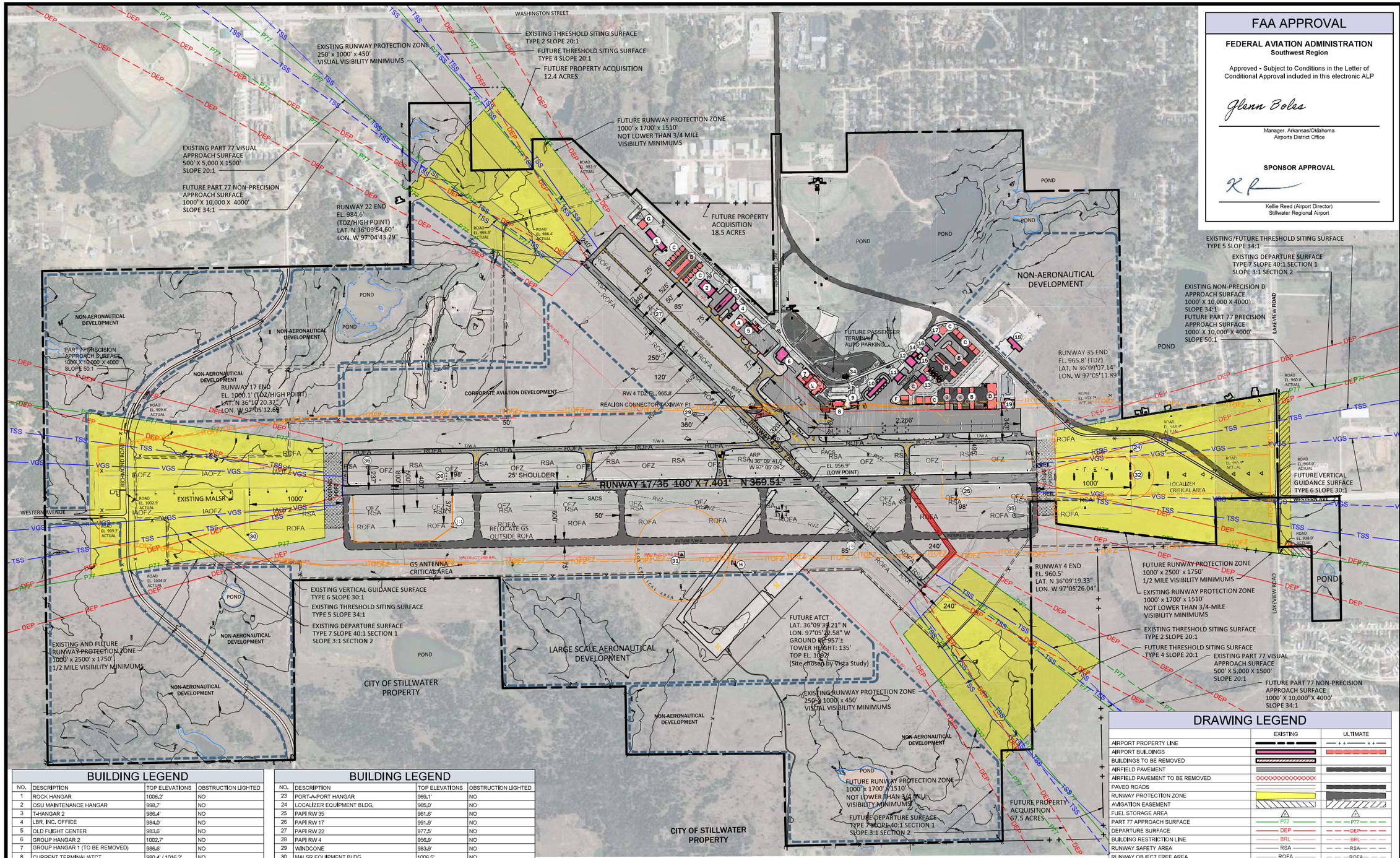

FAA APPROVAL

FEDERAL AVIATION ADMINISTRATION
Southwest Region

Approved - Subject to Conditions in the Letter of Conditional Approval included in this electronic ALP

Glenn Boles

Manager, Arkansas/Oklahoma
Airports District Office

SPONSOR APPROVAL

Kellie Reed (Airport Director)
Stillwater Regional Airport

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
1	ROCK HANGAR	1006.2'	NO
2	OSU MAINTENANCE HANGAR	998.7'	NO
3	T-HANGAR 2	986.4'	NO
4	LBR, INC. OFFICE	984.0'	NO
5	OLD FLIGHT CENTER	983.6'	NO
6	GROUP HANGAR 2	1002.7'	NO
7	GROUP HANGAR 1 (TO BE REMOVED)	986.6'	NO
8	CURRENT TERMINAL/ATCT	980.4' / 1016.2'	NO
9	ARFF	974.0'	NO
10	T-HANGAR 1	967.0'	NO
11	COWBOY HANGAR	972.0'	NO
12	AIRPORT OPERATIONS & MAINTENANCE	977.3'	NO
13	HANGAR 10	978.6'	NO
14	ADMINISTRATION BUILDING	972.0'	NO
15	AIRCRAFT WASH BAY	975.1'	NO
16	WAITS HOLDING HANGAR	976.7'	NO
17	DETMILER HANGAR	980.5'	NO
18	WASTE MANAGEMENT BLDG. AND FACILITY	983.2'	NO
19	NEW OSU FLIGHT CENTER	991.4'	NO
20	PORT-A-PORT HANGAR	968.0'	NO
21	PORT-A-PORT HANGAR	968.1'	NO
22	PORT-A-PORT HANGAR	969.1'	NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
23	PORT-A-PORT HANGAR	969.1'	NO
24	LOCALIZER EQUIPMENT BLDG.	965.0'	NO
25	PAPI RW 35	961.6'	NO
26	PAPI RW 17	991.9'	NO
27	PAPI RW 22	977.5'	NO
28	PAPI RW 4	956.9'	NO
29	WINDCONE	983.9'	NO
30	MALSR EQUIPMENT BLDG.	1006.5'	NO
31	ASOS	968.0'	NO
32	LOCALIZER ANTENNA	967.8'	NO
33	GLIDE SLOPE EQUIPMENT BLDG.	994.0'	NO
34	AIRPORT BEACON	1009.2'	NO
35	WINDCONE	985.0'	NO
36	WINDCONE	994.1'	NO
A	GROUP HANGAR 1		
B	FUTURE T-HANGAR		
C	FUTURE HANGAR		
D	FUTURE MAINTENANCE HANGAR		
E	FUTURE PASSENGER TERMINAL		
F	FUTURE ARFF/SRE MAINTENANCE BUILDING		
G	FUTURE OFF-SEASON STORAGE FACILITY		
H	FUTURE AIRPORT TRAFFIC CONTROL TOWER		

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 500 1000

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		
LAND USE DEVELOPMENT AREA		

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STILLWATER, OK 74075

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SHEET CONTENTS
AIRPORT LAYOUT PLAN

SHEET NO.
3

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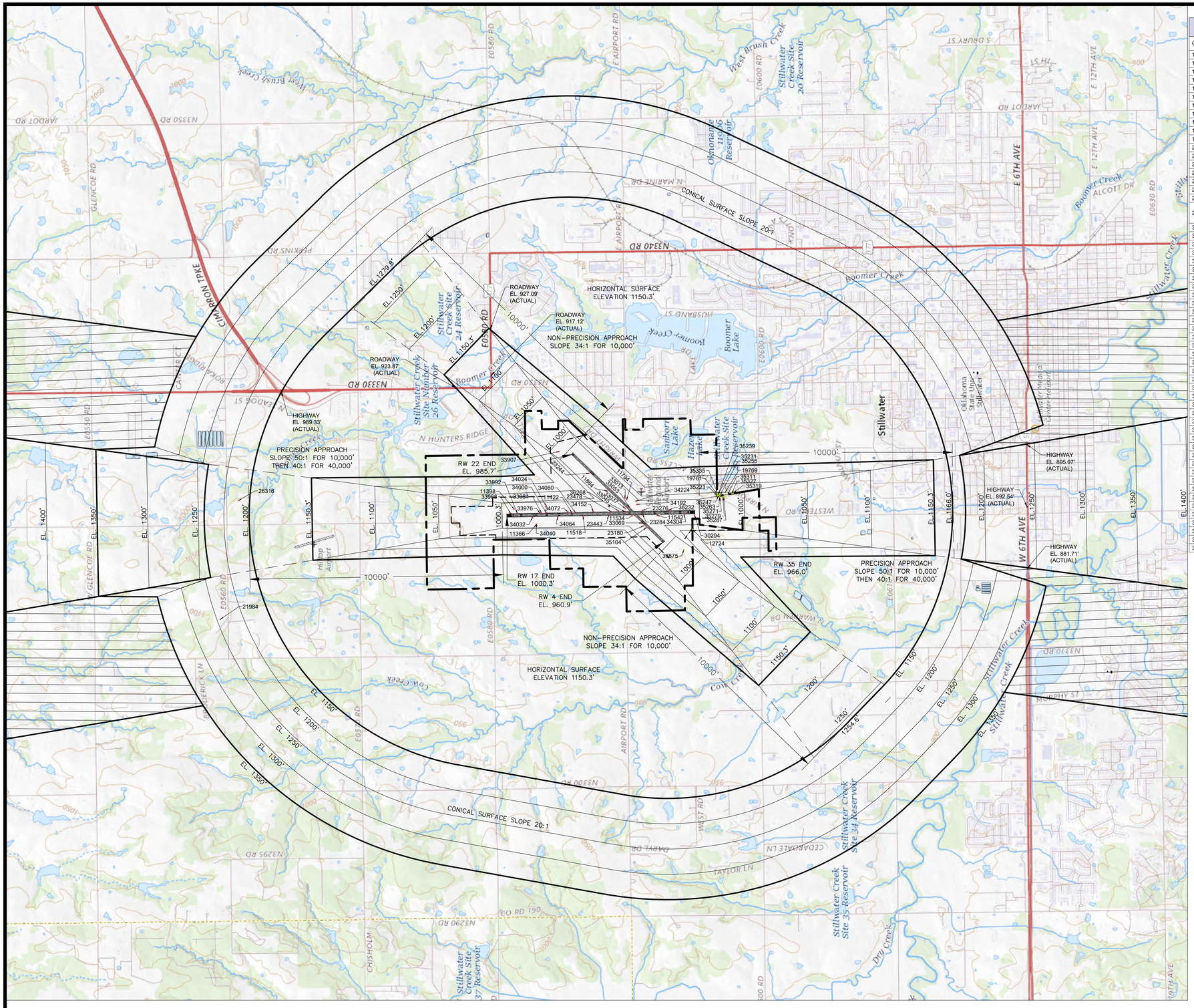

OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
11366	ANTENNA	1039.9	48	984.1	P77PS	TO REMAIN
11398	WINDSOCK	1004.9	6	994.0	P77PS	TO REMAIN
11422	SIGN	978.0	1	975.6	P77PS	TO REMAIN
11518	SIGN	974.4	2	970.2	P77PS	TO REMAIN
11534	SIGN	961.0	3	956.4	P77PS	TO REMAIN
11542	SIGN	960.0	2	955.3	P77PS	TO REMAIN
11794	SIGN	960.2	1	957.9	P77PS	TO REMAIN
11884	SIGN	969.8	3	965.2	P77PS	TO REMAIN
12724	TREE	995.5	3	971.7	P77TS	TO REMAIN
19761	TREE	995.2	5	950.0	P77TS	TO REMAIN
19769	TREE	1003.7	3	946.7	P77TS	TO REMAIN
21984	WATER TOWER	1206.2	1	1118.4	P77CON	TO REMAIN
23180	SIGN	960.5	3	955.0	P77PS	TO REMAIN
23244	SIGN	979.8	3	975.0	P77PS	TO REMAIN
23276	SIGN	958.7	1	954.0	P77PS	TO REMAIN
23284	SIGN	958.3	1	955.9	P77PS	TO REMAIN
23443	SIGN	965.1	2	960.7	P77PS	TO REMAIN
23478	SIGN	962.9	1	960.2	P77PS	TO REMAIN
26316	POWER TRANSMISSION TOWER	1075.8	-88	1004.5	P77CON	TO REMAIN
30294	REIL	967.5	1	965.0	P77PS	TO REMAIN
33013	SIGN	960.7	1	959.0	P77PS	TO REMAIN
33037	SIGN	963.2	5	958.4	P77PS	TO REMAIN
33045	SIGN	960.6	2	958.5	P77PS	TO REMAIN
33053	SIGN	959.6	1	957.4	P77PS	TO REMAIN
33069	SIGN	958.6	1	956.4	P77PS	TO REMAIN
33875	TREE	980.4	1	957.0	P77AS	TO BE REMOVED
33907	BUSH	996.4	1	988.5	P77AS	TO BE REMOVED
33968	SIGN	1000.2	1	998.1	P77PS	TO REMAIN
33976	SIGN	991.1	1	989.0	P77PS	TO REMAIN
33984	SIGN	992.2	2	987.9	P77PS	TO REMAIN
33992	SIGN	999.8	2	995.3	P77PS	TO REMAIN
34000	SIGN	989.0	1	987.0	P77PS	TO REMAIN
34024	SIGN	989.1	1	986.8	P77PS	TO REMAIN
34032	SIGN	994.6	2	990.2	P77PS	TO REMAIN
34040	BUILDING	993.9	2	984.3	P77PS	TO REMAIN
34064	SIGN	985.7	1	981.1	P77PS	TO REMAIN
34072	SIGN	982.0	3	977.2	P77PS	TO REMAIN
34080	SIGN	976.8	1	974.5	P77PS	TO REMAIN
34152	SIGN	971.3	2	967.0	P77PS	TO REMAIN
34192	SIGN	958.5	1	956.1	P77PS	TO REMAIN
34224	SIGN	958.8	1	956.8	P77PS	TO REMAIN
34304	SIGN	966.5	3	961.8	P77PS	TO REMAIN
35104	UTIL BOX	958.0	1	954.8	P77PS	TO REMAIN
35223	TREE	995.4	6	948.3	P77TS	TO REMAIN
35231	TREE	988.1	4	948.4	P77TS	TO REMAIN
35239	TREE	987.1	2	948.5	P77TS	TO REMAIN
35247	TREE	985.0	4	952.2	P77TS	TO REMAIN
35255	TREE	986.8	3	951.4	P77TS	TO REMAIN
35263	TREE	982.7	2	950.1	P77AS	TO BE REMOVED
35271	TREE	982.1	1	950.1	P77AS	TO BE REMOVED
35279	TREE	986.6	3	948.9	P77AS	TO BE REMOVED
35287	TREE	988.6	5	947.9	P77AS	TO BE REMOVED
35311	TREE	990.9	4	948.7	P77AS	TO BE REMOVED
35319	TREE	1005.2	14	949.0	P77TS	TO REMAIN
35327	TREE	1005.7	15	949.1	P77TS	TO REMAIN
35335	TREE	999.2	1	949.7	P77TS	TO REMAIN
36232	SIGN	960.8	1	956.5	P77PS	TO REMAIN
36268	SIGN	962.6	2	958.0	P77PS	TO REMAIN

AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 2000 4000

REVISIONS

NOTES

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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DATE: APRIL 2025
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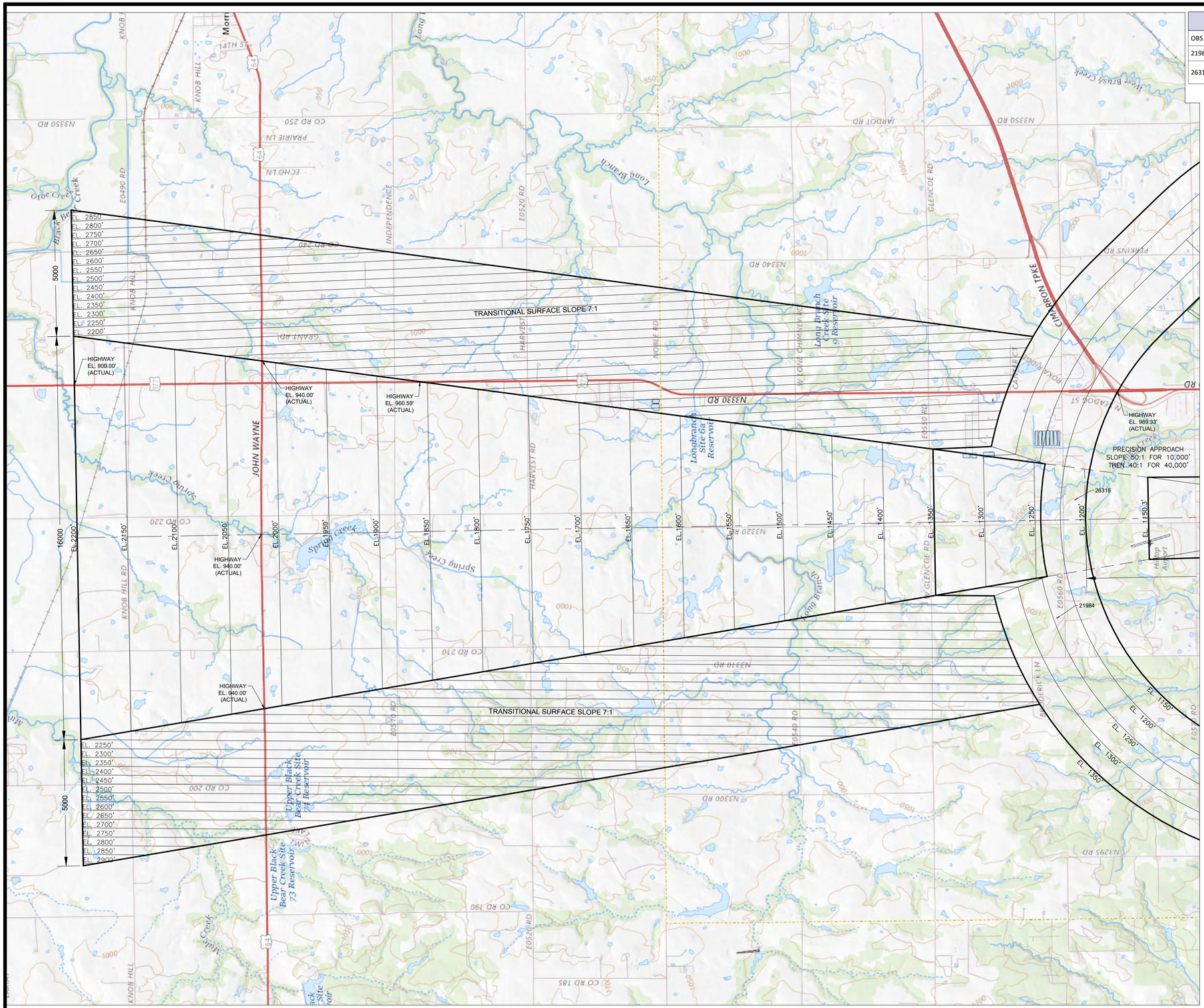

OBSTRUCTIONS						
OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
21984	WATER TOWER	1206.2	1	1118.4	CONCAL	TO REMAIN
26316	POWER TRANSMISSION TOWER	1075.8	-88	1004.5	CONICAL	TO REMAIN

AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.

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AIRPORT LAYOUT PLAN

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SHEET CONTENTS
AIRPORT AIRSPACE PLAN RUNWAY 17 APPROACH

SHEET NO.
5

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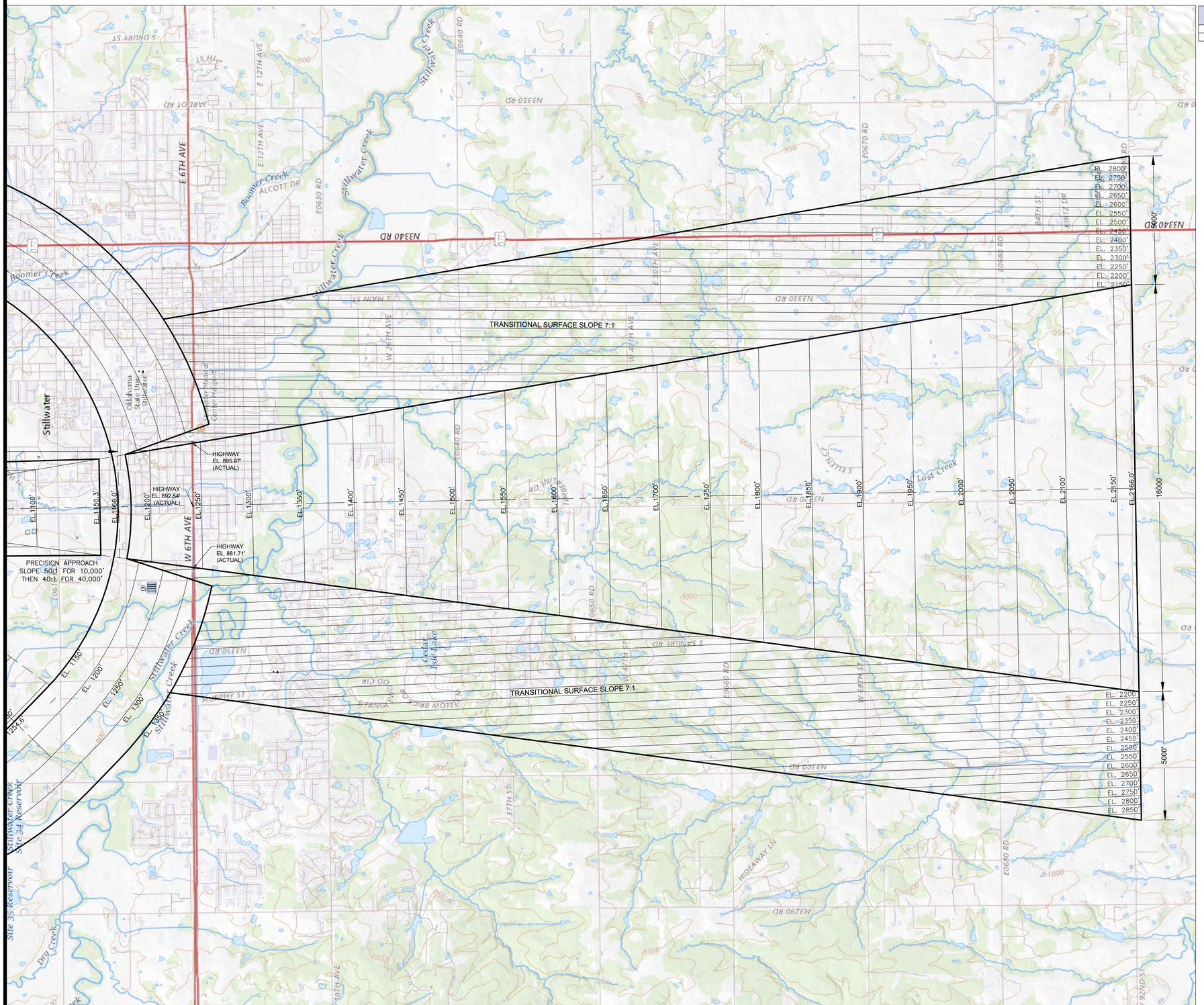

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

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SHEET CONTENTS
AIRPORT AIRSPACE PLAN RUNWAY 35 APPROACH

SHEET NO.
6

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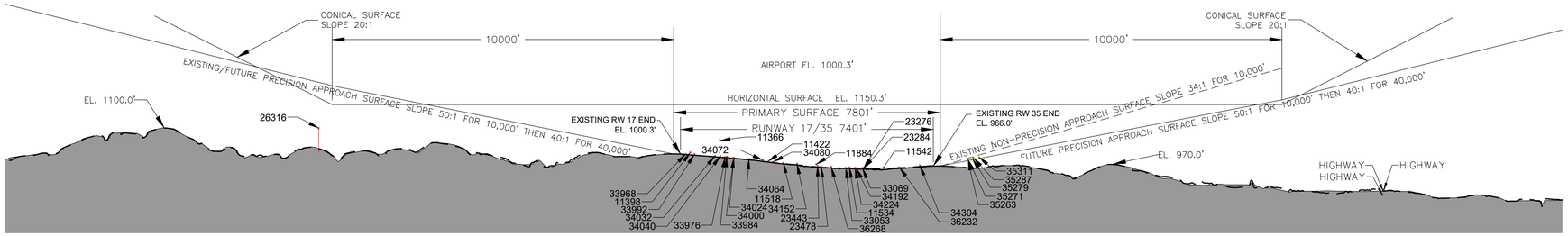
NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.



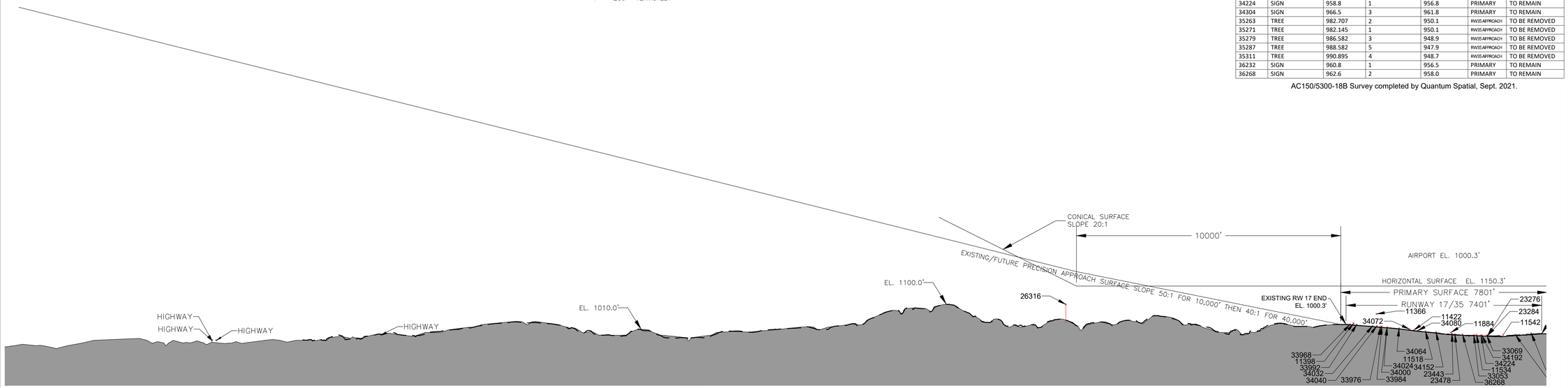
Runway 17/35 - Approach Profile View

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
11366	ANTENNA	1039.9	48	984.1	PRIMARY	TO REMAIN
11398	WINDSOCK	1004.9	6	994.0	PRIMARY	TO REMAIN
11422	SIGN	978.0	1	975.6	PRIMARY	TO REMAIN
11518	SIGN	974.4	2	970.2	PRIMARY	TO REMAIN
11534	SIGN	961.0	3	956.4	PRIMARY	TO REMAIN
11542	SIGN	960.0	2	955.3	PRIMARY	TO REMAIN
23276	SIGN	958.7	1	954.0	PRIMARY	TO REMAIN
23284	SIGN	958.3	1	955.9	PRIMARY	TO REMAIN
23443	SIGN	965.1	2	960.7	PRIMARY	TO REMAIN
23478	SIGN	962.9	1	960.2	PRIMARY	TO REMAIN
26316	POWER TRANSMISSION TOWER	1075.8	-88	1004.5	CONICAL	TO REMAIN
33053	SIGN	959.6	1	957.4	PRIMARY	TO REMAIN
33069	SIGN	958.6	1	956.4	PRIMARY	TO REMAIN
33968	SIGN	1000.2	1	998.1	PRIMARY	TO REMAIN
33976	SIGN	991.1	1	989.0	PRIMARY	TO REMAIN
33984	SIGN	992.2	2	987.9	PRIMARY	TO REMAIN
33992	SIGN	999.8	2	995.3	PRIMARY	TO REMAIN
34000	SIGN	989.0	1	987.0	PRIMARY	TO REMAIN
34024	SIGN	989.1	1	986.8	PRIMARY	TO REMAIN
34032	SIGN	994.6	2	990.2	PRIMARY	TO REMAIN
34040	BUILDING	993.9	2	984.3	PRIMARY	TO REMAIN
34072	SIGN	982.0	3	977.2	PRIMARY	TO REMAIN
34080	SIGN	976.8	1	974.5	PRIMARY	TO REMAIN
34152	SIGN	971.3	2	967.0	PRIMARY	TO REMAIN
34192	SIGN	958.5	1	956.1	PRIMARY	TO REMAIN
34224	SIGN	958.8	1	956.8	PRIMARY	TO REMAIN
34304	SIGN	966.5	3	961.8	PRIMARY	TO REMAIN
35263	TREE	982.707	2	950.1	RWY35 APPROACH	TO BE REMOVED
35271	TREE	982.145	1	950.1	RWY35 APPROACH	TO BE REMOVED
35279	TREE	986.582	3	948.9	RWY35 APPROACH	TO BE REMOVED
35287	TREE	988.582	5	947.9	RWY35 APPROACH	TO BE REMOVED
35311	TREE	990.895	4	948.7	RWY35 APPROACH	TO BE REMOVED
36232	SIGN	960.8	1	956.5	PRIMARY	TO REMAIN
36268	SIGN	962.6	2	958.0	PRIMARY	TO REMAIN

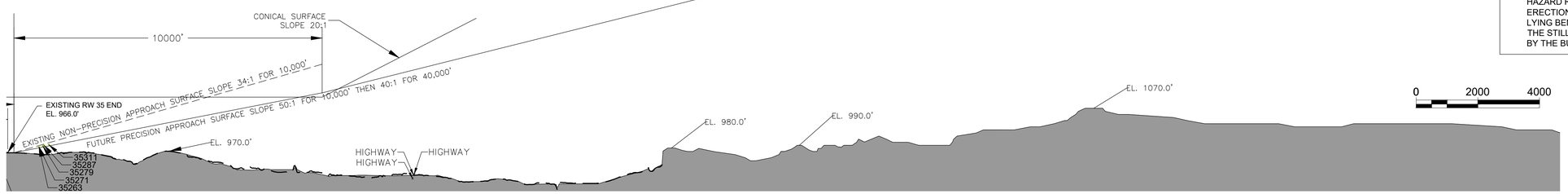
AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.



NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

Runway 17 - Extended Approach Profile View

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY



Runway 35 - Extended Approach Profile View

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

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AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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SHEET CONTENTS
AIRPORT AIRSPACE
RUNWAY 17-35
PROFILE

SHEET NO.
7

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OBSTRUCTIONS						
OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
11534	SIGN	961.0	3	956.4	PRIMARY	REMAIN
11884	SIGN	969.8	3	965.2	PRIMARY	REMAIN
23180	SIGN	960.5	3	955.0	PRIMARY	REMAIN
23244	SIGN	979.8	3	975.0	PRIMARY	REMAIN
33037	SIGN	963.2	5	958.4	PRIMARY	REMAIN
33053	SIGN	959.6	1	957.4	PRIMARY	REMAIN
33069	SIGN	958.6	1	956.4	PRIMARY	REMAIN
33875	TREE	980.4	1	957.0	RW 4 APPROACH	REMOVE
33907	BUSH	996.4	1	988.5	RW 22 APPROACH	REMOVE
35104	UTIL BOX	958.0	1	954.8	PRIMARY	RELOCATE

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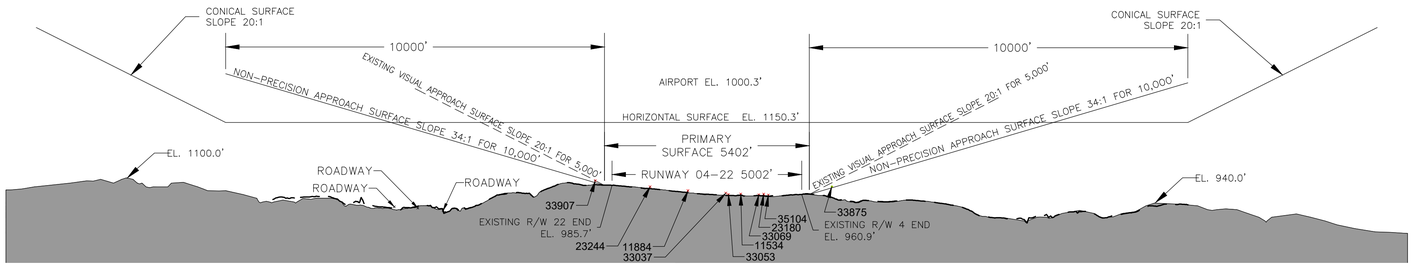

Runway 4/22 - Approach Profile View

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

0 2000 4000

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SHEET CONTENTS
AIRPORT AIRSPACE
RUNWAY 4-22
PROFILE

SHEET NO.
8

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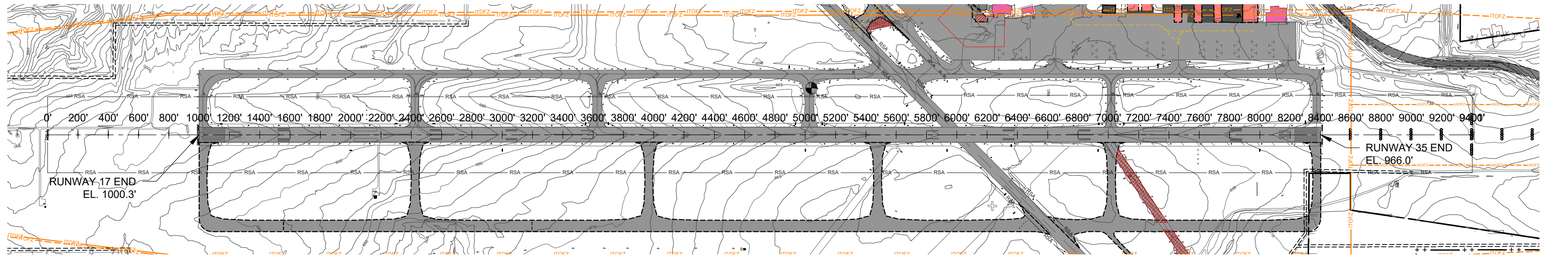

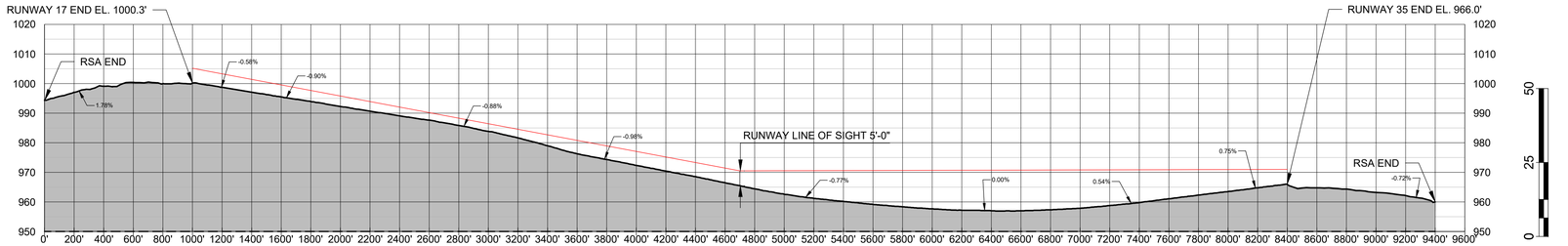

RUNWAY 17/35 CENTERLINE PROFILE

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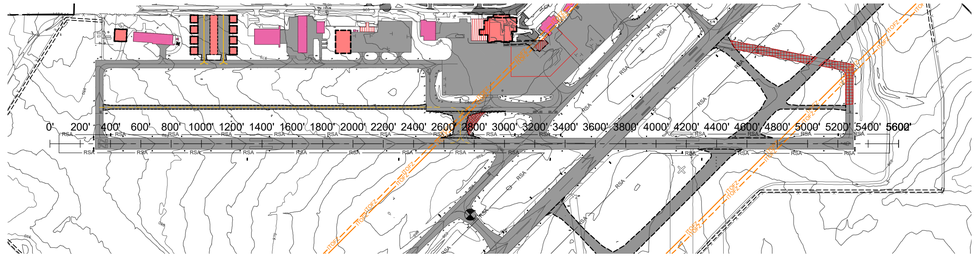

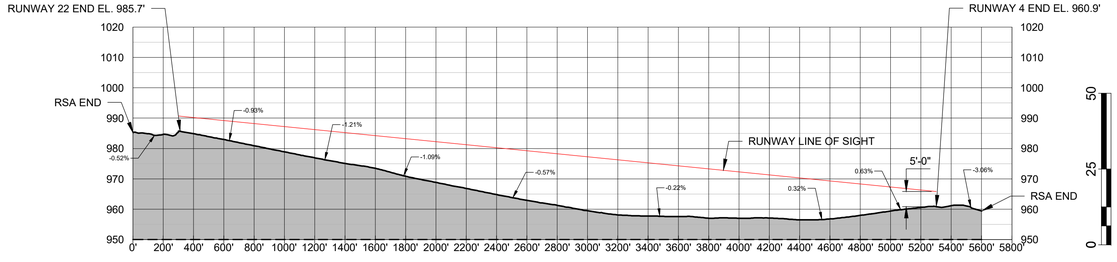

RUNWAY 4/22 CENTERLINE PROFILE

0 500 1000

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SHEET CONTENTS
RUNWAY CENTERLINE PROFILES

SHEET NO.
9

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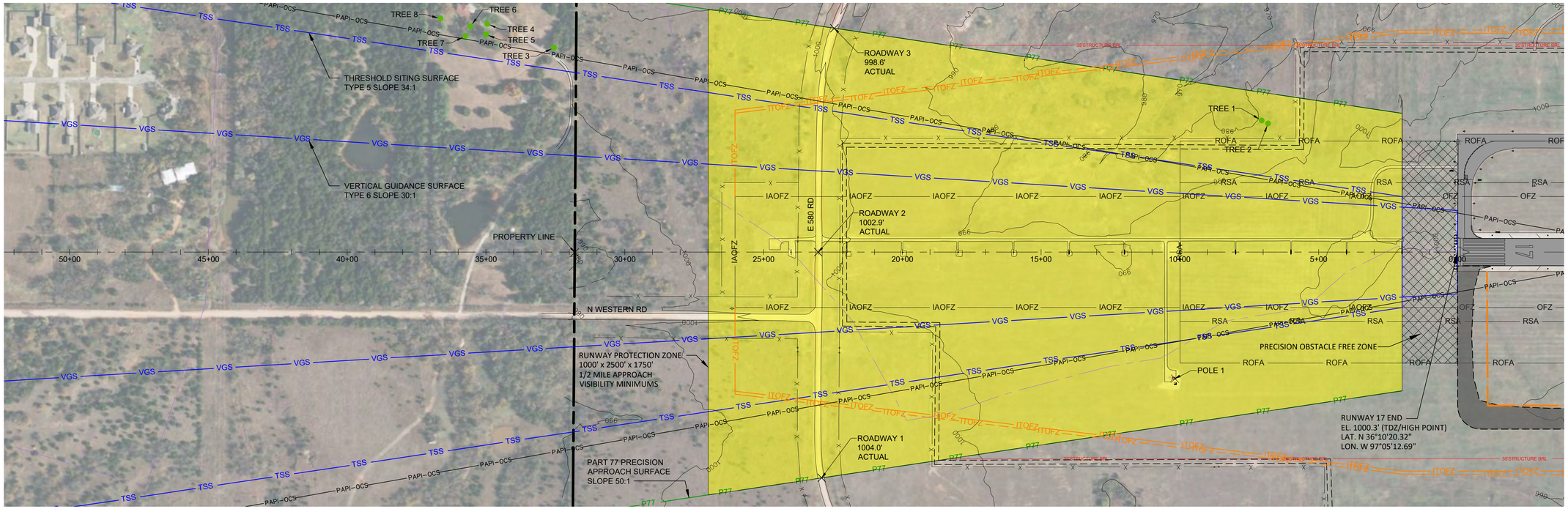

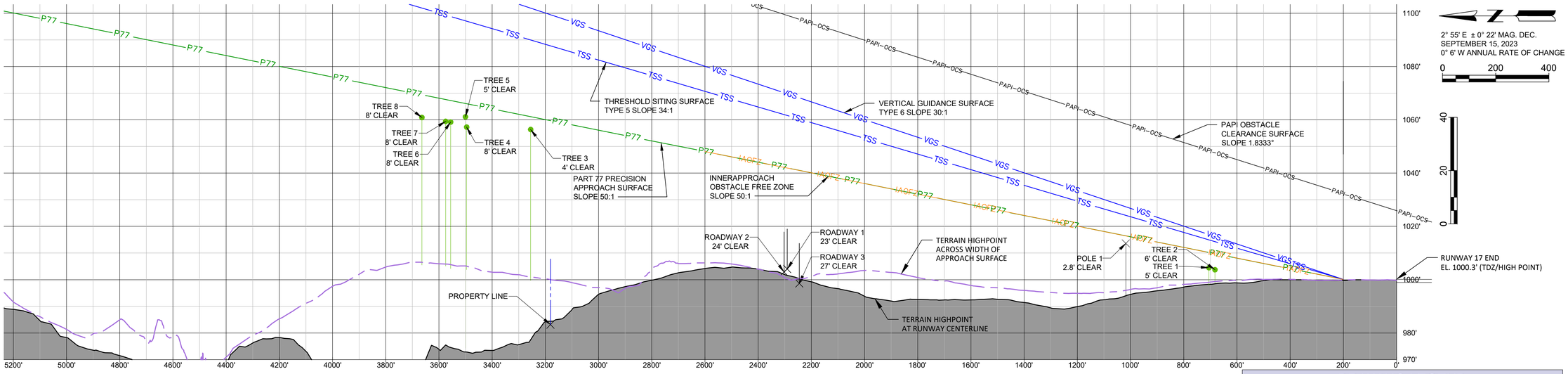

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400

0 20 40

PART 77 APPROACH OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PAPI OBSTACLE CLEARANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

VERTICAL GUIDANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

OBSTACLE FREE ZONE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

THRESHOLD SITING OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

REVISIONS

NOTES

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2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.
3. AC150/5300-18B SURVEY COMPLETED BY QUANTUM SPATIAL, SEPT 2021.

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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M&H NO.: 3261200-182363.01
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SHEET CONTENTS

RUNWAY 17 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.

10

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\3261200\182363.01\TECH\CAD\AIRPORTLAYOUTPLAN\RUNWAY 17 INNER APPROACH.DWG
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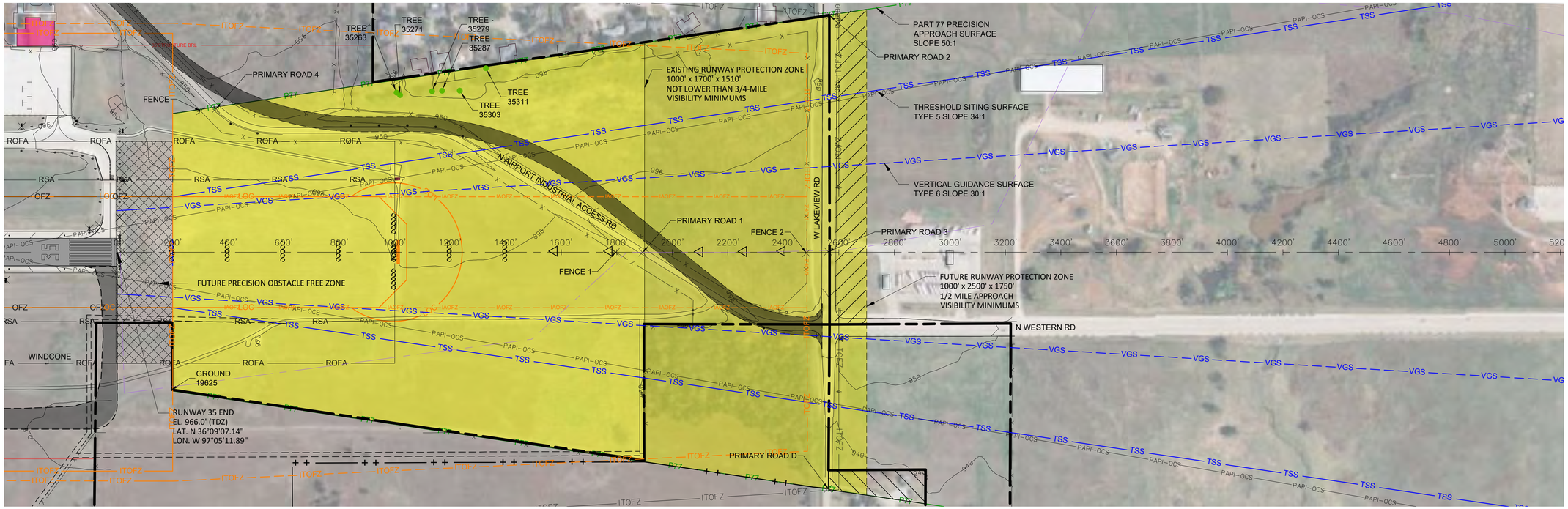

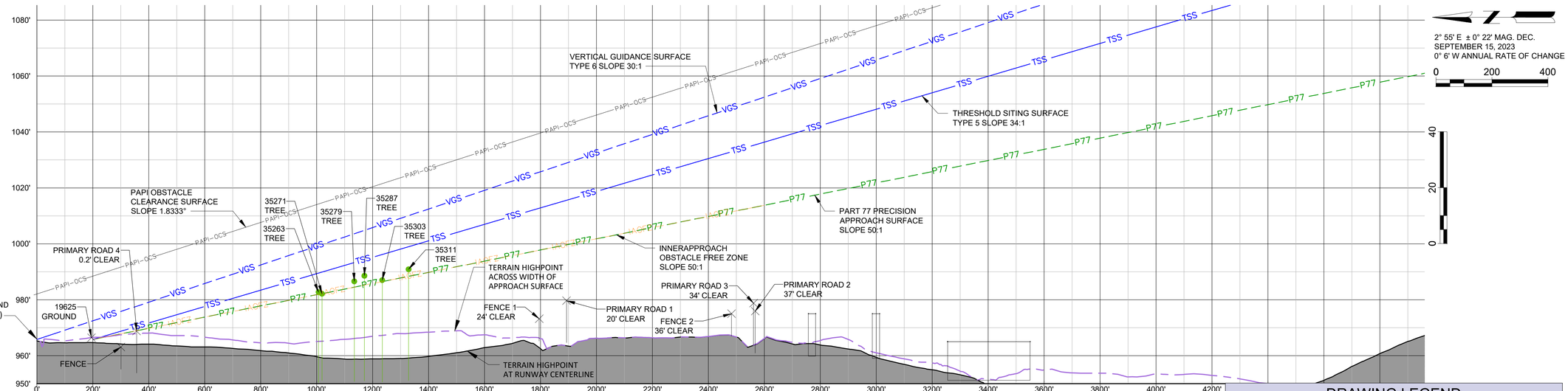

PAPI OBSTACLE CLEARANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

VERTICAL GUIDANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

OBSTACLE FREE ZONE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PART 77 APPROACH OBSTRUCTIONS

OBS #	DESCRIPTION	EASTING	NORTHING	ELEVATION	PENETRATION	SURFACE	DISPOSITION
19625	GROUND	2237653.0	420406.0	966.5	0.7	PRIMARY	GRADED
35263	TREE	2238739.2	419614.4	982.7	2	PART 77 APPROACH	REMOVE
35271	TREE	2238730.3	419601.8	982.1	1	PART 77 APPROACH	REMOVE
35279	TREE	2238746.6	419486.8	986.6	3	PART 77 APPROACH	REMOVE
35287	TREE	2238749.0	419450.7	988.6	5	PART 77 APPROACH	REMOVE
35303	TREE	2238750.6	419450.7	987.0	1	PART 77 APPROACH	REMOVE
35311	TREE	2238832.9	419387.0	990.9	4	PART 77 APPROACH	REMOVE

THRESHOLD SITING OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	x	xx
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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SHEET CONTENTS

RUNWAY 35 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.

11

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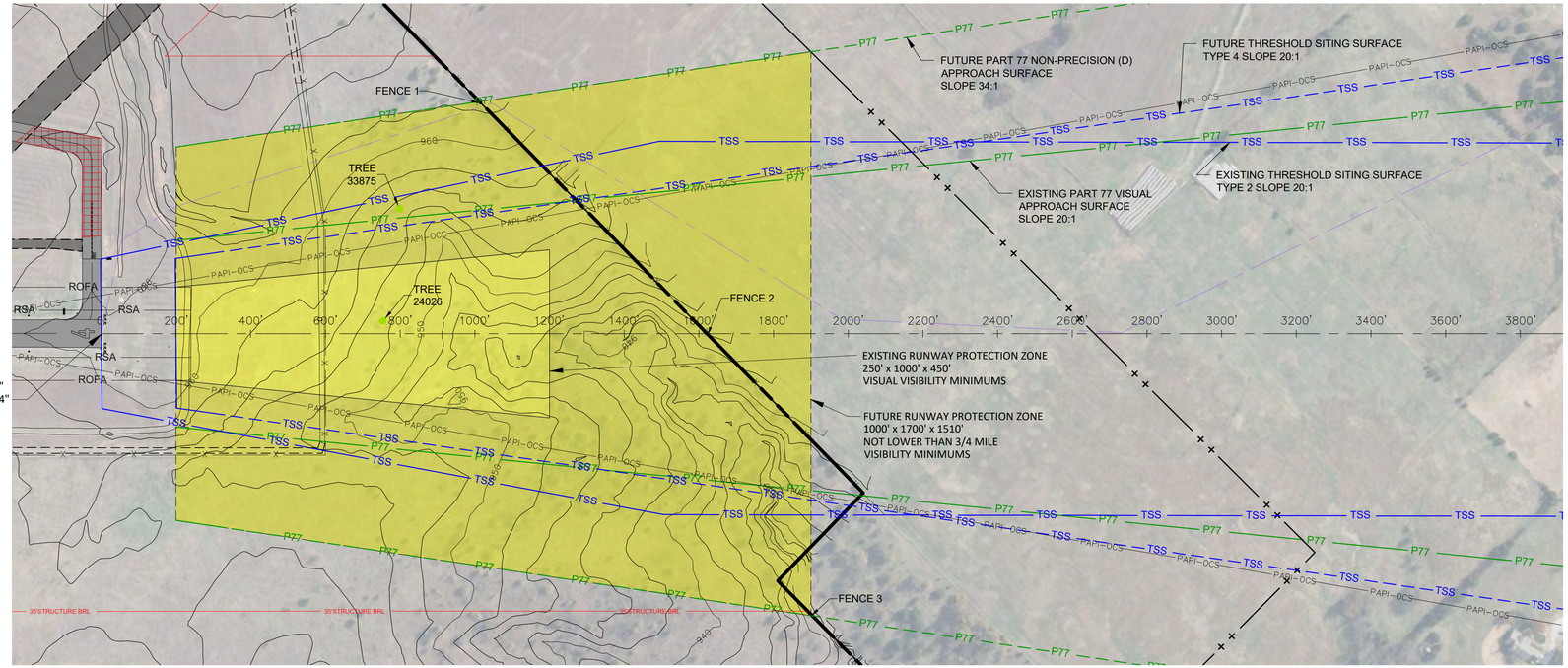
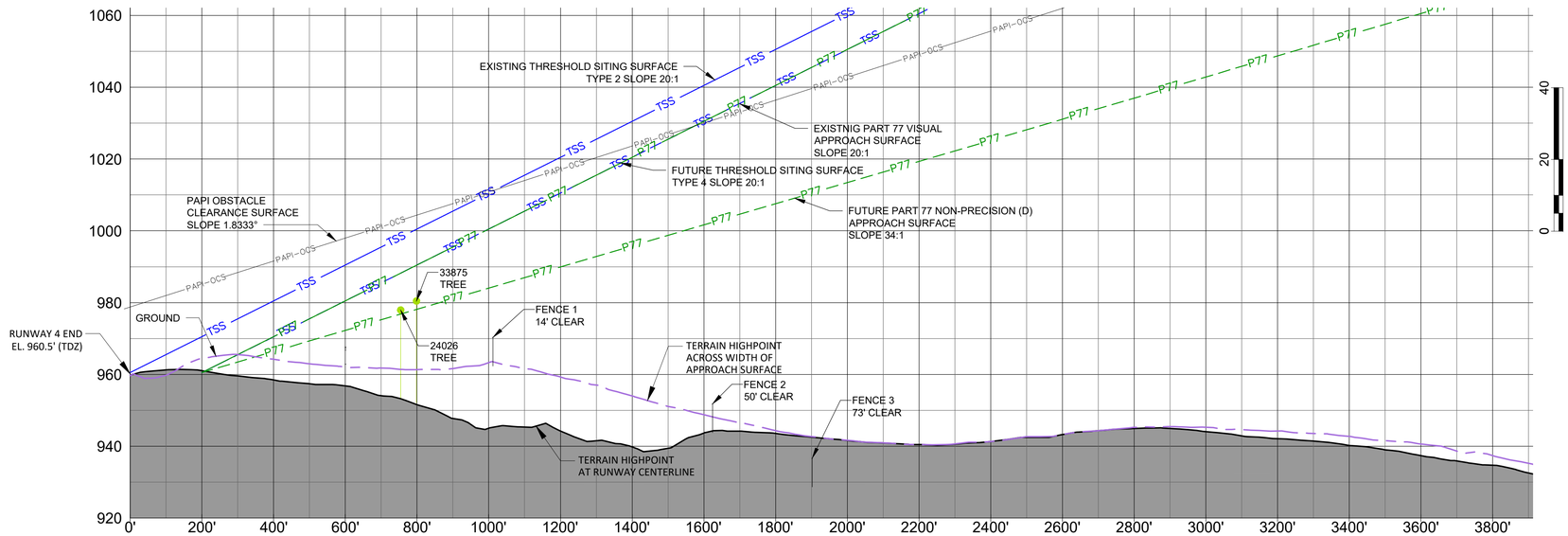


2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400



PART 77 OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
24026	TREE	977.9	1	PART 77 APPROACH	REMOVE
33875	TREE	980.4	1	PART 77 APPROACH	REMOVE
GROUND	TERRAIN	965.0	4.5	FUTURE PART 77 APPROACH	GRADE

PAPI OBSTACLE CLEARANCE SURFACE

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

THRESHOLD SITING OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	x	xx
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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SHEET CONTENTS
RUNWAY 4 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.
12

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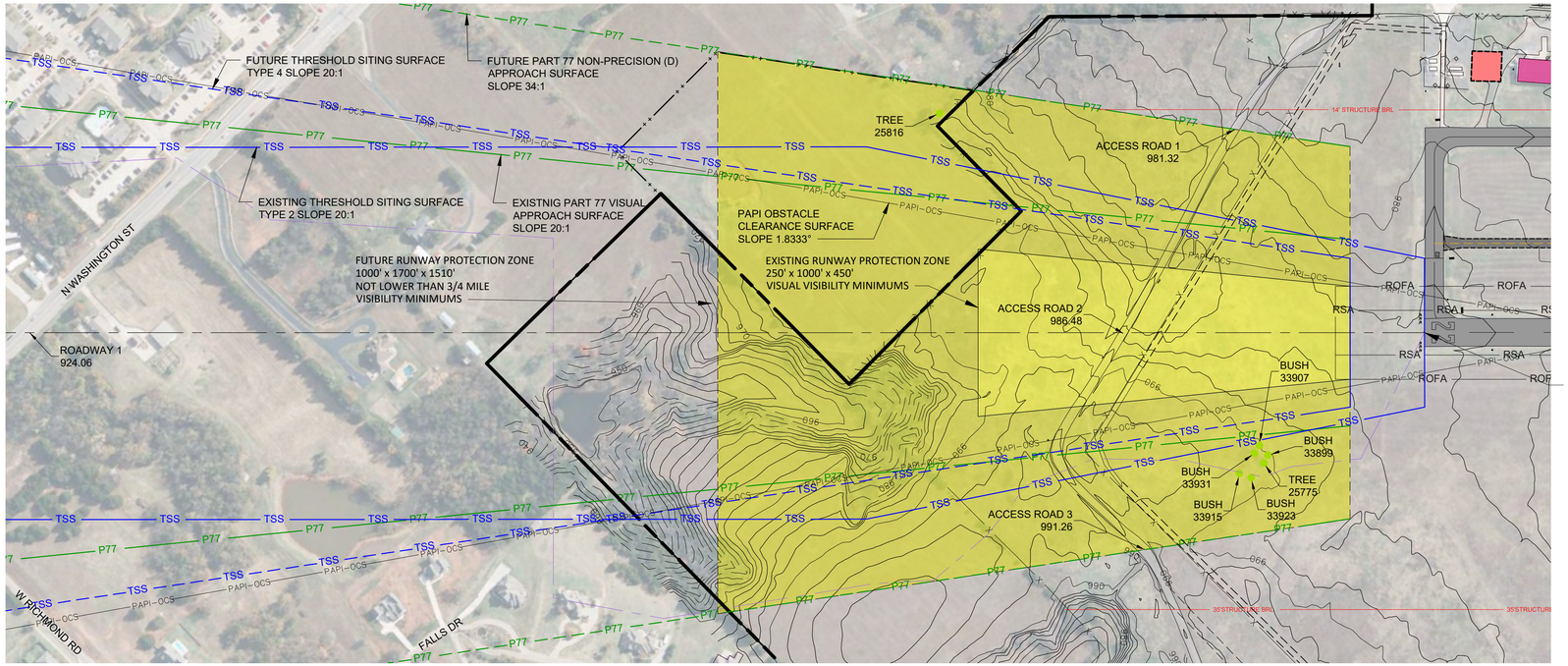

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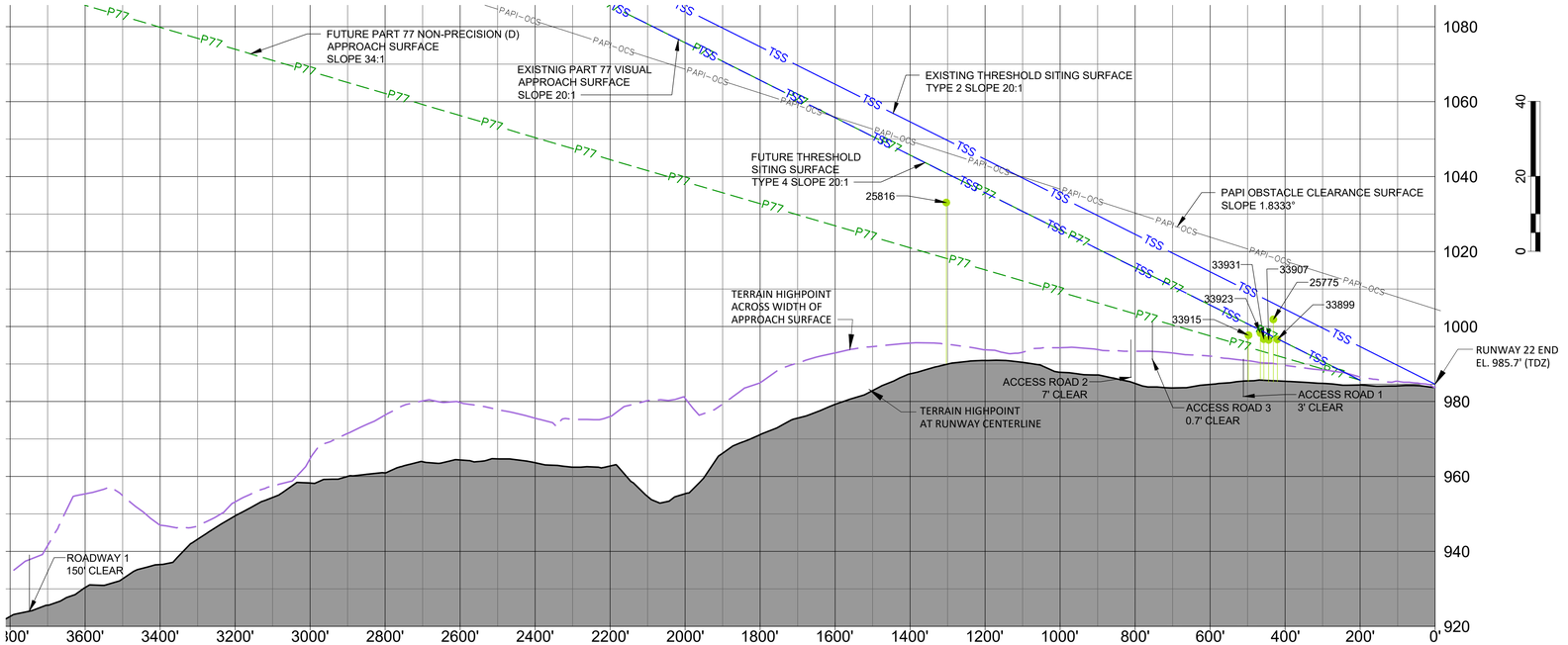

THRESHOLD SITING OBSTRUCTIONS

OBS#	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PAPI OBSTACLE CLEARANCE SURFACE

OBS#	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PART 77 OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
25775	TREE	1001.9	10	960.2	FUTURE PART 77 APPROACH	REMOVE
25816	TREE	1033.1	16	960.2	FUTURE PART 77 APPROACH	REMOVE
33899	BUSH	996.6	5	957.0	FUTURE PART 77 APPROACH	REMOVE
33907	BUSH	996.4	1	988.5	FUTURE PART 77 APPROACH	REMOVE
33915	BUSH	997.7	4	988.5	FUTURE PART 77 APPROACH	REMOVE
33923	BUSH	998.2	6	988.5	FUTURE PART 77 APPROACH	REMOVE
33931	BUSH	996.6	4	988.5	FUTURE PART 77 APPROACH	REMOVE

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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AIRPORT LAYOUT PLAN

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STILLWATER, OK 74075

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SHEET CONTENTS
RUNWAY 22 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.
13

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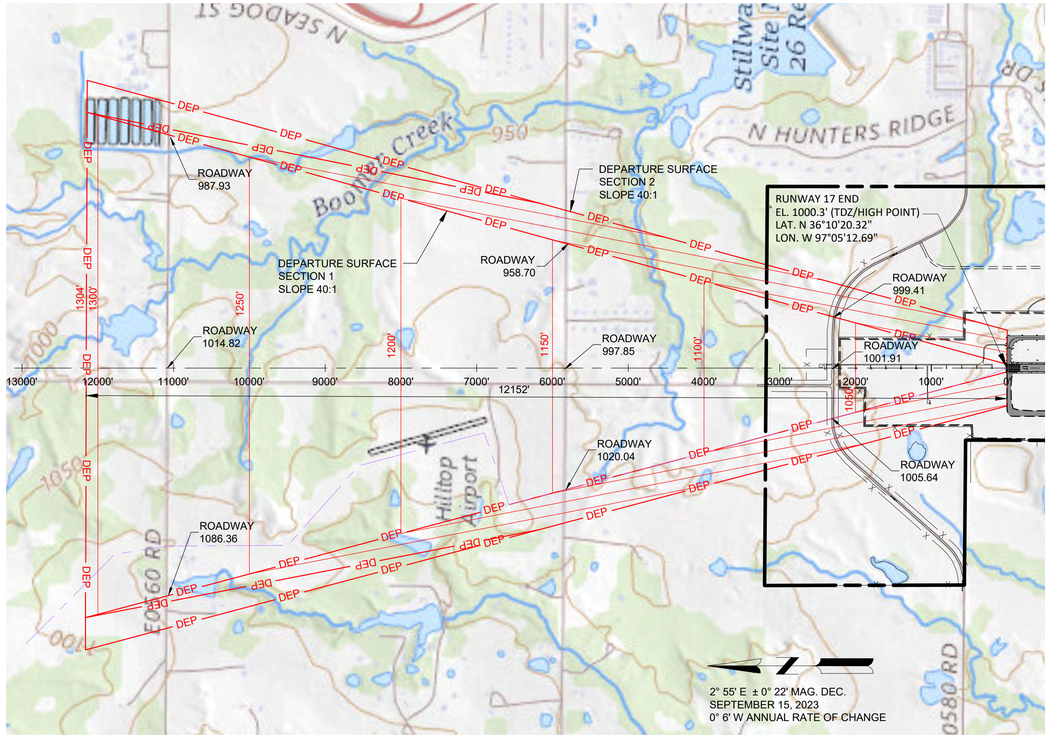

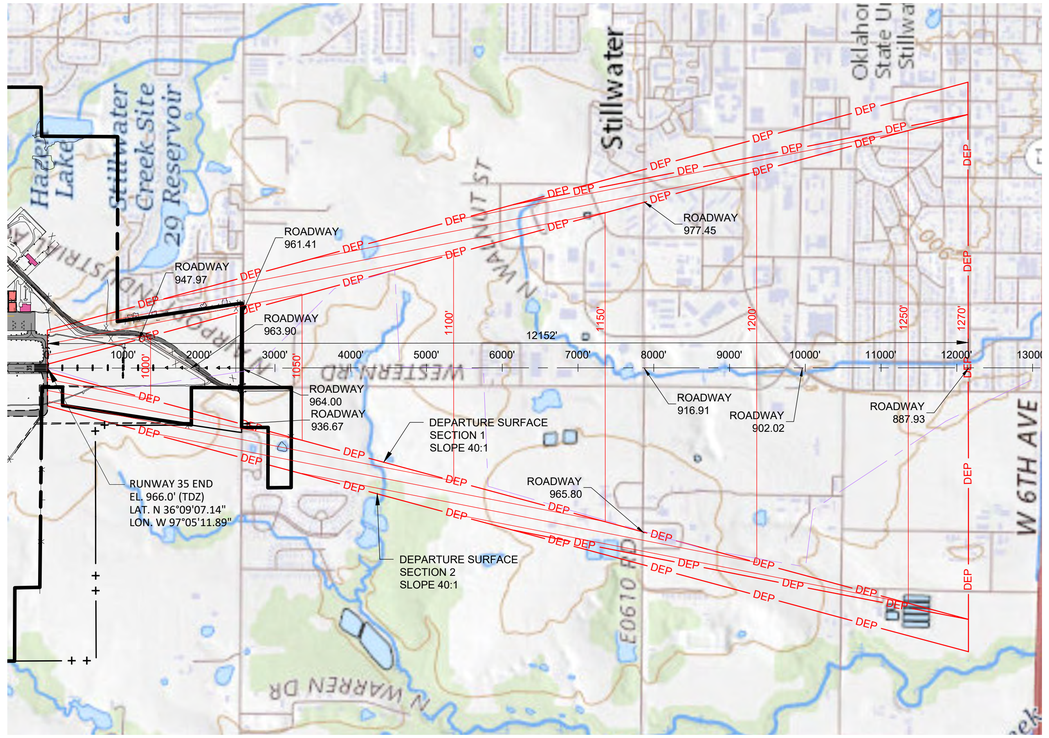

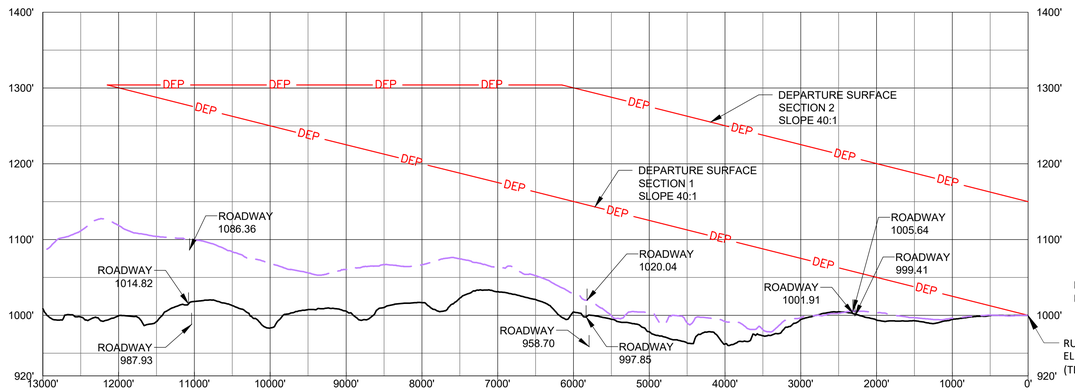

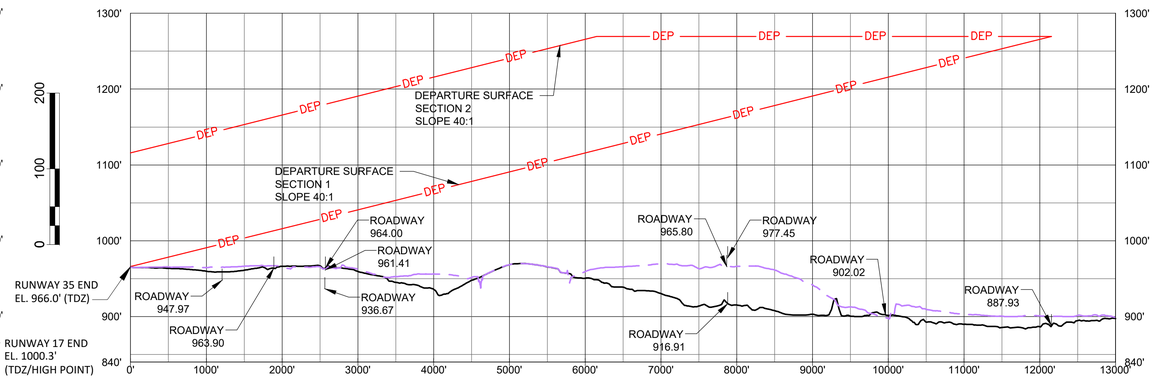

DEPARTURE SURFACE OBSTRUCTIONS

NONE IDENTIFIED

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
DEPARTURE SURFACE	DEP	DEP
AIRPORT SECURITY FENCE (8 FT)	x	x x

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AIRPORT LAYOUT PLAN

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SHEET CONTENTS
RUNWAY 17-35 DEPARTURE SURFACE PLAN & PROFILE

SHEET NO.
14

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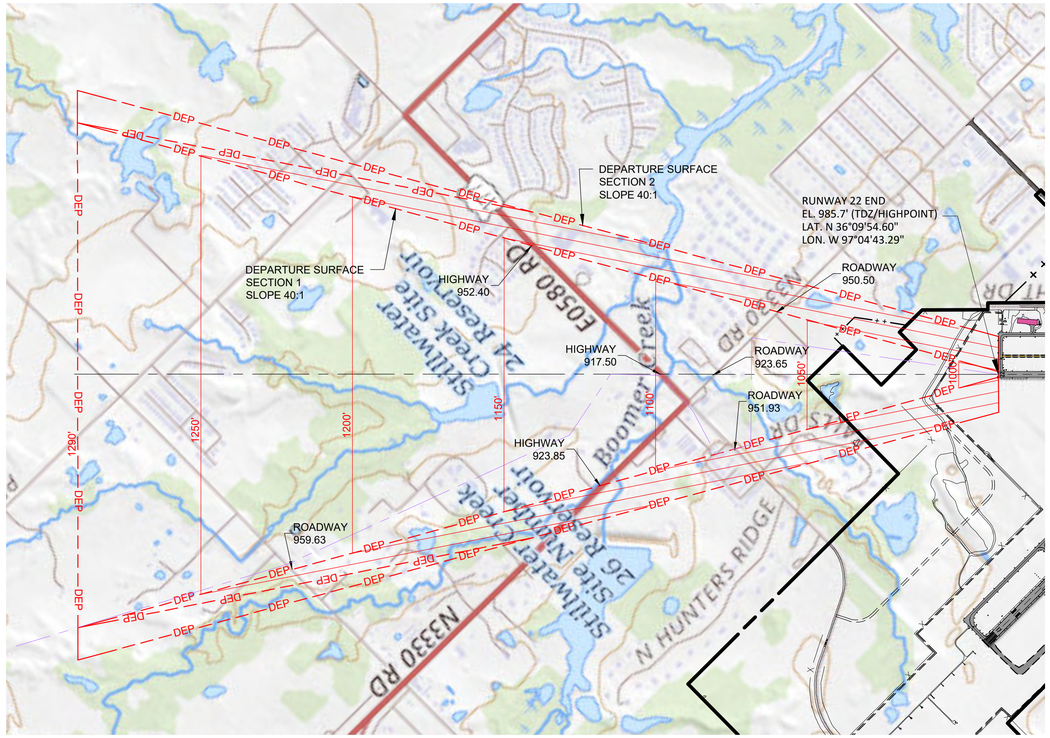

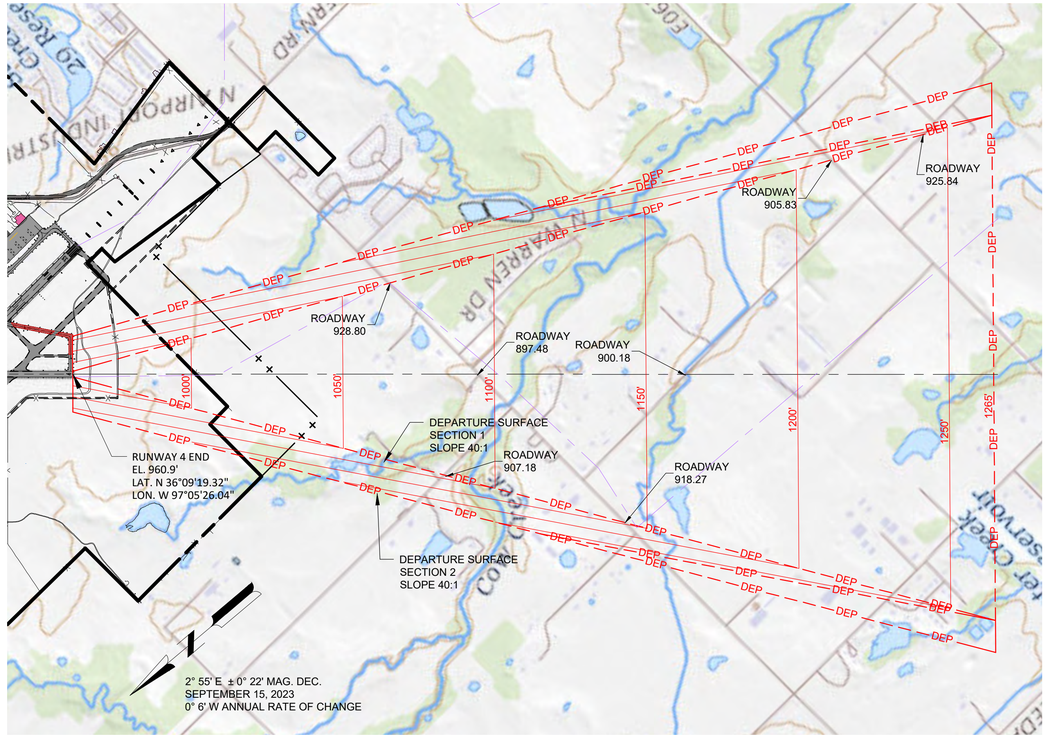

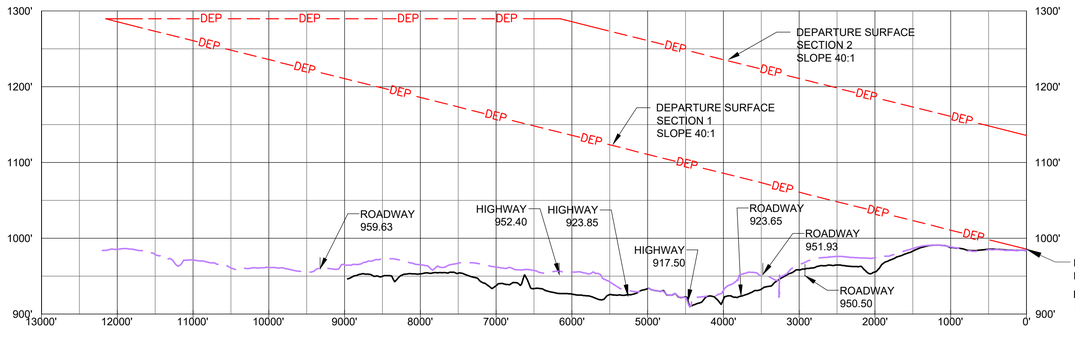

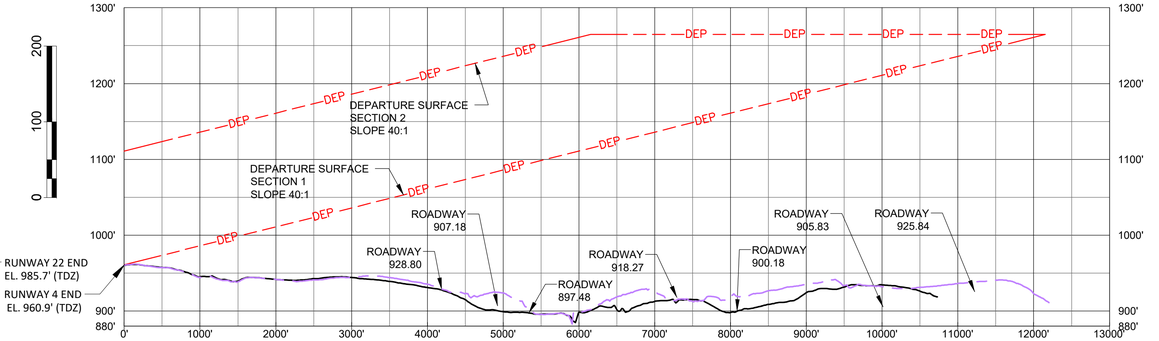

DEPARTURE SURFACE OBSTRUCTIONS

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AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
DEPARTURE SURFACE	DEP	DEP
AIRPORT SECURITY FENCE (8 FT)	x	x x

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RUNWAY 4-22 DEPARTURE SURFACE PLAN & PROFILE

SHEET NO.
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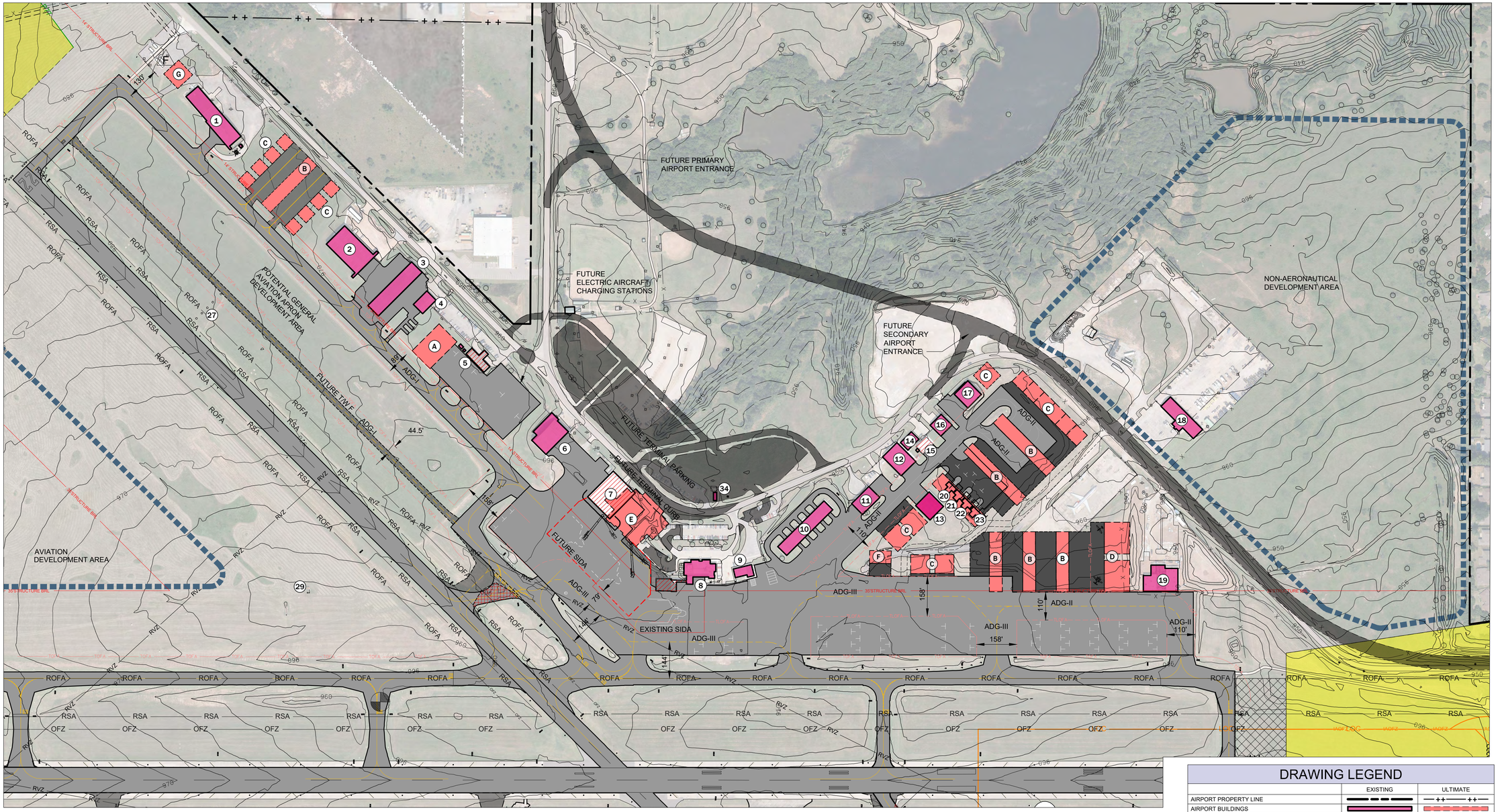

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
1	ROCK HANGAR	1006.2'	NO
2	OSU MAINTENANCE HANGAR	998.7'	NO
3	T-HANGAR 2	986.4'	NO
4	LBR, INC. OFFICE	984.0'	NO
5	OLD OSU FLIGHT CENTER	983.6'	NO
6	GROUP HANGAR 2	1002.7'	NO
7	GROUP HANGAR 1 (TO BE REMOVED)	986.6'	NO
8	CURRENT TERMINAL/ATCT	980.4' / 1016.2'	NO
9	ARFF	974.0'	NO
10	T-HANGAR 1	967.0'	NO
11	COWBOY HANGAR	972.0'	NO
12	AIRPORT OPERATIONS & MAINTENANCE	977.3'	NO
13	HANGAR 10	978.6'	NO
14	ADMINISTRATION BUILDING	972.0'	NO
15	AIRCRAFT WASH BAY	975.1'	NO
16	WAITS HOLDING HANGAR	976.7'	NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
17	DETWILER HANGAR	980.5'	NO
18	WASTE MANAGEMENT BLDG. AND FACILITY	983.2'	NO
19	NEW OSU FLIGHT CENTER	991.4'	NO
20	PORT-A-PORT HANGAR	968.0'	NO
21	PORT-A-PORT HANGAR	968.1'	NO
22	PORT-A-PORT HANGAR	969.1'	NO
23	PORT-A-PORT HANGAR	969.1'	NO
24	LOCALIZER EQUIPMENT BLDG.	965.0'	NO
25	PAPI RW 35	961.6'	NO
26	PAPI RW 17	991.9'	NO
27	PAPI RW 22	977.5'	NO
28	PAPI RW 4	956.9'	NO
29	WINDCONE	983.9'	NO
30	MALSR EQUIPMENT BLDG.	1006.5'	NO
31	ASOS	968.0'	NO
32	LOCALIZER ANTENNA	967.8'	NO
33	GLIDE SLOPE EQUIPMENT BLDG.	994.0'	NO
34	AIRPORT BEACON	1009.2'	NO
35	WINDCONE	985.0'	NO
36	WINDCONE		NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
A	GROUP HANGAR 1		
B	FUTURE T-HANGAR		
C	FUTURE HANGAR		
D	FUTURE MAINTENANCE HANGAR		
E	FUTURE PASSENGER TERMINAL		
F	FUTURE ARFF/SRE MAINTENANCE BUILDING		
G	FUTURE OFF-SEASON STORAGE FACILITY		

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		
LAND USE DEVELOPMENT AREA		
SECURITY IDENTIFICATION DISPLAY AREA (SIDA)		

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TERMINAL AREA PLAN

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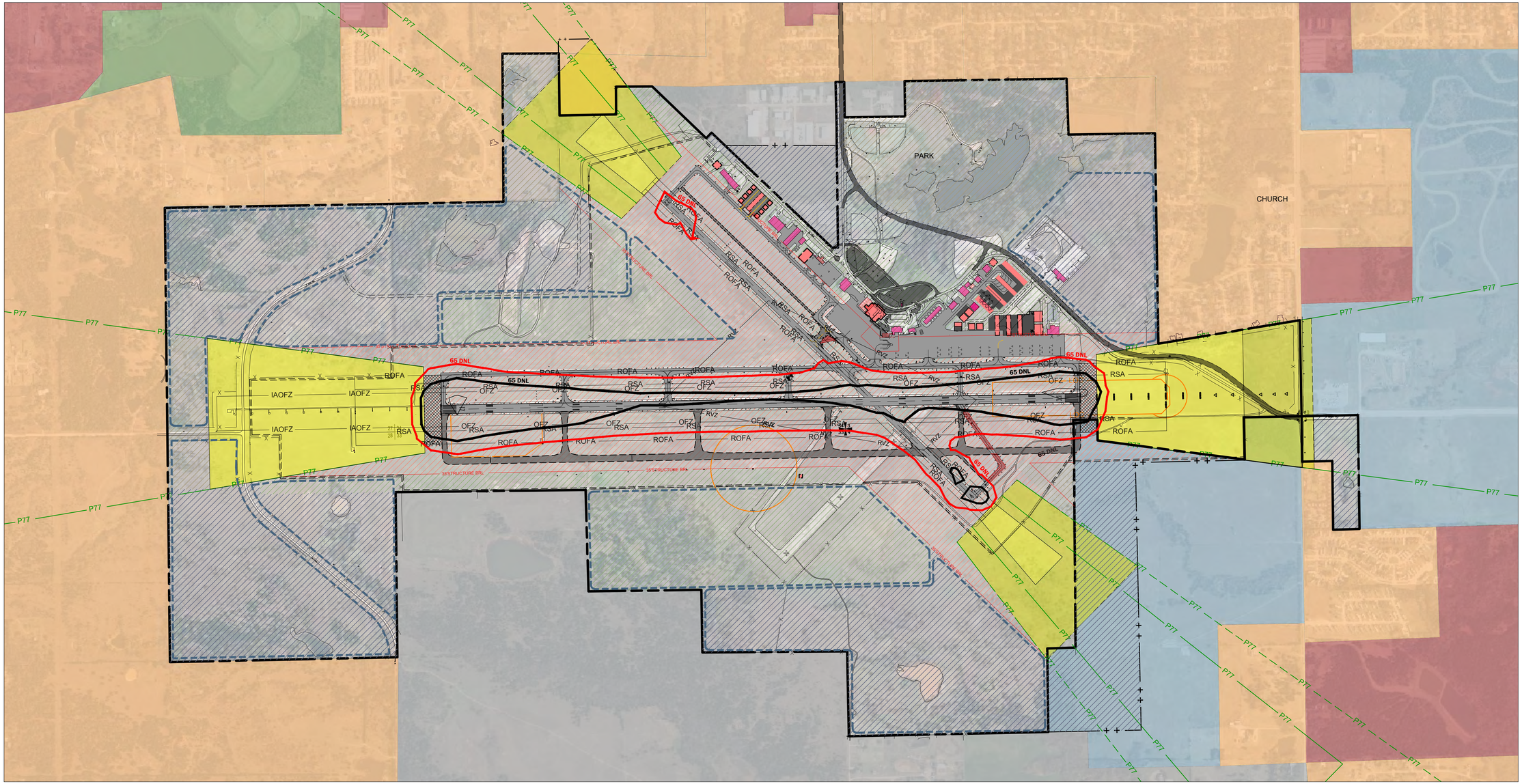

ON AIRPORT LAND USE	OFF AIRPORT LAND USE
Aircraft Operations Protected Area	Residential
Aviation Development	Commercial
Open Space	Public/University
Non-Aviation Development	Parks/Open Space
Runway Protection Zone	Industrial

65 DNL NOISE CONTOURS

Existing

Future

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 600 1200

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3. STILLWATER CITY CODE CHAPTER 23, ARTICLE XX.-AIRPORT HAZARD REGULATIONS, RESTRICTS AND REGULATES THE ERECTION OF ANY STRUCTURE OR TREE AND THE USE OF LAND LYING BENEATH THE DESIGNATED SURFACES APPLICABLE TO THE STILLWATER REGIONAL AIRPORT EXCEPT AS PERMITTED BY THE BUILDING OFFICIAL FOR THE CITY.

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
AIRPORT REFERENCE POINT (ARP)		

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AIRPORT LAND USE PLAN

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EASEMENTS GRANTED

TRACT NO.	GRANTOR	GRANTEE	TYPE OF INTEREST	ACRES	DATE	CONVEYANCE INSTRUMENT	LIBER/BOOK & PAGE
UE1	STILLWATER AIRPORT AUTHORITY BOARD	CITY OF STILLWATER	EASEMENT	2.34	12/16/1993	GENERAL UTILITY EASEMENT	1035 @ 896-898
UE2	STILLWATER AIRPORT AUTHORITY BOARD	CITY OF STILLWATER	EASEMENT		11/30/1998	GENERAL UTILITY EASEMENT	1216 @ 670-671
UE3	CITY OF STILLWATER	CITY OF STILLWATER	RIGHT OF WAY	0.98	1/3/2005	DEDICATION DEED	1546 @ 149-150
UE4	CITY OF STILLWATER	CITY OF STILLWATER	EASEMENT	0.06	3/12/2010	GENERAL UTILITY EASEMENT	1881 @ 104
UE5	CITY OF STILLWATER	CITY OF STILLWATER	RIGHT OF WAY	0.23	11/4/2024	DEED OF DEDICATION - PERMANENT RIGHT OF WAY	---

RELEASED AIRPORT PROPERTY DATA

TRACT NO.	ACRES	TYPE OF INTEREST	GRANTOR	GRANTEE	LIBER/BOOK & PAGE	DATE
15	6.6	WARRANTY DEED	CITY OF STILLWATER	STATE OF OKLAHOMA	400 @ 25-27	8/21/1978

AIRPORT PROPERTY TO BE ACQUIRED DATA

TRACT NO.	INTEREST	ACRES	PURPOSE
A	FEE	12.50	APPROACH PROTECTION
B	FEE	60.30	APPROACH PROTECTION
C	FEE	18.00	APPROACH PROTECTION
D	EASEMENT	4.60	APPROACH PROTECTION
E	FEE	18.50	NON-AERONAUTICAL DEVELOPMENT

EXISTING AIRPORT PROPERTY DATA

TRACT NO.	GRANTOR	TYPE OF INTEREST	ACRES	DATE	CONVEYANCE INSTRUMENT	LIBER/BOOK & PAGE	PURPOSE FOR ACQUISITION	FAA PARTICIPATION
1	---	FEE	955.00	---	---	---	---	---
1a	COMMISSIONERS OF THE LAND OFFICE OF THE STATE OF OKLAHOMA	FEE	57.36	7/3/1943	PATENT	75M @ 123	AERONAUTICAL	NONE
1b	NANETAH OERKE, ET AL	FEE	126.90	8/13/1943	REPORT OF COMMISSIONERS	76M @ 108	AERONAUTICAL	NONE
1c	A.J. THOMAS, ET AL	FEE	15.10	8/13/1943	REPORT OF COMMISSIONERS	76M @ 110	AERONAUTICAL	NONE
1d	A.J. THOMAS	FEE	105.50	8/13/1943	REPORT OF COMMISSIONERS	76M @ 106	AERONAUTICAL	NONE
1e	OKLAHOMA STATE UNIVERSITY	FEE	281.03	9/24/1984	GENERAL WARRANTY DEED	660 @ 758-760	AERONAUTICAL	NONE
1f	SARAH M. CURRY, ET AL	FEE	60.00	8/13/1943	REPORT OF COMMISSIONERS	76M @120	AERONAUTICAL	NONE
1g	OKLAHOMA STATE UNIVERSITY	FEE	4.56	3/18/1988	GENERAL WARRANTY DEED	873 @ 600-601	AERONAUTICAL	NONE
1h	OKLAHOMA STATE UNIVERSITY	FEE	0.73	---	---	---	AERONAUTICAL	NONE
1i	OKLAHOMA STATE UNIVERSITY	FEE	0.70	9/21/1984	QUIT CLAIM DEED	660 @757	AERONAUTICAL	NONE
1j	OKLAHOMA STATE UNIVERSITY	FEE	1.44	3/18/1988	GENERAL WARRANTY DEED	873 @ 600-601	AERONAUTICAL	NONE
2	SOUTHWEST TITLE & TRUST CO. INC.	FEE	38.00	5/12/1967	WARRNATY DEED	196 @ 300	APPROACH PROTECTION	FAA #9-34-050-C6C3
3a			26.80		---	---	AERONAUTICAL	ADAP #8-40-0090-02
3b			8.40	---	---	---	AERONAUTICAL	NONE
4	AURVIL J. JR. & VICTORIA M. KETCH, JOSEPH L. & PAMELA HANEY	FEE	79.60	8/23/2000	WARRANTY DEED	1269 @ 119	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	NONE
5	SHIRLEY ANN SWIM, EMMA ADELE BENNETT, LEVA FAIRWEATHER, MELVIN I. THOMASON	FEE	22.09	1/8/1999	JOURNAL ENTRY	1200 @ 41-42	APPROACH PROTECTION	NONE
6	JAMES B. & JACQUELINE M. CUMMINS	FEE	9.90	1/6/1992	WARRANTY DEED	969 @ 705	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	NONE
7	GERTRUDE MAE CONDREAY, CLARA LUELLA SNEARY, BONITA . STADLER	FEE	10.82	5/9/2001	REPORT OF COMMISSIONERS	1200 @ 499-501	APPROACH PROTECTION	NONE
8	---	FEE	9.20	---	---	---	---	ADAP #5-40-0090-05/06-07
9	---	FEE	4.20	---	---	---	---	ADAP #5-40-0090-05/06-07
10	STILLWATER INDUSTRIAL FOUNDATION	FEE	3.12	1/23/1973	WARRANTY DEED	220DR @ 74	NON-AERONAUTICAL DEVELOPMENT	NONE
11	OKLAHOMA STATE UNIVERSITY	FEE	14.30	9/3/2002	DEDICATION DEED	1374 @ 172	APPROACH PROTECTION	AIP 3-40-0090-012-2002
12	GLENN P. & LANELDA J. MCDANIEL	FEE	127.20	3/23/2000	WARRANTY DEED	1249 @ 929	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	AIP 3-40-0090-013-2003
13a	ARLIE MELVIN & BARBARA THOMASON, EARL THOMASON	FEE	38.10	8/20/2003	WARRANTY DEED	1235 @ 268-269	APPROACH PROTECTION	AIP 3-40-0090-013-2003
13b	ARLIE MELVIN & BARBARA THOMASON, EARL THOMASON	FEE	110.50	8/20/2003	WARRANTY DEED	1235 @ 268-269	NON-AERONAUTICAL DEVELOPMENT	AIP 3-40-0090-014-2003
14	ANN COCHRAN ENIX	FEE	26.00	12/31/2019	WARRANTY DEED	2544 @ 590-591	APPROACH PROTECTION	NONE
16	STILLWATER INDUSTRIAL FOUNDATION	ASSIGNMENT	0.76	2/21/1995	DEDICATION DEED	1065 @ 528-529	NON-AERONAUTICAL	NONE
17	JON AND DANA VAUGHT	FEE	0.61	10/27/2023	WARRANTY DEED	2788 @ 448-492	NON-AERONAUTICAL	NONE
18	STATE OF OKLAHOMA	FEE	0.05	1/8/2025	DEED OF DEDICATION - PERMANENT RIGHT OF WAY	---	NON-AERONAUTICAL	NONE
19	---	ANNEXATION	3.10	3/29/1961	ORDINANCE	145M @ 321-323	NON-AERONAUTICAL	NONE
e1	---	EASEMENT	0.70	---	---	---	---	ADAP #5-40-0090-05/06-07
e2	CITY OF STILLWATER	EASEMENT	10.00	1/5/2004	AVIGATION EASEMENT	1475 @ 646	APPROACH PROTECTION	NONE
	NOTES: --- INFORMATION NOT AVAILABLE							

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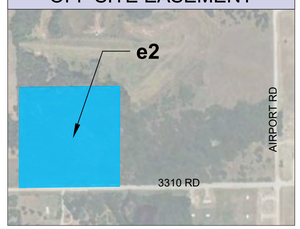

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BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	X X
AIRPORT REFERENCE POINT (ARP)		
EASEMENTS		

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SHEET CONTENTS
AIRPORT PROPERTY MAP

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Stillwater
REGIONAL AIRPORT

MASTER PLAN

SWO

Stillwater REGIONAL AIRPORT

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MASTER PLAN

FINAL REPORT – MAY 2025

THE Mead & Hunt TEAM

110 South Hartford, Suite 1010
Tulsa, OK 74120
918-585-8844
www.meadhunt.com

Mead & Hunt
Tulsa, OK

McFarland Architects
Tulsa, OK

Olsson Engineering
Oklahoma City, OK

Leibowitz & Horton AMC
Greenwood Village, CO

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Executive Summary

INTRODUCTION

Stillwater Regional Airport (SWO or the Airport) was originally constructed in 1929 when the City of Stillwater acquired 239 acres of land north of town and provided the first runway consisting of a half-mile long grass strip. The U.S. Navy leased the Airport in 1942 and continued operations until six months following the end of World War II. The City of Stillwater resumed control and operation in 1980 and continues operating the Airport today as a commercial service airport while serving a large General Aviation (GA) user base. Oklahoma State University (OSU) is the largest user of SWO, operating a flight training program at the OSU Flight Center.

SWO encompasses approximately 1,484 acres and consists of two runways, numerous taxiways, a passenger terminal building, a commercial apron, a general aviation (GA) apron, and various hangars and buildings. Runway 17/35, the primary runway is 7,401 feet in length and 100 feet in width. Runway 4/22, the crosswind runway is 5,002 feet in length and 75 feet in width. Taxiway A is the parallel taxiway serving Runway 17/35. Taxiway F is the partial parallel taxiway serving the northeast end of Runway 4/22; Taxiway B is the partial parallel taxiway serving the southwest end of Runway 4/22. The Airport is located within the City of Stillwater's city limits, approximately three miles northwest of the central business district, within Payne County, in the north-central portion of Oklahoma. The Airport is approximately 60 miles north of Oklahoma City and 60 miles west of Tulsa.

This Master Plan Study (Study) assists in documenting the current state of aviation industry at SWO, and ultimately supports the modernization and improvement of Airport facilities. The findings can serve as the strategic guide for overall economic development opportunities and sustainability recommendations, as well as provide data and support for continued development of existing and future commercial air service.

OUTREACH AND COMMUNICATIONS PLAN

The Master Plan includes an Outreach and Communications Plan that defines the proposed communication and community engagement process for the project including overall goals, key community audiences, information needs and messages, and proposed community engagement activities.

Throughout the Study, SWO and the project team form several goals. These goals include:

- Establish a process to inform stakeholders and the broader community about the master planning process in a collaborative setting.
- Support Airport Staff and the Mead & Hunt Team in developing the Master Plan.
- Consult with those most affected by SWO operations and development to foster collaboration.
- Collaborate with the Study Committee (SC) to identify recommendations for incorporation into the Master Plan, to the extent possible.

- Build community and stakeholder awareness and understanding of the Master Plan process, establishing realistic expectations for what will be considered and accomplished.
- Inform the public on how they can be involved and how their input will be considered.
- Collect substantive and meaningful public input at appropriate milestones.
- Conduct a public engagement process that is efficient, effective, and results in informed and engaged stakeholders and community members.

AVIATION ACTIVITY FORECASTS

To provide a defined rationale for necessary improvements needed at SWO as demand increases, aviation activity forecasts were developed using approaches outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. The aviation activity forecasts were developed for the 20-year planning period based on historic activity, industry trends, local socioeconomic data, anticipated growth rates, uncertainties surrounding the recovery of the COVID-19 pandemic, and changes that had occurred at SWO since the completion of previous planning studies.

Following the post COVID-19 pandemic recovery, SWO is on pace to exceed the 20-year enplanements forecast by 2026.

Following the completion, review, and FAA approval of SWO's forecasts in March 2022, which is contained in **Chapter B – Forecasts of Aviation Activity**, SWO rebounded from the COVID-19 pandemic much faster than the Study's forecasts anticipated. Passenger enplanements for Fiscal Year 2023 indicate SWO enplaned 34,398 passengers. This exceeds the 31,830 enplanements the Study forecast to occur in 2030. Recent monthly trends indicate annual enplanements could approach 36,000 for 2024, which nearly surpass the forecasted 36,150 in 2035. Thus, SWO is on pace to exceed the Study's 20-year enplanements forecasts by 2026; an excellent achievement given the uncertainties surrounding the post pandemic planning assumptions. **Table 1** presents the updated historical passenger enplanements from 2009 through 2023.

Table 1: Passenger Enplanements, 2009-2023

Fiscal Year	Air Carrier	Air Taxi/Commuter	Total	Percent Change
2009	2,028	214	2,242	N/A
2010	1,718	288	2,006	-10.5%
2011	1,304	141	1,445	-28.0%
2012	2,115	79	2,194	51.8%
2013	1,888	0	1,888	-13.9%
2014	1,588	32	1,620	-14.2%
2015	1,642	0	1,642	1.4%
2016	1,386	2,131	3,517	114.2%
2017	1,929	25,825	27,754	689.1%
2018	1,629	24,689	26,318	-5.2%
2019	1,441	27,523	28,964	10.1%
2020	1,308	16,102	17,410	-39.9%
2021	990	15,467	16,457	-5.5%
2022	2,010	25,110	27,120	64.8%
2023	2,461	31,937	34,398	26.8%
CAGR (2017-2023)	**4.1%**	**3.6%**	**3.6%**	**N/A**

Sources: [1] FAA TAF, 2024.

Over the next 20 years, the types of aircraft projected to operate at SWO generally remain the same as those presently operating at the Airport, including small single engine piston aircraft, business jet aircraft, and regional jet commercial passenger service aircraft. However, as with the passenger enplanements, after the completion, review, and FAA approval of SWO's forecasts, Envoy/SkyWest Airlines accelerated the retirement of the 50-seat ERJ 145 from their fleet, which are now completely removed from regional service. These were replaced by the 65-seat Bombardier CRJ 700 in November 2022, which reclassified the flights from air taxi to air carrier. This aircraft up-gauge required SWO to transition from a partial security program to a complete security program. In February 2024, Envoy/SkyWest Airlines temporarily up-gauged to the 65-seat ERJ 170, with some 76-seat ERJ 175 aircraft being used periodically. SWO assisted this change by purchasing a larger passenger boarding bridge supporting the larger aircraft. This transition was anticipated and accounted for in the Study forecasts. Thus, the CRJ 700 is the existing (i.e., 2022 to 2024) critical aircraft and the Embraer ERJ 175 is the future critical aircraft, as shown in **Figure 1**.

Figure 1: Existing and Future Runway 17/35 Critical Aircraft

Overall, total aircraft operations, passenger enplanements, and based aircraft at SWO are anticipated to increase over the course of the 20-year planning period. **Table 2** is a summary of the Study's aviation activity forecast to occur at SWO, which as noted above, passenger enplanements have rebounded much quicker than provided in the table.

Table 2: Summary of Aviation Activity Forecasts, 2020-2040

Activity	2020	2025[5]	2030[5]	2035[5]	2040[5]
Enplanements					
Total	**17,410[1]**	**28,000**	**31,830**	**36,150**	**41,060**
Operations					
Commercial Service	***1,920***	***2,284***	***2,284***	***2,180***	***2,284***
Air Carrier	30[1]	348	1,180	1,284	1,492
Narrow Body Jets	*30[2]*	*348*	*1,180*	*1,284*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,000	792	792
Regional Jets	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
GA Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	***57,512[1]***	***71,870***	***79,750***	***85,820***	***91,560***
Itinerant	25,654[1]	31,260	34,760	38,640	42,140
Local	31,858[1]	40,610	44,990	47,180	49,420
Military	***3,211[1]***	***3,200***	***3,200***	***3,200***	***3,200***
Itinerant	1,314[1]	1,310	1,310	1,310	1,310
Local	1,897[1]	1,890	1,890	1,890	1,890
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**
Based Aircraft					
Total	**80[4]**	**87**	**91**	**96**	**101**
Critical Aircraft					
Runway 17/35	ERJ 145	ERJ 145	ERJ 175	ERJ 175	ERJ 175
Runway 4/22	Cessna 172	Cessna 172	Cessna 172	Cessna 172	Cessna 172

Sources: [1] FAA TAF, 2021.
[2] TFMSC Direct – Operations obtained directly from TFMSC data.
[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.
[4] SWO staff.
[5] Mead & Hunt projections.

FACILITY REQUIREMENTS

Facility requirements examine the landside and airside facilities necessary to meet aviation demand. These estimates are based upon an airport's aviation activity forecasts, but they are also determined via the FAA's design standards. These two elements account for the efficiency and utility of an airport, as well as the efficiency of the airfield environment. Some major airside development considerations at SWO include:

- Implementation of a Global Positioning System (GPS) based Instrument Approach Procedure (IAO) providing visibility minimums of 1/2 mile to Runway 35.
- Implementation of Non-Precsion Approach (NPA) IAPs to Runways 4 and 22.
- Remediation of FAA taxiway design standard deficiencies associated with Taxiways B, F, and F1.

Major landside development considerations at SWO include:

- Design and construct new terminal building with vehicle access and parking that accommodates anticipated passenger demand.
- Construct Airport Traffic Control Tower (ATCT) building in a new, physically separated location from the terminal building.
- Reserve space for future terminal support development.
- Provide a new Aircraft Rescue and Fire Fighting (ARFF) building.
- Provide a new Snow Removal Equipment (SRE) and Airport Maintenance Facility.
- Reserve space for large scale aeronautical and non-aeronautical facilities.
- Construct perimeter road within perimeter fence for security inspections.
- Install comprehensive security system hardware and software updates to monitor and control access to Security Identification Display Area (SIDA) and Air Operations Area (AOA).

ALTERNATIVES AND DEVELOPMENT PLAN

To accommodate the forecasted growth and needed facilities at SWO, a set of alternatives was developed. The alternatives analysis was preceded by several goals intended to guide the Master Plan and inform future development. These goals include:

- Provide effective direction for future development through the preparation of a rational plan and adherence to the adopted development program.
- Plan and develop SWO to be capable of accommodating the future needs of the City of Stillwater, Payne County, and the surrounding area.
- Program the construction of facilities when demand is realized (construction is to be demand driven, not forecast driven).
- Plan SWO to accommodate the aviation forecasts safely and efficiently with needed facilities. The primary potential facilities improvement under consideration include:
    - The terminal building.
    - A standalone Airport Traffic Control Tower (ATCT).
    - Improved landside vehicle roadway access and parking facilities.
    - An ARFF Facility and a SRE and Airport Maintenance Facility.
    - Aircraft storage hangars and aprons.
    - Terminal landside development.
- Enhance the self-sustaining capability of SWO and the financial feasibility of future development.
- Integrate the needs of existing tenants with future development plans, recognizing and accommodating the needs of general aviation including corporate and flight training.

- Plan and develop airport facilities to be environmentally compatible with their surroundings, minimizing the potential environmental impact to both on and off airport property.
- Encourage the protection of existing public and private investment in land and facilities, and advocate for the resolution of any potential land use conflicts.

Several alternatives addressing needed facilities were examined, including perhaps most notably the provision of a new passenger terminal building. Siting considerations and other long-term planning and space reservation factors that were considered in the passenger terminal building alternatives evaluation were:

- Accommodate a single-story building consisting of approximately 32,000 square feet.
- Accommodate a minimum of two airlines, including two gates/holdrooms and two parking positions for Boeing 737-800 aircraft.
- Allow for the development of vehicle parking accommodating the forecast passenger demand.
- Minimize the conflicts between commercial service and GA functions.
- Consider the impacts of the passenger terminal building improvements on existing buildings and infrastructure in the terminal area (e.g., continuation of existing commercial service operations during construction, Group Hangar 1, ARFF Facility, and Fixed Base Operator (FBO) facilities).
- Maximize use of the existing Terminal Ramp pavement, including consideration of providing Passenger Boarding Bridges (PBB) and ensuring the provision of commercial service aircraft parking positions and on-apron aircraft taxilanes.

Subsequent to the ATCT siting analysis contained in this Study, an FAA Tower Siting Study was conducted and a site nearly matching the parameters of Alternative Location One was evaluated and approved. Improvements to the SWO taxiway system, a taxiway re-naming study, FAA design standards, implementation of improved IAPs, and provision of additional OSU Flight Center facilities, GA hangars, large-scale aeronautical and non-aeronautical facilities were also addressed. This analysis result in the Conceptual Development Plan (CDP) presented in **Figure 2**.

IMPLEMENTATION

The Capital Improvement Plan (CIP) for airport development projects outlines the long-term development program for SWO and includes planning level cost estimates for each project. Airport improvement projects are addressed in the three phases to best incorporate funding mechanisms over time:

- **Phase I –** Short-Term (0-5 years)
- **Phase II –** Mid-Term (6-10 years)
- **Phase III –** Long-Term (11-20 years).

The primary objective of the Financial Implementation Analysis is to evaluate SWO's capability to implement, fund, and finance the CIP, airport operations, and maximize the potential to receive federal and state grant funds. The analysis includes development of a detailed Financial Implementation Plan that presents the

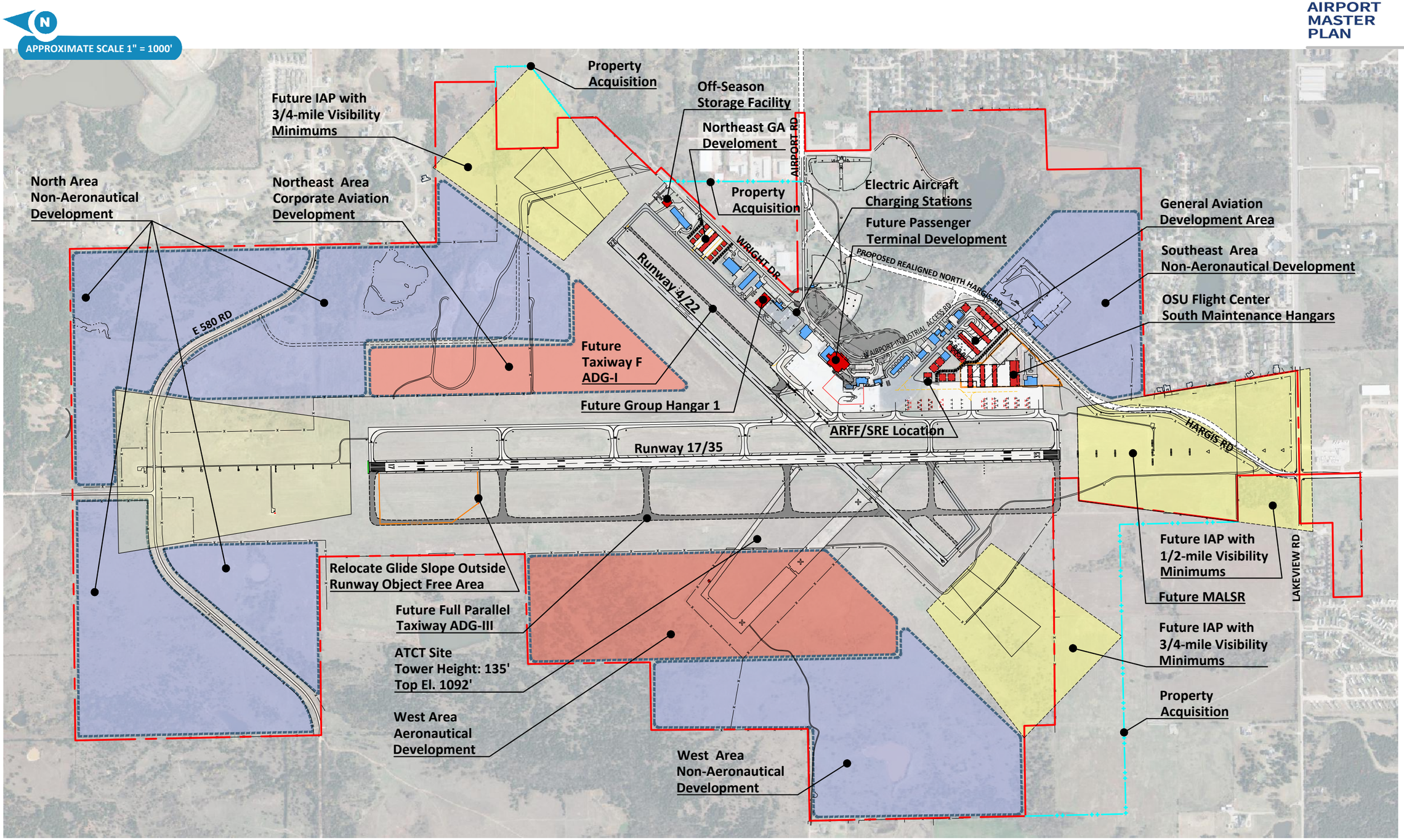


Figure 2:
Conceptual Development Plan

results of the implementation evaluation and provides practical guidelines for matching an appropriate amount and timing of financial sources with the planned use of funds.

Projects are placed in a specific phase based upon priority and available funding. Those projects with lower priorities are placed in later phases, but several projects can and will be phased over multiple years due to their funding needs or length to complete. **Tables 2**, **3**, and **4** provide the projects and costs in each phase of the development program.

Table 2: Phase I (1-5 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Year 1 (2023)		
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225
A.2	Design Terminal Building, Parking, and Utility Relocation	$1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	$100,000
A.4	Prepare ATCT EA	$200,000
A.5	Replace Two Primary Mower Apparatus	$30,000
2022	SRE Equipment – FY 22 Grant Carryover	$280,829
	Year 1 Totals	**$2,563,492**
Year 2 (2024)		
A.6	Construct New Group Hangar	$2,500,000
A.7	Design and Construct Terminal Building (Phase One), Including Demolition of Group Hangar #1	$19,000,000
A.8	Design and Construct Terminal Area Access Road and Parking Lots (Phase One)	$907,000
A.9	Crack Seal, and Re-Mark Taxiway A	$60,000
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	$200,000
	Year 2 Totals	**$22,667,000**
Year 3 (2025)		
A.11	Construct Terminal Building (Phase Two)	$1,500,000
A.12	Construct Terminal Area Access Road and Parking Lots (Phase Two)	$615,000
A.13	Construct One Corporate Hangar with Pavement	$2,213,000
	Year 3 Totals	**$4,328,000**
Year 4 (2026)		
A.14	Construct Terminal Building (Phase Three)	$1,400,000
A.15	Construct Terminal Area Access Road and Parking Lots (Phase Three)	$653,500
A.16	Replace Mower	$80,000
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35	$150,000
A.18	Construct Portions of Perimeter Road (Phase One)	$107,000
	Year4 Totals	**$2,390,500**
Year 5 (2027)		
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase One)	$10,888,889
A.20	Implement Airport Safety Management System (SMS)	$90,000
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	$5,349,000
A.22	Construct One 10-Unit T-hangar	$1,200,000
	Year 5 Totals	**$17,527889**
Subtotal Phase I		**$49,476,881**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Table 3: Phase II (6-10 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 6-10 (2028-2032)		
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase Two)	$1,000,000
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	$1,920,000
B.3	Demolish Existing ATCT	$40,000
B.4	Install Whole Airport Facility Back-Up Power Generator	$3,000,000
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and One 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	$1,178,000
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	$2,000,000
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	$7,576,000
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	$731,000
B.9	Install Comprehensive Airport Access Control System/Security Upgrades	$300,000
B.10	Construct Snow Removal Equipment (SRE) and Airport Maintenance Facility	$2,000,000
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	$1,200,000
B.12	Expand Terminal Parking Lots (Phase Two)	$317,000
B.13	Construct South GA Development Access Road	$611,000
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	$7,468,000
B.15	Runway and Taxiway Pavement Maintenance	$2,000,000
B.16	Construct One Corporate Hangar with Pavement	$2,213,000
B.17	Install Two Electric Aircraft Charging Stations	$416,000
B.18	Construct Two Box Hangars	$2,969,000
B.19	Construct Portions of Perimeter Road (Phase Two)	$446,000
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	$280,767
B.21	Rehabilitate Airport Drainage System	$500,000
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	$1,195,425
B.23	Acquire Airfield De-icing Vehicle	$500,000
Subtotal Phase II		**$39,861,192**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Table 4: Phase III (11-20 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 11-20 (2033-2042)		
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$800,000
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	$940,000
C.3	Relocate Taxiway F, Including CATEX or EA	$1,292,000
C.4	Expand Terminal Parking Lots (Phase Three)	$439,000
C.5	Runway and Taxiway Pavement Maintenance	$1,076,000
C.6	Construct One 10-Unit T-hangar with Pavement	$2,400,000
C.7	Construct Two Box Hangars	$2,969,000
C.8	Construct Two Corporate Hangars with Pavement	$4,406,000
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	$7,711,000
C.10	Construct Taxiway West of Runway 17/35, Including EA	$27,822,853
C.11	Runway and Taxiway Pavement Reconstruction	$20,000,000
C.12	Construct Portions of Perimeter Road (Phase Three)	$680,000
C.13	Update Airport Master Plan	$750,000
C.14	Purchase ARFF Vehicle	$1,000,000
Subtotal Phase III		**$72,285,853**
GRAND TOTAL		**$161,623,926**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

A. Inventory of Existing Conditions

INTRODUCTION

The purpose of this Master Plan Study (Study) is to formulate a long-term comprehensive development plan that meets the unique goals and objectives of Stillwater Regional Airport (SWO or the Airport). The Study will seek to address SWO's operational, maintenance, and improvement considerations, incorporate the City of Stillwater's priorities, enhance the natural environment, embrace land use compatibility considerations, improve SWO's fiscal viability, and comply with all relevant Federal Aviation Administration (FAA) requirements.

The foundation of any Study begins with a thorough review of an airport's pertinent background data, as well as a physical inventory of its airside, landside, and airspace components and facilities. Documenting SWO's existing conditions serves as the baseline for subsequent chapters of the Study. This chapter presents the five basic elements of SWO: airport facilities, the surrounding airspace system, the surrounding environs, the financial conditions, and a strategic evaluation.

Airport History

SWO was originally constructed in 1929 when the City of Stillwater acquired 239 acres of land north of town. The first runway was a half-mile grass strip and early airport facilities included a steel hangar and a wood-framed office. SWO formally opened on December 7, 1929. After many improvements, the U.S. Navy leased the Airport in 1942 and continued operation for an additional six months following the end of World War II.

In 1949, Oklahoma Agricultural and Mechanical College (forerunner of Oklahoma State University) took charge of the Airport, known as Searcy Field at the time, and operated the Airport for 25 years. Central Airlines offered the first commercial service in 1953, providing daily flights between Stillwater and Dallas. This service ceased in 1968 when Central merged with Frontier Airlines. Lone Star Airlines provided commercial service to Dallas, Memphis, and other cities beginning in 1984, but it ceased service in 1987.

The Airport was renamed Stillwater Municipal Airport in 1977 and the City of Stillwater resumed responsibility for operating the Airport in 1980. The Airport became known as Stillwater Regional Airport in 1999.

Airport Location and Vicinity

SWO is in the north-central portion of Oklahoma, approximately three miles northwest of the City of Stillwater within Payne County. Stillwater is approximately 50 miles north of Oklahoma City and 60 miles west of Tulsa. **Figure A-1** illustrates SWO's location within the state, and **Figure A-2** presents the location of SWO relative to the City of Stillwater and surrounding area.

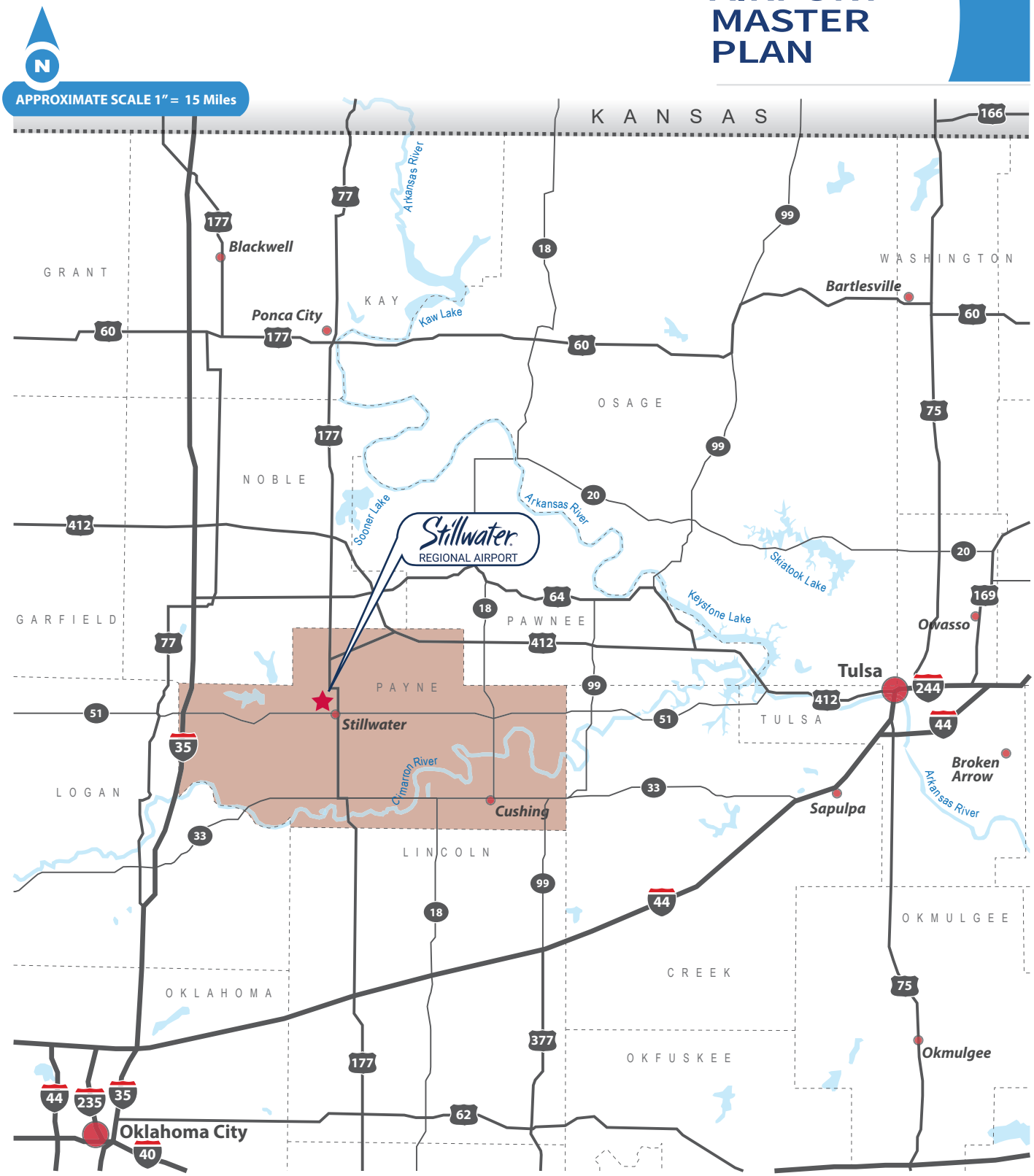
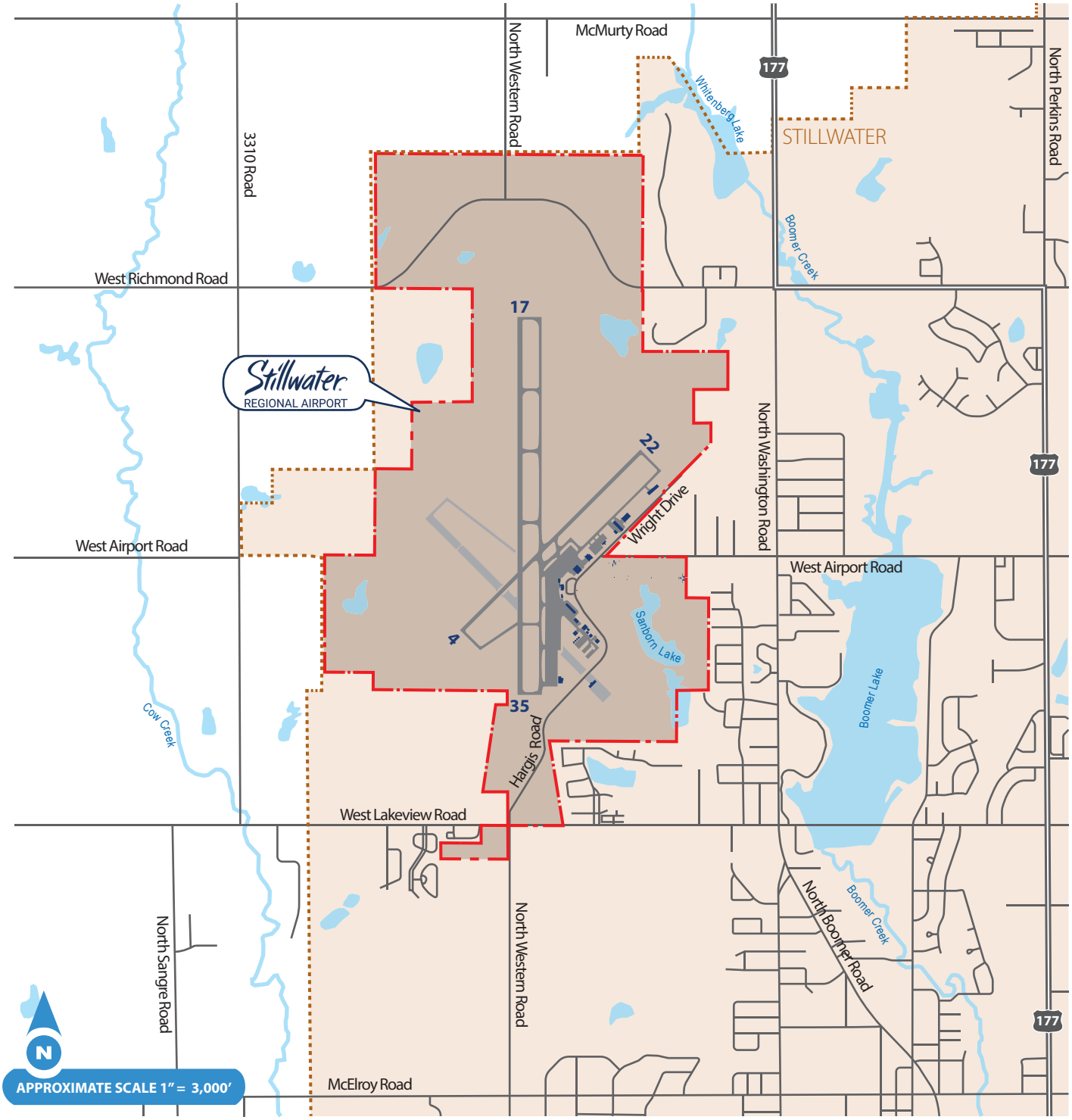


Figure A-1
Airport Location Map



Source: Google Maps, 2021 & City of Stillwater GIS.

Figure A-2
Airport Vicinity Map

SWO Stillwater REGIONAL AIRPORT

Airport Ownership Structure and Role

SWO is a public use airport owned and operated by the City of Stillwater. Within the City's government structure, SWO is in the Airport Department. The Stillwater Regional Airport Advisory Board (Board) has been established to act in an advisory capacity to the Stillwater City Council. The Board consists of five voting members appointed by the City Council who serve three-year terms. The City Manager and the Chamber of Commerce Chief Executive Officer serve as non-voting ex-officio members. According to the SWO website, the functions of the Board are:

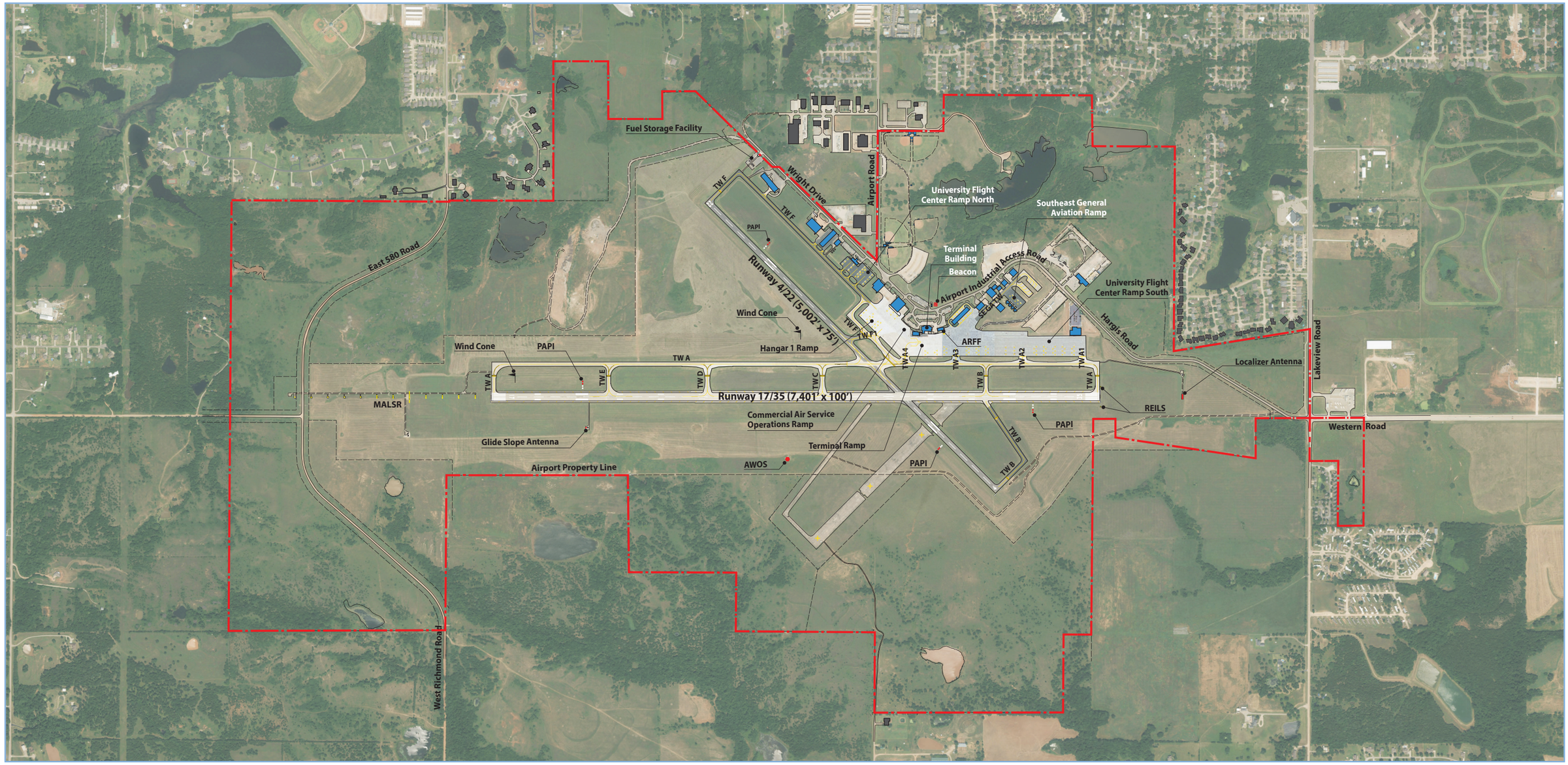
- Annually review the schedule of airport rates and charges and make necessary recommendations regarding these items to the City Council for the upcoming Fiscal Year.
- Periodically review terms and conditions for standard airport leases and contract documents.
- Review airport ordinances, regulations, rules, standards, and operational policies as needed and make appropriate recommendations to the City Council.
- Direct planning activities for SWO and the establishment of the Airport Master Plan and present the same to the City Council for consideration and adoption.
- Study, review, analyze, and mark reports, findings, and recommendations to the City Council concerning the betterment of aviation within the City of Stillwater.
- Carry out other airport-related tasks assigned by the City Council.

An airport's role indicates the type of service it provides to the community and how it performs within the national and state airport systems. The FAA's National Plan of Integrated Airport Systems (NPIAS) 2021-2025 consists of 3,310 existing and proposed airports considered significant to national air transportation. As part of the NPIAS, SWO is classified as a nonhub primary airport. A primary airport is defined by statute as a public use airport receiving scheduled air carrier service with 10,000 or more annual enplaned passengers. Primary airports are divided into four categories based on the percentage of total U.S. passenger enplanements, with nonhub airports accounting for less than 0.05 percent of the total.

AIRPORT FACILITIES

SWO contains a variety of airside, landside, and support facilities that facilitate aircraft operations and passenger movement. Airside facilities are those in which aircraft, support vehicles, and equipment are located and in which aviation-specific operational activities take place. They consist of such components as airfield pavements, navigational aids, weather reporting equipment, lighting, and signage. Landside facilities are those designed to serve passengers or other airport users, typically located outside aircraft movement areas. They consist of such components as aircraft parking aprons, terminal buildings, and general aviation (GA) facilities. Support facilities are airport components such as Aircraft Rescue and Fire Fighting (ARFF) facilities and the Airport Traffic Control Tower (ATCT). **Figure A-3** graphically depicts the major airside facilities at SWO.

N SCALE 1" = 1,200'



Stillwater Regional Airport

Figure A-3
Airport Facilities

Airside Facilities

Airfield Pavements

Airfield pavements consist of runways and taxiways. These pavements are the framework of an airport system, supporting and connecting aircraft activities to non-movement areas and landside facilities. A general description and condition of the existing airside pavements are provided below.

Pavement Strength

Pavement weight bearing capacity does not limit the size of aircraft that can use the pavement but does indicate the size of aircraft for which the pavement is designed. Continuous use of aircraft heavier than the designated weight-bearing capacity can result in increased pavement maintenance and lead to premature pavement failure requiring replacement. Current pavement strengths at SWO were listed in **Table A-1**.

Runways

SWO operates with two runways, the north-south oriented Runway 17/35, and the northeast-southwest oriented Runway 4/22. **Table A-1** summarizes the characteristics of both runways.

Table A-1: Existing Runways

Facility Component	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Length and Width	7,401' x 100'		5,002' x 75'	
Pavement Surface/Condition	Concrete – Good condition		Asphalt – Good condition	
Pavement Treatment	Grooved		None	
Pavement Strength	100,000 pounds Single Wheel (SW) 157,000 pounds Double Wheel (DW) 310,000 pounds Double Tandem Wheel		34,000 pounds Single Wheel (SW) 60,000 pounds Double Wheel (DW)	
Elevation	1,000.1'	965.8'	960.5'	984.6'
True Heading	179°	359°	45°	225°
Threshold Crossing Height	48'	26'	35'	39'
Visual Glide Path Angle	3°	3°	3°	3°

Source: Airport Master Record Form 5010, FAA.

Taxiways

SWO is equipped with one full-length parallel taxiway, one partial parallel taxiway, four entrance taxiways at each runway end, multiple exit taxiways, and a series of connector taxiways. **Table A-2** summarizes the taxiway characteristics at SWO, informed by the 2008 Airport Layout Plan (ALP).

Table A-2: Existing Taxiways

Taxiway Segment	Taxiway A	Taxiway A1	Taxiway A2	Taxiway A3
Type	Full Parallel/Entrance	Connector	Connector	Connector
Location	• 400 feet east of Runway 17/35 • Both Runways 17 and 35	Between Taxiway A and University Flight Center Ramp South at south end of Taxiway A	Between Taxiway A and University Flight Center Ramp South at north end of University Flight Center Ramp South	Between Taxiway A and Terminal Ramp at south end of Terminal Ramp
Width	50’	90’	90’	60’
Pavement Surface	Concrete	Concrete	Concrete	Asphalt
Edge Lighting	Medium Intensity (MITL)	MITL	MITL	MITL
Taxiway Segment	**Taxiway A4**	**Taxiway B**	**Taxiway C**	**Taxiway D**
Type	Connector	Entrance/Connector/Exit	Exit	Exit
Location	Between Taxiway A and Terminal Ramp at north end of Terminal Ramp	• Entrance to Runway 4 • Connector between Runways 4/22 and 17/35 • Exit at 1,385’ north of Runway 35	2,400’ north of the intersection of Runways 17/35 and 4/22	1,000’ north of the intersection of Runways 17/35 and 4/22
Width	100’	50’	55’	55’
Pavement Surface	Concrete	Asphalt/Concrete	Concrete	Concrete
Edge Lighting	MITL	MITL	MITL	MITL
Taxiway Segment	**Taxiway E**	**Taxiway F**	**Taxiway F1**	**Southeast GA Taxiway**
Type	Exit	Partial Parallel/Entrance	Exit/Connector	Connector
Location	1,425’ south of Runway 17	• 525 feet southeast of Runway 4/22 from Runway 22 to the Hangar 1 Ramp • 240’ feet southeast of Runway 4/22 from Taxiway A to the end of the Hangar 1 Ramp • Entrance to Runway 22	• 2,400’ southwest of Runway 22 • Between Taxiway F and Hangar 1 Ramp	Southeast of the Terminal Ramp
Width	50’	50’	50’	50’
Pavement Surface	Concrete	Concrete/Asphalt	Concrete	Asphalt
Edge Lighting	MITL	MITL	MITL	None

Source: Stillwater Regional Airport ALP.

Runway Protection Zones

A Runway Protection Zone (RPZ) is a trapezoidal area off the end of the runway designed to enhance safety for aircraft operations and for people and objects on the ground. **Table A-3** summarizes the Arrival and Departure RPZ information.

Table A-3: Existing Runway Protection Zone Dimensions

RPZ	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Approach RPZ	**Precision**	**Non-Precision**	**Visual**	**Visual**
Length	2,500’	1,700’	1,000’	1,000’
Inner Width	1,000’	1,000‘	500’	500’
Outer Width	1,750’	1,510’	700’	700’
Departure RPZ				
Length	1,700’	1,700’	1,000’	1,000’
Inner Width	500’	500’	500’	500’
Outer Width	1,010’	1,010’	700’	700’

Source: Stillwater Regional Airport ALP, 2009.

Pavement Marking, Lighting, and Signage

Airfield Marking

Runway markings are white and indicate the Instrument Approach Procedure (IAP) category for each runway threshold. Runways 17 and 35 have markings for precision approaches (i.e., an IAP provided with course and vertical path guidance with visibility minimums lower than 3/4 statute mile), although the Runway 35 precision approach has an IAP with visibility minimums not lower than 3/4 mile. Runways 4 and 22 have visual markings.

Airfield Lighting

Runway lighting systems enable aircraft to use the runways during periods of low visibility and assist in identifying the runway environment during instrument landings. Runway lights are white. Both Runways 17/35 and 4/22 are equipped with Medium Intensity Runway Lights (MIRL).

Approach lighting systems allow pilots to visually identify the runway environment and align the aircraft with the runway upon arriving at a prescribed point on an IAP. Runway 17 is equipped with a Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 35 is equipped with Runway End Identifier Lights (REILs). REILs are flashing strobe lights that help to identify runway ends during night and low visibility approaches.

Visual Glide Slope Indicators (VGSI) are ground-based visual aids that use lights to help pilots monitor their angle of descent during landing. All four runway ends have a four-box Precision Approach Path Indicator (PAPI) located on the left-hand side of the runway as seen by the pilot on approach.

Airfield Signage

FAA Advisory Circular 150/5340-18G, *Standards for Airport Signs Systems* (AC 5340-18G) states that airports with frequent turbojet aircraft operations shall include distance remaining signs. Both Runways 17/35 and 4/22 have distance remaining signs. The runway and taxiway signage facilities at SWO support the existing airfield operations, support IAPs, and comply with the airfield signage plan. The 2021 Part 139 commercial airport certification inspection found that several markings on Taxiway A were faded or damaged but have been remarked. No other deficiencies with markings, lighting, and signage were identified at SWO. **Table A-4** summarizes the airfield marking types, lighting equipment, and airside signage at SWO.

Table A-4: Markings, Lighting, and Signage Summary

Facility Component	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Runway Markings	Precision – Good Condition	Precision – Good Condition	Basic – Good Condition	Basic – Good Condition
Aim Points	Yes		Yes	
Centerline	Yes		Yes	
Threshold Bars	Yes		No	
Edge Lines	Yes		No	
Touchdown Zone Markings	Yes		No	
Edge Lights	MIRL		MIRL	
Approach Lighting System	MALSR	No	No	No
Visual Approach Path Guidance	PAPI-4L	PAPI-4L	PAPI-4L	PAPI-4L
Runway End Identifier Lights	No	Yes	No	No
Runway and Taxiway Signage				
Distance Remaining Signage	Yes		Yes	
Runway Entry Hold Signs	Yes		Yes	
Taxiway Location Signs	Yes		Yes	
Taxiway Directional Signs	Yes		Yes	

Source: Airport Master Record Form 5010, FAA.

Airfield Grading and Drainage and Storm Water Management

The terrain at SWO is relatively flat (slopes of 1-5 percent) with overall drainage from north to south. Rainfall east of Runway 17/35 primarily drains to the southeast; rainfall west of Runway 17/35 drains to the southwest. SWO has a self-contained drainage system of swales, inlets, and culverts.

Landside Facilities

Aircraft Parking Aprons

SWO has six main aprons: the Terminal Ramp, the Commercial Air Service Operations Ramp, the Hangar 1 Ramp, the University Flight Center Ramp North, the University Flight Center Ramp South, and the Southeast General Aviation Ramp. **Table A-5** summarizes the aircraft parking aprons at SWO.

Table A-5: Existing Aprons

Item	Description
Terminal Ramp	• 113,600 square feet • Located west of the Terminal Building • One commercial service aircraft parking space • 9 Tie-down spaces
Commercial Air Service Operations Ramp	• 18,500 square feet • Located northeast of the Terminal Building • 6 Tie-down spaces
Hangar 1 Ramp	• 53,000 square feet • Located north of the Commercial Air Service Operations Ramp, northwest of Taxiway F • 15 Tie-down spaces
University Flight Center Ramp North	• 69,000 square feet • Located northeast of Hangar 1 Ramp • 20 Tie-down spaces
University Flight Center Ramp South	• 310,000 square feet • Located south of the Terminal Ramp • 51 Tie-down spaces
Southeast General Aviation Ramp	• 30,000 square feet • Located southeast of the Terminal Ramp • 8 Tie-down spaces

Source: SWO Ultimate Aircraft Parking Plan (March 2020).

Tenant Building and Ground Facilities

This section describes the existing tenant buildings and ground facilities, entrance roadways, access points, vehicle circulation, truck routes, service and perimeter roadways, property interests, emergency response, utilities, wildlife hazards, and perimeter security. **Table A-6** lists the buildings and square footage of each facility. **Figure A-4** depicts the layout and locations of major facilities.

Table A-6: Tenant Buildings and Ground Facilities

Description	Square Feet
Administration Building	2,470
Cowboy Hangar	5,745
Hangar 10	6,000
OSU Flight Center (Old)	3,100
OSU Flight Center (Existing)	16,000
Group Hangar 1	17,082
Group Hangar 2	12,212
Airport Operations and Maintenance	6,392
LBR, Inc. Office/Hangar	3,900
OSU Maintenance Hangar	16,500
Port-A-Ports	4,375
Rock Hangar	7,700
Detwiler Hangar	3,682
T-Hangar 1	12,470
T-Hangar 2	13,750
Waits Holding Hangar	10,160
Waste Management Building/Facility	10,170 (8.06 acres)

Administration Building

The administration building is owned by the City of Stillwater. The building is between Airport Industrial Access Road and the Southeast GA Taxilane and is a total of 2,400 square feet. The building is roughly ten years old and is in good condition.

Cowboy Hangar

The Cowboy Hangar is currently owned by Oklahoma State University (OSU) and is near the intersection of the Terminal Ramp and the Southeast GA Taxilane. This hangar has a contractual reversion to the City of Stillwater that is effective during the 2060s. The Cowboy Hangar has a total of 5,740 square feet and retains its structural stability.

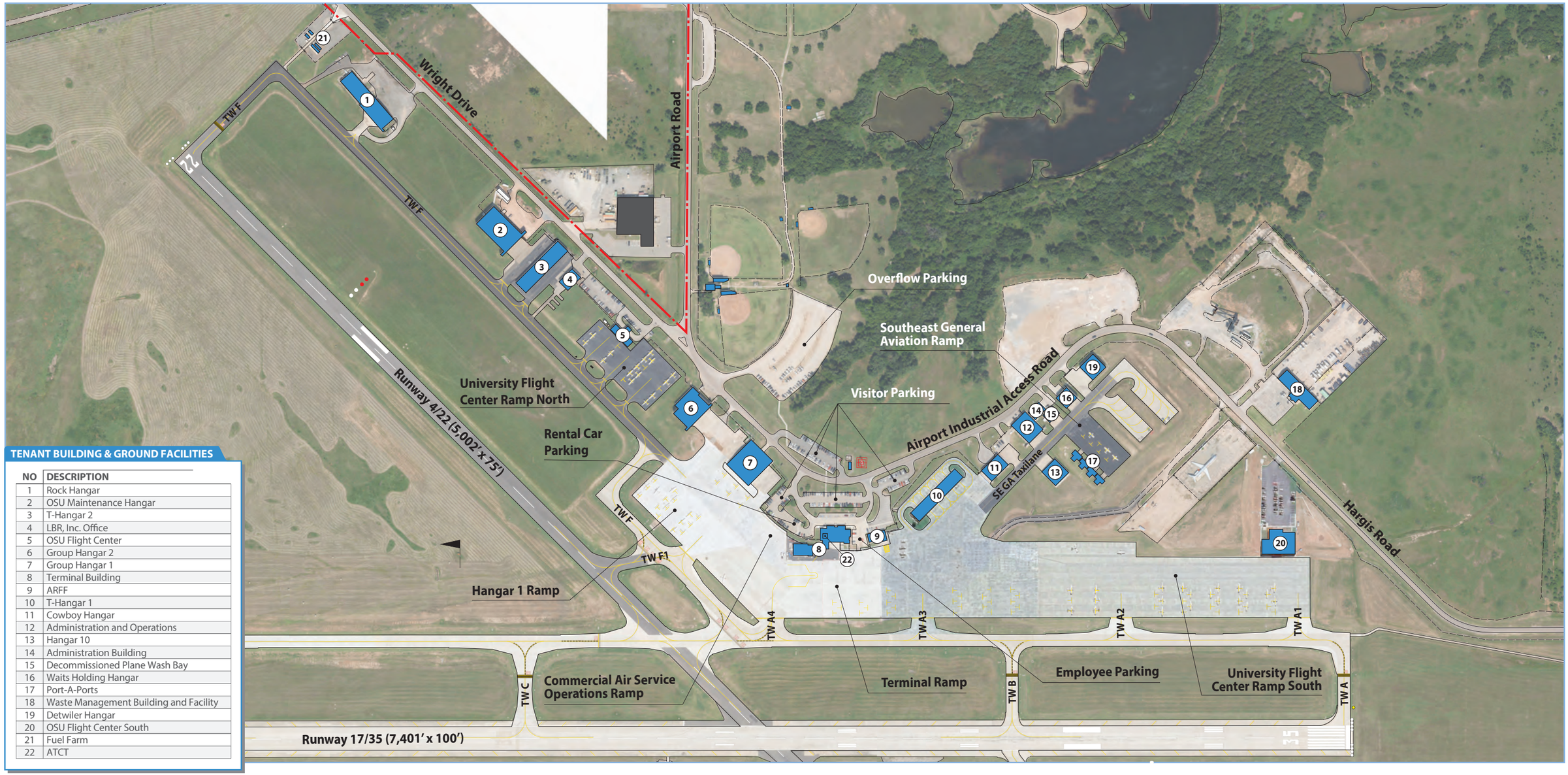
Hangar 10

Hangar 10 is currently owned by Simmons with a contractual reversion to the City of Stillwater. Hangar 10 is southwest of the Southeast GA Taxilane opposite the Cowboy Hangar. The Simmons Hangar is in excellent condition and consists of 6,000 square feet.

Group Hangar 1

Group Hangar 1 is owned by the City of Stillwater. The hangar is just northeast of the terminal building. Business activity here includes the office and hangar use for both Hangar 1 Flight School and Quality Aircraft Maintenance. At 70 to 80 years old, the structure remains structurally sound, but the exterior needs repairs and upgrades. The space is a total of 17,082 square feet and is scheduled for demolition in the Summer of 2024 for construction of the new termina building.

N APPROXIMATE SCALE 1" = 400'



TENANT BUILDING & GROUND FACILITIES

NO	DESCRIPTION
1	Rock Hangar
2	OSU Maintenance Hangar
3	T-Hangar 2
4	LBR, Inc. Office
5	OSU Flight Center
6	Group Hangar 2
7	Group Hangar 1
8	Terminal Building
9	ARFF
10	T-Hangar 1
11	Cowboy Hangar
12	Administration and Operations
13	Hangar 10
14	Administration Building
15	Decommissioned Plane Wash Bay
16	Waits Holding Hangar
17	Port-A-Ports
18	Waste Management Building and Facility
19	Detwiler Hangar
20	OSU Flight Center South
21	Fuel Farm
22	ATCT

Figure A-4
Landside Facilities

Group Hangar 2

Group Hangar 2 is owned by the City of Stillwater. The hangar is between Taxiway F and Airport Road just northeast of Group Hangar 1 and southwest of the existing OSU Flight Center. Group Hangar 2 business activity includes the hangar space and mechanic shop for Stillwater Aircraft Services. Group Hangar 2 is also 70 to 80 years old and requires exterior updates. This hangar provides 12,212 total square feet.

Airport Operations and Maintenance

The Airport Operations and Maintenance building is owned by the City of Stillwater. The hangar is directly south of the Cowboy Hangar and north of the Administration Building. This building is structurally sound, only limited exterior needs have been identified, and it consists of 6,392 total square feet.

LBR, Inc. Office/Hangar

The LBR, Inc. office/hangar is currently owned by LBR with a contractual reversion to the City of Stillwater. The building is between Taxiway F and Wright Drive south of T-Hangar 2 and north of the OSU Flight Center (Existing). The structure is in fair condition and is approximately 3,900 square feet.

OSU Flight Center (Old)

The old OSU Flight Center is owned by the City of Stillwater and is on Wright Drive near the intersection of West Airport Road and Wright Drive. This structure provides 3,100 square feet of space.

OSU Flight Center (Existing)

The existing OSU Flight Center is at the south end of the airfield near the approach end of Runway 35, just east of Taxiway A. The center is currently owned by OSU with a contractual reversion to the City of Stillwater. The center provides a total of 16,016 square feet.

OSU Maintenance Hangar

The OSU Maintenance Hangar is between Taxiway F and Wright Drive north of T-Hangar 2. The hangar is currently owned and operated by OSU with a contractual reversion to the City of Stillwater, which is expected to occur upon completion of the new OSU Flight Center. The hangar is used to perform maintenance on and store OSU aircraft. The hangar is structurally sound and is 16,500 square feet in total.

Port-a-Port Hangars

The Port-a-Port hangars are owned by the City of Stillwater and are south of Hangar 10. By design, Port-a-Port hangars are not long-term structures, and their current location is on the site of future hangar development. In total the space is a combined 4,375 square feet spread among four structures.

Rock Hangar

The Rock Hangar is at the northeast end of Taxiway F and is owned by the City of Stillwater. The Hangar is currently used by RPX Technology for aircraft storage; the City of Stillwater uses the Hangar for miscellaneous storage, including Emergency Management Equipment. Needed upgrades include electrical, water, and sewer systems. The total space provided is 7,700 square feet.

Detwiler Hangar

The Detwiler Hangar is currently owned by Alex Detwiler with reversion back to the City of Stillwater. The hangar is south of the Waits Holding Hangar and east of the SE GA Taxilane. The hangar is in excellent condition with no needs. Its total space is 3,682 square feet.

T-Hangar 1

Containing the corporate office for the Stillwater Flight Center, the Fixed Base Operator (FBO) serving SWO, this hangar is owned by the City of Stillwater and is over 40 years old. The total space this t-hangar provides is 12,470 square feet and 10 individual storage units. The hangar is south of the ARFF facility near the intersection of the Terminal Ramp and the Southeast GA Taxilane.

T-Hangar 2

Owned by the City of Stillwater, this hangar is over 40 years old and is structurally in fair condition with recent rehabilitation. The total space it provides is 13,750 square feet and 10 individual storage units. The hangar is between Taxiway F and Wright Drive, roughly at the halfway point of Taxiway F.

Waits Holding Hangar

The Waits Holding Hangar is currently owned by Waits with reversion back to the City of Stillwater in six years. This hangar is in excellent condition and provides 10,160 square feet of total space. The hangar is east of the Southeast GA Taxilane just south of the Airport Administration Building.

Waste Management Building and Facility

This facility is currently owned by the City of Stillwater and leases the facilities to Waste Management. This is an older building that has been well maintained. The building provides is 10,170 square feet of space and the overall site consists of just over 8 acres. The building is the southernmost facility south of North Airport Industrial Access Road (recently renamed as Hargis Road).

FAA Airfield Facilities

SWO's lease with the FAA includes five facilities: the MALSR, the Localizer/Distance Measuring Equipment (LOC/DME), the Glideslope antenna, the Remote Communications Outlet (RCO), and the Automated Surface Observation System (ASOS). The leases include facility sites, equipment shelters, restricted critical areas, access roads, a sensor group site, and Aircraft Cooling Unit (ACU) space in the terminal building.

Hay and Pasture Lease

Within and around SWO property, vacant property is leased for hay and pasture that consists of a total of 1,215 acres and 13 different tracts. The leased properties are spread in and around SWO among undeveloped parcels. The lease is for an initial five-year period, and the parties have the option to extend the lease for one additional five-year period by written agreement of the parties prior to expiration of the initial term.

Terminal Building

Historically the terminal building has served both commercial airline passengers and general aviation activity, including FBO facilities. The terminal building was originally constructed and put into operation in 1952. The building has been extensively altered and remodeled several times over the past seven decades. Commercial passenger flights serving Stillwater started in April 1953 with daily flights to Dallas by Central Airlines (later Central merged with Frontier airlines). Other airlines serving SWO through the mid-1980s included Metro Airlines, Lone Star Airlines, and Exec Express. From the mid-1980s to 2016, SWO had no scheduled airline service. American Airlines began operation in August 2016 with service to Dallas/Fort Worth International Airport (DFW). This service continues today.

Terminal Building Facilities

The terminal building is on the east side of Runway 17/35, south of the runway's mid-point. The first floor of the terminal building contains commercial passenger facilities consisting of ticketing, bag claim, checked bag screening, non-secure arrival/departure waiting areas, airline, and Transportation Security Administration (TSA) offices and restrooms. In addition, the first floor contains FBO facilities, including service counter/dispatch, pilot's flight planning room and ready room/rest areas. The total area of the first floor is approximately 7,200 square feet, with approximately 1,000 square feet being used for FBO/GA facilities and the remainder being primarily focused on commercial passenger facilities.

The first floor of the terminal building was extensively remodeled in preparation for the beginning of American Airline service in 2016. This included the construction of a modular building to accommodate TSA passenger screening facilities, along with a secure passenger waiting area. The modular building, which is just to the northwest of the terminal building, has a total floor area of approximately 2,700 square feet. The use of the terminal building spaces is illustrated in **Figure A-5**.

SCALE 1" = 20'

Source: McFarland Architects.

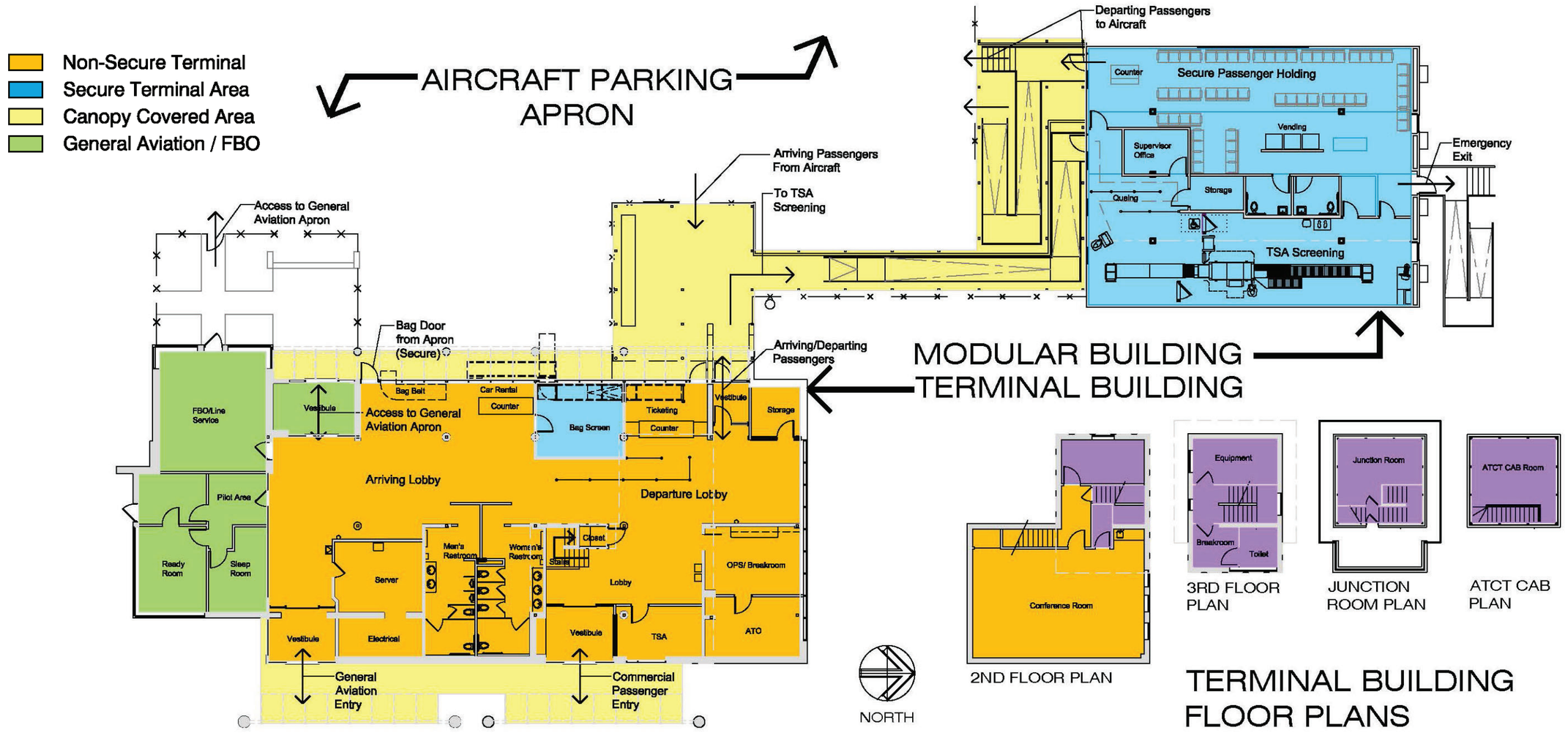
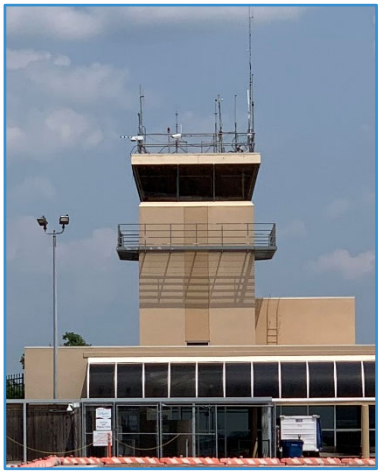


Figure A-5
Terminal Building Floor Plans

The terminal building also has a second-floor conference room (approximately 1,000 square feet), a third floor Airport Traffic Control Tower (ATCT) office, and a top floor containing the ATCT cab (total ATCT area is approximately 600 square feet). The ATCT is operational from 8:00 a.m. to 10:00 p.m. Central Standard Time (CST).



Aircraft Rescue and Fire Fighting (ARFF) Facility

SWO currently maintains an ARFF Index B classification, meaning that the largest aircraft to regularly depart the airport an average of five times daily is longer than 90 feet but shorter than 126 feet. Commercial passenger aircraft regularly operating at SWO fit into this category. Some longer models such as the Boeing 737-800 and Airbus A321, used by Oklahoma State University and visiting university football teams, are ARFF Index C, meaning their length is at least 126 feet, but less than 159 feet. SWO will provide Index C services with prior arrangement.

The ARFF facility at SWO is south of the terminal building. The facility is comprised of one vehicle bay staffed on-demand for scheduled and non-scheduled commercial flights. An additional bay is leased in tandem with the adjoining apartment that serves as the residence of the FBO manager. **Table A-7** lists the ARFF equipment at SWO.

Table A-7: ARFF Vehicles

Equipment	Year	Water (gal)	Dry Chem (lbs)	AFFF[1] (lbs)
Oshkosh T-1500	2000	1,500	500	210
Ford F350 (with skid)	2002	-	500	-
Rosenbauer Class 4 Panther 4x4 Unit	2021/22	1,500	500	200

Source: Stillwater Regional Airport personnel.

Note: [1]AFFF (Aqueous Film Forming Foam).

Fuel Storage Facilities

The SWO fuel storage facility is southeast of Runway 22. The facility consists of three aboveground tanks owned and operated by SWO. There are two 12,000-gallon Jet A fuel tanks and one 20,000-gallon AVGAS tank. Stillwater Flight Center operates two 3,000-gallon Jet A fuel delivery trucks, one 1,200-gallon and one 1,000-gallon AVGAS fuel delivery trucks.

Snow Removal and Airport Maintenance

SWO does not currently have a dedicated Snow Removal Equipment (SRE) facility; SWO stores equipment indoors and outdoors where space is available. Limited indoor equipment storage space is used in the

Operations Center (Hangar 3). SWO staff use SRE to clear the runways, taxiways, and aprons during snowfall events. **Table A-8** lists the SRE equipment at SWO.

Table A-8: SRE Equipment

Equipment	Year
Blizzard Buster 3616 tow-behind broom	1988
Blizzard Buster 3616 tow-behind broom	1988
Wylie 800-gallon agricultural sprayer	2019
Snow Dog Plow 9-foot truck mounted	Unknown
Tractor-mounted 12-foot snow pusher box	Unknown

Source: Stillwater Regional Airport personnel.

Vehicle Access, Parking, and Circulation

Entrance Roads

SWO is accessible by vehicle, truck, and bus. Primary access to SWO is provided by West Airport Road and North Hargis Road. West Airport Road is oriented east and west, intersecting with North Washington Street to the east and Airport Industrial Access Road to the west. North Hargis Road is oriented north and south and connects the intersection of Western Road and Lakeview Road on the south to the intersection of Airport Industrial Access Road to the north. Wright Drive provides access to the GA hangars, existing OSU Flight Center, OSU Maintenance Hangar, and Fuel Farm east of Taxiway F via its intersection with West Airport Road.

Public transportation is provided by the OSU/Stillwater Community Transit System. Bus routes are operated within the Stillwater City Limits and on the OSU Campus for a small fee. The Blue Route travels to SWO Monday through Friday beginning at 6:20 a.m. and ending at 7:00 p.m.

Parking Facilities

Free short-term and long-term parking is available at SWO. This includes two primary lots, one on either side of Hargis Road: a 50-space lot to the west of the road and a 43-space lot to the east. An unpaved overflow lot is located to the east adjacent to the ballfields in Sanborn Lake Park and Sports Complex. An additional 52-space parking lot is located to the northeast of the terminal building, and a 23-space lot is located to the southeast of the terminal building. Employee parking is provided immediately south of the terminal building and east of the ARFF buildings.

Parking provided along the curb in front of the terminal building is allowed only for loading and unloading. Vehicles must be accompanied at all times in this area. Vehicles left unattended are subject to ticketing and towing. Parking is available in the lot directly across from the terminal building. Handicap accessible drop off is provided just east of the curbside drop off spaces east of the terminal building.

Enterprise and Avis car rentals are available at SWO with prior reservations. Hertz has an office in the terminal building and provides customer service during regular business hours. There are 34 designated rental car spaces along the east side of the lot north of the main lot. Uber and Lyft are also available at SWO.

Access Points

All access points at SWO are required to be controlled and monitored. There are currently airport restricted area vehicle access control points at SWO along Airport Industrial Access Road, Airport Road, Wright Drive, and Hargis Road. Of those, there are a mix of access-controlled gates and lock and key gates. Most SWO restricted area pedestrian gates and doors are access controlled, some are lock and key controlled.

Vehicle Circulation

Vehicle circulation is conducted on Hargis Road, Airport Industrial Access Road, Airport Road, and Wright Drive. All employees, tenants, and any other ground operators have access to these roads and the entrances provided. Currently roadway circulation improvement plans are in progress to realign Hargis Road to locate it further east of the terminal building. Once Hargis Road is relocated, the existing roadway will be utilized as an access and entrance road and will connect to the relocated Hargis Road at two locations.

Truck Routes

Trucks headed east-west may depart SWO to the south via Hargis Road. Hargis Road eventually becomes North Western Road, which then merges with Highway 51 two miles to the south. Northbound and southbound trucks use West Airport Road heading east to North Washington Street. Trucks can then proceed north along North Washington Road for one mile before reaching State Highway 177.

Service and Perimeter Roads

SWO has service roads accessing the navigational and electronic equipment on the airfield. The service road network is comprised of paved and unpaved surfaces. Parts of airport property do not have a dedicated, paved service road, so communication with the ATCT is necessary when using taxiways and runways by ground vehicles. Service roads that may interfere with aircraft operations also require communication with the ATCT. SWO lacks a full perimeter road surrounding the airfield, and SWO remains inaccessible from the west.

Airport Property Interests

Currently SWO owns 1,487 acres of land in fee simple and 0.7 acres controlled through an easement. A breakdown of these areas is presented in **Table A-9**. The 2008 ALP identifies 242.9 acres for future acquisition that is still unacquired. The easement is located just south of Lakeview Road.

Table A-9: Airport Property Interests

Tract	FAA Project Number	Interest	Acres
1	Original Airport	Fee Simple	955.0
2	FAA #9-34-050-C6C3	Fee Simple	38.0
3a	ADAP #8-40-0090-02	Fee Simple	26.8
3b	NON - FAA	Fee Simple	8.4
4	-	Fee Simple	79.6
5	-	Fee Simple	24.0
6	-	Fee Simple	9.9
7	-	Fee Simple	11.9
8	ADAP #5-40-0090-05/06-07	Fee Simple	9.2
9	ADAP #5-40-0090-05/06-07	Fee Simple	4.2
10	-	Fee Simple	3.9
11	AIP 3-40-0090-012-2002	Fee Simple	14.3
12	AIP 3-40-0090-013-2003	Fee Simple	127.2
13a	AIP 3-40-0090-013-2003	Fee Simple	38.1
13b	AIP 3-40-0090-014-2003	Fee Simple	110.5
B	-	Fee Simple	26.0
E1	ADAP #5-40-0090-05/06-07	Easement	0.7

Source: Airport Property Map by Barnard Dunkelberg & Company, 2008. SWO staff.

Utilities

The major utility systems at SWO include water, sanitary sewer, stormwater drainage, electric, natural gas, and communications.

Water

Water to SWO is supplied by the City of Stillwater. The City's water source is Kaw Lake north of Stillwater. The water system consists of 2-, 6-, and 12-inch lines.

Sanitary Sewer

The City of Stillwater Public Works Department operates and maintains the sanitary sewer system surrounding SWO. A 6-inch pipe is located along the south side of Lakeview Road. A few various stretches of sanitary sewer extend north according to the City of Stillwater Atlas. An 8-inch line runs along the east side of North Hargis Road beginning at the Stillwater Water and Wastewater Maintenance Building. This line extends roughly 500 feet then crosses under the road to the west servicing all the major SWO buildings.

Stormwater

Rainfall at SWO is collected by sheet flow, area inlets, or culverts from the airfield and conveyed to tributaries of Cow Creek to the west and Sanborn Lake or Hazen Lake to the east. All the rainfall that does not infiltrate the ground or evaporate will eventually flow to Stillwater Creek on the south side of the City of Stillwater.

Electric

Electric service at SWO is provided by the City of Stillwater, referred to as Stillwater Utilities Authority (SUA). Overhead electric lines supplying SWO are primarily from Airport Road to the east and Lakeview Road to the

south. Several overhead and underground facilities run throughout the area supplying power to buildings, hangars, and streetlights.

Natural Gas

Oklahoma Natural Gas provides service to SWO. An existing 4-inch steel line is located on the north side of Lakeview Road in an east-west direction. Existing gas lines also run along the north end of SWO property connecting all the major buildings.

Telephone/Fiber Optic Communications

Data and voice communication lines run along Lakeview Road and North Hargis Road. Communication services are provided by AT&T, Chickasaw Telecom, and Sudden Link.

Perimeter Fencing and Gates

SWO's airfield is surrounded by an 8-foot perimeter fence. Security gates provide access to airside uses including the hangars, OSU facilities, and controlled movement areas of the airfield. Additional gates to the north and south provide access to either end of Runway 17/35.

Wildlife Hazards

Wildlife strikes by birds and other animals are the most significant wildlife hazards faced by an airport. While no habitats or significant congregations of any animal exist on SWO property, wildlife management practices should be followed to minimize wildlife strikes. **Threatened and Endangered Species** discusses in further detail the wildlife found on or near SWO.

AIRSPACE, NAVIGATIONAL AIDS (NAVAIDS), AND COMMUNICATIONS

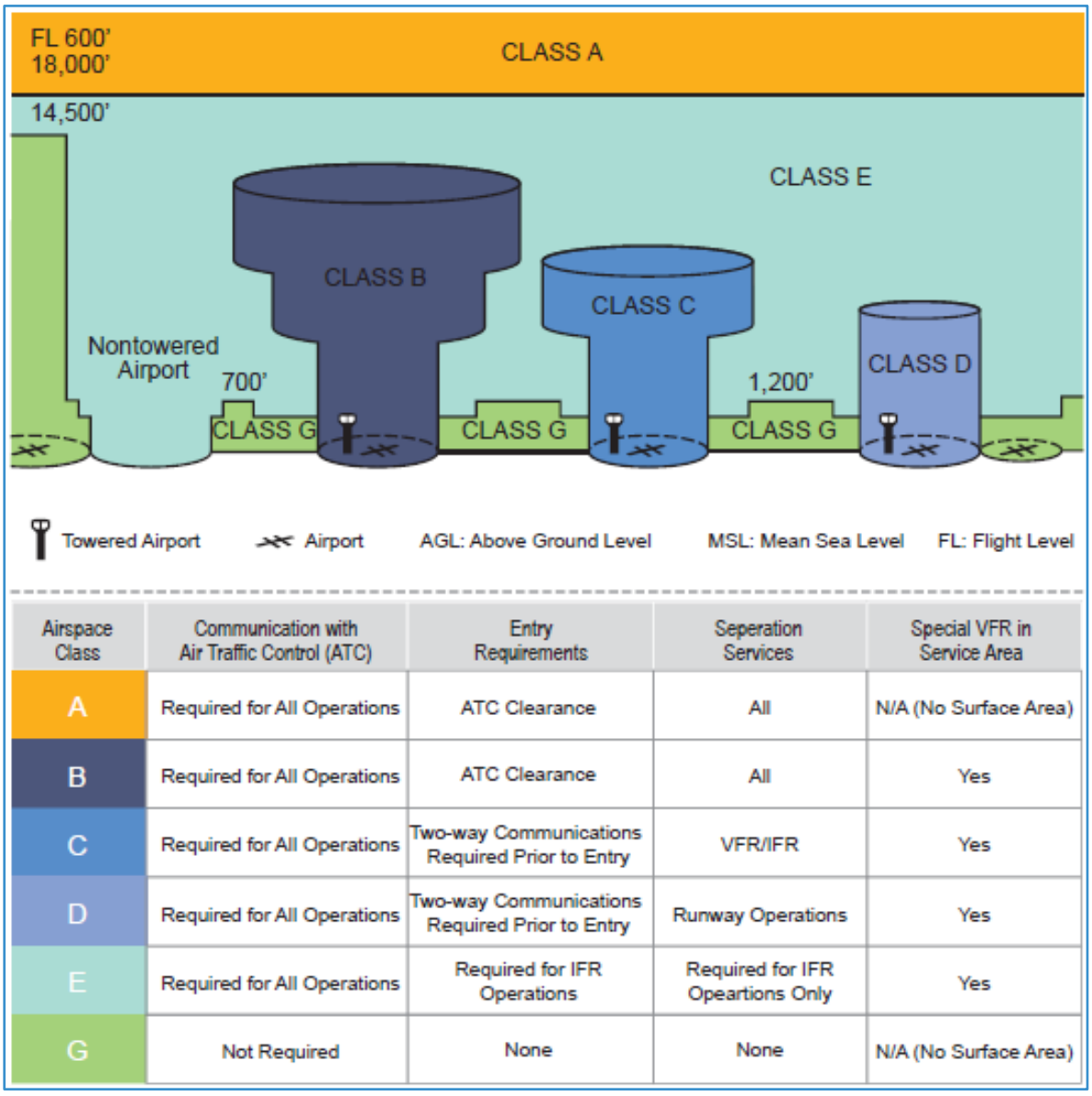
Airspace

SWO functions as all airports do within the National Airspace System (NAS). The NAS consists of various classifications of airspace regulated by the FAA. Airspace is either controlled or uncontrolled. Pilots flying in controlled airspace are subject to Air Traffic Control (ATC) and must follow either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) requirements. These requirements include combinations of operating rules, aircraft equipment and pilot certification, and vary depending on the class of airspace. A graphical representation of the different airspace classes is shown in **Figure A-6**. General definitions of the classes of airspace are provided below:

- **Class A Airspace -** Airspace from 18,000 feet Mean Sea Level (MSL) up to and including flight level (FL) 600, or approximately 60,000 feet MSL.
- **Class B Airspace -** Airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements.
- **Class C Airspace -** Generally, airspace from the surface to 4,000 feet above the airport elevation (MSL) surrounding those airports that have an ATCT.

- **Class D Airspace -** Airspace from the surface up to 2,500 feet above the airport elevation (MSL) surrounding those airports with an ATCT.
- **Class E Airspace -** Generally, controlled airspace that is not designated Class A, B, C or D.
- **Class G Airspace -** Generally, uncontrolled airspace that is not designated Class A, B, C, D, or E.
- **Victor Airways -** These airways are low altitude flight paths between ground-based Very High Frequency (VHF) Omni-Directional Range receivers (VORs).

Figure A-6: Airspace Classes



Airspace Class	Communication with Air Traffic Control (ATC)	Entry Requirements	Seperation Services	Special VFR in Service Area
A	Required for All Operations	ATC Clearance	All	N/A (No Surface Area)
B	Required for All Operations	ATC Clearance	All	Yes
C	Required for All Operations	Two-way Communications Required Prior to Entry	VFR/IFR	Yes
D	Required for All Operations	Two-way Communications Required Prior to Entry	Runway Operations	Yes
E	Required for All Operations	Required for IFR Operations	Required for IFR Opeartions Only	Yes
G	Not Required	None	None	N/A (No Surface Area)

SWO is situated under Class D airspace during the ATCT's operational hours from 8:00 a.m. to 10:00 p.m. CST. The Class D airspace begins at the surface and extends to 2,500 feet above the airport elevation (charted in MSL). Aircraft operating within Class D airspace are required to establish communications with the ATCT. There are extensions of the Class D airspace to accommodate instrument approaches into SWO. When the ATCT is not operational, the Class D airspace is reclassified as uncontrolled Class G. Aircraft can continue to operate at SWO when the ATCT is closed and the airspace is uncontrolled, but pilots are expected to announce their positions and intentions to other aircraft on the ATCT radio frequency known as the Common Traffic Advisory Frequency (CTAF). The traffic patterns at SWO are standard left-hand traffic for all runways. Traffic Pattern Altitude (TPA) is the standard 1,000 feet above ground level (AGL). A depiction of the airspace and other elements surrounding SWO is found on the VFR sectional chart as shown in **Figure A-7**.

Air Traffic and Aviation Communications

Air Route Traffic Control Centers (ARTCC) are responsible for providing navigational assistance in 22 geographic areas to aircraft en route along airways and other portions of airspace. SWO is within the Kansas City ARTCC coverage area operating on frequency 127.8. Airports in parts of Oklahoma, Kansas, Missouri, and Texas are also under the Kansas City ARTCC jurisdiction.

Aviation communications facilities associated with SWO include the CTAF frequency 125.35, a Universal Communications (UNICOM) frequency 122.95. The SWO ATCT frequency is 125.35 and Stillwater Ground Control is frequency 121.6.

Navigational Aids (NAVAIDs)

NAVAIDs provide guidance and positional information to aircraft. NAVAIDs include ground-based radio beacons, satellite-based Global Positioning System (GPS) signals, signage, marking, and lighting systems. NAVAIDs can transmit weather and airport operational information to en route aircraft and allow pilots to operate during periods of poor visibility.

SWO is served by a ground based VOR collocated with Distance Measuring Equipment (DME) (VOR/DME SWO 108.4) that is located approximately 3 ½ miles to the north. The FAA owns the VOR/DME, which guides the non-precision IAPs to Runways 17 and 35. The VOR/DME also serves as a NAVAID identifying airway intersections for aircraft en route along low altitude airways.

Runway 17 is equipped with an Instrument Landing System (ILS) that comprises two components working together to guide precision instrument approaches. The ILS localizer antenna is installed 1,000 feet south of Runway 35 and provides final course guidance. The Glideslope antenna, providing vertical guidance on the descent path, is located approximately 1,170 feet south of Runway 17 and 375 feet west of the runway centerline.

Figure A-7: NAVAIDS Map

Source: FAA Wichita, Kansa City, and Dalla – Ft. Worth Aeronautical Charts.

SWO is also equipped with an ASOS, a rotating beacon, and a wind indicator. The ASOS is located approximately 3,560 feet south of Runway 17 and 750 feet west of the Runway 17/35 centerline. The ASOS broadcasts weather and wind data on frequency 133.725. The rotating beacon is located east of the terminal building, east of Hargis Road. SWO has three wind cones, two east of Runway 17/35, one near Runway 17

and the other near the intersection of Runway 4/22 and Taxiway A, and one on the southwest side of Runway 17/35.

Instrument Approach Procedures

SWO has three precision and two non-precision IAPs providing for the orderly transfer of aircraft from the beginning of the initial approach to landing. Runway 17 is equipped with an ILS approach, a satellite-based Area Navigation (RNAV) GPS approach, and a ground-based VOR approach. Runway 35 is equipped with a RNAV (GPS) approach and a VOR/DME approach. Runway 4/22 is a visual approach only runway. IAPs are categorized by aircraft approach speed and by the visibility and altitude to which an aircraft can follow the approach until the pilot can execute the landing. **Table A-10** lists SWO's IAPs.

Table A-10: Instrument Approaches and Lowest Minimums

Runway End	Procedure	Procedure Type	Aircraft Categories	Minimum Descent Altitude (Feet AGL)	Visibility Minimums (Statute Mile)
17	ILS	Precision	A, B, C, D	200	1/2
17	RNAV (GPS)	Precision	A, B, C, D	200	1/2
35	RNAV (GPS)	Precision	A, B, C, D	200	3/4
17	VOR	Non-Precision	A, B, C	460	3/4
			D	460	1
35	VOR/DME	Non-Precision	A, B	414	1
			C, D	414	1-1/4

Source: FAA published Instrument Approach Procedures.

EXISTING LAND USE, ZONING, AND PUBLIC INFRASTRUCTURE

An inventory of existing zoning, land uses, and various land use planning and control mechanisms used to guide property development surrounding SWO is an important element in the airport planning process. Land use compatibility with airport development is achieved through knowledge of what land uses are proposed and what, if any, changes need to be made.

Existing Zoning

SWO property is currently zoned as Public (P), Light Industrial (IL), and University (U) under the City of Stillwater. IL zoning encompasses the industrial development areas east of Hargis Road and north of West Airport Road. The OSU Research Range Airport Pasture, located on the southwestern edge of the property, is zoned U, and all remaining land is zoned P.

Surrounding property zoning includes a mixture of residential, commercial, industrial, university, and public land uses as defined by the City of Stillwater:

- **Residential –** Small Lot Single-Family Residential (RSS) provides the bulk of residential zoning around SWO, with significant single-family housing located southwest, southeast, and east of SWO. Other higher density zones, such as Two/Multi-Family Residential (RTM) are scattered amongst the RSS zoning.
- **Commercial –** Similar to residential, commercial zones are found south, southeast, and east of SWO. Most commercial uses are located along North Boomer Road and US-177 to the southeast.

- **Industrial –** Industrial zones are located directly east of SWO.
- **University –** OSU owns a significant portion of the land south of SWO.
- **Public –** Additional public zones located east of SWO are Boomer Lake Park and the Lakeside Memorial Golf Course.

The existing zoning is provided in **Figure A-8**. Only zoning directly attributed to the City of Stillwater is shown.

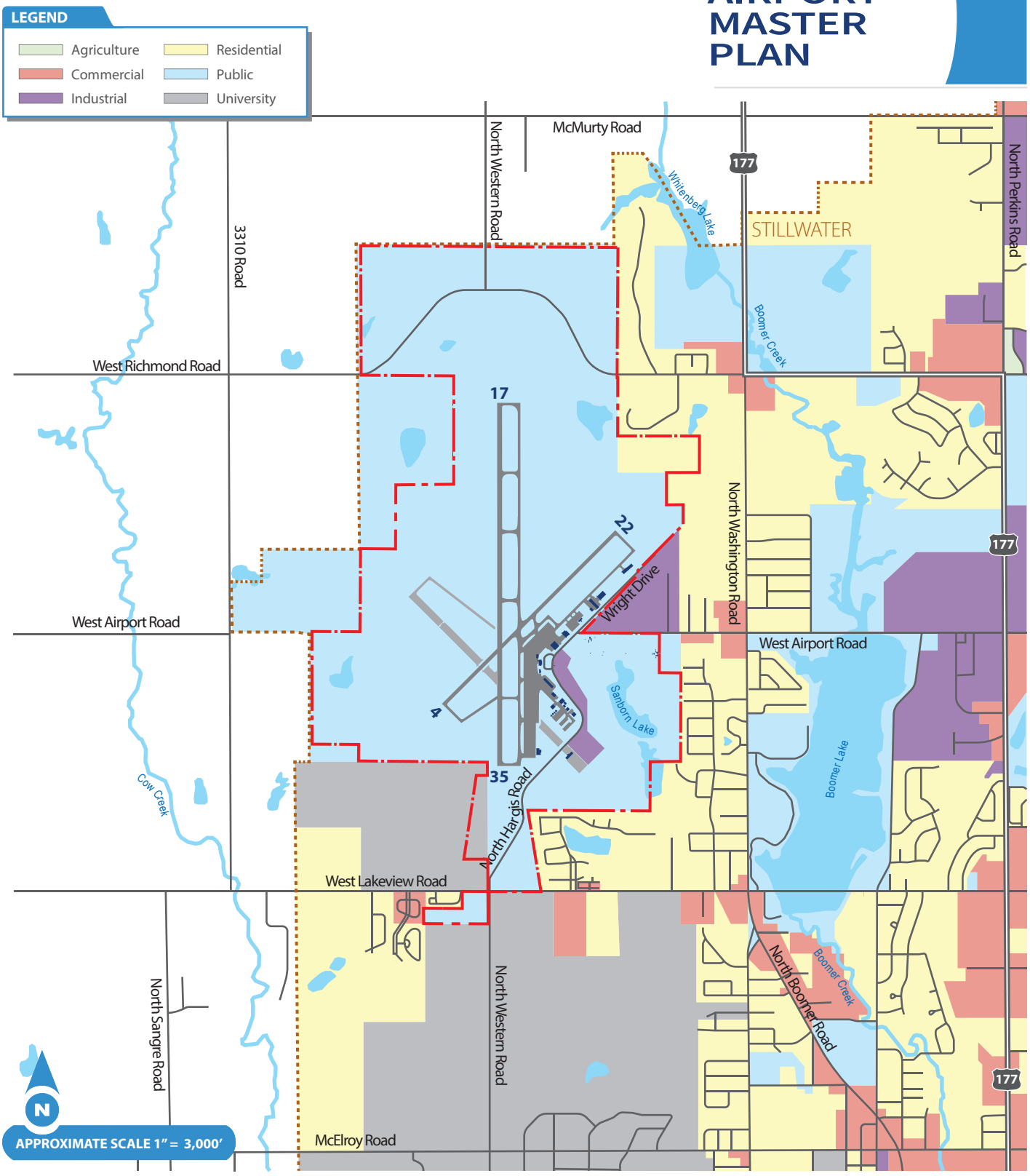
Existing Land Use

Land uses to the north and west of SWO consist primarily of agricultural and scattered rural residential. OSU-owned land immediately abuts SWO to the south, and additional medium density residential and downtown commercial uses are located further south. Land uses to the south and east include a mix of residential, commercial, and industrial developments. Parklands and greenways are scattered throughout the City of Stillwater, with several located immediately east of SWO. Existing land uses are depicted in **Figure A-9**.

Future Land Use

It is important that future land use planning efforts consider the compatibility of off-airport development to avoid creating obstacles to the safe and efficient use of the airspace surrounding an airport. Non-compatible future land uses planned for the areas surrounding an airport can negatively impact current and future airport operations.

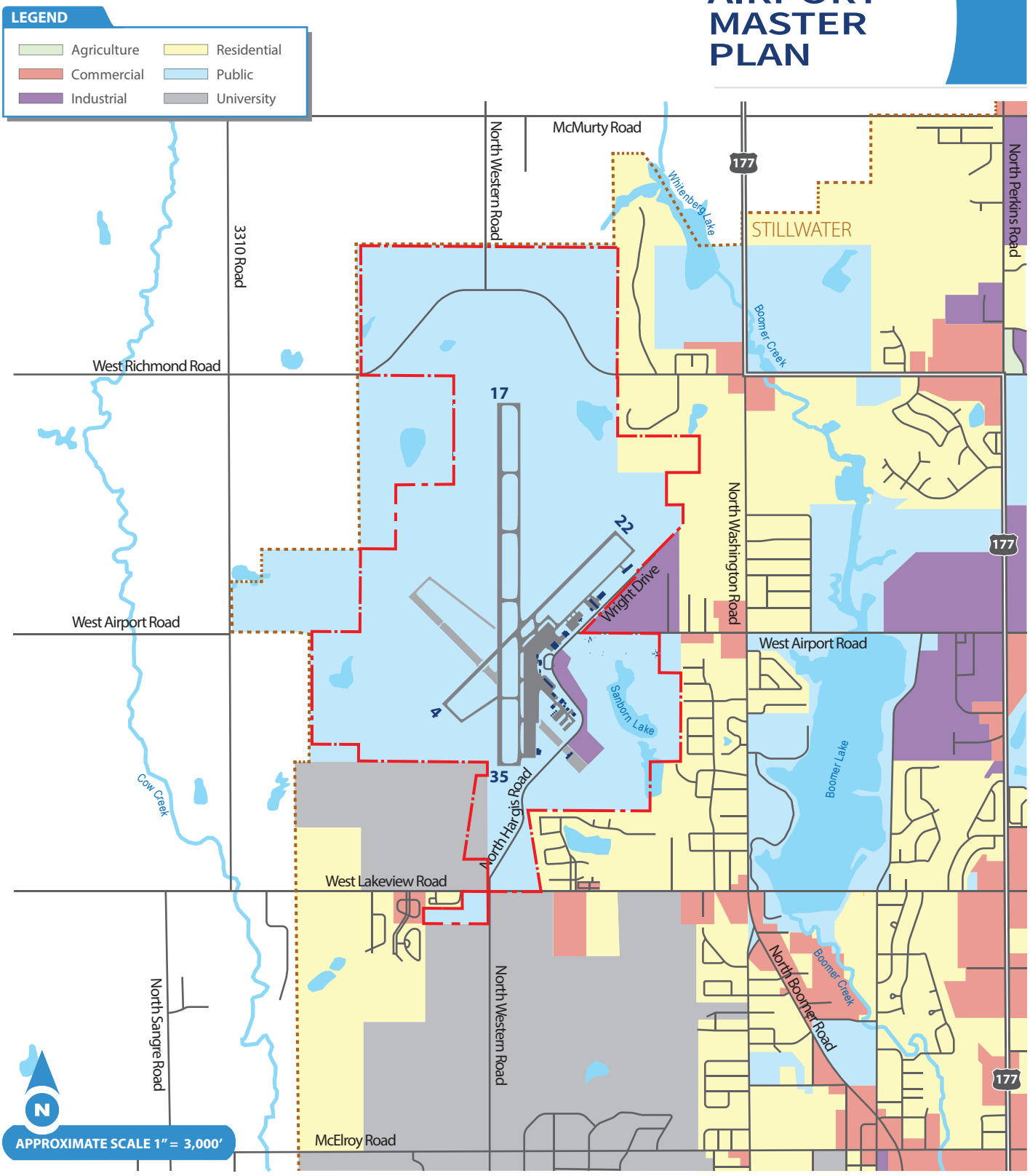
Future land uses of the areas immediately north and west of SWO skew towards low-density residential development interspersed among agricultural croplands. Additional industrial land is indicated west of the airport property line. Additional land to the south is provided for the expansion of OSU. Significant expansion of commercial uses is anticipated along Stillwater's major thoroughfares, including North Washington Road, North Boomer Road, and US-177. High density residential, or densities of 12 to 150 dwelling units per acre, are planned around areas of increased commercial development. Future land use is shown in **Figure A-10**.



Source: Google Maps, 2021; City of Stillwater GIS.

Figure A-8
Generalized Existing Zoning

SWO Stillwater REGIONAL AIRPORT



Source: Google Maps, 2021; City of Stillwater GIS.

Figure A-8
Generalized Existing Zoning

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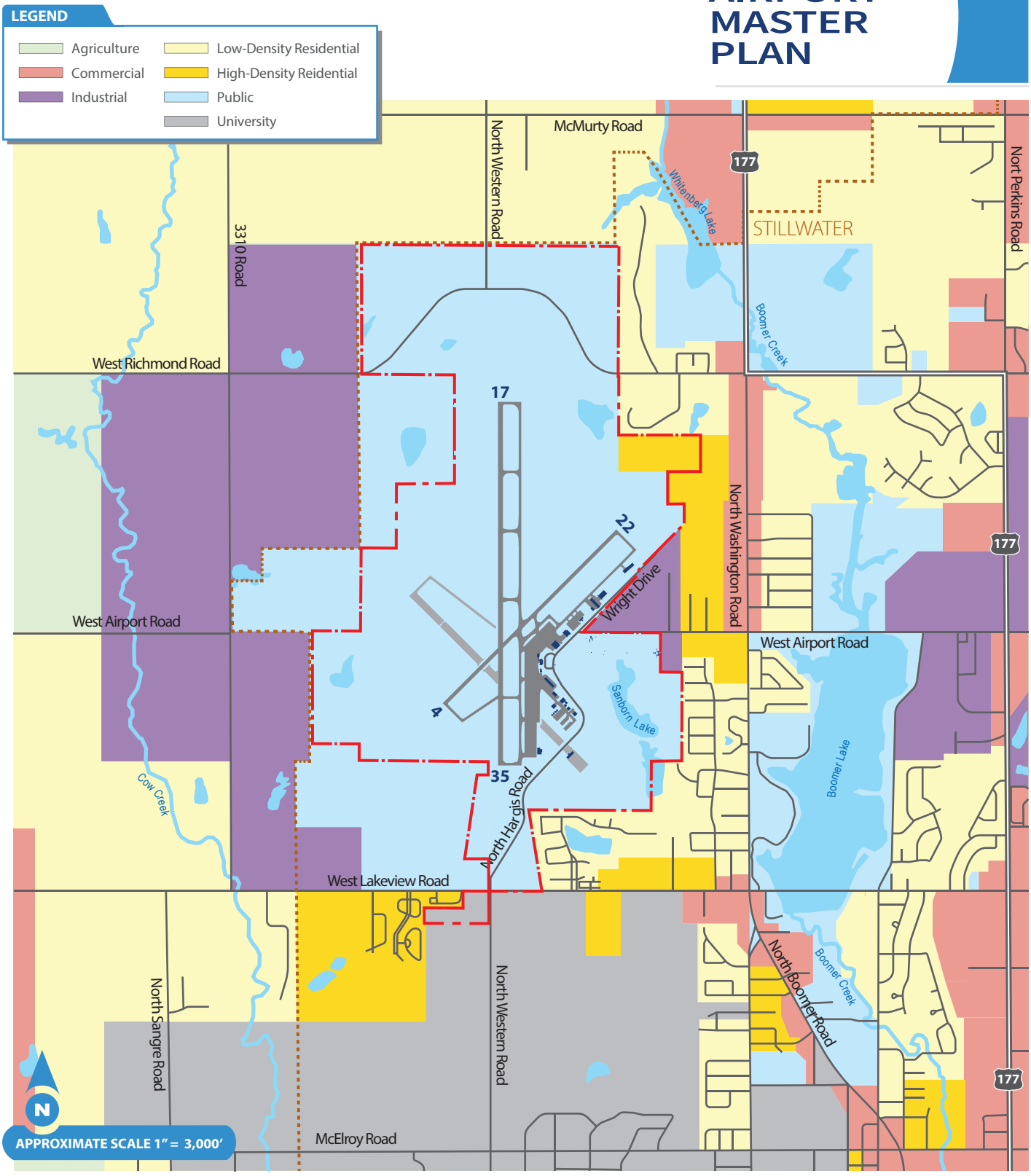


Source: Google Maps, 2021; City of Stillwater Comprehensive Plan 2030.

Figure A-10
Generalized Future Land Use

SWO Stillwater REGIONAL AIRPORT

ENVIRONMENTAL CONDITIONS INVENTORY

Understanding the environment on and surrounding SWO allows for efficient planning of future development and compliance with federal and state regulations. Awareness of the surrounding environment also affords the opportunity to understand how SWO affects the environment and neighboring community. The following narrative details environmental factors at SWO, surrounding the Airport, and within Payne County.

This environmental inventory section is not intended to satisfy environmental clearance requirements outlined in FAA Order 1050.1F, *Environmental Impacts and Procedures*, nor is it intended to fulfill requirements of the National Environmental Policy Act (NEPA). It does provide a baseline condition of environmental resources that are known to occur on or near SWO. The intent is to assist in the identification and analysis of airport development alternatives throughout the airport master planning process. The following environmental categories are not discussed as they are not relevant to SWO and/or they only relate to impacts from a specific project:

- Coastal Resources
- Light Emissions and Visual Impacts
- Natural Resources, Energy Supply, and Sustainable Designs
- Secondary (Induced) Impacts
- Wild and Scenic Rivers

Air Quality

As required by the Clean Air Act, the Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants considered harmful to public health and the environment: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Pollution (PM; both 10 micron and 2.5 micron), and Sulfur Dioxide (SO_2). An attainment area is one in which air pollutants do not exceed the NAAQS. Nonattainment areas are those in which a criteria pollutant has exceeded the NAAQS for a period of time. Payne County is in attainment for all six criteria pollutants.

Compatible Land Use

Compatible land use protects the health, safety, and welfare of those living and working near SWO, while protecting airspace for safe and efficient aircraft operations. Airports that receive federal funds must prevent the development of incompatible uses on land. They must also ensure that proposed airport actions, including the adoption of zoning laws, have or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft.

The compatibility of existing and planned land uses near airports is typically determined in relation to the level of aircraft-generated noise. Federal guidelines for a variety of compatible land uses are provided in the Code of Federal Regulations (CFR) under 14 CFR part 150, Appendix A, Table 1, *Land Use Compatibility with*

Yearly Day-Night Average Sound Levels, which is included here as **Table A-11**. The table identifies land use types as compatible, incompatible, or compatible if conducted within a sound-attenuated structure. Developed by the FAA, the table acts as a guide to local municipalities for land use planning and control and provides a tool to compare relative land use impacts resulting from planning alternatives.

Table A-10: Land Use Compatibility Matrix

LAND USE	YEARLY DAY-NIGHT NOISE LEVEL (DNL) IN DECIBELS 65-70	70-75	75-80	80-85	OVER 85
RESIDENTIAL					
Residential, other than mobile homes and transient lodgings	N(1)	N(1)	N	N	N
Mobile home parks	N	N	N	N	N
Transient lodgings	N(1)	N(1)	N(1)	N	N
PUBLIC USE					
Schools	N(1)	N(1)	N	N	N
Hospitals and nursing homes	25	30	N	N	N
Churches, auditoriums and concert halls	25	30	N	N	N
Governmental services	Y	25	30	N	N
Transportation	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE					
Offices, business and professional	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	25	30	N	N
Utilities	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	25	30	N	N
MANUFACTURING AND PRODUCTION					
Manufacturing, general	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y(6)	Y(7)	N	N	N
Mining and fishing resource production and extraction	Y	Y	Y	Y	Y
RECREATIONAL					
Outdoor sports arenas and spectator sports	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	N	N	N	N	N
Nature exhibits and zoos	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	25	30	N	N

Numbers in parentheses refer to NOTES.

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

TABLE KEY

SLUCM	Standard Land Use Coding Manual.
Y(Yes)	Land Use and related structures compatible without restrictions.
N(No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30 or 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

NOTES

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided that special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Land uses around SWO largely remain compatible with airport operations. Agricultural, industrial, commercial, and university land uses can generally function under airport flight paths with minimal impairment. Residential developments under flight paths, such as those to the northeast, are not ideal. In the Noise section that follows, existing and future noise contours are compared with the surrounding land use to determine the compatible nature of the existing land uses.

Construction Impacts

FAA Advisory Circular (AC) 150/5370-10H, *Standards for Specifying Construction of Airports*, contains provisions to minimize impacts to air quality, water quality, and soil erosion associated with projects. The AC directs that construction and demolition debris be disposed of according to applicable state and federal criteria.

The construction of proposed master plan projects can cause temporary impacts associated with construction noise, air quality, traffic impacts on local roads, and the use and storage of fuel to operate construction vehicles and equipment. Best management practices are available to avoid or reduce temporary construction impacts. Potential construction impacts will be considered in forthcoming environmental analyses performed in accordance with NEPA.

Department of Transportation Section 4(f) Properties

Section 4(f) provides that the Secretary of Transportation "may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land and the program or project includes all possible planning to minimize harm resulting from the use." The U.S. Department of Transportation Act – Section 4(f) protects certain properties from use for Department of Transportation projects unless the FAA determines there is no feasible and prudent alternative.

The Sanborn Lake Park and Sports Complex is located on SWO property occupying most of the area east of Hargis Road and south of West Airport Road. The following Section 4(f) properties are located near SWO:

- **Lakeside Memorial Golf Course –** Located 0.5 miles northeast of the Airport along US 177.
- **Boomer Lake Park –** Located immediately east of North Washington Street.
- **Western Fields football field –** Located 0.5 miles south of SWO.

Farmlands

The Farmland Protection Policy Act (FPPA) was enacted to minimize the extent to which federal actions and programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The FPPA classified farmland as prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Unique farmland is land other than prime farmland used to produce specific high-

value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Farmland of statewide or local importance includes soils that do not meet prime farmland criteria, but economically produce high yields of crops when treated and managed. A federal action that may result in conversion of farmland to non-agricultural use requires coordination with the U.S. Department of Agriculture Natural Resource Conservation Services (NRCS).

The NRCS online web soil survey system was used to identify soil types on the airport and adjacent property. Mapping and table details regarding the mapped soils within PSC are contained within the USDA/NRCS Soil Report. Airport soils are listed in **Table A-11**.

Table A-11: Airport Soils

Map Unit Name	Rating	Acres in AOI	Percent of AOI
Coyle loam, 3 to 5 percent slopes	Prime farmland	10.4	0.7%
Renfrow silt loam, 1 to 3 percent slopes	Prime farmland	18.3	1.3%
Renfrow silt loam, 3 to 5 percent slopes	Prime farmland	73.2	5.0%
Zaneis loam, 3 to 5 percent slopes	Prime farmland	10.9	0.7%
Coyle loam, 1 to 3 percent slopes	Prime farmland	4.5	0.3%
Grainola-Lucien complex, 1 to 5 percent slopes	Prime farmland	30.0	2.1%
Kirkland silt loam, 1 to 3 percent slopes	Prime farmland	67.3	4.6%
Zaneis-Huska complex, 1 to 5 percent slopes	Prime farmland	140.6	9.6%
Zaneis loam, 1 to 3 percent slopes	Prime farmland	20.6	1.4%
Total Prime Farmland		**375.8**	**25.7%**
Coyle loam, 3 to 5 percent slopes, eroded	Not prime farmland	10.0	0.7%
Pulaski fine sandy loam, 0 to 1 percent slopes, frequently flooded	Not prime farmland	25.4	1.7%
Renfrow loam, 3 to 5 percent slopes, eroded	Not prime farmland	166.3	11.4%
Renfrow and Grainola soils, 3 to 8 percent slopes, severely eroded	Not prime farmland	61.7	4.2%
Mulhall loam, 3 to 5 percent slopes, eroded	Not prime farmland	21.3	1.5%
Masham silty clay loam, 5 to 20 percent slopes	Not prime farmland	82.2	5.6%
Zaneis loam, 3 to 5 percent slopes, eroded	Not prime farmland	3.9	0.3%
Coyle and Zaneis soils, 3 to 5 percent slopes, severely eroded	Not prime farmland	3.7	0.3%
Renfrow-Urban land complex, 1 to 5 percent slopes	Not prime farmland	393.7	27.0%
Huska silt loam, 1 to 3 percent slopes	Not prime farmland	66.0	4.5%
Doolin silt loam, 1 to 3 percent slopes	Not prime farmland	28.0	1.9%
Grainola-Ashport frequently flooded-Mulhall complex, 0 to 8 percent slopes	Not prime farmland	76.7	5.3%
Grainola-Lucien complex, 5 to 12 percent slopes	Not prime farmland	125.4	8.6%
Water	Not prime farmland	17.4	1.2%
Total Non-Prime Farmland		**1,081.3**	**74.3%**
Totals for Area of Interest		**1,457.1**	**100%**

Source: USDA, NRCS, Soil Resource Report for SWO property (Area of Interest), August 2021.
Note: AOI = Area of Interest

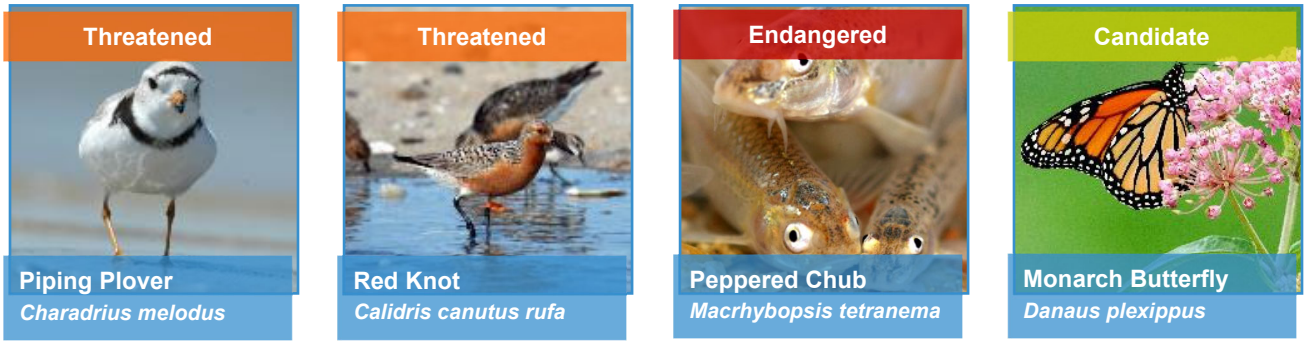
According to the NRCS, there is a variety of soil types on SWO property. The most prominent soil by percentage is the Renfrow-Urban land complex with 1 to 5 percent slopes, which accounts for 27 percent of the airport area. In addition to other non-prime farmland soils, roughly three quarters of SWO is rated as non-prime farmland.

Threatened and Endangered Species

The Endangered Species Act (ESA), as amended, requires each "federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species." The U.S. Fish and Wildlife Service is responsible for listing federal threatened and endangered species protected by the ESA. The Oklahoma Department of Wildlife Conservation (ODWC) lists the U.S. Fish and Wildlife Service federal threatened and endangered species along with the state threatened and endangered species.

The U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) System was used to identify species of concern. Species listed as threatened or endangered, or candidates that may be found within the Airport vicinity are depicted in **Figure A-11**.

Figure A-11: Listed Species Potentially Located on SWO Property



Source: U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) Species Report, August 10, 2022.

No critical habitats for any threatened or endangered species were found at SWO, nor were any National Wildlife Refuge Lands or fish hatcheries.

Some birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Certain migratory birds are listed by the USFWS Birds of Conservation Concern (BCC) list as species of potential concern. Migratory birds that may be impacted by operations at SWO are listed in **Figure A-12**.

Figure A-12: Migratory Birds Potentially Located on SWO Property

Source: U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) Species Report, August 10, 2022.

The presence of threatened or endangered species, including bald eagles and other migratory birds, does not necessarily impair operational capabilities at SWO. Certain projects, should they have the potential to disturb or kill endangered species, may require permits to proceed.

Hazardous Material, Pollution Prevention, and Solid Waste

Hazardous materials are defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) 42 United States Code (USC) 6901-6992. Hazardous materials include substances

that, due to their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment.

The two statutes of concern to the FAA are the RCRA, as amended by the Federal Facilities Compliance Act, and the CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA) and by the Community Environmental Response Facilitation Act. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of release of a hazardous substance, excluding petroleum, into the environment.

Sites of interest are defined as state cleanup sites, federal superfund cleanup sites, hazardous waste generators, solid waste facilities, underground storage tanks, dairies, and enforcement actions. The U.S. EPA lists four sites of interest at SWO. These are listed in **Table A-12**.

Table A-12: EPA-Regulated Facilities Near SWO

Site Name	Site Address (Stillwater, OK 74075)
The Brinkman Corporation	1616 W Airport Rd
Oklahoma Military Department / Stillwater Readiness Center	1616 W Airport Rd
Oklahoma Army National Guard OMS #4	1207 W Airport Rd
Sanborn Baseball Fields	1201 W Airport Rd

Source: US EPA Envirofacts.

Note: None of the addresses listed by the EPA are on SWO property.

Historical, Architectural, Archaeological, and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the impacts of their undertakings on historic properties, which include archeological sites, buildings, structures, objects, and districts. The NHPA also requires federal agencies to allow the Advisory Council of Historic Preservation the opportunity to comment on the undertaking. The National Park Service (NPS) maintains the National Register of Historic Places (NRHP), which lists all historic sites that meet criteria.

According to the NRHP, there are no historical sites, buildings, structures, or objects on airport property. The nearest historical sites are located in or around OSU and downtown Stillwater, approximately 1.5 miles south of SWO.

Noise

Noise is generally defined as unwanted sound that can disturb routine activities (such as sleep, conversation, or student learning) and cause annoyance. The determination of acceptable levels is subjective. The standard unit of measurement for the loudness of sound is the decibel (dB). The FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activity must be established in terms of a yearly day-night average sound level (DNL). DNL is a 24-hour, time-weighted energy average noise level based on the “A” weighted decibel (dBA), in which “A” weighted refers to the sound scale pertaining to the human ear, or the overall noise energy level experienced during an entire day. Time-weighted refers to the fact that noise occurring between the hours of 10:00 p.m. and 7:00 a.m. is penalized by

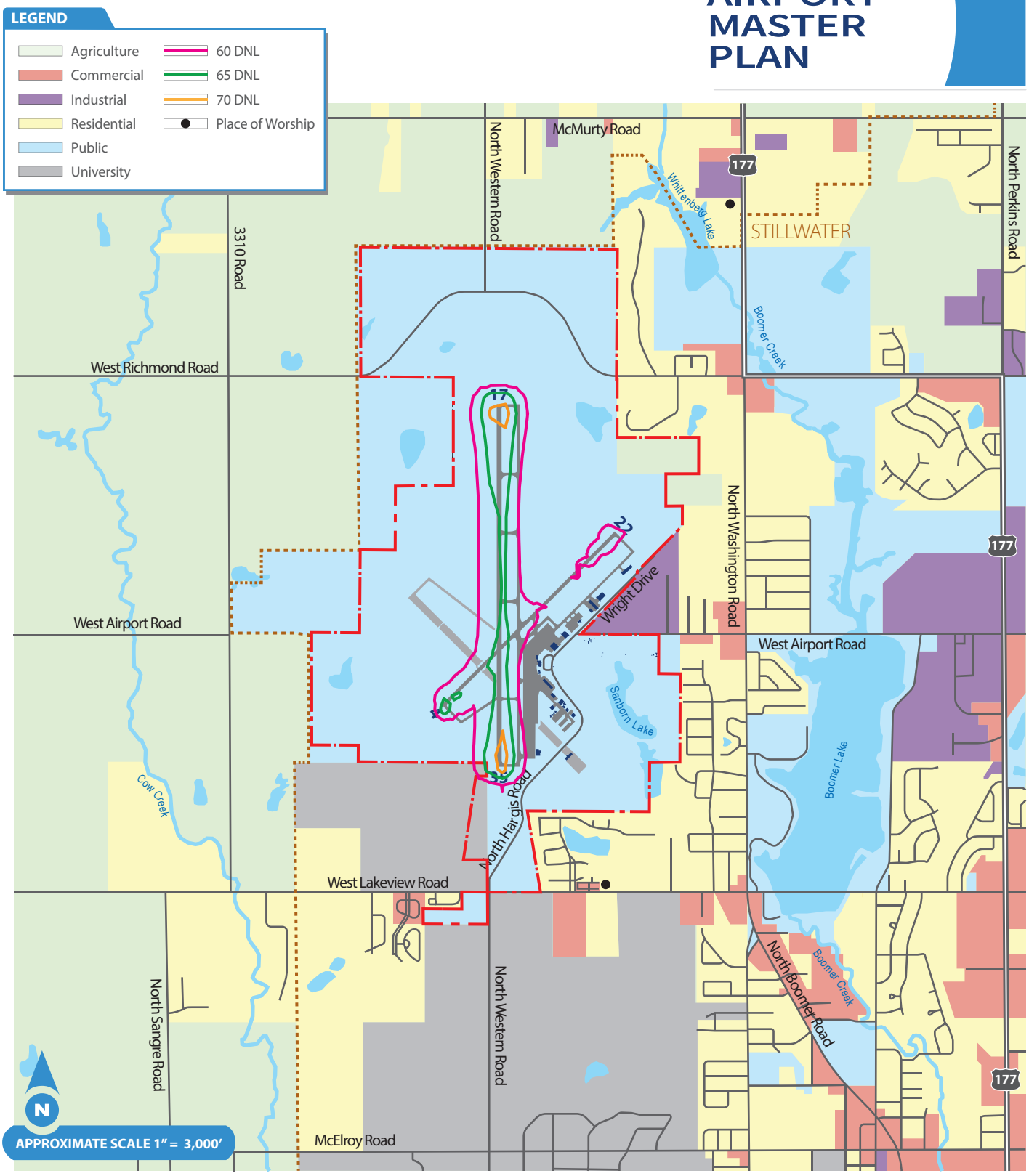
10 dBA to account for the higher sensitivity to noise during nighttime hours and the expected decrease in background noise levels.

DNL noise levels are depicted as noise contours, which show interpolations of noise levels based on the center of grid cells. Grid cells are squares of land of a specific size entirely characterized by a noise level. Noise contours connect the points of comparable noise levels, similar to topographical contours, and form concentric footprints around a noise source. These footprints surrounding an airport are used to predict community response to noise from aircraft using the airport.

As presented earlier in **Table A-10**, FAA guidelines indicate the 65 DNL noise contour is the threshold of significance for land use analysis. **Figure A-13** provides the existing noise contours generated using the 2020 aircraft operational activity presented in **Chapter B – Forecasts of Aviation Activity**, overlaid on the existing land uses surrounding SWO. As can be seen, the existing 65 DNL noise contour does not extend beyond airport property. The existing 60 DNL noise contour does extend slightly beyond airport property west of Runway End 35 into land owned by OSU. This property is undeveloped.

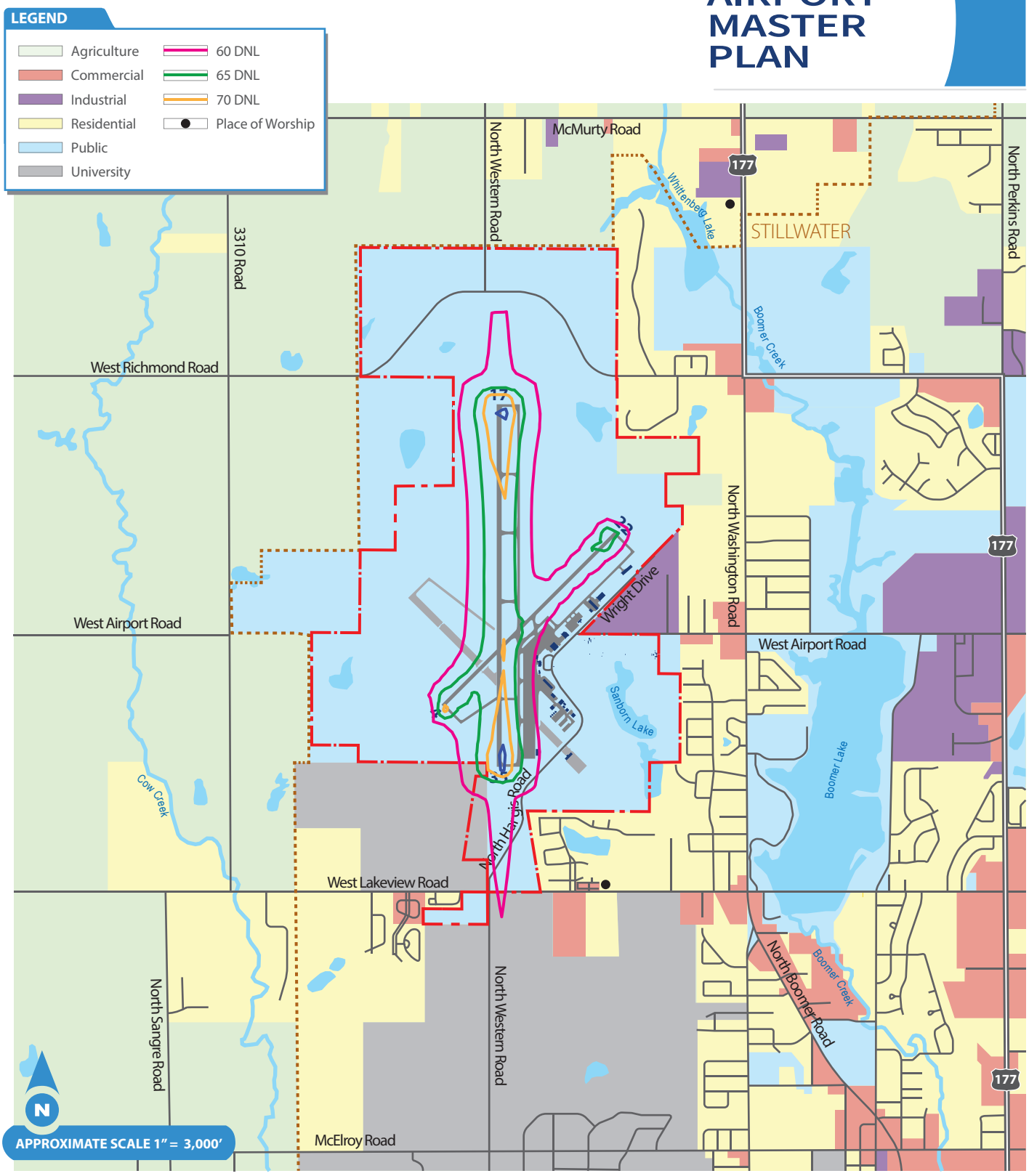
Figure A-14 provides the future noise contours generated using the 2040 forecast of aircraft operational activity also presented in **Chapter B – Forecasts of Aviation Activity** and overlaid on the existing land uses surrounding SWO. As provided, the future 65 DNL noise contour extends slightly into land owned by OSU west of the Runway 35 End. Again, this land is currently undeveloped. The future 60 DNL noise contour extends further into the OSU-owned land in this same general area, as well as into OSU-owned land south of West Lakeview Road. This land is currently used by OSU for its bus transportation fleet storage and Compressed Natural Gas (CNG) fueling facility.

Based on this analysis, there are no land use incompatibilities associated with existing or future noise levels generated by aircraft operations at SWO.



Source: Google Maps, 2021; City of Stillwater and Payne County GIS.

Figure A-13:
Existing (2020) Noise Contours
With Generalized Existing Land Use



Source: Google Maps, 2021; City of Stillwater and Payne County GIS.

Figure A-14:
Future (2040) Noise Contours
With Generalized Existing Land Use

Socioeconomic, Environmental Justice, and Children's Health and Safety Risks

Council on Environmental Quality regulations in 40 CFR, Section 1508, requires environmental documents prepared for federally funded projects to address potential social impacts. The evaluation of a proposed project on the human environment must address the following:

- Disproportionate impacts to low-income and minority populations
- Potential relocation of homes or businesses
- Division or disruption of an established community
- Disruptions to orderly planned development
- Notable project-related changes in employment
- Impacts on health and safety risks to children.

Demographics for the City of Stillwater are shown in **Table A-13**. It should be noted that the population of OSU students population during the academic year (i.e., August through May) increases the Stillwater population to near 80,000.

Table A-13: Demographics for Stillwater, Oklahoma

Demographic Category	2010	Percent	2019	Percent
Population	**44,681**		**49,952**	
Male	22,465	50.3%	25,842	51.7%
Female	22,216	49.7%	24,110	48.3%
Age				
Under 18 years	6,324	14.2%	7,964	15.9%
18-64 years	34,628	77.5%	37,412	74.9%
65 years and over	3,729	8.3%	4,576	9.2%
Median Age (years)	23.8		23.5	
Race				
White	35,642	79.8%	38,601	77.3%
Black or African American	1,691	3.8%	2,306	4.6%
American Indian and Alaska Native	1,919	4.3%	2,031	4.1%
Asian	2,695	6.0%	3,354	6.7%
Native Hawaiian and Other Pacific Islander	21	0.0%	63	0.1%
Other	315	0.7%	387	0.8%
Two or more races	2,398	5.4%	3,210	6.4%
Persons Below the Poverty Level	**12,352**	**31.1%**	**15,069**	**35.2%**

Source: U.S. Census Bureau, American Community Survey.

Socioeconomic Impacts

Improvements at SWO are not expected to create significant change in population, public service, and economic activity, but are expected to have positive impacts through creation of employment opportunity, business growth, and economic activity. Coordination with resource agencies should be a priority prior to implementation. As shown in **Table A-13**, the poverty rate for the City of Stillwater was 35.2 percent in 2019.

FAA Order 1050.1F states, “If acquisition of real property or displacement of persons is involved, 49 CFR Part 24 (implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970), as amended, must be met for federal projects and projects involving federal funding. Otherwise, the FAA, to the fullest extent possible, observes all state and local laws, regulations, and ordinances concerning zoning, transportation, economic development, housing, etc. when planning, assessing, or implementing the proposed action or alternative(s).”

Environmental Justice

Environmental justice assessments seek to identify the health disparities across a community’s disadvantaged and underrepresented populations as defined by race, ethnicity, and socioeconomic status. FAA Order 1050.1F states, “…the FAA must provide for meaningful public involvement by minority and low-income populations. In accordance with Department of Transportation Order 5610.2(a), this public involvement must provide an opportunity for minority and low-income populations to provide input on the analysis, including demographic analysis, which identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.”

Environmental justice impacts, including cancer, asthma, obesity, and mental health issues, can be exacerbated through the construction and operation of new facilities and those impacts tend to affect low-income or minority populations at a disproportionately higher rate. In cases where the population in or around a project area have been identified to be disadvantaged or underrepresented, the environmental documents are expected to include the following:

- Demographic information about the affected populations
- Information about the population(s) that have an established use for the significantly affected resource, or to whom that resource is important (e.g., subsistence fishing)
- Results of analysis to determine if a low-income or minority population using the resource sustains more of the impact than any other population segments
- Identification of disproportionately affected low-income and minority populations
- Discussion of alternatives that would reduce the effect on these populations
- Description of possible mitigation to reduce the effect on the disproportionately affected low-income and minority populations.

The NEPA process requires environmental justice review and impact analysis for airport improvements. According to a search of the American Community Survey (2010-2019), the percentage of minority (non-white) populations as of 2019 was 22.7 percent in the City of Stillwater. The Climate and Economic Justice Screening Tool (CEJST) published by the White House Council on Environmental Quality (CEQ) indicated that there were no identified disadvantaged communities near SWO.

Children's Environmental Health and Safety Risks

FAA Order 1050.1F states "Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, Federal agencies are directed to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to."

Locations with concentrated populations of children near SWO are Will Rogers Elementary and Stillwater High School 1.25 miles to the southeast, and Richmond Elementary School 1.75 miles to the northeast. Boomer Lake Park east of SWO could also attract concentrated adolescent populations. According to the American Community Survey, 15.9 percent of the population, or 7,964 individuals, are under the age of 18 in Stillwater.

Water Resources

Water resources are surface and ground waters that are vital to society because they provide drinking water as well as support recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. Surface water, ground water, floodplains, and wetlands do not function as separate and isolated components of the watershed, but rather as a single, integrated natural system. Disruption of any one part of this system can result in consequences to the functioning of the entire system, which must be considered along with potential impacts to the quality of water resources throughout this Master Plan.

Wetlands

The Clean Water Act (CWA) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Federal regulations require that proposed actions avoid, to the greatest extent possible, long-term and short-term impacts to wetlands, including the destruction and altering of the functions and values of wetlands.

The USFWS National Wetlands Inventory (NWI) online mapping system was reviewed to identify mapped wetlands near SWO. According to the NWI, two freshwater wetlands are located in the easternmost portion of SWO property: one wetland is located north of Sanborn Lake and the other north of Hazen Lake. A freshwater emergent wetland is also located north of Sanborn Lake. This system is fed by a stream that continues off SWO to the south.

Floodplains

A floodplain is generally a flat, low-lying area adjacent to a stream or river that is subject to inundation during high flows. The relative elevation of a floodplain determines its frequency of flooding.

Executive Order 11988 requires federal agencies "to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of 100-year floodplains (i.e., areas subject to inundation by a 1 percent annual chance of flood) and to avoid direct or indirect support of floodplain development whenever there is a practical alternative."

According to the Federal Emergency Management Agency National Flood Hazard Layer Viewer, SWO is entirely located within an area of minimal flood hazard (Zone X). Areas within Zone X are areas are outside the 500-year flood plain. Boomer Lake and its surrounding watersheds is designated as Zone AE, which is within the 100-year floodplain and has a base flood elevation.

Surface Waters

Protected by the Safe Drinking Water Act (SDWA) and CWA, surface waters are considered waters of the United States and include streams, rivers, lakes, ponds, statuaries, and oceans. The Oklahoma Water Resources Board (OWRB) monitors surface water throughout the state. In addition to Sanborn Lake on SWO's southeastern edge, several freshwater ponds are scattered throughout SWO. These ponds are usually connected by streams that flow off the property and connect with other nearby surface waters.

Groundwater

Groundwater is a subsurface water that occupies the space between sand, clay, and rock formations. Aquifers are the geologic layers that store or transmit groundwater to wells, springs, and other water sources. The SDWA and its implementing regulations (40 CFR Parts 141-149) prohibit federal agencies from funding actions that would contaminate an EPA-designated sole source aquifer or its recharge area. State and local agencies may also promulgate regulations to protect sole source aquifers and their recharge areas.

No groundwater aquifers were identified by the OWRB at or near SWO. There are two wells located on SWO property, as well as a regulated underground storage tank used for jet fuel.

CLIMATE AND WIND DATA

Weather conditions impact aircraft performance and influence airport design. The design process must account for temperature, precipitation, winds, visibility, and cloud ceiling heights. Wind patterns impact runway use and must be assessed to determine runway design requirements.

Wind

The historical pattern of prevailing winds influences desirable runway orientation and runway use. The FAA has determined that crosswinds pose a hazard to the safe operation of aircraft, particularly to small and light aircraft. Therefore, an airport's primary runway should align with the prevailing winds.

Wind coverage is defined as the average percentage of time that a runway is not subjected to crosswinds of magnitude greater than the allowable crosswind component for each runway. FAA defines the desirable minimum wind coverage of an airport's runway configuration as 95 percent of wind velocity and direction observations over the most recent 10-year period. The allowable crosswind component used to compute the

wind coverage for a given runway is based on the Runway Design Code (RDC) of the most demanding aircraft expected to use the runway. RDC categories, FAA crosswind components, and aircraft types are listed in **Table A-14**.

Table A-14: Crosswind Component RDC Categories

Runway Design Code (RDC)	Aircraft Types	FAA Crosswind Component
A-I and B-I: Includes A-I and B-I Small (Small Aircraft of 12,500 pounds or less)	Piston	10.5-Knot
A-II and B-II	Small Jets and Turboprops	13-Knot
A-III, B-II | C-I to C-III | D-I to D-III	Large Jets and Turboprops	16-Knot
A-IV and B-IV | C-IV to C-VI | D-IV to D-VI	Large Jet Transports	20-Knot

Source: FAA Advisory Circular (AC) 150/5300-13A, Change 1.

Wind data is reported to and available from the National Oceanic and Atmospheric Administration (NOAA) by an ASOS located at SWO. Wind data from 2010 to 2020 is grouped in three categories presented in **Table A-15**.

Table A-15: Ceiling and Visibility Categories

Wind Coverage	Definition	Occurrence
All Weather	All wind observations	N/A
Instrument Flight Rules (IFR)	Cloud ceiling less than 1,000' and/or visibility less than 3 miles, but cloud ceiling greater or equal to 200 feet and visibility greater than or equal to 1/2 miles	Approximately 13 percent of the time from 2011 to 2020
Visual Flight Rules (VFR)	Could celling greater than or equal to 1,000 feet and visibility greater than or equal to 3 miles	Approximately 87 percent of the time from 2011 to 2020

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. August 2021. Wind data provided by NOAA Integrated Surface Database (ISD). Station 723545. Period of Record 2011-2020.

The FAA's Airport Data and Information Portal (ADIP) wind analysis program was used to determine the wind coverage for SWO's runway orientations, both individually and combined as presented in **Table A-16**. Runway 17/35 and Runway 4/22 align with the prevailing winds and together provide greater than 95 percent wind coverage for the 10.5-, 13-, and 16-knot crosswind components.

Table A-16: Wind Coverage

Runway	10.5-Knot	13-Knot	16-Knot
All Weather			
Runway 17/35	95.63%	97.93%	99.40%
Runway 4/22	83.81%	91.45%	97.65%
Combined	97.78%	99.18%	99.78%
IFR Weather			
Runway 17/35	94.96%	97.43%	99.15%
Runway 4/22	85.84%	92.32%	97.77%
Combined	97.31%	98.92%	99.67%
VFR Weather			
Runway 17/35	95.72%	98.01%	99.45%
Runway 4/22	83.43%	91.28%	97.62%
Combined	97.85%	99.23%	99.80%

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. August 2021. Wind data provided by NOAA Integrated Surface Database (ISD). Station 723545. Period of Record 2011-2020.

Climate

Stillwater lies near the western edge of the country's humid subtropical climate region as well as where the Rocky Mountain rain shadow has faded. Therefore, the climate is characterized by hot, humid summers and generally mild to cool winters. Rainfall is evenly distributed throughout the year. **Table A-17** presents the basic monthly and annual average climate data for Stillwater using data obtained from the NOAA.

Table A-17: Climate Data

Month	Precipitation (inches)	Mean Maximum Temperature (°F)	Mean Minimum Temperature (°F)	Mean Average Temperature (°F)
January	0.92	50.7	26.7	38.7
February	1.33	55.5	30.7	43.1
March	2.22	64.8	39.5	52.1
April	3.72	73.4	48.5	60.9
May	4.58	80.9	58.5	69.7
June	4.49	89.6	67.6	78.6
July	3.12	95.4	72.1	83.7
August	3.28	95.0	70.5	82.7
September	3.11	86.7	61.9	74.3
October	2.94	75.3	49.4	62.3
November	1.95	62.8	37.8	50.3
December	1.51	52.3	29.5	40.9
Annual Average	**33.17**	**73.5**	**49.4**	**61.5**

Source: NOAA, U.S. Climate Normals Quick Access Tool. August 2021.

STRATEGIC EVALUATION

As a strategic planning process, this Study is structured to be responsive to the overall mission of SWO while being inclusive of broader community needs. Knowing that plans involving diverse participation are more successful and widely accepted than those without, a Study Committee (Committee) was assembled

specifically for this Study. The Committee serves in an advisory capacity and consists of aviation and non-aviation constituents selected to provide well-rounded perspectives. The Committee provides continuous participation, engages at key decision-points, and guides Study recommendations reflecting airport user needs, aligning with community interests, and supporting the City of Stillwater's plan and vision. The Committee is charged with reviewing materials, attending meetings, providing comment on findings, and encouraging awareness and adoption of the Study recommendations. Committee feedback is incorporated, as appropriate, into the final Study documentation.

As part of the strategic planning process, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted to determine the appropriate strategic visions for SWO, and specific goals and objectives to be addressed throughout the Study. The SWOT analysis is a process for synchronizing strategic decision-making factors and helps categorize the Airport's and city's internal and external characteristics, qualities, and merits. The SWOT factors help formulate goals, provide the basis to pragmatically assess recommendations, and guide the Study's overall development policy. The full SWOT analysis is contained in **Appendix One**.

B. Forecasts of Aviation Activity

INTRODUCTION

Aviation activity forecasts evaluate future demand at an airport. The development of accurate and defensible forecasts is a key element in the Master Plan Study process. Forecasts inform the determination of future airport requirements, analysis of alternative development plans, assessment of the possible environmental effects of proposed plans, and the determination of the economic implications of future growth and development. While forecasting, by nature, is not an exact science, it does establish general estimates for future aviation activity levels and provides a defined rationale for necessary airport facility changes as demands increase.

Principally, local airport factors, aviation industry trends, and overarching regional socioeconomic market conditions influence aviation activity forecasts. They are developed to meet five main objectives:

- Provide a realistic and sustainable estimate.
- Be based on the latest available data.
- Reflect current conditions at the Airport.
- Be supported by information in the Master Plan Study.
- Provide adequate justification for future airport development.

The forecasts have a base year of 2020 and use the Federal Aviation Administration (FAA) Fiscal Year (FY) from October to September. The forecast period is 20 years from the base year with reporting intervals of every five years. In keeping with the industry standards, data from the past 10 years is used as the basis for historical trends. Using the previous 10 years helps the forecasts account for various economic conditions and provides a perspective of the effects of economic change on aviation activity. This Master Plan places an additional focus on economic and aviation activity since 2020 because of the COVID-19 pandemic impacts.

Data Sources

A variety of data sources were used in this chapter, as listed in **Table B-1**. However, most of the aviation activity occurring at Stillwater Regional Airport (SWO or the Airport) is derived from the FAA 2020 Terminal Area Forecast (TAF). The TAF is the official FAA forecast that is prepared annually by FAA Headquarters for each airport in the FAA National Plan of Integrated Airport Systems (NPIAS). TAF data comes from the U.S. Department of Transportation (USDOT) T-100 database, Airport Traffic Control Tower (ATCT) records, and FAA Form 5010, which airports submit annually to the FAA.

The TAF is generally reliable. However, its most recent data may lag a year behind other available records, and values for 2020 onward feature updates with data available from other databases and records. Therefore, 2021 year-to-date (at the time of forecast preparation, June 2021 was the most recent data available) and the most recent 12-months of data (when available) are presented.

Table B-1: Data Sources

Source	Description
FAA Terminal Area Forecasts (TAF)	The FAA TAF provides historical records and forecasts for passenger enplanements, aircraft operations and based aircraft. It does not forecast operations by aircraft type, peak activity level, critical aircraft, or air cargo. These forecasts serve as a comparison for forecasts prepared as part of this planning effort and provide historical information on aircraft activity. The 2020 TAF used in this forecast was released in May 2021.
FAA Traffic Flow Management System Counts (TFMSC)	TFMSC includes data collected from flight plans. These operations are categorized by aircraft type and used to identify trends in the SWO fleet mix. The advantage of the TFMSC data is its degree of detail and its insights into the itinerant users of SWO. A disadvantage of TFMSC data is that it does not include local operations or operations that did not file a flight plan. As such, the utility of TFMSC data is limited to larger aircraft, including scheduled commercial passenger, air cargo, charter operations, and private business jets.
FAA Aerospace Forecasts	The Aerospace Forecast 2021-2041 is a national-level forecast of aviation activity. The Aerospace Forecast helps guide local forecasts by serving as a point of comparison between local trends and national trends.
U.S. Department of Transportation (USDOT) T-100 Database	Scheduled, charter passenger, and air cargo airlines fill out the T-100 form monthly. The T-100 database is an online repository of the data recorded on the forms, such as number of seats sold, number of seats available, freight transported, aircraft used, and departures performed. The T-100 provides a detailed look at the operations of passenger and cargo airlines.
Woods & Poole Inc.	Socioeconomic data is provided by data vendor Woods & Poole Inc. (W&P), which is a data vendor providing socioeconomic data for gap years in the U.S. Census. The W&P dataset considers the Stillwater Metropolitan Statistical Area (MSA) equivalent to the boundary of Payne County. The dataset provides 124 data categories with records from 1970 to 2020 and forecast through 2050. Data categories considered include population, employment, earnings and income, and Gross Regional Product (GRP).
Operations Network (OPSNET)	OPSNET is the source of National Airspace System (NAS) air traffic operations and delay data. Provided information for monthly aircraft operations for 2020 and 2021, as well as Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) operations.
Stakeholder Interviews/Data Gathering	The Consultant conducted interviews with stakeholders during site visits and made contact via phone and email with others. Interviews included the Air Traffic Control Tower (ATCT), Transportation Security Administration (TSA), Aircraft Rescue and Fire Fighting (ARFF), Fixed Based Operator (FBO), the City of Stillwater, the Oklahoma State University (OSU) Flight Center, Envoy Airlines, and Martinaire Aviation LLC (SWO's air cargo operator).

One of the primary drivers in the difference between the TAF and other records of data available is the operations that occur when the ATCT is closed. The SWO ATCT is open from 8:00 a.m. to 10:00 p.m., and it records aircraft operations that occur during this time. Operations occurring outside these hours are not reported. Therefore, TAF data is supplemented with data from the airport or tenants, TFMSC, or USDOT 1-100 when determined to be accurate. This data may include sources such as air carrier aircraft operations occurring when the ATCT is closed.

The FAA reviews airport master plan forecasts by comparing them to the TAF. Forecasts within 10 percent of the TAF over the first five-year period and within 15 percent within the 10-year period can be approved by the Airports District Offices. Forecasts outside these tolerances go to FAA Headquarters for review. Therefore, every preferred forecast component that has a corresponding TAF category is compared to the TAF for consistency.

EXISTING CONDITIONS AND ASSUMPTIONS

The level and type of aviation activity is dependent upon many factors, but it is generally reflective of:

- Local and national airline activity trends.
- Airport services available to the aviation community.
- Specific activity and businesses located on the airport or within the community the airport serves.
- General socioeconomic conditions prevalent within the surrounding area.

Regional Profile

Several regional underlying conditions were evaluated to develop a series of assumptions serving as a foundation for these forecasts. They represent a variety of locational, operational, and socioeconomic considerations that may affect aviation activity at SWO to varying degrees.

Regional Socioeconomic Conditions

Socioeconomic data generally correlates with aviation activity within the same geographic region. Population, employment, income, and gross domestic product (GDP) are indicators that typically influence aviation activity. Population is an indication of the general number of persons served by an airport, and therefore influences the potential customer base. Employment levels gauge economic activity and vitality. Income statistics reflect the degree to which an airport's customer base has sufficient disposable income to spend on aviation activities such as airline ticket purchases, pilot training, aircraft ownership, and aircraft charter or rental. GDP is the value of goods and services produced in an area and serves as an index for the health of the overall economy.

Despite significant short-term impacts, Woods & Poole determined that COVID-19 did not appear to have made a quantifiable long-term economic impact affecting the forecasts.

(Woods & Poole, Inc., *2020 Regional Projections and Database*)

The economic and demographic forecasting firm Woods & Poole, Inc, is used for most of the socioeconomic historical data and all the future projections in this Master Plan. When the data and projections were published in mid-2020 (using data through 2018), the effects on COVID-19 on the U.S. economy were being experienced. Sharp and significant declines in monthly retail sales, GDP, and employment were already evident through the first four months of the year. Woods & Poole analyzed the preliminary monthly data to determine what, if any conclusions about 2020 annual totals could be made and included in their models. The inclusion of a revised 2020 estimate of historical data that incorporated the COVID-19 impacts was decided against because the data were unclear about what the estimate should be and because the long-term impact of an estimate could not be made reliably. No doubt, many of the COVID-19 related economic impacts have been mitigated by the various federal government actions such as the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020, the Coronavirus Response and Consolidated Appropriations Act of 2021, and the American Rescue Plan (ARP) of 2021.

Population

According to Woods & Poole data, the Stillwater MSA population has seen a steady but slight increase since 2010. This compares favorably to both the state and national growth rates. Future growth expectations for both the city and state are slightly less than national rates. **Table B-2** details the population data over the past 10 years, contains projected conditions 20 years into the future, and shows the respective associated Compound Annual Growth Rates (CAGR).

Table B-2: Population Data, 2010-2040

Year	Stillwater	Oklahoma	United States
Historical			
2010	78,223	3,759,632	309,326,026
2015	81,324	3,909,831	320,745,038
2020	83,095	3,989,697	331,472,851
CAGR	**0.7%**	**0.6%**	**0.7%**
Projected			
2025	85,698	4,105,730	342,330,653
2030	88,147	4,217,120	353,002,641
2035	90,370	4,321,153	363,262,483
2040	92,313	4,415,738	372,934,650
CAGR	**0.5%**	**0.5%**	**0.6%**

Source: Woods & Poole, Inc., 2020.

Employment

Historical employment growth within Stillwater has lagged both the state and national growth rates. However, the unemployment rate within Stillwater has been lower than the historical state and national averages.

Evaluating the unemployment rates for Stillwater, Oklahoma, and the United States by quarter through 2020 and the first half of 2021, both Stillwater and Oklahoma have clearly returned to near pre-pandemic levels. The national unemployment rate, while declining, has not yet reached its pre-pandemic level.

Woods & Poole employment projections throughout the 20-year future period indicate a smaller growth rate for Stillwater than the state and nation. **Table B-3** details the historical and projected employment data for the City of Stillwater, the state, and nation.

Table B-3: Employment Data, 2010-2040

Year	Stillwater		Oklahoma		United States	
	Employment[1]	Unemployment Rate[2]	Employment[1]	Unemployment Rate[2]	Employment[1]	Unemployment Rate[2]
Historical						
2010	46,674	5.1	2,130,129	6.5	172,901,690	9.6
2015	49,123	3.3	2,286,959	4.3	190,315,792	5.3
2020	51,304	4.8	2,413,383	6.1	206,901,316	8.1
CAGR	**1.0%**	**N/A**	**1.3%**	**N/A**	**1.8%**	**N/A**
2020-2021 by Quarter[2]						
1Q 2020	---	2.5	---	3.3	---	4.1
2Q 2020	---	9.3	---	10.3	---	12.9
3Q 2020	---	4.6	---	6.3	---	8.9
4Q 2020	---	3.1	---	4.7	---	6.5
1Q 2021	---	3.4	---	4.8	---	6.5
2Q 2021	---	2.8	---	3.6	---	5.8
Projected						
2025	53,752	---	2,541,470	---	221,248,604	---
2030	55,994	---	2,661,667	---	234,749,589	---
2035	58,100	---	2,776,376	---	247,922,569	---
2040	60,105	---	2,886,756	---	260,952,286	---
CAGR	**0.8%**	**N/A**	**0.9%**	**N/A**	**1.2%**	**N/A**

Sources: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Labor Statistics, 2021.

Notes: --- Data not available.

With over 6,000 employees, Oklahoma State University (OSU) is Stillwater's largest employer. Because of its public education function, OSU is not as affected by variations of the local, state, or national economies as private entities, and is therefore less prone to large employment swings. OSU's employment is expected to remain steady and will continue to be Stillwater's largest employer throughout the planning period.

Other top employers within Stillwater and Payne County include:

- **Stillwater Medical Center** (over 1,000 employees)
- **Stillwater Public Schools** (over 750 employees)
- **City of Stillwater** (over 550 employees)
- **Stillwater Design/Kicker** (over 175 employees)
- **ASCO Aerospace** USA (over 150 employees)
- **National Standard** (over 150 employees)
- **OnCue** (over 150 employees)
- **Meridian Technology Center** (over 125 employees)
- **Frontier Electronic Systems** (over 100 employees)
- **Stan Clark Companies** (over 100 employees)
- **Armstrong World Industries** (over 100 employees).

Income

Personal per capita income growth within Stillwater has also historically lagged both the state and national growth rates. Using quarterly state and national data from the Bureau of Economic Analysis, the COVID-19

pandemic clearly has had a negative effect on income levels in the third and fourth quarters of 2020. However, income levels have rebounded to pre-pandemic levels by the first quarter of 2021.

Woods & Poole projections continue the trend that income growth within Stillwater will be behind the state and national rates, although the City's per capita income rate is expected to make up ground in both the state and national growth rates during the 20-year future period. **Table B-4** details the historical and projected employment data for the city, state, and nation.

Table B-4: Per Capita Personal Income Data, 2010-2040

Year	Stillwater	Oklahoma	United States
Historical[1]			
2010	$30,912	$36,544	$40,546
2015	$35,455	$44,245	$48,977
2020	$39,646	$48,752	$57,668
CAGR	**2.5%**	**2.9%**	**3.6%**
2020-2021 by Quarter[2]			
1Q 2020	---	$47,644	$57,523
2Q 2020	---	$52,502	$62,060
3Q 2020	---	$48,683	$60,184
4Q 2020	---	$48,293	$59,532
1Q 2021	---	$55,504	$66,889
Projected[1]			
2025	$48,247	$59,531	$71,114
2030	$60,293	$74,663	$89,940
2035	$75,952	$94,387	$114,601
2040	$95,749	$119,390	$146,088
CAGR	**4.5%**	**4.6%**	**4.8%**

Source: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Economic Analysis, 2021.

Notes: --- Data not available.

Gross Domestic Product

Historical GDP for Stillwater has consistently increased but has not equaled both state and national growth rates. Quarterly data from the Bureau of Economic Analysis indicates the GDP for both the state and nation declined in the second quarter of 2020 but has regained and exceeded those levels by the first quarter of 2021.

Woods & Poole projects the City's GDP growth rate will still be below state and national rates but will increase at a slightly greater rate than the historical growth rate. Meanwhile, expectations for the state and nation are a decrease in the future growth rate compared to the historical rates. **Table B-5** lists the historical and projected GDP breakdown of the city, state, and nation.

Table B-5: GDP Data (In Millions), 2010-2040

Year	Stillwater	Oklahoma	United States
Historical[1]			
2010	$2,987	$159,774	$155,562,809
2015	$3,173	$180,442	$175,776,505
2020	$3,250	$194,054	$198,107,361
CAGR	**0.8%**	**2.0%**	**2.4%**
2020-2021 by Quarter[2]			
1Q 2020	---	$195,606	$215,611,390
2Q 2020	---	$173,061	$195,201,140
3Q 2020	---	$186,883	$211,702,520
4Q 2020	---	$190,776	$214,947,310
1Q 2021	---	$198,008	$220,615,030
Projected[1]			
2025	$3,444	$209,939	$220,128,092
2030	$3,618	$225,596	$242,580,423
2035	$3,782	$241,402	$265,938,763
2040	$3,938	$257,486	$290,419,913
CAGR	**1.0%**	**1.4%**	**1.9%**

Sources: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Economic Analysis, 2021.

Notes: --- Data not available.

Community/Airport Location and Potential

Stillwater is centrally located between two large metropolitan areas: Tulsa 65 miles to the east and Oklahoma City 60 miles to the south. North-central Oklahoma provides a strong and definable market area for all forms of aviation activity.

SWO is less than 3 miles northwest of downtown Stillwater. With over 1,400 acres of undeveloped property and development potential remaining high, SWO is poised to attract additional aviation and non-aviation development in the future. SWO's largest tenant, the OSU Flight Center, provides flight instruction, on-site classroom instruction, simulator technology, and aircraft maintenance for its current aircraft fleet. There are approximately 300 students enrolled in the six undergraduate and graduate degree programs.

Community Support

SWO benefits from an exceptional relationship with and support from the City of Stillwater, as well as OSU, local industry, and surrounding citizens. SWO is recognized as a vital asset that contributes to the stability and future of the city and region's economy. The overall position of the populace is one of continued growth and development, with special focus on the incentive of a commercial service airport continuing to attract additional economic and industrial development to the area.

Air Carrier Service Profiles

Envoy Airlines, one of nine regional air carriers operating as American Eagle under a codeshare agreement with American Airlines, initiated service in 2016 and is the only commercial air carrier currently serving SWO

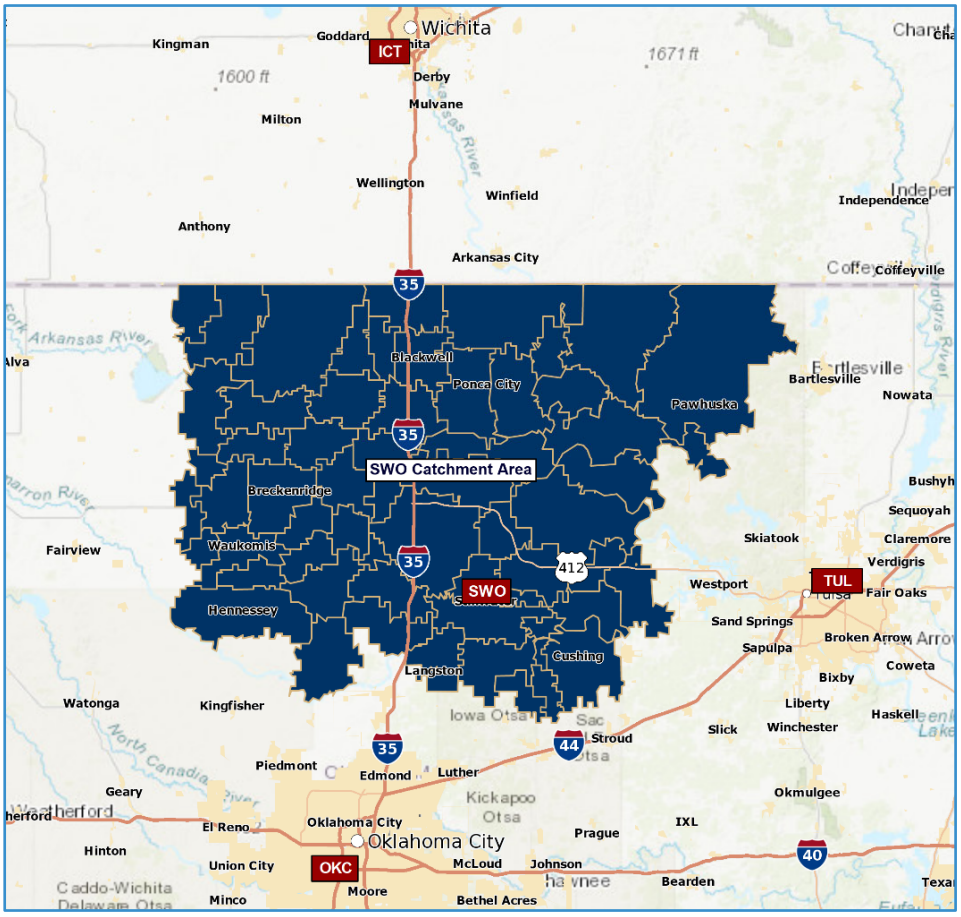
(although SkyWest Airlines also operates at SWO at the discretion of American Airlines). The carrier currently provides two daily flights between SWO and Dallas-Fort Worth International Airport (DFW). Up to mid-2021, the flights used both the 50-seat Embraer ERJ-145 and the 44-seat Embraer ERJ-140 aircraft. In mid-2021, Envoy/SkyWest Airlines discontinued use of the ERJ-140.

Martinaire Aviation, LLC is a FAR Part 135 air cargo carrier based in Dallas, Texas, that has served SWO since 2009. They currently provide an approximate weekly schedule to SWO through Cessna C208 Caravan aircraft. Other air cargo at SWO is transported in the belly compartments of Envoy/SkyWest Airlines commercial service aircraft or via non-scheduled chartered air cargo aircraft.

Catchment Area/True Market

An airport catchment area is the surrounding geographic area containing the population of passengers who should reasonably be expected to use the airport considering drive times to competing airports. It is also representative of the local market and most travelers using or expected to use the airport. The area is presented in the Passenger Demand Analysis prepared separately (see **Appendix Two**) and portrayed in **Figure B-1**. SWO's catchment area comprises 60 zip codes and has a 2020 population of 250,782.

Figure B-1: SWO's Catchment Area



An airport's true market estimate is based on data from the airline's reporting origin and destination statistics to the U.S. DOT and by ticket data from Airline Reporting Corporation (ARC). ARC data includes tickets sold through travel agencies as well as via online travel agencies by passengers using SWO within the catchment area. It does not include tickets issued directly by airline websites or reservation offices. As presented in the Passenger Demand Analysis, SWO's 2020 true market is estimated at 351,291 origin and destination passengers. This is mostly representative of domestic passengers (318,455 or 91 percent), with the remainder being international passengers (32,836 or 9 percent).

Airfares

According to the Passenger Demand Analysis, SWO's 2020 overall average domestic airfare was 209 dollars. This is 25 dollars higher than average domestic airfares at Oklahoma City's Will Rogers' World Airport (OKC), 23 dollars higher than Tulsa International Airport (TUL), and 19 dollars higher than Dallas Fort Worth International Airport (DFW). From 2017 through 2020, overall airfares increased at a lower CAGR at SWO compared to DFW, but were higher than OKC, TUL, and Wichita Dwight D. Eisenhower National Airport (ICT).

New Air Service Opportunities

While SWO is one of the few airports in the country that had no commercial air service since airline deregulation and was able to successfully recruit traditional legacy service, it is unlikely to add service to a new hub either through American Airlines or a different air carrier, although additional service is one of the highest priority goals for SWO to accomplish. According to the Passenger Demand Analysis, the benchmarks indicating the need to consider additional service are improvement in passenger numbers on existing flights (i.e., higher boarding load factors) and consistent revenue per available seat mile that is on par or above peer markets. Long-term, service to Chicago O'Hare International Airport (ORD) on American Airlines or new service via United Airlines to Denver International Airport (DEN) would be the most likely candidates.

Potential Challenges

Few negative factors have the potential to significantly impact future aviation activity at SWO. However, as part of the planning process, considering broad factors that could have a negative or neutralizing effect is important.

COVID-19

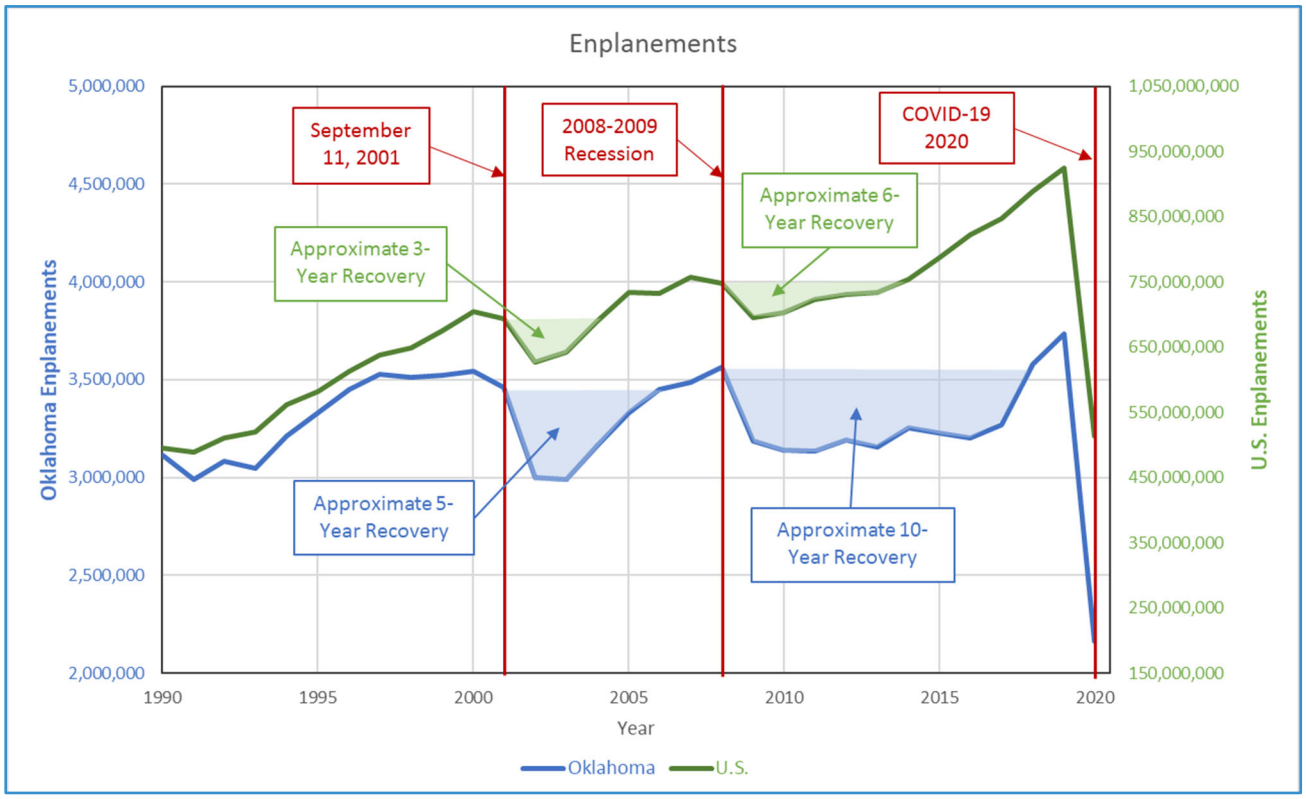
The effects of the COVID-19 pandemic and the emergence of the COVID-19 Delta variant in the summer of 2021 are lingering concerns. Beginning in March 2020 and continuing through the fall/winter of that year, the pandemic and resulting lockdowns had serious negative effects on worldwide economies, and in particular, the aviation industry. Airline travel was severely affected, causing air carriers to reduce flights, cut back services, and ground aircraft, thus reducing system-wide capacity. Service to SWO was reduced from three daily flights in the summer of 2019 to one daily flight in the spring of 2020. By summer 2020 the second flight had been reinstated but service was once again reduced to one daily flight in late summer. However, in mid-summer 2021, the second daily flight was reinstated.

The length of time required for enplanements to recover from the COVID-19 pandemic might be gleaned by examining recovery times from recent past global economic crises. **Figure B-2** illustrates the historical TAF data for statewide and nationwide enplanements since 1990, with a focus on enplanements recovery after the September 11, 2001, terrorist attacks and the 2008-2009 recession. Both events took a toll on passenger enplanements, but the impact of the COVID-19 pandemic is even more severe than those two events.

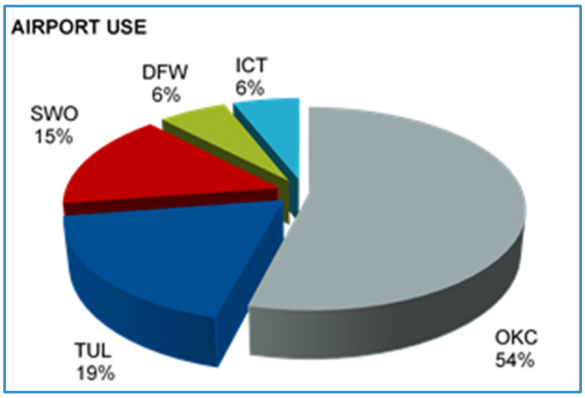
Nationwide enplanements decreased a total of 9.4 percent from FY 2001 to 2002, 7.0 percent from FY 2008 to 2009, and 44.4 percent from FY 2019 to 2020. Statewide enplanements decreased 13.4 percent from FY 2001 to 2002, 10.5 percent from FY 2008 to 2009, and 42.1 percent from FY 2019 to 2020. Since SWO did not have scheduled passenger service until mid-2016, historical passenger enplanement data is not relevant. However, SWO passenger enplanements decreased 20.9 percent from FY 2019 to 2020. The data indicates that an average of four years were required for nationwide passenger enplanements to recover after each event. Statewide numbers show longer recovery times, where an average of seven years was required for passenger enplanements to recover to pre-event levels. This indicates the post-COVID pandemic passenger

level recovery may be prolonged since the reduction was much more drastic in terms of total passenger enplanement decreases.

Figure B-2: State and National Enplanements, 1990-2020



Proximity to Other Commercial Service Airports



Stillwater's proximity and relative ease of vehicle access to both OKC and TUL make it challenging to retain commercial service passengers and expand air service. In addition to using OKC or TUL rather than SWO, local airport users were shown to travel out of state to DFW in Texas and ICT in Kansas. According to the Passenger Demand Analysis, of the total SWO true market, only 15 percent of the domestic passengers and 14 percent of the international passengers used SWO. OKC captured the most domestic and international passengers of SWO's true market, with 55 percent and 47 percent, respectively. TUL captured 19 percent and 14 percent of domestic and international passengers, respectively, of SWO's true market.

Because of the presence of low-cost carriers such as Allegiant and Frontier at the competing airports, it is thought that many residents within SWO's catchment area will continue to choose the over one-hour drives to either OKC or TUL.

State of General Aviation

Other potential challenges could include the relatively slow growth in general aviation (GA) activity nationally for the past 20 years. New general aviation aircraft deliveries and active general aviation aircraft have declined. According to the General Aviation Manufacturer Association (GAMA) Annual Report 2020, worldwide shipments of all GA aircraft declined by more than 23 percent since 2000. Fewer planes being produced would suggest less demand for planes, which indicates fewer planes used worldwide. This is confirmed by data published in the FAA's Aerospace Forecasts 2021-2041, which reports active GA aircraft in the United States declined by over 8 percent from 2010 to 2020, resulting in a CAGR of -0.9 percent. The FAA Aerospace Forecasts also reported that GA aircraft operations at towered airports declined by over 6 percent from 2010 to 2020, a CAGR of -0.6 percent.

HISTORICAL AND EXISTING AVIATION ACTIVITY PROFILE

Aviation activity forecasting commences by using the present time as a starting point, supplemented with historical data obtained from various sources. Normal activity profiles use data from the previous 10 years (i.e., 2010 to 2020) for historical trends in an attempt to explain the changes that have occurred. This Master Plan includes an analysis from the 10-year period of 2009 to 2019 to draw conclusions prior to the COVID-19 pandemic for projecting what a long-term recovery might look like. The Master Plan also, where records are available, includes SWO's activity for FY 2021 Year-to-Date (i.e., October 2020 through June 2021) and for the previous 12 months (i.e., July 2020 through June 2021) for the most recent data to evaluate how SWO is currently recovering since the full effects of the COVID-19 pandemic began in March 2020. The historical profile serves as a baseline for the forecasts and includes information on passengers, air carrier, air cargo, GA, and military aviation activity.

The SWO ATCT records flights from 8:00 a.m. to 10:00 p.m. Operations that occur outside of these hours are not included in records submitted to the FAA. Commercial airline operations are reported to the DOT and capture operations occurring outside of ATCT operating hours. USDOT does not record GA operations.

Commercial Service

Commercial service encompasses scheduled passenger flights, cargo flights, and non-scheduled charter flights. The following sections describe the passenger enplanements, commercial operations, and air cargo service at SWO.

Passenger Enplanements and Airline Operations

The FAA TAF defines a passenger enplanement as a passenger who boards a scheduled commercial or chartered aircraft with more than nine seats for turboprops (or any number of seats for jet aircraft). The

aircraft must be operating under Title 14 Code of Federal Regulations (CFR) Part 121 that applies to air carriers and commercial operators. Passenger enplanements include revenue and non-revenue passengers who paid taxes and passenger facility charges (PFC) for their carriage. Passenger enplanements do not include pilots, flight attendants, and any other members of the airline crew.

Passenger enplanements are categorized as air carrier or air taxi/s based on the type of carrier that is operating the route. For example, passengers on an American Airlines B 737 would be categorized as air carrier enplanements, whereas passengers on an American Eagle ERJ 145 would be categorized as air taxi enplanements. Airline operations are categorized based on aircraft seating capacity. Aircraft operating with more than 60 seats are classified as air carrier; aircraft with 60 or fewer seats are classified as air taxi.

TAF Airline Classification System

Classification	Air Carrier	Air Taxi
Enplanements	Operated by a mainline carrier	Operated by a regional carrier
Operations	More than 60 seats	60 or fewer seats

Enplanements for 2009 to 2021 are shown in **Table B-6**. The air carrier enplanements are primarily the result of university athletic teams using chartered mainline air carrier flights into and out of SWO. SWO air carrier enplanements have fluctuated but remained somewhat steady throughout the years (averaging 1,665) with an overall decrease, resulting in a CAGR of -3.4 percent between 2009 to 2019 (10-year pre-pandemic analysis), and by a decrease of 2.7 percent decrease from 2010 to 2020 (10-year analysis to include the pandemic).

Since scheduled commercial service is provided by Envoy/SkyWest Airlines (i.e., regional carriers), the airline enplanements are classified as air taxi/commuter. With the resumption of scheduled passenger air service in mid-2016, the air taxi/commuter enplanements analysis is limited to the changes experienced since 2017, the first full year of service. Air taxi/commuter enplanements increased at a CAGR of 3.2 percent between 2017 and 2019 prior to the COVID-19 pandemic. While only a two-year dataset, this is reflective of healthy growth. With the sharp enplanement declines experienced in 2020, the three-year CAGR was a decrease of 14.6 percent.

Table B-6: Passenger Enplanements, 2009-2021

Fiscal Year	Air Carrier	Air Taxi/Commuter	Total	Percent Change
2009[1]	2,028	214	2,242	N/A
2010[1]	1,718	288	2,006	-10.5%
2011[1]	1,304	141	1,445	-28.0%
2012[1]	2,115	79	2,194	51.8%
2013[1]	1,888	0	1,888	-13.9%
2014[1]	1,588	32	1,620	-14.2%
2015[1]	1,642	0	1,642	1.4%
2016[1]	1,386	2,131	3,517	114.2%
2017[1]	1,929	25,825	27,754	689.1%
2018[1]	1,629	24,689	26,318	-5.2%
2019[1]	1,441	27,523	28,964	10.1%
CAGR	**-3.4% (2009-2019)**	**3.2% (2017-2019)**	**2.2% (2017-2019)**	**N/A**
2020[1]	1,308	16,102	17,410	-39.9%
CAGR	**-2.7% (2010-2020)**	**-14.6% (2017-2020)**	**-14.4% (2017-2020)**	**N/A**
2021 (YTD)	887[2]	10,951[3]	11,838	-32.0%
2021 (Previous 12 Months)	1,066[2]	13,683[3]	14,749	-15.3%
CAGR (2017-2021)	**-13.8**	**-14.7%**	**-15.4%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] SWO staff.
[3] Envoy Airlines SWO station manager and SWO staff (includes revenue and non-revenue passengers, plus 538 athletic sports team passengers boarding chartered air aircraft with 60 seats or less).

Notes: YTD=Year-to-Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

The year-to-date (i.e., October 2020 through June 2021) and previous 12-month total (i.e., July 2020 through June 2021) analysis indicates that enplanements are behind 2020 levels. However, this is to be expected as FY 2020 enplanements included five months of non-pandemic enplanements that were on pace to exceed FY 2019 enplanements before the full effects of COVID-19 pandemic were felt. Additionally, from May 2019 through February 2020, SWO did not experience a decrease in monthly enplanements from the previous year, averaging a monthly increase of 10.9 percent from the previous year. Finally, during the fall and winter of 2020-2021, the OSU administration imposed seating restrictions on its athletic events reducing most athletic facilities to 25 percent of maximum capacity. These restricted seating events, especially during the fall football season, had an additional negative impact on passenger enplanements as some ticket holders who would normally have flown commercially were unable or chose not to attend the athletic events. These seating restrictions have since been lifted and are not expected to be reimposed.

The TAF also divides commercial service operations (an operation is defined as either a takeoff or a landing) into two categories: air carrier and air taxi/commuter. Air carrier operations are defined as activity by aircraft of more than 60 seats and air cargo aircraft with more than 18,000 pounds of payload capacity. Air taxi/commuter activity is defined as aircraft with 60 seats or fewer that transport regional passengers on scheduled commercial flights, non-scheduled or for-hire flights, and air cargo flights with 18,000 pounds or less payload. The air taxi category includes all air cargo and non-airline operations that involve direct on-demand transactions rather than a regularly scheduled flight. Air carrier operations include all scheduled

operations with a commercial component regardless of number of seats, such as operations through Envoy Airlines Embraer ERJ 140 and 145, which are 44- and 50-seat aircraft, respectively. As shown in **Table B-7**, air carrier commercial service aircraft operations have decreased during the historical timeframe with the exception being 2017, when ATCT personnel mistakenly recorded a portion of Envoy Airlines' 50-seat aircraft as air carrier operations instead of commuter. Historical air taxi/commuter commercial service aircraft operations have remained relatively stable with an overall increase. The increases experienced since 2017 are the result of the successful reinstated daily service of Envoy/SkyWest Airlines.

Table B-7: Commercial Service Operations, 2009-2021

Fiscal Year	Air Carrier	Air Taxi/ Commuter	Total	Percent Change
2009[1]	61	1,120	1,190	N/A
2010[1]	80	965	1,045	-12.2%
2011[1]	51	1,284	1,335	27.8%
2012[1]	73	1,167	1,240	-7.1%
2013[1]	69	717	786	-36.6%
2014[1]	57	1,075	1,132	44.0%
2015[1]	41	859	900	-20.5%
2016[1]	85	646	731	-18.8%
2017[1]	362	1,635	1,997	173.2%
2018[1]	38	2,664	2,702	35.3%
2019[1]	32	2,485	2,517	-6.8%
CAGR (2009-2019)	**-6.2%**	**8.3%**	**7.8%**	**N/A**
2020[1]	30	1,890	1,920	-23.7%
CAGR (2010-2020)	**-9.3%**	**7.0%**	**6.3%**	**N/A**
2021 (YTD)[2]	22	1,472	1,494	-22.2%
2021 (Previous 12 Months)[2]	22	1,951	1,973	2.8%
CAGR (2011-2021)	**-8.1%**	**4.3%**	**4.0%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), 2021.

Notes: YTD=Year to Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

Air Cargo

As stated previously, air cargo transported at SWO is provided primarily by Martinaire Aviation, LLC with approximately one flight per week using Cessna Caravan 208 aircraft. Additional air cargo is either shipped in the belly compartments of air carrier aircraft or transported by non-scheduled charter air cargo aircraft. **Table B-8** shows the air cargo transported exclusively by Martinaire Aviation at SWO over the past approximate two and one-half years (this is the only data available). The short trend expressed by this data suggests a stable amount of annual cargo transported with ample payload capacity available in the existing aircraft operations.

Using data provided by the USDOT T-100 database, the information presented in **Table B-9** indicates air cargo volume transported in the belly compartments of air carrier aircraft or non-scheduled charter air cargo aircraft at SWO had increased through 2020, with the 10-year CAGRs of 24.1 percent from 2009 to 2019, and 41.0 percent from 2010 to 2020. It was only during the more recent 10-year period from 2011 to 2021 that a decreasing CAGR was experienced at -7.8 percent.

Table B-8: Martinaire Aviation Air Cargo Volumes, 2019-2021

Calendar Year	Cargo Out	Cargo In	Total Cargo	Percent Change	Operations	Payload	Percent of Payload
2019	17,399	34,737	52,136	N/A	96	336,000	15.5%
2020	12,230	24,827	37,057	-28.9%	92	322,000	11.5%
2021 (YTD)	7,472	17,568	25,040	-32.4%	56	196,000	12.8%
CAGR (2019-2020)	**-29.7%**	**-28.5%**	**-28.9%**	**N/A**	**-4.2%**	**-4.2%**	**N/A**
2021 (Previous 12 Months)	11,915	27,917	39,832	7.5%	96	336,000	11.9%
CAGR (2019-2021)	**-17.2%**	**-10.4%**	**-12.6%**	**N/A**	**0.0%**	**0.0%**	**N/A**

Source: Martinaire Aviation LLC, August 2021.

Notes: YTD=Year to Date (January through July 2021). Previous 12 Months=August 2020 through July 2021.

Table B-9: Air Cargo Volumes, 2009-2021

Calendar Year	Cargo Out	Cargo In	Total Cargo	Percent Change
2009	2,713	4,660	7,373	N/A
2010	875	616	1,491	-79.8%
2011	32,131	21,275	53,406	3481.9%
2012	18,315	22,570	40,885	-23.4%
2013	6,124	9,142	15,266	-62.7%
2014	16,660	9,710	26,370	72.7%
2015	33,037	19,740	52,777	100.1%
2016	32,333	27,198	59,531	12.8%
2017	37,959	29,556	67,515	13.4%
2018	32,785	16,619	49,404	-26.8%
2019	33,427	30,390	63,817	29.2%
CAGR (2009-2019)	**28.5%**	**20.6%**	**24.1%**	**N/A**
2020[1]	38,593	7,797	46,390	-27.3%
CAGR (2010-2020)	**46.0%**	**28.9%**	**41.0%**	**N/A**
2021 (YTD)	251	303	554	-98.8%
2021 (Previous 12 Months)	16,345	7,898	24,243	-47.7%
CAGR (2011-2021)	**-6.5%**	**-9.4%**	**-7.6%**	**N/A**

Source: USDOT T-100, September 2021.

Notes: YTD = Year to Date (January through June 2021). Previous 12 Months=July 2020 through June 2021.

General Aviation

GA refers to flight activities that do not include scheduled air services, unscheduled air transport operations, or military operations. GA activities include, but are not limited to, flight training, recreational flying, private and corporate air transportation, and flight testing.

Itinerant GA Operations

Itinerant operations are those that originate and terminate at different airports. These operations include business travelers coming to and from the community, recreational pilots, and student pilots performing cross country training flights. Itinerant operations made up 45 percent of overall GA operations in 2020 and have been increasing at an average annual rate of 2.5 percent between 2010 and 2020. This is down from the 3.0

percent CAGR experienced between 2009 and 2019. Year-to-date (June 2021) and the previous 12 months' levels seem to indicate that itinerant GA activity is rebounding from the COVID-impacted 2020 level.

Local GA Operations

Local operations are those that originate and terminate at the same airport. These operations are generally performed by pilots practicing landings. Touch-and-go operations, where aircraft land, slow, then accelerate and takeoff without leaving the runway, count as two operations. Depending on the traffic pattern, an aircraft can perform more than six operations in an hour when practicing touch-and-goes. Local operations are highly sensitive to the amount of flight training occurring at an airport. As mentioned previously, SWO has two flight schools, the OSU Flight Center and Hangar 1 Flight Center. Local GA operations made up 55 percent of overall GA operations in 2020 and have been increasing at an average annual rate of 1.3 percent between 2010 and 2020. Like itinerant GA operations, local GA operations were increasing at a faster rate prior to 2020, experiencing a CAGR of 2.5 percent between 2009 and 2019. Unlike itinerant GA operations, local GA operations experienced year-to-date and the previous 12 months do not indicate a rebound to pre-COVID levels.

However, discussions with OSU Flight Center personnel indicate their training levels will increase in the future. Currently, approximately 300 students are in the flight training program. With small, incremental changes, OSU intends to increase student enrollment in the program to approximately 400 in the future. This represents a 33 percent increase in student pilots. The OSU Flight Center also has plans to upgrade their existing training fleet, replacing older Cessna 152s with Cirrus SR20 and Piper PA-44 Seminole aircraft.

Total GA operations have fluctuated during the past decade, but overall SWO has experienced healthy growth. **Table B-10** presents SWO itinerant, local, and total GA operations since 2009. **Figure B-3** shows the breakdown graphically.

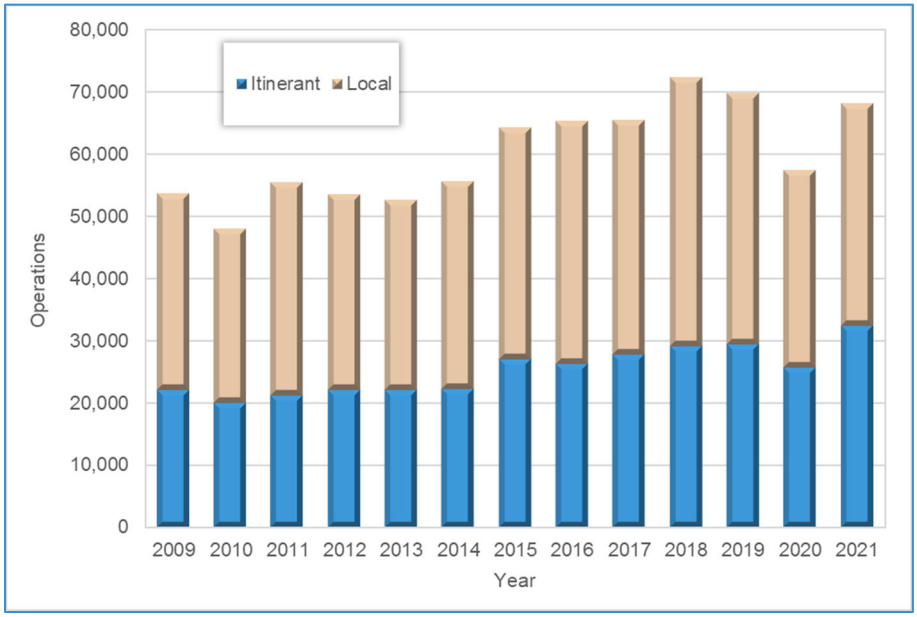
Table B-10: GA Operations, 2009-2021

Fiscal Year	Itinerant Operations	Percent Change	Local Operations	Percent Change	Total Operations	Percent Change
2009[1]	21,921	N/A	31,526	N/A	53,447	N/A
2010[1]	19,959	-9.0%	28,045	-11.0%	48,004	-10.2%
2011[1]	21,195	6.2%	34,305	22.3%	55,500	15.6%
2012[1]	22,020	3.9%	31,551	-8.0%	53,571	-3.5%
2013[1]	21,994	-0.1%	30,731	-2.6%	52,725	-1.6%
2014[1]	22,180	0.8%	33,553	9.2%	55,733	5.7%
2015[1]	27,009	21.8%	37,355	11.3%	64,364	15.5%
2016[1]	26,291	-2.7%	39,119	4.7%	65,410	1.6%
2017[1]	27,782	5.7%	37,787	-3.4%	65,569	0.2%
2018[1]	29,113	4.8%	43,310	14.6%	72,423	10.5%
2019[1]	29,455	1.2%	40,501	-6.5%	69,956	-3.4%
CAGR (2009-2019)	**3.0%**	**N/A**	**2.5%**	**N/A**	**2.7%**	**N/A**
2020[1]	25,654	-12.9%	31,858	-21.3%	57,512	-17.8%
CAGR (2010-2020)	**2.5%**	**N/A**	**1.3%**	**N/A**	**1.8%**	**N/A**
2021 (YTD)[2]	23,945	N/A	24,604	N/A	48,549	N/A
2021 (Previous 12 Months)[2]	32,375	26.2%	35,879	12.6%	68,254	18.7%
CAGR (2011-2021)	**4.3%**	**N/A**	**0.4%**	**N/A**	**2.1%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), August 2021.

Notes: YTD=Year to Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

Figure B-3: Itinerant and Local General Aviation Operations, 2009-2021



Military

SWO does not have based military aircraft. The aircraft operations are mainly related to training or touch-and-go flights and fueling of various aircraft and mission types. Military activity is driven by the needs of the U.S. Department of Defense rather than by economic forces. Therefore, for planning purposes, military operations are projected to remain flat at the 2020 levels. Historical military operations are provided in **Table B-11**.

Table B-11: Military Operations, 2009-2021

Fiscal Year	Itinerant	Local	Total	Percent Change
2009[1]	709	1,207	1,916	N/A
2010[1]	1,523	1,876	3,399	77.4%
2011[1]	1,363	2,044	3,407	0.2%
2012[1]	1,146	1,863	3,009	-11.7%
2013[1]	1,187	1,676	2,863	-4.9%
2014[1]	1,384	2,344	3,728	30.2%
2015[1]	1,115	1,492	2,607	-30.1%
2016[1]	1,099	1,551	2,650	1.6%
2017[1]	1,107	1,405	2,512	-5.2%
2018[1]	1,326	1,734	3,060	21.8%
2019[1]	1,485	1,324	2,809	-8.2%
CAGR (2009-2019)	**7.6%**	**0.9%**	**3.8%**	**N/A**
2020[1]	1,314	1,897	3,211	14.3%
CAGR (2010-2020)	**-1.5%**	**0.1%**	**-0.6%**	**N/A**
2021 (YTD)[2]	1,137	1,207	3,642	N/A
2021 (Previous 12 Months)[2]	1,872	2,634	4,506	N/A
CAGR (2011-2021)	**3.2%**	**2.6%**	**2.8%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), 2021.

Existing Operations by Aircraft Type

Table B-12 shows the total breakdown of aircraft operations at SWO and their percentage of total operations. The breakdown by type for Commercial Service and GA turboprop and jet activity come directly from the FAA TFMSC data since the confidence level regarding the accuracy of the data recorded in TFMSC is very high. The TFMSC confidence level for the accuracy of other aircraft types is not as high, and therefore various degrees of estimation have been applied to arrive at these operational numbers. SWO ATCT personnel reviewed and approved the data as being accurate according to their estimation.

Table B-12: Existing Operations by Aircraft Type, 2019, 2020, and 2021

Aircraft Type	FY 2019 Operations	Percentage	FY 2020 Operations	Percentage	FY 2021 Operations[1]	Percentage
Commercial Service	**2,517[2]**	**3.3%**	**1,920[2]**	**3.1%**	**1,973[1]**	**2.6%**
Air Carrier[2]	32	1.3%	30	1.6%	22	1.1%
Narrow Body Jet[3]	32	100.0%	30	100.0%	22	100.0%
Air Taxi/Commuter[2]	2,485	98.7%	1,890	98.4%	1,951	98.9%
Regional Jet[3]	1,791	72.1%	1,312	69.4%	991	50.8%
Air Cargo[3]	100	4.0%	92	4.9%	94	4.8%
GA Types[4]	584	23.9%	486	25.7%	866	44.4%
General Aviation	**69,956[2]**	**92.9%**	**57,512[2]**	**91.8%**	**68,254[1]**	**91.3%**
Single Engine Piston[6]	62,162	88.9%	51,277	89.2%	62,311	91.3%
Multi-Engine Piston[5]	6,347	9.1%	4,911	8.5%	4,461	6.5%
Turboprop[3]	564	0.8%	623	1.1%	693	1.0%
Jet[3]	883	1.3%	697	1.2%	787	1.2%
Helicopter[3]	0	0.0%	4	0.0%	2	0.0%
Military	**2,809[2]**	**3.7%**	**3,211[2]**	**5.1%**	**4,506[1]**	**6.0%**
Piston[7]	2,099	74.7%	2,661	82.9%	3,830	85.0%
Turboprop[3]	476	16.9%	350	10.9%	516	11.5%
Jet[3]	216	7.7%	192	6.0%	150	3.3%
Helicopter[3]	18	0.6%	8	0.2%	10	0.2%
Total[1]	**75,282[2]**	**100%**	**62,643[2]**	**100%**	**74,733[1]**	**100%**

Sources: [1] Previous 12 Months (July 2020 through June 2021) using FAA OPSNET, 2021.

[2] FAA TAF, 2021.

[3] TFMSC Direct – Operations obtained directly from TFMSC data.

[4] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[5] TFMSC Derived – Operations derived from applying the ratio of MEP to all piston operations contained in TFMSC to the remainder of GA operations when turboprop, jet and helicopter operations are removed.

[6] TFMSC Derived – Operations derived from subtracting the sum of GA MEP, turboprop, jet, and helicopter operations from total GA operations.

[7] TFMSC Derived – Operations derived from subtracting the sum of turboprop, jet, and helicopter operations from total Military operations.

Based Aircraft

The FAA categorizes based aircraft by engine with the main categories being single engine piston, multi-engine piston, jet aircraft with turbine engines (includes both turboprops and turbojets), helicopters, and other, which includes experimental sport, glider, and ultralight aircraft. Based aircraft are those stored in a hangar or apron at SWO and do not include itinerant aircraft temporarily stored. **Table B-13** shows the based aircraft records from 2009 to 2021. Based aircraft at SWO have remained steady with a slight overall increase.

As of 2021, 90 percent of based aircraft at SWO are single engine, 7.5 percent are multi-engine piston, and 2.5 percent are jet (which are single engine turboprop aircraft). No aircraft categorized as “Other” have been based at SWO since 2009. Growth in single engine piston and jet aircraft have offset the decline in multi-engine piston and helicopter.

Table B-13: Based Aircraft, 2009-2021

Fiscal Year	Single Engine Piston	Multi-Engine Piston	Jet	Helicopter	Other	Total	Percent Change
2009[1]	66	10	0	1	1	78	N/A
2010[1]	62	8	0	1	0	71	-9.0%
2011[1]	63	6	0	1	0	70	-1.4%
2012[1]	64	6	0	1	0	71	1.4%
2013[1]	64	6	0	1	0	71	0.0%
2014[1]	68	5	0	2	0	75	5.6%
2015[1]	65	5	0	2	0	72	-4.0%
2016[1]	64	5	0	1	0	70	-2.8%
2017[1]	64	5	0	1	0	70	0.0%
2018[1]	64	5	0	1	0	70	0.0%
2019[1]	66	5	0	0	0	71	1.4%
CAGR (2009-2019)	**0.0%**	**-6.7%**	**N/A**	**-100%**	**-100%**	**-0.9%**	**N/A**
2020[1]	67	5	0	0	0	72	1.4%
CAGR (2010-2020)	**0.8%**	**-4.6%**	**N/A**	**-100%**	**N/A**	**0.1%**	**N/A**
2021[2]	72	6	2	0	0	80	11.1%
CAGR (2011-2021)	**1.3%**	**0.0%**	**200%**	**-100%**	**N/A**	**1.3%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] SWO staff.

FORECAST DOCUMENTATION REVIEW

Prior to forecasting future activity levels at SWO, examining historical aviation activity data, existing and emerging trends, and projections made by other independent organizations is important for context. The following reports, studies, and publications and their associated projections were reviewed, and their relevance to the SWO is discussed.

2008 Stillwater Regional Airport Master Plan

The 2008 Stillwater Regional Airport Master Plan has a base year of 2006 and forecasted aviation activity through the year 2026. Prepared almost a full decade before the reinstatement of commercial air carrier service, the total enplanements were forecasted to minimally increase from 1,436 to 2,970 (CAGR of 3.7 percent), relying primarily on the increase in the transportation of college athletic teams and the occasional charter service to gambling destinations such as Laughlin, Arizona, and Reno, Nevada. Air carrier and charter aircraft operations were projected to increase from 250 to 360 operations (CAGR of 1.8 percent); GA operations were projected to increase from 78,415 in 2006 to 119,091 by 2026 (GACR of 2.0 percent). Based aircraft were expected to increase from 77 in the 2006 to 102 by 2026 (CAGR 1.4 percent). A comparison of the forecast to actual activity levels indicates from 2006 to 2016 operations and based aircraft grew at slower rates than anticipated; enplanements far exceeded the forecast.

2015 Stillwater Regional Airport Air Service Environmental Assessment

The 2015 Stillwater Regional Airport Air Service Environmental Assessment provided forecasts for the base year of commercial air carrier service (2016) and a five-year with and without air carrier service future forecast (2021). The project forecasts anticipated initial year and five-year projections for commercial service passengers to equal a total of 57,938 (28,969 enplanements). This was an estimation based on two daily flights with 77 percent occupancy of a 50-seat aircraft and the charter flights of college athletic teams. Air carrier operations were also anticipated not to increase during the five-year forecast period, remaining at 1,517 operations. Air Taxi and Commuter aircraft operation increases were expected to grow from 1,108 in 2016 to 1,193 by 2021 (CAGR of 1.5 percent). GA operations were projected to increase from 22,549 in 2016 to 23,933 in 2021 (CAGR of 1.2 percent).

FAA's Terminal Area Forecast (TAF)

The TAF is an FAA developed forecasting tool that the FAA updates annually and uses to determine budget and staffing needs. Due to limited staff resources, the FAA cannot forecast to the same degree of detail at smaller regional airports as they can at large airports. However, the TAF provides a guideline for developing forecasts and is utilized by FAA to compare scenario-driven forecasts with the forecasts developed by the FAA. The TAF projects enplanements at SWO to increase from 17,410 in 2020 to 28,964 by 2025, remaining constant at this level through 2045 (CAGR of 2.1 percent). Total commercial service operations are projected to increase from 1,920 in 2020 to 3,061 in 2045 (CAGR of 1.9 percent). GA operations are expected to increase from 57,512 in 2020 to 88,248 by 2045 (CAGR of 1.7 percent). The TAF predicts SWO's based aircraft to increase from 72 in 2020 to 123 in 2045 (CAGR of 2.2 percent).

FAA's Aerospace Forecasts Fiscal Years 2021-2041

The FAA Aerospace Forecasts, updated annually, are aeronautical activity projections by major industry sectors used to understand future demands on the national airport and airspace systems. Many factors are considered in the FAA's development of the forecasts. Some of the most important include U.S. and international economic forecasts and anticipated trends in fuel costs. The FAA Aerospace Forecasts are used for the SWO forecasts to correlate with past activity trends, assimilate nationwide industry patterns, comprehend the basis for the major forecast rationale and methodology, and to quantify growth patterns and rates of change relative to specific industry activity and utilization components.

Major assumptions employed in the forecasts and the projections relevant to SWO are summarized here:

- Airline activity, capacity, and profitability were drastically affected by the COVID-19 pandemic. Extreme cost cutting measures and business modifications were implemented that will shape the industry for many years.
- It is thought that airlines will be smaller. Fleets have and will continue to be much younger and more fuel efficient with older aircraft retirement, and future growth will be restricted as airlines carry higher levels of debt and restrain capital spending and investment.

- Due to pent-up demand experienced by consumers in late 2020 and early 2021, domestic leisure passenger traffic has led the airline recovery so far, and domestic business passenger travel should increase in the short term.
- Over the long term, FAA sees the strengths and capabilities developed by airlines pre-COVID will return, and aviation growth will be driven by improving U.S. and world economies.
- Following three years of expected double-digit growth during the short-term recovery from 2021, U.S. air carrier domestic passenger growth is expected to level off at an average growth rate of 2.3 percent, resulting in a 20-year average growth rate of 4.9 percent per year.
- Nationwide, domestic passengers are expected to return to 2019 levels by early 2024.
- Air taxi and commuter aircraft operations are expected to increase by 1.1 percent annually at towered airports.
- The U.S. active GA aircraft fleet is expected to increase slightly at 0.1 percent annual growth.
- Active piston-powered fixed-wing aircraft are projected to decrease 0.9 percent annually. Active single engine piston-powered aircraft are forecast to decline 0.9 percent annually, while active multi-engine piston-powered aircraft are projected to decline by 0.4 percent annually.
- Active turbine-powered, fixed-wing aircraft are expected to increase 1.7 percent annually. Turboprop aircraft are expected to increase 0.6 percent annually, while turbojet aircraft are projected to increase 2.3 percent annually.
- Active light sport aircraft (i.e., aircraft with weight, capacity, and performance restrictions) are projected to increase significantly by 4.0 percent annually.
- Anticipated GA aircraft hours flown will increase 1.0 percent annually through 2041. GA operations at towered airports are expected to increase 0.8 percent annually.

AVIATION ACTIVITY FORECASTS

The role and importance of SWO will continue to support a wide range of activities including commercial service, flight training, GA activity, and military. The planning period forecasts aviation activity into the future, from baseline data collected in 2021 to the end of the period in 2040. SWO is expected to see steady growth over the next 20 years, but near-term airport activities have been adversely affected and will likely continue to be adversely affected by COVID-19. The methods, assumptions, risks, and uncertainties associated with the forecasts are presented. As stated earlier, each preferred forecast is compared with the FAA's TAF for consistency.

Forecast Approach and Methodology

Various statistical forecast methods are available to address aviation activity and overall demand. A technique's effectiveness depends on the availability and accuracy of the data. The three most common

methodologies considered and assessed for applicability in developing a range of reasonable forecast scenarios are described below.

Regression Analysis

In a regression analysis forecast, the value being estimated or forecast (called the dependent variable) is related to other variables (called the independent or explanatory variables, which help "explain" the estimated value). A correlation coefficient is calculated for each pairing of dependent to independent variables to quantify this link. One major advantage of regression analysis is that if the independent variables are more readily projected than the forecasts or dependent available, then deriving a forecast is relatively easy.

Market Share Analysis

A market share analysis is a relatively easy method to use and can be applied to any measure for which a reliable higher-level (i.e., larger aggregate) forecast is available. Historical shares are calculated and used as a basis for projecting future shares. This approach is a "top-down" method of forecasting, since forecasts of larger aggregates (e.g., national aviation forecasts) are used to derive forecasts for smaller areas (e.g., individual airport aviation forecasts).

Trend Analysis

Trend analysis relies on projecting historical trends into the future. In trend analysis, a regression equation is used, with time as the independent variable. It is one of the fundamental techniques used to analyze and forecast aviation activity. While it is frequently used as a back-up or expedient technique, it is highly valuable because it is simple to apply. Sometimes trend analysis can be used as a reasonable method of projecting variables that would be complicated to project by other means.

Correlation Analysis

Correlation analysis, which is part of the regression analysis methodology, ignores units and orders of magnitude and instead measures how closely different variables change in proportion to one another using percentages. Correlation can be negative, indicating that as one index grows, the other declines. Correlation is measured by the correlation coefficient, which ranges from -1.00 to +1.00. A score close to +/-1.00 suggests stronger positive/negative correlation, and a score closer to zero suggests that the two variables are not correlated. Scores with a coefficient greater than 0.8 are considered highly correlated.

While correlation shows potential interrelatedness between variables, it cannot be the sole factor to determine that growth of one variable is caused by the other. Often there are unrelated factors and additional variables that impact the growth in both variables. Correlation analysis usually does not fully explain why variables behave the way they do, but does help suggest a connection, or lack thereof, between variables that may be subject to the same market forces. Correlation is augmented by professional judgement that helps explain the correlation.

Passenger Enplanements

Forecasts of passenger enplanements serve as the foundation of other commercial service activity forecasts and provide a basis for determining future requirements for facilities integral to the accommodation of passengers.

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO's historical passenger enplanements from 2017 through 2020, which corresponds to the reinstatement of commercial service at SWO. The three variables with the highest correlation to SWO passenger enplanements are:

- Domestic revenue passenger enplanements on U.S. regional carriers as recorded in the FAA's Aerospace Forecasts 2021-2041 (correlation of 0.983).
- Domestic revenue passenger enplanements on U.S. commercial air carriers as recorded in the FAA's Aerospace Forecasts, 2021-2041 (correlation of 0.979).
- Enplanements within the State of Oklahoma (correlation of 0.958).

However, since SWO enplanements are a subset of these three variables, a market share analysis is considered more appropriate and was performed. SWO's market share, expressed as a percentage of the three variables, is provided in **Table B-14**.

Table B-14: Passenger Enplanement Market Share Comparison, 2017-2020

Fiscal Year	SWO[1]	U.S. Regional Carriers Domestic Revenue Enplanements[2]	SWO Market Share	Domestic Revenue Enplanements U.S. Commercial Air Carrier[2]	SWO Market Share	Oklahoma Enplanements[1]	SWO Market Share
2017	27,754	148,599,874	0.019%	743,717,643	0.0037%	3,271,695	0.85%
2018	26,318	153,668,408	0.017%	780,654,359	0.0034%	3,579,505	0.74%
2019	28,964	159,331,828	0.018%	813,109,423	0.0036%	3,733,601	0.78%
2020	17,410	93,780,639	0.019%	462,559,228	0.0038%	2,162,525	0.81%
Average Market Share			**0.018%**		**0.0036%**		**0.79%**

Sources: [1] FAA TAF, May 2021.
[2] FAA Aerospace Forecast 2021-2041.

Forecast Scenarios

There were five passenger enplanement forecast scenarios evaluated and presented. They are based on a variety of assumptions that consider a range of potential scenarios related to the COVID-19 pandemic recovery, socioeconomic drivers, and long-term economic sustainability. Each scenario uses 17,410 enplanements in 2020 as the base year, which includes 1,308 passengers enplaned by chartered aircraft transporting university athletic teams. The number of chartered passengers is expected to increase slightly to its 10-year historical average of approximately 1,600 by FY 2022 and remain at this level throughout the planning period. The scenarios described below are compared against each other and to the 2020 TAF in **Table B-15**. **Figure B-4** graphically portrays the forecast scenarios.

Scenario One

This scenario uses linear projection by applying the expected City of Stillwater MSA population growth rate from 2020 to 2040 to forecast passenger enplanements expected to occur at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with enplanements of -0.75, not a significant correlation so this scenario is eliminated from consideration.

Scenario Two

This scenario uses trend projection by applying SWO's passenger enplanement growth rate experienced from 2017 to 2019 to future enplanements. This results in a CAGR of 4.4 percent. The limited three-year historical period does not provide a significant trend line to warrant sufficient confidence in this analysis. This scenario is eliminated from consideration.

Scenario Three

This scenario uses market share to estimate future passenger enplanements at SWO as a function of nationwide domestic revenue enplanements on regional air carriers. SWO's four-year average market share is 0.018 percent. Applying this same ratio to projected domestic revenue enplanements on regional air carriers as contained in the FAA's Aerospace Forecast 2021-2041 results in a CAGR of 4.7 percent.

Scenario Four

This scenario also uses SWO's market share of nationwide domestic revenue enplanements on regional air carriers but applies a slightly decreasing average market share from 0.019 percent in 2021 to 0.014 percent in 2040. This does not fully demonstrate SWO's historic market share trend, rather just assumes that it is reasonable to expect SWO's limited catchment area population base will not keep pace with expected nationwide growth but will at least remain similar to the past four years. Applying the decreasing ratio to projected domestic revenue enplanements on regional air carriers as contained in the FAA's Aerospace Forecast 2021-2041 results in a CAGR of 3.3 percent.

Scenario Five

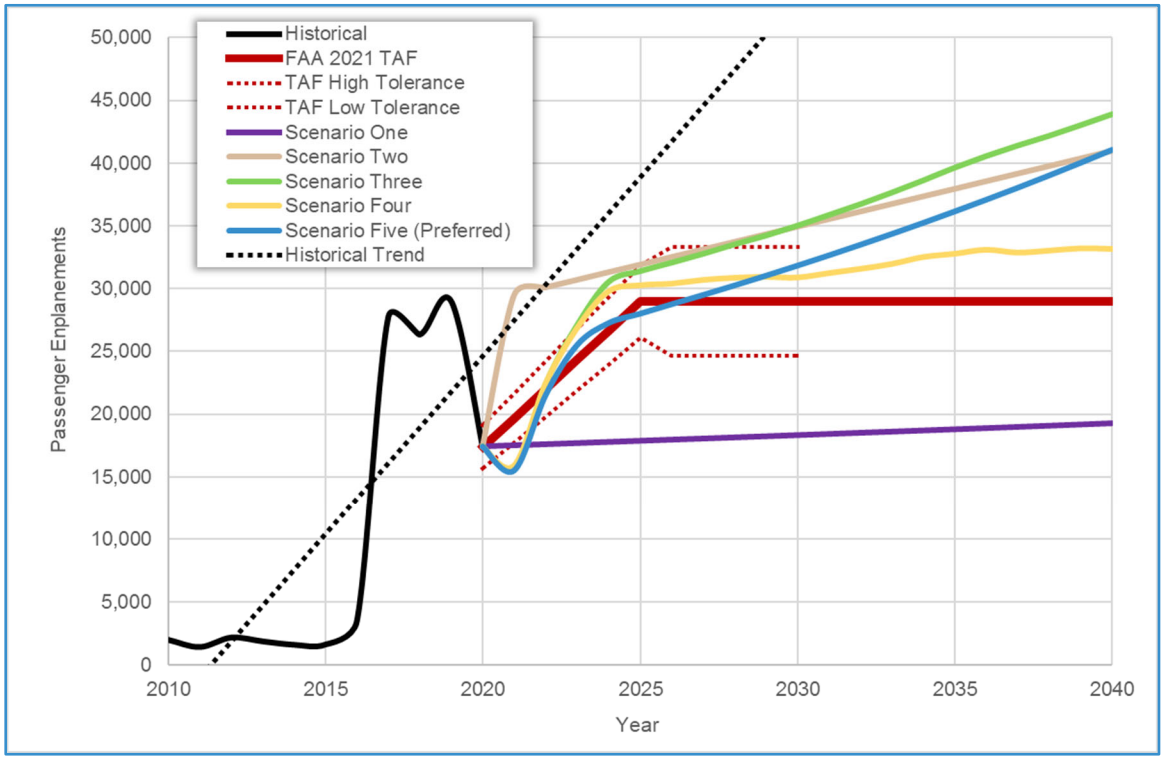
This scenario applies the longer enplanement recovery times experienced by airports in Oklahoma after the events of September 11, 2001, and the economic recession of 2008-2009 to SWO. Unlike the FAA's Aerospace Forecast 2021-2041 expectation that domestic passenger enplanements will return to pre-pandemic 2019 levels by early 2024, this scenario does not anticipate SWO's enplanements will surpass 2019 numbers until 2026. This is based primarily on the uncertainty of business travel returning to pre-pandemic levels and when OSU will rescind restrictions on staff travel enacted during the pandemic. Thereafter, this scenario uses linear projection by applying the TAF's 20-year CAGR rate of 2.6 percent applied to SWO enplanements throughout the remainder of the forecast period. This scenario results in an overall CAGR of 4.4 percent.

Table B-15: Passenger Enplanement Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2017-2020 Trend)	Scenario Three (Average Market Share)	Scenario Four (Decreasing Market Share)	Scenario Five (Deferred Recovery/TAF CAGR - Preferred)
2020[1]	17,410	17,410	17,410	17,410	17,410	17,410
2021[2]	19,721	17,500	29,490	15,620	15,930	15,500
2022[2]	22,031	17,580	30,100	22,380	22,460	21,500
2023[2]	24,343	17,670	30,700	27,070	26,870	25,500
2024[2]	26,653	17,760	31,310	30,520	29,790	27,250
2025[2]	28,964	17,850	31,910	31,380	30,270	28,000
2030[2]	28,964	18,300	34,940	35,010	30,890	31,830
2035[2]	28,964	18,760	37,960	39,640	32,780	36,150
2040[2]	28,964	19,240	40,990	43,900	33,160	41,060
CAGR	2.6%	0.5%	4.4%	4.7%	3.3%	4.4%

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-4: Passenger Enplanement Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for passenger enplanements at SWO. As presented above, it is thought that it will take several years for SWO's passenger enplanements to return to pre-pandemic levels primarily based on the uncertainty of business travel returning to normal. Some business travel will be found

unnecessary as discovered during pandemic related shutdowns and travel restrictions. The advent and proliferation of technology that allows virtual meetings and presentations is thought to supplant a certain but unknown percentage of business travel. However, as the situation returns to more normal conditions, it is thought that business travel will return, and OSU will lift staff travel restrictions. The improving national economic conditions underlying the long-term forecasts contained in the FAA Aerospace Forecasts and TAF and the steadily improving local socioeconomic factors will eventually drive SWO's enplanements to reach levels suggested by the 2017 to 2019 trend.

Table B-16 shows a side-by-side comparison of the preferred enplanement forecasts with the 2020 TAF. As can be seen, the preferred forecast is slightly below the TAF initial five-year forecast by approximately -3.3 percent, but slightly above the TAF 10-year forecast by approximately 9.9 percent. These are well within TAF tolerances.

Table B-16: Passenger Enplanement Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	17,410	17,410	0	0.0%
2025[2]	28,000	28,964	-964	-3.3%
2030[2]	31,830	28,964	2,866	9.9%
2035[2]	36,150	28,964	7,186	24.8%
2040[2]	41,060	28,964	12,096	41.8%
CAGR	**4.4%**	**2.6%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Commercial Service Passenger Aircraft Operations

Commercial aircraft operations are performed by scheduled and charter passenger airlines, and air cargo aircraft and Part 135 on-demand are performed by air taxi operations. Private business aircraft operations are counted as general aviation operations rather than commercial operations.

Approximately 97 percent of commercial service aircraft operations at SWO are scheduled passenger regional jet and air cargo turboprop operations. The remaining 3 percent were performed by charter airlines using narrow-body aircraft. As stated previously, Envoy/SkyWest Airlines and Martinaire Aviation LLC are the scheduled passenger and air cargo air carriers, respectively, at SWO. This is likely to remain so throughout the planning period. Martinaire Aviation LLC aircraft operations are addressed in the subsequent Air Cargo section. This section only considers scheduled passenger aircraft operations by Envoy/SkyWest Airlines and the on-demand air carriers transporting collegiate athletic teams travelling to and from SWO.

Methodology

The establishment of projected passenger enplanements is required to properly project commercial service operations, as there is usually a direct relationship between enplanements and commercial service operations. If enplanements increase, operations will generally increase to accommodate the demand.

However, the relationship can vary significantly, in that enplanements can increase without increasing operations, or even increase following a decrease in operations. Often, this is a result of airlines using larger aircraft with greater seating capacity, or more efficient scheduling with increased passenger load factors. The load factor is a ratio of the number of actual enplanements compared to the total number of departure seats (e.g., if an aircraft has 50 seats and 25 passengers board, the load factor is 50 percent).

The commercial aircraft operations forecast is based on the following assumptions:

- Air carriers will add service to meet the level of demand in the passenger enplanement forecast.
- Air carrier regional jets with 50 seats or fewer will be retired by 2031 following expectations of the FAA Aerospace Forecast 2021-2041.
- The average number of seats per departure will increase as smaller regional jets are replaced by narrow-body aircraft. Air carriers typically adjust flight frequency to keep load factors at profitable levels (striving for 80 percent). However, as air carriers transition to larger aircraft, load factors are expected to decrease with an adjustment period before rising. The growth in enplanements at SWO leads to an increase in overall operations. However, the projected increase in operations is tempered by the up gaging of aircraft, with the number of forecast operations otherwise being even higher.

Forecast Scenario

Table B-17 presents the information for existing and future non-scheduled commercial service aircraft operations at SWO. As the number of university athletic teams transported to and from SWO on both air carrier aircraft (i.e., more than 60 seats) and air taxi/commuter aircraft (i.e., 60 or fewer seats) returns to pre-pandemic conditions, the number of operations is expected to remain stable throughout the planning period.

Table B-17: Non-Scheduled Commercial Service Passenger Aircraft Operations Forecast, 2020-2040

Year	Enplanements	Air Carrier Charter		Air Taxi/Commuter Charter		Total Operations
		Departures	Operations	Departures	Operations	
2020[1]	1,308	15	30	286	572	602
2025[2]	1,600	18	36	350	700	736
2030[2]	1,600	18	36	350	700	736
2035[2]	1,600	18	36	350	700	736
2040[2]	1,600	18	36	350	700	736
CAGR	**1.0%**	**0.9%**	**0.9%**	**1.0%**	**1.0%**	**1.0%**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt.

Table B-18 presents the existing and forecast scheduled commercial service (i.e., regional air carrier Envoy Airlines/SkyWest Airlines) passenger aircraft operations at SWO. As presented earlier, the FAA Aerospace Forecast 2021-2041 expects all 50-seat regional jet aircraft to be retired from airline fleets nationwide by 2031. Therefore, the number of air taxi/commuter aircraft operations at SWO is expected to decrease through the first half of the planning period, eventually being eliminated altogether by 2035. This decrease is offset by the gradual replacement of the 50-seat regional jets by 76-seat narrow body jets, both nationally and at SWO. The resulting changes in the fleet mix and seating capacities indicate that scheduled commercial service

passenger aircraft operations will slightly increase at the end of the planning period, resulting in a CAGR of 0.9 percent.

Table B-18: Scheduled Commercial Service Passenger Aircraft Operations Forecast, 2020-2040

Year	Enplanements	Air Carrier Departures	Air Taxi/ Commuter Departures	Load Factor	Total Seats	Seats/ Departure	Total Operations
2020	16,102[1]	0	613[2]	57.7%	27,914[3]	46	1,226
2025[4]	26,400	156	572	65.3%	40,456	56	1,456
2030[4]	30,230	572	156	59.0%	51,272	70	1,456
2035[4]	34,550	676	0	67.2%	51,376	76	1,352
2040[4]	39,460	728	0	71.3%	55,328	76	1,456
CAGR	**4.6%**	**N/A**	**-99.9%**	**N/A**	**3.5%**	**N/A**	**0.9%**

Sources: [1] FAA TAF, May 2021.
[2] Envoy/SkyWest Airlines, August 2021.
[3] USDOT T-100 data, September 2021.
[4] Mead & Hunt.

Preferred Forecast Scenario and Comparison to TAF

Table B-19 shows a side-by-side comparison of the preferred commercial service aircraft operations forecasts with the 2020 TAF. As can be seen, the preferred forecasts are within the TAF tolerances in both the initial five-year and 10-year forecast periods. Nevertheless, it seems the TAF did not fully anticipate the retirement of 50-seat regional aircraft, and the phased introduction of 76-seat aircraft by the air carriers serving SWO and overestimated total commercial service aircraft forecast operations. Introduction of larger commercial service aircraft with almost 50 percent more seats per departure indicates air carriers will not increase flight frequency at the rate anticipated by the TAF.

Table B-19: Commercial Service Aircraft Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	1,920	1,920	0	0.0%
2025[2]	2,284	2,517	-233	-9.3%
2030[2]	2,284	2,645	-361	-13.6%
2035[2]	2,180	2,776	-596	-21.5%
2040[2]	2,284	2,915	-631	-21.6%
CAGR	**0.9%**	**2.1%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.
Note: Includes air cargo aircraft operations.

Air Cargo

Methodology

Because air cargo volume transported in the belly compartments of commercial service aircraft at SWO fluctuated wildly over the past decade, a strong, discernable correlation could not be established with any aviation or socioeconomic variables. The highest correlation coefficient was 0.70 with local GA operations in

the State of Oklahoma and 0.64 with Stillwater's historical population and retail sales. These are not statistically significant correlations, and they exclude regression forecasting from consideration. Additionally, with air cargo volumes transported by Martinaire LLC air cargo aircraft only available back to 2019, no discernable correlation can be established with any aviation or socioeconomic variables.

Over the past several years, the U.S. domestic air cargo market trends have declined due to security regulations and the shift from air to other modes of transportation (especially truck) as carriers face price competition from ground shipping methods. National online retailers like Amazon and Walmart incentivize their customers to use "free" two-day shipping rather than overnight at cost. The two-day day shipping allows for more cargo to be transported via truck instead of air, which is a cheaper alternative in most cases.

In the absence of correlated data, historical trends at SWO and GDP growth rates are used in air cargo forecasting because they better reflect the local economic conditions and historically nationwide air cargo activity tends to track with national GDP. Three methods considered for the air cargo volume forecasts, whether transported in the belly compartments of commercial service aircraft or in dedicated air cargo aircraft, are the following:

- Trend forecast carrying forward air cargo volume data.
- Stillwater MSA GDP growth rate time series analysis.
- National GDP growth rate time series analysis.

Dedicated air cargo aircraft operations provided by Martinaire LLC are expected to remain flat in the next 20 years as cargo payload capacities from 2019 through year-to-date 2021 has averaged 8 percent for outbound cargo and 18 percent for inbound cargo. This indicates any increases in air cargo volume experienced by Martinaire LLC can be accommodated within the existing aircraft operations.

Forecast Scenarios

There were three air cargo volume forecast scenarios analyzed and presented for both air cargo transported in the belly compartments of airline aircraft and in dedicated air cargo aircraft. These scenarios are shown in **Table B-20**.

Scenario One

This scenario uses trend projection by applying SWO's historical air cargo trends to future years. For air cargo transported in the belly compartments of air carrier aircraft, this results in a CAGR of 5.7 percent. This appears high given the historical amounts have fluctuated wildly and never surpassed 70,000 pounds. For air cargo transported by Martinaire LLC aircraft, this results in a negative CAGR. This scenario has been eliminated from consideration.

Scenario Two

This scenario uses linear projection by applying the expected Stillwater MSA GDP future growth rates from 2020 to 2040 to forecast air cargo volume. This results in CAGRs of 1.0 percent for both belly compartment and dedicated aircraft air cargo volumes throughout the 20-year planning period. Considering that neither the

belly compartment nor dedicated aircraft air cargo volumes reach the amounts experienced at SWO in 2019, this scenario has been eliminated from consideration.

Scenario Three

This scenario uses linear projection by applying national expected GDP future growth rates from 2020 to 2040. This results in a CAGR of 2.0 percent for belly compartment transported air cargo volumes and 1.9 percent for dedicated aircraft transported air cargo volumes. Using this scenario brings the 20-year planning period air cargo volumes back to near historical highs experienced at SWO.

Table B-20: Air Cargo Volume Forecast, 2020-2040

	Scenario One		Scenario Two		Scenario Three	
Year	Martinaire	Airlines	Martinaire	Airlines	Martinaire	Airlines
2020	37,057[1]	46,390[2]	37,057[1]	46,390[2]	37,057[1]	46,390[2]
2021[3]	21,980	66,760	37,460	46,900	37,800	47,320
2022[3]	6,900	70,670	38,880	47,420	38,550	48,260
2023[3]	---	74,570	38,290	47,940	39,330	49,230
2024[3]	---	78,470	38,710	48,470	40,110	50,210
2025[3]	---	82,380	39,140	49,000	40,910	51,220
2030[3]	---	101,890	41,340	51,750	45,170	56,550
2035[3]	---	121,400	43,020	54,390	49,150	62,430
2040[3]	---	140,910	45,220	57,160	54,000	68,930
CAGR	N/A	5.7%	1.0%	1.0%	1.9%	2.0%

Sources: [1] Martinaire Aviation LLC, August 2021.
[2] USDOT T-100, September 2021.
[3] Mead & Hunt.

Preferred Forecast Scenario

Scenario Three is the preferred forecast for air cargo volume. The unpredictable nature and limited historical data of air cargo volumes at SWO make accurate predictions challenging. Growth in the local economy would reasonably be expected to increase overall air cargo volumes. However, as stated earlier, the trend is changing from cargo transported by air to more ground-based transportation due to cost and the development of service centers spread throughout the country that make expedited ground deliveries feasible.

General Aviation Aircraft Operations

Itinerant General Aviation Operations

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO historical itinerant GA operations from 2010 through 2020. The four most highly correlated variables:

- Local GA operations within the State of Oklahoma (correlation of 0.89).
- Population of Stillwater (correlation of 0.88).
- Retail sales within Stillwater (correlation of 0.85).

- The Standard & Poor's (S&P) 500 stock market index average annual close (correlation of 0.84).

These four variables were tested using regression analysis. The validity of each test is measured by the R-squared (R^2) value. The R^2 value describes how well the variables explain variance in the dependent market (i.e., itinerant GA operations). R^2 is the percent of variance explained by the model. The closer the R^2 value is to 1.00 (100 percent of variance explained), the more confidence can be placed in the model's ability to explain historical variability rather than by chance.

To account for the effects of the different but strongly correlated variables, multi-variable regression models were tested against historical itinerant GA operations. Multi-variable models allow the forecast to account for local (i.e., population and retail sales), statewide (i.e., local GA operations in Oklahoma), and national (i.e., S&P 500 stock market index) forces. In the case of multi-variable regression, the adjusted R^2 value is used to decide the level of confidence each model has displayed. Every variable added to a model increases the R^2 and never decreases it, which can lead to an incorrectly high R^2 value. The adjusted R^2 value accounts for this effect and avoids the issue of not knowing if the R^2 value is high due to the model being better or because it has more predictor variables. **Table B-21** shows the adjusted R^2 value of the four variables, and various combinations of the four variables. As can be seen, only one combination of variables, the analysis of all four variables, produced an R^2 value greater than 0.9. Therefore, the regression analysis will use this combination of variables for forecasting itinerant GA operations.

Table B-21: Multi-Variable Adjusted R2 Regression Analyses

Variable	Adjusted R^2 Value
Local OK GA Operations, MSA Population, MSA Retail Sales, S&P 500	0.928
Local OK GA Operations	0.777
MSA Population	0.745
MSA Population and MSA Retail Sales	0.720
MSA Population and S&P 500	0.714
MSA Retail Sales	0.697
MSA Population, MSA Retail Sales, S&P 500	0.684
S&P 500	0.673
MSA Retail Sales and S&P 500	0.663

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), 2021.

Forecast Scenarios

As with the passenger enplanements forecast, five itinerant GA operations forecast scenarios were evaluated and presented. They too are based on a variety of assumptions and considerations unique to SWO. The FAA Aerospace Forecasts 2021-2041 indicate that the GA sector of aviation was less affected by the COVID-19 pandemic than other sectors, especially airlines. Thus, the recovery for GA activity is not expected to take nearly as long. Each scenario uses 25,654 operations in 2020 as the base year.

Itinerant GA operations at SWO have fluctuated during the past 10 years with an overall increase of 2.5 percent. This is the inverse experienced at the national level, where the same period was -1.6 percent. The

methods used in the FAA Aerospace Forecasts 2021-2041 indicate national itinerant GA operations will increase at a CAGR of 0.9 percent. **Table B-22** and **Figure B-5** show the itinerant GA forecasts.

Scenario One. This scenario uses linear projection by applying the expected Stillwater MSA population growth rate from 2020 to 2040 to forecast itinerant GA Operations at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with itinerant GA operations of 0.88, a fairly high correlation. However, as stated previously, when checked using the regression analysis, population only resulted in R^2 value of 0.745, not a significant correlation. This scenario is eliminated from consideration.

Scenario Two. This scenario uses trend projection by applying the growth rate established from 2010 through 2020 to future itinerant GA operations. This results in a 20-year CAGR of 3.1 percent.

Scenario Three. This scenario uses market share to forecast the itinerant GA operations at SWO as a function of the nationwide itinerant GA operations. SWO's 2020 market share of national itinerant GA operations was 0.235 percent. Application of this percentage to projections contained in the FAA Aerospace Forecasts 2021-2041 results in a CAGR of 1.1 percent.

Scenario Four. This scenario also uses market share to forecast itinerant GA operations but uses SWO's market share of itinerant GA operations historically occurring in Oklahoma. The 2020 market share of 4.90 percent is increased rapidly to 5.30 percent in the initial five-year period to be in line with recent historical shares of 2018 and 2019, where SWO's market shares were 5.36 and 5.48, respectively. The reason for the rapid increase is the expected return to pre-pandemic levels of Stillwater's economic indicators at a much faster pace than experienced nationally or statewide. Application of the increasing ratio results in a 20-year CAGR of 0.8 percent.

Scenario Five. This scenario applies multi-variable regression analysis using the four variables stated previously (i.e., local GA operations within the State of Oklahoma, Stillwater's population, Stillwater's retail sales and the S&P stock market index average annual close). The equation is displayed below:

$$y = m_1(x_1) + m_2(x_2) + m_3(x_3) + m_4(x_4)+b$$

y = Itinerant GA operations, b = Intercept from Regression Analysis

$$y =(1.45\times\text{Population}) + (0.0000099 \times \text{MSA Retail Sales}) + (-3.64 \times \text{S\&P}) 500) + (0.057 \times \text{OK Local GA Operations}) - 125{,}712.59$$

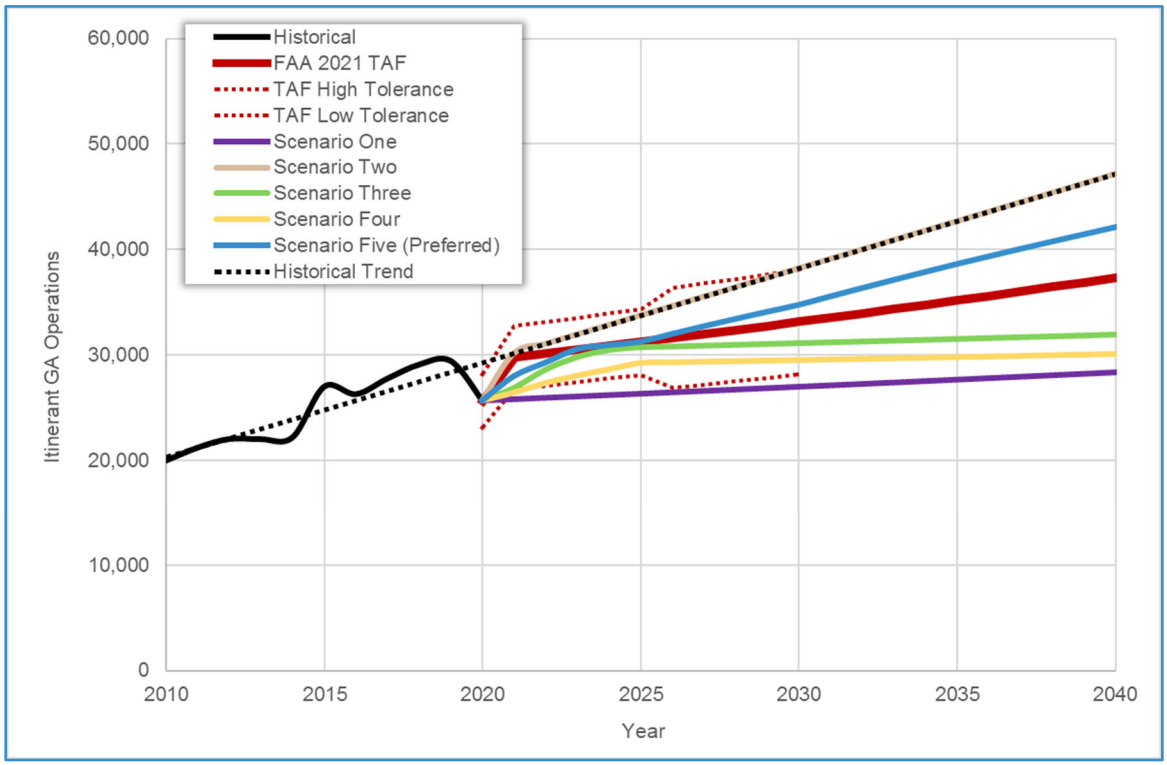
The multi-variable regression methodology incorporates a statical analysis to give confidence that the chosen variables have exhibited a degree of correlation with itinerant GA operations in the past. This scenario results in an overall CAGR of 2.5 percent.

Table B-22: Itinerant GA Operations Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2010-2020 Trend)	Scenario Three (Average Market Share)	Scenario Four (Increasing Market Share)	Scenario Five (Regression - Preferred)
2020[1]	25,654	25,654	25,654	25,654	25,654	25,654
2021[2]	29,770	25,780	30,160	26,860	26,410	27,980
2022[2]	30,128	25,910	31,050	28,610	27,320	29,270
2023[2]	30,488	26,040	31,950	29,800	28,010	30,540
2024[2]	30,854	26,170	32,840	30,470	28,610	30,920
2025[2]	31,224	26,300	33,740	30,730	29,210	31,260
2030[2]	33,144	26,970	38,220	31,120	29,480	34,760
2035[2]	35,180	27,650	42,690	31,520	29,760	38,640
2040[2]	37,342	28,340	47,170	31,940	30,060	42,140
CAGR	**1.9%**	**0.5%**	**3.1%**	**1.1%**	**0.8%**	**2.5%**

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-5: Itinerant GA Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for itinerant GA operations at SWO. Because FAA Aerospace Forecasts 2021-2041 project slight growth in the national itinerant GA aircraft operations, growth at SWO is supported. While the overall usage of piston-powered aircraft is anticipated to decline nationally, other

categories including turbine-powered, experimental, and light sport aircraft are growing. The facilities at SWO can accommodate larger turboprop and business jet aircraft operations and will not constrain growth. The preferred scenario incorporates regression forecasting using four strong correlated independent variables. Additionally, the preferred forecast mirrors increased growth by the TAF expected at SWO.

Table B-23 shows a side-by-side comparison of the preferred itinerant GA aircraft operations forecast with the 2020 TAF. As can be seen, the preferred forecasts vary from the TAF by less than 1 percent in initial five-year forecast period, and by less than 5 percent in the 10-year forecast period.

Table B-23: Itinerant GA Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	25,654	25,654	0	0.0%
2025[2]	31,260	31,224	36	0.1%
2030[2]	34,760	33,143	1,617	4.9%
2035[2]	38,640	35,180	3,460	9.8%
2040[2]	42,140	37,342	4,798	12.8%
CAGR	**2.5%**	**1.9%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Local General Aviation Operations

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO historical local GA operations from 2010 through 2020. The highest correlated variable with SWO's local GA operations was local GA operations within the State of Oklahoma, which has a correlation of 0.78. This is not a statistically significant correlation and excludes regression forecasting from consideration.

In the absence of correlated data, historical trends and market share analyses are employed because they better reflect local conditions. Additionally, current plans to increase student enrollment in the OSU Flight Center over time are factored and considered. Flight Center staff report that current training hours have been averaging 1,800 per month for the past several months, exceeding their normal 1,000 hours per month. The staff estimate this is from unmet demand resulting from students having limited training opportunities during mid to late 2020 after the COVID-19 pandemic began.

Forecast Scenarios

Five local GA operations forecast scenarios were evaluated and presented, which are based on a variety of assumptions and considerations unique to SWO. As stated previously, the GA sector of aviation was less affected by the COVID-19 pandemic, and the recovery is not expected to take nearly as long as the air carrier sector. Each forecast scenario uses 31,858 operations in 2020 as the base year.

Local GA operations at SWO have fluctuated during the past 10 years with an overall increase of 1.3 percent. This is a greater rate increase than experienced at the national level, where an increase of only 0.5 percent

was experienced during the same period. Methodology used in the FAA Aerospace Forecasts 2021-2041 indicate national local GA operations will slightly increase at a CAGR of 0.6 percent. **Figure B-6** and **Table B-24** show the local GA forecasts.

Scenario One. This scenario uses linear projection by applying the expected City of Stillwater MSA population growth rate from 2020 to 2040 to forecast itinerant GA Operations at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with local GA operations of 0.67, which is not a high correlation factor. This scenario is eliminated from consideration.

Scenario Two. This scenario uses trend projection by applying the growth rate established from 2010 through 2020 to future local GA operations. This results in a rather high 20-year CAGR of 3.0 percent.

Scenario Three. This scenario uses market share to forecast the local GA operations at SWO as a function of the nationwide local GA operations. SWO's 2020 national market share of local GA operations was 0.2583 percent. Application of this percentage to projections contained in the FAA Aerospace Forecasts 2021-2041 results in a CAGR of 0.8 percent.

Scenario Four. This scenario also uses market share to forecast local GA operations but uses SWO's market share of local GA operations historically occurring in Oklahoma. The 2020 market share of 6.056 percent is increased during the planning period to 7.7 percent – a return to a pre-pandemic high experienced in 2018. The presence of the OSU Flight Center and other flight training operations at SWO indicates that a higher growth rate in flight training will be expected at SWO than the rest of Oklahoma. Application of the increasing ratio results in a 20-year CAGR of 1.6 percent.

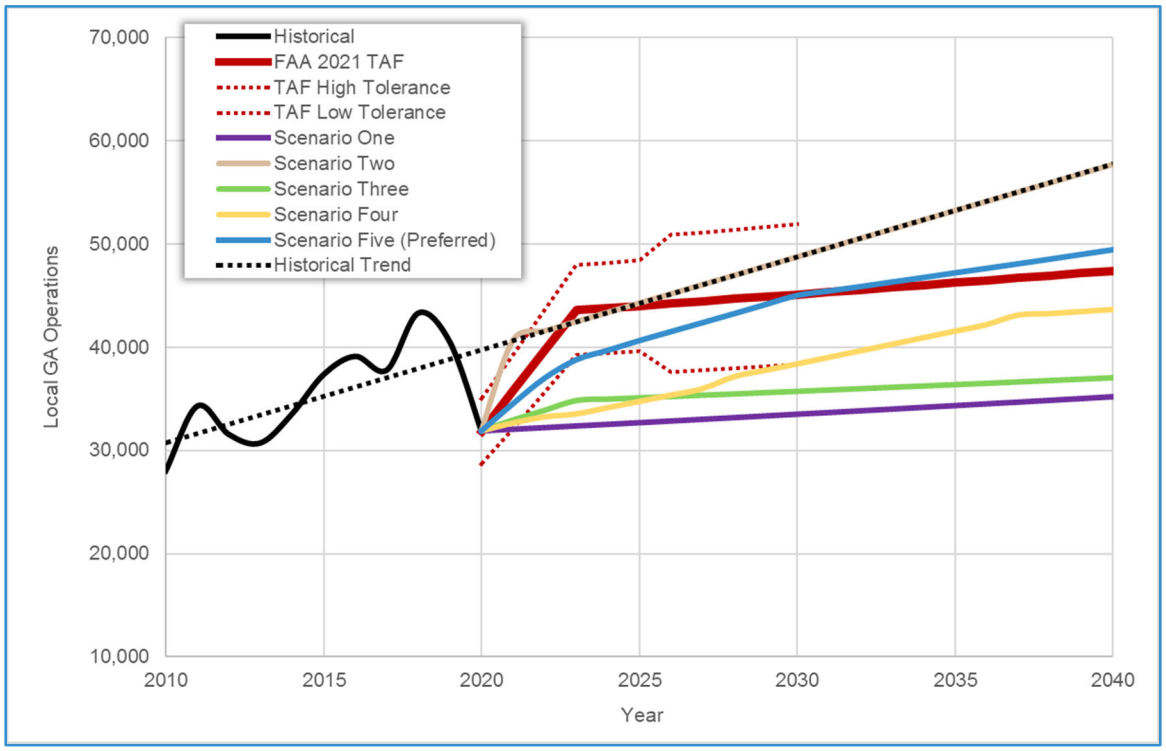
Scenario Five. This scenario reflects the continuation of the OSU Flight Center monthly training exceeding normal operations for the next two years, thereafter, slowly returning to a more normal training regimen once the unmet demand is satisfied. The scenario also applies the expected increase of student enrollment in the Flight Center pilot program from 300 to 400 by 2030. After that, a modest increase 0.6 percent growth rate is applied which corresponds to the local GA operations projected to occur nationally in the FAA Aerospace Forecast 2021-2041. The scenario also applies the growth rates projected in the TAF for SWO local operations in each of the five-year time periods to the non-OSU Flight Center estimated flight training operations (i.e., 6.7 percent during the first five years, 3.5 percent during the next five years, 2.5 percent during the five years after that, and 2.0 percent during the final five years). When combined, this scenario results in an overall CAGR of 2.2 percent.

Table B-24: Local GA Operations Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2010-2020 Trend)	Scenario Three (2020 Market Share)	Scenario Four (Increasing Market Share)	Scenario Five (Local Conditions - Preferred)
2020[1]	31,858	31,858	31,858	31,858	31,858	31,858
2021[2]	35,765	32,020	40,670	32,920	32,630	34,500
2022[2]	39,673	32,180	41,570	33,870	33,220	36,970
2023[2]	43,580	32,340	42,470	34,820	33,510	38,750
2024[2]	43,797	32,500	43,370	34,960	34,110	39,670
2025[2]	44,015	32,660	44,270	35,090	34,730	40,610
2030[2]	45,122	33,490	48,760	35,720	38,380	44,990
2035[2]	46,256	34,330	53,250	36,370	41,560	47,180
2040[2]	47,419	35,200	57,740	37,040	43,670	49,420
CAGR	2.0%	0.5%	3.0%	0.8%	1.6%	2.2%

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-6: Local GA Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for local GA operations at SWO. No strong correlations exist with any national aviation variables, nor were any correlations found to exist with local or national socioeconomic variables. The presence of the OSU Flight Center as well as the other flight training companies at SWO supports strong growth in local GA aircraft operations. Fulfilling unmet demand created by limited flight

training opportunities during 2020 and the expected gradual increase in student enrollment at the OSU Flight Center by over 30 percent is cause for expected substantial increase during the initial 10-year forecast period. Strong growth shown in local GA aircraft operations at SWO in the TAF further supports the expected growth shown in the preferred forecast.

Table B-25 provides a side-by-side comparison of the preferred local GA aircraft operations forecast with the 2020 TAF. As can be seen, the preferred forecasts vary from the TAF by less than 8 percent in initial five-year period and less than 1 percent in the 10-year period.

Table B-25: Local GA Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	31,858	31,858	0	0.0%
2025[2]	40,610	44,015	-3,405	-7.7%
2030[2]	44,990	45,122	-132	-0.3%
2035[2]	47,180	46,256	924	2.0%
2040[2]	49,420	47,419	2,001	4.2%
CAGR	**2.2%**	**2.0%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Military Aircraft Operations

As a percentage of annual aircraft operations, the number of military operations at SWO has historically been relatively insignificant. No factors have been identified that would significantly increase the number of military operations in the future. Therefore, military aircraft operations are projected to remain at the approximate 2020 level of 3,200 throughout the forecast period.

Aircraft Fleet Mix

A further assessment of the forecasts involves the individual and collective use of SWO by various aircraft types. Knowledge of the aircraft types expected to use SWO assists in determining the amount and type of storage facilities needed to meet the aviation demand.

Data for FY 2020 comes from applying data derived from the FAA's TFMSC. TFMSC data has a very high confidence level for recording virtually all commercial service aircraft as well as GA business jet and turboprop aircraft operations. However, since TFMSC only records aircraft filing IFR flight plans, it does not record touch-and-go operations and most single and multi-engine piston aircraft operations. Therefore, some degree of estimation, as presented in the sources section of **Table B-26** is applied to arrive at these types of aircraft operations.

Methodology

Table B-26 depicts the approximate level of use by aircraft type projected to use SWO throughout the 20-year planning period. As presented earlier, it is anticipated that 50-seat regional jet aircraft such as the CRJ 200

and ERJ 145 will be phased out of service by 2031. At SWO, they are anticipated to be replaced by 76-seat ERJ 175 aircraft. Since these aircraft have more than 60 seats they are classified as narrow body air carrier aircraft in the table and thus explain the future increases. It is anticipated that some 50-seat regional jets will continue to be used to transport university athletic teams via charter so they will remain operational at SWO throughout the planning period.

The table reflects a growing percentage of turbine-powered, multi-engine GA aircraft anticipated to operate at SWO, and a decreasing percentage of both single and multi-engine piston-powered aircraft. This is a national GA trend where smaller piston-power aircraft are being flown less due to several factors including, but not limited to, the cost of owning and flying personal aircraft (which tend to be piston-powered) and turbine-powered aircraft being used more for business purposes increasing as a percentage of total operations. The decreases in traditional single engine, piston-powered aircraft will be offset somewhat by the expected growth in light sport or experimental aircraft and helicopter operations.

Table B-26: Summary of Total Operations by Aircraft Type, 2020-2040

Aircraft Type	2020	2025	2030	2035	2040
Commercial Service	**1,920[1]**	**2,284**	**2,284**	**2,180**	**2,284**
Air Carrier	30[1]	348	1,180	1,388	1,492
Narrow Body Jet	*30[2]*	*348*	*1,180*	*1,388*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,104	792	792
Regional Jet	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
General Aviation Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	**57,512[1]**	**71,870**	**79,750**	**85,820**	**91,560**
Single Engine Piston	51,277[5]	64,064	70,750	75,934	81,022
Multi-Engine Piston	4,911[4]	6,146	6,794	7,160	7,416
Turboprop	623[2]	790	1,010	1,300	1,460
Jet	697[2]	860	1,116	1,332	1,552
Helicopter[2]	4	10	80	94	110
Military	**3,211[1]**	**3,200**	**3,200**	**3,200**	**3,200**
Piston	2,661[6]	2,652	2,652	2,652	2,652
Turboprop	350[2]	350	350	350	350
Jet	192[2]	190	190	190	190
Helicopter	8[2]	8	8	8	8
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**

Sources: [1] FAA TAF, 2021.

[2] TFMSC Direct – Operations obtained directly from TFMSC data.

[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[4] TFMSC Derived – Operations derived from applying the ratio of MEP to all piston operations contained in TFMSC to the remainder of GA operations when GA turboprop, jet and helicopter operations are removed.

[5] TFMSC Derived – Operations derived from subtracting the sum of GA MEP, turboprop, jet, and helicopter operations from total GA operations.

[6] TFMSC Derived – Operations derived from subtracting the sum of Military turboprop, jet, and helicopter operations from total Military operations.

Peak Period Forecasts

Peak forecasts estimate when certain airport facilities will be the busiest. Peak forecasts are used to assess level of service of airfield and terminal facilities and to right-size improvement projects. Improvement projects are not typically designed for the busiest day of the year specifically, as such a design would lead to over-building. The peak period forecasts are based on examining the average day of the busiest month of the year, in accordance with FAA Advisory Circular 150/5070-6B, Change 2.

Methodology

The methodology used to forecast future peaking is based on the historical record; therefore, it is essential that peak forecasts be reevaluated if a change in user or aircraft type occurs. **Table B-27** presents the peak forecasts for enplanements, total passengers, and aircraft operations.

Table B-27: Peak Period Forecasts, 2020-2040

Category	Period	Factor	2020	2025	2030	2035	2040
Enplanements and Deplanements	**Annual**	100%	16,102[1]	26,400	30,230	34,550	39,460
	Peak Month	9.9%	2,850[2]	2,614	2,993	3,420	3,907
	Average Day	3%	95	87	100	114	130
	Peak Hour – Enplanements	51%	48	44	51	58	66
	Peak Hour – Deplanements	49%	45	43	49	56	64
Total Passengers	**Annual**	100%	32,204[2]	52,800	60,460	69,100	78,920
	Peak Month	9.9%	5,592[2]	5,227	5,986	6,841	7, 813
	Peak Day	3%	186	174	200	228	260
	Peak Hour	50%	93	87	100	114	130
Aircraft Operations	**Annual**	100%	62,643[3]	77,354	85,234	91,200	97,044
	Peak Month	13%	8,077[3]	10,056	11,080	11,856	12,616
	Peak Day	3%	269	335	369	395	421
	Peak Hour	11%	30	37	41	43	46

Sources: [1] Actual, FAA TAF, 2021.
[2] Actual, Envoy/SkyWest Airlines, October 2019.
[3] Actual, FAA The Operations Network (OPSNET), 2021.

The peak passenger enplanement and deplanement forecast is determined by the growth in the total number of passengers traveling through SWO and the trends in air carriers transitioning from smaller to larger aircraft. Air carrier records show May has historically been the peak month for enplanements during the non-COVID time frame. This overlaps with the end of school when some university students may be travelling home and the beginning of the summer vacation season when families tend to travel together. October has been the busiest month for aircraft operations five out of the previous 12 Fiscal Years, with September being the peak month in four of the previous 12 Fiscal Years. These two months overlap the peak of the home games during the OSU football season and typically include some of the best flying weather for fans travelling to the games.

Future peaking analysis assumes that peak percentages shown in **Table B-27** will remain the same into the future.

Based Aircraft

The number and type of aircraft to be based at an airport is an important component in developing a plan for future facilities. GA operators are particularly sensitive to both quality and location of the basing facilities. Many factors affect the decision of aircraft owners to base their aircraft at an airport, including:

- Radio communications
- Available facilities and services
- Proximity to home and work
- Airport accessibility
- Basing capacity at nearby airports.

Methodology

Based aircraft at SWO did not exhibit strong historical correlation with any socioeconomic variables considered; the highest correlation coefficient was 0.66 with Stillwater's historical earnings and 0.65 with Stillwater's historical GRP. This seems to be caused by based aircraft only mildly fluctuating over the past decade, ranging between 71 and 75 as reported in the TAF, until increasing drastically to 80 based aircraft in the most recent data provided by SWO staff. For this reason, regression analysis using socioeconomic indicators was eliminated from consideration.

In the absence of correlated data, various methods and assumptions are employed to project the number and composition of SWO's based aircraft fleet. The methods and assumptions applied to the based aircraft include:

- Application of the FAA's Aerospace Forecast, 2021-2041 growth rates for each component of the GA fleet.
- Assumption that SWO will maintain a similar based aircraft market share in Oklahoma.
- Expectation that one helicopter and two "Other" (e.g., light sport or experimental aircraft) will be based at SWO by the end of the planning period.
- Discussions with OSU Flight Center staff regarding their plans for aircraft fleet and student enrollment.
- There is currently a wait list of 25 aircraft owners desiring to base their aircraft at SWO if hangar space was available, indicating a strong local demand for hangar space, particularly T-hangars.

Forecast Scenarios

There were five based aircraft forecast scenarios evaluated and presented. They were based on a combination of methods and assumptions presented above and are shown in **Table B-28** and **Figure B-7**.

Scenario One

This scenario uses linear projection by applying SWO's 10-year CAGRs for the individual based aircraft categories to future years. This results in a total based aircraft CAGR of 1.4 percent.

Scenario Two

This scenario uses trend analysis by applying SWO's trend projections for the individual based aircraft categories experienced from 2010 to 2020 to future years. This results in essentially no total based aircraft growth, only reaching the existing level of 80 based aircraft at the end of the forecast period.

Scenario Three

This scenario uses linear projection by applying the growth rate for each individual active GA fleet category contained in the FAA Aerospace Forecast 2021-2041 to the individual based aircraft categories at SWO to forecast future growth. Application of these individual growth rates results in a negative CAGR of 0.6 percent. This scenario is eliminated from consideration.

Scenario Four

This scenario uses market share analysis to forecast the individual categories of based aircraft at SWO as a percentage of nationwide active GA fleet contained in the FAA Aerospace Forecast 2021-2041. Applying SWO's 10-year average market share of each individual component to the individual components forecasts in the FAA Aerospace Forecast also results in a negative CAGR of 1.3 percent. This scenario is also eliminated from consideration.

Scenario Five

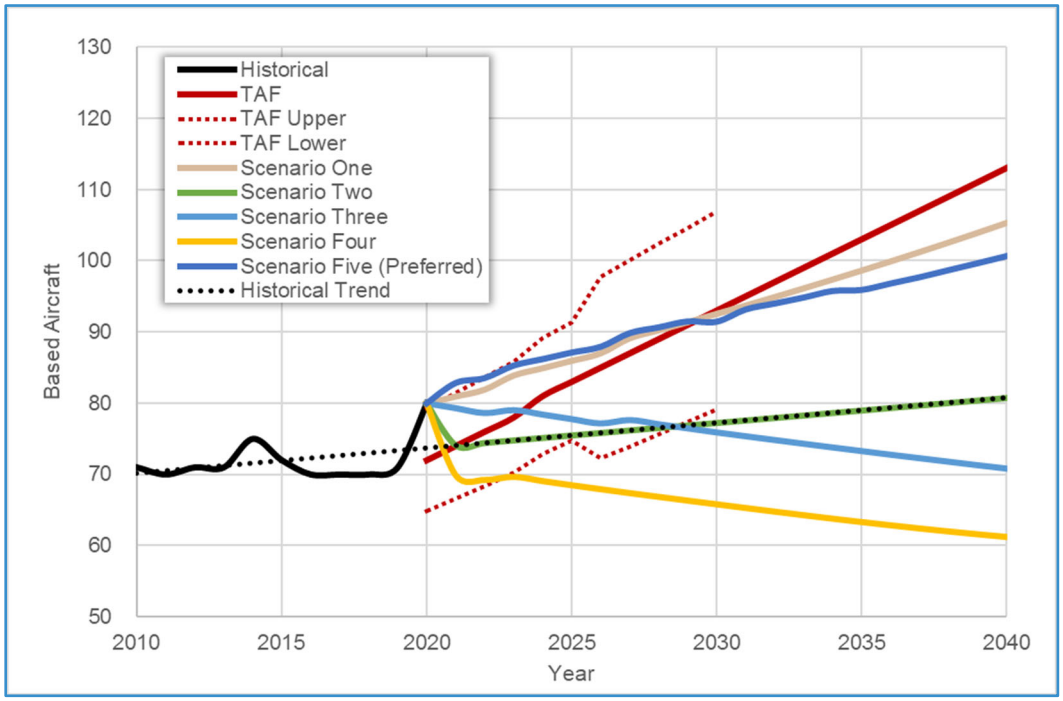
This scenario, a hybrid scenario uses the market share of SWO's based aircraft as a ratio of based aircraft in the State of Oklahoma recorded by the TAF. The 2020 market share experienced by SWO's individual based aircraft categories is applied to the TAF-forecasted State of Oklahoma based aircraft. However, it also applies the expected increase of two additional Piper PA 42 twin engine piston aircraft to the OSU Flight Center's aircraft fleet by the end of 2022. Thereafter, the projected gradual decrease of piston-powered aircraft as presented in the FAA Aerospace Forecast 2021-2041 is applied to the multi-engine piston aircraft expected to be based at SWO. Application of these assumptions results in a CAGR of 1.2 percent.

Table B-28: Based Aircraft Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Historical Growth Rates)	Scenario Two (2010-2020 Trend)	Scenario Three (FAA Aerospace Forecast)	Scenario Four (Average Market Share)	Scenario Five (Local Conditions - Preferred)
2020	72	80[1]	80[1]	80[1]	80[1]	80[1]
2021[2]	74	81	74	79	70	83
2022[2]	76	82	74	79	69	84
2023[2]	78	84	75	79	70	85
2024[2]	81	85	75	78	69	86
2025[2]	83	86	75	78	68	87
2030[2]	93	93	77	76	66	91
2035[2]	103	99	79	73	63	96
2040[2]	113	105	81	71	61	101
CAGR	**2.3%**	**1.4%**	**0.0%**	**-0.6%**	**-1.3%**	**1.2%**

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-7: Based Aircraft Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred based aircraft forecast at SWO. The FAA Aerospace Forecast 2021-2041 expects nationwide decreases of 0.9 percent in active single engine piston aircraft and 0.4 percent in active multi-engine piston aircraft. Increases are expected in turboprop and jet active aircraft by CAGRs of 0.6 and 2.3 percent, respectively by 2041. Increases are also expected in helicopter and light sport aircraft by CAGRs of 1.4 and 4.0 percent, respectively. While there are no helicopter or aircraft categorized as “Other” currently based at SWO, historically there has been as many as two helicopters based at the Airport and the growing light sport and experimental aircraft market is expected to become more common as they replace a growing percentage of aging single engine piston aircraft. The preferred forecast accounts for the OSU Flight Center adding aircraft to their fleet to accommodate the expected increase in student enrollment.

Table B-29 provides a side-by-side comparison of the preferred based aircraft forecast with the 2020 TAF. As can be seen, the preferred forecast varies from the TAF by 5 percent in the initial five-year period and by less than 2 percent in the 10-year period. This occurs even with the 11 percent variance of the based aircraft recorded in the TAF compared to the actual based aircraft reported by SWO staff.

Table B-29: Based Aircraft Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	80	72	8	11.1%
2025[2]	87	83	4	5.0%
2030[2]	91	93	-2	-1.7%
2035[2]	96	103	-7	-6.9%
2040[2]	101	113	-12	-10.9%
CAGR	**1.2%**	**2.3%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Table B-30 shows the preferred based aircraft forecast broken down by aircraft type at SWO. The future aircraft mix is expected to remain proportionally similar to the current based aircraft mix. However, in line with both local and national expectations, growth in helicopter and light sport aircraft will offset the decreases in piston-powered aircraft. Additionally, the presence of the OSU Flight Center and their aircraft fleet mix will offset the nationwide trend of decreased piston-powered aircraft.

Table B-30: Based Aircraft Forecast by Type, 2020-2040

Fiscal Year	Single Engine Piston	Multi-Engine Piston	Jet	Helicopter	Other	Total
2020[1]	72	6	2	0	0	80
2021	73	8	2	0	0	83
2022	74	8	2	0	0	84
2023	74	8	2	0	1	85
2024	75	8	2	0	1	86
2025	76	8	2	0	1	87
2030	80	7	2	1	1	91
2035	84	6	3	1	2	96
2040	88	6	4	1	2	101
CAGR	**1.0%**	**0.0%**	**3.5%**	**N/A**	**N/A**	**1.2%**

Sources: [1] Actual, as reported by SWO staff.

Runway Utilization

Runway utilization is defined by the distribution and frequency of aircraft operations on the runway system. Runway utilization at SWO is based on ATCT personnel observations collected during stakeholder outreach conversations, and to a lesser extent, the direction and wind speed used in the wind coverage analysis presented in **Chapter A – Inventory of Existing Conditions**. **Figure B-8** is a graphical representation of the estimated runway utilization, by percentage of total operations provided by ATCT personnel.

Figure B-8: Runway Utilization

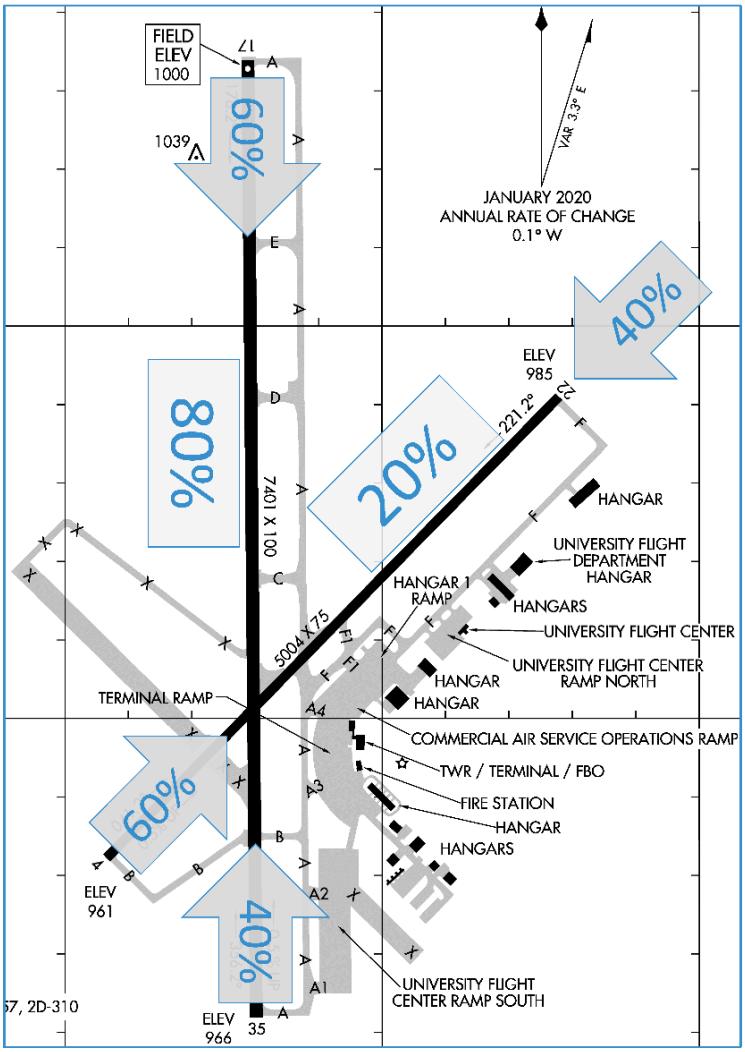


Table B-31 presents the runway utilization by RDC based on total aircraft operations and the wind coverage analysis. Runway 17/35 provides almost 96 percent wind coverage for the 10.5-knot crosswind component during all weather conditions, and almost 98 percent wind coverage for the 13-knot crosswind component. The 10.5-knot crosswind component is considered the maximum crosswind component for small aircraft with RDCs A-I and B-I. The 13-knot crosswind component is considered the maximum crosswind component for aircraft with RDCs A-II and B-II, which includes turboprops and small jets. ATCT personnel estimate that only 20 percent of single engine aircraft use Runway 4/22; the remainder of all other aircraft types use Runway 17/35. However, based on the wind coverage analysis, a small percentage of multi-engine piston, turboprop, and small business jet aircraft would need to use Runway 4/22 during excessive crosswind conditions. Therefore, an approximate four percent of multi-engine piston aircraft and two percent of turboprop and small business jet aircraft are estimated to use Runway 4/22.

Table B-31: Runway Utilization by Runway, 2020-2040

Runway	2020	2025	2030	2035	2040
Runway 17/35	**50,280**	**61,884**	**68,188**	**72,960**	**77,634**
Runway 17	30,168	37,130	40,912	43,776	46,580
Runway 35	20,112	24,754	27,276	29,184	31,054
Runway4/22	**12,363**	**15,470**	**17,046**	**18,240**	**19,410**
Runway 4	7,418	9,282	10,226	10,944	11,646
Runway 22	4,945	6,188	6,820	7,296	7,764
Total[1]	**62,643**	**77,354**	**85,234**	**91,220**	**97,044**

Sources: [1] FAA TAF, 2021.

[2] Percentage estimates provided by SWO ATCT personnel and Mead & Hunt calculations based on wind coverage analysis.

Night Operations

Night operations at SWO have been defined as the aircraft activity occurring between 10:00 p.m. and 7:00 a.m. local time. This differs from the definition provided in Title 14 of the Code of Federal Regulations (14 CFR) part 61, which refers to one hour after sunset and ending one hour before sunrise. The reason is the local time matches the definition used in FAA's noise modeling program Aviation Environmental Design Tool (AEDT). When aircraft noise modelling is performed, aircraft operations occurring between 10:00 p.m. and 7:00 a.m. are deemed more intrusive. In fact, AEDT penalizes the noise energy from aircraft operations at night by ten decibels to compensate for the perceived greater disturbance on sleep habits.

Since SWO's ATCT is closed between the hours of 10:00 p.m. and 8:00 a.m. local time, no official aircraft activity is recorded during these hours. However, the second daily Envoy/SkyWest Airlines flight into SWO has a scheduled arrival at 10:30 p.m., remains overnight, and has a scheduled departure time of 6:00 a.m. Additionally, ATCT and SWO staff estimate that 15 percent of total GA operations at SWO occur during nighttime hours. Therefore, based on this information, the estimated number of night operations for this Master Plan are provided in **Table B-32**. As the shift from commercial service 50-seat regional jets to 76-seat narrow body jets fully occurs by 2035 at SWO, the need for twice daily flights throughout an average week decreases. Therefore, the annual nighttime commercial service aircraft operations decrease throughout the planning period.

Table B-32: Estimated Existing and Forecast Night Operations, 2020-2040

Aircraft Type	2020[1]	2025[2]	2030[2]	2035[2]	2040[2]
Commercial Service	728	728	570	520	520
Itinerant GA	640	780	870	970	1,050
Local GA	3,980	5,080	5,620	5,900	6,180
Total[1]	**5,350**	**6,590**	**7,060**	**7,390**	**7,750**

Sources: [1] Actual, based on Envoy/SkyWest Airlines current schedule and estimate of itinerant and local GA operations.

[2] Mead & Hunt.

Runway Design Code/Critical Aircraft Analysis

The critical aircraft, often referred to as the design aircraft is defined in FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination* as the most demanding type or grouping of aircraft with similar

characteristics, that make regular use of an airport. Regular use is defined as 500 annual operations, including itinerant and local, but excluding touch-and-go operations. The 500 annual operations regular use threshold is not a cap or limit on aircraft operations, but rather a planning metric for consideration of the potential need to upgrade airport facilities.

Critical aircraft type is defined by the RDC, which consists of the Aircraft Approach Category (AAC) and the Airport Design Group (ADG). The AAC, depicted by a letter relates to the aircraft approach speed. The ADG, depicted by a Roman numeral relates to the aircraft wingspan and tail height. The FAA's specified criteria for AAC and ADG, as referenced in AC 150/5300-13A are presented in **Table B-33** and **Table B-34**.

Table B-33: Aircraft Approach Category (AAC)

AAC	V_{Ref}/Approach Speed
A	Less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

Source: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Table B-34: Airplane Design Group (ADG)

AAC	Wingspan	Tail Height
I	Less than 49'	Less than 20'
II	Greater than 49' but less than 79'	Greater than 20' but less than 30'
III	Greater than 79' but less than 118'	Greater than 30' but less than 45'
IV	Greater than 118' but less than 171'	Greater than 45' but less than 60'
V	Greater than 171' but less than 214'	Greater than 60' but less than 66'
VI	Greater than 214' but less than 262'	Greater than 66' but less than 80'

Source: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Critical Aircraft by Runway

To determine the SWO critical aircraft, existing operations by aircraft type are derived from the TFMSC data. Forecasts of commercial service critical aircraft operations are based on commercial service aircraft fleet changes through airline orders currently being fulfilled or yet to be delivered. GA critical aircraft forecasts are based on the changing use patterns outlined in the aircraft fleet mix section presented earlier. Military aircraft are not considered for critical aircraft consideration because the critical aircraft designation is a key component in FAA decision making for project justification.

Runway 17/35

Table B-35 presents the existing and forecasted operations occurring on Runway 17/35 broken down by AAC and ADG. In 2020, the Embraer ERJ 140 had the most operations of any single commercial service aircraft with 621. The Embraer ERJ 145/145 EX followed closely with 541 operations. Both aircraft have a RDC of C-II. However, Envoy/SkyWest Airlines have retired their ERJ 140 aircraft and by June 2021, only 32 operations were recorded at SWO. By comparison, the ERJ 145/145 EX recorded 407 operations by June 2021. This

indicates the existing critical aircraft for Runway 17/35 is the ERJ 145 and the existing RDC is C-II. The 50-seat ERJ 145s flown by Envoy/SkyWest Airlines are expected to be phased out of service during the planning period, replaced by 76-seat ERJ 175 aircraft. This aircraft has a RDC of C-III. Therefore, for Runway 17/35 the ERJ 175 is the future critical aircraft and the future RDC is C-III. **Figure B-9** shows the existing and future critical aircraft for Runway 17/35.

Table B-35: Summary of Runway 17/35 Operations Forecasts by RDC, 2020-2040

Typical Aircraft	RDC	2020[1]	2025	2030	2035	2040
Cessna 172, Cirrus SR-20	A-I	45,732	56,340	61,270	65,490	69,634
Pilatus PC-12	A-II	115	146	154	164	176
Beech King Air 90, Raytheon Beechjet 400	B-I	964	1,196	1,326	1,444	1,550
Cessna 208 Caravan, Beech 200 Super King Air	B-II	520	650	732	780	864
Saab 2000	B-III	6	10	10	12	14
Bombardier Learjet 60, Hawker 800	C-I	36	48	64	72	96
Embraer ERJ 140/145, Bombardier Challenger 600/601/604	C-II	1,242	1,466	1,704	1,830	2,012
ERJ 175, Boeing 737-400	C-III	18	370	1,202	1,414	1,522
Lockheed C-130	C-IV	4	6	8	8	8
Northrop T-38	D-I	2	4	4	4	4
Gulfstream G IV/G400	D-II	2	2	2	4	4
Boeing 737-900, Gulfstream G V/G500	D-III	22	32	34	38	40
Total[2]		**48,662**	**60,270**	**66,510**	**71,260**	**75,924**

Sources: [1] Mead & Hunt estimates using FAA TFMSC, 2021 and runway utilization analysis.
[2] Military aircraft and helicopter operations not included.

Figure B-9: Existing and Future Runway 17/35 Critical Aircraft

Runway 4/22

Applying the runway utilization analysis presented earlier to the TFMSC data, **Table B-36** shows the existing and forecasts operations estimated to occur on Runway 4/22 broken down by AAC and ADG. In 2020, the

Cessna 172 had the most operations of any single aircraft with an estimated 7,095. The Cirrus SR-20 had the next highest number of operations with an estimated 2,522 in 2020. Both aircraft have a RDC of A-I and are used extensively by the OSU Flight Center. The OSU Flight Center has plans to increase its SR-20 fleet by an additional six aircraft in 2022. This indicates the existing and future critical aircraft is the Cessna 172 and the existing and future RDC is A-I. **Figure B-10** shows the existing and future critical aircraft for Runway 4/22.

Table B-36: Summary of Runway 4/22 Operations Forecasts by RDC, 2020-2040

Typical Aircraft	RDC	2020[1]	2025	2030	2035	2040
Cessna 172, Cirrus SR-20	A-I	10,723	13,810	15,366	16,538	17,672
Pilatus PC-12	A-II	5	8	12	20	32
Beech King Air 90, Raytheon Beechjet 400	B-I	28	38	50	58	70
Cessna 208 Caravan, Beech 200 Super King Air	B-II	10	16	20	26	36
Total[2]		**10,766**	**13,872**	**15,448**	**16,642**	**17,810**

Sources: [1] Mead & Hunt estimates using FAA TFMSC, 2021 and runway utilization analysis.
[2] Military aircraft and helicopter operations not included.

Figure B-10: Existing and Future Runway 4/22 Critical Aircraft

SUMMARY

A summary of aviation activity forecasts prepared for SWO is provided in **Table B-37**. This information is used as a background to develop the remaining portions of the Master Plan (analyze facility requirements, aid development of alternatives, and guide the preparation of the plan and program of future airport facilities). In other words, the aviation activity forecasts are the foundation from which plans will be developed and implementation decisions will be made.

Table B-37: Summary of Aviation Activity Forecasts, 2020-2040

Activity	2020	2025[5]	2030[5]	2035[5]	2040[5]
Enplanements					
Total	**17,410[1]**	**28,000**	**31,830**	**36,150**	**41,060**
Operations					
Commercial Service	***1,920***	***2,284***	***2,284***	***2,180***	***2,284***
Air Carrier	30[1]	348	1,180	1,284	1,492
Narrow Body Jets	*30[2]*	*348*	*1,180*	*1,284*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,000	792	792
Regional Jets	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
GA Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	***57,512[1]***	***71,870***	***79,750***	***85,820***	***91,560***
Itinerant	25,654[1]	31,260	34,760	38,640	42,140
Local	31,858[1]	40,610	44,990	47,180	49,420
Military	***3,211[1]***	***3,200***	***3,200***	***3,200***	***3,200***
Itinerant	1,314[1]	1,310	1,310	1,310	1,310
Local	1,897[1]	1,890	1,890	1,890	1,890
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**
Based Aircraft					
Total	**80[4]**	**87**	**91**	**96**	**101**
Critical Aircraft					
Runway 17/35	ERJ 145	ERJ 145	ERJ 175	ERJ 175	ERJ 175
Runway 4/22	Cessna 172	Cessna 172	Cessna 172	Cessna 172	Cessna 172

Sources: [1] FAA TAF, 2021.

[2] TFMSC Direct – Operations obtained directly from TFMSC data.

[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[4] SWO staff.

[5] Mead & Hunt projections.

FORECAST APPROVAL

According to FAA language contained in Review and Approval of Aviation Forecasts, regional airports division offices or airports district offices are responsible for aviation forecast approvals at local airports. As stated previously, airport master plan forecasts that are consistent with the FAA's TAF (i.e., the airport master plan forecast differs by less than 10 percent in the first 5 years and differs by less than 15 percent in the 10-year forecast period) do not need to be coordinated with FAA headquarters (APP-400, APO-110). As noted in **Table B-38**, the forecasts estimated for this Master Plan are within the TAF tolerances during the five- and 10-year forecast periods. The actual FAA templates for **Table B-38** and **Table B-39** have been completed and are presented for reference in **Appendix Three**. The FAA forecast approval letter is also contained in **Appendix Three**.

Table B-38: Summary of Master Plan and TAF Comparison

	Year	Master Plan Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base Year	2020	17,410	17,410	0%
Base Year + 5 Years	2025	28,000	28,964	-3%
Base Year + 10 Years	2030	31,830	28,964	10%
Base Year + 15 Years	2035	36,150	28,964	25%
Commercial Operations				
Base Year	2020	1,920	1,920	0%
Base Year + 5 Years	2025	2,284	2,517	-9%
Base Year + 10 Years	2030	2,284	2,645	-14%
Base Year + 15 Years	2035	2,180	2,776	-21%
Total Operations				
Base Year	2020	62,643	62,643	0%
Base Year + 5 Years	2025	77,354	80,967	-4%
Base Year + 10 Years	2030	85,234	84,121	1%
Base Year + 15 Years	2035	91,200	87,423	4%

Source: Mead & Hunt.

Table B-39: Summary of Airport Planning Forecasts

Activity Forecasts						Average Annual Compound Growth Rate			
	Base Year (2020)	Base Yr. + 1 Yr. (2021)	Base Yr. +5 Yrs. (2025)	Base Yr. +10 Yrs. (2030	Base Yr. + 15 Yrs. (2035)	Base Yr. to + 1 Yr.	Base Yr. to + 5 Yrs	Base Yr. to + 10 Yrs	Base Yr. to + 15 Yrs.
Passenger Enplanements									
Air Carrier	1,308	1,600	1,600	1,600	1,600	22.3%	4.1%	2.0%	1.4%
Commuter	16,102	13,900	26,400	30,230	34,550	-13.7%	10.4%	6.5%	5.2%
Total	**17,410**	**15,500**	**28,000**	**31,830**	**36,150**	**-11.0%**	**10.4%**	**6.2%**	**5.0%**
Operations									
Itinerant									
Air Carrier	30	94	348	1,180	1,388	212.0%	63.3%	44.4%	29.1%
Commuter/air taxi	1,890	1,899	1,936	1,104	792	0.5%	0.5%	-5.2%	-5.6%
Total Commercial Operations	**1,920**	**1,993**	**2,284**	**2,284**	**2,180**	**3.8%**	**3.5%**	**1.8%**	**0.9%**
General aviation	25,654	27,980	31,260	34,760	38,640	9.1%	4.0%	3.1%	2.8%
Military	1,314	1,310	1,310	1,310	1,310	-0.3%	-0.1%	0.0%	0.0%
Local									
General aviation	31,858	34,500	40,610	44,990	47,180	8.3%	5.0%	3.5%	2.7%
Military	1,897	1,890	1,890	1,890	1,890	-0.4%	-0.1%	0.0%	0.0%
Total Operations	**62,643**	**67,673**	**77,354**	**85,234**	**91,200**	**8.0%**	**4.3%**	**3.1%**	**2.5%**
Instrument Operations	4,737	5,034	5,643	5,983	6,255	6.3%	3.6%	2.4%	1.9%
Peak Hour Operations	30	31	37	41	43	4.7%	4.5%	3.2%	2.6%
Cargo/mail (enplaned +deplaned tons)	42	43	46	51	51	2.0%	2.0%	2.0%	1.3%
Based Aircraft									
Single Engine (Nonjet)	72	73	76	80	84	1.2%	1.0%	1.0%	1.1%
Multi Engine (Nonjet)	6	8	8	7	6	33.3%	5.9%	1.6%	0.2%
Jet Engine	2	2	2	2	3	0.7%	1.0%	0.9%	2.7%
Helicopter	0	0	0	1	1	N/A	N/A	N/A	N/A
Other	0	0	1	1	1	0.0%	0.0%	0.0%	0.0%
Total	**80**	**83**	**87**	**91**	**96**	**3.6%**	**1.7%**	**1.3%**	**1.2%**
Average aircraft size (seats)									
Air carrier	164	150	85	79	78				
Commuter	46	46	50	48	45				
Average enplaning load factor									
Air carrier	74%	70%	55%	69%	67%				
Commuter	58%	60%	65%	59%	67%				
GA operations per based aircraft	**719**	**754**	**825**	**872**	**895**				

Source: Mead & Hunt.

C. Facility Requirements

INTRODUCTION

In efforts to determine an airport's future facility needs, it is necessary to translate the forecasted aviation activity into specific physical development requirements. Using the Federal Aviation Administration (FAA) design standards and guidelines, this chapter analyzes the actual types and quantities of facilities and/or the required improvements to existing facilities needed to accommodate the projected demand in a safe and efficient manner. For those components determined to be deficient, the type, size, or number of facilities required to meet the demand is identified and explained using FAA standards and guidelines.

Although the analysis uses the forecasts presented in the previous chapter for establishing future development, it is not intended to dismiss the possibility that either consistently higher or lower growth levels may occur. Aviation activity levels should be monitored for consistency with the forecasts. Since the facility improvements are identified to resolve existing deficiencies, accommodate projected growth, and satisfy airport development goals, the resulting recommendations respond to demand rather than being planned for a specific year.

Airport Design Standards

The geometric design of an airport is based on the Runway Design Code (RDC) standards specified in FAA's Advisory Circular (AC) 150/5300-13B, *Airport Design* and introduced in the previous chapter, **Chapter B – Forecasts of Aviation Activity**. Although the RDC is based on the Critical Aircraft or Design Aircraft defined in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, and is used for planning and design, it does not limit the aircraft that may be able to operate at an airport. Critical aircraft can take the form of one aircraft or a composite of aircraft representing a collection of aircraft with similar characteristics. FAA AC 150/5300-13B allows for the application of different RDCs to individual runways based on the critical aircraft operating or expected to operate on each runway.

The previous chapter and FAA Forecast Approval Letter contained in **Appendix Three** identified the Runway 17/35 existing critical aircraft as the Embraer ERJ 145, which has a RDC of C-II. The future critical aircraft is identified as the Embraer ERJ 175, which has a RDC of C-III. The Cessna 172 was identified as the Runway 4/22 critical aircraft, which has a RDC of A-I. Since the Cessna 172 has a maximum gross takeoff weight of less than 12,500 pounds, it is considered a small aircraft.

In addition to the aircraft approach speed (AAC) and wingspan components (ADG) comprising the RDC introduced in the previous chapter, a third component exists that is related to the lowest Instrument Approach Procedure (IAP) visibility minimums. An IAP is a series of predetermined maneuvers designed to transition aircraft under instrument flight conditions from the en route portion of the flight to a point where a landing can be made visually. Runways provide maximum utility when they can be used in less-than-ideal weather conditions. This translates to visibility minimums in terms of the distance to see and identify prominent

unlighted objects by day and lighted objects by night. Pilots must be able to see the runway or associated lighting at a certain distance from and height above the runway to land during periods of limited visibility. Ultimate runway development should be designed for one of the following visibility categories:

- **Visual –** Runways that support Visual Flight Rules (VFR) operations only, except circle-to-land approaches.
- **Non-Precision Approach (NPA) –** Runways designed to accommodate straight-in approaches with only lateral guidance provided. NPA runways will only support Instrument Flight Rules (IFR) approach operations with visibility minimums of 3/4 mile or greater.
- **Approach Procedure with Vertical Guidance (APV) –** Runways designed to accommodate approaches where the navigation system provides vertical guidance down to 250 feet above the threshold and visibility minimums of 3/4 mile or greater.
- **Precision Approach (PA) –** Runways designed to accommodate approaches where the navigation system provides vertical guidance lower than 250 feet above the threshold and visibility minimums lower than 3/4 mile.

For airport facility geometric design purposes, the instrument approach visibility minimums are expressed as Runway Visual Range (RVR) values in feet. **Table C-1** provides the instrument approach visibility minimums and corresponding RVR value.

Table C-1: RVR Values

Instrument Flight Visibility Minimum Category (miles)	RVR (feet)[1]
Visual	VIS
Not Lower Than 1 Mile	5000
Lower Than 1 Mile but Not Lower Than 3/4 Mile	4000
Lower Than 3/4 Mile but Not Lower Than 1/2 Mile	2400
Lower Than 1/2 Mile but Not Lower Than 1/4 Mile	1600
Lower Than 1/2 Mile	1200

Source: FAA AC 150/5300-13B, *Airport Design*.
Notes: [1] RVR values are not exact equivalents.

As presented in **Chapter A – Inventory of Existing Conditions**, SWO is equipped with an Instrument Landing System (ILS) Instrument Approach Procedure (IAP) and an Area Navigation (RNAV) Global Positioning System (GPS) IAP to Runway 17 that have visibility minimums as low as 1/2 mile. Runway 4/22 is a visual approach only runway. Therefore, the full expression of the Runway 17/35 existing RDC is C-II-2400 and the Runway 4/22 existing RDC is A-I-VIS (small aircraft only). Future IAP improvements will be evaluated in the next section that will determine the future RDC designations for both runways.

AIRSIDE FACILITY REQUIREMENTS

The analysis of airside facility requirements focuses on the determination of needed facilities and spatial considerations related to the actual operation of aircraft at an airport. The FAA is responsible for the overall safety of civil aviation in the United States. Therefore, the FAA design standards and policy focus first and

foremost on safety, with secondary emphasis on efficiency and utility. The evaluation of airside facilities contained in this section includes the application of appropriate design standards to the aircraft operating surfaces (i.e., runways and taxiways), the desired IAP improvements, the sufficiency of the approach areas, and the resulting navigation and lighting needs.

Instrument Approach Procedures and Navigational Aids Analysis

Since many appropriate airport design standards are determined upon the lowest visibility minimums, an evaluation of IAP improvements should be established first that provide an understanding of the benefits received, the implementation required, and the methodology employed.

Instrument Approach Procedures

Increased airport access can be improved by reducing the ceiling and/or visibility minimums associated with IAPs. Further analysis of SWO's climatological conditions presented in **Chapter A – Inventory of Existing Conditions** indicates the existing IAPs to Runway 17/35 are slightly lacking for providing IFR accessibility. As presented in **Table C-2**, the IFR wind analysis indicates that Runway 35 offers slightly better wind coverage during IFR weather conditions than Runway 17. Additionally, Runway 17/35 offers less than 95 percent IFR wind coverage for the 10.5-knot crosswind component. Providing at least one IAP to Runway 4/22 would increase the amount of time that smaller aircraft are able to access SWO during excessive crosswind conditions under IFR weather conditions.

The existing Airport Layout Plan (ALP) indicates a future IAP with visibility minimums not lower than 1/2 mile is planned for implementation to Runway 35. It also shows future IAPs with visibility minimums not lower than 3/4 mile planned for Runways 4 and 22. Therefore, it is recommended that this Master Plan evaluate the possibility of implementing IAPs with lower visibility minimums to Runways 35, 4, or 22 in the next chapter. This would include an evaluation of any required Approach Lighting Systems (ALS).

Table C-2: IFR Wind Coverage by Runway End

Runway	10.5-Knots	13-Knot	16-Knot
17/35	**94.96%**	**97.43%**	**99.15%**
17	67.05%	68.04%	69.57%
35	78.43%	80.23%	81.59%
4/22	**85.84%**	**92.32%**	**97.77%**
4	79.87%	84.72%	88.89%
22	64.12%	67.98%	71.73%
Combined	**97.31%**	**98.92%**	**99.67%**

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. February 2022.
Wind data provided by NOAA Integrated Surface Database (ISD), Station 723545.
Period of Record 2011-2020.

Navigational Aids

FAA AC 150/5070-6B defines Navigational Aids (NAVAIDs) as aids to navigation that provide pilots with information that assist in locating an airport and to provide horizontal and/or vertical positional guidance

during landing. The type, mission, and volume of aeronautical activity, in association with airspace, meteorological conditions, and capacity data determine the need and eligibility for NAVAIDs. NAVAID requirements are based on guidelines contained in FAA Handbook 7031.2C, *Airway Planning Standard Number One* and FAA AC 150/5300-13B, *Airport Design*.

As presented above, Runway 35 is equipped with a ground-based ILS IAP. Two antennae comprise the ILS and work in tandem to provide both vertical and horizontal guidance to approaching aircraft. The localizer antenna provides the horizontal guidance, and the glide slope antenna provides the vertical guidance. The localizer antenna south of Runway 35 is located approximately 1,000 feet from the threshold and the glide slope antenna is located approximately 1,170 feet south of the Runway 17 threshold and 370 feet west of the runway centerline.

A Very High Frequency Omni-Directional Range/Distance Measuring Equipment (VOR-DME) station is located approximately 3.1 miles north/northeast of Runway 17. This ground-based facility is utilized for en route navigation for airways as well as the NPA IAPs to Runways 17 and 35.

For many years, the FAA has been transitioning away from IAPs that use ground-based NAVAIDS to those that utilize the satellite-based Global Positioning System (GPS). SWO has two PA GPS-based IAPs that have no associated ground-based facilities or equipment. It is anticipated that any future IAP improvements will be implemented using GPS technology and no ground-based NAVAIDS will be utilized at SWO.

Instrument Approach Procedure and Navigational Aids Conclusion

The operational capacity for each runway regarding wind coverage and navigational aids is sufficient to enable an unincumbered system to support existing and future airport operations. However, the ability to implement a GPS-based IAP providing visibility minimums of 1/2 mile to Runway 35 and NPA IAPs providing visibility minimums not less than 3/4 mile to Runways 4 and 22 would enhance SWO's access during adverse weather conditions. It is recommended that SWO evaluate the potential to implement these types of IAPs, including the impact on developable area within the terminal area, in the next chapter.

Airfield Design Standards Analysis

Runway Design Standards

Runway design standards are established to assure that runway facilities are designed, constructed, and operated in a safe and efficient manner and represent the minimum standards to be achieved. To determine if existing facilities meet the required standards, this analysis compares the dimensional requirements associated with the appropriate RDC to the existing airport facilities. NAVAIDS classified as fixed-by-function within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA), as listed in Table 6-1 of FAA AC 150/5300-13B, *Airport Design*, are excluded from the analysis.

Runway 17/35

Runway Object Free Area (ROFA). An area centered on the surface of the runway provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects that need to be in the OFA for air navigation or aircraft ground maneuvering purposes. (FAA AC 150/5300-13B, *Airport Design*)

Table C-3 presents the existing dimensions and applicable design standards for Runway 17/35. As contained in the table, Runway 17/35 does not mee the ROFA width dimensional criteria because of two objects. The first is the glideslope equipment building and antenna located 370 feet west of the runway centerline, while the second is a frangible windsock located 250 feet east of the runway centerline. However, the windsock was recently constructed in this location with FAA approval. Therefore, it is not considered an obstruction or non-standard condition within the ROFA. The glideslope equipment building and antenna are non-standard conditions and results in a ROFA width deficiency of 30 feet, providing only a total width of 770 feet.

Table C-3: Runway 17/35 Design Standards

Item	Design Standard (C-III-2400)[1]	Existing Dimensions	
		Runway 17	Runway 35
Runway Design			
Runway Width	100’	100’	
Shoulder Width[2]	20’	25’	
Blast Pad Width[2]	140’	N/A	N/A
Blast Pad Length[2]	200’	N/A	N/A
Runway Safety Area (RSA)			
Length Beyond Departure End	1,000’	1,000’	1,000’
Length Prior to Threshold	600’	600’	600’
Width	500’	500’	
Runway Object Free Area (ROFA)			
Length Beyond Departure End	1,000’	1,000’	1,000’
Length Prior to Threshold	600’	600’	600’
Width	800’	**770’**	
Runway Obstacle Free Zone (ROFZ)			
Length	200’	200’	200’
Width[3]	400’	400’	
Runway Separation			
Runway Centerline to:			
Holding Position[4]	260’	260’	
Parallel Taxiway/Taxilane Centerline	400’	400’	

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Standards based on aircraft with maximum gross takeoff weight of less than 150,000 pounds.

[2] Paved runway shoulders and blast pads are recommended, but not required for runways accommodating ADG III and below aircraft. Stabilized shoulders of turf are acceptable.

[3] Standard based on 400 feet for operations by large aircraft.

[4] Standard based on 250 feet plus one foot for each 100 feet above sea level (SWO elevation is 1,001 feet).

N/A = Not Applicable.

Bold = Standard not met.

Runway 4/22

Table C-4 presents the existing dimensions and applicable design standards for Runway 4/22. There are no design standard deficiencies associated with this runway.

Table C-4: Runway 4/22 Design Standards

Item	Design Standard (A-I-VIS Small)	Existing Dimensions	
		Runway 4	Runway 22
Runway Design			
Runway Width	60’	75’	
Shoulder Width[1]	10’	0’	
Blast Pad Width[1]	80’	N/A	N/A
Blast Pad Length[1]	60’	N/A	N/A
Runway Safety Area (RSA)			
Length Beyond Departure End	240’	240’	240’
Length Prior to Threshold	240’	240’	240’
Width	120’	120’	
Runway Object Free Area (ROFA)			
Length Beyond Departure End	240’	240’	240’
Length Prior to Threshold	240’	240’	240’
Width	250’	250’	
Runway Obstacle Free Zone (ROFZ)			
Length	200’	200’	200’
Width[2]	250’	250’	
Runway Separation			
Runway Centerline to:			
Holding Position	125’	200’	
Parallel Taxiway/Taxilane Centerline	150’	240’ +	

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved runway shoulders and blast pads are recommended, but not required for runways accommodating ADG III and below aircraft. Stabilized shoulders of turf are acceptable.

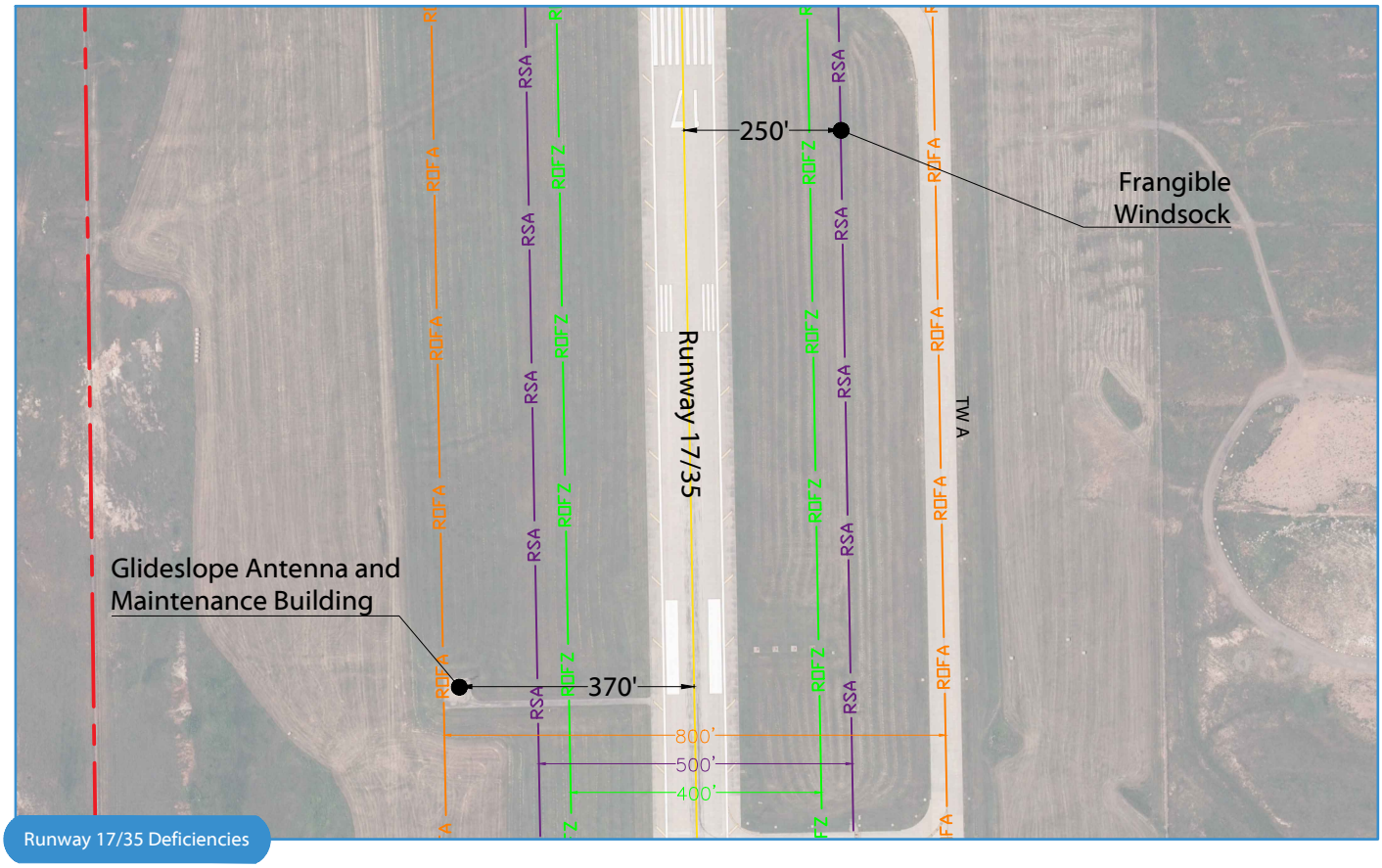
[2] Standard based on 250 feet for operations by small aircraft with approach speeds of 50 knots or more.

N/A = Not Applicable.

Bold = Standard not met.

Runway Design Standards Conclusion

Most of the runway design standards for each of SWO’s two runways are met. However, deficiencies in the Runway 17/35 ROFA width was noted and is shown in **Figure C-1**. Alternatives addressing the ROFA width deficiency will be considered in the next chapter.



Runway 17/35 Deficiencies

Figure C-1
Runway Dimensional Standard Deficiencies

Runway Line of Sight

Line of sight standards exist to allow pilots to observe runway and taxiway surfaces for assurance that they are clear of aircraft, vehicle, wildlife, and other hazardous objects. According to the longitudinal (i.e., along the length of the runway) line of sight standards contained in FAA AC 150/5300-13B, any two points located five feet above the runway centerline must be mutually visible for the entire length of the runway. However, if the runway is served by a full-length parallel taxiway, the requirement is reduced to one half the runway length.

The longitudinal profile evaluation from each end of Runway 17/35 and 4/22 to the individual runway midpoint at five feet above the runway surface indicates a clear line of sight is achieved. Both Runway 17/35 and 4/22 have an overall longitudinal gradient of approximately 0.48 percent.

When airfield geometry includes intersecting runways, line of sight standards indicate that there must be an unobstructed view from any point five feet above the runway centerline to any other point five feet above the intersecting runway within the Runway Visibility Zone (RVZ). At SWO, the RVZ is defined as an area formed by the imaginary lines connecting the two runways' line of sight points. Because all runway ends are more than 1,500 feet from the runway intersection, the line of sight points are established one-half the distance from the intersecting runway centerline to the runway ends. An analysis was conducted using SWO's GIS survey data collected in 2021 and no obstructions to the RVZ line of sight were found.

Runway Line of Sight Conclusion

The analysis indicated there were no identified line of sight deficiencies for either Runway 17/35 or 4/22.

Pavement Strength

FAA pavement design considers the pavement strength needed to accommodate the expected aircraft fleet to frequently use the pavement. No single critical aircraft is designated for pavement strength. Pavement design strength does not necessarily prohibit airport use by heavier aircraft. However, if routine use by an aircraft heavier than the pavement strength is anticipated, then it would be recommended that pavement strength be increased.

As identified in **Chapter A – Inventory of Existing Conditions**, the pavement of Runway 17/35 and 4/22 is rated in good condition. It should be noted that portions of Runway 17/35 were most recently reconstructed between 2001 and 2009, while a full-depth rehabilitation of Runway 4/22 occurred in 2018. SWO noted a need for rehabilitation on both runways, with minor cracks requiring sealing followed by remarking of the runways. A series of full depth repairs on various runway shoulder areas and edges is anticipated.

SWO's aprons remain in good condition, with SWO staff noting the pavement around T-hangar 2 is exhibiting signs of wear that might need to be addressed, but overall no major pavement improvements are anticipated. The following taxiways were noted for crack sealing and remarking:

- Taxiway A
- Taxiway B
- Taxiway E
- Taxiways A1 through A4
- Taxiway D
- Taxiways F and F1

Pavement Strength Conclusion

Information provided by airport staff indicates that the pavement strength of the runways, taxiways, and aprons remain generally suitable for the SWO fleet mix. Apron surrounding T-hangar 2 will be monitored for wear and pavement rehabilitation programmed as needed.

Runway Length Analysis

The runway length analysis recommends the length necessary to meet existing and future aircraft demands. The analysis considers aircraft design characteristics, airport elevation, temperature, and destinations, among other factors. The detailed runway length methodology and analysis is contained in **Appendix Four**.

Runway Length Methodology

The determination of runway recommendations for airport planning purposes uses the methodology found in FAA AC 150/5325-4B, *Runway Length Requirements*. This AC states the design objective for primary runways is to provide a runway length for all aircraft that will regularly use the runway without causing operational weight restrictions. AC 150/5000-17, *Critical Aircraft and Regular Use Determination* defines regular use as 500 annual operations, excluding touch-and-go local operations.

Runway 17/35 serves air carrier and the full range of general aviation (GA) aircraft. Runway 4/22 serves primarily smaller GA aircraft. The existing design aircraft (and most demanding aircraft) for Runway 17/35 has been determined to be the Embraer ERJ 145. The future design aircraft (and most demanding aircraft) is the Embraer ERJ 175. The existing and future design aircraft (and most demanding aircraft) for Runway 4/22 has been determined to be the 95 percent family grouping of small aircraft (i.e., aircraft with maximum takeoff weight equal to or less than 12,500 pounds) that have approach speeds greater than 50 knots but have less than 10 passenger seats excluding crew (i.e., pilot and copilot).

Runway Length Analysis

The runway length analysis uses the takeoff performance table and payload and range charts contained in the Airport Planning Manuals (APMs) of the design aircraft. The APMs base aircraft performance on airport temperature and elevation. SWO has an airport elevation of 1,000 feet above mean sea level (AMSL) and a mean maximum temperature of the hottest month of 94 degrees Fahrenheit. Combined, SWO's Density Altitude (DA) is calculated at 3,400 feet AMSL. **Table C-5** presents SWO's recommended runway lengths.

Table C-5: Runway Length Recommendations

Runway	Recommended Runway Length
17/35	**7,401' Actual**
Existing Design Aircraft (E-145)	8,630' (MTOW)
Future Design Aircraft (E-175)	9,430' (MTOW)
4/22	**5,002' Actual**
Existing and Future Design Aircraft (C 172)	3,730'

Source: Mead & Hunt using airport planning manuals and FAA AC 150/5325-4B methodology.

Aircraft have different ranges depending on the amount of weight carried. The recommended runway length will vary based on payload (i.e., passengers, baggage, and cargo), fuel load, and destinations as described by stage length in nautical miles (NMs). The longer the stage length, the more fuel that is required. The amount of fuel required to reach a given destination determines if payload restrictions are required. As stated in **Chapter B – Forecasts of Aviation Activity**, Envoy/SkyWest Airlines currently provide service to Dallas Fort Worth International Airport (DFW) and the most likely long-term future destinations to be served by air carriers are Denver International Airport (DEN) and Chicago O'Hare International Airport (ORD). DFW, DEN, and ORD are located approximately 200, 225, and 550 NMs from SWO, respectively.

Runway Length Conclusion

The runway length analysis suggests that Runway 17/35, with an existing length of 7,401 feet is slightly insufficient to accommodate both the existing and future design aircraft operating at MTOW. However, neither the Embraer ERJ 145 nor the ERJ 175 experience payload restrictions until stage lengths of 650 and 1,300 NMs, respectively, are required. Therefore, the existing Runway 17/35 length is determined to be sufficient, and no runway extensions are recommended.

Runway Protection Zones

Runway Protection Zones (RPZs) are trapezoidal areas beginning 200 feet beyond the threshold of a runway; their dimensions are determined by function (i.e., approach or departure RPZ), critical aircraft size, and the appropriate AAC; and the lowest IAP visibility minimums. Their purpose is to enhance the protection of people and property on the ground. This is accomplished through airport control of the RPZ areas, preferably exercised through fee simple ownership by the airport sponsor. It is desirable to clear all above ground objects from within RPZs. Where this is impractical, airport sponsors should work with property owners to maintain the RPZ clear of all facilities supporting incompatible activities. In consideration of the existing IAP visibility minimums and aircraft type the runways are designed to accommodate, **Table C-6** provides a comparison of the existing RPZ dimensions at SWO and the FAA's specified RPZ dimensional requirements.

Table C-6: Runway Protection Zone Dimension Criteria

Item	Inner Width	Length	Outer Width	Airport Controls Entire RPZ
Runway 17/35				
17 (Approach)	1,000’	2,500'	1,750’	Yes
17 (Departure)	500’	1,700’	1,010’	Yes
35 (Approach)	1,000’	1,700’	1,510’	Yes
35 (Departure)	500’	1,700’	1,010’	Yes
Runway 4/22				
4 (Approach)	250’	1,000’	450’	Yes
4 (Departure)	250’	1,000’	450’	Yes
22 (Approach)	250’	1,000’	450’	Yes
22 (Departure)	250’	1,000’	450’	Yes

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

Runway Protection Zone Conclusion

SWO currently owns all the property within the existing RPZs. Any changes to RPZs in the future will be analyzed in the next chapter.

Runway End Siting Surfaces

FAA AC 150/5300-13B provides criteria for the proper siting of runway ends and thresholds. The criteria are in the form of imaginary evaluation surfaces that are typically trapezoidal shaped and extend away from the runway ends along the centerline at specific slopes, expressed in horizontal feet by vertical feet (e.g., a 20:1 slope rises one foot vertically for every 20 feet horizontally). The specific size, slope, and starting point of the trapezoid depends upon the visibility minimums and the type of IAP associated with the runway end.

Approach Surfaces

Thresholds are located to provide proper clearance over obstacles for landing aircraft on approach to a runway end. When an object penetrates the approach surface required for aircraft to land at the beginning of the runway, and it is beyond the airport sponsor’s ability to remove, relocate, or lower, the landing threshold may require a location other than the end of the pavement (i.e., a displaced threshold). The existing criteria and analysis prepared for SWO are presented in **Table C-7**. According to this analysis there are no obstructions to the threshold siting surfaces.

Table C-7: Approach Surface Dimensions

Runway End	Distance From Runway End	Inner Width	Length	Outer Width	Slope	Existing Obstructions
17	200’	400’	10,000’	3,400’	34:1	None
35	200’	400’	10,000’	3,400’	20:1	None
4	0’	250’	5,000’	700’	20:1	None
22	0’	250’	5,000’	700’’	20:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

IAPs With Vertical Guidance Surfaces

Runway ends equipped with IAPs providing vertical guidance require an additional level of approach surface analysis. When objects penetrate this imaginary surface that cannot be mitigated, then an approach with vertical guidance is not authorized. The size, shape, slope, and criteria for these surfaces, and the analysis conducted for Runways 17 and 35 are presented in **Table C-8**. Runways 17 and 35 are the only runway ends currently equipped with IAPs providing vertical guidance. There are no objects that penetrate these surfaces.

Table C-8: IAPs With Vertical Guidance Threshold Siting Surface Dimensions

Runway End	Distance From Runway End	Inner Width	Length	Outer Width	Slope	Existing Obstructions
17	0’	300	10,200’	1,520’	30:1	None
35	0’	300	10,200’	1,520’	30:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Departure Surfaces

Departure ends of runways normally mark the end of the full-strength runway pavement available and suitable for departures. Departure surfaces, when clear of obstacles, allow pilots to follow standard departure procedures. If obstacles penetrate the departure surface, then the obstacles must be evaluated through the Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process. After the OE/AAA process, departure procedure amendments such as non-standard climb rates, non-standard (higher) departure minimums, or a reduction in the length of takeoff distance available may be required. The size, shape, slope, and criteria of the departure surfaces, as well as the analysis conducted for Runways 17 and 35 are presented in **Table C-9**. No obstructions were observed in the analysis of the departure surfaces.

Table C-9: Departure Runway Surface Dimensions

Runway End	Distance From Departure Runway End	Inner Width Section One	Inner Width Section Two	Length	Outer Width	Slope	Existing Obstructions
17	0’	100’	450’	12,152’	7,512’	40:1	None
35	0’	100’	450’	12,152’	7,512’	40:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Runway End Siting Conclusion

There were no obstructions identified in the existing approach surfaces, IAP with vertical guidance evaluation, or departure surfaces. Should any improvements or changes to the existing IAPs be proposed or the location of any runway thresholds change, then additional runway end siting analysis will be required.

Pavement Marking, Lighting, and Signage

The minimum requirements for surface marking schemes used for runways are a direct function of the approach category for each runway end.

Runway and Taxiway Markings

Runway 17/35 is provided with white precision markings consisting of landing designator numbers, centerline, threshold markings, aiming points, touchdown zone, and edge markings. The markings are consistent with the requirements of runways having precision IAPs. The markings are outlined in black to enhance the contrast with the concrete pavement and are in good condition. Yellow angled shoulder markings are provided between the edge markings and the pavement edge for additional delineation of the runway shoulders as unusable runway pavement.

Runway 4/22 is provided with white basic markings consisting of landing designator numbers, centerline, and aiming points. The markings exceed the requirements of runways with visual only approaches and are in good condition.

All taxiways at SWO are provided with yellow centerline markings. Taxiways that intersect a runway are provided with holding position markings, surface painted holding position signs, and enhanced centerline markings. The surface painted holding position signs and enhanced centerline markings are supplemental visual cues to alert pilots of an upcoming holding position marking in efforts to minimize potential runway incursions. Taxiway markings located on concrete pavements are outlined in black to enhance the contrast with the concrete. The taxiway markings at SWO meet all requirements for Part 139 airports.

Runway and Taxiway Lighting

Runway 17/35 is equipped with Medium Intensity Runway Lights (MIRL) and four-box Precision Approach Path Indicator (PAPI) at each runway end. Runway 35 is equipped with Runway End Identifier Lights (REILs) and Runway 17 has a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 4/22 is equipped with MIRL and four-box PAPI. These lighting systems are consistent with the existing IAP visibility minimums requirements and recommendations. If an IAP with visibility minimums lower than 3/4 mile is implemented to Runway 35, then AC 150/5300-13B indicates a full approach light system, such as a MALSR, would be required.

All taxiways providing access to the runway system at SWO are equipped with Medium Intensity Taxiway Lights (MITL). This practice is recommended for any additional taxiways serving the runway system.

Runway and Taxiway Signage

Both Runways 17/35 and 4/22 have distance remaining signs, which is consistent with requirements of airports frequented by turbojet aircraft as contained in FAA AC 150/5340-18G, *Standards for Airport Signs Systems*. The taxiway signage, consisting of runway entry hold signs, taxiway location signs, and taxiway directional signs is consistent with requirements for Part 139 airports.

Pavement Marking, Lighting, and Signage Conclusion

In conjunction with the Runway 35 potential IAP improvement of visibility minimums to 1/2 mile mentioned above, it is recommended that SWO evaluate the potential installation of a full approach light system such as a MALSR. Likewise, if a NPA IAP is implemented to either Runway 4 or 22, then the non-precision markings will be maintained. It is recommended that LED edge lighting replace all existing incandescent lighting.

Taxiway/Taxilane System

Taxiways provide defined movement corridors for aircraft between the runway system and the various functional landside areas on an airport. Some taxiways are necessary simply to provide access between aircraft parking aprons and runways, whereas other taxiways become necessary to provide more efficient and safer use of the airfield. Parallel taxiways eliminate the use of a runway for taxiing, referred to as back taxiing, which increases an airport's capacity and protects the runway under low visibility conditions. Taxiway turns and intersections are designed for safe and efficient taxiing by aircraft while minimizing excess pavement.

Taxilanes are provided for low speed, precis taxiing of aircraft that are usually, but not always, located outside the aircraft movement area. They normally provide aircraft access from taxiways to apron parking positions or hangar areas.

Taxiway/Taxilane Design Standards

Taxiways and taxilanes are designed for cockpit over centerline taxiing, with enough pavement width to allow for a certain amount of wander. Potential runway incursions should be minimized by using design criteria contained in FAA AC 150/5300-13B. Taxiway and taxilane clearance standards are based on wingspan and wingtip clearance criteria determined by the ADG of the critical aircraft. Taxiway and taxilane pavement design standards are based on the landing gear dimension determined by the Taxiway Design Group (TDG).

SWO's existing critical aircraft, the Embraer ERJ 145, has an ADG designation of II and a TDG designation of 2. The future critical aircraft (Embraer E 175) has an ADG III and TDG 3 designation, so the design standards associated with ADG III and TDG 3 will be evaluated for taxiways serving Runway 17/35. **Table C-10** presents the design criteria, design standards, and existing conditions for taxiways serving Runway 17/35.

Table C-10: Taxiway Design Standards for Taxiways Serving Runway 17/35

Design Criteria	Design Standard		Existing Dimension		
			Taxiway A	Taxiways A1 – A4	Taxiway B
ADG Design Criteria	**II**	**III**			
Taxiway Safety Area Width	79’	118’	118’	118’	118’
Taxiway Object Free Area Width	124’	171’	186’	186’	186’
Taxiway Centerline to:					
Parallel Taxiway/Taxilane Centerline	102’	144’	N/A	600’ +	1,350’ +
Fixed or Movable Object	62’	85.5’	93’	93’	93’
TDG Design Criteria	**2**	**3**			
Taxiway Width	35’	50’	50’	60’ +	50’
Taxiway Shoulder Width	15’	20’[1]	N/A	N/A	N/A

Design Criteria	Design Standard		Existing Dimension		
			Taxiway C	Taxiway D	Taxiway E
ADG Design Criteria	**II**	**III**			
Taxiway Safety Area Width	79’	118’	118’	118’	118’
Taxiway Object Free Area Width	124’	171’	186’	186’	186’
Taxiway Centerline to:					
Parallel Taxiway/Taxilane Centerline	102’	144’	1,400’ +	1,200’ +	1,200’ +
Fixed or Movable Object	62’	85.5’	93’	93’	93’
TDG Design Criteria	**2**	**3**			
Taxiway Width	35’	50’	55’	55’	50’
Taxiway Shoulder Width	15’	20’[1]	N/A	N/A	N/A

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved taxiway shoulders are recommended, but not required for taxiways, taxilanes, and aprons accommodating ADG-III and below aircraft. Stabilized shoulders of turf are acceptable.

The taxiway design standards analysis indicates the existing conditions of Runway 17/35 meet or exceed the FAA design criteria. However, Taxiway B west of Runway 17/35 does not intersect the runway at a right-angle. FAA design recommendations are that taxiways should intersect runways at right angles unless specifically designed as high-speed exit taxiways to increase capacity of a runway. Therefore, Taxiway B west of Runway 17/35 should be redesigned to a right-angled taxiway when pavement condition warrants.

Taxiway design criteria for taxiways serving Runway 4/22 are based on the critical aircraft Cessna 172, which has an ADG of I and a TDG of 1A. **Table C-11** presents the design criteria, design standards, and existing conditions for taxiways serving Runway 4/22.

Table C-11: Taxiway Design Standards for Taxiways Serving Runway 4/22

Design Criteria	Design Standard	Existing Dimension		
		Taxiway B	Taxiway F	Taxiway F1
ADG Design Criteria	**I**			
Taxiway Safety Area Width	49’	49’	49’	49’
Taxiway Object Free Area Width	89’	89’	89’	89’
Taxiway Centerline to:				
Parallel Taxiway Centerline	70’	2,000’	2,450’	450’ +
Taxiway Centerline to Fixed or Movable Object	44.5’	45’	45’	45’
TDG Design Criteria	**1A**			
Taxiway Width	25’	50’	50’	50’
Taxiway Shoulder Width	10’[1]	N/A	N/A	N/A

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved taxiway shoulders not required for taxiways accommodating ADG-I aircraft. Stabilized shoulders of turf are acceptable.

While the existing dimensions of Runway 4/22 meet or exceed the FAA design criteria, Taxiway F1 is a non-standard taxiway. The design and location of Taxiway F1 nearly leads directly from the Hangar 1 Ramp to Runway 4/22. To reduce the probability of inadvertent runway incursions, proper taxiway design requires a turn be executed by the pilot when leaving an apron before entering the runway system. The suggested design requires two 90-degree turns instead of one approximate 30-degree turn, as the current design provides. SWO staff report that Taxiways A and F, near the intersection with Runway 4/22 have been known to cause pilot confusion. However, this confusion is often remedied with Airport Traffic Control Tower (ATCT) instructions.

Exit Taxiways

Optimally located exit taxiways minimize runway occupancy times and allow the airfield to be used more efficiently. Figure 4-17 in AC 150/5300-13B provides the cumulative percentages of aircraft able to exit runways at specific exit taxiway locations, given in 1,000-foot increments. Percentages for both right-angled and acute-angled taxiway configurations are included for each AAC.

Runway 17/35 Exit Taxiways

Table C-12 presents the location of current exit taxiways serving Runway 17/35 and the approximate percentages of landing aircraft types that can exit the runway in a safe and efficient manner.

Table C-12: Runway 17/35 Exit Taxiway Analysis

Runway / Taxiway	Distance From Runway Threshold	Percentage of Landing Aircraft Exit Probability		
		AAC A	AAC B	AAC C
Runway End 17				
Taxiway E	1,425’	3	1	0
Taxiway D	2,625’	71	18	0
Taxiway C	4,025’	100	76	2
Taxiway B	6,015’	100	100	88
Taxiway A	7,375’	100	100	100
Runway End 35				
Taxiway B	1,385’	2	0	0
Taxiway C	3,375’	96	50	0
Taxiway D	4,775’	100	95	23
Taxiway E	5,975’	100	100	88
Taxiway A	7,375’	100	100	100

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

The taxiways of Runway 17/35 appear suitably spaced to accommodate all aircraft sizes from either direction.

Runway 4/22 Exit Taxiways

Runway 4/22 does not have a high-speed exit taxiway but Taxiways A and F1 are obtuse-angled taxiways for aircraft landing to Runway 22. For aircraft landing to Runway 4 they are acute-angled but do not meet the requirements for high-speed exit taxiways. Therefore, they will be analyzed as right-angled taxiways. **Table C-13** presents the location of existing exit taxiways serving Runway 4/22 and the approximate percentages of landing aircraft types that can exit the runway in a safe and efficient manner.

Table C-13: Runway 4/22 Exit Taxiway Analysis

Runway / Taxiway	Distance From Runway Threshold	Percentage of Landing Aircraft Exit Probability		
		AAC A	AAC B	AAC C
Runway End 4				
Taxiway A	2,140’	33	5	0
Taxiway F1	2,600’	81	27	0
Taxiway F	4,975’	100	97	37
Runway End 22				
Taxiway F1*	2,400’	71	20	0
Taxiway A*	2,875’	88	33	0
Taxiway B	4,975’	100	97	37

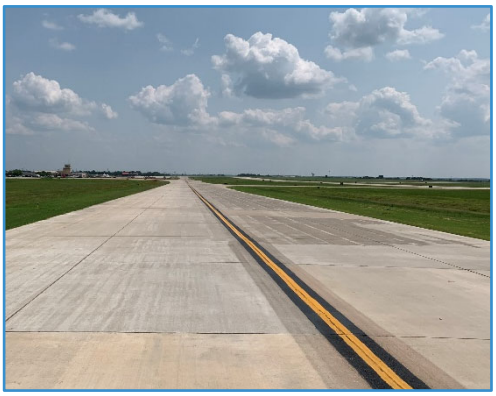
Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Note: * Acute-angled taxiways.

Most of the taxiways serving Runway 4/22 are sufficiently placed to ensure adequate exits for small aircraft. Taxiway F1, with its non-standard design, hinders the ability of aircraft to use F1 from both directions. Aircraft landing to the northeast on Runway 4 are met with a sharp turn of approximately 150 degrees at Taxiway F1, which limits the ability of aircraft to exit on F1 from that direction.

Taxiway/Taxilane System Conclusion

The existing taxiway/taxilane system in place at SWO meets most FAA standards. However, the non-standard design and location of Taxiway F1 nearly connects Runway 4/22 directly to the Hangar 1 Ramp. Taxiway F1's angle also introduces potential issues for aircraft exiting Runway 4/22 when landing to the northeast. As pavement conditions warrant, a redesign of Taxiways B (west of Runway 17/35) and F1 to right-angled taxiways is recommended. This will alleviate the non-right-angled taxiway intersections and the direct access from the Hangar 1 Ramp to the runway environment.



AIRFIELD CAPACITY ANALYSIS

The capacity of an airfield is primarily a function of the major aircraft operating surfaces that compose the facility and the configuration of those surfaces (runways and taxiways). However, it is also related to and considered in conjunction with environmental conditions, wind coverage, airspace utilization, and the availability and type of navigational aids. Capacity refers to the number of aircraft operations that a facility can accommodate either on an hourly or yearly basis. It does not refer to the size or weight of aircraft.

The evaluation method used to determine airfield capacity comes from AC 150/5060-5, *Airport Capacity and Delay*. From this methodology, airfield capacity for long-range planning is defined in the following terms:

- **Hourly Capacity of Runways:** The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period during both VFR and IFR conditions.
- **Annual Service Volume (ASV):** A reasonable estimate of an airport's annual capacity (i.e., level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

Airfield Capacity Factors

Airfield capacity for long-range planning is a function of several factors, including the layout of the airfield, local environmental conditions, specific characteristics of local aviation demand, and air traffic control requirements.

Airfield Layout and Runway Use

The arrangement and interaction of airfield components (i.e., runways, taxiways, and ramp entrances) refers to the layout or "design" of the airfield. Runway use is primarily defined by the orientation of the active runways with prevailing winds, the available IAP capabilities, and the distribution and frequency of aircraft operations on the airfield facilities. SWO operates with a two intersecting runway configuration (Runways 17/35 and 4/22) that are supported by a system of parallel and connecting taxiways. Intersecting runways do

not maximize overall capacity as they cannot be used simultaneously because when aircraft are using one runway, aircraft on the other runway must wait.

As presented in the previous chapter, SWO ATCT staff indicate that Runway 17/35 is used approximately 80 percent of the time, with Runway 17 used approximately 60 percent and Runway 35 used approximately 40 percent. Runway 4/22 is estimated to be used approximately 20 percent of the time, with Runway 4 utilized an estimated 60 percent of the time and Runway 22 used approximately 40 percent.

Meteorological Conditions

Low cloud ceilings and reduced visibility typically reduce capacity. Three categories of ceiling and visibility minimums are considered. Visual Flight Rules (VFR) conditions occur when the cloud ceiling is greater than or equal to 1,000 feet above ground level (AGL), and visibility is greater than or equal to three statute miles. National Oceanic and Atmospheric Administration (NOAA) data shows that these conditions occur 78 percent of the time at SWO. Instrument Flight Rules (IFR) conditions occur when the cloud ceiling is less than 1,000 feet AGL, or visibility is less than three statute miles. These conditions occur 22 percent of the time at SWO. Poor visibility and ceiling conditions exist whenever the cloud ceiling is less than 200 feet AGL, or visibility is less than 1/2 statute mile. These conditions are lower than the ILS minimums, effectively closing SWO. These conditions occur less than 1 percent of the time at SWO.

Aircraft Mix

Aircraft mix is the relative percentage of aircraft operations that have a MTOW over 12,500 pounds. The aircraft mix index is determined by the equation (C+3D), where C is the percent of aircraft with MTWO over 12,500 pounds but under 300,000 pounds, and D represents the percent of aircraft over 300,000 pounds MTOW. **Table C-14** outlines the data used to determine the aircraft mix index.

Percent Arrivals

Runway capacity is significantly influenced by the percentage of all operations that are arrivals. Because aircraft on final approach are travelling at a reduced speed and are typically given absolute priority over departures, higher percentages of arrivals during peak periods of operations will reduce the ASV. The operations mix at SWO reflects a general balance of arrivals to departures. Therefore, for the capacity calculations arrivals equal departures during the peak period.

Table C-14: Aircraft Fleet Mix, 2020-2040

Year	VFR Conditions			IFR Conditions		
	Class A & B	Class C	Class D	Class A & B	Class C	Class D
2020	97%	3%	0%	95%	5%	0%
2025	97%	3%	0%	95%	5%	0%
2030	97%	3%	0%	95%	5%	0%
2035	97%	3%	0%	95%	5%	0%
2040	97%	3%	0%	95%	5%	0%

Source: Existing percentages Future percentages estimated by Mead & Hunt.

Notes: Class A = Small Single Engine, < 12,500 pounds. Class B = Small Twin-Engine, < 12,500 pounds.
Class C = 12,500 – 300,000 pounds. Class D = > 300,000 pounds.

Touch-and-Go Operations

As presented in the previous chapter, touch-and-go operations represent 54 percent total annual operations being conducted at SWO. It is anticipated that by 2040 the overall percentage of touch-and-go activity will decrease slightly to 53 percent.

Exit Taxiways

The amount, spacing, and design of exit taxiways influence the length of time aircraft occupy runways by providing aircraft the ability to exit runways as quickly and safely as possible. SWO generally has an adequate exit system in place to minimize runway occupancy times and maximize airfield capacity. The lone exceptions would be Taxiways A and F1 since they are obtuse angled for aircraft landing to Runway 4. Aircraft landing to the northeast would have to be travelling at a slower speed to make these exits than aircraft landing to the southwest. While these taxiways have additional pavement design to accommodate exiting aircraft landing to the northeast, some aircraft using Runway 4 might not have the ability to slow down in sufficient time to make the exits and would have to travel to the end of the runway before exiting at Taxiway F. Because Taxiway A is the parallel taxiway service the primary runway, it will remain. However, a reconstruction of Taxiway F1 to a right-angled taxiway would provide a slight benefit for aircraft with faster landing speeds using Runway 4. Additionally, as presented previously, a redesign that alleviates the nearly direct access from the Hangar 1 Ramp to the Runway 4/22 environment would reduce the probability of runway incursions.

Air Traffic Control Rules

The FAA specifies aircraft separation criteria and operational procedures for aircraft in the vicinity of airports, contingent upon aircraft size, availability of radar, sequencing of operations, and noise abatement procedures that may be in effect at an airport. The impact of air traffic control on airfield capacity is most influenced by aircraft separation requirements dictated by aircraft mix. Presently, there are no special air traffic control rules in effect at SWO that significantly affect airfield capacity.

Airfield Capacity Analysis

As previously indicated in this section, the determination of ASV and hourly capacity for long-range planning purposes uses the methodology described in AC 150/5060-5. Several assumptions are incorporated in these capacity calculations, which are:

- Arrivals equal departures
- Percentage of touch-and-go operations is between zero and 50 percent
- There is a full-length parallel taxiway with ample exits and no taxiway crossing problems
- There are no airspace limitations
- There is at least one runway equipped with and ILS and the necessary air traffic control facilities to carry out operations in a radar environment
- IFR weather conditions occur roughly 10 percent of the time
- Approximately 80 percent of the time the airport is operated with the runway use configuration that produces the greatest hourly capacity.

It is recognized that SWO does not conform to all the assumptions listed above, mainly that the percentage of touch-and-go operations exceeds 50 percent.

Applying the information generated from the preceding analyses, guidelines, and assumptions, SWO's ASV is calculated at approximately 230,000 annual aircraft operations, with a VFR hourly capacity of 98 operations and an IFR hourly capacity of 59 operations. As presented in **Table C-15**, SWO's current operations are at approximately 27.2 percent of ASV and will be at 42.2 percent of ASV in 2040.

Table C-15: Annual Service Volume and Demand Capacity Analysis, 2020-2040

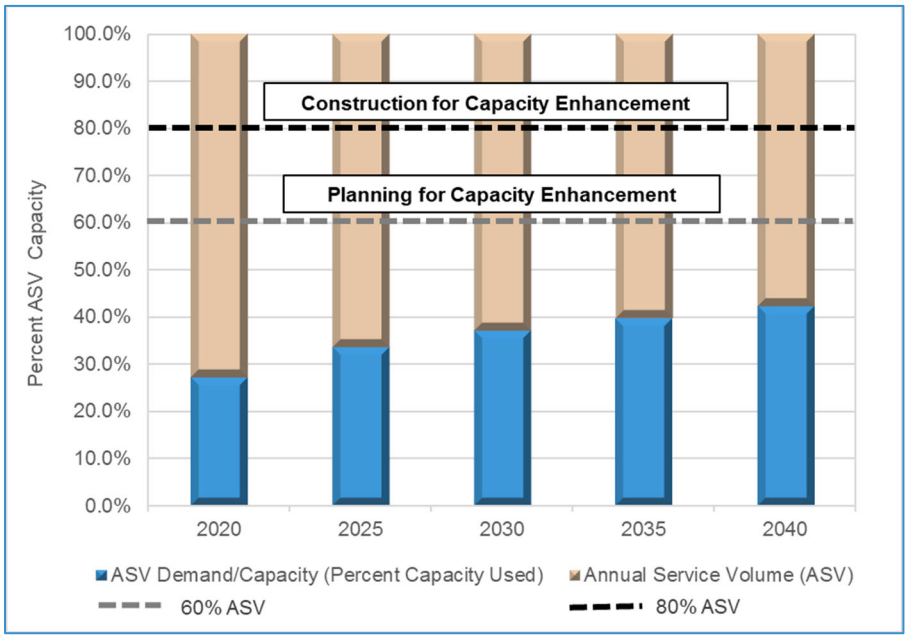
ASV Capacity Components	2020	2025	2030	2035	2040
Annual Aircraft Operations	62,643	77,354	85,234	91,200	97,044
Airport Operational Peaking					
Peak Month Operations	8,077	10,056	11,080	11,856	12,616
Average Day of Peak Month Operations	269	335	369	395	421
Peak Hour Operations	30	37	41	44	46
Hourly Capacity VFR/IFR	98/59	98/59	98/59	98/59	98/59
ASV	230,000	230,000	230,000	230,000	230,000
ASV Demand/Capacity (Percent Capacity Used)	**27.2%**	**33.6%**	**37.1%**	**39.7%**	**42.2%**

Source: Mead & Hunt analysis using FAA AC 150/5060-5.

Notes: SWO critical aircraft, [E] – Existing, [F] – Future.

Figure C-2 compares the calculated ASV to the existing and projected aircraft operations expressed as a percentage of ASV. FAA guidelines indicates that when 60 percent to ASV is reached, an airport should begin planning ways to increase capacity, and when 80 percent of ASV is reached then construction of facilities needed to increase capacity should be initiated. The ASV analysis does not indicate areas of systemic airfield capacity challenges occurring either on an hourly basis (both VFR and IFR) or an annual basis.

Figure C-2: Annual Service Volume and Demand Comparison



Source: Mead & Hunt analysis.

Airfield Capacity Conclusion

The existing airfield configuration provides adequate capacity for the operations forecast through 2040. Future operations are not expected to exceed the 60 percent threshold to trigger planning for airfield capacity improvements.

LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those facilities that support the airside facilities but are not actually a part of the aircraft operating surfaces. These consist of such elements as the terminal building, aircraft parking aprons, corporate and GA hangars, Fixed Base Operator (FBO) facilities, Aircraft Rescue and Fire Fighting (ARFF) facilities, fuel storage and dispensing systems, aeronautical and non-aeronautical development, utilities, perimeter security, and access roads. Following an analysis of these existing facilities, current deficiencies can be noted in accommodating both existing and future needs.

Terminal Building Requirements

The terminal building is the face of SWO to the community and the front door for many visitors to Stillwater. Quality amenities and adequate space encourage visitors and the local community to use SWO, add value to the passenger experience, and improve the perception of SWO.

The objective of noting facility requirements for the terminal building is to identify the type, quality, and quantity of the facilities that are required for the terminal to operate safely and efficiently through the planning

period. While some of the recommendations made for SWO intend to address specific shortfalls, others are to improve general performance. This section largely analyzes the future needs based on forecasted activity levels of a new, fully reconstructed terminal building, rather than requirements for the existing terminal building.

Methodology

Given the size of SWO and the forecasted passenger levels throughout the planning period, terminal building components are calculated using peak hour enplanements. Enplanement figures were taken from **Table B-27** of the previous chapter and reprised in **Table C-16**, which have been multiplied by industry standards for space per passenger to yield the total space requirements for the terminal building. Component performance was measured by processing and wait times, with the latter representing the amount of time passengers wait at a ticket counter agent position and in the queue. These elements are then translated into component level of service.

Table C-16: Peak Hour Enplanements, Deplanements, and Total Passengers 2020-2040

Peak Period Activity	2020	2025	2030	2035	2040
Peak Hour Enplanements	48	44	51	58	66
Peak Hour Deplanements	45	43	49	56	64
Total Peak Hour Passengers	**93**	**87**	**100**	**114**	**130**

Source: Mead & Hunt projections.

Future component capacity requirements are based on forecasted demand. When demand begins to exceed capacity, this represents a point at which the system will become stressed and may possibly exceed available space at individual components and within the overall space. Such a breakdown in performance can result in increased passenger processing and wait times, queues, congestion, interference with adequate circulation, and diminished passenger level of service. This is normally evident at peak seasonal travel periods, with a potential decline in level of service occurring for a limited period prior to flight departure. In general, this is expected and acceptable. However, once the decline extends beyond a certain threshold of time and/or space, additional capacity must be provided.

For SWO, calculating the capacity of terminal components has an allowance for university athletic teams travelling on non-scheduled charter flights. These intermittent flights increase the throughput capacity on selected terminal components. Currently, security screening of the chartered passengers is conducted by outside security contractors using temporary metal detectors and tables in the lobby near the Stillwater Flight Center office. Screened passengers exit the terminal building through doors with direct apron access and board the chartered aircraft via apron loading. Accommodating non-scheduled chartered passengers within the future terminal building can be accomplished by one of two means:

- Sharing scheduled commercial service programmed facilities.
- Increasing the terminal size to account for desired level of service and potential overlap of operations.

This analysis uses the first scenario, in which scheduled commercial service dictates the component evaluations which are available for university athletic teams' chartered aircraft with seating capacity of approximately 150 seats.

For the purposes of this study, the following references are used in determining the terminal building requirements:

- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- 10th and 11th Editions of the IATA *Airport Development Reference Manual* (ADRM)[1]
- ACRP Report 25*, Airport Passenger Terminal Planning and Design, Volumes 1 & 2: Guidebook and Analysis Worksheets*

Analysis

Terminal Gates and Aircraft Parking Positions

The new terminal building will require one gate and one aircraft parking position based on forecasted enplanements. Aircraft apron area is listed under **Table C-17**. The table includes aircraft to be used at SWO, which support enplanements over the planning period. Envoy/SkyWest Airlines currently operate twice daily flights using the 50-seat ERJ 145 aircraft at SWO. As stated in the previous chapter, 76-seat ERJ 175 aircraft are expected to completely replace the ERJ 145s nationwide by 2031, and possibly sooner at SWO. Additionally, Boeing 737-800 aircraft are representative of the narrow body charters used by university athletic teams. It is also the largest aircraft on SWO's apron. The total commercial service apron area required for simultaneous occupancy by one ERJ 175 and one Boeing 737-800 is 43,545.

Table C-17: Terminal Aircraft Apron Area by Aircraft Type with Minimum Setback from Building

Aircraft Capacity			Gate Requirements and Total Area				
			Aircraft Specs		Aircraft Apron Area		
ADG	Terminal Design Aircraft	Design Aircraft Seats	Wing Span	Length	Aircraft Separation	Setback Nose to Building	Gate Area (sq ft)
II	ERJ 145	50	65.75'	87.83'	25'	35'	11,638
III	ERJ 175	76	93.92'	103.92'	25'	35'	20,793
IV	B 737-800	150	117.42'	129.50'	25'	35'	22,752'

Source: Mead & Hunt analysis.

SWO has paved a large area of apron, including within the area designated previously as the preferred future terminal building site. SWO has the option of striping only the area of apron that will serve the scheduled and non-schedule air carrier aircraft operated during the planning period. This will allow the remaining apron to be used for GA use.

[1] *Airport Development Reference Manual, 10th Edition, October 2016, and 11th Edition, March 2020, The International Air Transport Association.*

Main Entrance Hall

There are three separate areas of public circulation: the departures, entrance, and arrivals halls. The depth of this corridor was determined by the ticket hall, which begins at the face of the ticket counters. This provides passenger processing depth and bypass circulation of 8 feet (i.e., the 3 feet a passenger occupies at the counter plus a 5-foot clear walkway for passengers), passenger queue of 10 feet, corridor circulation of 12 feet, and passenger seating of 5 feet, for a total width requirement of 35 feet. The length of the corridor is dependent upon the terminal layout plan and orientation of the security checkpoint. The ticketing and claim hall circulation areas are listed in each component's area summary. The main entrance hall is calculated at 40 feet in length by 35 feet in width, for a total area of 1,400 square feet.

Passenger Ticketing and Check-In

Calculating airline ticketing and queueing areas to support departing passengers is dependent upon when passengers arrive at the terminal. The normal departing passenger arrivals curve (i.e., the time passengers arrive at the terminal prior to their flight) typically shows most passengers arrive between 100 to 40 minutes prior to departure. This period represents the peak hour. However, a shorter period of one-half hour and a smaller percentage of the total peak, 49 percent, was used for this passenger demand analysis because it tends to represent a peak period within the peak hour. This places greater demand on the component thus requiring greater capacity. It is akin to adding a more accurate surge factor.

The ticketing and check-in area calculations include both kiosks and counter positions, with the latter providing full services, boarding pass, baggage tags, and baggage check. Passengers may print boarding passes prior to arrival but may still use either kiosks or counters to obtain baggage tags. All passengers checking bags will contact the ticket counters. **Table C-18** details the airline ticketing area requirements.

Table C-18: Airline Ticketing and Check-In Assumptions and Requirements

Passenger Ticketing and Check-In Demand Profile	2020	2025	2030	2035	2040
Design Hour Departing Passengers	48	44	51	58	66
Percent of Passengers in Peak 30 Minute Period	49%	49%	49%	49%	49%
Percent of Passengers Using Ticketing	75%	75%	75%	75%	75%
Peak 30-Minute Originating Passengers	18	16	19	21	24
Processing Time Per Passenger (Average)	2.5	2.5	2.5	2.5	2.5
Service Level Maximum Wait Time	10	10	10	10	10
Queue Results					
Number of Staffed Service Positions Required	2	2	2	2	2
Average Queue Wait Time	1	1	1	1.5	3
Maximum Queue Wait Time	2	1	2	3.5	6
Maximum Number of Passengers Waiting in Queue	**1**	**1**	**2**	**3**	**5**

Source: Mead & Hunt analysis.

Ticket counter frontage, which is the amount of linear footage each counter provides, is important in managing passenger queues. Airports may opt to increase counter length to provide more area for passenger queues, which can reduce the depth of the ticket hall. It also allows for additional staff during anticipated peak passenger demand times (e.g., seasonal holidays) providing a greater level of service and capacity for

processing customers to meet scheduled departure times. Adequate counter length has been included in the program to meet the potential requirements for a second airline or second peak-hour flight int eh future. **Table C-19** shows the ticket hall requirements.

Table C-19: Ticket Hall Requirements

Terminal Ticket Hall Requirements	Measurement
Ticket Counter and Concourse Length (ft)	24
Passenger Check-In, Circulation, Queue Seating Area (sq ft)	840
Seating Area (sq ft)	120
Total Terminal Ticket Hall Area (sq ft)	**960**

Source: Mead & Hunt analysis.

Airline Ticket Offices (ATOs) are areas consisting of airline ticketing, check-in, baggage check (i.e., the area behind the ticket counters), and the private offices and operations areas that support the airlines' business. These areas typically include a manager and supervisors' office, an agent check-in and check-out area, a break room, a locker room, office equipment, and supplies storage. The operations area includes workstations for supervisors and managers (e.g., aircraft load and balance figures/statistics), as well as equipment storage, radio chargers, and baggage tugs and carts. Airlines will need at least one parking space for a company SUV at the apron area adjacent to their operations space. **Table C-20** details the calculations for ATO space needs. A detailed breakdown of the proposed ATO and ground operations areas is included in **Appendix Five**

Table C-20: Airline Ticket Offices and Ground Operations Area

Airline Ticket Offices and Ground Operations Requirements	Area (sq ft)
Airline Ticket Offices	568
Airline Ground Operations	556
Sub-Total	**1,124**
Circulation (10%)	112
Subtotal ATO and Ground Operations	**1,236**
GSE Equipment Storage	800
Total ATO and Ground Operations Space	**2,036**
Total Area for Two ATO and Ground Operations Spaces	**4,072**

Source: Mead & Hunt analysis.

Checked Baggage Inspection Screening

The Transportation Security Administration (TSA) operates checked baggage inspection screening manually, using Explosive Trace Detection (ETD) devices in the process. This is not anticipated to change during the planning period. **Table C-21** lists the number of ETD devices required during the 20-year planning period.

Table C-21: Checked Baggage Inspection Screening Assumptions and Area Requirements

Baggage Screening Demand Profile	2020	2025	2030	2035	2040
Peak Hour Passengers Checking In	48	44	51	58	66
Percent of Passengers Checking Bags	65%	65%	65%	65%	65%
Average Number of Bags Per Passenger	1	1	1	1	1
Number of Bags to Process in Peak Hour	31	28	33	38	43
Percent of Over & Odd-Size Bags	2%	2%	2%	2%	2%
Total Number of Bags to Process	31	29	33	38	43
Process Rates Per Hour ETD	24	24	24	24	24
Number of ETD Required	2	2	2	2	2
Total Area Required (sq ft)	**300**	**300**	**300**	**300**	**300**

Source: Mead & Hunt analysis.

Airline Outbound Baggage Make-Up Room

The values shown in **Table C-22** were calculated for scheduled flights in each period based on its forecasted critical aircraft. Area calculations use a runout conveyor from the TSA's screening room into the make-up area, usually running along the back wall of the space. Baggage carts are manually set perpendicular to the conveyor so they can be pulled directly out of the make-up room by the baggage tug driver. The loading area is protected and closed after the flights have departed. The make-up room has been programmed for a single ERJ 175 aircraft, with space allocated for loading two carts per flight. This allows for seasonal increases in checked baggage. If needed, university athletic team charter flights can use this facility.

Table C-22: Airline Outbound Baggage Make-Up Room Area

Baggage Make-Up Demand Profile	2020	2025	2030	2035	2040
Narrow-Body Equivalent Aircraft	0.7	0.7	0.7	0.7	0.7
Scheduled Departures Per Gate in 2 – 3 Hour Period	1	1	1	1	1
Staged Carts per Equivalent Aircraft	1	1	1	1	1
Area Required per Cart (sq ft)	200	200	200	200	200
Make-Up Area Required (sq ft)	300	300	300	300	300
Conveyor and Circulation (sq ft)	250	250	250	250	250
Total Make-Up Area (sq ft)	**950**	**950**	**950**	**950**	**950**

Source: Mead & Hunt analysis.

Passenger Security Screening Checkpoint

The TSA has one security screening checkpoint in the existing terminal building. Given that passengers typically arrive at the terminal over a period greater than one hour, a single checkpoint will remain sufficient to manage demand and process the number of enplanements on scheduled commercial flights through 2040. TSA's innovations in security screening have been installed at major airports, the most recent with an announcement that Analog Computed Tomography (CT) scanning devices are being installed throughout the country. SWO's existing screening device will likely be replaced when a new terminal is built; TSA's new checkpoint layout standards were released in December 2021, thereby affecting all new installations. The Analog CT scanner or another similar device will be installed at SWO in the future as these are representative of the TSA's technology program for security screening checkpoints.

The values in **Table C-23** list results for the anticipated departing passenger demand. The null, or zero, maximum wait time shown in the chart is considered a very good level of service during the peak hour.

Table C-23: TSA Security Screening Checkpoint Requirements and Area

Security Screening Demand Profile	2020	2025	2030	2035	2040
Design Hour Departing Passengers	48	44	51	58	66
Number of Passengers in Peak 30-Minute Period	25	24	29	34	39
Screening Throughput Rate per Hour	150	150	150	150	150
Passengers Processed Per Minute Per Lane	2.5	2.5	2.5	2.5	2.5
Maximum Target Wait Time in Queue	10	10	10	10	10
Minimum Required Number of Screening Lanes	1	1	1	1	2
Maximum Wait Time in Queue	-	-	-	-	-
Checkpoint Space Requirements (sq ft)	**2,100**	**2,100**	**2,100**	**2,100**	**2,100**

Source: Mead & Hunt analysis.

TSA's field office operations space requirements are listed in **Table C-24**.

Table C-24: TSA Field Office Area

TSA Field Office Requirements	2020	2025	2030	2035	2040
Transportation Security Manager-on-Duty	120	120	120	120	120
Break/Training Room	150	150	150	150	150
Training Storage	100	100	100	100	100
IT Room	30	30	30	30	30
Total TSA Field Office (sq ft)	**400**	**400**	**400**	**400**	**400**

Source: Mead & Hunt analysis.

Passenger Departures Lounge

Passenger departures lounge space requirements were initially calculated to serve ERJ 145 aircraft. Up-gauging the aircraft to the next higher seat capacity aircraft (i.e., ERJ 175) would have a limited effect on overall passenger level of service in this area due to the area per passenger provided in the calculations. However, it would be prudent to plan and program the terminal building with the larger seat capacity of the ERJ 175 from the beginning, which is included in the following space calculations. Various lounge seating types and arrangements would be possible within this space. Concessions amenities would be provided for this area, increasing the total number of seats and space. A service animal relief area will also be provided adjacent to this space. Passenger departures lounge seating area and ancillary space requirements are presented in **Table C-25**.

Table C-25: Passenger Departures Lounge Requirements

Passenger Departures Lounge Demand Profile	2020	2025	2030	2035	2040
Peak Hour Departing Passengers	48	44	51	58	66
Departures Lounge Seating Area (sq ft)	1,296	1,245	1,380	1,635	1,775
Gate Podium Width / Depth	4 / 8	4 / 8	4 / 8	4 / 8	4 / 8
Area per Podium Position (sq ft)	32	32	32	32	32
Number of Podium Positions	1	1	1	1	1
Total Podium and Queue Area (sq ft)[1]	100	100	100	100	100
Boarding Corridor Width / Lounge Depth	6 / 25	6 / 25	6 / 25	6 / 25	6 / 25
Total Boarding Corridor (sq ft)	150	150	150	150	150
Total Departures Lounge Area (sq ft)	**1,160**	**1,545**	**1,680**	**1,885**	**2,025**
Total Area for Two Departure Lounges (sq ft)	**2,320**	**3,090**	**3,610**	**3,770**	**4,050**

Source: Mead & Hunt analysis.

Note: [1] Assumes a 25-foot lounge depth.

Concessions

Proposed concessions for SWO are comprised of a restaurant serving the public pre-secure area, so that it can become viable through airport business patronage. A small news/gift store located within the public concourse that has proximity and visibility to both departing and arriving passengers should also be provided. A news/gift store and cafe that includes both fresh bakery as well as pre-prepared packaged sandwiches, and other refrigerated foods, would best serve passengers in the post-security area of the terminal building. Small airports have successfully managed a dual operation that allows the larger restaurant to serve both pre-secure and post-secure spaces; this would also be the recommendation for food and beverage service at SWO. Terminal concessions requirements are shown in **Table C-26**.

Table C-26: Terminal Concessions

Terminal Concessions Requirements	Area (sq ft)
Public Pre-Secure Space	
Restaurant [1]	1,500
News and Gifts	150
Passenger Post-Security Space	
News/Gifts and Cafe	225
Seating Area	150
Total Concessions Area (sq ft)	**2,025**

Source: Mead & Hunt analysis.

Note: [1] Restaurant space includes kitchen and refrigerator storage.

Secure Concourse Circulation

Secure concourse circulation is determined broadly by calculating the number of equivalent aircraft in the flight schedule.[2] One aircraft is currently operated at SWO, an ERJ 145, which counts as one equivalent aircraft. Using an aircraft wingtip separation of 25 feet and aircraft wingspan of 79 feet for ADG II, concourse

[2] Using ACRP Report 25, Equivalent Aircraft value equals .70 for an Embraer 145 aircraft and is rounded up in the worksheets. An EJR 175 aircraft also counts as on Equivalent Aircraft.

length circulation is equal to 104 feet multiplied by the corridor width of 15 feet to equal a total of 1,560 square feet of secure concourse circulation area.

As stated previously, accommodating the ERJ 175 aircraft in the initial terminal building planning and programming is prudent. With a larger wingspan than the ERJ 145, ERJ 175 increases the ADG from II to III. Under the circumstances, using the smaller 94-foot wingspan of the ERJ 175 rather than the full 118-foot width of the ADG III category would be more appropriate for determining the overall width of the secure circulation space.

Using a premise of two parking positions would translate into 213 total feet of secure concourse length and corresponding departure lounge; however, this length would be considered greater than necessary during the early timeframe of the planning period. Depending on terminal arrangement, this building length might be required due to activities on the non-secure public side of the building. A balance must be struck between the departures lounge efficiency on the secure side of the terminal and the activities on the non-secure public side. Applying a depth of 15 feet provides the total square footage of the secure concourse circulation needs.

A lounge depth of 25 feet is considered the minimum for passenger queueing at the gate during boarding to keep the circulation corridor from becoming congested. Other uses can fill the space between the lounges but overflow of passengers from one lounge to the other might be compromised. A reduced initial secure concourse length may be appropriate, with an understanding that expansion of the concourse beyond the planning period might be necessary to meet requirements. This is left to the design team's discretion based upon location, adjacency, and layout of the components.

Restrooms

Secure and non-secure restroom programming figures fall below the threshold of 3.0 equivalent aircraft (EQA) requirement noted in the reference guide ACRP Report 130: *Guidebook for Airport Terminal Restroom Planning and Design*. Using this guidance, a minimum of six fixtures are required per men's restroom. Men's fixtures serve as the basis for calculating women's restroom fixture requirements with parity set at a 1.25 factor, or a 56 percent to 44 percent ratio of women to men. Women's restrooms are therefore calculated to have eight fixtures. Since secure restrooms are calculated using arriving passengers as a basis for planning, the figures are also appropriate for serving a narrow body charter aircraft at SWO.

Non-secure restrooms are typically smaller than secure restrooms, as the number of passengers and visitors in the departures or arrivals areas will see stable usership over time instead of a spike. This is compared to deplaning passengers, who will use a restroom during a very short period immediately following a flight. For SWO, four fixtures for men and five for women is appropriate. This provides one accessible and one standard water closet and two urinals for the men's restroom, and one accessible and four standard water closets for the women's restroom. The latter is equivalent to one fixture per 30 passengers and visitors for a combined arrival and departure flight. The restroom area is calculated as fixtures multiplied by 135 square feet per fixture. Restroom requirements are shown in **Table C-27**.

Table C-27: Restroom Fixtures and Area

Restroom Requirements	Fixtures	Area (sq ft)
Public Pre-Secure Space		
Men's Restroom	4	540
Women's Restroom	5	675
Family Restroom	1	120
Mother's Room [2]	-	100
Janitor	-	80
Total Fixtures and Area	**10**	**1,435**
Passenger Post-Security Space		
Men's Restroom	5	675
Women's Restroom	6	810
Family Restroom	1	120
Mother's Room	-	100
Janitor	-	100
Total Fixtures and Area	**12**	**1,705**
Grand Total Fixtures and Area	**22**	**3,140**

Source: Mead & Hunt analysis.

Notes: [1] Restroom space is calculated using 135 square feet per fixture, which accounts for the fixture, lavatory, circulation, and plumbing access.

[2] Mother's room is included with the restroom program. However, it is preferable for this function to be located away from the restroom block to a quieter area of the terminal.

One family restroom is located inside both the secure and non-secure areas as part of the restroom block. A mother's room should be planned and designed as a part of the terminal public and secure passenger space. The location should be convenient to both arrivals and departures halls but should remain separate from the restroom area. A service animal relief area (SARA) of at least 150 square feet is also required on the secure side of the terminal.

Baggage Claim

Baggage claim device display length is calculated using a peak 20-minute period for arriving passengers. At SWO, all passengers will arrive at the claim hall within 20 minutes of disembarking their flight. The area of the claim hall is determined by the device length, the number of passengers claiming bags, and industry standards for claim hall space. **Table C-28** lists these factors and results of the analysis.

The baggage claim area consists of the claim device, passenger queueing area around the device, and the circulation area. A baggage services office is likely not required initially, since the airline will keep unclaimed baggage at their ticket office.

Table C-28: Baggage Claim Assumptions and Device Length

Baggage Claim Demand Profile	2020	2025	2030	2035	2040
Design Hour Arriving Passengers	45	43	49	56	64
Passengers Arriving in Peak 20-Minute Period	45	43	49	56	64
Percent of Passengers Checking Bags	65%	65%	65%	65%	65%
Passengers Checking Bags	29	28	32	37	42
Average Number of Bags Per Passenger	1	1	1	1	1
Number of Bags to Process in Peak Period	29	28	32	37	42
Average Passenger Party Size	1.2	1.2	1.2	1.2	1.2
Number of Passenger Parties	24	23	27	31	35
Percent of Additional Visitors at Claim	10%	10%	10%	10%	10%
Total People at Claim Device	27	25	29	34	39
Claim Device Display Frontage per Person	1.5	1.5	1.5	1.5	1.5
Total Length of Baggage Claim Device Display (ft)	**40**	**38**	**44**	**51**	**58**

Source: Mead & Hunt analysis.

With the option for allowing university athletic teams use of the baggage claim device, additional length would have the additional benefit of reducing passenger congestion during normal use. An alternative is to provide a single run-out belt along the length of the outside wall of the baggage claim area. This would allow the larger bags for team members' gear to be delivered in an orderly manner. Passengers can queue in the adjacent baggage claiming area, and smaller bags can still be delivered to the claim device. The run-out belt could serve scheduled commercial service passengers travelling with odd or oversize bags

Providing a baggage claim device with 75 linear feet of display frontage will provide additional length to account for seasonal travel. **Table C-29** details the baggage claim area requirements.

Table C-29: Baggage Claim Area

Baggage Claim Demand Profile	2020	2025	2030	2035	2040
Length of Baggage Claim Device Display	40	38	44	51	58
Passenger Claim Area	750	570	660	765	870
Circulation Factor	1.25	1.25	1.25	1.25	1.25
Passenger Area	695	712	825	956	1,088
Claim Device Area	282	262	322	392	462
Total Claim Area (sq ft)	**977**	**974**	**1,147**	**1,348**	**1,550**
Claim Hall Circulation (sq ft)	**1,750**	**1,750**	**1,750**	**1,750**	**1,750**

Source: Mead & Hunt analysis.

Rental Car Agencies

Enterprise and Avis car rentals are available with prior reservations, and Hertz has an office in SWO's terminal building. Space for Hertz's counter and operations offices will be provided, as will be space for an additional car rental company so it's available when the need occurs. The standard counter and operations office is 150 square feet with an allowance for passenger queueing set at eight feet from the counter. This equates to a total of 230 square feet for each rental car company.

Building Support and Envelope Space

Building systems, chases, and interior and exterior wall structures represent approximately 15 percent of the total area of the terminal building. The terminal space summary is detailed in **Table C-30**.

Table C-30: Terminal Space Summary

Terminal Space Summary by Component (sq ft)	2020	2025	2030	2035	2040
Main Entrance Hall	1,400	1,400	1,400	1,400	1,400
Terminal Ticket Hall	960	960	960	960	960
Airline Ticket Office & Ground Operations	4,072	4,072	4,072	4,072	4,072
Checked Baggage Inspection Screening	300	300	300	300	300
Airline Outbound Baggage Make-Up	950	950	950	950	950
Passenger Security Screening Checkpoint & Exit Lane	2,100	2,100	2,100	2,100	2,100
Secure Concourse Exit Lane [1]	520	520	520	520	520
TSA Field Office	400	400	400	400	400
Secure Concourse Circulation	3,195	3,195	3,195	3,195	3,195
Passenger Departures Lounge	2,320	3,090	3,360	3,770	4,050
Concessions					
Non-Secure	1,650	1,650	1,650	1,650	1,650
Secure	375	375	375	375	375
Restrooms					
Non-Secure	1,435	1,435	1,435	1,435	1,435
Secure	1,705	1,705	1,705	1,705	1,705
Inbound Baggage Drop-Off	1,200	1,200	1,200	1,200	1,200
Baggage Claim	977	974	1,147	1,348	1,550
Baggage Claim Hall	1,750	1,750	1,750	1,750	1,750
Car Rental	230	230	230	230	230
SARA	150	150	150	150	150
Sub-Total Building	**25,689**	**26,456**	**26,899**	**27,510**	**27,992**
Building Systems, Structure @ 15% of Program Space	3.853	3,968	4,035	3,821	4,199
Total Building	**29,542**	**30,424**	**30,934**	**31,637**	**32,191**

Source: Mead & Hunt analysis.

Note: [1] Based on a 65-foot-long checkpoint (including document check stations) and an 8-foot wide corridor.

Terminal Curbside

Vehicular access to the existing terminal curbside is via the approximately 20-foot wide, one-way frontage road accessible from North Hargis Road/West Airport Road, which runs from north to south. Upon reaching the primary terminal curbside, the frontage road splits into four lanes. The first lane is adjacent to the terminal frontage sidewalk, is the main terminal curbside; and is the most frequently used lane. The second lane may be used as an outer curb, for vehicle stacking, as a temporary double-parking lane, or as a pull-out lane. This lane can increase curb capacity equal to the inner lane, depending on maneuverability factors. The third lane serves as a through-lane. The fourth lane, on the east edge of the roadway, is reserved for handicap parking.

The terminal curbside is roughly divided between the arrivals and departures areas of the terminal building. This distinction is recommended to continue for SWO's future terminal plans due to the likely secondary entrance to the ticket hall, an exit from the baggage claim, and a central entrance to the security checkpoint. A bus and hotel courtesy van drop-off/pick-up stop is located at the south end of the existing curb. Vehicle

curb lanes will serve all vehicle types: private cars, taxis, transportation network company (TNC) vehicles, ride-hailing services, buses, and hotel courtesy vans.

Curb length methodology requirements are based upon peak hour enplanements. The premise of this formula is that a curbside lane is considered a series of stopping or parking spaces, each accommodating one vehicle and the average number of vehicles each space can serve during a given period is inversely proportional to the average length of time a vehicle occupies a space. Industry standard factors used in the analysis are shown in **Table C-31**.

Table C-31: Percent of Passengers Using Each Travel Mode and Average Vehicle Dwell Time

Mode	Percent	Wait Time (minutes)
Private Vehicle	80%	3
Taxi and TNC	12%	2
Hotel Shuttle	6%	3
Bus	2%	4

Source: ACRP Report 25, Vol. 2, *Terminal Planning Spreadsheet Model, Transportation Research Board, 2010;* Mead & Hunt analysis.

Vehicle curb frontage requirements were determined using peak hour enplanements and deplanements factored by 45 percent for a peak 15-minute period within the peak hour. This represents a peak surge demand of approximately 10 percent. Vehicle stacking or double-parking increases curb frontage capacity, but this should be limited to a maximum of 50 percent of the frontage to maintain maneuverability for vehicles exiting the inner curb and to limit congestion in the bypass lane. Arrivals curb requirements are more significant to account for higher vehicle dwell times. Pedestrian crosswalks needed to access terminal parking areas would increase the linear curbside frontage requirements and should be added to the figures in **Table C-32**.

Table C-32: Vehicle Curb Frontage Requirements

Curb Frontage	2025	2030	2035	2040
Departures	88	100	114	129
Arrivals	94	110	120	138
Total Curbside (linear feet)	**182**	**210**	**234**	**267**

Source: Mead & Hunt analysis.

Vehicle Parking

Passenger and visitor vehicle parking is currently distributed across five parking lots near the existing terminal building. The lots contain over 200 spaces, of which 34 spaces are dedicated to car rental companies. Five spaces are allocated to air traffic control employees in the lot north of the terminal building. The total number of existing spaces available for passenger and visitor parking is over 200. A summary of parking space allocation by lot is shown in **Table C-33**.

Table C-33: Existing Terminal Parking and Occupancy

Parking Lot	Existing	Occupancy	Percent
West (of Hargis Road)	50	45	90.0%
East (of Hargis Road)	43	41	95.3%
South	23	21	91.3%
North	36	36	100%
Overflow	Undesignated[1]	Unknown	---
Total	**152[2]**	**143**	**94.1%**

Source: Mead & Hunt analysis.

Notes: [1]Overflow lot is shared with the Sanborn Park ballfields and does not have designated parking spaces.
[2]Total parking spaces is over 200 when including the overflow lot.

As shown in the table, SWO's total parking occupancy rate is 94 percent. This parking occupancy is well above the industry threshold of 85 percent, the level at which additional spaces should be provided. Above 85 percent passengers and visitors begin to search for a parking space which can negatively impact their schedules. It has been assumed that the existing figures shown in **Table C-33** represent an average day of the peak month.

Parking figures are typically determined using annual enplanements and utilization figures from peak hour enplanements as a basis for determining future requirements. Using 85 percent as a minimum requirement for planning, the number of required existing parking spaces has been increased by 15 percent of the current total to yield 198. A factor of 4.125 spaces results from dividing 198 by the 2020 peak hour enplanements of 48. Applying this factor to each time period's peak hour enplanements provides the minimum number of parking spaces required. By increasing the factor to 4.75 provides approximately 115 percent of 2020 enplanements, allowing for additional growth over the planning period and additional flexibility during peak activity. **Table C-34** summarizes the parking requirements at SWO throughout the planning period.

Table C-34: Passenger and Visitor Parking

Passenger and Visitor Parking (Including Rental Cars)	2020	2025	2030	2035	2040
Peak Hour Enplanements	48	44	51	58	66
Parking Space Minimum Requirements	230	210	240	275	315

Source: Mead & Hunt analysis.

Use of the parking methodology assumes a duration-of-stay consistent with the existing parking counts. Should future parking surveys (e.g., counting vehicle license plates that remain overnight) indicate that average duration-of-stay increases over time, the parking factor can be increased accordingly. Conducting the surveys at different times of the year would also provide a better understanding of SWO's true customer needs.

Terminal Building Conclusion

The amount of space required to provide sufficient public non-secure and secure area within a future terminal building was calculated to accommodate one scheduled commercial service flight during the peak hour, with the understanding that passengers travelling aboard charter flights could use the terminal when there is no

scheduled commercial activity. This practice could improve chartered air carrier and airport operations by removing passengers from the terminal apron during departures and arrivals, assuming a passenger boarding bridge is included in the new terminal (which is recommended).

The analysis indicates that, including university athletic team charter flights, the aircraft size, passenger seats, and potential passenger demand essentially support a two-gate replacement terminal. The use of B 737 aircraft for charter flights requires the following standard to be met as outlined by the FAA's Private Charter Standard Security Program:

> *"The Private Charter Standard Security Program (PCSSP) is for operators with an FAA Part 121, 125, or 135 certificate using aircraft with a maximum certificated takeoff weight greater than 100,309.3 pounds (45,500 kg) or configured with 61 or more passenger seats. The cost of this type of operation is provided by a single entity, not individual passengers. This program includes requirements to screen passengers and their accessible property."*

If charter airlines or SWO allow passengers the use of the departures lounge prior to boarding, this may be perceived as a higher level of service. With a potential for light concessions sales, passengers could purchase goods, food, or beverages and use the restrooms for boarding.

Constructing the initial terminal building with sufficient space to accommodate existing scheduled commercial service and non-scheduled charter service will allow for post-planning period growth, the introduction of a second air carrier during the planning period, or the introduction of an unanticipated second early morning flight to an additional airport. Including the additional space in the new terminal building would benefit SWO and the community by offering opportunity to support these events should they occur. This could increase the community's options, maximize opportunity for competition, and raise the level of passenger service within a modern facility.

An initial two-gate terminal building would increase area requirements, mainly through the addition of a second departures lounge and aircraft apron parking position. The cost of the lounge area would be less than if it were added at a future date. Sufficient space for additional ticketing counters has been provided in the ticket hall should the university athletic teams' charter flights, or a second commercial air carrier, want to lease ticket counters and the accompanying secure operations area. SWO would be responsible for this option, but the cost could be postponed until such time as an air carrier might request these facilities. Providing flexibility for a building with a lifespan of 30 to 40 years will provide SWO the means to adapt to changes in air transportation through and beyond the planning period. It is also recommended that the new terminal building use a single parking lot that can accommodate the full parking needs of SWO's passengers and visitors.

Landside and Terminal Area Support Facilities

General Aviation Facilities

GA facilities support and serve the based and transient airport users through aircraft storage, pilot and passenger amenities and services, and aircraft maintenance. GA traffic at SWO represented approximately 91.8 percent of total operations in 2020 and is expected to compromise 94.3 percent by 2040. Based aircraft are expected to increase from 80 in 2020 to approximately 101 in 2040.

Fixed Base Operators

FBOs are businesses providing aircraft services such as fuel sales, aircraft maintenance, flight training, and aircraft storage. Currently, Stillwater Flight Center is the sole FBO at SWO. The facility requirements for FBOs depend on staffing and equipment needs to keep up with an anticipated increase in demand. New or expanded FBO buildings might be necessary as the existing facility reaches capacity.

Aircraft Hangar Storage

Based on the high investment of owning and operating aircraft, hangar storage is generally the most desired option for both short- and long-term aircraft storage. Aircraft hangar storage at SWO consists of 20 T-hangar units, 19 large group storage hangars, and four individual "Port-A-Port" hangars. T-hangars are designed to house one small aircraft per space, while group hangars are designed to house larger aircraft or multiple smaller aircraft. Port-A-Port hangars are short-term T-hangars owned by the City of Stillwater. **Table C-35** presents the estimated aircraft hangar storage demand throughout the planning period.

Table C-35: Hangar Storage Analysis, 2020-2040

Hangar Type	2020	2025	2030	2035	2040
Based Aircraft	80	87	91	96	101
Total Hangar Spaces	**43**	**48**	**52**	**56**	**58**
T-Hangar Units	24	28	30	32	34
Group Hangars	19	20	22	23	24

Source: Mead & Hunt analysis using forecast projections.

As of 2020, there are 0.54 hangar spaces to every based aircraft at SWO, confirming that group hangars are storing multiple aircraft. This ratio is used to estimate future storage recommendations, as it is expected that future storage facilities will reflect many of the existing characteristics of the current storage patterns. While the existing Oklahoma State University (OSU) fleet of 37 aircraft are based almost exclusively outside on apron tiedowns, SWO personnel indicate no other based aircraft use apron tiedown storage.

The based aircraft forecast presented in **Chapter B – Forecasts of Aviation Activity** projected an increase of 16 single engine aircraft, two jet aircraft, one helicopter, and two light sport aircraft from 2020 to 2040. The number of multi-engine aircraft are not ultimately expected to change from 2020 to 2040. The OSU fleet of

aircraft is expected to increase somewhat during the planning period, and these aircraft will likely remain based outside until such time that funding can be arranged to construct covered parking. In consideration of similar storage preference characteristics, it is expected that additional T-hangar units will be needed to correspond with the increase in single engine aircraft. Group hangars should be added to accommodate any additional single engine aircraft as well as the other larger aircraft types. The actual number, size, and location of future hangars will depend on user needs and financial feasibility at the time demand occurs.

Aircraft Apron Storage

As previously listed in **Chapter A – Inventory of Existing Conditions**, there are six aprons at SWO that will collectively provide approximately 109 aircraft tiedowns when all aprons are constructed.

GA apron storage requirements typically are based on the estimated amount of itinerant and based aircraft using tiedowns or apron storage spaces. Itinerant aircraft typically only require short-term, temporary storage on an apron, while based aircraft, if using tiedowns, typically have need of longer-term requirements until additional hangar spaces are provided.

Apron space calculations use 400 square yards of apron per itinerant aircraft and 300 square yards of apron per based aircraft. There are two reasons for this:

- Itinerant aircraft users will not be as familiar with the layout and circulation patterns at SWO so additional maneuvering space is essential.
- Whereas typically smaller, single engine based aircraft use apron storage, itinerant aircraft of various sizes do and will continue to use temporary apron storage at SWO.

Larger military aircraft are also regularly accommodated on the aprons. Therefore, it is necessary to provide additional apron area to accommodate the larger aircraft. As presented in **Table C-36**, the amount of anticipated demand for GA apron space is expected to exceed existing capacity during the planning period.

Table C-36: Apron Storage Requirements, 2010-2040

Apron Type	2020	2025	2030	2035	2040
Projected Apron Requirements	**34,786**	**39,719**	**42,799**	**46,543**	**50,283**
Itinerant GA Aprons	22,576	27,509	30,589	34,003	37,083
Based GA Aprons[1]	12,210	12,210	12,210	12,540	13,200
Existing Apron Area	**39,502**	**39,502**	**39,502**	**39,502**	**39,502**
Itinerant GA Aprons[2]	21,166	21,166	21,166	21,166	21,166
Based GA Aprons[3]	18,335	18,335	18,335	18,335	18,335

Source: Mead and Hunt analysis using forecast projections.

Notes: Apron areas calculated for area available for aircraft parking.

[1] The total number of OSU based aircraft is expected to remain stable through 2030 as older aircraft are replaced. A slight increase is expected thereafter through 2040.

[2] Itinerant aprons are currently located on the Terminal, Hangar 1, and Southeast General Aviation Ramps.

[3] Based GA aprons are currently located on the University Flight Center North and South Ramps, and they are only used for basing OSU aircraft.

Following completion of the University Flight Center South Ramp, all OSU based aircraft will be moved to tiedowns in this area. The existing University Flight Center North Ramp is then likely to be used for itinerant aircraft tiedowns.

With the evolving technologies of electric propulsion and enhanced battery capacity, electric Urban Air Mobility (UAM) and Vertical Takeoff and Landing (eVTOL) aircraft are expected to become a larger part of the nationwide fleet in the future. SWO should plan and program for adequate area to accommodate at least one electric aircraft charging station accommodating ADG II aircraft. This translates into an approximate 9,300 square feet of apron area (including adequate wingtip clearance). The preferred location would be near the edge of the designated itinerant apron where adequate electrical power supply can be accessed.

General Aviation Facilities Conclusion

To accommodate the projected growth in single-engine aircraft, T-hangar structures should be increased by approximately 10 over the planning period. Group hangars should be increased by approximately five to account for the forecasted growth in the remaining aircraft. It is anticipated that additional GA apron space for itinerant aircraft will be required, including one charging station for electric aircraft.

Air Cargo Facilities

Currently, air cargo aircraft use the terminal apron just southwest of the terminal building for loading and unloading of air cargo directly onto the aircraft to and from the delivery trucks. This location provides easy access for the delivery trucks to the apron. It is expected that this location will continue to be utilized for air cargo loading throughout the planning period.

Air Cargo Facilities Conclusion

The air cargo facilities are sufficient in size and can accommodate air cargo throughout the planning period.

Large Scale Aeronautical Facilities

The presence of the recently completed OSU Flight Center at SWO is part of the continued expansion of the Oklahoma Aerospace Institute for Research and Education (OAIRE) that was announced in late 2021. It will be the first Aerospace Institute in the state of Oklahoma and twice the size of any facility in the country. Coupled with OSU's Research and Development (R&D) opportunities for Unmanned Aerial Systems (UAS) and the State Department of Commerce's strong support for aeronautical development, many potential opportunities exist to provide additional offerings for training, educating, and certifying students for careers in the aviation industry. Careers in aircraft Maintenance, Repair, and Overhaul (MRO), education, and experimental aircraft enterprises can be expected. With the likely influx of aviation-focused students, SWO will become more attractive for additional aviation entities to invest in facilities.

Large Scale Aeronautical Facilities Conclusion

It is not anticipated that SWO's west side property will be required for GA facilities within the planning period. Therefore, the reservation of adequate space for large-scale aeronautical development immediately west of Runway 17/35 and northwest of Runway 4/22 should be planned and protected for non-GA aeronautical uses.

Airport Traffic Control Tower (ATCT)

The existing ATCT is located atop the terminal building connected to the ticketing area with an open stair from the common area up to the conference room on the second level. Access to the upper three levels that define the ATCT facilities is controlled though a secure locking mechanism at the second-floor door opened only with the correct entry of numerical codes. The level directly above the conference room is an equipment room; the level above that is a breakroom/toilet area for the ACTC personnel. The 600 square feet of space within the ATCT cab is the highest structure within the building.

Siting requirements for ATCTs are found in FAA Order 6480.4B, *Airport Traffic Control Tower Siting Process*, and AC 150/5300-13B, *Airport Design*. Accessibility requirements for people with disabilities to public buildings is described in Title II of the 2010 Standards for Accessibility, commonly called the Americans with Disabilities Act (ADA).

ATCT Requirements

Generalized ATCT requirements are summarized below. ATCT buildings must:

- Provide sufficient height to have unobstructed views of all controlled aircraft movement areas including runways, taxiways, and ramp areas, as well as airborne traffic patterns and runway approaches, having a perpendicular line-of-sight (LOS) with the primary runway/taxiway system.
- Provide sufficient height such that the LOS angle of incidence to the key point on the airfield is equal to or greater than 0.80 degrees.
- Orient so the primary operational view faces north, or alternatively east, west, or south in that order of preference.

- Prevent the impairment of visibility by direct or indirect external light sources, sunlight, reflective surfaces, naturally occurring atmospheric conditions, and industrial/municipal discharges.
- Prevent degrading or affecting the performance of existing or planned communications, navigation, or surveillance equipment.
- Avoid adverse impacts to any current or planned terminal instrument procedures.
- Comply with Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace* and all airport design criteria surfaces.
- Comply with the ADA public access requirements if the existing terminal building is remodeled and the existing ATCT is to remain.
- Comply with all safety and security regulations contained in FAA Order 1600.69C, *FAA Facility Security Management Program* commensurate with the Facility Security Level (FSL) assigned to the ATCT.

ATCT Analysis

An analysis of the existing ATCT LOS indicates that no obstructions block the view of any runway surfaces and most taxiway surfaces. However, as illustrated in **Figure C-3** the tops of Group Hangars 1 and 2 obscure a segment of Taxiway F from ATCT LOS, as are all the ramps northeast of Group Hangar 1 including the OSU Flight Center Ramp North. Additionally, most of the Southeast GA Taxilane is obscured from ATCT LOS by the hangars located north of the taxilane. In interviews, ATCT personnel have confirmed these LOS issues. They also report that a taller cab elevation at the current location might eliminate the LOS issue and taller windows in the cab would be preferrable.

The existing LOS angle of incident as calculated to the key point on the airfield (i.e., Runway 17) is 0.04, meaning the controller eye height elevation (1003.7 feet AMSL) is barely above the Runway 17 elevation (1,000 feet AMSL). This angle of incident does not meet the requirements in FAA Order 6480.4B, which as previously stated is a minimum 0.80 degrees.

The status of the life safety requirements such as exit requirements and smoke proof enclosures along with fire rated partition locations have not been documented. Fire protection and fire and smoke detection are also potentially out of date.

Security concerns exist regarding reasonable provisions for employee parking. Currently, there is inadequate parking at the terminal and the ATCT personnel share parking spaces with other users on the terminal building.

The current equipment room is a little larger than a closet and does not have adequate heating, ventilation, and air conditioning (HVAC), leading to equipment overheating and the inability for the tower to install additional equipment needed for backup and redundancy purposes. The employee breakroom and restroom are extremely small by modern standards.

The existing ATCT is not accessible to people with disabilities. However, the multi-story buildings Section 206.2.3 of Title II of the ADA states that air traffic control towers have an exemption from the requirements to

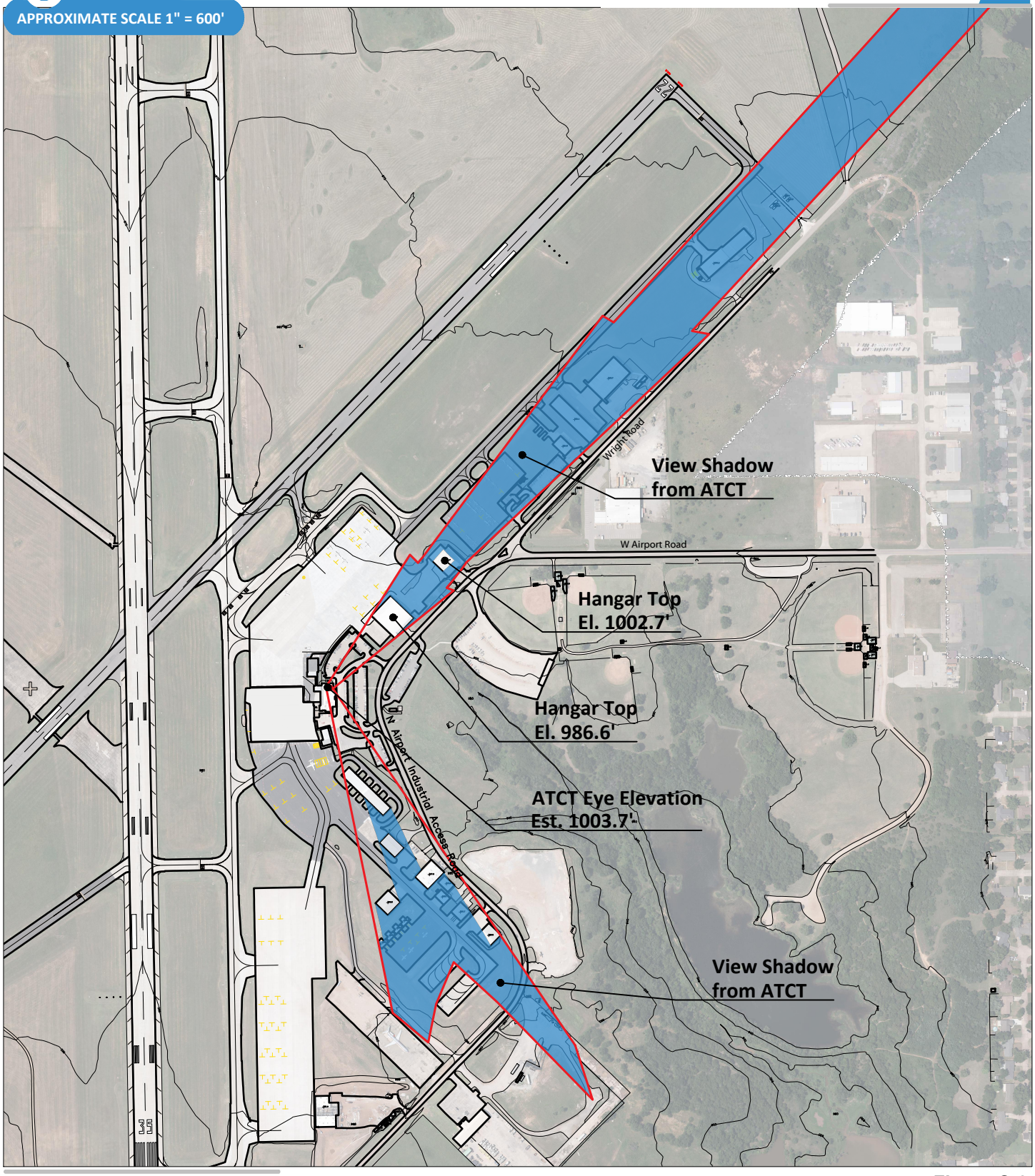


Figure C-3
ATCT Line of Sight Analysis

have an elevator that serves both the cab and one floor below. Given that the space located two-levels below is an equipment room, this level would be exempt from the elevator requirements also. Title II of the ADA does not allow for elevator exemptions for all public areas of new or renovated airport terminals. Therefore, should the decision be made to remodel the existing terminal building and retain the existing ATCT in its present location, ADA requirements include the installation of either an elevator or a vertical platform lift to the second floor of the existing terminal (i.e., the airport conference room) as part of the renovation process.

To improve security, it is expected that the conference room will be set aside for use by ATCT personnel only. Controlled access will require a separate entrance into the facility and will be designed to minimize the usability of the existing terminal building.

Airport Traffic Control Tower Conclusion

Given that the existing ATCT is located atop the existing terminal building, the sizable cost to provide an elevator or vertical platform lift to the second floor if the existing terminal building is remodeled will be questionably spent. Spending construction monies on improving the ATCT in the existing location is not practical considering a replacement facility will likely be constructed in less than ten years due to the antiquated design. Long-term cost savings can be achieved by separating the tower from the terminal during the upcoming remodel rather than performing another renovation a few years later. Segregating a secure entrance and providing secure parking for ATCT personnel will minimize the usability of the existing terminal building and parking areas. Additionally, it is unknown at this time if the existing ATCT will structurally support additional height that would alleviate the unobstructed LOS issues with Taxiway F and the Southeast GA Taxilane, and the inadequate LOS angle of incident.

It is recommended that a future ATCT location be evaluated. Since the primary runway (Runway 17/35) is oriented north-south, and perpendicular LOS is preferred with an east facing view being the second-most advantageous orientation, a site on the west side of SWO is recommended for evaluation in the next chapter, **Chapter D – Alternatives Analysis**.

While this Master Plan will evaluate and recommend a future ATCT location, the use of the Airport Facilities Terminal Integration Laboratory (AFTIL) method or the Alternate Siting Process (both outlined in Order 6480.4B) is required. A follow-on ATCT Siting Study will need to be prepared separate from this Master Plan to either confirm the recommended site or select another location. Close coordination with and review by the Technical Operation Services Air Traffic Organization (AJW) Terminal Facilities Execution will be conducted before an official written decision memorandum of a new ATCT site can be provided.

Aircraft Rescue and Fire Fighting Facility

According to Code of Federal Regulations (CFR) Part 139.315, ARFF equipment and staffing requirements are based upon the length of the largest air carrier aircraft that serves an airport with an average of five or more daily departures. **Table C-37** presents the ARFF Index, aircraft length criteria, and representative air carrier aircraft.

Table C-37: ARFF Support Requirements

ARFF Index	Aircraft Length	Representative Aircraft
A	Less than 90'	ERJ 135, CRJ 200
B	At least 90' but less than 126'	CRJ 900, A319/A320, **ERJ 145^{E}/175^{F}**
C	At least 126' but less than 159'	ERJ 195, A321, B 737-800/900
D	At least 159' but less than 200'	B 757, B 767, A330
E	At least 200'	B 747, B 777, A340

Source: CFR Part 139.315 ARFF Index Determination.

Notes: **Bold** = SWO critical aircraft, ^{E} – Existing, ^{F} – Future.

SWO currently holds an ARFF index designation of B, with Index C services provided with prior arrangement. The Index B designation is due to the average commercial operations of two departures daily of the ERJ 145, which is the existing critical aircraft. The ERJ 175 is the forecasted future critical aircraft. Both aircraft are within the ARFF index B classification. The Index C provided services accommodate the longer aircraft used by OSU and visiting universities athletic teams.

The existing ARFF facility is centrally located on the east edge of the terminal apron just south of the terminal building. It provides approximately 1,110 square feet and is comprised of one vehicle storage bay. An additional bay is leased in tandem with the adjoining apartment. While an older structure the ARFF is in good functioning condition. SWO's ARFF facility currently operates two vehicles, which were detailed in **Chapter A – Inventory of Existing Conditions**. The existing equipment can accommodate the necessary requirements for its current ARFF index. However, SWO desires to store both ARFF vehicles indoors with ample equipment and material storage and maintenance space provided.

ARFF Conclusion

It is recommended that alternative locations for a new ARFF building providing two vehicle bays and ample storage and maintenance area be analyzed in the next chapter. Additionally, SWO should engage with an engineering or architectural firm to right-size the ARFF building space and layout to best conform with FAA guidance, as well as with local codes and ordinances.

Snow Removal Equipment and Airport Maintenance Facility

Airport maintenance is responsible for the upkeep, protection, and preservation of airport facilities and snow removal equipment (SRE) is used for snow and ice removal from airport pavements. Facilities that are right sized to store equipment and material is an important part of the airport planning process. Currently, SWO does not have a dedicated SRE facility, so equipment is stored outdoors and indoors where space is available.

FAA AC 150/5220-20A, *Airport Snow and Ice Control Equipment*, provides guidance in the purchase of AIP-eligible SRE. AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, provides siting factors and space allocation calculation for SRE facilities. FAA AC 150/5200-30D, *Airport Field Condition Assessments and Winter Operations Safety*, provides guidance to airport sponsors in developing snow and ice control plans.

SRE Requirements

The minimum SRE requirements at commercial service airports are primarily based on three factors: the total square footage of designated Priority 1 paved area identified in the winter storm management plans, the annual aircraft operations, and the amount (in tonnage) of snow to be removed in a given time period. Priority 1 paved areas are defined as the primary runway, parallel taxiway, terminal ramp, control tower access, and ARFF access. In SWO's *Snow and Ice Control Plan*, approved by the FAA in June 2021, the following are identified as Priority 1 areas:

- Runway 17/35
- Taxiways A, A3, A4, and C
- Terminal/airline apron
- ARFF access ramp
- Southeast GA Taxiway to the Airport Operations and Maintenance Center and Administration Offices
- ILS equipment roadways (glideslope and localizer antennas)
- PAPIs

This amounts to over 1,335,000 square feet of Priority 1 pavement, which classifies SWO as a large airport by AC 150/5220-18A.

Commercial service airports with more than 40,000 aircraft operations should have equipment to clear the Priority 1 surfaces of one inch of snow weighing up to 25 pounds per cubic foot in 30 minutes. The calculations for SWO indicated approximately 3,980 tons of snow is removed per hour assuming one inch of snow accumulation. However, SWO's current *Snow and Ice Control Plan* sets the removal time at one hour.

The FAA online snow removal equipment calculator provides a recommended amount of SRE. It is possible for equipment to be multi-purpose that combines multiple functions on one platform (e.g., a plow truck may also double as a hopper spreader, and an assortment of quick-change attachments allow a vehicle to convert from one function to another). **Table C-38** presents the existing SRE equipment at SWO and the equipment recommendations based on these calculations. Based on the assumptions and calculations presented in this analysis, SWO is eligible for two Class III high-speed rotary plows with the capacity to cast 2,500 tons of snow per hour a distance of 100 feet. The rotary plows should be supported by four snowplows of equal snow removal capacity, equaling 40 feet of actual blade length with a 30-degree plow cutting angle and a 20-mile per hour operating speed.

SWO currently meets these minimum equipment requirements; however, it appears that SWO is eligible for two sweepers that are available at its discretion through AIP funding. It is recommended that SWO replace or supplement the existing SRE vehicles that do not meet the requirements or that have exceeded the expected useful lifespan (i.e., generally 10 to 15 years). SWO is planning to replace the two existing rotary plows with newer equipment in Fiscal Year 2022. The existing SRE vehicle inventory that does not meet the

recommendations could be used to clear secondary and tertiary paved areas such as GA aprons, taxilanes, hangar areas, access roads, automobile parking, and off-airside surfaces.

Table C-38: AIP Eligible SRE Recommendations

Equipment	Existing	Recommended
Rotary Plows (Snow Blowers)	• Two Blizzard Buster 12-foot Tow-Behind Brooms	• Two Class III
Plows	• Snow Dog Plow 9-foot truck mounted • Tractor mounted 12-foot snow pusher box • Dump Truck mounted 11-foot plow • Sand truck mounted 10-foot plow • Motor grader with 14-foot blade	• Four Class III with a total 40-foot blade length
Multi-Purpose Equipment	• Wyle 800-gallon towed motorized chemical de-ice sprayer with 42'foot boom • New Holland Skid Steer with bucket • ATV-mounted de-ice granular spreader	• Two Sweepers • Two Hopper Spreaders

Source: SWO Snow and Ice Control Plan, dated June 10, 2021, and Mead & Hunt analysis using FAA AC 150/5220-20A.

SRE and Airport Maintenance Facility Requirements

SRE is a costly piece of complex and technologically advanced equipment. To protect and service equipment, and to protect local and federal investment, specifically designed maintenance and storage buildings are needed. SRE should be housed in a building capable of maintaining a temperature of 50 degrees Fahrenheit to prolong the useful life of the equipment and to enable more rapid response to operational needs.

Total space allocation for an SRE facility is based on the total of three individual areas determined necessary to meet different functional purposes:

- **Storage area** (including equipment parking, snow and ice control materials, and equipment parts)
- **Support area** (including administrative and equipment maintenance areas)
- **Special equipment area** (including heating, ventilation air conditioning, steam generation, emergency power, and machine rooms).

Space allocation for each area is determined by local building code and ordinance, values provide by tables in AC 150/5220-18A, and applying equipment clearance values as determined by using equipment safety zone concepts.

Using this guidance, a total SRE and airport maintenance facility consisting of approximately 15,500 square feet[3] is recommended. Thus, since the existing facility is approximately 9,000 square feet, with plans to expand to expand to approximately 13,000 square feet, the SRE needs exceed the existing conditions.

SRE and Airport Maintenance Facility Conclusion

It is recommended that SWO continue programming for the replacement of the existing antiquated SRE vehicles that do not meet the recommendations presented in this analysis or have exceeded their useful

[3] Includes storage area allocation for two self-propelled rotary snowplows, four trucks and/or tractors for snowplow operations, four 10-foot-long snow blades, two 10-foot sweepers, and two spreader hoppers. Support area allocation does not include sleeping quarters but does include a lunchroom, kitchen, a cleaning bay, and a repair bay.

lifespans with equipment that are eligible for AIP funding. Alternative sites for a future SRE and Airport Maintenance Facility will be examined in the next chapter. Additionally, as with the ARFF building, SWO should engage with an engineering or architectural firm to right-size the SRE building space and layout to best conform with FAA guidance, as well as with local codes and ordinances.

Fuel Storage Facility

The City of Stillwater owns the SWO fuel storage facility, which provides both Jet A and 100LL AVGAS. According to fuel sales records provided by SWO, there has been an average of 123,456 gallons of Jet A and 123,456 gallons of 100LL AVGAS sold during the past four years (i.e., 2017-2020). Based on the 2020 total aircraft operations, this equates to approximately 79.7 gallons of Jet A fuel sold per turbine-powered aircraft operation and 2.0 gallons of 100LL AVGAS fuel sold per piston-powered aircraft operation.

Typically, as operations increase, fuel storage requirements can be expected to increase proportionately. Current aircraft trends at SWO indicate that GA aircraft are more frequently used for business purposes and less for recreation or leisure purposes. The distance travelled for aircraft being used for business purposes is typically longer compared to recreation or leisure aircraft. Coupled with the continued increase in training operations by the OSU Flight Center, aviation fuel trends suggest that the ratio of 100LL AVGAS gallons sold per operation will slightly increase throughout the planning period. Additionally, with the airlines transitioning from 50-seat aircraft to larger 76-seat aircraft, and larger business jets continuing to use SWO, the ratio of Jet A gallons sold per operation will also increase. Using the increasing gallons sold per operation ratio, an estimate of fuel storage needs can be calculated as a two-week supply during the peak month of operations, which is an industry rule-of-thumb planning standard. **Table C-39** presents the demand for fuel storage compared to the existing capacity.

Table C-39: Fuel Storage Requirements, 2020-2040

Fuel Type	2020	2025	2030	2035	2040
Jet A					
Average Day of Peak Month Turbine-Powered Aircraft Operations	15	18	20	22	24
Two Weeks of Operations	213	256	287	311	39
Gallons Per Operation	79.7	80.0	82.0	84.0	86.0
Forecast Fuel Storage Demand	17,000	20,480	23,515	26,110	29,140
Actual Fuel Storage (gallons)[1]	24,000	24,000	24,000	24,000	24,000
Fuel Storage Excess/Deficiency (gallons)	2,200	-1,280	-4,315	-6,910	-9,940
100LL AVGAS					
Average Day of Peak Month Piston-Powered Aircraft Operations	254	317	349	373	396
Two Weeks of Operations	3,556	4,437	4,884	5,222	5,548
Gallons Per Operation	2.0	2.2	2.3	2.3	2.3
Forecast Fuel Storage Demand	7,105	9,760	11,230	12,010	13,315
Actual Fuel Storage (gallons) [2]	20,000	20,000	20,000	20,000	20,000
Fuel Storage Excess/Deficiency (gallons)	8,895	6,240	4,770	3,990	2,685

Source: Mead & Hunt analysis.

Notes: [1] Existing Jet A fuel storage capacity (80 percent of storage tank capacity is considered full).

[2] Existing 100LL AVGAS fuel storage capacity (80 percent of storage tank capacity is considered full).

Fuel Storage Facility Conclusion

It appears that the existing Jet A fuel storage capacity is somewhat undersized and additional capacity may be needed in the future based on the generalized planning standard. The existing fuel storage area has sufficient space to either include additional fuel storage tanks or replace older tanks with new larger tanks.

Non-Aeronautical Tenants and Ground Facilities

SWO-owned property provides opportunities for potential non-aeronautical tenants to occupy space and generate revenue to help fund airport operations and future improvements. Continued population and job growth are the result of a desirable quality of life, a well-educated labor base, a high-quality public institution in OSU, a central presence in the United States, and strong community support. These competitive strengths and assets provide the opportunity to accommodate a variety of non-aeronautical land use needs on portions of airport property, thereby benefitting SWO, the City of Stillwater, and the surrounding region.

According to Woods & Poole projections, Payne County is expected to add over 8,800 jobs from 2020 to 2040, representing an approximate 0.8 percent Compound Annual Growth Rate (CAGR). As the largest city in Payne County, Stillwater would be expected to add the most jobs within the county. SWO has ample undeveloped property to accommodate some of this job growth as it relates to non-aeronautical tenants.

The continued growth and cultivation of commercial passenger service at SWO over time should stimulate non-aeronautical development related to ancillary travel services. With the nearby softball fields, a right-sized hotel may be supportive of both the commercial air carrier passengers and crew using SWO, as well as the users of the adjacent public use facilities. Commercial establishments, such as convenience stores, gas stations, and restaurants serving both SWO and the surrounding community, could be viable options for development. With the current and planned configuration of the road system along the east side of SWO, access and capacity would be attractive for these types of future small-scale development. Currently, the closest hotel is more than three miles from SWO.

The west side of SWO not reserved for aeronautical development affords the opportunity for development of large-scale non-aeronautical tenants. These property parcels are currently zoned as public/light industrial. This property is situated in a favorable location for long-term opportunities as the needs arise and supporting infrastructure can be supplied. The area surrounding SWO is not generally a preferred location for office and commercial space users, so market expectations seem to support R&D facilities and light industrial type development on SWO's west side. It could also include facilities consisting of warehouses or cargo handling and sorting facilities. Any large-scale development would need to be sited and constructed in consideration of Federal Aviation Regulations (FAR) Part 77 imaginary surfaces regulating height restrictions.

Non-Aeronautical Tenants and Ground Facilities Conclusion

It is recommended that options for the provision of non-aeronautical facilities, and the infrastructure needed to support it be evaluated and identified in the next chapter, **Chapter D – Alternatives Analysis**. This includes property on both the east and west sides of SWO.

Airport Access, Circulation, and Truck Routes

Stillwater's major access roadways are the north-south oriented US Highway 177 and east-west oriented State Highway 51, which meet in the middle of the City of Stillwater. State Highway 51 intersects with Interstate 35 (I-35) approximately 16 miles west of Stillwater and US Highway 177 intersects with the Cimarron Turnpike Spur approximately five miles to the north.

SWO is accessible by vehicle, truck, and bus. The primary access to SWO from the south is Airport Industrial Road (recently renamed North Hargis Road), which runs from the intersection of North Western Road and West Lakeview Road to the intersection of West Airport Road just east of the terminal building. West Airport Road is SWO's primary access from the east, which intersects with North Washington Street (US Highway 177) approximately 3/4 miles to the east. Current plans include a complete proposed realignment of North Hargis Road so that it would be located further east of the terminal area, as illustrated in **Figure C-4**.

When Hargis Road is realigned, the existing roadway network will continue to provide access and entrance points for all passengers, employees, tenants, and other ground operators, including access to the terminal parking areas. Connectivity with the realigned Hargis Road will be maintained at two locations at the north and south ends.

The proposed realigned North Hargis Road will be a two-lane roadway constructed of asphalt. Using the Highway Capacity Software, the one-way capacity of a 35 mile per hour (mph) roadway with no curb and gutter results in an Annual Average Traffic (AADT) of 1,650 cars per day. The capacity for a two-lane facility doubles to 3,300 cars per day, which is the effective AADT of the proposed realigned North Hargis Road. According to traffic counts for Hargis Road measured approximately one quarter mile north of the intersection with West Lakeview Road, AADT for 2022 is equal to 1,822 cars per day. Using an annual increase in traffic of about 2.0 percent yields approximately 2,404 cars per day by 2042. The capacity of North Hargis Road is well over the existing and forecasted demand for the vehicle traffic. Once North Hargis Road is realigned, there will be no need for further improvements except for additional access points as needed to serve future tenants.

West Airport Road is a two-lane road, and thus also has a capacity of 3,300 cars per day. According to traffic counts for West Airport Road measured approximately one quarter mile west of the intersection with North Washington Street/Highway 177, AADT for 2022 is equal to 2,413 cars per day. Using an expected annual traffic increase of about 2.6 percent, AADT is expected to increase to 3,480 cars per day. Based on this analysis, future traffic on West Airport Road will likely exceed the road's capacity. It is recommended to closely monitor traffic conditions so that demand does not exceed capacity before improvements are provided.

With the potential development of SWO's west side property, there will be a need to provide vehicular access. Most likely this access will be provided by improvements made to West Airport Road from the west via 3310 Road and its connection to West Lakeview Road.

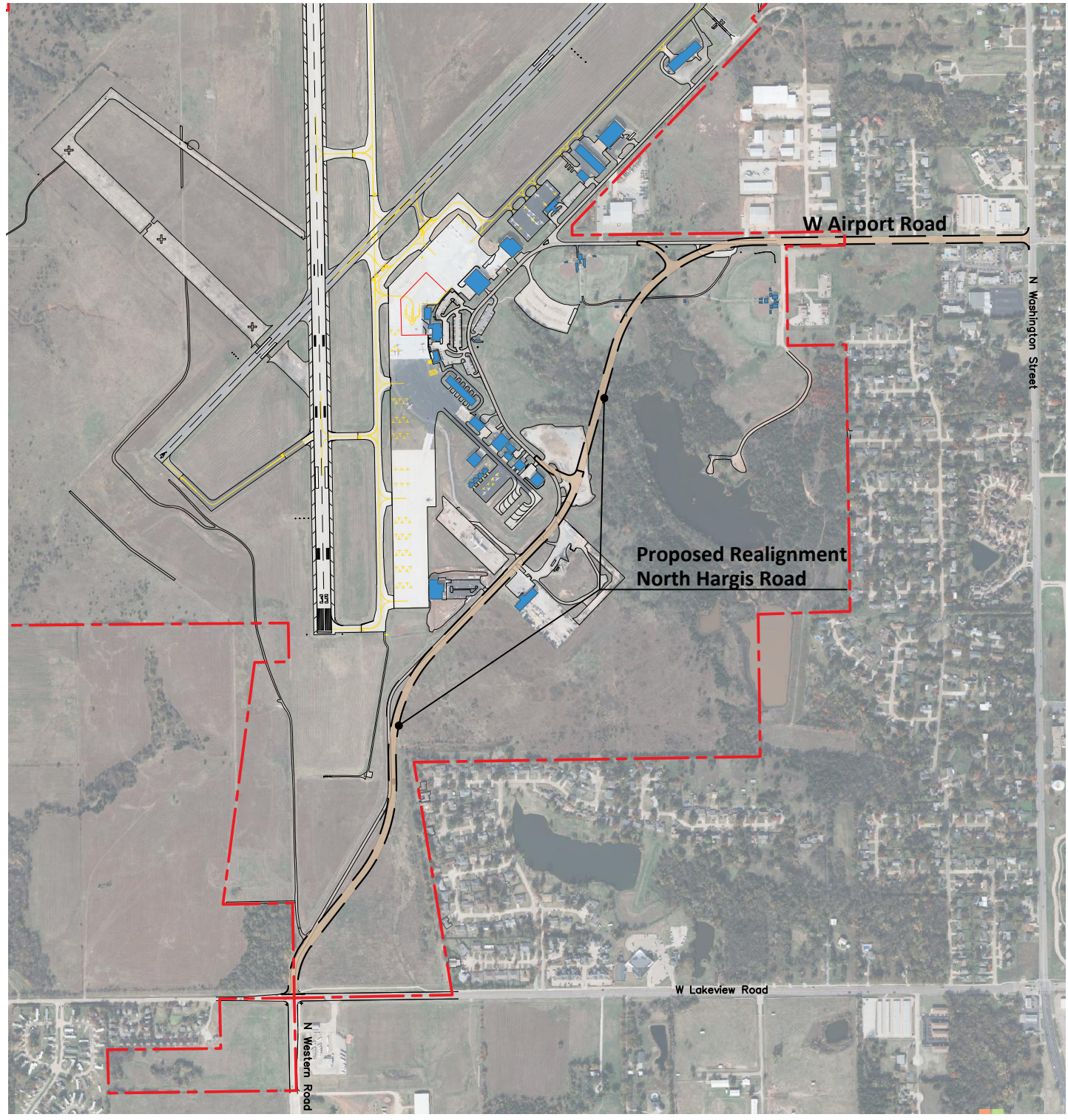


Figure C-4:
North Hargis Road Proposed Realignment

Considering vehicle circulation at the terminal and the provision of future parking areas, it is recommended that terminal reconfiguration alternatives be evaluated that increase parking areas and improve passenger pick up/drop off vehicle lanes. This could be accomplished while maintaining clear routes to the GA facilities to both the north and south of the terminal area.

According to the National Highway Freight Network, there are two primary truck routes that pass within approximately 30 miles of SWO. These routes are I-35, running north/south through the center of the state, and Interstate 44, running northeast/southwest from Oklahoma City to Tulsa. Neither truck route has or is planned to have an impact on SWO.

There is a railroad that runs through the City of Stillwater, called the Stillwater Central Railroad. This railroad continues to the north and then connects into the BNSF railroad network. Presently there are no stubs that extend to SWO property, and it is not anticipated that a connection will be provided during the planning period.

Access, Circulation, and Truck Routes Conclusion

It is recommended that the current airport access be maintained in the existing location once North Hargis Road is realigned. In conjunction with the terminal building alternatives evaluation, various vehicle access points, circulation routes, and parking facilities will be analyzed and considered. Traffic conditions on West Airport Road east of the intersection with the proposed realigned North Hargis Road should be monitored so that capacity improvements can be provided accordingly.

Utilities

The major utility systems at SWO include water, sanitary sewer, stormwater drainage, electric, natural gas, and communications, which were assessed for their ability to accommodate the requirements of any future development that might reasonably be expected to occur at SWO (e.g., hangar development, apron expansion, and new or expanded aeronautical or non-aeronautical facilities). Water and waste water are analyzed separately below, but the existing stormwater drainage, electric, natural gas, and communications utilities are adequate to meet the existing and anticipated demand.

Water Usage

Metered water usage information was gathered from the City of Stillwater's billing system for all meters registered to the city from 2015 through 2019, which includes meters serving the terminal building and various SWO support facilities. Not included in this review were meters registered to private third parties, which support private hangars and other establishments.

Meter water usage was compared to passenger enplanement, commercial service operations, and air cargo volume on an annual basis. No correlation was found between metered water usage and passenger enplanement, commercial service operations, or air cargo volume for the period reviewed. While commercial service operations and air cargo volume remained relatively steady for all five years and passenger enplanement was relatively stable from 2017 through 2019, annual metered water usage varied from a high of

244,000 gallons in 2016 to a low of 66,000 gallons in 2019. The reason for the variation in water usage was not known, but it could be attributed to construction activities or variations in operation and maintenance procedures. An average of 4.4 gallons of water per passenger enplanement were used for the period of 2017 through 2019.

The peak month water usage during the review period was October of 2016. This month's usage was 46,800 gallons, an average usage rate of one gallon per minute or 1,560 gallons per day. SWO's metered water usage has historically been very low, particularly compared to its fire flow demands. If adequate capacity for fire protection is maintained for SWO, sufficient domestic flow would surely be maintained for even very large increases in passengers, air cargo, or commercial service operations. SWO is served by a 12-inch water line and 8-inch sanitary sewer line, which, by observation, should be more than sufficient to serve the airport's domestic needs.

Utilities Conclusion

The utility systems at SWO are observed to be sufficient for the existing and future needs, and no alterations are necessary.

Perimeter Security

The security fence that surrounds the airport property is an 8-foot chain link topped with three strands of barb wire. There are 21 secure vehicle gates placed at strategic locations around the perimeter fence providing access from the non-secure landside areas to the secure landside and airside facilities. There are ten pedestrian gates providing secure access to aprons, hangars, and airside facilities. Three are near the airport administration building providing access to the south corporate hangar ramp, with an additional gate currently being provided near the Cowboy Hangar. Four are located near the terminal building and four are in the northeast hangar development area. SWO staff indicate that the existing perimeter security system is generally adequate for existing and future needs. However, increased cameras and automated gates would improve security at SWO.

There is no existing continuous perimeter roadway system. SWO has used gravel and millings from city roadway projects to improve the rougher areas near the security fence for what are the beginnings of a perimeter road. A continuous paved perimeter road would make the patrolling of the airport perimeter possible in all weather conditions.

Perimeter Security Conclusion

SWO staff indicate the security perimeter fencing and access gate system are generally adequate for existing and future needs. However, increased cameras for improved airfield surveillance, additional automated gates, and a continuous paved perimeter road are recommended.

SUMMARY

The information provided in this chapter provides the basis for understanding the facility improvements that are needed at SWO to accommodate future aviation demand efficiently and safely. Following are the major improvement considerations that have been identified in this chapter.

Airside Considerations

Instrument Approach Procedures and Navigational Aids

- Evaluate the potential to implement a GPS-based IAP providing visibility minimums of 1/2 mile to Runway 35 and NPA IAPs providing visibility minimums not less than 3/4 mile to Runways 4 and 22.

Airfield Design Standards

- Evaluate remediation of the deficient Runway 17/35 ROFA width, as well as the deficient Runway 4/22 ROFA and ROFZ width.
- Monitor the pavement strength of the apron surrounding T-hangar 2.

Pavement Marking, Lighting, and Signage

- Evaluate potential installation of a full approach light system, such as a MALSR, in conjunction with the potential Runway 35 IAP improvement.
- Maintain the non-precision threshold markings in conjunction with the proposed NPA IAPs to Runways 4 or 22.
- Replace all LED edge lighting with incandescent lighting.

Taxiway/Taxilane System

- Redesign Taxiway F1 to a right-angled taxiway.

Landside Considerations

Terminal Building

- Construct a new terminal building approximately 32,000 square feet in total size incorporating appropriate programmed space needs to meet the anticipated passenger demand.

General Aviation Facilities

- Construct approximately 10 additional T-hangar spaces and five additional group hangars over the planning period.
- Evaluate additional GA apron space for itinerant aircraft.

Large Scale Aeronautical Facilities

- Evaluate property reservation west of Runway 17/35 and northwest of Runway 4/22 for non-GA aeronautical uses.

ATCT Facility

- Reconstruct ATCT building in a new, physically separated location from the terminal building.
- Evaluate suitable locations for the relocated ATCT building using the AFTIL Alternate Siting Process and a subsequent ATCT Siting Study.

ARFF Facility

- Reconstruct the ARFF building in a new location, right-sizing the space to best conform with FAA guidance or other local building codes.
- Evaluate suitable locations for the relocated ARFF building.

SRE and Airport Maintenance Facility

- Program the replacement of the existing SRE vehicles no longer fulfilling their primary function or exceeding their useful lifespans.
- Evaluate sites for a future SRE and Airport Maintenance Facility, right-sizing the space to best conform with FAA guidance or other local building codes.

Fuel Storage Facility

- Evaluate future expansion of Jet A fuel storage in accordance with demand.

Non-Aeronautical Tenants and Ground Facilities

- Evaluate property reservation for non-aeronautical facilities.

Access, Circulation, and Truck Routes

- Maintain airport access to North Hargis Road following its proposed realignment.
- Evaluate vehicle access points, circulation routes, and parking facilities in conjunction with the terminal building reconstruction.
- Monitor for capacity improvements on West Airport Road east of the intersection with the proposed realigned North Hargis Road.

Perimeter Security

- Program for additional cameras, automated gates, and a continuous perimeter road.

D. Alternatives Development and Recommendations

INTRODUCTION

This chapter presents the development alternatives analysis and recommendations for Stillwater Regional Airport (SWO) to satisfy the facility requirements described in **Chapter C – Facility Requirements**. It does so in terms of concepts and reasoning, and it provides a description of the various factors and influences that meet the needs of the airport users as well as fulfills the strategic vision for the City of Stillwater. The ultimate recommendations will form the basis for SWO's long-term development plan.

DEVELOPMENT ASSUMPTIONS AND GOALS

In concert with the role of SWO and informed by community input received during the planning process, a series of basic assumptions and goals have been established. These goals intend to guide and direct the evaluation process of future SWO development and maintain continuity throughout the process. They involve several categorical considerations relating to both the short- and long-term facility needs. These considerations include safety enhancement, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While some represent more tangible and physical activities than others, all are deemed important and appropriate for future airport development.

Development Assumptions

- **Assumption One:** SWO will be developed and operated in a manner that is consistent with local ordinances and codes, federal and state statutes, and Federal Aviation Administration (FAA) grant assurances and regulations.
- **Assumption Two:** The recognized role of SWO will continue to serve as a facility accommodating regional commercial service passenger activity, along with general aviation (private, corporate, and training) activity and a small amount of military aviation activity.
- **Assumption Three:** Runway 17/35 will be designed, constructed, and maintained to FAA-defined Runway Design Code (RDC) C-III-2400 dimensional standards.
- **Assumption Four:** While the existing and future RDC for Runway 4/22 has been determined to be A-I-VIS, SWO desires to maintain this runway in a manner that protects for the limited use of commercial air carrier aircraft operations. This creates redundancy when Runway 17/35 is inoperable due to long lasting maintenance or rehabilitation, or in the event of aircraft incidents. Standards to be maintained include the runway length and width, parallel taxiway separation standards, and instrument approach protection consistent with past recommendations contained on the existing Airport Layout Plan (ALP).
- **Assumption Five:** SWO will accommodate the forecast aviation activity reliably and safely.

- **Assumption Six:** The existing lengths provided by both runways are adequate to accommodate the needs of the existing and forecast aircraft fleet safely and efficiently.
- **Assumption Seven:** The plan for future airport development should strive to make the most efficient use of the available area for aviation-related activities because the amount of accessible landside development area is at a premium.
- **Assumption Eight:** To the maximum extent possible, future facilities will be designed compatible and complementary with the operation of SWO and the surrounding land uses.

Development Goals

- Provide effective direction for future development through the preparation of a rational plan and adherence to the adopted development program.
- Plan and develop SWO to be capable of accommodating the future needs of the City of Stillwater, Payne County, and the surrounding area.
- Program the construction of facilities when demand is realized (construction is to be demand driven, not forecast driven).
- Plan SWO to accommodate the aviation forecasts safely and efficiently with needed facilities. The primary potential facilities improvement under consideration include:
    - The terminal building.
    - A standalone Airport Traffic Control Tower (ATCT).
    - Improved vehicle roadway access and parking facilities.
    - An Aircraft Rescue and Fire Fighting (ARFF) Facility and a Snow Removal and Equipment (SRE)/Airport Maintenance Facility.
    - Aircraft storage hangars and aprons.
    - Terminal landside development.
- Enhance the self-sustaining capability of SWO and the financial feasibility of future development.
- Integrate the needs of existing tenants with future development plans, recognizing and accommodating the needs of general aviation including corporate and flight training.
- Plan and develop airport facilities to be environmentally compatible with their surroundings, minimizing the potential environmental impact to both on and off airport property.
- Encourage the protection of existing public and private investment in land and facilities, and advocate for the resolution of any potential land use conflicts.

AIRSIDE DEVELOPMENT CONCEPTS, ALTERNATIVES, AND RECOMMENDATIONS

Because all other functions relate to and revolve around the basic runway/taxiway layout and Instrument Approach Procedures (IAPs), airside development alternatives must first be examined and evaluated. The

primary objective of the airside alternatives analysis is to examine options that will result in the best and safest possible aircraft operating environment. The analysis has been prepared to provide SWO with a comprehensive outline of each alternative's key components, advantages, and disadvantages associated with each.

Airfield Design Standards

Runway 17/35 Design Standards

As presented in the previous chapter, an FAA-owned glideslope equipment building and antenna are located approximately 370 feet west of the Runway 17/35 centerline. Thus, the Runway Object Free Area (ROFA) width is deficient by 30 feet, providing only a total width of 770 feet. A frangible windsock was also located 250 east of the runway centerline; however, it was constructed recently with FAA approval and is not considered an obstruction or non-standard condition.

Recommendation. Plan and program the relocation of the glideslope antenna and equipment building a minimum of 30 feet to the west outside the ROFA.

Instrument Approach Procedure Improvement

As stated in the previous chapter, an evaluation of implementing improved GPS IAPs to Runways 35, 4, and 22 is warranted to enhance SWO's access during inclement weather conditions.

Runway 35

This runway is currently equipped with an Area Navigation (RNAV) Global Positioning Satellite (GPS) approach with visibility minimums as low as 3/4-mile and a Very High Frequency Omni-Directional Range (VOR) approach with visibility minimums as low as 1-1/4 mile. The installation of a Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) on Runway 35 would provide lighting credit enabling a decrease of the visibility minimums to as low as 1/2-mile. In doing so, the RPZ and the runway end approach surface would increase in size accordingly. **Figure D-1** illustrates the location of the MALSR, increased RPZ, increased runway end approach surface, the existing vertical guidance approach surface, the Federal Aviation Regulations (FAR) Part 77 approach surface, and the Precision Obstacle Free Zone (POFZ) associated with this IAP improvement. The POFZ would extend beyond existing SWO property to the west (approximately 0.7 acres), and the future RPZ would extend beyond SWO property (approximately 12 acres) encompassing West Lakeview Road. Because public roadways are considered incompatible land uses within an RPZ, coordination with FAA headquarters is required before approval of this improved IAP can be granted. There are five tree obstructions penetrating the existing and improved FAR Part 77 approach surface.

Runway 4

The existing and future RDC for Runway 4/22 is A-I-VIS, so Runway 4 is a visual approach runway served by no IAPs. However as stated in Development Assumption Four, SWO wishes to maintain the runway for use

by commercial air carrier aircraft operations in emergencies. To achieve an IAP with visibility minimums as low as 3/4-mile to Runway 4, as designated on the existing ALP, installation of a RNAV (GPS) approach can be implemented. According to FAA Advisory Circular (AC) 150/5300-13B, an Approach Lighting System (ALS) is recommended but not required for this type of IAP. Non-precision markings are required and are currently provided on Runway 4. In implementing this type of IAP, the RPZ and threshold siting surface would increase in size accordingly. It is anticipated that this IAP would provide vertical guidance so a vertical guidance approach surface would be required that is free of any obstructions. **Figure D-2** illustrates the location of the larger RPZ, increased runway end approach surface, vertical guidance approach surface, and FAR Part 77 approach surface associated with this IAP improvement. The future RPZ would extend beyond SWO property (approximately 10.7 acres). There is a single tree obstruction penetrating the existing and improved FAR Part 77 surface and is within the larger RPZ.

Runway 22

Like Runway 4, Runway 22 is visual approach only but would be maintained to achieve IAP with visibility minimums as low as 3/4-mile. Installation of a RNAV (GPS) approach could also be implemented on Runway 22 to achieve an IAP with visibility minimums as low as 3/4-mile. An ALS is recommended but not required for this IAP, and non-precision markings are required and currently provided. **Figure D-3** illustrates the location of the larger RPZ, increased runway end approach surface, vertical guidance approach surface, and FAR Part 77 approach surface associated with this IAP improvement. The future RPZ would extend beyond SWO property (approximately 10.7 acres). A bush penetrates the improved FAR Part 77 surface and is within the larger RPZ.

Recommendation. Continue to include the improved visibility minimum IAPs as shown on the existing ALP to Runways 35, 4, and 22 for use by commercial air carrier aircraft operations. Obstruction removal is recommended at the time of IAP implementation. As indicated on the existing ALP, an avigation easement will be sought for property inside the future Runway 35 RPZ that extends south of West Lakeview Road and is outside existing SWO property. Property inside the larger Runway 35 RPZ north of West Lakeview Road and outside existing SWO property is recommended for fee simple acquisition. Property acquisition is recommended for property within the future Runway 4 and 22 RPZs that extend beyond existing SWO property. The cost to mitigate the incompatible land uses within the RPZs might outweigh the benefits gained, but preserving the airspace associated with the improved IAPs assures that future implementation is not impeded by obstructions created beyond SWO's boundary.

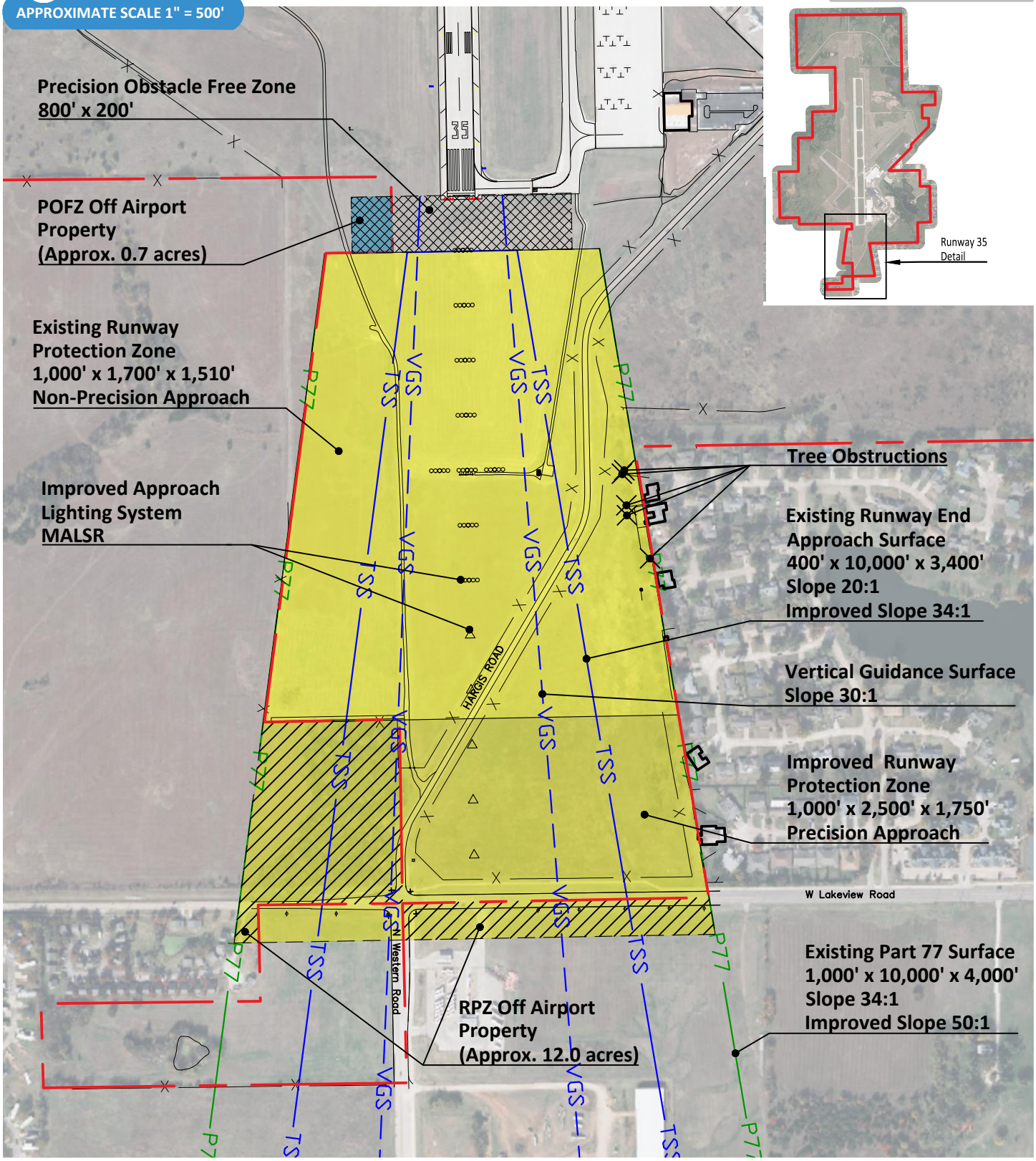
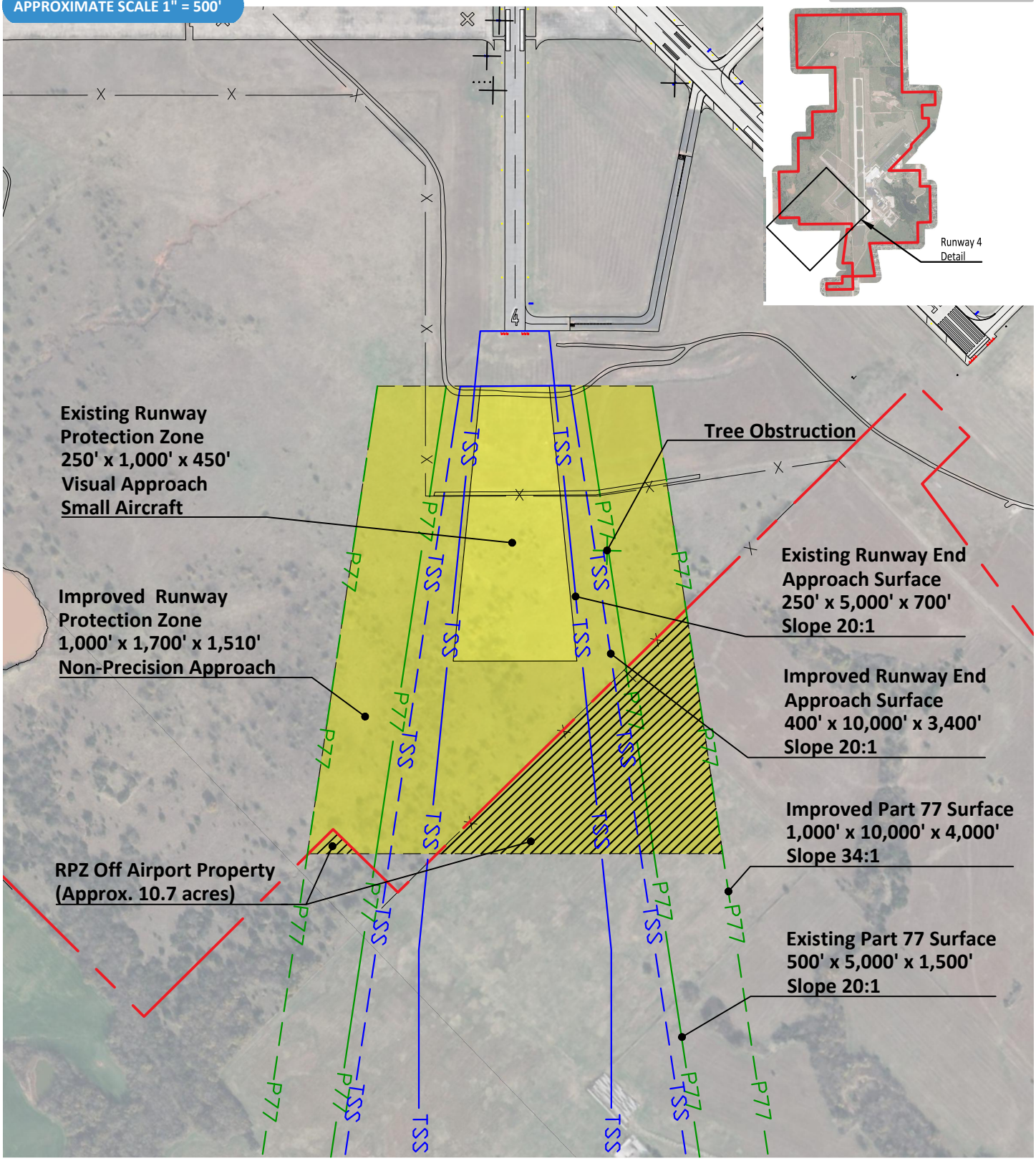


Figure D-1
Runway 35 IAP
Improvement Requirements



SWO Stillwater REGIONAL AIRPORT

Figure D-2
Runway 4 IAP
Improvement Requirements

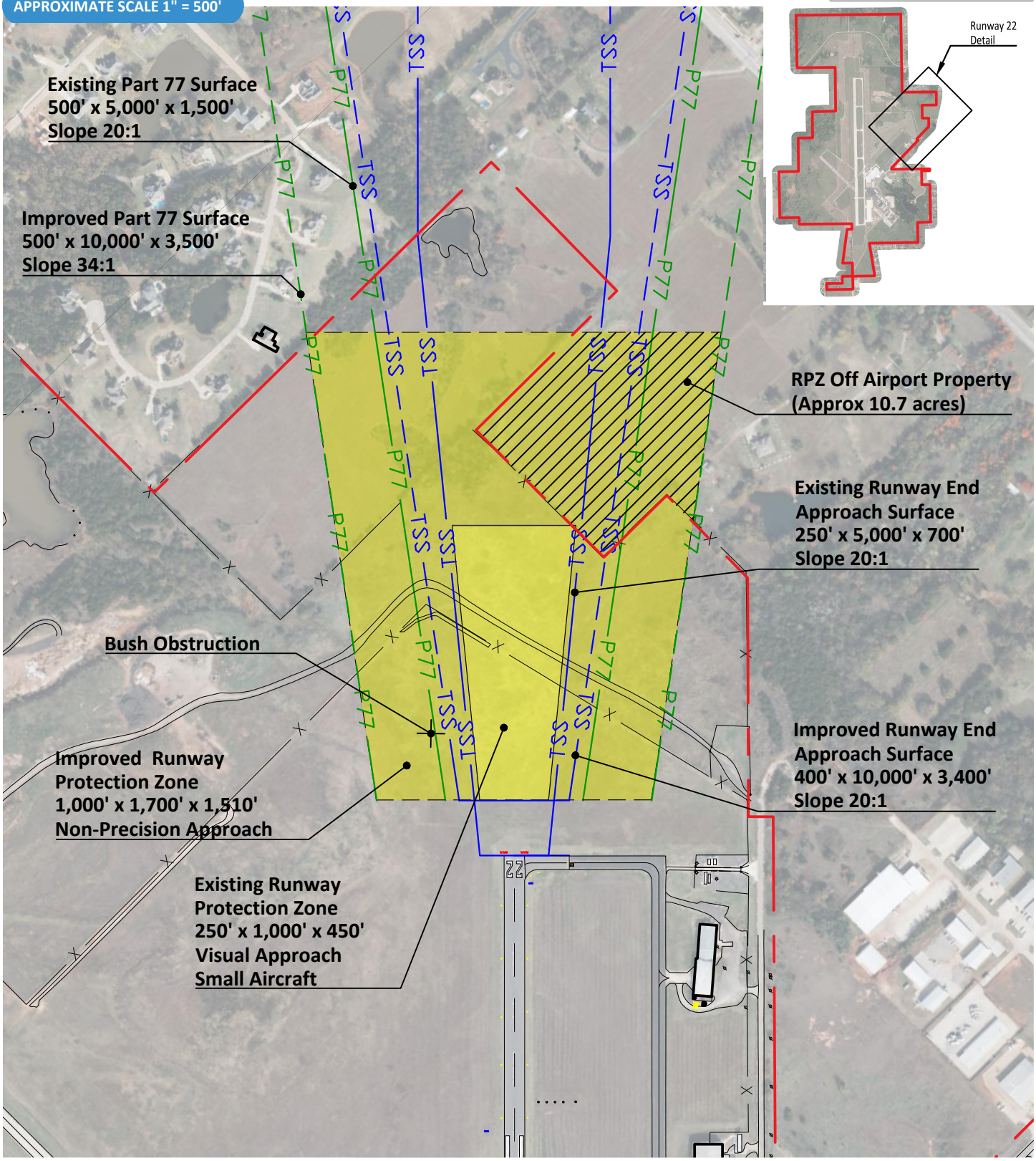


Figure D-3:
Runway 22 IAP
Improvement Requirements

Taxiway/Taxilane Design Standards

As presented in the previous chapter, Taxiway F1 nearly leads directly from the Hangar 1 Ramp to Runway 4/22, which could cause inadvertent runway incursions. Additionally, Taxiways F1 and B west of Runway 17/35 are not designed with the recommended right-angled taxiway geometry. The repositioning of Taxiway F northwest of the existing Taxiway F will provide a full-length taxiway parallel to Runway 22. The existing 530-foot separation of Taxiway F from the runway centerline will be reduced to 240 feet; this improvement has been on the existing ALP and is proposed to be continued.

Recommendation. When pavement age and conditions warrant, it is recommended to reconfigure Taxiway F1 to a right-angled intersection and located such that two 90-degree turns are required between the Hangar 1 Ramp and Runway 4/22. The realignment should also help alleviate some of the pilot confusion that occurs near the Taxiways A and F intersections with Runway 4/22. Taxiway B should also be reconfigured to a right-angled intersection perpendicular with Runway 17/35 when its pavement age and condition warrants reconstruction.

A taxiway renaming study and project is recommended to rename two of three separate taxiways that are currently designated Taxiway F.

When aeronautical development occurs on the west side of SWO, an ultimate parallel taxiway should be provided west of Runway 17/35. The location of this taxiway should be positioned outside the relocated glideslope antenna and its associated Critical Area (i.e., approximately 600 feet west of Runway 17/35, centerline to centerline). Additionally, the previous ALP presented a relocation of Taxiway F 290 feet to the northwest parallel to Runway 4/22. The relocated Taxiway F will be approximately 240 feet southeast of Runway 4/22, centerline to centerline. **Figure D-4** presents the ultimate layout of the taxiway system.

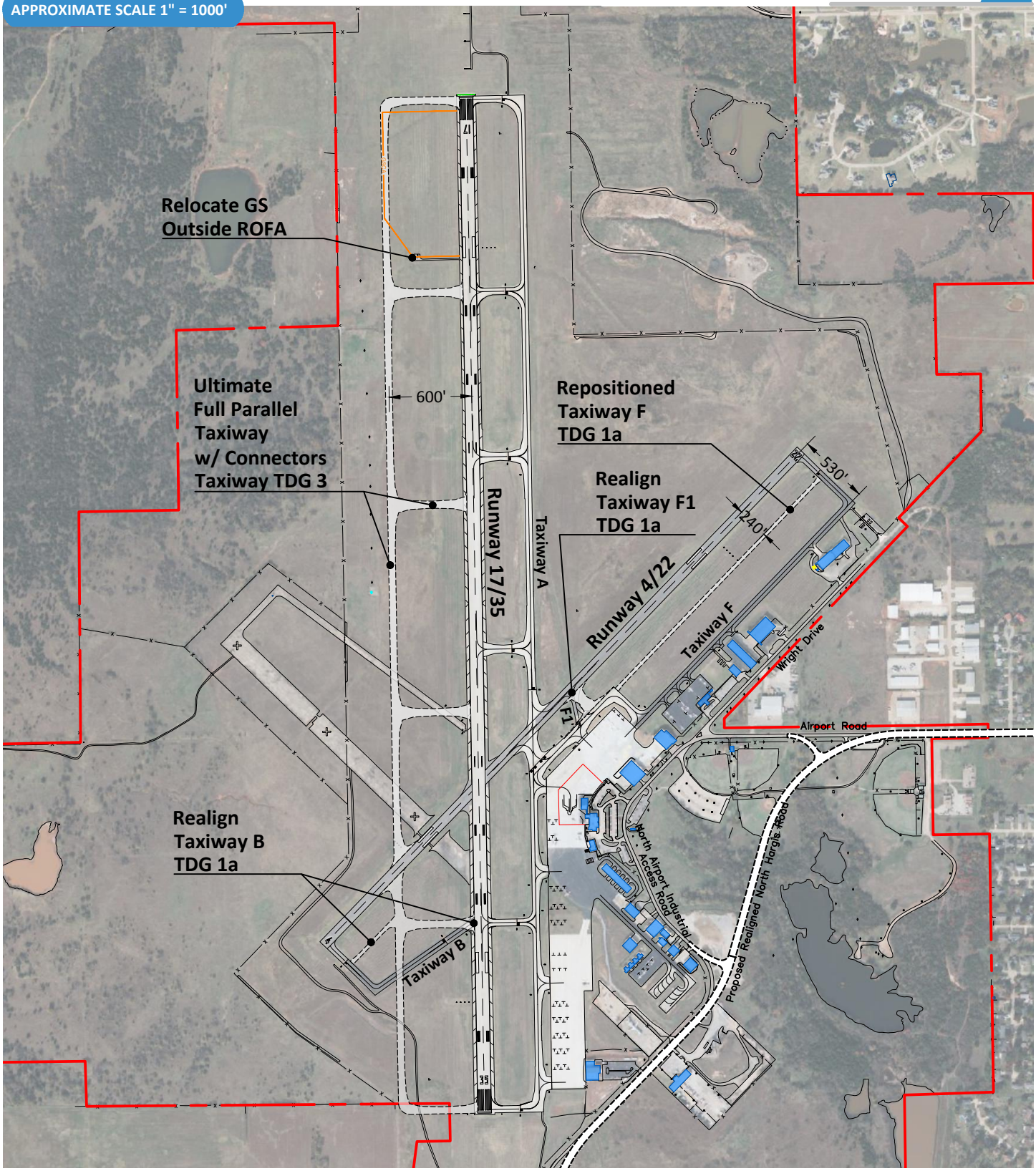


Figure D-4:
Ultimate Taxiway System

LANDSIDE DEVELOPMENT CONCEPTS, ALTERNATIVES, AND RECOMMENDATIONS

With the framework of SWO's ultimate airside development identified, placement of needed landside facilities can now be analyzed. The overall objectives of the landside plan is to provide conceptual development locations for facilities that are conveniently located, accessible to the community, and accommodate the specific requirements of SWO's users.

Passenger Terminal Building

As previously presented in **Chapter B - Forecasts of Aviation Activity** and **Chapter C - Facility Requirements**, programming for the expansion (or replacement) of the existing passenger terminal building at SWO is a critical factor in formulating the Master Plan recommendations.

The most important consideration in making a passenger terminal siting recommendation is the location of existing infrastructure. Locating the passenger terminal improvements where they can be easily accessed by existing utilities (i.e., water, sanitary sewer, electricity, fiber, telecommunications, etc.) is important; however, the real driving influences are:

- Airside access to the existing runway, taxiway, and aircraft parking Terminal Ramp pavement.
- Landside access to the local and regional roadway system.

The existing passenger terminal building area on the east side of SWO has these infrastructure prerequisites, which makes it the logical choice for future passenger terminal improvements.

Siting considerations and other long-term planning and space reservation factors that are considered in the passenger terminal building alternatives evaluation should:

- Accommodate a single-story building consisting of 32,000 square feet.
- Accommodate a minimum of two gates/holdrooms.
- Accommodate a minimum of two airlines.
- Accommodate a minimum of two parking positions for aircraft as large as the Boeing 737-800 (although the ERJ 175 is the critical commercial service aircraft used for the terminal improvement calculations).
- Allow for the development of vehicle parking with an area large enough to accommodate the needed 315 total parking spaces, which includes short-term, long-term, employee, and rental cars.
- Minimize the conflicts between commercial service and GA functions.
- Consider the impacts of the passenger terminal building improvements on existing buildings and infrastructure in the terminal area (e.g., continuation of existing commercial service operations during construction, Group Hangar 1, ARFF Facility, and Fixed Base Operator (FBO) facilities).

- Maximize use of the existing Terminal Ramp pavement, including consideration of providing Passenger Boarding Bridges (PBB) and ensuring the provision of commercial service aircraft parking positions and on-apron aircraft taxilanes.

Although the future passenger terminal building footprint should be reserved at 32,000 square feet with adequate space for PBBs, the passenger terminal building may be phased. The provision of PBBs may also be phased.

Additionally, even though the planning assumptions considered a single-story building, the final decision will be left to the design phase of the passenger terminal architectural project scheduled to begin in the fall of 2022.

Passenger Terminal Area Plan – Concept 1

Concept 1 proposes the development of a new passenger terminal building northeast of the existing facility. The new terminal would be rotated 45 degrees clockwise from its current configuration and provides a northwest-southeast façade orientation that maximizes the utilization of the Terminal Ramp pavement. The existing passenger terminal building would remain operational during the construction of the new facility and would later be modified to serve an FBO/GA terminal facility role. Siting of the new passenger terminal would also require removal of Group Hangar 1 and the removal of the existing ATCT and replacement with a new facility to provide increased separation from the adjacent GA facilities. A new passenger terminal parking area would be constructed southeast of the new terminal building accessible via the new airport loop access roadway system. The airport loop road will connect to West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 1 are presented in **Figure D-5**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Minimizes impacts to existing commercial service operations during construction.
- Maximizes sight-line visibility and prominence of passenger terminal building.
- Maximizes separation between commercial service and GA functions.
- Maximizes utilization of new Terminal Ramp pavement.
- Maximizes redevelopment opportunities of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).
- Potential reduction of construction costs due to site separation from existing passenger terminal building.
- Maximizes phasing options for ATCT removal.

Disadvantages

- Requires removal or relocation of Group Hangar 1.
- Group Hangar 1 removal or relocation impacts existing airport revenue generating tenants.

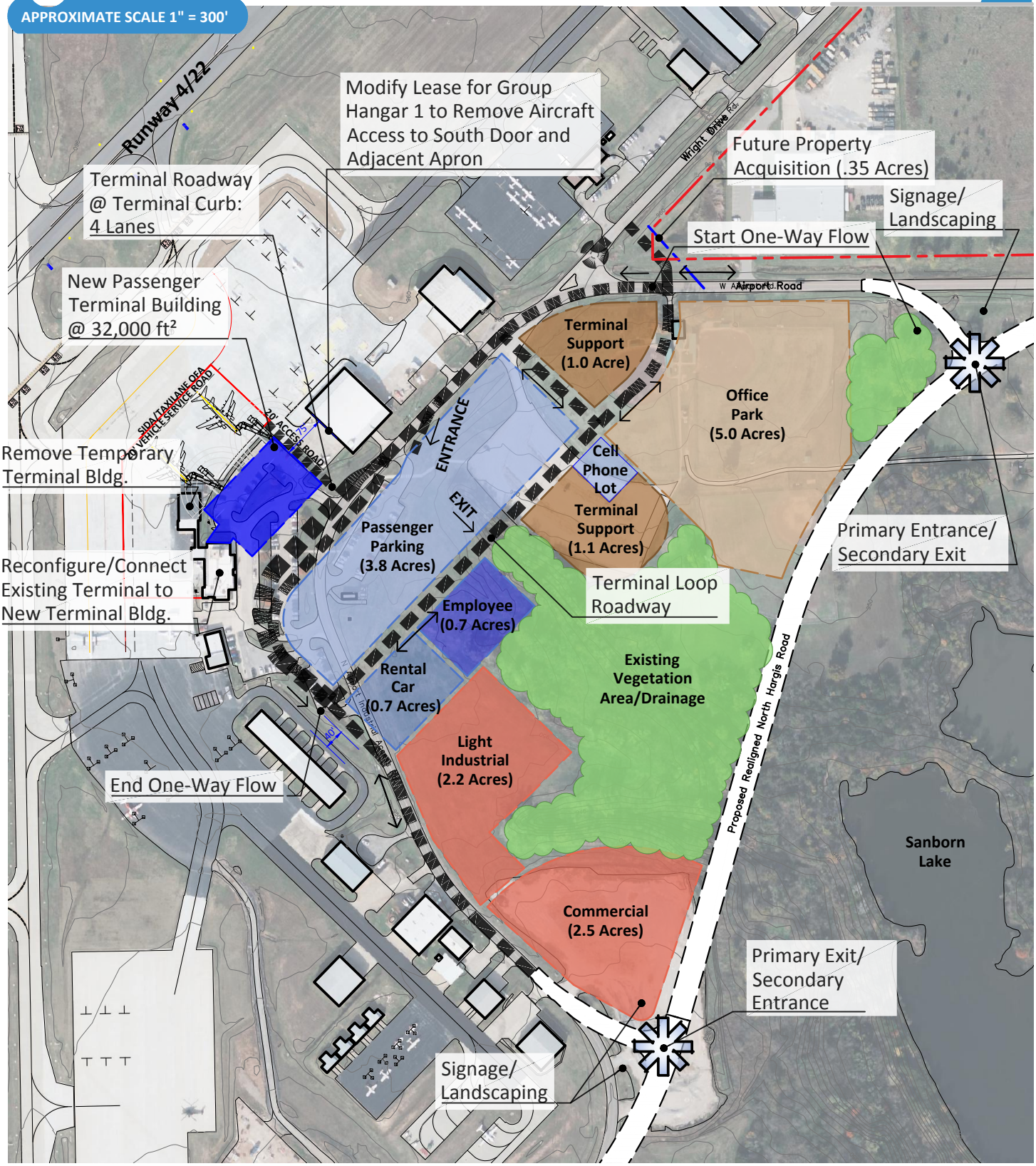


Figure D-6:
Terminal Area Plan - Concept 1A

Passenger Terminal Area Plan – Concept 1A

Like Concept 1, Concept 1A proposes the development of a new passenger terminal building northeast of the existing facility. Similarly, this terminal would also be rotated 45 degrees clockwise from its current configuration, providing a northwest-southeast orientation maximizing the utilization of the Terminal Ramp pavement. The existing passenger terminal building would remain operational during the construction of the new portion of the facility, and later be connected to the new terminal building. The existing terminal building would also be modified to serve as a component of the new passenger terminal as well as an FBO/GA terminal facility. Siting of this passenger terminal concept would also require relocation of the existing modular building of the current terminal and the removal of the existing ATCT. A new passenger terminal parking facility would be constructed southeast of the new terminal and would be accessible via the airport loop access roadway, West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 1A are presented in **Figure D-6**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Potentially minimizes impacts to existing commercial service operations during construction.
- Potentially minimizes construction costs from reusing portions of existing passenger terminal building.
- Improves separation between commercial service and GA functions.
- Improves utilization of new Terminal Ramp pavement.
- Facilitates redevelopment opportunities for portion of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).

Disadvantages

- Introduces construction phasing and operational complexities through integration of and connection to existing passenger terminal building.
- Provides fewer phasing options for ATCT removal compared to Concept 1.
- Improves, but does maximize, separation between commercial service and GA functions.
- Potentially accelerates phasing of ATCT removal.
- Minimizes site-line visibility and prominence of passenger terminal building compared to Concepts 1 and 2.

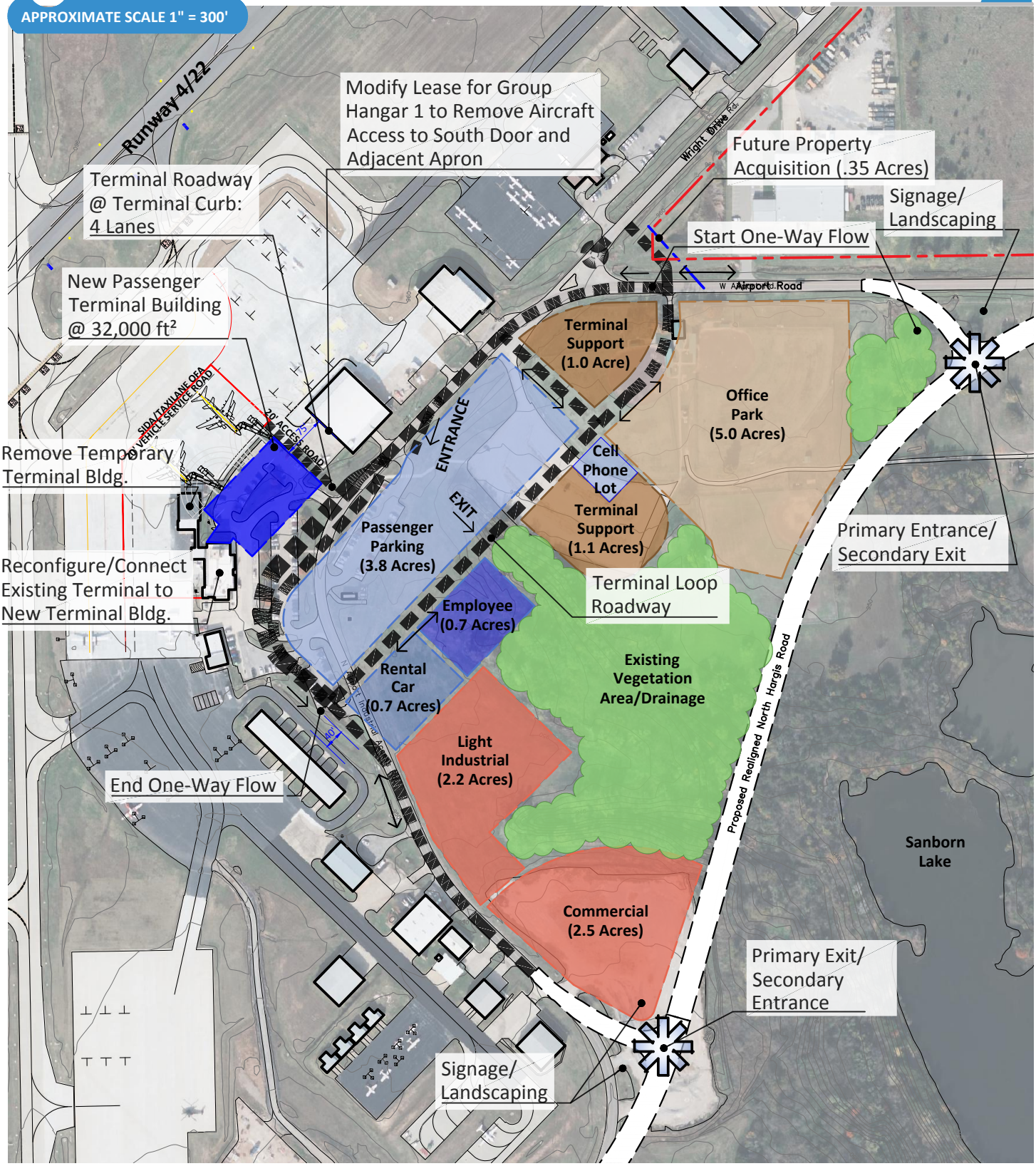


Figure D-6:
Terminal Area Plan - Concept 1A

Passenger Terminal Area Plan – Concept 2

Concept 2 proposes the development of a new passenger terminal building directly east of the existing facility while maintaining the existing east-west facing orientation. The existing passenger terminal building would remain operational during the construction of the new facility and later be removed (including the modular terminal building and ATCT) to accommodate a connection of the terminal apron. Siting of the new passenger terminal building will also require the relocation of the existing ARFF facility. A passenger terminal parking facility serving passenger autos, rental cars, and employees would be constructed east of the new terminal. As with Concepts 1 and 1A, the new parking facilities would be accessible via the airport loop access roadway and its connection to West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 2 are presented in **Figure D-7**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Improves sight-line visibility and prominence of passenger terminal building compared to Concept 1A.
- Improves separation between commercial service and GA functions.
- Improves utilization of new Terminal Ramp pavement.
- Facilitates conversion or redevelopment opportunities for Group Hangar 1 for FBO and/or GA terminal uses.

Disadvantages

- Maximizes impacts to existing commercial service operations during construction.
- Potentially increases construction costs due to minimal site separation from existing passenger terminal building.
- Prohibits potential redevelopment opportunities of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).
- Reduces phasing and scheduling options for ATCT removal.
- Requires relocation of existing Group Hangar 1 tenants for reusing or repurposing as FBO/GA terminal.

Recommendation

Passenger Terminal Area Plan Concept 1 is preferred for many reasons. It minimizes impacts to the existing commercial service operations of the existing passenger terminal building during construction, which potentially reduces construction costs. It creates several varied phasing options for the ATCT removal and maximizes separation of the commercial service functions from the GA functions. When construction of the new passenger terminal building is complete, Concept 1 allows the entire existing terminal building to be repurposed into an FBO/GA terminal. It also maximizes the site-line visibility and prominence of the passenger terminal building.

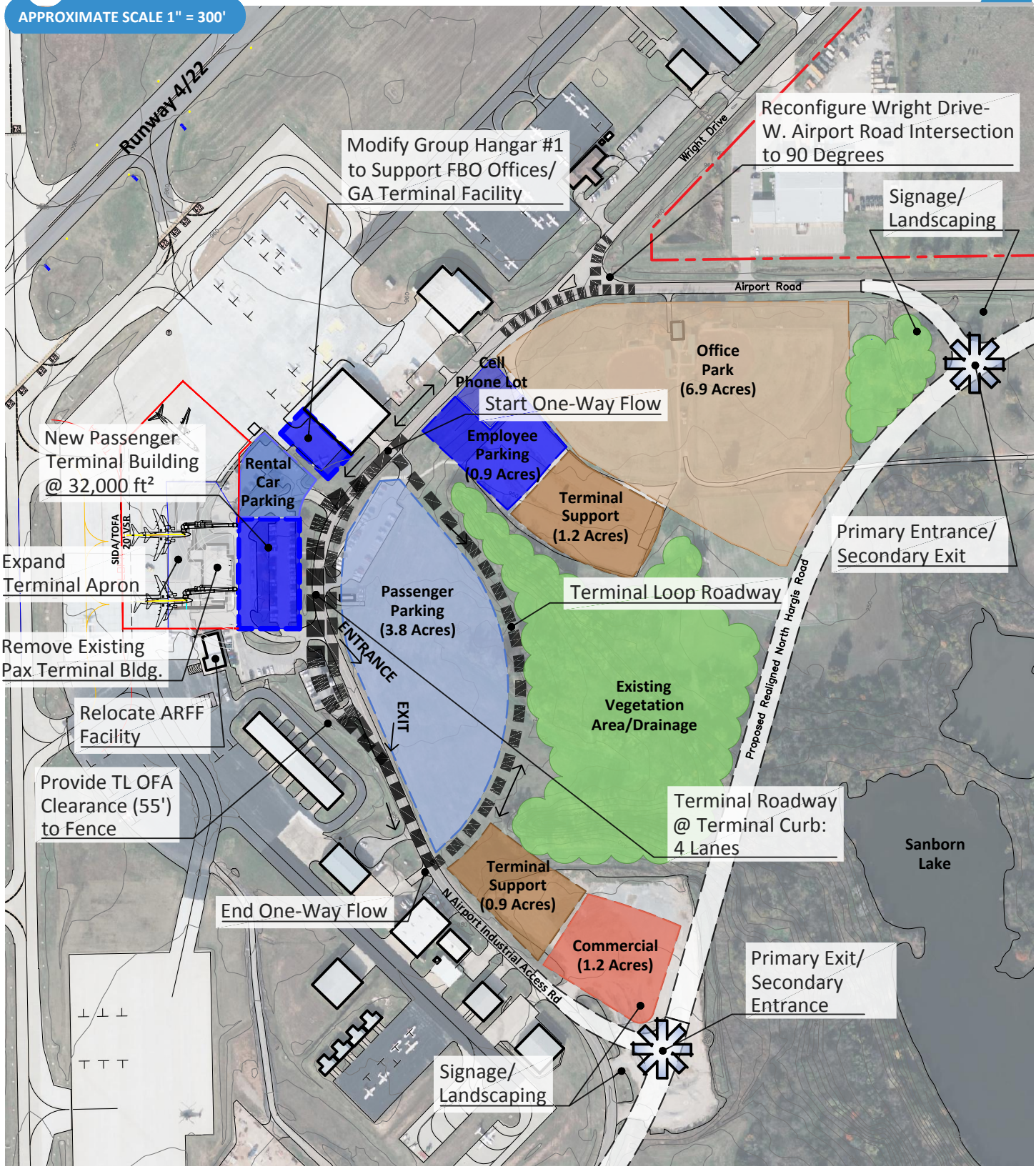


Figure D-7:
Terminal Area Plan - Concept 2

Terminal Area Landside Development

The terminal area landside development analysis focuses on the property directly east of the existing terminal building, between the proposed terminal building improvement options and the proposed realigned North Hargis Road. Landside facility improvements are evaluated on properties not needed to support the passenger terminal functions either directly or indirectly (e.g., vehicle parking facilities and roadway relocation or improvement). This section accounts for on-airport land uses, landside constraints and opportunities, and any physical and environmental constraints. An emphasis will be placed on potential revenue generation, existing and planned infrastructure, and vehicle access.

The alternatives reflect development on all appropriate developable sites. The alternatives all include similar increases in impervious surface, and the associated environmental impacts of the landside alternatives are likely to be very similar. The existing vegetation and drainage area, located roughly in the middle of the development site, remains largely intact and consistent within each development concept. The topography within this area makes development difficult and cost prohibitive. Retaining native vegetation, to the extent possible, benefits the natural environment and minimizes runoff and drainage into Sanborn Lake and other downstream detention facilities. Retention of the existing trees at the primary entrance/secondary exit provides an attractive backdrop for the proposed entrance monumentation signage.

Each passenger terminal building alternative previously presented, Concepts 1, 1A, and 2, has two landside development concepts prepared and presented here.

Terminal Area Landside Alternative – Concept 1-01

Terminal Area Landside Alternative - Concept 1-01, associated with Passenger Terminal Area Plan – Concept 1, proposes the reservation of space for future terminal parking expansion at the southwest end of the passenger parking lot. In the northeast area of Concept 1-01, multi-story office buildings providing a total of 100,000 square feet of space and the required parking are located just beyond the primary entrance/ secondary exit of the terminal area. The development of office buildings would provide a professional, welcoming experience for airport visitors.

In the south portion of the development area just beyond the terminal parking expansion reserve, a 17,000-square foot light industrial facility is proposed. Additionally, a multi-unit, 25,000-square foot commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. These uses can generate revenue for SWO while enhancing the overall visitor experience and surrounding community amenities.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1-01 are presented in **Figure D-8**.

N

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-8:
Terminal Area Landside Development Alternative - Concept 1-01

Terminal Area Landside Alternative – Concept 1-02

Terminal Area Landside Alternative - Concept 1-02, likewise associated with Passenger Terminal Area Plan – Concept 1, also proposes the reservation of space for future terminal parking expansion at the southwest end of the passenger parking lot. The multi-story office building development for this concept, providing approximately 80,000 square feet of space, is situated farther to the southwest when compared to Concept 1-01, adjacent the retained native vegetation and drainage area. Parking lots for the office buildings are located next to the buildings, which allows for a more attractive open landscape of native trees and prairie vegetation at the primary entrance/secondary exit. This also maximizes site lines to the proposed passenger terminal building as airport visitors enter and approach the terminal area.

In the south portion of the development area just beyond the terminal parking expansion reserve, a light industrial facility is proposed similar to Concept 1-01. However, this facility is slightly reoriented, and the parking lots are sited differently on the parcel. A smaller multi-unit commercial facility, that is also reoriented, and parking lots redesigned for the site are located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road.

Concept 1-02 also proposes the cell phone lot be located east of the proposed realigned North Hargis Road, near the primary entrance/secondary exit. This could be a shared use parking lot that also serves Sanborn Lake Park. Park improvements such as a shelter could be accommodated by this parking lot while also providing parking for airport visitors waiting to pick up arriving passengers.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1-02 are presented in **Figure D-9**.

N

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

SWO Stillwater REGIONAL AIRPORT

Figure D-9:
Terminal Area Landside Development Alternative - Concept 1-02

Terminal Area Landside Alternative – Concept 1A-01

Terminal Area Landside Alternative - Concept 1A-01, associated with Passenger Terminal Area Plan – Concept 1A, proposes the reservation of space for terminal parking expansion at the southeastern end of the passenger parking lot. A cell phone lot is also proposed in this area. The multi-story office building development for this concept is located just beyond the primary entrance/secondary exit of the terminal area. Similar to Concept 1-01, the development of approximately 100,000 square feet of office space would provide a professional and welcoming experience for airport visitors. Parking lots for the office buildings are located next to the buildings with a slightly different configuration compared to other concepts.

Two 20,000-square foot light industrial buildings are located on the west side of the development area, configured with loading access between the buildings. Like the previous concepts, multi-unit commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. However, Concept 1A-01 provides a unique orientation and configuration compared to the previous concepts. Subdivision of the commercial space could be provided to accommodate various potential tenants.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1A-01 are presented in **Figure D-10**.

Terminal Area Landside Alternative – Concept 1A-02

Terminal Area Landside Alternative - Concept 1A-02, also associated with Passenger Terminal Area Plan – Concept 1A, likewise proposes the reservation of space for terminal parking expansion at the southeast end of the passenger parking lot. This concept proposes two multi-story office buildings providing approximately 80,000 square feet of space, which are located just beyond the primary entrance/secondary exit of the terminal area. The parking lots designed for the office buildings are arranged in a quarter-circle west of the buildings, somewhat shielded from view of airport visitors as they approach the terminal area.

Two smaller light industrial buildings are located on the west side of the development area along the primary exit road. At the southwest corner of the site, near the primary exit/secondary entrance, there are commercial parcels that could be subdivided as needed to accommodate prospective tenants. Parking is located behind the buildings to provide architectural character along the proposed realigned North Hargis Road.

Across the proposed realigned North Hargis Road, a shared use parking lot is proposed that could serve as both the cell phone lot and as a trailhead for the nearby Sanborn Lake Park trails.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1A-02 are presented in **Figure D-11**.

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-10:
Terminal Area Landside Development
Alternative - Concept 1A-01

N

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-11:
Terminal Area Landside Development
Alternative - Concept 1A-02

Terminal Area Landside Alternative – Concept 2-01

Terminal Area Landside Alternative - Concept 2-01, associated with Passenger Terminal Area Plan – Concept 2, allocates the reservation of space for future terminal parking expansion at the southeastern end of the proposed passenger parking lot. With the proposed passenger terminal building located on the west side of the site, additional landside development area is available in the northeastern corner. Therefore, Concept 2-01 proposes three multi-story office buildings providing a total of 100,000 square feet of space located just beyond the primary entrance/secondary exit of the terminal area. The required parking is shown between the buildings, somewhat shielding it from airport visitors as they approach the terminal area.

Like the preceding concepts, commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. Concept 2-01 shows a convenience store occupying this site, which would benefit the surrounding community, provide revenue to SWO, and provide fuel for drivers returning their rental cars.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 2-01 are presented in **Figure D-12**.

Terminal Area Landside Alternative – Concept 2-02

Terminal Area Landside Alternative - Concept 2-02, likewise associated with Passenger Terminal Area Plan – Concept 2, also proposes the reservation of space for future terminal parking expansion at the southeastern end of the proposed passenger parking lot. This concept provides for commercial development in the northeast corner of the site along the primary entrance road. Providing approximately 16,000 square feet of space, it may be subdivided as needed to accommodate prospective tenants. Southwest of the commercial development, adjacent to the retained native vegetation and drainage area, multi-story office building development is shown providing approximately 80,000 square feet of space. Parking lots for the office buildings are located to the north, which provides separation from the commercial land uses and maximizes the sight lines to the proposed passenger terminal building.

In the southern portion of the site, additional office development is proposed. This three-story building provides an additional 60,000 square feet of space, and ample parking is provided between the building and the primary exit/secondary entrance road. The preserved native vegetation and drainage area is used as an amenity area for the office park development. The office buildings are positioned next to the existing trees to help surround the office users with nature. Trails through the existing vegetation area could connect office users to each building as well as to the public trails at Sanborn Lake Park.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 2-02 are presented in **Figure D-13**.

Source: The Olsson Studio.

Figure D-12:
Terminal Area Landside Development Alternative - Concept 2-01

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-13:
Terminal Area Landside Development Alternative - Concept 2-02

Recommendation

The six concepts presented in the preceding section represent various landside development schemes for the terminal area. No concept is selected as the preferred development at this time. SWO can use the concepts as a marketing tool for potential developers as demand occurs and financial realties are more defined.

ATCT

As presented in the previous chapter, the existing ATCT is not sited to provide adequate line of sight (LOS) angle of incidence to Runway 17 and unobstructed views to all aircraft movement areas. Additionally, the location atop the terminal building does not meet sufficient safety guidelines of separation from non-secure vehicles and persons, is not structurally sustainable, and is not compliant with the Americans with Disabilities Act (ADA). The evaluation of four new ATCT alternative sites is presented below.

Alternative Location One

Alternative One is located approximately 1,285 feet west of the Runway 17/35 centerline and 3,625 feet south of Runway 17. With a primary view to the east, this location affords excellent visibility to all approach areas and runway ends. Based on an eye height elevation of 1,054 feet, which is approximately 95 feet above ground level (AGL), a LOS angle of incidence of 0.80 degrees is achieved to Runway 17. As presented on **Figure D-14**, all aircraft movement areas are afforded unobstructed views. Total tower height would be approximately 120 feet AGL with an approximate top elevation of 1,079 feet[1]. This alternative is below all FAR Part 77 obstruction surfaces.

Alternative Location Two

Alternative Two is located approximately 1,142 feet east of the Runway 17/35 centerline and 972 feet northwest of the Runway 4/22 centerline. With a primary view to the west, this location affords acceptable visibility to the approach areas and Runways 17, 35, and 4. The Runway 22 approach area would be behind the primary viewing direction toward Runway 17/35 but is not expected to create controller viewing issues. Based on an eye height elevation of 1,039 feet, which is approximately 60 feet AGL, a LOS angle of incidence of 0.81 degrees is achieved to Runway 17. As presented on **Figure D-15**, most of the primary aircraft movement areas provide unobstructed views except for the Southeast GA Taxilane, which is virtually 100 percent obscured from controller views. Additionally, portions of the south end of the existing Terminal Ramp and the north end of the University Flight Center Ramp South would also be obscured. However, with the expected removal of the portable building housing the TSA security screening checkpoint and secure holding room, and the existing ATCT atop the existing terminal building, some, but not all, of the obstruction areas would be alleviated. Total tower height would be approximately 85 feet AGL with an approximate top elevation of 1,064 feet. This alternative is below all FAR Part 77 obstruction surfaces.

[1] All tower heights estimated at 25 feet above controller eye elevation.

Alternative Location Three

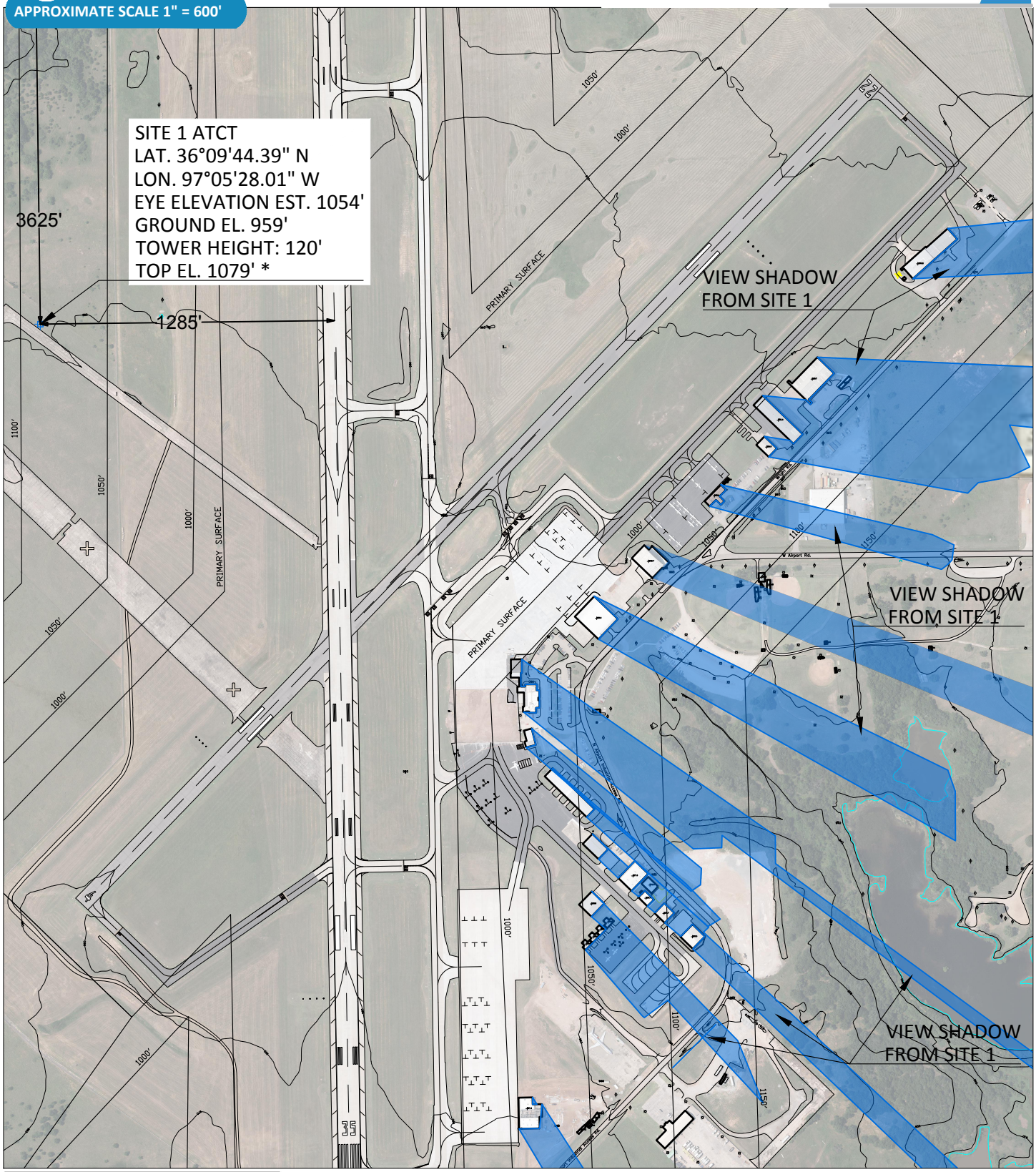
Alternative Three is located approximately 1,543 feet west of the Runway 17/35 centerline and 2,520 feet north of Runway 22. With a primary view to the east, this location affords excellent visibility to all approach areas and runway ends. Based on an eye height elevation of 1,072 feet, which is approximately 120 feet AGL, a LOS angle of incidence of 0.81 degrees is achieved to Runway 17. As presented on **Figure D-16**, all primary aircraft movement areas provide unobstructed views except for a portion of the southern end of the Southeast GA Taxilane. Total tower height would be approximately 145 feet AGL with an approximate top elevation of 1,097 feet. This alternative is below all FAR Part 77 obstruction surfaces.

Alternative Location Four

Alternative Four is located approximately 1,618 feet southwest of Runway 22 and 746 feet southeast of the Runway 4/22 centerline. With a primary view to the west, this location affords adequate visibility to the approach areas and Runways 17, 35, and 4. The Runway 22 approach area would be slightly behind the primary viewing direction toward Runway 17/35 but is not expected to create controller viewing issues. Based on an eye height elevation of 1,065 feet, which is approximately 100 feet AGL, a LOS angle of incidence of 0.80 degrees is achieved to Runway 17. As presented on **Figure D-17**, most primary aircraft movement areas provide unobstructed views except for parts of Taxiways A and B and the southern portion of the Terminal Ramp. With the expected removal of the portable building housing, the TSA security screening checkpoint, secure holding room, and the existing ATCT atop the terminal building, many of the obstructions would be alleviated. However, the existing terminal building would still obscure parts of the Terminal Ramp from the controller's eyesight. Total tower height would be approximately 125 feet AGL with an approximate top elevation of 1,090 feet. A taller tower would alleviate the obstructed views to the Terminal Ramp, but this alternative is above the existing FAR Part 77 obstruction surfaces; additional height will increase the amount of penetration.

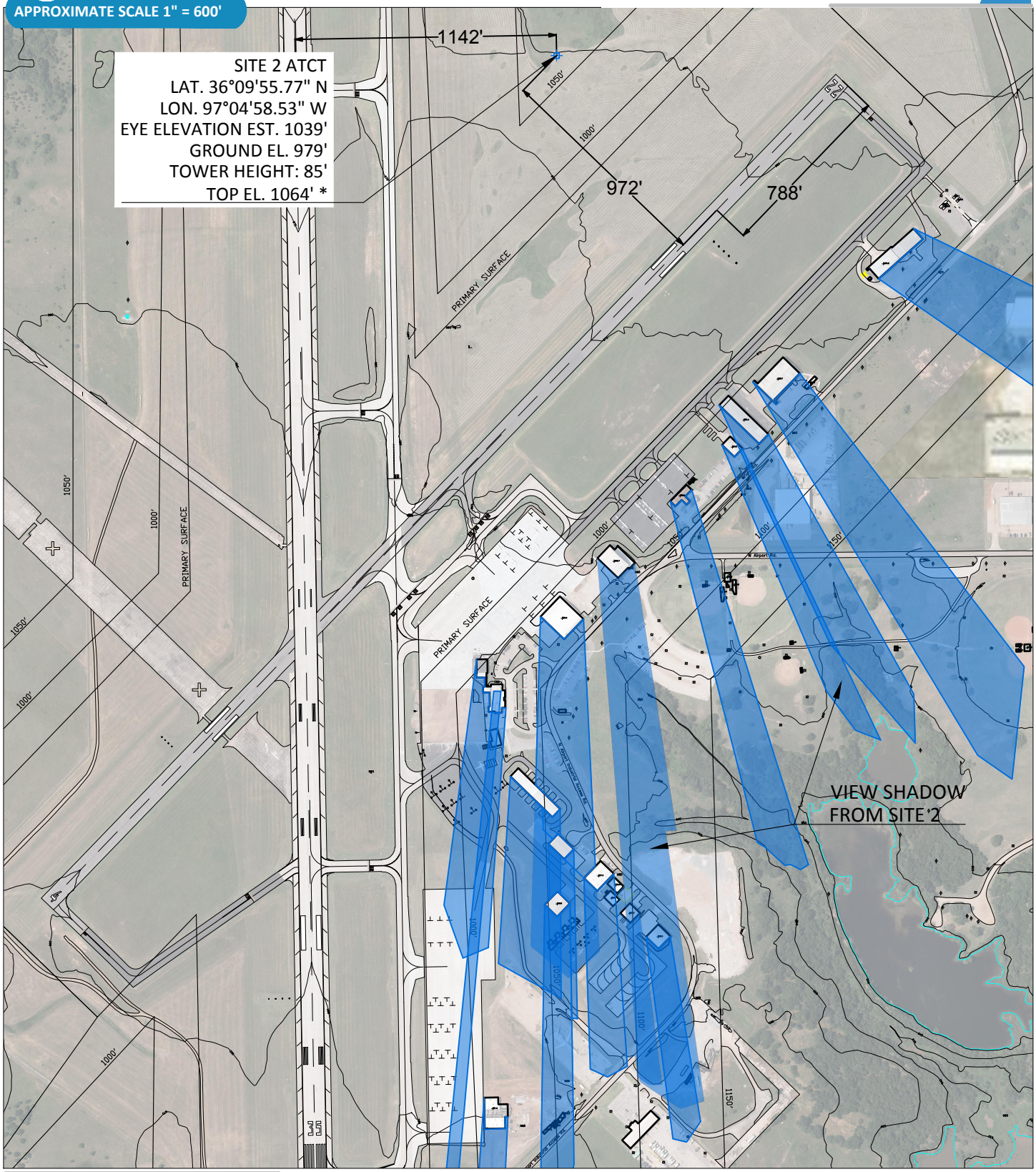
Recommendation

Alternative Location One is preferred because of its more central location of Runway 17/35, lower height, and better visibility to all approach areas, runway ends, and aircraft movement areas.



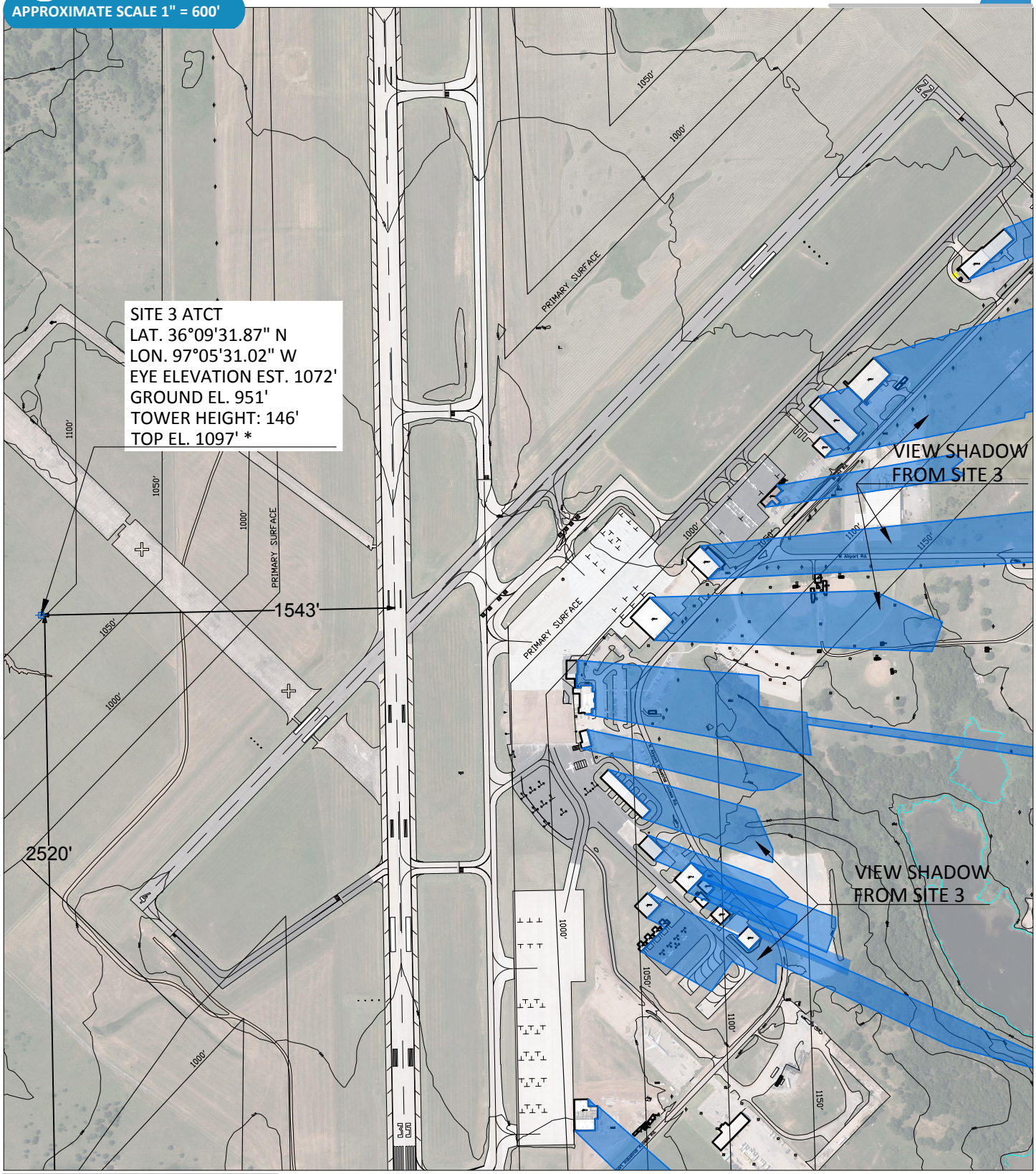
* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-14:
ATCT Alternative Location One Shadow Study



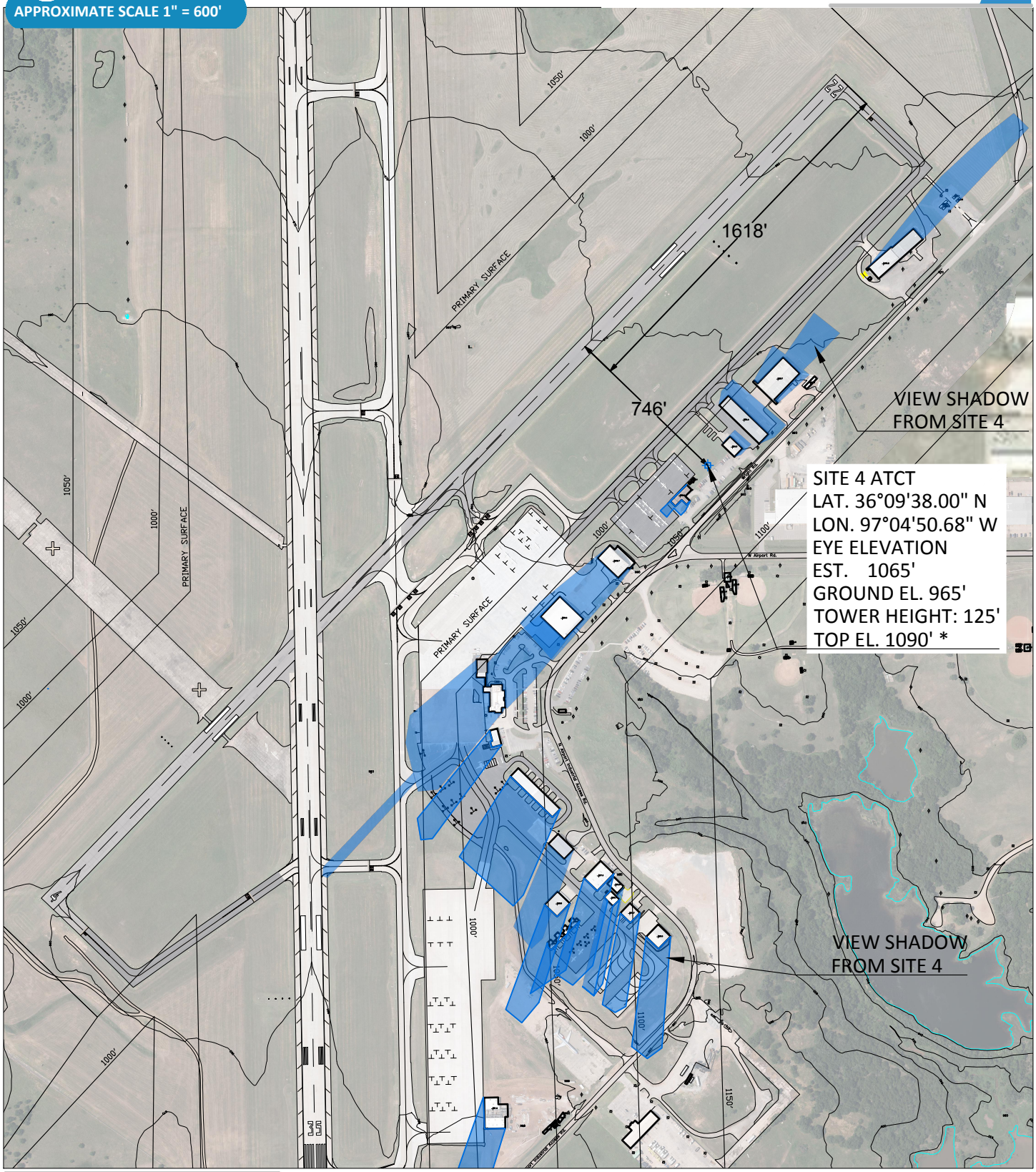
* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-15:
ATCT Alternative Location Two Shadow Study



* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-16:
ATCT Alternative Location Three Shadow Study



* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-17:
ATCT Alternative Location Four Shadow Study

ARFF Facility

As presented in the previous chapter, the existing ARFF Facility is not adequately sized to store both ARFF vehicles indoors, nor does it provide sufficient area for equipment and material storage. There is also generally insufficient space for ARFF related maintenance activities. With the redevelopment of the terminal area and the proposed reuse of the existing ARFF Facility for additional FBO facilities, alternative locations for a future ARFF facility meeting the siting requirements provided in FAA AC 150/5210-15A should be evaluated and a preferred site selected. Siting factors for an ARFF Facility are summarized below:

- One vehicle must be able to respond to the midpoint of the farthest runway serving air carrier aircraft within three minutes from the time an alarm sounds.
- Any other vehicles must respond within four minutes from the time an alarm sounds to the same point.
- Sites should provide immediate, unimpeded, and straight access to the airfield network with a minimum of turns.
- Direct access to the terminal apron that minimizes crossing of active runways.
- Provide maximum surveillance of the airfield.
- Minimize interference or obstruction from other airport uses such as fuel farms, access roads, and aircraft taxiing or parking areas.

There are four ARFF facility alternative locations presented in **Figure D-18** and the evaluation of each is outlined below.

Alternative Location One

This location is located near the north end of Taxiway A. Direct access to the airfield system can be provided via a connection to the north end of Taxiway A. Response times to the midpoint of Runway 17/35 within the prescribed period should be met from this location. Direct access to the Terminal Ramp is possible without crossing Runway 17/35. No additional airport uses are currently located at this location. This location does not maximize airfield surveillance when compared to Alternative Location Two. Joint use of the ARFF Facility and a City of Stillwater fire station is possible in this location, should SWO and the city choose to enter into a joint use agreement. Landside access can be provided through a road connection to East 580 Road.

Alternative Location Two

This location is located on the west side of SWO, west of Runway 17/35. Utilizing the access road and utilities installed for the preferred ATCT site would reduce the initial installation costs for this location. Airfield surveillance is maximized from this location, as are vehicle response times to the midpoint of Runway 17/35. However, Runway 17/35 would have to be crossed to access the Terminal Ramp. Airside access is less direct for this location compared to the other three alternatives, so an initial paved access road would need to be provided to Runway 17/35. This location also affords the opportunity for a joint ARFF Facility and City of Stillwater fire station.

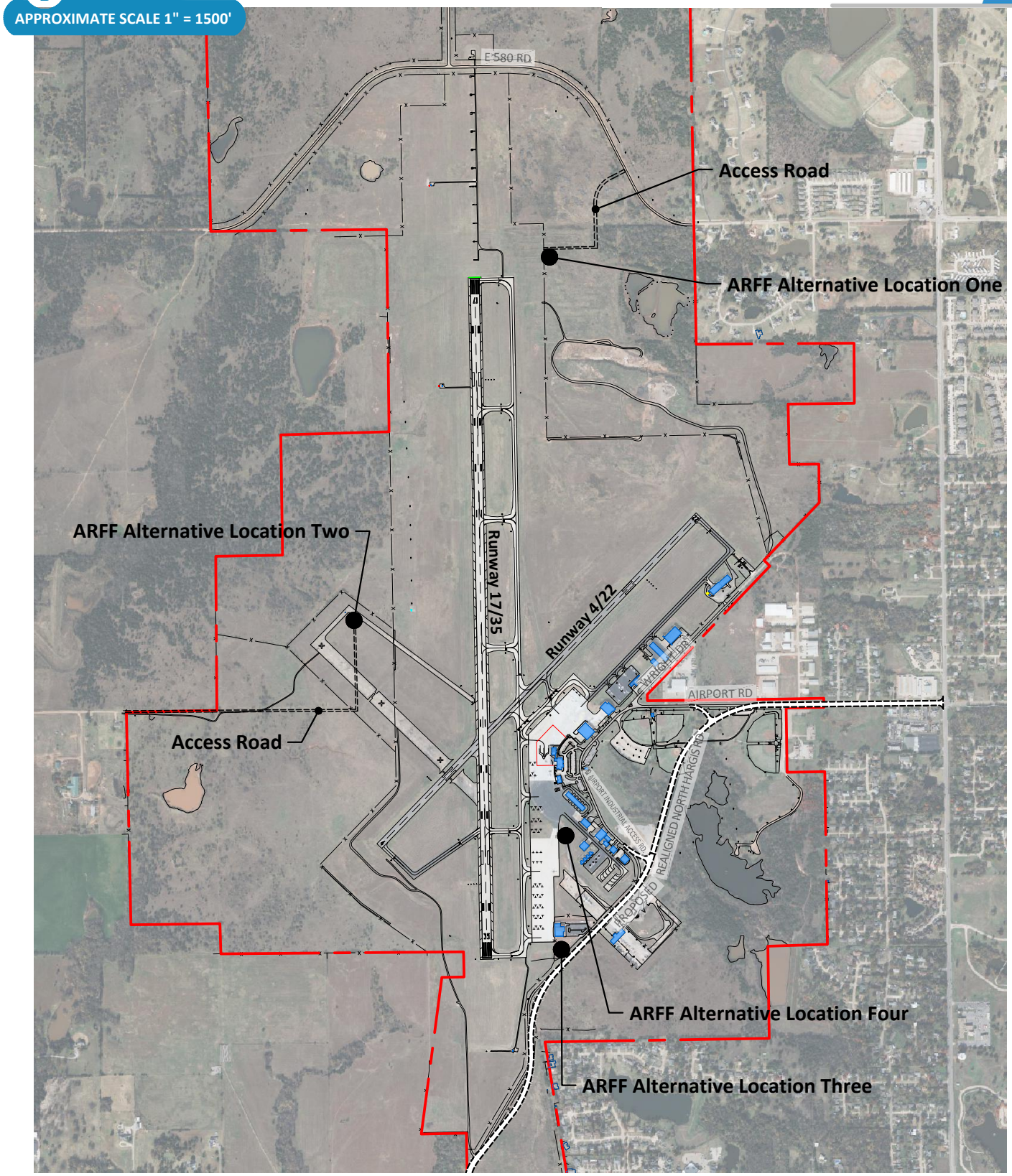


Figure D-18:
Airport Rescue and Fire Fighting Building Site Alternatives

Alternative Location Three

This location is at the south end of Taxiway A, south of the new OSU Flight Center. Currently, this site is the storm water detention facility for the OSU Flight Center facilities. Direct existing airside access is provided by Taxiway A1, thus response times to the midpoint of Runway 17/35 within the prescribed period should be met from this location. Direct access to the Terminal Ramp is provided without crossing Runway 17/35. The University Flight Center Ramp South is near this location, but the tie-down areas are north of Taxiway A1 and should not interfere with the ARFF vehicles responding to an emergency. Like Alternative Location One, this location does not maximize airfield surveillance when compared to Alternative Locations Two and Four. This location also affords the opportunity for a joint ARFF facility and City of Stillwater fire station through landside access directly via North Hargis Road.

Alternative Location Four

This location is at the south end of the Terminal Ramp, near the intersection of the Southeast GA Taxilane and the University Flight Center Ramp South. **Figure D-21**, which follows the South GA Area Alternative One analysis, provides more details about this site. It is centrally located, provides direct airside access via the Terminal Ramp, and response times to the midpoint of Runway 17/35 within the prescribed period would be met from this location. Aircraft tie-downs associated with both the University Flight Center Ramp South and the Terminal Ramp are close to this location, but these facilities should not interfere with ARFF vehicles responding to an emergency. Like Alternative Location Two, this location maximizes airfield surveillance when compared to Alternative Locations One and Three. Vehicle access can be provided by a new access route serving the future GA development in the area, but its location does not afford the opportunity for a joint ARFF Facility and City of Stillwater fire station.

Recommendation

Based on a central east side location providing excellent response times to the airfield and Terminal Ramp, Alternative Location Four is the preferred ARFF Facility location.

Snow Removal Equipment (SRE) and Airport Maintenance Facility

The previous chapter indicated that an ultimate SRE and Airport Maintenance Facility building totaling approximately 15,500 square feet is considered appropriate for SWO. Thus, alternative locations meeting siting factors outlined in FAA AC 150/5220-18A should be evaluated and a preferred site selected. Siting factors include:

- No interference with fire lanes used by the ARFF services and aircraft taxiing operations.
- Direct access to taxiways and runways without using airport perimeter roads to reduce wear and tear on equipment and prevent slow response times.
- Emphasis on the mitigation of runway incursions by eliminating the need for employee, private, and service vehicles to cross runways or taxiways to access the facility.

- Consideration of the effect on other existing facilities and avoidance of existing and future revenue-producing areas such as aprons and hangar areas.

There are six SRE and Airport Maintenance Facility alternative locations presented in **Figure D-19**, and the evaluation of each is outlined below.

Alternative Location One

This location is at the northeast end of Taxiway F, northeast of the existing fuel storage facility. Direct airside access is provided to Taxiway F and landside access through a connection to Wright Drive. Ample space is available for outdoor material storage and future expansion needs. This site is not anticipated to be developed for revenue-producing facilities because of its proximity to the fuel storage facility and distance from the airside facilities.

Alternative Location Two

This site is located near the north end of Taxiway A. If developed in conjunction with an ARFF facility, the site development costs could be reduced by combining utilities and vehicle access across two facilities. Near-direct airside access to Taxiway A is available and landside access can be provided by a road connection to East 580 Road.

Alternative Location Three

Located on the west side of SWO, this site can be developed in conjunction with the preferred future ATCT site and ARFF facility, thus benefitting from the utilities provided when the ATCT is constructed. Airside access is less direct than the other alternative locations, requiring an initial paved access road to Runway 17/35. Landside access can make use of the vehicle road provided for the ATCT.

Alternative Location Four

This location is at the south end of Taxiway A, south of the new OSU Flight Center. Currently, this site is the storm water detention facility for the OSU Flight Center facilities. Excellent direct airside access is provided via Taxiway A1 to Taxiway A, and landside access can be provided directly to North Hargis Road. The site's size prevents both an ARFF and SRE and Airport Maintenance Facility from being collocated in the same area, and it would only marginally accommodate a 15,500-square foot facility.

Alternative Location Five

This location is an expansion of existing facilities consisting of the current Airport Operations and Maintenance large group hangar, the plane wash bay, and the Administration Building. Constructing a facility that makes use of existing structures and reuse of space, to the extent practical provides a fiscally responsible alternative to a new stand-alone facility. With the proposed removal of Group Hangar 1 for terminal building development, a large group hangar is of increased need and demand. Continued Airport use of the existing Operation and Maintenance large group hangar prevents lease and associated revenue from this large group hangar.

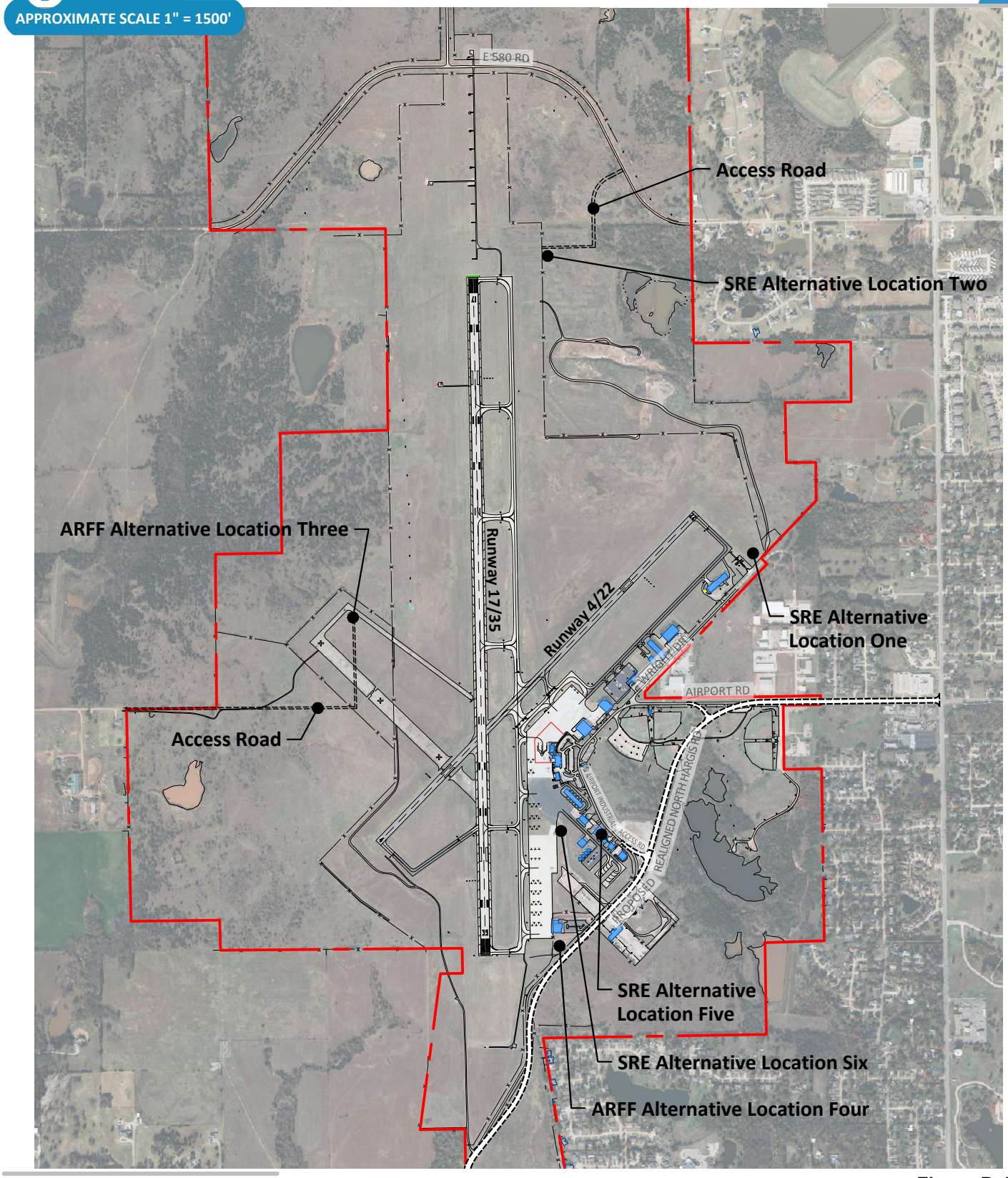


Figure D-19:
Snow Removal Equipment and Airport Maintenance Building Site Alternatives

Alternative Location Six

This location is co-located with the ARFF Alternative Location Four presented in the previous section, near the intersection of the Southeast GA Taxilane and the University Center Ramp South. Excellent direct airside access is provided via the Terminal Ramp to Taxiway A and is centrally located. Landside access can be provided by a new access route serving the future GA development in the area. Utilities are also readily available and accessible.

Recommendation

With the aforementioned recommendation of ARFF Alternative Location Four, the continuation of a centralized location for SRE, Airport Maintenance, and ARFF is most responsible. Therefore, Alternative Location Six, co-locating the SRE facility with the future ARFF location, is the preferred site.

General Aviation Facilities

As has been established in previous chapters, general aviation (GA) is a very diverse category of aviation uses considering aircraft size, technology and sophistication, mission of the organization operating the aircraft, and both airside and landside access requirements. GA as a category includes private aviation related to recreational flying, flight training, business transportation and storage, corporate aviation related to employee transportation and aircraft storage, and Fixed Base Operators (FBOs) or Specialized Aviation Service Operators (SASOs) providing aviation services. FBOs and SASOs may provide one or many services generally consisting of aircraft maintenance, aircraft charter and rental, aircraft storage, fuel sales, and aircraft manufacturing and/or refurbishment.

The diverse aviation use categories mentioned above will impact the appropriateness of a given location for specific GA uses. However, as in most cases, any given site can accommodate a variety of GA uses. The recommendations provided here attempt to identify the best types of facilities for a specific developable site. Ultimately, SWO must evaluate specific development proposals and make land use determinations based on the proposed site use efficiencies, striving to maximize the utilization of the available property in the most efficient and effective manner (i.e., the highest and best use of each property parcel), and for SWO's best business and financial practices.

With the configuration of the terminal building layout decided, alterative GA facilities can be considered and evaluated. SWO GA landside development is divided by the passenger terminal building into two separate areas: the northeast area and the south area. Conceptual level planning layouts are provided for these two areas in the following sections.

Northeast Area

The proposed GA layout in the northeast area of SWO assumes that Taxiway F will be relocated to the northwest by approximately 290 feet. When relocated, additional aviation development area is made available. However, because of the northeast area's proximity to Runway 4/22, the allowable height of any structures will be limited, so aircraft apron parking is the anticipated primary aviation use between existing

Taxiway F and the relocated Taxiway F, similar to the existing Hangar 1 Ramp. Additionally, as the timing of the taxiway relocation is unknown, most initial and intermediate period development will occur southeast of the existing Taxiway F.

A replacement location for the existing Group Hangar 1 to be built new is proposed at the northeastern edge of the old University Flight Center Ramp North. Relocation of this hangar is not feasible nor planned due to poor hangar condition, age, wear, and the prior master plan recommendation for removal or demolition. Ample space is available for a 10,000-square foot hangar and an adjoining 5,000-square foot office space. The vacated Flight Center building is proposed for demolition, providing development space for additional hangars or support facilities. Sufficient space for two electric aircraft charging stations is recommended at the south end of the apron.

Between the OSU Maintenance Hangar and the Rock Hangar, space is reserved for additional box hangars or T-hangars. An off-season storage building is currently proposed for construction between the fuel storage facility and the Rock Hangar. **Figure D-20** provides the layout of proposed GA facilities in this area.

South Area

Both South Area alternatives assume continued development of the OSU Flight Center facilities adjacent to the University Flight Center Ramp South. Minor variations to the existing layout are proposed. Additionally, development at the southeast end of the Southeast GA Taxilane reflects current plans for additional T-hangars, box hangars, and corporate hangars. A proposed airport road provides vehicle access from North Hargis Road along the northeast side of the MD-80 site.

South Area GA Alternative One

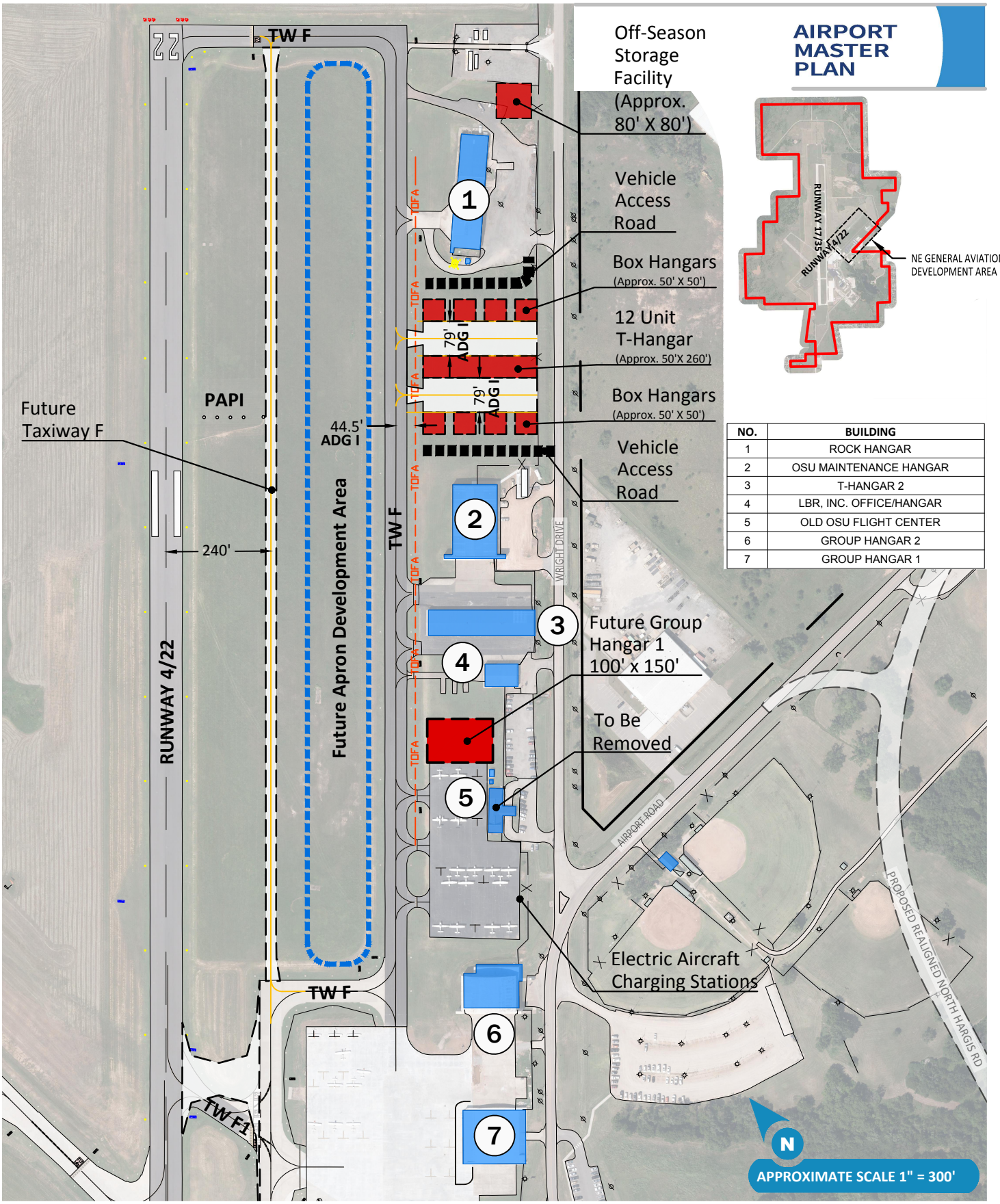
This alternative retains the two proposed OSU Maintenance Hangars north of the existing flight center. Aircraft parking apron is provided along the north ends of the hangars. The T-hangar layout remains unchanged.

Two corporate hangars are proposed north of the OSU T-hangars on the east edge of the University Flight Center Ramp South. Two additional corporate hangars are provided southwest of the Southeast GA Taxilane adjacent to the Simmons Hangar. An ARFF facility is proposed at the junction of the University Flight Center Ramp South and the Southeast GA Taxilane, as described above. **Figure D-21** shows the proposed South Area GA Development – Alternative One.

South Area GA Alternative Two

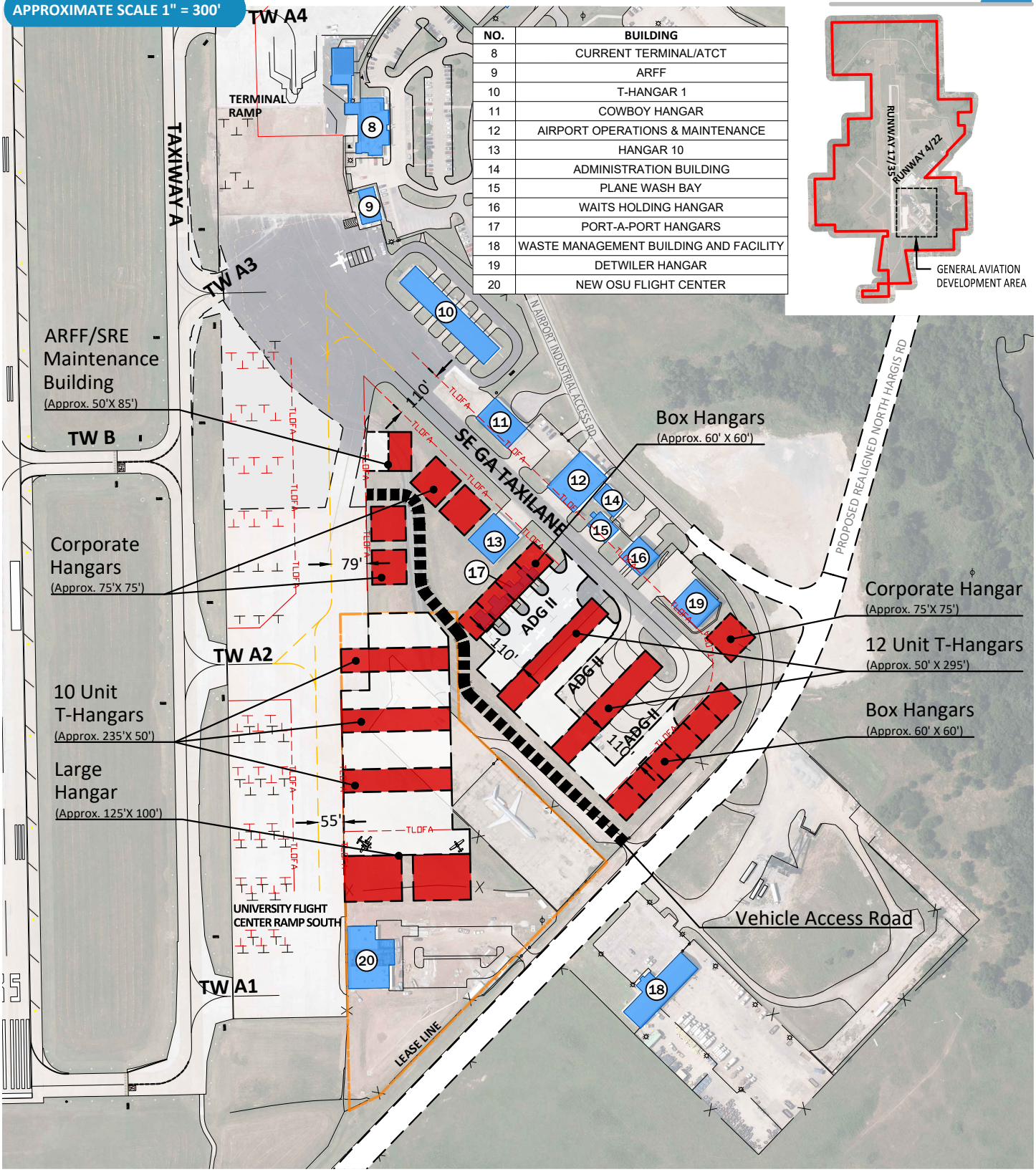
This alternative slightly modifies the current OSU Flight Center plans by proposing one maintenance hangar directly north of the existing flight center facility instead of two. Additional aircraft parking apron is proposed between the east edge of the University Flight Center Ramp South and the proposed Maintenance Hangar. The T-hangar layout remains unchanged.

Like Alternative One, this alternative proposes two corporate hangars north of the OSU T-hangars on the east edge of the University Flight Center Ramp South. One 10-unit T-hangar is proposed at the northwestern end



NO.	BUILDING
1	ROCK HANGAR
2	OSU MAINTENANCE HANGAR
3	T-HANGAR 2
4	LBR, INC. OFFICE/HANGAR
5	OLD OSU FLIGHT CENTER
6	GROUP HANGAR 2
7	GROUP HANGAR 1

Figure D-20:
Northeast Area General Aviation Proposed Development



NO.	BUILDING
8	CURRENT TERMINAL/ATCT
9	ARFF
10	T-HANGAR 1
11	COWBOY HANGAR
12	AIRPORT OPERATIONS & MAINTENANCE
13	HANGAR 10
14	ADMINISTRATION BUILDING
15	PLANE WASH BAY
16	WAITS HOLDING HANGAR
17	PORT-A-PORT HANGARS
18	WASTE MANAGEMENT BUILDING AND FACILITY
19	DETWILER HANGAR
20	NEW OSU FLIGHT CENTER

Figure D-21
South Area General Aviation Proposed Development - Alternative One

of the Southeast GA Taxilane. This alternative provides for an ARFF south of the existing OSU Flight Center. Provided with both excellent airside and landside access, this facility could be a joint use ARFF and city fire station facility, as described above. **Figure D-22** shows the proposed South GA Area Development – Alternative Two.

Recommendation

Alternative One is the preferred GA development concept for the south area.

Large Scale Aeronautical Development

As presented in the previous chapter, large scale aeronautical development should be reserved for such facilities as Unmanned Aerial System (UAS) research and development (R&D), aircraft Maintenance, Repair, and Overhaul (MRO), larger corporate aviation facilities, and aeronautical training and education industries. Two large areas on SWO property are reserved for this development:

- **Northeast Area** – East of Runway 17/35 and northwest of Runway 4/22.
- **West Area** – West of Runway 17//35 and northwest of Runway 4/22.

Northeast Area

The area east of Runway 17/35, consisting of approximately 60 acres, has excellent airside access via Taxiway A but is lacking in landside access and utilities. The current use is for a hay and pasture lease. This area should be reserved for development of corporate aviation facilities, utilizing the airside access provided by Taxiway A. Landside access can be provided via a connection to East 580 Road.

West Area

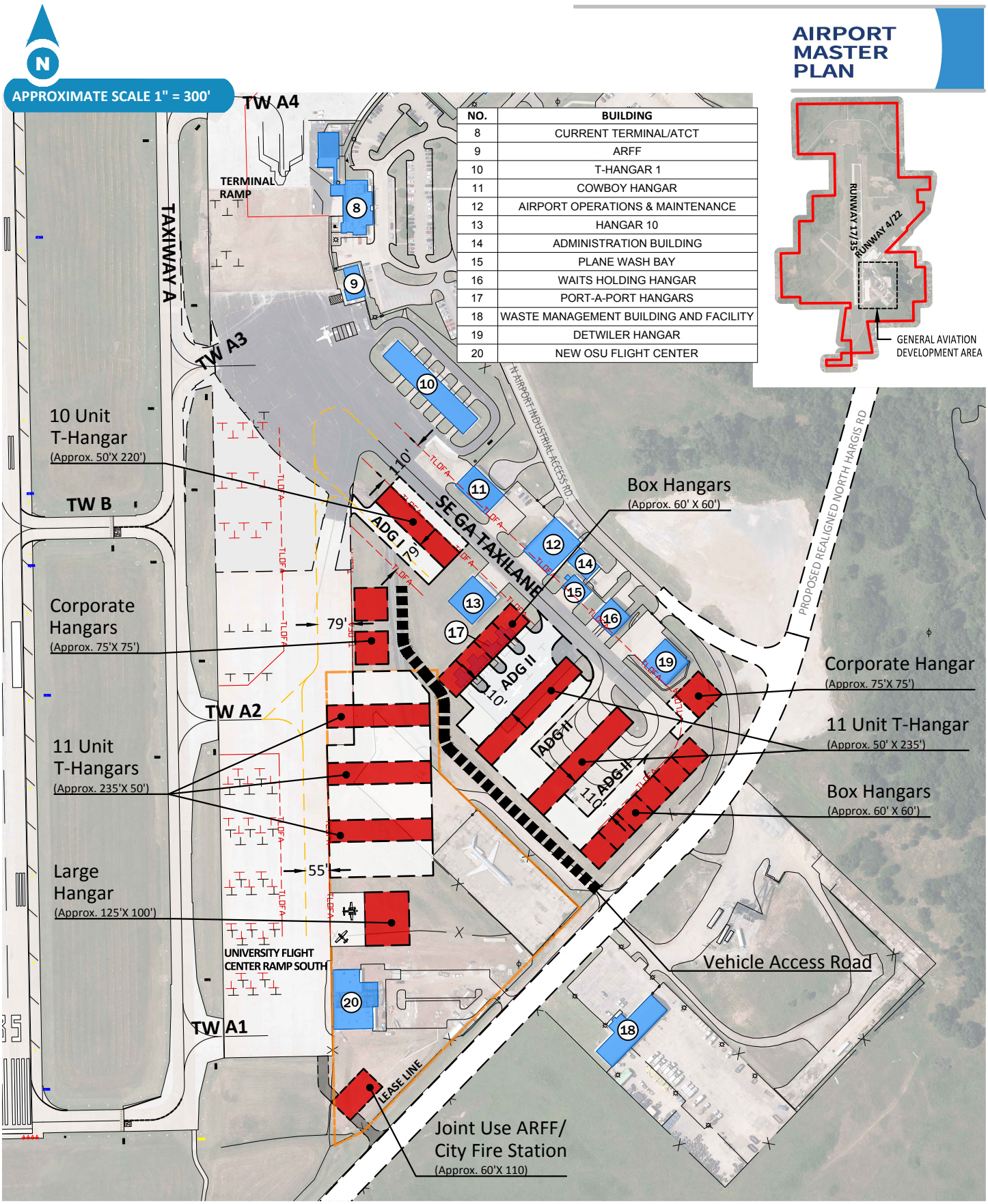
The west area, consisting of approximately 100 acres, is located west of Runway 17/35 and northwest of Runway 4/22. Currently, this area lacks both airside and landside access, is undeveloped, and leased for hay and pasture uses. It is recommended that this area be reserved for UAS R&D facilities, MRO hangars, and aeronautical training and education capabilities. Airside access can eventually be provided through a future parallel taxiway west of Runway 17/35 and northwest of Runway 4/22. Landside access can make use of the access road and utilities developed for the future ATCT.

Non-Aeronautical Development

There are three large areas of SWO property that are available for non-aeronautical development.

Southeast Area

This area is located southeast of the proposed realigned North Hargis Road. Current uses include Sanborn Lake Park, ballfields, and hiking trails in the eastern portion of the area. Hay and pasture lease comprise the southern and western portions. It is recommended that the recreation uses remain, acting as a buffer between airport facilities and the residential areas to the east. Trail head access improvements can be incorporated into the design of the proposed realign North Hargis Road. The hay and pasture leased land adjacent to



NO.	BUILDING
8	CURRENT TERMINAL/ATCT
9	ARFF
10	T-HANGAR 1
11	COWBOY HANGAR
12	AIRPORT OPERATIONS & MAINTENANCE
13	HANGAR 10
14	ADMINISTRATION BUILDING
15	PLANE WASH BAY
16	WAITS HOLDING HANGAR
17	PORT-A-PORT HANGARS
18	WASTE MANAGEMENT BUILDING AND FACILITY
19	DETWILER HANGAR
20	NEW OSU FLIGHT CENTER

Figure D-22
South Area General Aviation Proposed Development - Alternative Two

and southeast of the proposed realigned North Hargis Road (containing approximately 48 acres) is recommended for future light industrial, R&D facilities, city development, or cargo handling and sorting facilities as the demand materializes. Utilities to be provide along the proposed realigned North Hargis Road make this area valuable for short- and medium-term development. Zoning changes from Public to Industrial would be required, and it is recommended that a buffer remain between the existing residential development and any facilities recommended here.

North Area

This area is in the far northern section of Airport property, both east and west of Runway 17/35 as well as north and south of East 580 Road. Consisting of approximately 260 acres, the area is currently undeveloped and leased for hay and pasture. Like the southeast area, it is recommended that the hay and pasture leases continue until such time as light industrial, R&D facilities, or cargo handling and sorting facilities demand is realized. Adequate utilities are presently lacking, so improvements are anticipated for future development. Zoning changes from Public to Industrial would also be required.

West Area

The area in the western part of Airport property, west of the proposed large-scale aeronautical development, is recommended for reservation of non-aeronautical development. Consisting of approximately 100 acres, this area is currently undeveloped and leased for hay and pasture. Like the other areas, it is recommended that the hay and pasture leases continue until such time as light industrial, R&D facilities, or cargo handling and sorting facilities demand is realized. Also like the other areas, adequate utilities are presently lacking and improvements are anticipated for future development. Zoning changes from Public to Industrial would similarly be required.

Figure D-23 presents the large scale aeronautical and non-aeronautical development areas within SWO property.

N SCALE 1" = 1,200'

Non-Aeronautical Devleopment
- North Area
• Light Industrial
• R&D Facilities
• Cargo Handling/Sorting

East 580 Road

Large Scale Aeronautical Devleopment
- Northeast Area
• Corporate Aviation

Non-Aeronautical Devleopment
- Southeast Area
• Recreation Facilities

Non-Aeronautical Devleopment
- Southeast Area
• Light Industrial
• R&D Facilities
• Cargo Handling/Sorting
• City Development

Wright Drive

Airport Road

Proposed Realigned North Hargis Road

Airport Industrial Access Road

Hargis Road

Lakeview Road

Western Road

PAPI

Runway 4/22 (5,002' x 75')

Runway 17/35 (7,401' x 100')

TW A

TW A1

TW A2

TW A3

TW A4

TW B

TW C

TW D

TW E

TW F

TW F1

ARFF

Airport Property Line

Large Scale Aeronautical Devleopment
- West Area
• MRO Facilities
• UAS R&D Facilities
• Aeronautical Traning/Educational Facilities

Non-Aeronautical Devleopment
- North Area
• Light Industrial
• R&D Facilities
• Cargo Handling/Sorting

West Richmond Road

Non-Aeronautical Devleopment
- West Area
• Light Industrial
• R&D Facilities
• Cargo Handling/Sorting

LEGEND
- Airport Property Line
- Building Restriction Line
- Airfield Reserve
- Developable Area - Airside
- Developable Area - Landside Only

SWO Stillwater REGIONAL AIRPORT

Figure D-23:
Large Scale Aeronautical and Non-Aeronautical Development

SUMMARY

The main goals for this chapter are to identify airport improvements that accommodate existing and future demand safely and efficiently, and to develop SWO in a financially feasible and environmentally sustainable manner as demand is realized. The alternative evaluation and selection are based on input and comments provided by airport users and key airport and community stakeholders.

Utilizing the recommended components of SWO's airside and landside development areas results in the Conceptual Development Plan presented in **Figure D-24**. The plan presents SWO with a comprehensive development scheme accommodating a wide range of aviation user groups and operational activities. As with any airport planning decision, the ultimate build-out of the various aviation and aviation-compatible development areas will be demand driven, and the depicted development far exceeds that which is projected during the 20-year planning period. The Conceptual Development Plan will be carried forward to the Capital Improvement Plan (CIP) and will be used for the preparation of the ALP set representing the ultimate long-term airport configuration.

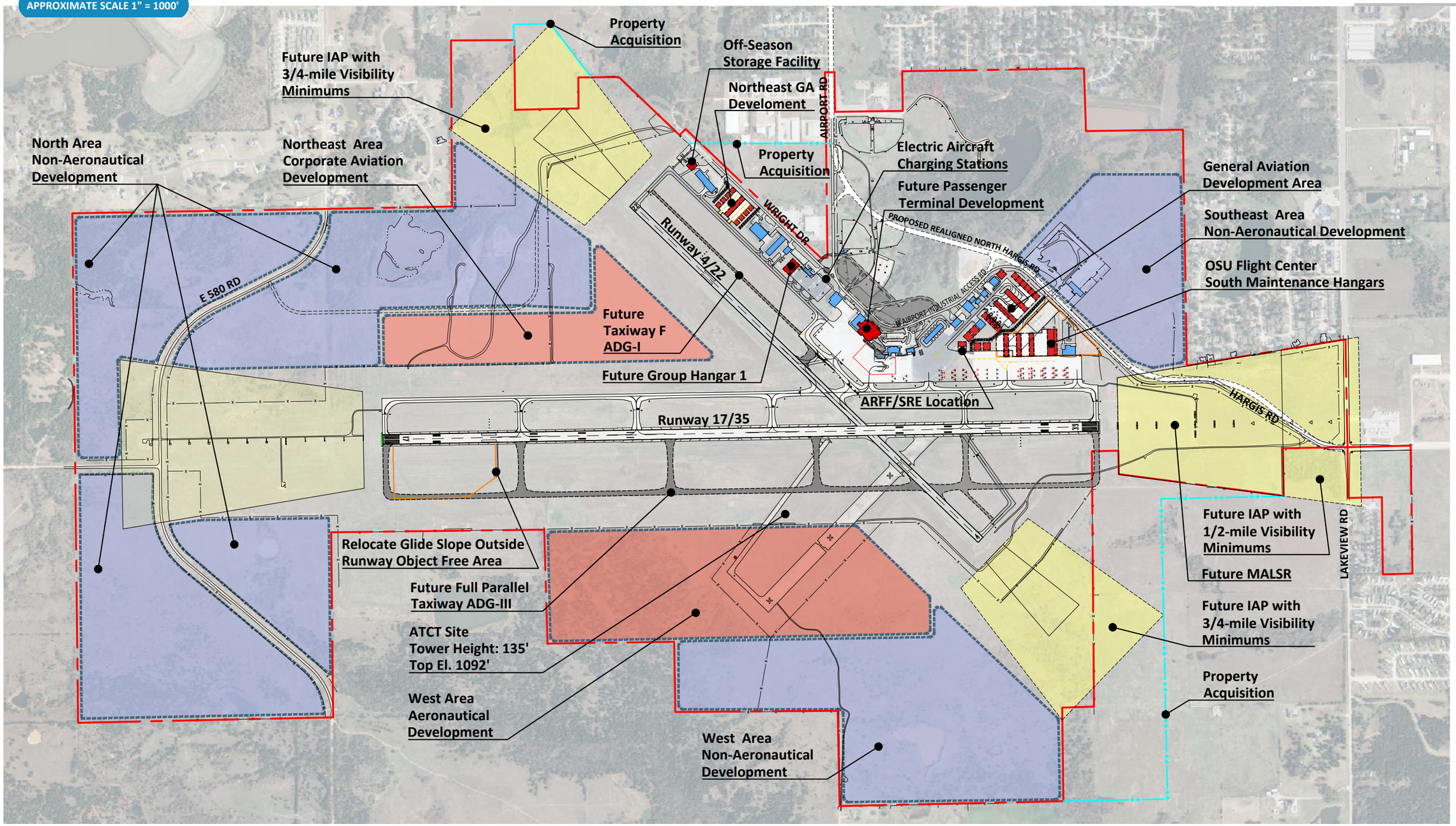


Figure D-24:
Conceptual Development Plan

E. Financial Implementation

INTRODUCTION

This chapter documents the strategy to implement, fund, and finance the recommended 20-year project improvements (i.e., the Capital Improvement Program or CIP), finance operations, and maximize the potential to receive federal and state grant funds at Stillwater Regional Airport (SWO or the Airport). It also establishes a financially prudent plan for improvement funding on a local level. The CIP is planned for implementation through three phases of development including a five-year Phase I period (0 – 5 years - 2023-2027), a five-year Phase II period (6 – 10 years - 2028-2032) and a ten-year Phase III period (11 – 20 years - 2033-2042). The CIP identifies improvement needs and allows budgeting and financial decision to be made with a comprehensive understanding of future financial implications. Although the CIP will be used for preliminary programming by the Federal Aviation Administration (FAA) and the Oklahoma Department of Aerospace and Aeronautics (ODAA), this analysis does not guarantee any financial commitment from federal, state, or local governments to provide funding for the CIP.

CAPITAL IMPROVEMENT APPROACH

The CIP identifies the overall airport development objectives, individual project costs, and anticipated funding. The CIP projects are based on the needs identified in **Chapter C - Facility Requirements**, the most recent approved Airport's CIP (kept on file with the FAA), and planning and pavement maintenance projects. The following considerations influenced the project priority approach:

- Ability to meet user demand
- Ability to enhance efficiency and meet FAA design standards
- Ability to repair and upgrade facilities reaching the end of useful life.

Projects also considered SWO preference and ability to facilitate an orderly sequence of improvements while taking into consideration economic and environmental factors. Projects are sequenced according to strategic vision, forecast demand triggers, and funding considerations. The first phase projects are sequences in year-by-year format, the second and third phase projects are identified in priority order without year distinction. This allows flexibility for changes or adjustments to the timing and priority of projects based on SWO needs as it progresses through the planning periods.

COST ESTIMATES AND PROECT PHASING

Cost Estimates

Cost estimates, based on current construction unit costs, have been prepared so SWO and the FAA can allocate financial resources for the improvement projects that have been identified as potentially being needed during the 20- year planning period. Professional engineers and architects develop cost estimates for

each project based on 2022 dollars. Contingencies are included to account for unknown factors at the planning level of design. The contingency amount varies by project but is generally set between 5 and 15 percent depending on the complexity and overall project cost. Costs for planning, environmental review, design, and construction management are included as appropriate. The cost estimates are intended to be used for planning purposes only and should not be construed as construction cost estimates, which can only be compiled following the preparation of detailed engineering design documents.

Project Phasing

Project phasing prioritizes projects through a priority ranking system based on development needs. The FAA's priorities in administering the CIP gives highest priority to projects that currently do not meet FAA design standards to maintain safety, security, and efficiency. Projects with higher priority are considered to have more urgency and are placed in the beginning phase. Those projects with lower priorities are placed in later phases. Several projects can and will be phased over multiple years. This approach helps distribute capital costs more evenly and allows SWO to implement improvements as demand materializes. Project phasing supports accelerating or delaying project implementation in response to economic conditions and changing airport user needs.

Future demand for airport facilities is difficult to predict accurately, especially during the latter phases of the 20-year planning period. Therefore, emphasis is placed on the initial portion of the planning period. In this phase, projections are more definable, and the magnitude of program accomplishment is more pronounced.

Phase I Projects

Table E-1 provides the sequencing and costs for each project placed in the first phase (i.e., 1-5 years). Phase I major improvement projects are centered around the development of the new passenger terminal, which includes relocation of Group Hangar 1, the relocation of Airport Drive, and constructing vehicular parking facilities. The first phase construction of a new Airport Traffic Control Tower (ATCT) is included in this phase. Other projects identified include hangar construction, equipment purchases, and pavement maintenance.

Table E-1: Phase I (1-5 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Year 1 (2023)		
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225
A.2	Design Terminal Building, Parking, and Utility Relocation	$1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	$100,000
A.4	Prepare ATCT EA	$200,000
A.5	Replace Two Primary Mower Apparatus	$30,000
2022	SRE Equipment – FY 22 Grant Carryover	$280,829
	Year 1 Totals	**$2,563,492**
Year 2 (2024)		
A.6	Construct New Group Hangar	$2,500,000
A.7	Design and Construct Terminal Building (Phase One), Including Demolition of Group Hangar #1	$19,000,000
A.8	Design and Construct Terminal Area Roadways and Parking Lots (Phase One)	$907,000
A.9	Crack Seal, and Re-Mark Taxiway A	$60,000
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	$200,000
	Year 2 Totals	**$22,667,000**
Year 3 (2025)		
A.11	Construct Terminal Building (Phase Two)	$1,500,000
A.12	Construct Terminal Area Roadways and Parking Lots (Phase Two)	$615,000
A.13	Construct One Corporate Hangar with Pavement	$2,213,000
	Year 3 Totals	**$4,328,000**
Year 4 (2026)		
A.14	Construct Terminal Building (Phase Three)	$1,400,000
A.15	Construct Terminal Area Roadways and Parking Lots (Phase Three)	$653,500
A.16	Replace Mower	$80,000
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35	$150,000
A.18	Construct Portions of Perimeter Road (Phase One)	$107,000
	Year4 Totals	**$2,390,500**
Year 5 (2027)		
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase One)	$10,888,889
A.20	Implement Airport Safety Management System (SMS)	$90,000
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	$5,349,000
A.22	Construct One 10-Unit T-hangar	$1,200,000
	Year 5 Totals	**$17,527889**
Subtotal Phase I		**$49,476,881**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Phase II Projects

Table E-2 provides the sequencing and costs for each project contained with the second phase (i.e., 6-10 years). Major projects within this phase include the second phase of ATCT construction, demolition of the existing ATCT, property acquisition for approach protection, new and improved Instrument Approach Procedures (IAPs), relocation of facilities to meet FAA Runway Object Free Area (ROFA) and Runway Obstacle Free Zone (ROFZ) design standards, and terminal building vehicle parking expansion. Other projects include expansion of the fuel farm and various hangar construction.

Table E-2: Phase II (6-10 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 6-10 (2028-2032)		
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase Two)	$1,000,000
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	$1,920,000
B.3	Demolish Existing ATCT	$40,000
B.4	Install Whole Airport Facility Back-Up Power Generator	$3,000,000
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and One 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	$1,178,000
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	$2,000,000
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	$7,576,000
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	$731,000
B.9	Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	$51,000
B.10	Construct Snow Removal Equipment (SRE) and Airport Maintenance Facility	$2,000,000
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	$1,200,000
B.12	Expand Terminal Parking Lots and Roadways (Phase Two)	$317,000
B.13	Construct South GA Development Access Road	$611,000
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	$7,468,000
B.15	Runway and Taxiway Pavement Maintenance	$2,000,000
B.16	Construct One Corporate Hangar with Pavement	$2,213,000
B.17	Install Two Electric Aircraft Charging Stations	$416,000
B.18	Construct Two Box Hangars	$2,969,000
B.19	Construct Portions of Perimeter Road (Phase Two)	$446,000
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	$280,767
B.21	Rehabilitate Airport Drainage System	$500,000
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	$1,195,425
B.23	Acquire Airfield De-icing Vehicle	$500,000
Subtotal Phase II		**$39,612,192**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Phase III Projects

Phase III projects are difficult to predict accurately, but like all CIP projects, they must be included on the Airport Layout Plan (ALP) to be eligible for FAA funding. Major projects included in this phase are taxiway reconstruction and relocation, terminal building vehicular parking expansion, and airfield pavement maintenance. Other projects include various hangar construction. **Table E-3** provides the sequencing and costs for each project contained with the third phase (i.e., 11-20 years).

Table E-3: Phase III (11-20 Years) Development Plan Project Costs

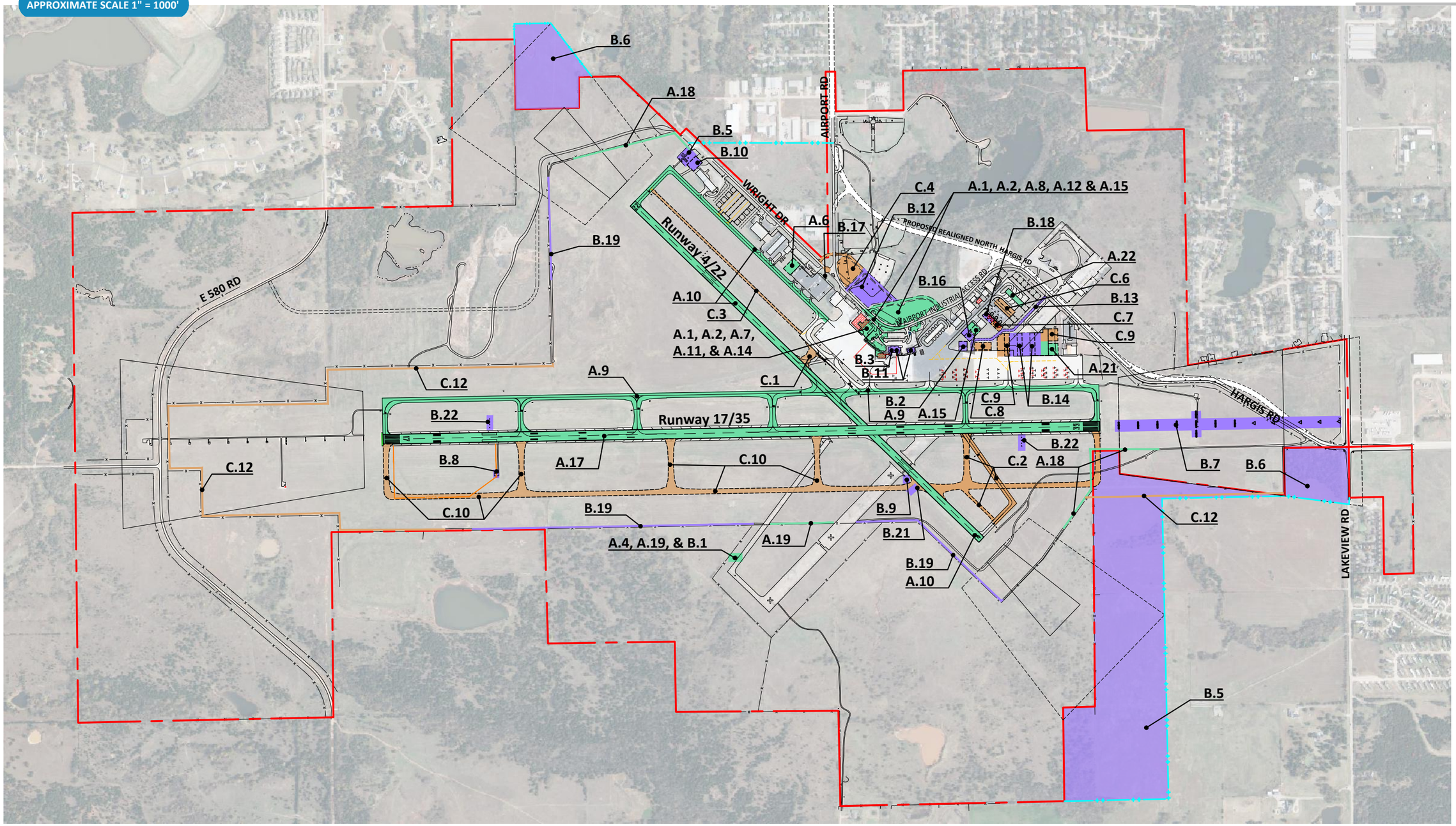
Project Number	Project Description	Total Cost[1]
Years 11-20 (2033-2042)		
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$800,000
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	$940,000
C.3	Relocate Taxiway F, Including CATEX or EA	$1,292,000
C.4	Expand Terminal Parking Lots and Roadways (Phase Three)	$439,000
C.5	Runway and Taxiway Pavement Maintenance	$1,076,000
C.6	Construct One 10-Unit T-hangar with Pavement	$2,400,000
C.7	Construct Two Box Hangars	$2,969,000
C.8	Construct Two Corporate Hangars with Pavement	$4,406,000
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	$7,711,000
C.10	Construct Taxiway West of Runway 17/35, Including EA	$27,822,853
C.11	Runway and Taxiway Pavement Reconstruction	$20,000,000
C.12	Construct Portions of Perimeter Road (Phase Three)	$680,000
C.13	Update Airport Master Plan	$750,000
C.14	Purchase ARFF Vehicle	$1,000,000
Subtotal Phase III		**$72,285,853**
GRAND TOTAL		**$161,374,926**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Figure E1 graphically illustrates the location of all projects on the airfield and **Figure E2** provides an enlarge drawing of the terminal area projects.

N

APPROXIMATE SCALE 1" = 1000'



Phase I (0-5 Years)

Phase II (6-10 Years)

Phase III (11-20 Years)

Buildings to be removed

Figure E-1:
Airport-Wide Phasing Plan

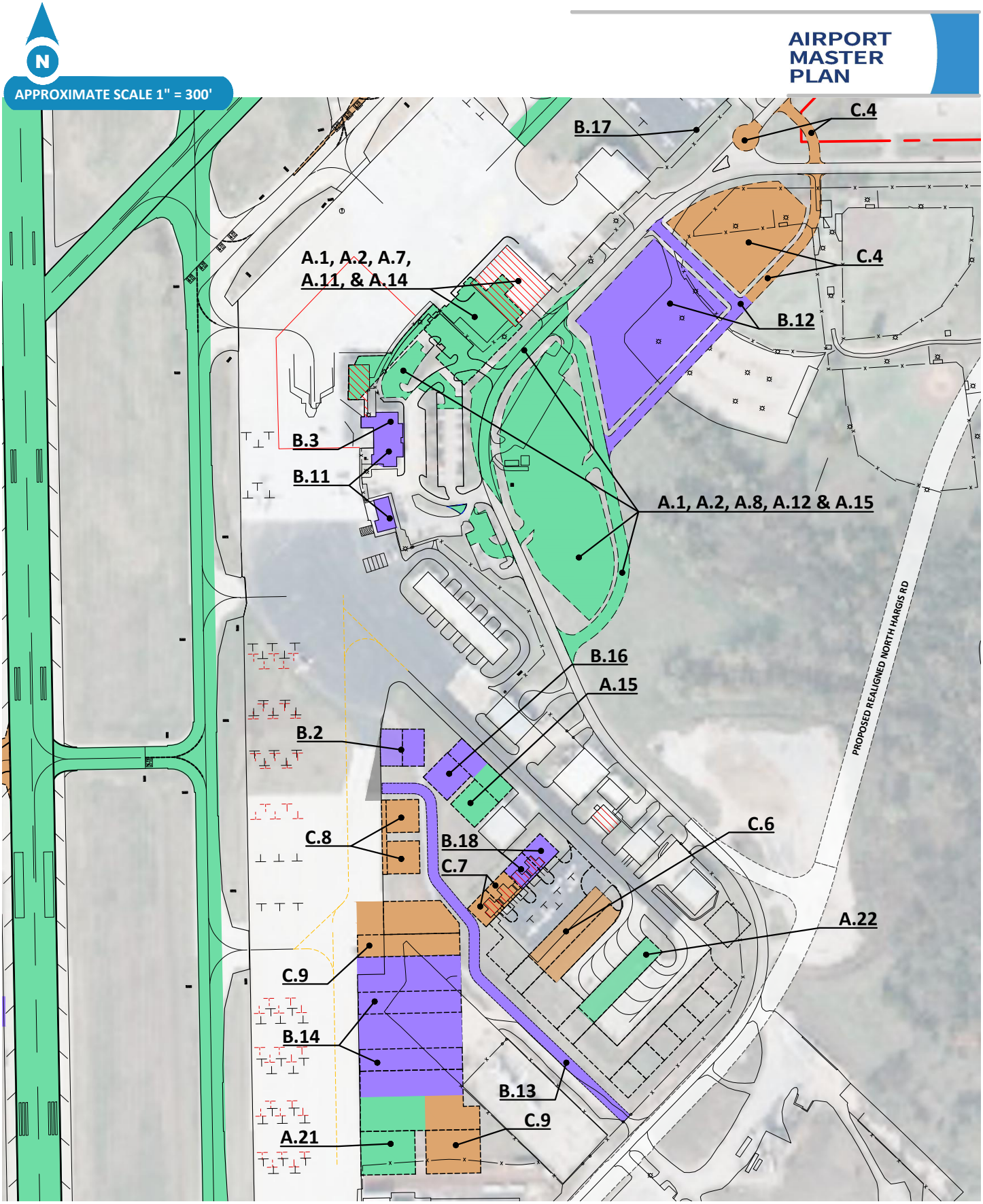


Figure E-2:
Terminal Area Phasing Plan

FINANCIAL IMPLEMENTATION ANALYSIS

Overall Approach

The overall objectives and approach for conducting the financial implementation analysis include presenting detailed results of the analysis and providing practical guidelines for matching an appropriate amount ant time of financial sources with the planned use of funds. The overall approach for conducting the financial implementation analysis included the following steps:

- Gathering and reviewing key SWO historical financial results, capital improvement plans, operating budgets, regulatory requirements, City of Stillwater policies, airline agreements, and other operating agreements with SWO users
- Interviewing key SWO officials to gain an understanding of the existing operating and financial environment, relationships with the airlines, and overall management philosophy
- Reviewing the information resented in **Chapter B - Aviation Activity Forecasts**
- Reviewing the projects list, cost estimates, and development schedules presented previously and projecting the overall financial requirements for the CIP
- Determining and analyzing the sources and timing of capital funds available to meet the financial requirements for operating SWO and financing the CIP
- Analyzing historical operations and maintenance expenses, developing operations and maintenance expense growth assumptions, reviewing assumptions with SWO management, and projecting future operations and maintenance expenses for the planning period
- Analyzing historical revenue sources, developing revenue growth assumptions, reviewing assumptions with SWO management, and projecting future airline and non-airline revenues for the planning period
- Completing results of the review in a Financial Analysis Summary and Implementation Plan that evaluates the financial reasonableness of the CIP.

Organization, Accounting, and Budgeting

Governmental Organization and Administration

SWO is owned and operated by the City of Stillwater, Oklahoma (the City). The Airport Director is responsible for day-to-day operations, supervision of the administrative and maintenance staff, and reporting to the City.

Accounting and Budgeting Practices

The financial transactions of SWO are accounted for in the City's financial statements in an Enterprise Fund. The financial statements are reported using the accrual basis of accounting. Under the accrual basis of accounting, revenues are recognized when earned and expenses are recorded when the liability is incurred or economic asset used.

The annual budget serves as the foundation for SWO's financial planning and control. The budget is prepared on a modified accrual basis where revenues are recognized when measurable and available and expenses are recognized when incurred.

Aviation Forecasts

In **Chapter B - Aviation Activity Forecasts** aviation activity forecasts were developed to estimate potential future activity levels. These forecasts are then used in **Chapter C - Facility Requirements** to determine if existing Airport facilities have the capacity to meet future demand or if facility modifications are needed. These forecasts, which include passenger enplanements, total aircraft operations, and commercial aircraft operations aid in the development and prioritization of the projects included in the CIP. The aviation activity forecasts are used in the projection of many capital funding sources and operating revenues described below.

Capital Funding Sources

Funding sources for the CIP depend on many factors, including the project eligibility, priority rating models for project evaluation, the ultimate type and use of facilities to be developed, SWO's debt capacity, the availability of other financing sources, and the priories for scheduling project completion. For planning purposes, assumptions were made related to the funding source of each capital improvement. The following funding sources provide background and context when reviewing the financial feasibility of proposed improvements.

In recent years, SWO has used a combination of FAA Airport Improvement Program (AIP) entitlement and discretionary grants, Passenger Facility Charges (PFCs), City Transfers and Capital Contributions, and cash reserves/net operating revenues to fund capital improvements. These funding sources, as well as additional sources of capital funding, will continue to be important to finance the Airport's CIP during the twenty-year planning period.

Federal

The FAA provides funding for airport improvements through the Aviation Trust Fund (ATF), which is financed by aviation system user fees and taxes (e.g., airline passenger tax, aircraft parts tax, fuel tax, and aircraft registration fees). The AIP provides the mechanism to reinvest the ATF monies at FAA-eligible airports. The total amount of federal funds available through AIP is governed by congressional appropriations to the AIP. FAA Order 5100.38D, *Airport Improvement Program Handbook* (AIP Handbook), describes AIP funding eligibility.

The FAA's most recent version (2024) of the National Plan of Integrated Airport Systems (NPIAS) classifies SWO as a non-hub commercial service primary airport. A primary airport is defined by statute as a public use airport receiving scheduled air carrier service with 10,000 or more annual enplaned passengers. Primary airports are divided into four categories based on the percentage of total U.S. passenger enplanements, with non-hub airports accounting for less than 0.05 percent of the total. The NPIAS identifies airports eligible for AIP funding and estimates the amount of AIP funds needed to fund the projects that will update airports to

current FAA standards and increase capacity as needed. FAA AIP funds available for commercial service airports are allocated through entitlement grants and discretionary grants.

AIP Passenger Entitlement Grants

AIP entitlement grants are allocated among airports by an enplanements-driven formula. Primary commercial service airports receive a minimum of one million dollars in AIP entitlement funds under the current legislation. Additionally, under current AIP authorization legislation, eligible projects at non-hub airports in Oklahoma are funded on a 90 percent AIP/10 percent local match basis.

Based on the current program, SWO is projected to receive entitlement grants of approximately $1 million per year for the entire 20-year planning period based on its enplanement levels. Non-hub airports (currently, those with annual enplanements between 10,000 and approximately 423,000 passengers) can accumulate and carryover up to three years of unspent entitlement funds plus the current year, before the awards are revoked. At the end of 2022, SWO had $90,000 in entitlements to carryover for use in 2023. The analysis assumes the application of annual AIP passenger entitlement funds will be about $5 million during the Phase I planning period, $5 million during Phase II, and $10 million during Phase III.

AIP Discretionary Grants

Projects eligible for AIP funding may also receive discretionary grants if the total cost exceeds what can be covered by entitlement funds. The approval of discretionary grant funds is established through a project priority ranking methodology used by the FAA to award grants, at their discretion, based upon a project's importance to the National Airport System (NAS). Discretionary funds are generally provided for projects that have placed high in priority towards enhancing safety, security, and capacity and would be difficult to fund otherwise. Dollar amounts vary and can be significant compared to entitlement funds. Discretionary grants are not guaranteed, and the amount dedicated to any one airport is determined by its demonstrated and documented need compared to the needs at other airports within the NAS.

In past years, SWO received discretionary funds to support runway, taxiway, and apron improvement projects. It is reasonable to assume that SWO will receive additional discretionary grants throughout the 20-year planning period for higher priority, eligible projects such as runway and taxiway projects. Like passenger entitlement grants, discretionary grants usually have an FAA funding participation rate of 90 percent and a local match of 10 percent. The analysis assumes that $14.8 million of AIP discretionary funds will be required during Phase I for the new terminal building and ATCT facilities, and about $2.6 million will be required during the five-year Phase II period for ARFF facilities and runway and taxiway improvements. An additional $63.1 million of AIP discretionary funds are assumed for Phase III for significant runway and taxiway improvements. Since the future availability of AIP discretionary grants is not certain until an actual grant is awarded, it should be noted that any CIP projects which have discretionary funds indicated as a funding source in the analysis may need to be delayed until such funds actually become available.

The analysis further assumes that the current AIP program will be extended through 2042 and that future program authorizations will provide substantially similar funding levels as it currently does and as it has historically provided since the program was established in 1982.

Bipartisan Infrastructure Law Grants

With the passage of the Infrastructure Investment and Jobs Act of 2021, known as the Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. The legislation included $25 billion in funding for the FAA to invest in airport terminals, airport infrastructure, and air traffic control facilities over the next five years.

Included in the BIL is the Airport Infrastructure Grant (AIG) program. Like AIP Entitlements, AIG funds are allocated to airports based on passenger enplanements. AIG funds are non-competitive and may be used for projects based on PFC eligibility requirements. SWO's 2023 AIG allocation was $1,019,003. The Financial Implementation Analysis assumes the allocations in 2024 – 2026 will be approximately the same amount. The analysis assumes these AIG funds will be used toward constructing the new terminal building.

Also included in the BIL is the Airport Terminal Program (ATP). This program is a discretionary grant program providing $1 billion per year to replace aging terminals and airport-owned towers, increase terminal energy efficiency and accessibility, and other terminal projects. These grants will be awarded annually through a competitive process based on a Notice of Funding Opportunity (NOFO), and not less than $100 million per year may be allocated to general aviation (GA) and non-hub airports such as SWO. The analysis assumes the Airport will apply for and secure $6.1 million in ATP funding for the new terminal building.

State

The ODAA serves as the lead government agency to support, promote, and advocate for Oklahoma's aviation and aerospace industries. The agency provides funding, planning, programming, and engineering expertise for Oklahoma's airports and administers all state aviation grant programs through the Airport Construction Program (ACP). Grants are approved for projects including those that are AIP eligible. The analysis assumes the ODAA will support SWO with grant funds for two significant projects during Phase I – the new terminal building and the new ATCT in the amount of $1,000,000 for each project.

In addition to ODAA grant funds for certain capital development projects, the ODAA administers a loan program in which an airport can secure a loan for up to 70 percent of construction costs of a new aircraft hangar. The term of the loan is for ten years. The interest rate is determined by the ODAA at the time a loan is issued and is anticipated to be more competitive than what is available in the traditional loan market. It is appropriate to allow the ODAA to recover costs associated with administering the loan. For the analysis, it was assumed that SWO would secure a loan of $1.75 million for a new group hangar during Phase I. The loan rate was assumed to be 1.8 percent and the debt service would be funded through rents from the tenant(s) occupying the new hangar.

Other Federal/State Grants

Certain projects identified in the CIP lend themselves to be funded from other federal or state grant funding sources. Certain lighting and navigational aids programmed in the CIP, including a Global Positioning System (GPS) IAP and the associated Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR), the relocation of the Glideslope Antenna and equipment building, and the installation of Precision Approach Path Indicators (PAPIs) are assumed to be funded with FAA Facilities and Equipment (F&E) funds. Additionally, the CIP includes a project for the acquisition and installation of an airport facility backup power generator, for which SWO intends to pursue funding from Federal Emergency Management Agency (FEMA) grant opportunities.

Passenger Facility Charges

The Aviation Safety and Capacity Expansion Act of 1990 established the authority for commercial service airports to apply to the FAA for imposing and using a PFC of up to $3.00 per eligible enplaned passenger. With the passage of AIR-21 in June 2000, airports could apply for an increase in the PFC collection amount from $3.00 per eligible enplaned passenger to $4.50. The proceeds from PFCs are eligible to be used for AIP eligible projects and for certain additional projects that preserve or enhance capacity, safety or security, mitigate the effects of aircraft noise, or enhance airline competition. PFCs may also be used to pay debt service on bonds (including principal, interest, and issue costs) and other indebtedness incurred to carry out eligible projects. In addition to funding future planned projects, the legislation permits airports to collect PFCs to reimburse the eligible costs of projects that began on or after November 5, 1990.

The Airport currently collects PFC revenues through an approved application at the $4.50 collection level. Current collections at the $4.50 collection level are approximately $94,000 per year. This open application is expected to be fully collected in 2026. Annual PFC collections are anticipated to grow to approximately $116,000 per year by the end of Phase I and $171,000 per year by the end of the 20-year planning period.

The analysis assumes that SWO will submit new PFC applications to fund future projects included in the CIP. The analysis assumes that PFC collections available for use on the projects included in the CIP will be about $350,000 during the Phase I planning period, $848,000 during Phase II, and $1.5 million during Phase III. The analysis assumes that throughout the twenty-year planning period, SWO will use its PFCs to provide some or all the required local match on AIP grants as well as the purchase of an airfield deicing vehicle.

The analysis assumes that SWO will submit PFC applications and amendments, as required, to ensure that the collection of PFC revenues continues uninterrupted beyond the authorized expiration date through the end of the 20-year planning period in 2042.

Local

City Capital Contributions

SWO is a municipally owned facility and as such, the City may provide funding to the Airport for capital projects from its general fund budget, special assessments or as a temporary short-term loan from other City

enterprise funds. The analysis assumes the City will provide approximately $3.1 million of funds during the short-term period to fund a portion of the local funds required for the construction of the new terminal building and associated terminal area roadways and parking lots. Additional City funds are likely to be required to support future capital development projects, but those funds are not committed until approved by the City. Therefore, for the purposes of the analysis, funding deficiencies are programmed with Other Unidentified Funding described below. Local funds can include, but are not limited to, airport revenues from hangar leases, fuel surcharges, landing fees, facility charges and fees, concession revenues, airline operations, and non-aeronautical facility leases. SWO uses local funds to provide the ten percent match on AIP eligible projects and to pay for projects that are not eligible for or do not compete well for AIP funding.

Private Third-Party Funding

Certain on-airport development projects may be funded through private third-party funding. This is frequently the case for GA or private use development where a third-party will assume the capital development costs of a hangar, and in exchange, SWO receives rent through a ground lease. The analysis assumes private third-party funding of approximately $53.4 million during the twenty-year planning period for hangar development projects including maintenance hangars, corporate hangars, box hangars, and T-hangars. If private third-party funding does not materialize in the time frame needed, the associated projects may have to be modified, delayed, or cancelled until such funding is committed.

Cash Reserves/Airport Net Operating Revenue

At the beginning of 2023, SWO had accumulated about $2.3 million in unrestricted cash reserves available for operations and capital project funding. Prior to the COVID-19 pandemic, actual operating expenses at SWO exceeded operating revenues and the operating deficit, along with minor capital outlay and federal grant matches, were generally funded by the City. COVID relief funding alleviated the need for significant City subsidies from 2020 through 2023. Beginning in 2024, however, revenue and expense projections included in the Financial Implementation Analysis indicate that SWO will again be operating at a deficit and will require resumed subsidies from the General Fund to cover operations. The Airport and the City are working to reverse this trend by generating additional revenue from existing operating revenue sources and by identifying new sources of operating revenue. For conservative planning purposes, the Financial Implementation Analysis assumes limited net operating revenue available for capital development.

The analysis assumes that SWO's cash reserves available are used to fund the local funding requirements for the new terminal building.

Other Unidentified Funding

The traditional airport capital funding sources described in the preceding paragraphs are insufficient in amount and timing to finance some capital projects planned for implementation during the planning period. As previously discussed, the required local matches on federal grants received by the Airport have historically been provided through capital contributions from the City. However, as those funds cannot be assured until the City has committed to providing that support, those local matches on future federal grants have been

programmed as other unidentified funding. Additionally, certain projects included in the CIP are not eligible for federal funding, or there are insufficient federal funds available in the time needed to support the projects. Those projects have also been programmed with other unidentified funding and include projects such as pavement maintenance, parking lots, access and perimeter roads, land acquisition, fencing maintenance, drainage rehabilitation, a portion of hangar development, and a portion of the new terminal building. Consequently, non-traditional funding sources will be needed to finance the cost of projects totaling about $3.5 million during Phase I, $8.1 million during the Phase II planning period, and $8.3 million during the Phase III planning period. The source of this non-traditional "other" funding has not yet been determined and represents a shortfall for the capital project implementation plan. This "other" funding may potentially include sources such as City capital contributions (discussed above), state grant funding, federal economic stimulus grants, economic development funding, future private third-party funding, and other possible sources that are not certain at this time. If other funding sources cannot be identified and obtained in the time frames needed, the associated projects will have to be modified, delayed, or cancelled until such funding can be identified. Consequently, this source of capital funding has been referenced in the Financial Implementation Analysis as "Other Unidentified Funding."

FINANCIAL ANALYSIS AND IMPLEMENTATION FOR THE CIP

The analysis, along with the Schedules contained in **Appendix Six**, provides the results of evaluating the financial reasonableness of implementing the CIP during the planning period from 2023 through 2042.

Estimated Project Costs and Development Schedule

The CIP Estimated Project Costs and Development Schedule is derived from previous results of the Master Plan analysis. The CIP for capital expansion and improvement projects is projected on an annual basis for the Phase I planning period from 2023 through 2027, in total for the Phase II planning period from 2028 through 2032 and in total for the Phase III planning period from 2033 through 2042. For each of these planning periods, **Schedule E-1** (provided in **Appendix Six**) presents the CIP including estimated costs and anticipated development schedule for the identified projects.

As presented earlier in **Tables E-1**, **E-2**, and **E-3**, the total estimated cost of projects is $161,374,926 in 2023 dollars. The estimated costs for the projects are adjusted by an assumed three percent rate of annual inflation for the remainder of the twenty-year planning period. The resulting total project costs escalated for inflation are $210,184,145. **Table E-4** presents a summary of the project schedule and provides a comparison of 2023 base year costs with escalated costs adjusted for inflation for each of the planning periods.

Table E-4: Summary of 2023 Base Year and Total Escalated CIP Costs

Planning Period	2023 Base Year Costs	Total Escalated Costs
Phase I (2023-2027)	$49,476,881	$52,842,035
Phase II (2028-2032)	$39,612,192	$48,003,271
Phase III (2033-2042)	$72,285,853	$109,338,839
Total Costs	**$161,374,926**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

This Financial Implementation Analysis commenced in early 2023. However, due to unforeseen circumstances, it was not completed until early 2024. That is why the base year of the analysis is 2023, which includes the CIP and it associated cost estimates.

Sources and Uses of Capital Funding

Funding sources for the CIP depend on many factors, including AIP and PFC project eligibility, the ultimate type and use of facilities to be developed, management's current and desired levels of SWO's airline cost per enplaned passenger, the availability of other financing sources and the priorities for scheduling project completion. For master planning purposes, assumptions were made related to the funding source of each capital improvement.

Schedule E-2 (provided in **Appendix Six**) lists each of the CIP projects, their estimated costs (escalated annually for inflation) and the assumed funding sources and amounts. During the 20-year planning period, it was assumed that AIP entitlement, BIL AIG, AIP discretionary, and BIL ATP grants would fund terminal improvements including roadways and parking, a new ATCT, ARFF facilities, Snow Removal Equipment (SRE) facilities, and runway and taxiway improvements. State funds are assumed for the new terminal building and ATCT, as well as a loan on a new group hangar. Other federal and state grants are assumed for improvements to navigational aids and backup power generators. PFC pay-as-you-go revenues were assumed to fund the local matches of AIP and AIG grants to the extent available and the acquisition of a deicing truck. City contributions and available airport cash reserves are assumed to find the local portions of the new terminal building. Private third-party funds are assumed for hangar and other GA development projects. Projects for which funding has not been identified, reflected as “Other Unidentified Funding” include pavement maintenance, parking lots, access and perimeter roads, land acquisition, fencing maintenance, drainage rehabilitation, a portion of hangar development, and a portion of the new terminal building.

A summary of the sources of capital funding by type and uses of capital funding by planning period for the CIP is presented in **Table E-5**.

Table E-5: Summary of Sources and Uses of Capital Funding for the CIP

Sources of Capital Funding	Phase I	Phase II	Phase III	Totals
AIP Entitlement/BIL AIG	$9,168,052	$5,000,000	$10,000,000	$24,168,052
AIP Discretionary/BIL ATP	$20,936,184	$2,555,883	$63,077,396	$86,569,463
ODAA Grants and Loans	$3,750,000	$0	$0	$3,750,000
Other Federal/State Grants	$0	$14,241,950	$0	$14,241,950
Passenger Facility Charges	$350,000	$848,282	$1,486,075	$2,684,357
City Contributions	$3,052,715	$0	$0	$3,052,715
Private Third-Party Funding	$9,718,729	$17,261,317	$26,449,144	$53,429,190
Other Unidentified Funding	$3,547,885	$8,095,840	$8,326,224	$19,969,949
Cash Reserves/Net Operating Revenue	$2,318,469	$0	$0	$2,318,469
Total Sources of Capital Funding	**$52,842,035**	**$48,003,271**	**$109,338,839**	**$210,184,145**
Uses of Capital Funding	**Phase I**	**Phase II**	**Phase III**	**Totals**
Runway/Taxiway Improvements	$431,709	$2,423,661	$78,550,075	$81,405,445
Terminal Building	$24,643,831	$0	$0	$24,643,831
Terminal Roadway and Parking Improvements	$2,300,761	$384,150	$664,027	$3,348,938
Hangars and GA Infrastructure	$12,293,729	$18,001,745	$26,449,144	$56,744,618
Land Acquisition	$0	$2,423,661	$0	$2,423,661
SRE/Maintenance Facility	$0	$2,423,661	$0	$2,423,661
ARFF Facilities	$0	$2,326,715	$0	$2,326,715
Air Traffic Control Tower and Navigational Aids	$12,555,541	$12,727,161	$0	$25,282,702
Other Improvements	$398,247	$4,241,408	$1,512,590	$6,152,244
Total Uses of Capital Funding	**$52,842,035**	**$48,003,271**	**$109,338,839**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

A summary of the application of the different capital funding source to specific categories of CIP projects is presented in **Table E-6**.

Table E-6: Summary Application of Funding Sources to the CIP

Summary of Projects	AIP Entitlement/ BIL AIG	AIP Discretionary/ BIL ATP	ODAA Grants and Loans	Other Federal/ State Grants	PFCs	City Contri-butions	Private Third-Party	Other Unidentified Funding	Cash Reserves/ Net Revenues	Total
Runway/Taxiway Improvements	$8,979,002	$63,897,360	$0	$0	$1,463,738	$0	$0	$7,065,345	$0	$81,405,445
Terminal Building	$5,754,621	$12,136,184	$1,000,000	$0	$0	$2,794,556	$0	$700,000	$2,258,469	$24,643,831
Terminal Roadway and Parking Improvements	$2,070,685	$0	$0	$0	$0	$230,076	$0	$1,048,177	$0	$3,348,938
Hangars and GA Infrastructure	$0	$0	$1,750,000	$0	$0	$0	$53,429,190	$1,565,429	$0	$56,744,618
Land Acquisition	$0	$0	$0	$0	$0	$0	$0	$2,423,661	$0	$2,423,661
SRE/Maintenance Facility	$1,944,377	$236,918	$0	$0	$0	$0	$0	$242,366	$0	$2,423,661
ARFF Facilities	$956,374	$1,137,669	$0	$0	$0	$0	$0	$232,671	$0	$2,326,715
ATCT and Navigational Aids	$1,998,834	$8,800,000	$1,000,000	$11,515,331	$350,000	$0	$0	$1,588,537	$30,000	$25,282,702
Equipment	$1,252,746	$361,331	$0	$2,726,619	$757,174	$28,083	$0	$996,291	$30,000	$6,152,244
Other Improvements	$1,211,413	$0	$0	$0	$113,444	$0	$0	$4,107,471	$0	$5,432,328
Totals	**$24,168,052**	**$86,569,463**	**$3,750,000**	**$14,241,950**	**$2,684,357**	**$3,052,715**	**$53,429,190**	**$19,969,949**	**$2,318,469**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

Projected Operations and Maintenance Expenses

Operations and maintenance expense projections for the planning periods are based on SWO's 2024 budget, the anticipated impacts of inflation, aviation traffic increases, facility improvements and the recent experience of other airports with similar levels of aviation activity.

Operations and Maintenance Expense Projection Assumptions

Operations and maintenance expense growth assumptions, as reflected in **Schedule E-4** (provided in **Appendix Six**), were developed to project SWO's operating expenses during the planning period. Actual amounts for 2020 through 2022 and budgeted amounts for 2023 and 2024 provide a comparison with expenses that are projected for the period 2025 through 2042.

For all expense categories reflected on Schedule E-4, projections are based on 2024 budgeted amounts with an assumed three percent rate of annual inflation for the remainder of the 20-year planning period.

Projection of Operations and Maintenance Expense and Operating Expenses Per Enplaned Passenger

The projection of operations and maintenance expenses is provided in **Schedule E-4** (provided in **Appendix Six).** As shown in the Schedule, total expenses are expected to grow from $1,613,285 budgeted in 2024 to $1,762,880 projected in 2027 reflecting an overall growth rate of three percent per year and total $8,364,160 during the Phase I planning period. Phase II expenses are projected to total $9,640,151 reflecting a three percent annual growth rate for the five-year period 2028-2032, and Phase III expenses are projected to total $24,131,134 reflecting a three percent annual growth rate for the 10-year period 2033-2042.

Schedule E-4 also provides a comparison of SWO's total operating expenses per enplaned passenger versus non-hub airports with similar levels of aviation activity. SWO's operating expenses per enplaned passenger are projected to increase from $62.42 budgeted for 2024 to an average of $62.47 during the Phase III planning period. Over the same period of time, the overall non-hub industry average drops slightly from $75.60 in 2024 to $74.05 during Phase III[1]. These comparisons show that SWO's budgeted and projected operating expenses are lower than other non-hub airports of similar size during all three phases of the 20-year planning period. This implies that SWO currently manages operations and controls expenses in a manner that is more cost efficient than other comparable non-hub airports.

Projected Operating Revenues

Operating revenue projections for the planning periods are based on SWO's 2024 budget, current rates and charges methodology, current leasing practices, the anticipated impacts of inflation, aviation traffic increases, facility expansions and the recent experience of other airports with similar levels of aviation activity.

[1] Non-hub Airports, FAA Operating and Financial Summary Report #127 and FAA Air Carrier Activity Information System enplanement database.

Operating Revenue Projection Assumptions

Operating revenue growth assumptions, as reflected in **Schedule E-5** (provided **Appendix Six**), were developed to project SWO's operating revenues during the planning period. Actual amounts for 2020 through 2022 and budgeted amounts for 2023 and 2024 provide a comparison with revenues that are projected for the period 2025 through 2042. The analysis organizes revenues into categories for airline revenues, non-airline revenues and non-operating revenues. Annual Inflation was assumed at a three percent rate of annual inflation for the remainder of the 20-year planning period.

Annual revenue growth assumptions for the period 2024 through 2042 are provided in the following sections.

Airline Revenues

- **Landing Fees –** Beginning in 2025, the analysis assumes landing fees will grow based on the annual rate of inflation assumed above plus increases in aircraft landed weight assuming on half the annual growth rate of passenger enplanements forecast.
- **Terminal Rents, Stand-by ARFF Fees, and Security Fee –** Beginning in 2025, the analysis assumes terminal rent and ARFF and security fee increases will be based on the annual rate of inflation assumed above.

Non-Airline Revenues

Concessions projections beginning in 2025 are based on SWO's 2024 budget with growth based on previously described inflation assumptions plus the annual rate of forecast enplanement growth.

Projections for revenue from non-airline landing fees, fuel flowage fees, and fuel sales are based on SWO's 2024 budget with growth based on the assumed annual rate of inflation plus increases in aircraft landed weight assuming one half the annual growth rate of the passenger enplanements forecast.

Non-airline revenue projections for all other revenue categories beginning in 2025 are based on SWO's 2024 budget with growth at the annual inflation rate assumed above for all years thereafter.

Non-Operating Revenues

Non-operating revenues at SWO are limited and generally include interest income, and gains or losses from the sale of capital assets. None of these revenues are typically budgeted. Based on the historically small amount, none of these revenues have been projected for the remainder of the planning period.

Projections of Operating Revenues, Airline Cost Per Enplaned Passenger, and Operating Revenues Per Enplaned Passenger

The projection of operating revenues is provided in Schedule E-5 (provided in **Appendix Six**). As shown in the Schedule, airline revenues are expected to grow from $119,325 budgeted in 2024 to $132,598 projected for 2027 and total $601,720 during the Phase I planning period. During the five-year Phase II period, airline revenues are projected to total $732,659, and during the ten-year Phase III period, revenues are projected to total $1,884,738. The overall annual growth rate for airline revenues is 3.4 percent during the twenty-year

planning period. Non-airline revenues are expected to grow from $431,675 budgeted in 2024 to $478,834 projected for 2027 and total $2,247,122 during the Phase I planning period. During Phase II, non-airline revenues are projected to total $2,642,916, and during Phase III, non-airline revenues are projected to total $6,780,148. The overall annual growth rate for non-airline revenues is 3.4 percent. Total SWO revenues (including non-operating revenues) are expected to grow from $551,000 budgeted in 2024 to $611,431 projected for 2027 and total $3,846,411 during the Phase I planning period. During Phase II, revenues are projected to total $3,375,575 and during Phase III, revenues are projected to total $8,664,886. The overall annual growth rate for total Airport revenues is 3.4 percent.

Schedule E-5 also provides a comparison of SWO's airline cost per enplaned passenger (CPEP) versus non-hub airports with similar levels of aviation activity. The airline CPEP (all airline fees and rentals divided by enplaned passengers) is a measure that airlines use to compare their cost of operations among the airports they serve. SWO's airline CPEP is projected to grow from $4.62 budgeted in 2024 to an average of $4.88 during the Phase III planning period. Over the same period, the overall non-hub industry average drops slightly from $13.07 in 2024 to $12.80 during the Phase III[2].

This comparison indicates that SWO's airline rates and charges are much lower than the industry average and are projected to remain below the industry average throughout the planning period. This indicates that SWO has room to grow airline rates and charges in the future if it is determined that there is a need or justification to do so. SWO should continue to monitor their rates in comparison with the non-hub industry average and other comparable peer airports.

Schedule E-5 also provides a comparison of SWO's total operating revenue per enplaned passenger versus the industry average for other non-hub airports. SWO's total operating revenue per enplaned passenger is projected to grow from $21.32 budgeted for 2024 to an average of $22.43 during the Phase III planning period. Over the same period, the overall non-hub industry average drops slightly from $73.71 in 2024 to $72.20 during the Phase III[3].

SWO has several non-airline revenues including revenue generated from aeronautical and non-aeronautical land rents, building rents, and terminal related concessions. SWO and the City are actively working to generate additional revenues from these existing sources and by identifying new sources of revenue from the Airport operations. Additionally, as existing tenant leases expire, SWO should continue to review those agreements considering current airport operating costs, real estate fair market rental values, and current industry best practices.

SWO's overall policies for setting and negotiating airline and non-airline user fees and rental rates should continue to be reviewed and adjusted over time in order to establish rates that are more comparable with other airports having similar levels of aviation activity.

[2] Ibid.
[3] Ibid.

FINANCIAL ANALYSIS SUMMARY

The Financial Analysis Summary and Implementation Plan presented in Schedule E-6 (in **Appendix Six**) includes a Capital Cash Flow section that presents a summary of projected capital funding (from **Schedule E-2**) and scheduled capital expenditures (from **Schedule E-1**) with the cash flow that results from implementing the CIP. Schedule E-6 also includes an Operating Cash Flow section that summarizes totals for operating revenues (from **Schedule E-5**) and operating expenses (from **Schedule E-4**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities.

In **Schedule E-1**, practical approaches were provided for scheduling capital expenditures to match the availability of capital funding. **Schedule E-2** provided practical approaches for matching specific capital funding sources with each of the identified projects. As shown in **Schedule E-6**, year-end cash reserves are projected to remain extremely low and close to zero throughout the 20-year planning period based on the City practice of supporting the financial operations of SWO to the levels necessary to break even.

Based on the assumptions underlying the Financial Implementation Analysis summarized in the Capital Cash Flow section of **Schedule E-6**, implementation of projects in the CIP that are scheduled throughout the 20-year planning period are projected to be financially possible subject to substantial FAA discretionary support, identification of approximately $53.4 million in funding for projects with Other Unidentified Funding, and significant ongoing City financial support. If funding sources are not available in the timeframes needed for these projects and other alternative sources cannot be identified, then development of these projects will not be feasible during the period that is currently planned.

Implementation of other capital projects during the 2023-2042 planning period that have AIP discretionary grants indicated as a funding source are subject to the availability of those grants which are provided at the sole discretion of the FAA. If the identified portion of discretionary funding is not awarded by the FAA, then these projects will need to be delayed until funding is available.

Similarly, it should be noted that implementation of projects programmed for private third-party funding depends on favorable market demand conditions. If these favorable conditions do not occur, then the investment necessary for implementation of the associated projects may not be available in the time frames that are planned.

Additionally, as previously discussed, SWO is currently operating at a deficit and requires a subsidy from the City to cover operating expenses and minor capital outlays. The Financial Implementation Analysis assumes that the use of SWO's CARES Act grant funding is completely applied to capital and operating expenses by 2023. After 2023, it is assumed that City funding transfers will resume to support SWO operating expenses.

Finally, the Financial Implementation Analysis relies on achievement of the aviation activity and passenger enplanement forecast. Actual aviation traffic may temporarily vary from the projected levels of activity without a significant adverse impact on the capital program. If decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted, however,

that if the forecast activity levels are not met, then many of the planned capital improvements may not be necessary.

F. Recycling and Solid Waste Plan

SUMMARY

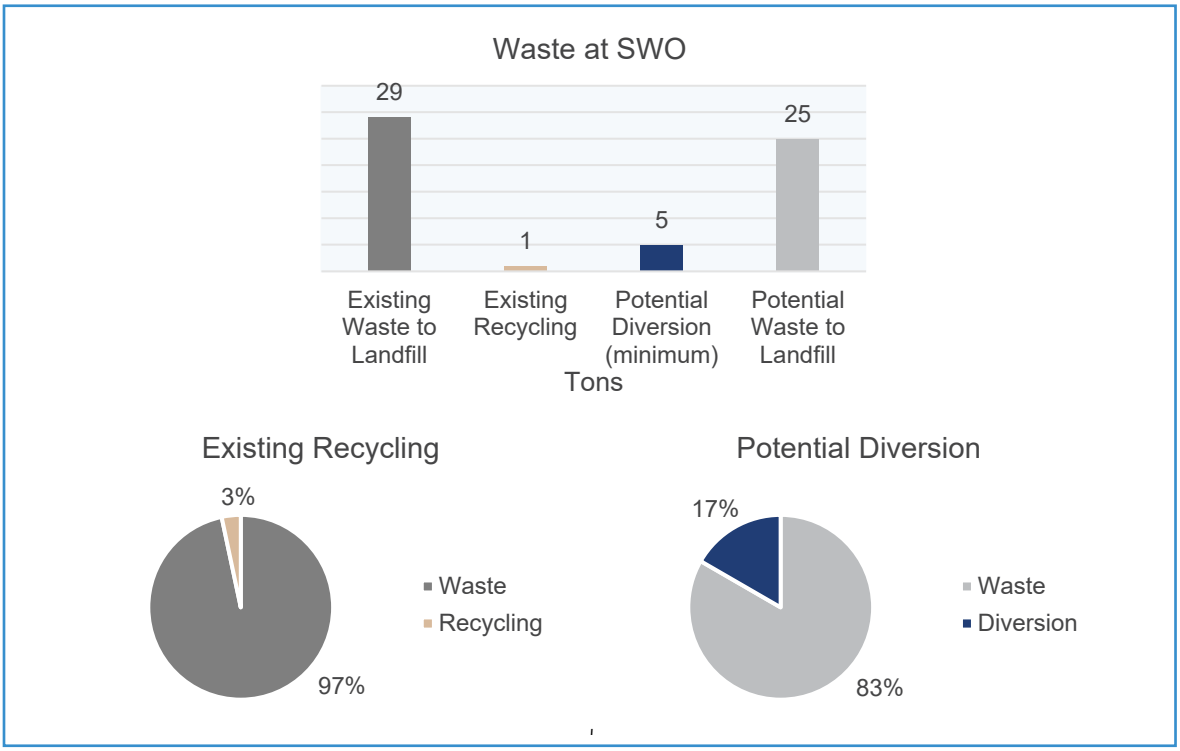
Planning for solid waste and recycling under the on-going master plan fulfills Stillwater Regional Airport (SWO)'s federal obligation under the Federal Aviation Administration (FAA) Modernization and Reauthorization Act of 2012, FAA Reauthorization Act of 2018, and associated guidance.#

SWO can reduce waste generation and increase landfill diversion by:

- Integrating waste diversion practices into airport operations.
- Improving purchasing practices, reducing disposable items, and reusing supplies.
- Enhancing the existing recycling program.
- Tracking and voluntarily reporting waste metrics and diversion progress.

It is estimated that SWO generates approximately 29 tons of landfill-bound waste annually, as well as an additional ton of comingled recycling. The recommended strategies contained in this chapter have the potential to divert at least five tons of general materials from the landfill a year. Reducing waste generation and increasing landfill diversion align with SWO's efforts to operate in an environmentally responsible manner.

Figure F-1: Potential Improvements to SWO Waste Stream



RECOMMENDATIONS

The following recommendations to improve waste management at SWO include waste reduction, reuse, and recycling strategies. Evaluation of each recommendation considers the estimated relative cost and diversion potential; the suggested implementation time frame; and noted alignment with best practices or standard programs. **Table F-1** shows the key for quick comparison of the impact of each recommendation on diversion.

Table F-1: Recommendation Key

Item	Icons	Significance
Relative Cost	$ $ $	Low cost
	$ $ $	Medium cost
	$ $ $	High cost
Estimated Diversion Potential		Low diversion potential
		Medium diversion potential
		High diversion potential
Benefits		Reduced Environmental Impact(s) *(For example, Reduced Resource Consumption, Emissions, and/or Pollution)*
		Cost Savings
		Support Community / Build Relationships
Alignment	BMP	Best Management Practice
	TRUE	BMP and Total Resource Use and Efficiency (TRUE) Certification program element

Recommendation 1: Integrate Waste Diversion in Airport Operations

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			BMP

Description

Waste diversion is the concept of avoiding and/or managing waste to avoid landfill disposal. Waste diversion strategies include practices such as reduction, reuse, donation, sustainable procurement, recycling, and composting. These strategies offer various levels of fiscal, environmental, and social benefits.

Action

It is recommended that SWO continue to integrate waste diversion concepts and practices into existing policies and operations, for example, in maintenance operations, purchasing practices, and tenant requirements.

Justification

Most of the municipal solid waste generated at SWO is collected for landfill disposal (see **Current Waste Management Program**). Waste diversion would reduce the volume of waste sent to the landfill as well as reduce the financial and social impacts of waste.

Information Needed

- Communication tools to reach SWO staff and tenants.
- Waste diversion information.

Action Plan

- Emphasize importance of waste diversion to SWO staff and tenants.
- Adopt additional waste diversion policy or integrate in existing guidance documents, including tenant lease language or contractor guidance.
- Identify sources of waste and promote strategies to avoid, reduce, or divert these materials.
- Continue existing practices such as double-sided printing, digital documentation, and water bottle filling stations.

Recommendation 2: Improve Purchasing Practices, Reduce, & Reuse

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			BMP

Description

To reduce the facility's volume of waste sent to the landfill, SWO should reduce waste generation and reuse materials where possible. SWO staff's existing purchasing practices may generate waste in the form of single-use and/or disposable items and supplies and tracking of these items could reveal opportunities for reduction and reuse.

Action

It is recommended SWO adopt a purchasing policy prioritizing durable (versus disposable) items and supplies that are reusable, recyclable, compostable, and/or made from recycled content. It is also recommended that SWO identify supplies and materials which can be avoided, reused on site, or donated to a third party.

Justification

Waste reduction is the most environmentally preferred waste management strategy as determined by the Environmental Protection Agency (EPA). Reduction and reuse simultaneously lower waste program costs by producing a smaller material stream.

Information Needed

- Purchasing records.
- Waste stream information.

Action Plan

- Adjust practices that generate waste (e.g., printing/physical media, housekeeping).
- Substitute durable alternatives for single use or disposable items in areas such as the administration office and staff areas.
- Reuse items and materials where possible and encourage reuse by passengers, tenants, and contractors.

Recommendation 3: Enhance Existing Recycling Program

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			TRUE

Description

To reduce the facility's volume of waste sent to the landfill, SWO should continue to recycle materials that cannot be diverted, reduced, or reused.

Action

It is recommended SWO maintain its existing recycling program and supplement current practices with additional receptacles, signage, and an education campaign. It is also recommended SWO expand its recycling program to include all materials accepted by the City of Stillwater.

Justification

Convenient receptacles, effective signage, and educational campaigns have been shown to increase participation and improve compliance with a recycling program. Recycling bins should be readily visible and instructional recycling signage would greatly increase the effectivity of designated recycling bins. An awareness campaign for employees, tenants, or visitors further compounds the program's effectiveness.

Information Needed

- Inventory of related signage and areas of significant waste generation.
- Protocol for communicating program to employees, tenants, and visitors.
- Input from janitorial staff and contractors regarding current practices and program effectivity.

Action Plan

- Introduce glass to recycling program.
- Convert surplus garbage bins into recycling bins with labeling.
- Collocate all recycling and garbage bins into pairs throughout facility.
- Right-size and standardize bins and bin liners to match capacity needs.
- Install color-coded, graphic instructional signage in public areas, such as Recycle Across America standardized recycling labels.
- Introduce restrictive bin covers to prevent waste contamination in recycling bins.
- Develop a promotional campaign to communicate information about recycling program to staff, tenants, and passengers.
- Monitor and adjust recycling program using feedback from Stillwater Waste Management Department.

Recommendation 4: Tracking and Reporting

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			TRUE

Description

Monitoring waste metrics provides feedback on the efficiency of diversion efforts. Sharing this information with stakeholders has been shown to increase participation in diversion practices.

Action

It is recommended that SWO begin to regularly estimate and track the volume of waste sent to the landfill and diverted through reduction, reuse, donation, recycling, or other strategies. Sharing the total costs and cost savings associated with these services is also recommended. Additionally, SWO should discuss these trends with the waste hauler and share this information with program stakeholders (SWO staff and tenants).

Justification

SWO does not currently track metrics associated with its waste or recycling. Trends associated with SWO's waste generation, landfill, diversion, and associated costs could indicate opportunities for improvement.

Information Needed

- Waste generation, disposal, and cost estimates.
- Simple tracking tool (spreadsheet).
- Estimates for volume of waste diverted by various strategies and avoided costs.
- Mechanism for communicating progress to stakeholders.

Action Plan

- Collaborate with Stillwater Waste Management Department to measure or estimate waste disposal.
- Obtain estimate of associated costs from City of Stillwater.
- Enter estimates into tracking tool.
- As strategies are implemented, update tracking tool to reflect waste avoided or diverted, and their associated costs.
- Evaluate data for additional opportunities to set and pursue waste diversion goals.
- Share and celebrate progress with stakeholders.

WASTE PLAN GUIDING ELEMENTS

Additional Recommendations for Consideration

In addition to the primary recommendations stated previously, it is suggested that other items could be implemented at SWO, which are presented in **Table F-2**.

Table F-2: Additional Recommendations for SWO Waste Recycling Plan

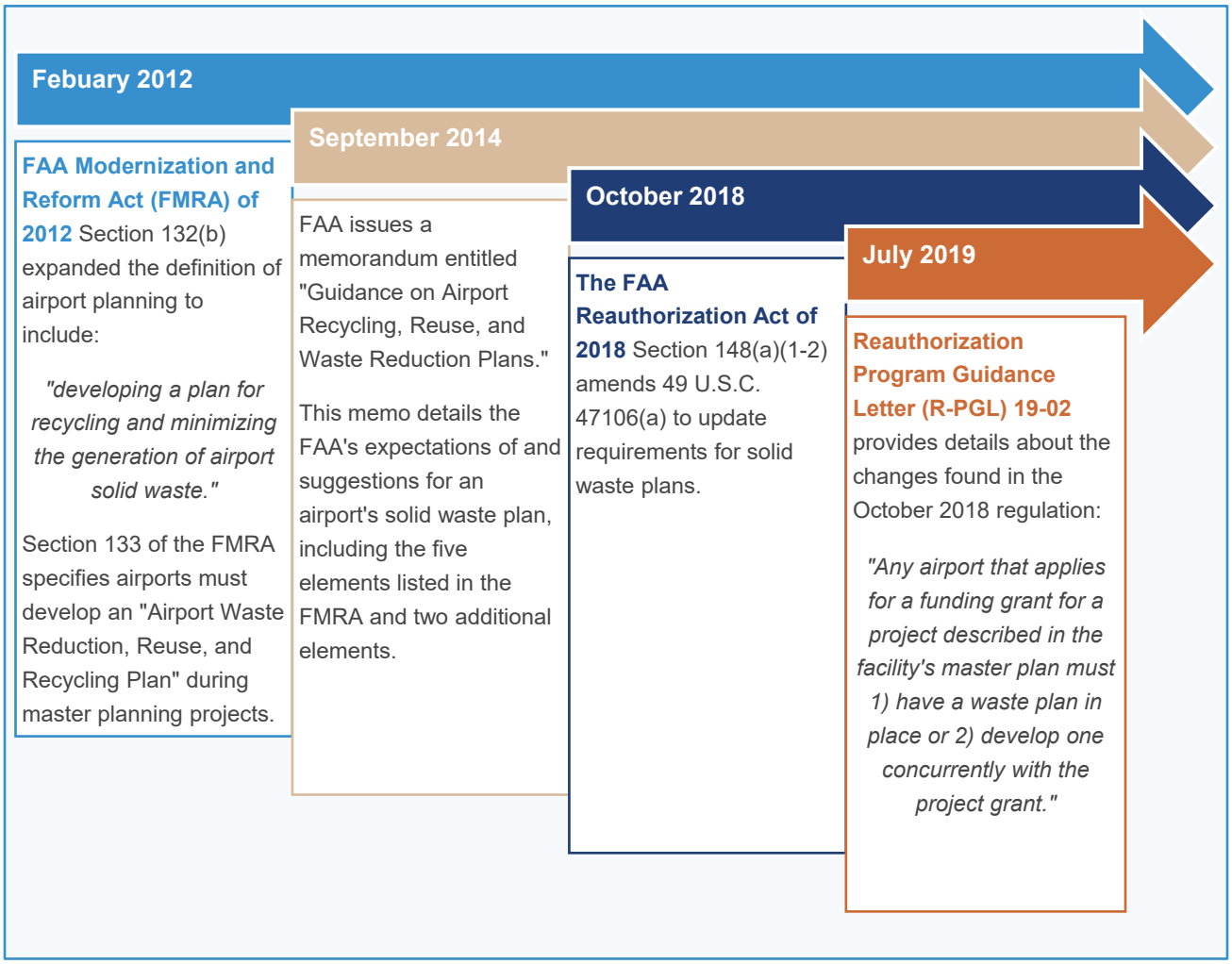
Recommendations Summary
Objectives and Targets Set specific, measurable, achievable, realistic, and time-bound (SMART) goals for SWO's waste program.
Tenant Requirements Revise rules and regulations and/or minimum standards to encourage or require waste diversion among tenants, including recycling.
Additional Facilities and New Development Consider waste diversion and management in the design and construction process of future airport projects.
Continuous Improvement Maintain and improve the recycling and waste program per the Plan Do Check Act cycle.

Source: Mead & Hunt.

Regulatory Background

Figure F-2 outlines the introduction timeline and specifics of FAA's waste planning requirement. The FAA provides content guidance for airport waste plans in the September 2014 memo on the topic (available on the FAA's website).

Figure F-2: FAA Solid Waste Recycling Planning Requirement Timeline and Details



Source: Federal Aviation Administration.

Figure F-3 details the elements which are required for a solid waste recycling plan per the FMRA (marked with an asterisk, *) or suggested for inclusion in a plan in the FAA Memo (marked with two asterisks, **). **Figure F-4** lists the factors influencing the scope and nature of an airport's waste program, as described in the FAA memo.

Figure F-3: Elements of Airport Solid Waste Management

Source: Federal Aviation Administration.

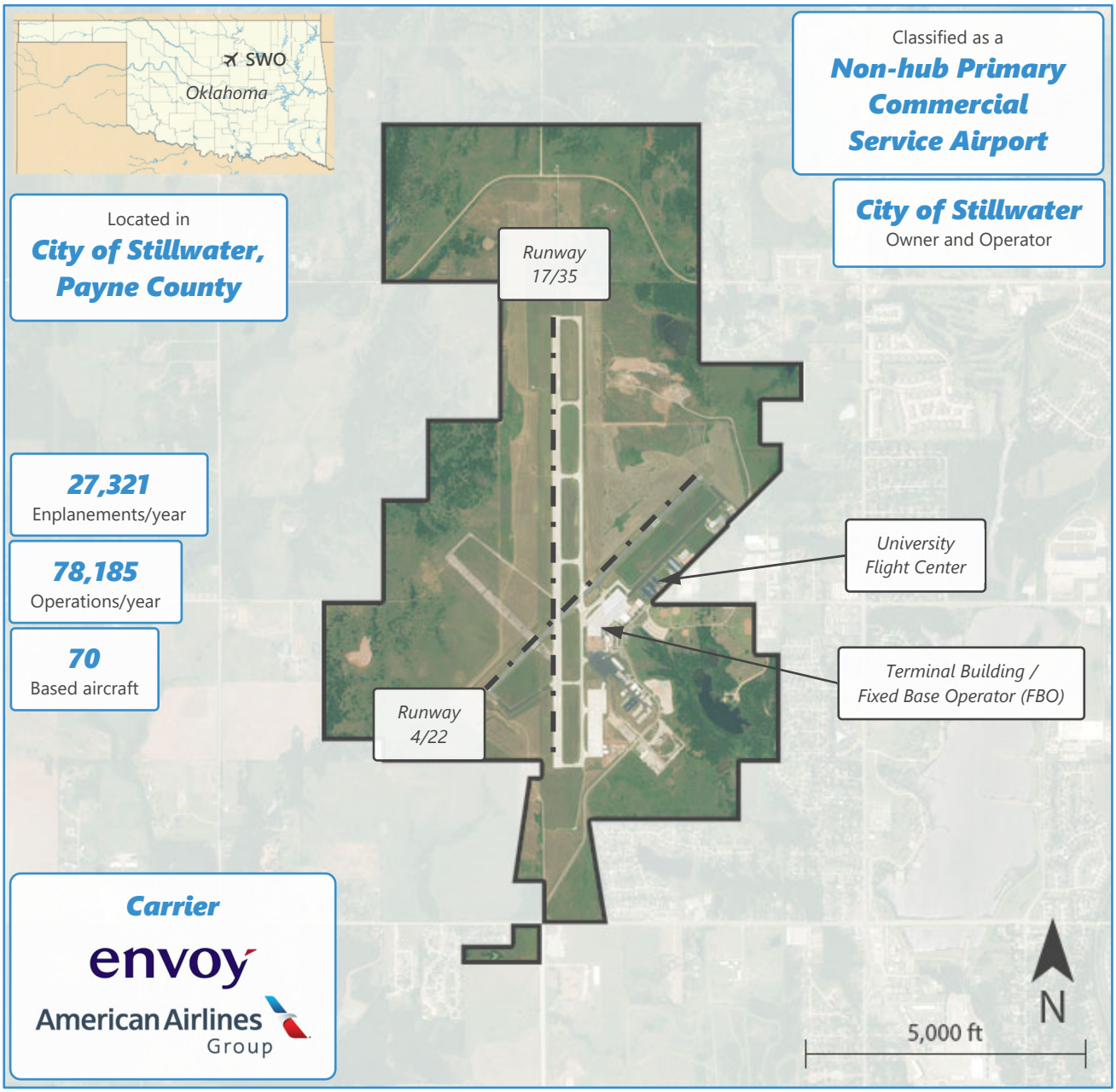
Figure F-4: Factors Influencing Airport Solid Waste Management Programs

Source: Federal Aviation Administration.

Airport Information

Figure F-5 shows a summary of background information about SWO, including its location, operations, air carrier, layout, classification, and governance.

Figure F-5: SWO Background Information



Sources: Stillwater Regional Airport; Google Earth; Alexrk – "USA Oklahoma location map".

Plan Scope

Municipal Solid Waste (MSW) consists of everyday items that are used and then discarded. This plan focuses on the management of MSW and other materials that may be recycled or disposed of in a municipal solid waste landfill. There are five primary types of MSW generated at airports:

- General MSW
- Food waste
- Green waste (yard waste)
- Deplaned waste
- Construction and demolition (C&D) waste.

This plan does not address the management of other waste types regulated by federal, state, or local laws, specifically: hazardous, universal, or industrial waste; waste from international flights, or C&D waste that is subject to special requirements/handling.

Facilities at SWO include buildings and areas over which SWO has a varying degree of control or influence over waste management practices. Some areas fall under direct control of SWO and its staff, while in other areas SWO has influence over but not direct control. According to FAA guidance, areas over which SWO has direct control or influence should be included in the Recycling, Reuse, and Waste Reduction Plan; areas outside SWO's direct control or influence may be excluded.

Table F-3 lists a breakdown of the areas SWO controls, influences, and neither controls nor influences.

Table F-3: Waste Management Areas at SWO

Management Level	Description
Areas under direct control	Public terminal areas • Parking and curbside • Ticketing / baggage claim area, restrooms, security queue, hold room
	Aircraft Rescue and Fire Fighting (ARFF) Station
	Airport Administration Areas • Office spaces • Conference rooms • Maintenance Facilities/SRE
Areas under influence	Terminal Tenants • TSA offices • Baggage screening • Envoy Airlines ticketing counter • Air Traffic Control Tower (ATCT)
	General Aviation (GA) facilities • Fixed Base Operator (FBO) Stillwater Flight Center • Private / leased hangars
	Oklahoma State University (OSU) Flight Center
Areas not under control or influence	TSA Security Checkpoint

Source: Stillwater Regional Airport.

Current Waste Management Program

The waste program at SWO is maintained by airport staff, and the City of Stillwater Waste Management Department directly manages waste collection. City garbage trucks collect waste and recyclable materials from SWO's dumpsters. Dumpsters are provided by the Waste Management Department for use by SWO. Recycling collection occurs only in the airport administration areas and in the Stillwater Flight Center FBO.

Figure F-6 shows the materials collected by the Stillwater Waste Management Department in SWO's existing recycling program.

Figure F-6: Items Currently Collected for Comingled Recycling at SWO

Source: Stillwater Regional Airport.

SWO's janitorial staff are managed by airport administration and are responsible for custodial activities in buildings and areas directly managed by the Airport, such as the public terminal and administration areas. Janitorial staff collect waste and recyclables from bins and transfer these materials to the appropriate dumpsters.

SWO's tenants (Envoy Airlines, OSU Flight Center, GA hangars, etc.) are responsible for custodial activities in their areas, including transferring waste to the appropriate dumpsters. Terminal tenants are responsible for housekeeping in their leased areas and use SWO's dumpsters. The OSU Flight Center, hangar tenants, and other aviation-related businesses at SWO are responsible for individual housekeeping and contracting for their own waste dumpsters and recycling services.

Infrastructure

Figure F-7 and **Figure F-8** detail the existing waste infrastructure in place at SWO.

Figure F-7: Existing Receptacles Collected by Waste Hauler

Figure F-8: Existing Terminal Building Infrastructure

Waste Audit

An evaluation of SWO's information and records, as well as aviation industry waste and recycling trends, supported efforts to identify the source, composition, and quantity of waste generated at SWO, including areas under SWO's direct control or influence. This information then served as a foundation to identify opportunities to improve and monitor program effectiveness.

Quantity

29
Annual tons of MSW

1
Annual ton of Recycling

These volumes are based upon the capacity and frequency of collection service for each of the facility's receptacles and the EPA's volume-to-weight conversion factors for MSW.

Purchases

SWO staff do not currently track the quantity and type of disposable items and supplies purchased for the facility. This information could provide insight on some of the materials coming into airport facilities that will go back out as waste (other materials are brought on-site by visitors, employees, and vendors). Identifying and tracking the type and quantity of all disposable items purchased will allow SWO to identify opportunities to reduce outgoing waste, including:

- Some items that could be eliminated
- Items that have reusable or recyclable alternatives.

Sources and Composition

Based on the activities taking place at SWO, a varied waste stream can be expected. **Table F-4** lists each area included in the scope of this plan and the type(s) of waste likely generated there. A waste sort could also be used to identify opportunities to improve the composition of the waste stream (by item substitution and by improving recycling to reduce the volume of waste, among others).

A physical waste material sort could provide more detailed information about the specific composition of waste at SWO. This information may include:

- Types of items included in each general category
- Contamination rate of the recycling stream
  (items that are not recyclable in the recycling bins)
- Recovery rate for recycling
  (the proportion of recyclable items that are segregated properly).

Table F-4: SWO Waste by Area and Material

Area | Material	Office Paper	Newspapers	Magazines	Plastic	Aluminum	Cardboard	Glass	Food Waste	Paper Products	Liquids	Toiletries	Deplaned Waste	Packaging	Styrofoam	Metals	Green Waste	C & D Waste	Other Waste
Terminal Building																		
Public areas		x	x	x	x		x	x	x	x			x					x
Airline areas	x	x	x	x	x	x	x	x	x	x		x	x					x
Tenant areas	x	x	x	x	x	x	x	x	x	x			x					x
Airport administration offices	x	x	x	x	x	x	x	x	x				x					x
TSA security queue		x	x	x	x		x	x		x	x		x					
Airport Support Buildings																		
Maintenance building	x	x	x	x	x	x	x	x	x	x			x	x				x
Airport maintenance facilities			x	x	x	x				x			x		x	x	x	x
GA facilities	x		x	x	x	x	x							x				
Other Airport Buildings																		
GA and commercial hangars				x	x	x	x	x		x			x					
Cargo tenant facilities	x			x	x	x	x	x					x	x				

Source: Stillwater Regional Airport.

Review of Recycling Feasibility

There are several factors that influence the feasibility of recycling and other waste diversion strategies at an airport. The project team assessed these factors for influence at SWO.

Guidelines and Policies

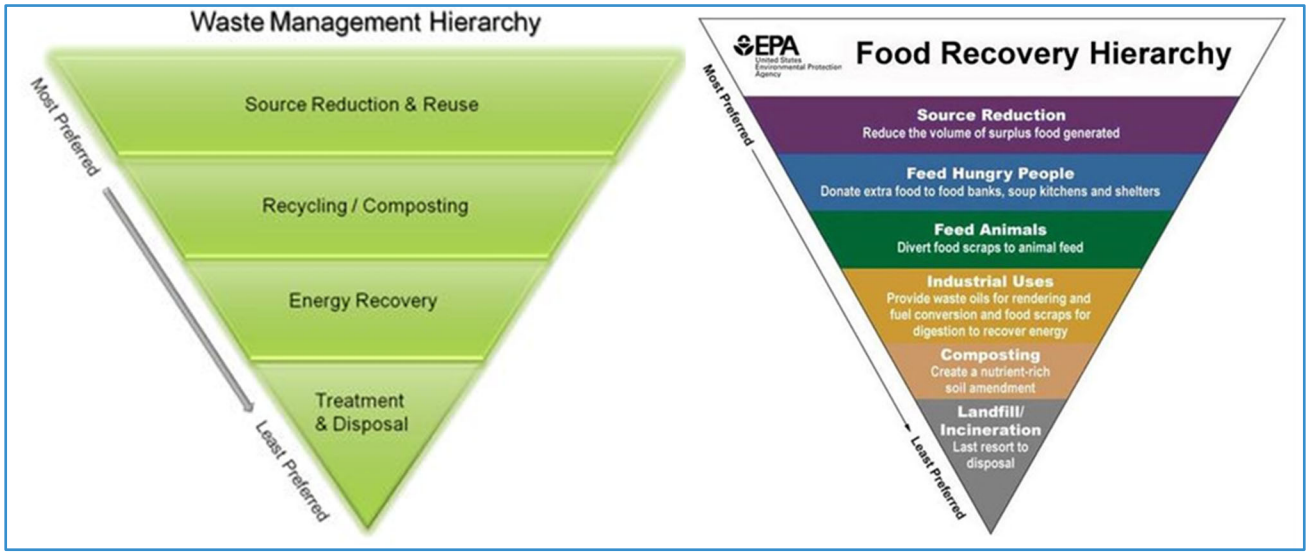
To evaluate SWO's existing diversion plan in the context of local, state, and national requirements, the project team reviewed federal, Oklahoma state, and local-level waste and recycling regulations, policies, and factors.

Federal

As described in **Regulatory Background**, the FAA's definition of airport planning includes planning for recycling and waste minimization. The EPA is responsible for developing a solid waste management program under the Resource Conservation and Recovery Act (RCRA) and related policies and guidance. RCRA provides the framework for management of hazardous and non-hazardous waste. All generators of hazardous waste, including airports, are required to comply with RCRA and all other federal waste laws and regulations.

Figure F-9 shows a hierarchy of waste management strategies developed by the EPA. This hierarchy on the left ranks these strategies from most- to least-environmentally preferred and places emphasis on reducing, reusing, and recycling. In addition to the general waste management hierarchy, the EPA has also developed a preference ranking of management strategies for food waste, as shown in the figure at the right.

Figure F-9: Waste Management and Food Recovery Hierarchies



Source: Environmental Protection Agency.

State

The Oklahoma Department of Environmental Quality (DEQ) oversees the state's waste management program. Oklahoma statute 252:515 states, "solid waste collection and transportation services shall be provided by all incorporated generators of solid waste located within the corporate city or town limits." While municipalities are not required to recycle under the statute, governmental entities may seek reimbursement for recycling programs under the Oklahoma Recycling Initiative.

Local

Payne County does not currently have a county-wide waste management program. All waste and recycling in the City of Stillwater is managed by the Stillwater Waste Management Department, which offers residential and commercial trash and recycling services for all city residents. The Oklahoma DEQ oversees the City's waste program, and accepts all recyclable materials listed in **Table F-5**.

Table F-5: Accepted Recyclable Items in the City of Stillwater

Disposal Area	Accepted Recyclable Items				
Curbside	• All paper	• Aluminum/tin cans	• Cardboard	• Plastics 1,2, & 5	• Glass
Drop-Off	• All paper • Plant material • Textiles/clothing	• Aluminum/tin cans • Antifreeze • Car batteries	• Cardboard • Appliances • Scrap metal	• Plastics 1,2, & 5 • Tires • Motor oil	• Glass • Rechargeable batteries

Source: Oklahoma Department of Environmental Quality.

Drivers and Constraints

Many factors affect recycling feasibility at SWO. Such factors include both opportunities for growth, such as local commitments, and challenges to the implementation of a recycling plan, such as the availability of region-wide recycling infrastructure.

Airport Policy, Commitment, and Support

The willingness of SWO staff, contractors, and tenants to support the existing recycling plan are critical to the program's success. Without committing resources such as funding, labor and time, space, and access to secure areas, a waste management program could struggle.

SWO's staff remain committed to the existing recycling program and wish to oversee its expansion into additional areas. They assert recycling and waste reduction represent opportunities for energy and cost savings, as well as providing a genuine service to the community.

Local Dedications

Based on the resources allocated to local recycling programs, the City of Stillwater appears to generally support waste diversion, responsible waste management, and sustainable operations. Based on the availability of residential and commercial recycling, this plan assumes the residents of the communities surrounding SWO, and therefore its employees and visitors, have been exposed to recycling, receive on-going messaging about its importance, and are generally supportive of recycling efforts.

Local Markets, Logistics, and Infrastructure

Markets for recycled materials fluctuate based on many factors and interactions. Local waste haulers typically accept materials that can be recycled cost-effectively in the area. Manufacturers purchasing recycled material need a predictable and ready for use product; therefore, recycling facilities are discriminatory about what materials they accept. They almost unilaterally prefer materials that are of high value, clean, and easy to separate.

The drop-off location for MSW in the City of Stillwater is the Republic Services Stillwater Landfill operated by Republic Services. The landfill facility is located approximately five miles northeast of SWO. Recycling is dropped off at the Payne County Recycling Center and it located approximately 10 miles south of SWO. Both facilities have adequate capacity to serve SWO and the local area for the foreseeable future.

Partnerships

American Airlines, Envoy Airlines' parent company, has established a sustainability program that includes elements of waste diversion and recycling for both passengers and internal operations. American Airlines has had an aluminum can recycling program since 1989, and internal operations reflect waste reduction and diversion through minimizing paper use and recycling electronic waste.

Aligning the SWO program with air carrier practices, like those of American's, provides opportunities for mutually beneficial agreements. SWO can reduce its environmental impact and, by helping the air carriers reduce their impact, generate goodwill with the local community.

Costs

Airport staff strive to operate SWO to be as self-sustaining as is feasible; therefore, it is imperative that programs implemented and maintained at SWO, including recycling and other waste diversion strategies, are as cost-effective as possible. See **Financial Analysis** for more information.

Review of Waste Management Contracts and Tenant Leases

The FAA memorandum titled "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans" explains that the purpose of reviewing waste management contracts is to "identify opportunities for improving (waste) program scope and efficiency, as well as identify constraints." By reviewing contracts and tenant leases for language pertaining to waste management practices, the waste plan may appropriately identify opportunities to encourage responsible waste management for all levels of airport activity.

The Consultant reviewed tenant leases for provisions related to waste management. The contracts detail general housekeeping requirements and related expectations for managing trash, but they provide no information about or requirement to reduce waste or recycle. The contracts do not necessarily impede recycling or other waste management strategies, but neither do they explicitly require conformance with or support of any future Airport-related waste efforts.

Financial Analysis

According to the FAA memo "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans," an analysis of the financial aspects of waste management assists airport sponsors in determining the cost versus benefit of all existing and proposed enhancements to an airport's practices and should include capital costs, physical infrastructure, transport, and labor.

A financial analysis of the cost for waste management at SWO was not conducted for this plan because the City of Stillwater serves as the waste service provider for all City facilities, including SWO. As a result, SWO does not receive invoices for waste collection services. It is anticipated that reducing and diverting waste generated at SWO would reduce costs through adjustments to the waste collection schedule and size of waste dumpsters required at the facility.

WASTE GLOSSARY

(Sorted by chronology)

FAA Modernization and Reform Act of 2012 (FMRA) – legislation that seeks to improve aviation safety and capacity of the national airspace system and provide a stable funding system.

FAA Reauthorization Act of 2018 – reauthorization of FMRA 2012 to extend funding and administrative authority to the FAA.

Total Resource Use and Efficiency (TRUE) – Zero waste certification program administered by the Green Business Certification Inc. (GBCI).

Environmental Protection Agency (EPA) – independent agency of the US government that establishes policies that protect the natural environment.

Reauthorization Program Guidance Letter (R-PGL) 19-02 – implements provisions to FAA Reauthorization Act of 2018 that changed project eligibility, scope, or funding under 49 U.S.C., Chapter 471.

Municipal Solid Waste (MSW) – everyday items that are used and then discarded. There are five primary types of MSW generated at airports:

- **General MSW** – common inorganic waste, such as product packaging, disposable utensils, plates and cups, bottles, and newspaper. Less common items, such as furniture and clothing, are also considered general MSW.
- **Food waste** – either food that is not consumed or the waste generated and discarded during food preparation. Food waste and green waste make up a waste stream known as compostable waste.
- **Green waste (yard waste)** – tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities. Food waste and green waste make up a waste stream known as compostable waste.
- **Deplaned waste** – waste removed from passenger aircraft. These materials include bottles and cans, newspaper and mixed paper, plastic cups, service ware, food waste, food-soiled paper, and paper towels.
- **Construction and demolition (C&D) waste** – any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipes, land clearing debris, cardboard, and salvaged building components.

Resource Conservation and Recovery Act (RCRA) – federal law of the US governing the disposal of solid or hazardous waste.

Oklahoma Department of Environmental Quality (DEQ) – Oklahoma state body dedicated “to protect and improve public health and our environment.”

APPENDIX ONE. SWOT Analysis

STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT) ANALYSIS

Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a strategic evaluation tool frequently used to identify existing influences, either positive or negative, in any number of situations. The SWOT analysis is employed early in the planning process, and it closely examines the four primary aspects in how they may influence the outcome of a project:

- **Strengths –** Internal characteristics that provide an advantage over others.
- **Weaknesses –** Internal characteristics that create a disadvantage compared to others.
- **Opportunities –** External elements that can be capitalized upon.
- **Threats –** External elements risks that can be detrimental.

These four components of the acronym can also be shown visually through the matrix shown below.

	Helps Progress	Harms Progress
Within Airport Influence	**Strengths**	**Weaknesses**
Outside Airport Influence	**Opportunities**	**Threats**

Stillwater Regional Airport (SWO or the Airport) is an important city economic asset with ample available land providing valuable properties for aviation development, therefore this method was used to aid in the development of goals, objectives, and visions for the Airport.

The following SWOT factors were identified by the Committee during the initial kick-off meeting and will be addressed throughout the Study:

Strengths

- Centrally located in the US
- Oklahoma State University (OSU) Flight Center
- Regularly scheduled commercial service operations
- Good pavement condition
- Contract Air Traffic Control Tower (ATCT)
- Community support
- 1,000 acres directly owned by the Airport, not including OSU or other surrounding properties
- Runway length can accommodate all types of aircraft operations

- Annual fuel sales exceeding half a million dollars
- Many services offered on the airfield
- Strong GA community
- Few to no noise complaints
- Research and Development (R&D) opportunities for Unmanned Aerial Systems (UAS)

Weaknesses

- No dedicated funding source for development activity
- Older and outdated facilities
- Lack of automation in the tower
- No facilities to house R&D airfield facilities
- No utilities supporting development of property on SWO's western side
- SWO not financially self-sufficient
- No specialty services incentivizing users to base their aircraft at SWO
- High turnover rate for ATCT personnel and TSA agents
- Difficult rightsizing commercial service aircraft to best fit the area

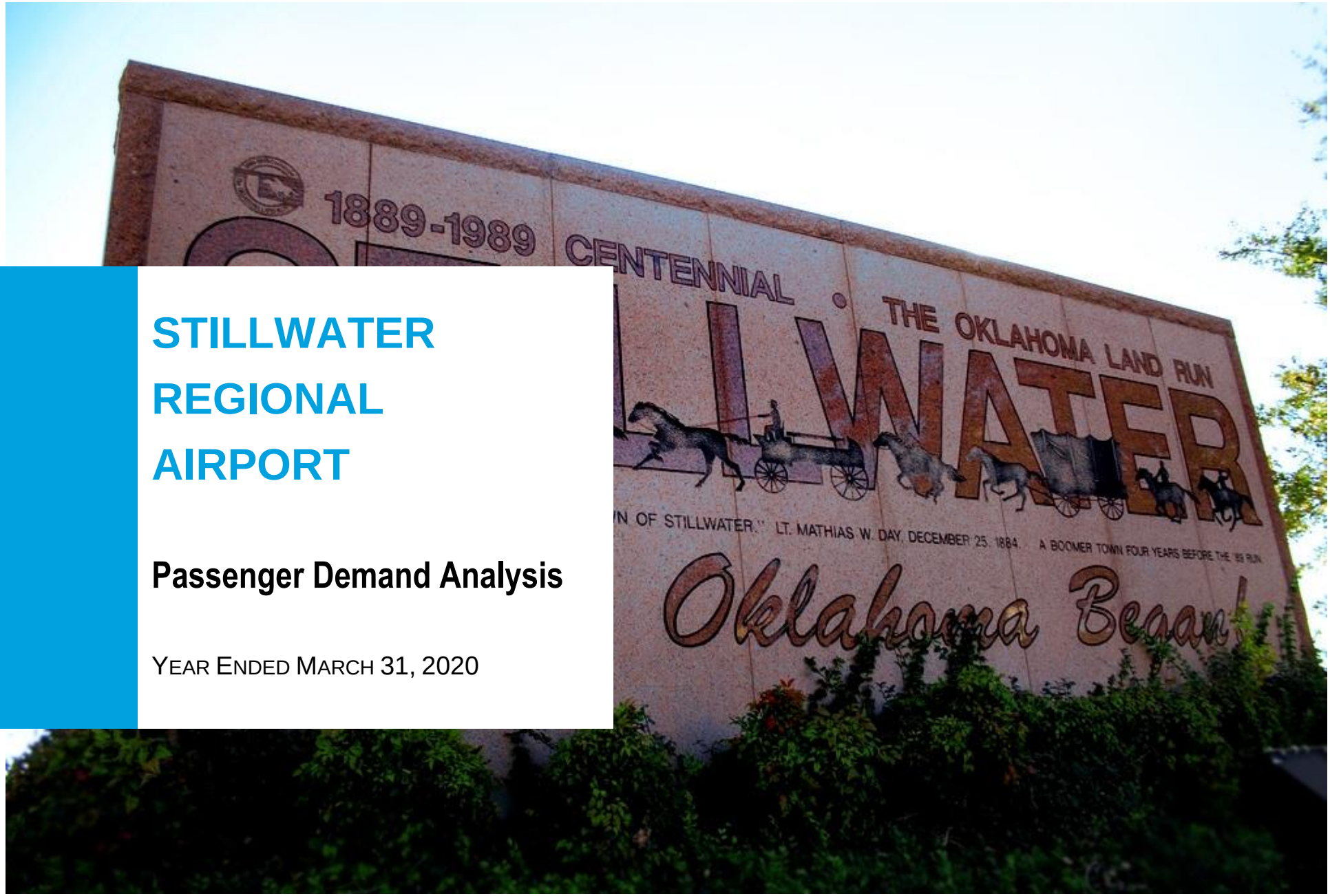
Opportunities

- Room for expansion of crosswind RWY (4/22)
- Room and demand for aircraft hangar construction
- OSU Flight School program growth
- University research group with UAS
- State and Department of Commerce pushing aerospace development
- Expansion of commercial service market
- Diversifying aircraft fuels and electronic aircraft

Threats

- COVID and its variants
- Uncertainty of commercial service market
- Declining funding for education
- Low-cost carriers at Oklahoma City and Tulsa
- No clear package drop-off locations result in unattended packages in the terminal building
- Pending economical concerns
- Change in airline business models
- Laws impacting funding and subsidies for airports

APPENDIX TWO. Passenger Demand Analysis



STILLWATER REGIONAL AIRPORT

Passenger Demand Analysis

YEAR ENDED MARCH 31, 2020

Mead & Hunt

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INTRODUCTION & METHODOLOGIES

INTRODUCTION

Achieving air service success requires thoroughly understanding the market and the needs of local stakeholders, airlines, and trends impacting the aviation industry. Air service development efforts are most effective when they follow a plan consistent with industry trends, the air service needs of the community and specific strategies of target airlines for additional air service. Stillwater Regional Airport (SWO) is subject to several trends that impact air service efforts, including:

- The years prior to the Coronavirus Disease 2019 (COVID-19) pandemic included major airline consolidation, fleet renewal with larger aircraft and rapid growth by ultra-low-cost carriers.
- The pandemic had an unprecedented worldwide impact on the airline industry. Airlines significantly reduced capacity as passenger demand dropped 90 percent in April 2020.
- Demand has slowly increased, but, in June 2021, capacity from the U.S. to Europe and Asia was still down more than 70 percent, and U.S. domestic capacity was down 14 percent. Even with the capacity reductions, March 2021 airline load factors were 21 points lower than the prior year.
- Prior to the pandemic, the industry was enjoying record profits due to lower fuel prices and less competition. Due to the pandemic, airlines have required financial aid and subsidies, but most have restructured debt and reduced costs to reduce cash burn and position for a return to profitability as demand returns.
- At the end of 2020, one-fourth of the U.S. passenger airline fleet was inactive, but airlines are seeing stronger demand in 2021 as the rate of vaccinations accelerate and the economy improves.
- Incentives for new service continue to be important to airline decision-making.
- Low-cost carriers and ultra-low-cost carriers, as a group, are growing faster than the majors as domestic leisure demand returns faster than business traffic during the pandemic.

With these trends in mind, the responsibility is on airports to monitor their market and be proactive with their air service development efforts, especially when performance issues are noted. When service improvements or new service is

sought, it is important that airports and communities know and understand their market, and the *Passenger Demand Analysis* is a critical tool in helping communities do so.

The ultimate impact on the airline industry from the pandemic is yet to be determined. There will be a long recovery period before the U.S. demand for air travel returns to normal conditions. This study reviews historical trends and demand as it existed through the first quarter of 2020. Assumptions about the pandemic-affected air travel environment have not been incorporated because there is not currently a clear view to where this evolving situation will lead. However, as with every other challenge to industry demand, the industry will rebound and air travel will continue to be a vital and growing element for economic development throughout the U.S. While the evolving environment will create temporary setbacks, the observations and recommendations of this study are still valid and important for long-term air service development.

OBJECTIVES

The objective of the *Passenger Demand Analysis* is to develop information on the travel patterns of airline passengers who reside in the SWO catchment area. The report provides an understanding of the SWO situation and formulates strategies for improvement. This analysis includes an estimate of total airline passengers in the catchment area and related destinations as well as an assessment of the air service situation at SWO.

METHODOLOGY

The *Passenger Demand Analysis* combines Airline Reporting Corporation (ARC) ticketed data and U.S. Department of Transportation (DOT) airline data to provide a comprehensive overview of the air travel market. For the purposes of this study, ARC data includes tickets purchased through travel agencies in the SWO catchment area (**Exhibit 3.1**, page 5) as well as tickets purchased via online travel agencies by passengers in the SWO catchment area. It does not capture tickets issued directly by airline web sites (e.g., www.aa.com, www.united.com) or directly through airline reservation offices. The data used include tickets for the zip codes in the catchment area, NOT all tickets. As a result, ARC data represents a sample to measure the air travel habits of catchment area air travelers. Data for travel agencies located within the catchment area is reported by the zip code of the travel agency. Online travel agency data (e.g. Expedia, Orbitz, and Travelocity) is reported by the customer zip code used to purchase the ticket. Although limitations exist, ARC data accurately portrays the airline ticket purchasing habits of a large cross-section of catchment area travelers. A total of 7,272 ARC tickets for the year ended March 31, 2020, were used in this analysis. Adjustments were made for Allegiant Air, Frontier Airlines and Southwest Airlines since they have limited ARC representation.

EXECUTIVE SUMMARY

DATA SOURCE/ CATCHMENT AREA

The *Passenger Demand Analysis* includes 7,272 ARC tickets from the SWO catchment area for the year ended March 31, 2020. The catchment area has an estimated population of 250,782 in 2020 and 60 zip codes. In addition to ARC data, Diio Mi origin and destination data and schedule data is used throughout the report.

DEPARTURES AND AVAILABLE SEATS

For the year ended March 31, 2020, SWO had service by one airline, American Airlines, to one hub/destination, Dallas-Fort Worth International Airport (DFW). SWO had 875 scheduled departures and 39,550 seats for the year ended March 31, 2020, with the peak month for seats in May.

AIRPORT USE

Fifteen percent of catchment area travelers used SWO, while 54 percent diverted to Oklahoma City's Will Rogers World Airport (OKC), 19 percent to Tulsa International Airport (TUL), 6 percent to DFW and 6 percent to Wichita Dwight D. Eisenhower National Airport (ICT).

In a comparison of domestic versus international itineraries, 15 percent of domestic travelers and 14 percent of international travelers used SWO. OKC served 55 percent of domestic and 47 percent of international travelers, while TUL served 19 percent of domestic and 14 percent of international travelers. DFW served 5 percent of domestic and 21 percent of international catchment area travelers. ICT served 6 percent of domestic and 4 percent of international travelers. Compared to the study completed for the year ended December 31, 2018, SWO's retention improved 1 percent overall, as the domestic retention increased slightly and the international retention decreased slightly.

TRUE MARKET

SWO's total air service market, called the true market, is estimated at 351,291 annual origin and destination passengers. Domestic travelers accounted for 318,455 of the total true market (91 percent). International travelers made up the remaining 32,836 passengers (9 percent). Compared to the study completed for the year ended December 31, 2018, the total true market increased 3 percent, with the domestic true market increasing 2 percent and the international true market increasing 12 percent.

DESTINATIONS

Forty-eight percent of travelers were destined to or from one of the top 25 markets. Denver was the number one destination with 4 percent of passengers. SWO retained only 5 percent of passengers to/from Denver. The next largest markets were Orlando-International, Atlanta, New York-LaGuardia and Seattle, with retention of 15, 10, 15 and 9 percent, respectively. Four of the top 25 markets had retention rates greater than 20 percent. Two markets had retention rates lower than 10 percent.

REGIONAL DISTRIBUTION

Twenty-five percent of travelers were destined to the Southeast region, followed by 14 percent to the West region. Travel to the Southwest region was the third highest. SWO's highest retention occurred in the Southwest region at 25 percent and the West region at 17 percent. The lowest retention occurred to the Northwest region (9 percent) and Alaska (5 percent). Of the international travelers, the top three international regions were Mexico and Central America, Europe, and Asia with the highest SWO retention to Asia (20 percent) and the lowest retention to Mexico and Central America, South America, and the Caribbean, each with retention of 11 percent.

AIRLINES USED

As the only service provider at SWO, American had the largest share of flown passengers based on U.S. DOT data at SWO. Airline share of diverting passengers were estimated using an approximation of carrier share with ARC data. An adjustment was made for Allegiant Air, Frontier Airlines and Southwest Airlines. Carrier shares of diverting SWO catchment area passengers were American with 37 percent, United Airlines with 24 percent, Southwest with 17 percent and Delta Air Lines with 16 percent. Alaska Airlines, Frontier Airlines and Allegiant each had a share of 2 percent or less while other various airlines served 2 percent.

PASSENGER ACTIVITY

Beginning with the initiation of service in the year ended March 31, 2017, SWO's passengers have increased each year since the first year, increasing 4.8 percent from 2019 to 2020. OKC and TUL had declining passengers while DFW and ICT passengers increased by less than 1 percent over the same period.

DOMESTIC AIRFARES

SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW. In individual markets, SWO had a higher fare than the highest fare at all of the competing airports in 14 of the top 25 markets. The highest fare difference compared to the highest fare at competing airports (greater than $50) was in the Denver, Phoenix-Sky Harbor and Portland markets.

AVERAGE FARE TREND

Overall from the year ended March 31, 2017 to 2020, average domestic fares increased at a CAGR of 3.3 percent at SWO, below the increase for DFW of 4.4 percent and above the increase for ICT of 0.7 percent. OKC's and TUL's fares decreased at CAGRs of 1.7 and 1.2 percent, respectively. In the latest year-ended period, SWO's fare differential compared to each of the competing airports decreased. The fare differential decreased by $5 compared to OKC, $6 compared to TUL, $3 compared to ICT and $8 compared to DFW.

NONSTOP SERVICE

For the year ended March 31, 2020, SWO had nonstop service to one of the top 25 catchment area destinations with an average of 17 weekly departures and one destination overall, DFW. OKC had service to 18 of the top 25 markets with an average of 412 weekly roundtrips, while TUL had service to 12 of the top 25 destinations with 295 weekly frequencies. DFW had service to 24 of the top 25 destinations and 259 total destinations. ICT had service to nine top 25 destinations with 215 weekly frequencies on average.

AIR SERVICE OPPORTUNITIES

SWO is one of the few communities in the U.S. that had no commercial service since deregulation and was able to successfully recruit traditional, legacy service. SWO needs to continue to concentrate on improving passenger levels on its flights, with load factors approximating 71 percent for the 12-months ended March 31, 2020. While this is above many peer markets at DFW, it is substantially below the industry and American averages. The revenue per available seat mile (RASM) for SWO also tends to be below many of its peer markets due to lower average fares. SWO should work with American to achieve average fares that are a consistent $30 to $40 one-way premium over what the fares for American are at OKC and TUL.

As SWO continues to recover post-pandemic, additional flights or capacity through use of larger aircraft are potential opportunities. In the near term, it is unlikely that SWO will be able to add service to a new hub either on American or a different airline until SWO is able to consistently have a RASM that is on par or above peer markets. Once RASM improves, new service to a new hub such as Chicago O'Hare International Airport on American or new service on United Airlines to Denver is possible.

AIRPORT USE

To understand airport use, it is important to understand the relative size of the catchment area, current air service and passenger activity. SWO's use was determined using year ended March 31, 2020, ARC data for the zip codes from the catchment area.

AIRPORT CATCHMENT AREA

An airport catchment area, or service area, is a geographic area surrounding an airport where it can reasonably expect to draw passenger traffic and is representative of the local market. The catchment area contains the population of travelers who should use SWO considering the drive time from the catchment area to competing airports. This population of travelers is SWO's focus market for air service improvements and represents the majority of travelers using the local airport. **Exhibit 3.1** identifies the SWO catchment area. It is comprised of 60 zip codes within the U.S. with a population of approximately 250,782 in 2020[1].

EXHIBIT 3.1 SWO CATCHMENT AREA

[1] *Source: U.S. Census Bureau, Woods & Poole Economics, Inc.*

AIR SERVICE

Table 3.1 provides SWO's departures and seats by month for the year ended March 31, 2020. One airline, American Airlines, served SWO to one destination, DFW. There were 875 scheduled departures for the 12-month period with two to three daily departures and 39,550 annual seats, with the peak month for seats in May.

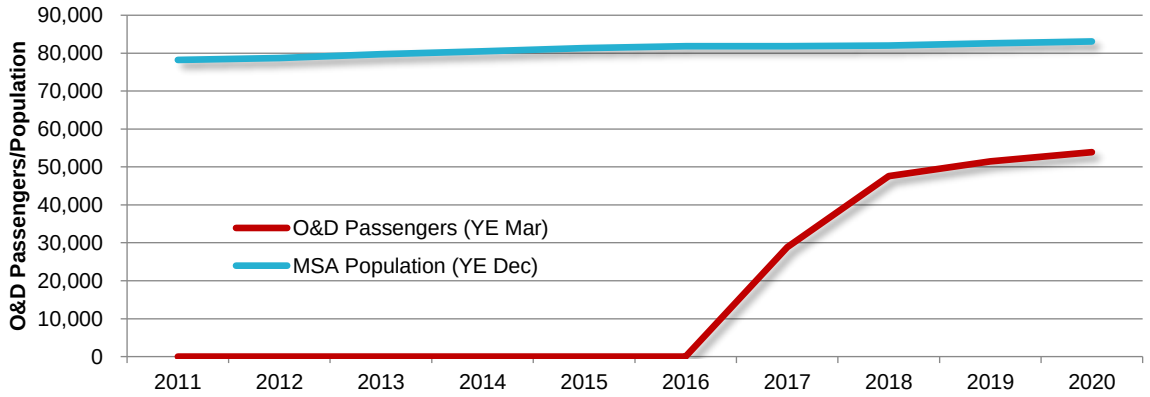
TABLE 3.1 DEPARTURES AND SEATS BY AIRLINE AND DESTINATION

DESTINATION	MARKETING CARRIER	CY 2019									CY 2020		
		APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Dallas, TX (DFW)	American	60	87	86	86	85	79	78	69	68	59	56	62
Total Departures		**60**	**87**	**86**	**86**	**85**	**79**	**78**	**69**	**68**	**59**	**56**	**62**
Total Seats		**2,640**	**3,828**	**3,784**	**3,790**	**3,740**	**3,632**	**3,618**	**3,264**	**3,232**	**2,764**	**2,530**	**2,728**

PASSENGER AND POPULATION TRENDS

Exhibit 3.2[2] plots passenger and population trends from 2011 to 2020. The Stillwater, Oklahoma, Micropolitan Statistical Area (Micro) was used for the growth trend of the SWO catchment area population. Since the initiation of commercial air service in the year ended March 31, 2017, passengers have grown each year, with a 4.8 percent growth rate for the year ended March 31, 2019, to the year ended March 31, 2020, while the population grew only 0.6 percent from calendar year 2019 to 2020.

EXHIBIT 3.2 PASSENGERS AND POPULATION TRENDS



[2] *Source: Diio Mi; Woods & Poole Economics, Inc.*

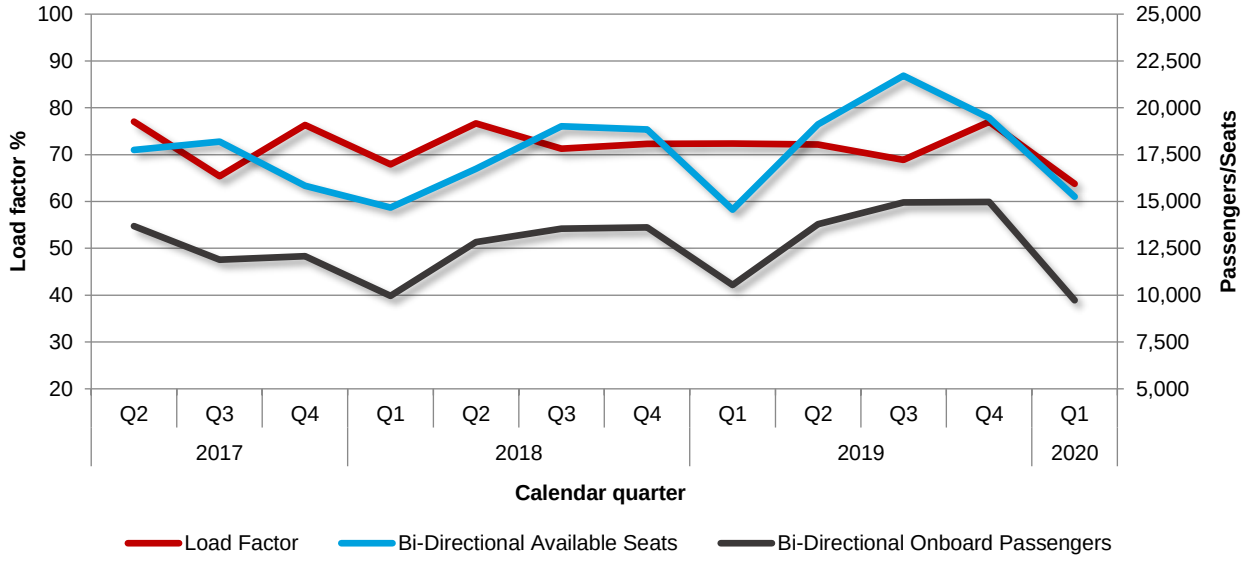
The average load factor decreased in three of the last four quarters year-over-year with an increase in seats in each of the last four quarters.

LOAD FACTOR, AVAILABLE SEATS AND PASSENGERS

Exhibit 3.3 shows SWO's bi-directional available seats, bi-directional onboard passengers and load factors for arrivals and departures by quarter from the second quarter 2017 through the first quarter 2020. The average load factor decreased in three of the last four quarters year-over-year with an increase in seats in each of the last four quarters. The lowest load factor during the 12-quarter period was in the first quarter of 2020 at 64 percent with part of March impacted by the pandemic. The high was in the second quarter of 2017 at 77 percent.

Over the three-year period, available seats were lowest in the first quarter of 2019 at 14,564. The highest number of seats was in the third quarter of 2019 at 21,714. The low for onboard passengers at SWO through the three-year span was in the first quarter of 2020, and the high for onboard passengers was in the fourth quarter of 2019. Onboard passengers increased in three of the last four quarters compared to the previous year.

EXHIBIT 3.3 LOAD FACTOR, AVAILABLE SEATS AND ONBOARD PASSENGERS



SWO retained 15 percent of its catchment area passengers, with OKC being the largest diversionary airport at 54 percent followed by TUL at 19 percent, DFW at 6 percent and ICT at 6 percent.

AIRPORT USE

Exhibit 3.4 shows the airports used by SWO catchment area travelers. An estimated 15 percent of the catchment area's air travelers used SWO for their trips; 54 percent diverted to OKC, 19 percent to TUL, 6 percent to DFW and 6 percent to ICT.

Table 3.2 shows passengers by domestic and international itineraries. Fifteen percent, or 49,398 domestic travelers, and 14 percent, or 4,499 international travelers, used SWO. OKC is the top diversionary airport for domestic passengers, serving 55 percent of domestic travelers, and the highest diversionary airport for international travelers serving 47 percent. TUL served the second highest share of diverting domestic passengers with 19 percent of domestic travelers versus serving 14 percent of international travelers. DFW served 5 percent of domestic and 21 percent of international travelers, while ICT served 6 percent of domestic and 4 percent of international travelers. Compared to the study completed for the year ended December 31, 2018, the total true market increased 3 percent, with the domestic true market increasing 2 percent and the international true market increasing 12 percent. SWO's retention improved 1 percent overall, as the domestic retention increased slightly and the international retention decreased slightly.

EXHIBIT 3.4 AIRPORT USE

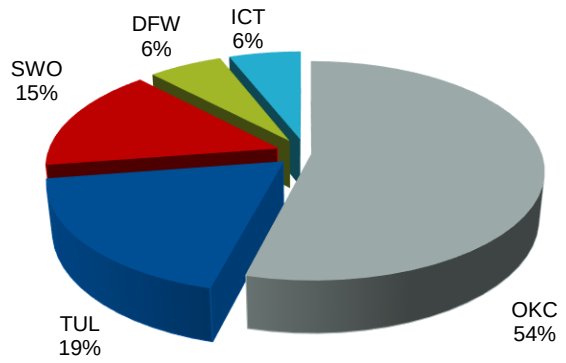


TABLE 3.2 AIRPORT USE - DOMESTIC & INTERNATIONAL COMPARISON

RANK	ORIGINATING AIRPORT	AIRPORT USE	
		PAX	%
Domestic			
1	OKC	174,351	55
2	TUL	60,643	19
3	SWO	49,398	15
4	ICT	19,602	6
5	DFW	14,461	5
Subtotal		**318,455**	**100**
International			
1	OKC	15,307	47
2	DFW	7,049	21
3	TUL	4,631	14
4	SWO	4,499	14
5	ICT	1,350	4
Subtotal		**32,836**	**100**
Domestic and International			
1	OKC	189,658	54
2	TUL	65,274	19
3	SWO	53,897	15
4	DFW	21,510	6
5	ICT	20,952	6
Total		**351,291**	**100**

AIRPORT USE BY COMMUNITY

Airport retention rates by community are an important aspect to understanding the overall SWO catchment area. ARC tickets include local travel agency data which is reported by the agency zip code and online travel agency data which is reported by the passenger zip code. **Table 3.3** shows how retention varies among the local communities within it.

Overall, the Stillwater community generated the highest number of true market passengers, with 131,923 annual passengers, 38 percent of the total. The Enid community generated more than 92,000 passengers while the Ponca City community generated more than 35,000 annual passengers. Communities that generally do not use SWO (0 percent retention) included the Hennessey, Pawhuska, Crescent, Waukomis, Newkirk and Pond Creek communities. The highest retention (greater than 20 percent) was in the Stillwater, Perry, Glencoe and Orlando communities.

TABLE 3.3 AIRPORT USE BY COMMUNITY

COMMUNITY	% AIRPORT USE					TRUE MARKET PASSENGERS
	OKC	TUL	SWO	DFW	ICT	
Stillwater	43	18	31	7	1	131,923
Enid	78	10	3	6	4	92,399
Ponca City	40	25	8	4	22	35,166
Perkins	63	11	17	6	2	9,737
Cushing	43	43	5	8	2	8,992
Perry	53	20	24	4	0	7,356
Blackwell	30	6	10	5	49	4,817
Hennessey	100	0	0	0	0	5,064
Pawhuska	5	91	0	2	1	4,982
Crescent	92	3	0	5	0	3,960
Pawnee	14	43	7	33	3	3,693
Tonkawa	53	12	1	9	24	3,552
Glencoe	38	32	26	5	0	3,438
Waukomis	92	4	0	3	2	2,711
Newkirk	34	11	0	5	50	2,450
Morrison	65	11	7	14	2	2,001
Pond Creek	67	7	0	5	22	1,979
Orlando	73	0	27	0	0	1,728
Other	49	30	5	5	10	25,342
Total	**54**	**19**	**15**	**6**	**6**	**351,291**

TRUE MARKET

The true market portion of the *Passenger Demand Analysis* provides the total number of passengers in the catchment area; specifically, it analyzes the portion of passengers diverting from the SWO catchment area. This section investigates destinations associated with travel to and from the catchment area. In addition, destinations are grouped into geographic regions to further understand the regional flows of catchment area air travelers.

TRUE MARKET ESTIMATE

The airport catchment area (**Exhibit 3.1**, page 5) represents the geographic area from which the airport primarily attracts air travelers. Domestic airlines report origin and destination traffic statistics to the U.S. DOT on a quarterly basis. Used by itself, these traffic statistics do not quantify the total size of an air service market. By combining ARC tickets with passenger data contained in the U.S. DOT airline reports, an estimate of the total air travel market by destination was calculated. The total air travel market is also referred to as the “true market”. Passengers were estimated for domestic and international markets on a destination basis. Adjustments were made to account for Allegiant Air, Frontier Airlines and Southwest Airlines, which are under-represented in ARC data.

The ARC data used in this report includes information on initiated passengers ticketed by local or online travel agencies. This enables the identification of passenger retention and diversion. According to U.S. DOT airline reports for the year ended March 31, 2020, 66 percent of SWO origin and destination passengers initiated air travel from SWO, and the other 34 percent began their trip from another city (e.g. New York, Dallas and Phoenix). For the purposes of this analysis, it is assumed that travel patterns for SWO visitors mirror catchment area passengers.

TOP 25 TRUE MARKET DESTINATIONS

The top 25 destinations for SWO (shown in **Table 4.1**) accounted for 48 percent of the travel to/from the SWO catchment area. Denver was the largest market with 14,798 annual passengers (20.3 passengers daily each way [PDEW]) and accounted for 4 percent of all catchment area travel. Orlando-International, Atlanta, New York-LaGuardia and Seattle made up the remaining top five markets. SWO had nonstop service to one of the top 10 markets, DFW.

TABLE 4.1 TRUE MARKET ESTIMATE - TOP 25 DESTINATIONS

RANK	DESTINATION	SWO REPORTED PAX	DIVERTED PAX	TRUE MARKET	PDEW
1	Denver, CO	810	13,989	14,798	20.3
2	Orlando, FL (MCO)	2,182	11,946	14,128	19.4
3	Atlanta, GA	1,006	8,603	9,608	13.2
4	New York, NY (LGA)	1,408	7,992	9,400	12.9
5	Seattle, WA	801	8,236	9,037	12.4
6	Chicago, IL (ORD)	1,074	7,946	9,020	12.4
7	Dallas, TX (DFW)	4,769	3,624	8,393	11.5
8	Los Angeles, CA	883	7,099	7,982	10.9
9	Houston, TX (IAH)	945	6,750	7,694	10.5
10	Tampa, FL	970	6,037	7,007	9.6
11	Nashville, TN	1,140	5,545	6,685	9.2
12	Washington, DC (DCA)	978	5,473	6,450	8.8
13	New Orleans, LA	684	5,221	5,905	8.1
14	Boston, MA	956	4,726	5,682	7.8
15	Phoenix, AZ (PHX)	624	4,909	5,534	7.6
16	Portland, OR	581	4,711	5,292	7.2
17	Philadelphia, PA	657	4,214	4,871	6.7
18	Las Vegas, NV	737	4,121	4,858	6.7
19	Fort Lauderdale, FL	518	3,982	4,500	6.2
20	Newark, NJ	641	3,660	4,302	5.9
21	San Francisco, CA	933	3,192	4,125	5.7
22	Salt Lake City, UT	510	3,237	3,747	5.1
23	Cancun, Mexico	338	3,334	3,671	5.0
24	San Diego, CA	1,062	2,576	3,638	5.0
25	Minneapolis, MN	702	2,694	3,397	4.7
Top 25 destinations		**25,909**	**143,816**	**169,725**	**232.5**
Total domestic		**49,398**	**269,057**	**318,455**	**436.2**
Total international		**4,499**	**28,337**	**32,836**	**45.0**
All markets		**53,897**	**297,394**	**351,291**	**481.2**

Four markets had retention greater than 20 percent, including DFW, San Francisco, San Diego and Minneapolis, while two markets had retention of less than 10 percent, Denver and Seattle.

TOP 25 DOMESTIC DESTINATIONS

Table 4.2 shows the percentage of passengers by market and originating airport for the top 25 domestic destinations. Fifteen percent of passengers used SWO for travel to the top 25 domestic markets. Overall, the highest retention rates by market (greater than 20 percent) included DFW, San Francisco, San Diego and Minneapolis. The lowest retention rates (less than 10 percent) included Denver and Seattle.

TABLE 4.2 TOP 25 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

RANK	DESTINATION	ORIGIN AIRPORT %					TOTAL PAX
		OKC	TUL	SWO	ICT	DFW	
1	Denver, CO	55	30	5	6	4	14,798
2	Orlando, FL (MCO)	54	25	15	4	1	14,128
3	Atlanta, GA	49	19	10	16	5	9,608
4	New York, NY (LGA)	52	20	15	4	10	9,400
5	Seattle, WA	67	10	9	12	2	9,037
6	Chicago, IL (ORD)	57	21	12	5	5	9,020
7	Dallas, TX (DFW)	28	13	57	3	0	8,393
8	Los Angeles, CA	57	23	11	2	7	7,982
9	Houston, TX (IAH)	58	23	12	4	3	7,694
10	Tampa, FL	57	20	14	3	6	7,007
11	Nashville, TN	56	23	17	1	3	6,685
12	Washington, DC (DCA)	76	5	15	2	1	6,450
13	New Orleans, LA	72	2	12	13	2	5,905
14	Boston, MA	47	16	17	2	18	5,682
15	Phoenix, AZ (PHX)	62	18	11	8	1	5,534
16	Portland, OR	55	28	11	5	1	5,292
17	Philadelphia, PA	40	37	13	1	8	4,871
18	Las Vegas, NV	57	20	15	3	4	4,858
19	Fort Lauderdale, FL	55	33	12	1	1	4,500
20	Newark, NJ	62	16	15	1	5	4,302
21	San Francisco, CA	38	10	23	12	18	4,125
22	Salt Lake City, UT	51	25	14	3	7	3,747
23	San Diego, CA	47	9	29	10	5	3,671
24	Minneapolis, MN	31	24	21	21	4	3,638
25	Charlotte-Douglas, NC	56	22	15	7	0	3,397
Top 25 Domestic		**54**	**20**	**15**	**6**	**5**	**169,725**
Total Domestic		**55**	**19**	**15**	**6**	**5**	**318,455**

Top markets for diverting airports were mixed, largely dependent on the type and frequency of available service.

TOP 10 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

Table 4.3 shows the top 10 markets when passengers exclusively fly out of SWO as well as the top 10 markets when passengers fly exclusively from the alternate airports. Top markets for each of the diverting airports were mixed, largely dependent on the type of nonstop service available and frequency of service. Only Atlanta appeared in each of the diverting airports top 10 markets.

TABLE 4.3 TOP 10 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

RANK	OKC		TUL		SWO	
	DESTINATION	PAX	DESTINATION	PAX	DESTINATION	PAX
1	Denver, CO	8,084	Denver, CO	4,420	Dallas, TX (DFW)	4,769
2	Orlando, FL (MCO)	7,695	Orlando, FL (MCO)	3,494	Orlando, FL (MCO)	2,182
3	Seattle, WA	6,089	Chicago, IL (ORD)	1,933	New York, NY (LGA)	1,408
4	Chicago, IL (ORD)	5,101	New York, NY (LGA)	1,902	Nashville, TN	1,140
5	Washington, DC (DCA)	4,928	Atlanta, GA	1,873	Chicago, IL (ORD)	1,074
6	New York, NY (LGA)	4,853	Los Angeles, CA	1,823	San Diego, CA	1,062
7	Atlanta, GA	4,718	Philadelphia, PA	1,799	Atlanta, GA	1,006
8	Los Angeles, CA	4,589	Houston, TX (IAH)	1,755	Washington, DC (DCA)	978
9	Houston, TX (IAH)	4,455	Nashville, TN	1,555	Tampa, FL	970
10	New Orleans, LA	4,226	Fort Lauderdale, FL	1,463	Austin, TX	965

RANK	ICT		DFW	
	DESTINATION	PAX	DESTINATION	PAX
1	Atlanta, GA	1,542	Boston, MA	1,047
2	Seattle, WA	1,045	New York, NY (LGA)	896
3	Denver, CO	877	San Francisco, CA	760
4	New Orleans, LA	746	Denver, CO	607
5	Minneapolis, MN	702	Los Angeles, CA	556
6	Orlando, FL (MCO)	623	Chicago, IL (ORD)	483
7	Fresno, CA	576	Atlanta, GA	469
8	San Francisco, CA	484	Tampa, FL	431
9	Norfolk, VA	482	Philadelphia, PA	394
10	Phoenix, AZ (PHX)	437	Jacksonville, FL	341

TOP 15 INTERNATIONAL DESTINATIONS

Table 4.4 shows the percentage of passengers for the top 15 international destinations by originating airport. Only the top 15 international destinations are shown due to the smaller market sizes involved with international itineraries and limited available data. SWO retained 13 percent of the catchment area passengers destined for the top 15 international markets.

Cancun, Mexico; London-Heathrow, United Kingdom; and Mexico City, Mexico were the top three international markets. San Jose del Cabo, Mexico and Vancouver, Canada made up the remainder of the top five markets. The highest retention (15 percent or greater) was to Shanghai, China; Beijing, China; Toronto, Canada; Amsterdam, Netherlands; and Mazatlan, Mexico. The lowest retention at less than 10 percent was to Cancun, Mexico; Vancouver, Canada; Dublin, Ireland; Lima, Peru; and Rome, Italy.

TABLE 4.4 TOP 15 INTERNATIONAL DESTINATIONS BY ORIGINATING AIRPORT

RANK	DESTINATION	ORIGIN AIRPORT %					PASSENGERS	
		OKC	DFW	TUL	SWO	ICT	TOTAL	PDEW
1	Cancun, Mexico	35	39	17	9	0	3,671	5.0
2	London, UK (LHR)	54	25	8	13	0	2,041	2.8
3	Mexico City, Mexico	22	59	7	12	0	1,964	2.7
4	San Jose del Cabo, Mexico	51	6	29	11	3	1,908	2.6
5	Vancouver, Canada	46	4	23	8	19	1,166	1.6
6	Shanghai, China	48	19	13	15	4	1,141	1.6
7	Dublin, Ireland	69	9	9	9	4	1,007	1.4
8	Beijing, China	48	13	0	40	0	981	1.3
9	Toronto, Canada	39	3	12	21	24	902	1.2
10	Amsterdam, Netherlands	48	19	13	15	4	884	1.2
11	Ho Chi Minh City, Vietnam	79	0	0	13	8	842	1.2
12	Calgary, Canada	39	19	19	13	10	830	1.1
13	Lima, Peru	28	24	40	5	4	769	1.1
14	Mazatlan, Mexico	48	19	13	15	4	567	0.8
15	Rome-Da Vinci, Italy	64	0	27	9	0	563	0.8
Top 15 International		**45**	**23**	**15**	**13**	**4**	**19,238**	**26.4**
Total International		**47**	**21**	**14**	**14**	**4**	**32,836**	**45.0**

Most airline hubs are directional and flow passenger traffic to and from geographic regions, not just destinations within the region.

FEDERAL AVIATION ADMINISTRATION (FAA) GEOGRAPHIC REGIONS

It is important to identify and quantify air travel markets, but it is also important to measure air travel by specific geographic regions. Generally, airlines operate route systems that serve geographic areas. Additionally, most airline hubs are directional and flow passenger traffic to and from geographic regions, not just destinations within the region. Therefore, air service analysis exercises consider the regional flow of passenger traffic as well as passenger traffic to a specific city. Accordingly, this section analyzes the regional distribution of air travelers from the airport catchment area. For this exercise, the FAA geographic breakdown of the U.S. is used (**Exhibit 4.1**).

EXHIBIT 4.1 FAA GEOGRAPHIC REGIONS

The Southeast region was the largest traveled region, with 25 percent of passengers, followed by the West region.

REGIONAL DISTRIBUTION OF TRAVELERS

Table 4.5 divides catchment area travel into the FAA's nine geographic regions and one catch-all international region. The Southeast region was the largest traveled region, with 25 percent of passengers. The West region was the second largest with 14 percent of passengers, followed by the Southwest, Northwest and East regions.

SWO's retention rates were highest to the Southwest region (25 percent) and West region (17 percent) while its lowest retention rates were to the Northwest region (9 percent) and Alaska (5 percent).

TABLE 4.5 REGIONAL DISTRIBUTION OF TRAVEL BY AIRPORT

AIRPORT		REGION										
		SE	W	SW	NW	E	GL	INTL	NE	C	AK	TOTAL
OKC	Pax	46,030	27,420	23,844	25,300	23,350	19,468	15,307	4,990	2,928	1,022	189,658
	%	24	14	13	13	12	10	8	3	2	1	100
TUL	Pax	18,926	7,034	7,091	9,578	8,711	6,425	4,631	1,179	1,002	697	65,274
	%	29	11	11	15	13	10	7	2	2	1	100
SWO	Pax	12,675	8,184	11,341	3,794	5,931	5,148	4,499	1,298	909	117	53,897
	%	24	15	21	7	11	10	8	2	2	0	100
DFW	Pax	3,749	3,039	1,366	1,392	2,087	1,388	7,049	1,063	285	93	21,510
	%	17	14	6	6	10	6	33	5	1	0	100
ICT	Pax	5,340	3,229	2,567	3,165	1,861	2,285	1,350	328	409	418	20,952
	%	25	15	12	15	9	11	6	2	2	2	100
Total	**Pax**	**86,720**	**48,906**	**46,208**	**43,230**	**41,940**	**34,714**	**32,836**	**8,857**	**5,532**	**2,347**	**351,291**
	%	**25**	**14**	**13**	**12**	**12**	**10**	**9**	**3**	**2**	**1**	**100**
SWO Retention %		**15**	**17**	**25**	**9**	**14**	**15**	**14**	**15**	**16**	**5**	**54**

Mexico and Central America was the largest international region, with 33 percent of SWO catchment area international passengers. SWO retained 11 percent of travelers to Mexico and Central America.

DISTRIBUTION OF INTERNATIONAL TRAVEL

Table 4.6 shows international travelers by airport and region. Nine percent of catchment area travelers had international itineraries. Mexico and Central America was the most frequented international region with 33 percent, or 10,725 of the total 32,836 catchment area international travelers, followed by Europe with 26 percent and Asia with 18 percent of the total. Canada was the fourth largest region with 9 percent of international travel. The remaining top international regions were, in order of greatest to least: South America, the Caribbean, the Middle East, Australia and Oceania, and Africa.

SWO's retention averaged 14 percent for international destinations. SWO's retention was highest (20 percent or greater) to Asia (20 percent). SWO's lowest retention (11 percent) was to Mexico and Central America, South America and the Caribbean.

TABLE 4.6 REGIONAL DISTRIBUTION OF INTERNATIONAL PASSENGERS

REGION	ORIGINATING AIRPORT					TRUE MARKET	% OF COLUMN	SWO RETENTION %
	OKC	DFW	TUL	SWO	ICT			
Mexico & Central America	4,245	3,463	1,679	1,167	171	10,725	33	11
Europe	4,542	1,545	1,043	1,189	254	8,573	26	14
Asia	3,151	961	493	1,181	232	6,018	18	20
Canada	1,280	258	557	408	529	3,032	9	13
South America	693	370	435	188	73	1,758	5	11
Caribbean	631	153	216	127	22	1,149	4	11
Middle East	367	143	100	115	33	758	2	15
Australia & Oceania	311	121	85	97	28	642	2	15
Africa	87	34	24	27	8	180	1	15
Total passengers	**15,307**	**7,049**	**4,631**	**4,499**	**1,350**	**32,836**	**100**	**14**
% of row	**47**	**21**	**14**	**14**	**4**	**100**	**-**	**-**

AIRLINES

Information in this section identifies airline use by catchment area air travelers. The information is airport and airline specific. The intent is to determine which airlines are used to travel to specific destinations. The airline market share at SWO is based on U.S. DOT airline reported data. Airline market share at diverting airports is based on ARC data and is an estimation of the carrier's share of diverted passengers.

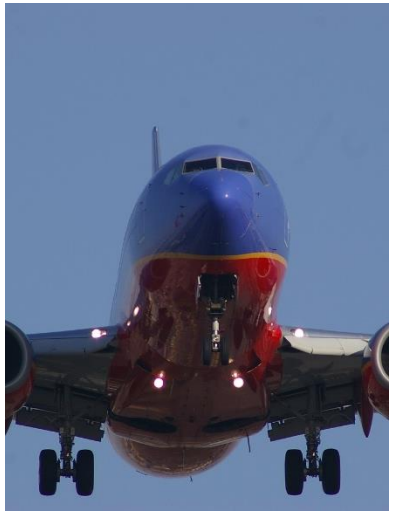
AIRLINES USED AT SWO

Table 5.1[3] provides the airline share for the top 25 SWO true markets and total share by airline at SWO. American Airlines carried the highest share as the only airline to provide nonstop service at SWO. All other carriers, through codeshare and interline connections, served 1 percent of passengers.

TABLE 5.1 AIRLINES USED AT SWO

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %		TOTAL PAX
		AA	OTHER	
1	Dallas, TX (DFW)	100	0	4,769
2	Orlando, FL (MCO)	100	0	2,182
3	New York, NY (LGA)	100	0	1,408
4	Nashville, TN	100	0	1,140
5	Chicago, IL (ORD)	100	0	1,074
6	San Diego, CA	100	0	1,062
7	Atlanta, GA	100	0	1,006
8	Washington, DC (DCA)	100	0	978
9	Tampa, FL	100	0	970
10	Austin, TX	100	0	965
11	San Antonio, TX	100	0	964
12	Boston, MA	100	0	956
13	Houston, TX (IAH)	100	0	945
14	San Francisco, CA	100	0	933
15	Los Angeles, CA	100	0	883
16	Miami, FL	100	0	812
17	Denver, CO	100	0	810
18	Seattle, WA	100	0	801
19	Las Vegas, NV	100	0	737
20	Houston, TX (HOU)	100	0	729
21	Minneapolis, MN	100	0	702
22	New Orleans, LA	100	0	684
23	Sacramento, CA	100	0	683
24	Philadelphia, PA	100	0	657
25	Newark, NJ	100	0	641
Total Top 25		**100**	**0**	**27,491**
Total All Markets		**99**	**1**	**53,897**

[3] *Source: Diio Mi; Year Ended March 31, 2020*



AIRLINES USED AT OKC

Table 5.2 shows the airlines used and top destinations when travelers from the catchment area used OKC. American had the highest estimated share of catchment area passengers at OKC, carrying 37 percent of diverting passengers. United Airlines had the second highest share at 24 percent, followed by Southwest Airlines, Delta Air Lines, Alaska Airlines and Frontier Airlines. All other carriers combined for the remaining 2 percent of passengers.

TABLE 5.2 AIRLINES USED AT OKC

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %							TOTAL OKC PAX
		AA	UA	WN	DL	AS	F9	OTHER	
1	Denver, CO	14	63	12	0	0	12	0	8,084
2	Orlando, FL (MCO)	22	19	18	24	0	18	0	7,695
3	Seattle, WA	15	42	1	5	36	1	2	6,089
4	Chicago, IL (ORD)	57	43	0	0	0	0	0	5,101
5	Washington, DC (DCA)	48	1	52	0	0	0	0	4,928
6	New York, NY (LGA)	45	16	33	6	0	0	0	4,853
7	Atlanta, GA	6	10	0	84	0	0	0	4,718
8	Los Angeles, CA	81	11	1	1	3	1	1	4,589
9	Houston, TX (IAH)	5	95	0	0	0	0	0	4,455
10	New Orleans, LA	32	17	52	0	0	0	0	4,226
11	Tampa, FL	35	8	42	15	0	0	0	4,003
12	Nashville, TN	26	17	50	7	0	0	0	3,731
13	Phoenix, AZ (PHX)	95	2	1	2	0	1	0	3,411
14	Portland, OR	29	38	2	25	5	2	0	2,927
15	Chicago, IL (MDW)	0	0	90	10	0	0	0	2,806
16	Las Vegas, NV	67	18	0	14	0	0	0	2,784
17	Newark, NJ	14	59	11	16	0	0	0	2,669
18	Boston, MA	46	3	30	21	0	0	0	2,660
19	Fort Lauderdale, FL	23	9	46	21	0	0	0	2,465
20	Dallas, TX (DFW)	100	0	0	0	0	0	0	2,337
21	Sacramento, CA	42	31	1	26	0	1	0	2,193
22	Fort Myers, FL	34	22	16	28	0	0	0	1,995
23	Norfolk, VA	55	6	20	18	0	0	0	1,958
24	Philadelphia, PA	84	10	1	3	0	1	0	1,955
25	Salt Lake City, UT	12	8	2	74	0	2	0	1,900
Total Top 25		**36**	**25**	**19**	**14**	**3**	**3**	**0**	**94,531**
Total All Markets		**37**	**24**	**18**	**16**	**2**	**1**	**2**	**189,658**

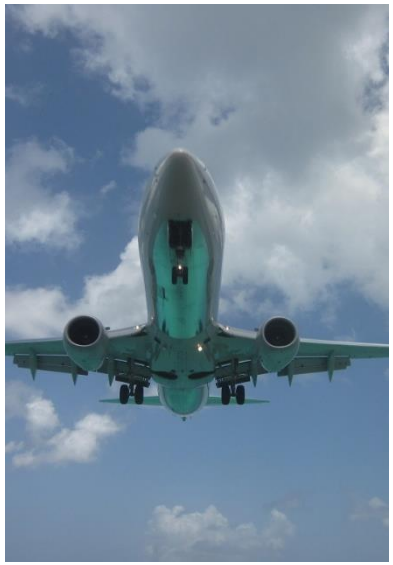
American Airlines had the highest share of catchment area passengers at TUL, carrying 33 percent of diverting passengers, followed by United Airlines at 26 percent.

AIRLINES USED AT TUL

Table 5.3 shows the airlines used and top destinations when travelers from the catchment area used TUL. American had the highest share of catchment area passengers at TUL, carrying 33 percent of diverting passengers, followed by United with 26 percent of passengers. Southwest had the third highest share at 21 percent, while Delta had the fourth highest share at 16 percent. Other carriers combined for the remaining 4 percent of passengers.

TABLE 5.3 AIRLINES USED AT TUL

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL TUL PAX
		AA	UA	WN	DL	OTHER	
1	Denver, CO	3	75	11	0	11	4,420
2	Orlando, FL (MCO)	32	27	9	24	9	3,494
3	Chicago, IL (ORD)	53	47	0	0	0	1,933
4	New York, NY (LGA)	49	11	34	5	0	1,902
5	Atlanta, GA	0	7	14	79	0	1,873
6	Los Angeles, CA	47	4	23	0	27	1,823
7	Philadelphia, PA	40	11	34	15	0	1,799
8	Houston, TX (IAH)	0	100	0	0	0	1,755
9	Nashville, TN	27	10	50	13	0	1,555
10	Fort Lauderdale, FL	11	30	40	19	0	1,463
11	Portland, OR	4	35	43	4	13	1,461
12	Tampa, FL	35	27	38	0	0	1,388
13	Pittsburgh, PA	60	21	19	0	0	1,206
14	Dallas, TX (DFW)	100	0	0	0	0	1,049
15	Phoenix, AZ (PHX)	31	13	50	6	0	999
16	Las Vegas, NV	12	44	19	7	19	992
17	Salt Lake City, UT	17	8	17	58	0	944
18	Boston, MA	25	39	26	10	0	927
19	Seattle, WA	16	16	34	12	23	892
20	Richmond, VA	69	13	0	19	0	881
21	West Palm Beach, FL	83	17	0	0	0	862
22	Savannah, GA	26	0	0	74	0	805
23	Minneapolis, MN	0	0	12	88	0	801
24	Pensacola, FL	25	25	25	25	0	765
25	Dallas, TX (DAL)	0	0	100	0	0	754
Total Top 25		**28**	**29**	**22**	**16**	**5**	**36,743**
Total All Markets		**33**	**26**	**21**	**16**	**4**	**65,274**



AIRLINES USED AT DFW

Table 5.4 shows the airlines used and top destinations when travelers from the catchment area used DFW. American had the highest share of catchment area passengers at DFW, carrying 65 percent of diverting passengers. Delta had the second highest share at 9 percent, followed by Interjet, a Mexico low-cost carrier headquartered in Mexico City, with an 8 percent share. United had the fourth highest share at 8 percent. All other carriers combined for the remaining 10 percent of passengers.

TABLE 5.4 AIRLINES USED AT DFW

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL DFW PAX
		AA	DL	4O	UA	OTHER	
1	Boston, MA	83	0	0	17	0	1,047
2	New York, NY (LGA)	84	16	0	0	0	896
3	San Francisco, CA	82	0	0	18	0	760
4	Denver, CO	78	0	0	22	0	607
5	Los Angeles, CA	18	82	0	0	0	556
6	Chicago, IL (ORD)	78	0	0	22	0	483
7	Atlanta, GA	43	57	0	0	0	469
8	Tampa, FL	63	0	0	38	0	431
9	Philadelphia, PA	100	0	0	0	0	394
10	Jacksonville, FL	100	0	0	0	0	341
11	Pensacola, FL	100	0	0	0	0	333
12	Charleston, SC	100	0	0	0	0	324
13	Austin, TX	100	0	0	0	0	322
14	West Palm Beach, FL	100	0	0	0	0	287
15	Lihue, HI	33	67	0	0	0	284
16	Salt Lake City, UT	57	29	0	14	0	275
17	Newark, NJ	100	0	0	0	0	233
18	Miami, FL	100	0	0	0	0	224
19	Seattle, WA	33	0	0	0	67	209
20	Nashville, TN	100	0	0	0	0	207
21	Houston, TX (IAH)	100	0	0	0	0	202
22	San Diego, CA	100	0	0	0	0	193
23	New York, NY (JFK)	100	0	0	0	0	186
24	Las Vegas, NV	50	0	0	0	50	184
25	Minneapolis, MN	0	100	0	0	0	140
Total Top 25		**76**	**13**	**0**	**8**	**3**	**9,590**
Total All Markets		**65**	**9**	**8**	**8**	**10**	**21,510**

United Airlines had the highest share of catchment area passengers at ICT, carrying 33 percent of diverting passengers, followed by closely by American Airlines also with a 33 percent share of passengers.

AIRLINES USED AT ICT

Table 5.5 shows the airlines used and top destinations when travelers from the catchment area used ICT. United had the highest share of catchment area passengers at ICT, carrying 33 percent of diverting passengers, followed closely by American, also with a 33 percent share of passengers. Delta had the third highest share at 27 percent, while Alaska carried the fourth highest share at 6 percent. Other carriers combined for the remaining 1 percent of passengers.

TABLE 5.5 AIRLINES USED AT ICT

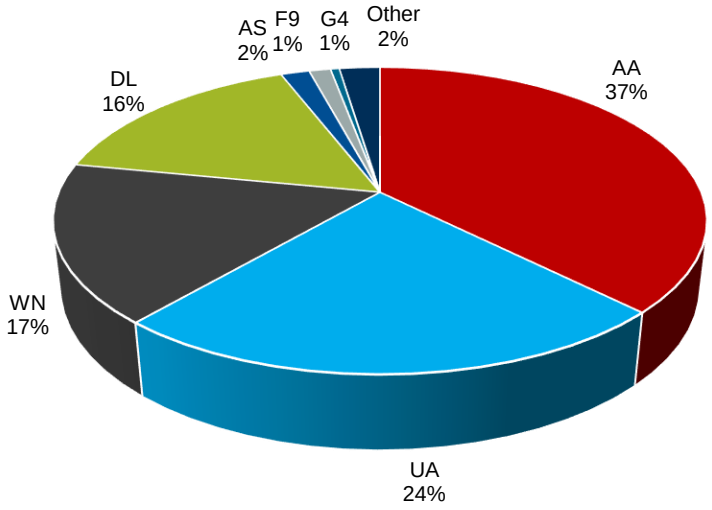
RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL ICT PAX
		UA	AA	DL	AS	OTHER	
1	Atlanta, GA	0	4	96	0	0	1,542
2	Seattle, WA	13	7	0	80	0	1,045
3	Denver, CO	85	15	0	0	0	877
4	New Orleans, LA	8	92	0	0	0	746
5	Minneapolis, MN	0	0	100	0	0	702
6	Orlando, FL (MCO)	14	43	43	0	0	623
7	Fresno, CA	83	17	0	0	0	576
8	San Francisco, CA	50	50	0	0	0	484
9	Norfolk, VA	0	75	25	0	0	482
10	Phoenix, AZ (PHX)	29	71	0	0	0	437
11	Chicago, IL (ORD)	75	25	0	0	0	430
12	Anchorage, AK	56	0	22	22	0	418
13	San Diego, CA	73	27	0	0	0	354
14	New York, NY (LGA)	13	0	88	0	0	341
15	Jacksonville, FL	0	0	100	0	0	341
16	Houston, TX (IAH)	100	0	0	0	0	337
17	Pensacola, FL	0	33	67	0	0	285
18	Raleigh/Durham, NC	0	100	0	0	0	284
19	Portland, OR	75	0	0	25	0	258
20	Bozeman, MT	100	0	0	0	0	241
21	Dallas, TX (DFW)	0	100	0	0	0	238
22	Charlotte-Douglas, NC	25	0	75	0	0	233
23	Buffalo, NY	67	33	0	0	0	218
24	Tampa, FL	0	75	25	0	0	216
25	Ontario, CA	57	43	0	0	0	205
Total Top 25		**32**	**29**	**31**	**8**	**0**	**11,914**
Total All Markets		**33**	**33**	**27**	**6**	**1**	**20,952**

When SWO catchment area travelers divert to alternate airports, the largest percentage used American Airlines, followed by United Airlines, Southwest Airlines and Delta Air Lines.

DIVERTING PASSENGER AIRLINE USE

Exhibit 5.1 shows the airlines used when travelers from the catchment area originated from any other airport besides SWO. Overall, American carried the highest number of diverting passengers, with 37 percent, followed by United with 24 percent, Southwest with 17 percent, Delta with 16 percent, Alaska with 2 percent, Frontier with 1 percent and Allegiant with 1 percent. Other airlines accounted for 2 percent of passengers.

EXHIBIT 5.1 DIVERTING PASSENGER AIRLINE USE



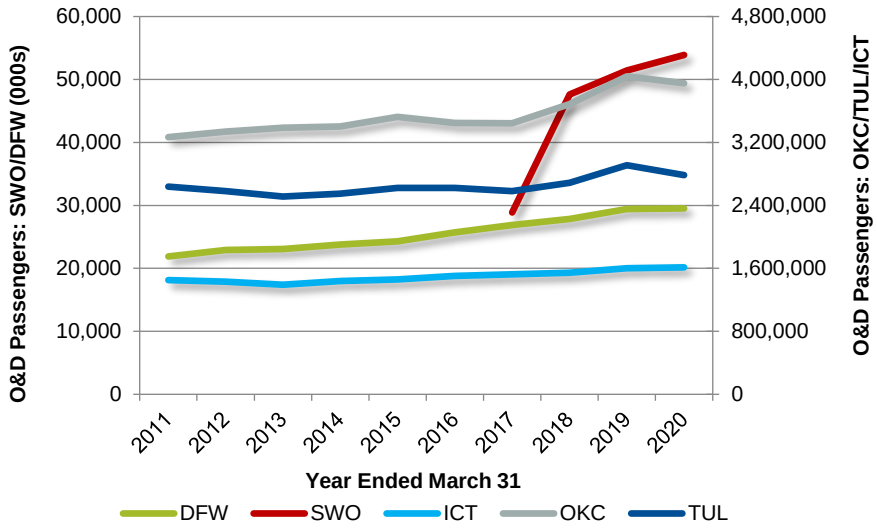
FACTORS AFFECTING AIR SERVICE DEMAND AND RETENTION

This section examines several factors that have affected and will continue to affect air service demand in the Stillwater area and SWO's ability to retain passengers. The factors affecting SWO's ability to retain passengers included in this section are airfares, nonstop service availability, and the quality and capacity of air service offered at SWO, OKC, TUL, ICT and DFW.

PASSENGER ACTIVITY COMPARISON

To better understand the changes in passenger volumes at SWO and the diverting airports, **Exhibit 6.1** provides a depiction of origin and destination passengers over the last 10 years by year ended March 31 passenger totals as reported to the U.S. DOT. During this period:

EXHIBIT 6.1 PASSENGER TRENDS



- Beginning with the initiation of service in the year ended March 31, 2017, SWO's passengers have increased each year since the first year, increasing 4.8 percent from 2019 to 2020.
- Each of the alternate airports had increasing growth rates over the 10-year period, with TUL having the lowest CAGR at 0.6 percent and DFW having the highest CAGR at 3.4 percent. From 2019 to 2020, however, OKC and TUL had declining passengers while DFW and ICT passengers increased by less than 1 percent.

SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW.

AIRFARES

When a traveler decides which airport to access for travel, airfares play a large role. Airfares affect air service demand and an airport's ability to retain passengers. One-way airfares (excluding taxes and Passenger Facility Charges [PFC]) paid by travelers are used to measure the relative fare competitiveness between SWO and the alternate airports. Fares listed for the alternate airports are for all air travelers using the airport and are not reflective of the average fare paid only by catchment area travelers diverting to these airports.

TABLE 6.1 U.S. DOT AVERAGE DOMESTIC ONE-WAY FARES

RANK	DESTINATION	AVERAGE ONE-WAY FARE					MIN DIFF.
		OKC	TUL	SWO	ICT	DFW	
1	Denver, CO	$111	$116	$192	$121	$118	$71
2	Orlando, FL (MCO)	$123	$148	$147	$180	$146	($33)
3	Atlanta, GA	$196	$200	$194	$199	$150	($6)
4	New York, NY (LGA)	$201	$215	$232	$221	$194	$11
5	Seattle, WA	$171	$197	$227	$188	$175	$30
6	Chicago, IL (ORD)	$183	$202	$225	$220	$150	$5
7	Dallas, TX (DFW)	$175	$150	$155	$194	-	($39)
8	Los Angeles, CA	$189	$156	$209	$181	$141	$20
9	Houston, TX (IAH)	$199	$199	$181	$217	$182	($36)
10	Tampa, FL	$162	$158	$204	$170	$160	$35
11	Nashville, TN	$142	$183	$166	$179	$189	($23)
12	Washington, DC (DCA)	$153	$216	$242	$211	$250	($8)
13	New Orleans, LA	$170	$178	$175	$172	$141	($3)
14	Boston, MA	$233	$229	$256	$234	$194	$22
15	Phoenix, AZ (PHX)	$172	$184	$270	$151	$180	$87
16	Portland, OR	$199	$214	$273	$217	$206	$56
17	Philadelphia, PA	$215	$219	$221	$235	$198	($14)
18	Las Vegas, NV	$147	$140	$185	$124	$128	$39
19	Fort Lauderdale, FL	$163	$161	$173	$188	$131	($15)
20	Newark, NJ	$229	$241	$200	$252	$236	($53)
21	San Francisco, CA	$214	$215	$231	$223	$200	$8
22	Salt Lake City, UT	$195	$186	$249	$214	$187	$36
23	San Diego, CA	$185	$199	$208	$201	$184	$7
24	Minneapolis, MN	$209	$203	$184	$217	$145	($34)
25	Charlotte-Douglas, NC	$235	$237	$267	$219	$245	$22
Average Domestic Fare		**$184**	**$186**	**$209**	**$195**	**$190**	**$15**

Table 6.1[4] shows one-way average airfares for the top 25 catchment area domestic destinations. Average airfares are a result of many factors including length of haul, availability of seats, business versus leisure fares and airline competition. SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW.

In individual markets, SWO had a higher fare than the highest fare at all of the competing airports in 14 of the top 25 markets. The highest fare difference compared to the highest fare at competing airports (greater than $50) was in the Denver, Phoenix-Sky Harbor and Portland markets.

[4] *Source: Diio Mi; Note: Year Ended March 31, 2020; Fares do not include taxes or Passenger Facility Charges*

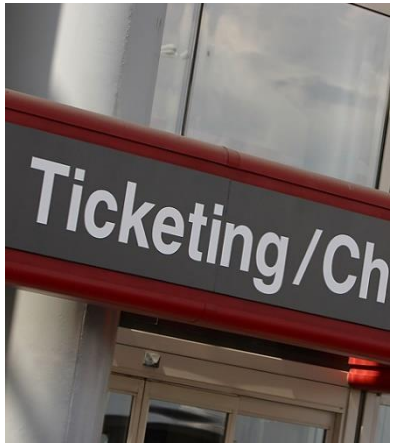
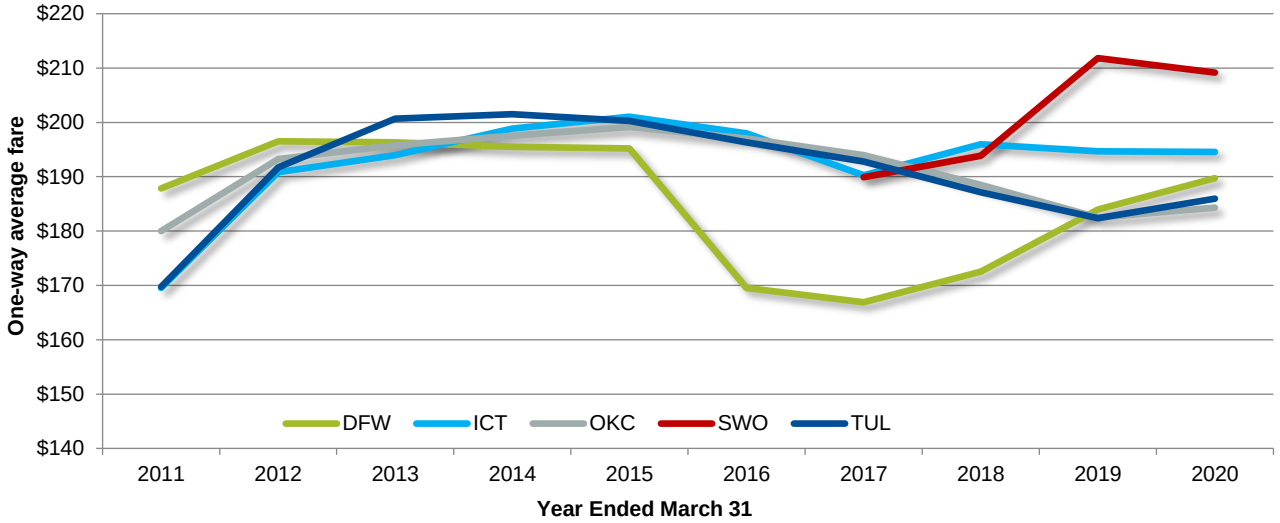


Exhibit 6.2 tracks the average fares at SWO and the competing airports from the year ended March 31, 2011, through the year ended March 31, 2020. Based on U.S. DOT airline data, average fares at SWO since initiation of service in the year ended March 31, 2017, ranged from $190 (2017) to $212 (2019). Over the same time period, the average fare at OKC ranged from $182 (2019) to $194 (2017), while the average fare at TUL ranged from $182 (2019) to $193 (2017), ICT's ranged from $190 (2017) to $196 (2018) and DFW's fares ranged from $167 (2017) to $190 (2020). Overall from 2017 to 2020, average domestic fares increased at a CAGR of 3.3 percent at SWO, below the increase for DFW of 4.4 percent and above the increase for ICT of 0.7 percent. OKC's and TUL's fares decreased at CAGRs of 1.7 and 1.2 percent, respectively.

In the latest year-ended period, SWO's fare differential compared to each of the competing airports decreased. The fare differential decreased by $5 compared to OKC, $6 compared to TUL, $3 compared to ICT and $8 compared to DFW.

EXHIBIT 6.2 10-YEAR AVERAGE DOMESTIC ONE-WAY FARE TREND



DFW offered the highest service levels to the top 25 catchment area destinations followed by OKC, TUL, ICT and SWO.

NONSTOP SERVICE AVAILABILITY

Travelers drive to competing airports to access air service for many reasons, one of which is nonstop service availability. **Table 6.2**[5] compares the level of air service offered at SWO with that offered at the competing airports. For the year ended March 31, 2020, SWO had nonstop service to one of the top 25 catchment area destinations with an average of 17 weekly departures and one destination overall, DFW. OKC had service to 18 of the top 25 markets with an average of 412 weekly roundtrips, while TUL had service to 12 of the top 25 destinations with 295 weekly frequencies. DFW had service to 24 of the top 25 destinations and 259 total destinations. ICT had service to nine top 25 destinations with 215 weekly frequencies on average.

TABLE 6.2 NONSTOP SERVICE COMPARISON

RANK	DESTINATION	AVG WEEKLY DEPARTURES				
		OKC	TUL	SWO	DFW	ICT
1	Denver, CO	60	43	0	117	32
2	Orlando, FL (MCO)	2	1	0	87	0
3	Atlanta, GA	38	31	0	129	20
4	New York, NY (LGA)	0	0	0	127	0
5	Seattle, WA	7	0	0	79	7
6	Chicago, IL (ORD)	46	46	0	149	48
7	Dallas, TX (DFW)	61	61	17	0	45
8	Los Angeles, CA	15	9	0	143	0
9	Houston, TX (IAH)	55	49	0	118	27
10	Tampa, FL	0	0	0	53	0
11	Nashville, TN	3	0	0	52	0
12	Washington, DC (DCA)	14	0	0	65	0
13	New Orleans, LA	0	0	0	56	0
14	Boston, MA	0	0	0	59	0
15	Phoenix, AZ (PHX)	27	10	0	91	9
16	Portland, OR	0	0	0	34	0
17	Philadelphia, PA	8	0	0	69	0
18	Las Vegas, NV	16	10	0	106	9
19	Fort Lauderdale, FL	0	0	0	61	0
20	Newark, NJ	5	0	0	64	0
21	San Francisco, CA	7	0	0	90	0
22	Salt Lake City, UT	15	10	0	74	0
23	San Diego, CA	0	0	0	63	0
24	Minneapolis, MN	14	10	0	82	19
25	Charlotte-Douglas, NC	19	14	0	70	0
Total Top 25 Frequencies		**412**	**295**	**17**	**2,037**	**215**
Total All Markets		**503**	**354**	**17**	**6,725**	**231**
Number of Top 25 Served		**18**	**12**	**1**	**24**	**9**
Total Destinations Served		**29**	**19**	**1**	**259**	**14**

[5] *Source: Diio Mi; Year Ended March 31, 2020*

SWO offered a total of 875 departures and 39,550 seats. SWO's departures were provided on regional jet aircraft; more than 50 percent of the service at OKC and ICT and nearly 50 percent of the service at TUL were provided on regional jets.

QUALITY OF AIR SERVICE AT COMPETING AIRPORTS

The quality of air service offered by an airport is a factor in a traveler's decision when selecting which airport to originate travel from. In general, passengers prefer larger over smaller aircraft and jet over turboprops.

Table 6.3[6] provides SWO's and the competing airports total departures by aircraft type for the year ended March 31, 2020. SWO had 875 departures and 39,550 seats, all on regional jet aircraft. Comparatively, OKC offered 26,157 departures and more than 2.7 million seats on a mix of regional jet and narrow-body aircraft. TUL had 18,425 departures and nearly 2.0 million seats, with 49 percent of the departures on regional jet aircraft, while ICT had 12,027 departures and nearly 1.1 million seats, 64 percent of which were on regional jets. DFW had the highest level of service with nearly 350,000 departures and nearly 44.3 million seats on a wide range of aircraft types.

TABLE 6.3 DEPARTURES BY AIRCRAFT TYPE BY ORIGIN

AIRCRAFT TYPE	SEAT RANGE	TOTAL DEPARTURES				
		OKC	TUL	SWO	DFW	ICT
Turboprop	9-30	-	-	-	4,837	-
Regional jet	30-50	2,029	3,799	875	36,432	4,957
	51-70	3,605	634	-	15,369	441
	71-100	8,575	4,542	-	84,114	2,301
Narrow body jet	70-125	862	247	-	6,828	130
	126-160	9,487	8,329	-	123,130	3,600
	>160	1,599	874	-	65,273	598
Wide body jet	160-240	-	-	-	3,372	-
	241-300	-	-	-	7,789	-
	>300	-	-	-	2,571	-
Total Departures		**26,157**	**18,425**	**875**	**349,715**	**12,027**
% Turboprop Departures		**0%**	**0%**	**0%**	**1%**	**0%**
% Regional Jet Departures		**54%**	**49%**	**100%**	**39%**	**64%**
Total Seats		**2,740,941**	**1,966,567**	**39,550**	**44,250,928**	**1,083,133**

[6] *Source: Diio Mi; Year Ended March 31, 2020*

An increase in retention of 10 percentage points would create an estimated additional 35,129 annual passengers (48.1 PDEW) for SWO.

RETENTION RATE SENSITIVITY

Considering the previous factors of airfares, nonstop service and quality of service, a retention rate sensitivity follows in **Table 6.4**. The purpose is to show how small changes in passenger retention can affect passenger volume. Passengers in total and for each of the top 25 markets are calculated using varying degrees of retention. An increase in retention of 10 percentage points would create an estimated additional 35,129 annual passengers (48.1 PDEW) for SWO.

TABLE 6.4 RETENTION RATE SENSITIVITY

RANK	DESTINATION	REPORTED PAX	RETENTION %	RETENTION IMPROVEMENT		
				5%	10%	15%
1	Denver, CO	810	5	1,550	2,290	3,029
2	Orlando, FL (MCO)	2,182	15	2,888	3,594	4,301
3	Atlanta, GA	1,006	10	1,486	1,967	2,447
4	New York, NY (LGA)	1,408	15	1,878	2,348	2,818
5	Seattle, WA	801	9	1,253	1,705	2,157
6	Chicago, IL (ORD)	1,074	12	1,525	1,976	2,427
7	Dallas, TX (DFW)	4,769	57	5,188	5,608	6,028
8	Los Angeles, CA	883	11	1,282	1,681	2,081
9	Houston, TX (IAH)	945	12	1,330	1,714	2,099
10	Tampa, FL	970	14	1,320	1,671	2,021
11	Nashville, TN	1,140	17	1,474	1,809	2,143
12	Washington, DC (DCA)	978	15	1,300	1,623	1,945
13	New Orleans, LA	684	12	979	1,274	1,569
14	Boston, MA	956	17	1,240	1,525	1,809
15	Phoenix, AZ (PHX)	624	11	901	1,178	1,454
16	Portland, OR	581	11	846	1,110	1,375
17	Philadelphia, PA	657	13	901	1,144	1,388
18	Las Vegas, NV	737	15	979	1,222	1,465
19	Fort Lauderdale, FL	518	12	743	968	1,193
20	Newark, NJ	641	15	856	1,071	1,286
21	San Francisco, CA	933	23	1,139	1,346	1,552
22	Salt Lake City, UT	510	14	698	885	1,073
23	Cancun, Mexico	338	9	521	705	888
24	San Diego, CA	1,062	29	1,244	1,426	1,608
25	Minneapolis, MN	702	21	872	1,042	1,212
Total Top 25		**25,909**	**15**	**34,395**	**42,882**	**51,368**
Total Domestic		**49,398**	**16**	**65,320**	**81,243**	**97,166**
Total International		**4,499**	**14**	**6,141**	**7,783**	**9,424**
Total of All Markets		**53,897**	**15**	**71,461**	**89,026**	**106,590**

SITUATION ANALYSIS

Stillwater is located approximately 70 miles, or an approximate 90-minute drive, from both TUL and OKC, creating challenges in retaining passengers flying out of SWO. For the 12-months ended March 31, 2020, SWO retained approximately 15 percent of catchment area passengers, which was 1 percentage point higher than the previous true market estimate.

SWO is one of the few communities in the U.S. that had no commercial service since deregulation and was able to successfully recruit traditional, legacy service. In August 2016, American Airlines commenced service to DFW with small regional jet aircraft. While the pandemic threatened service at SWO, American remained in the market during the entire pandemic and has since returned SWO to its pre-pandemic, twice daily service.

SWO needs to continue to concentrate on improving passenger levels, with load factors approximating 71 percent for the 12-months ended March 31, 2020. While this is above many peer markets at DFW, it is substantially below the industry and American averages. The RASM for SWO also tends to be below many of its peer markets due to lower average fares. SWO should work with American to achieve average fares at a consistent $30 to $40 one-way premium over what the fares for American are at OKC and TUL.

As SWO continues to recover post-pandemic, additional flights or capacity through use of larger aircraft are potential opportunities. In the near term, it is unlikely that SWO will be able to add service to a new hub either on American or a different airline until SWO is able to consistently have a RASM that is on par or above peer markets. Once RASM improves, new service to a new hub such as Chicago O'Hare International Airport on American or new service on United Airlines to Denver is possible.

TOP 50 TRUE MARKETS

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	SWO REPORTED PAX	RETENTION %	TRUE MARKET	PDEW	DIVERTING PASSENGERS			
						OKC	TUL	DFW	ICT
1	Denver, CO	810	5	14,798	20.3	8,084	4,420	607	877
2	Orlando, FL (MCO)	2,182	15	14,128	19.4	7,695	3,494	134	623
3	Atlanta, GA	1,006	10	9,608	13.2	4,718	1,873	469	1,542
4	New York, NY (LGA)	1,408	15	9,400	12.9	4,853	1,902	896	341
5	Seattle, WA	801	9	9,037	12.4	6,089	892	209	1,045
6	Chicago, IL (ORD)	1,074	12	9,020	12.4	5,101	1,933	483	430
7	Dallas, TX (DFW)	4,769	57	8,393	11.5	2,337	1,049	0	238
8	Los Angeles, CA	883	11	7,982	10.9	4,589	1,823	556	131
9	Houston, TX (IAH)	945	12	7,694	10.5	4,455	1,755	202	337
10	Tampa, FL	970	14	7,007	9.6	4,003	1,388	431	216
11	Nashville, TN	1,140	17	6,685	9.2	3,731	1,555	207	52
12	Washington, DC (DCA)	978	15	6,450	8.8	4,928	349	78	117
13	New Orleans, LA	684	12	5,905	8.1	4,226	124	124	746
14	Boston, MA	956	17	5,682	7.8	2,660	927	1,047	91
15	Phoenix, AZ (PHX)	624	11	5,534	7.6	3,411	999	62	437
16	Portland, OR	581	11	5,292	7.2	2,927	1,461	65	258
17	Philadelphia, PA	657	13	4,871	6.7	1,955	1,799	394	66
18	Las Vegas, NV	737	15	4,858	6.7	2,784	992	184	161
19	Fort Lauderdale, FL	518	12	4,500	6.2	2,465	1,463	27	27
20	Newark, NJ	641	15	4,302	5.9	2,669	700	233	58
21	San Francisco, CA	933	23	4,125	5.7	1,554	393	760	484
22	Salt Lake City, UT	510	14	3,747	5.1	1,900	944	275	118
23	Cancun, Mexico	338	9	3,671	5.0	1,287	612	1,435	0
24	San Diego, CA	1,062	29	3,638	5.0	1,708	322	193	354
25	Minneapolis, MN	702	21	3,397	4.7	1,050	801	140	702
26	Charlotte-Douglas, NC	524	15	3,389	4.6	1,893	740	0	233
27	Sacramento, CA	683	21	3,331	4.6	2,193	228	114	114
28	Chicago, IL (MDW)	0	0	3,238	4.4	2,806	369	0	64
29	West Palm Beach, FL	287	9	3,091	4.2	1,511	862	287	144
30	Austin, TX	965	32	3,056	4.2	1,448	161	322	161
31	Norfolk, VA	241	8	3,043	4.2	1,958	362	0	482
32	Miami, FL	812	27	2,996	4.1	1,400	448	224	112
33	Pittsburgh, PA	564	19	2,971	4.1	1,098	1,206	0	103
34	Houston, TX (HOU)	729	25	2,917	4.0	1,459	729	0	0
35	Boise, ID	157	5	2,858	3.9	1,865	640	0	196

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	SWO REPORTED PAX	RETENTION %	TRUE MARKET	PDEW	DIVERTING PASSENGERS			
						OKC	TUL	DFW	ICT
36	Richmond, VA	136	5	2,725	3.7	1,597	881	55	55
37	Pensacola, FL	381	14	2,702	3.7	938	765	333	285
38	Reno, NV	271	10	2,669	3.7	1,538	724	45	90
39	Fort Myers, FL	318	12	2,663	3.6	1,995	271	0	80
40	San Antonio, TX	964	37	2,609	3.6	1,588	0	0	57
41	Madison, WI	420	16	2,556	3.5	1,353	463	132	189
42	Anchorage, AK	117	5	2,347	3.2	1,022	697	93	418
43	Savannah, GA	127	6	2,289	3.1	1,229	805	42	85
44	Jacksonville, FL	341	15	2,272	3.1	754	496	341	341
45	Raleigh/Durham, NC	568	26	2,222	3.0	1,036	335	0	284
46	Knoxville, TN	317	14	2,220	3.0	1,374	423	106	0
47	St. Louis, MO	352	16	2,144	2.9	1,135	388	111	158
48	Milwaukee, WI	180	8	2,122	2.9	1,413	529	0	0
49	Fresno, CA	384	18	2,112	2.9	1,056	0	96	576
50	Honolulu, HI	139	7	2,091	2.9	1,533	279	105	35
Top 50 Destinations		**35,888**	**15**	**236,360**	**323.8**	**128,369**	**46,770**	**11,620**	**13,713**
Total Domestic		**49,398**	**16**	**318,455**	**436.2**	**174,351**	**60,643**	**14,461**	**19,602**
Total International		**4,499**	**14**	**32,836**	**45.0**	**15,307**	**4,631**	**7,049**	**1,350**
Total All Markets		**53,897**	**15**	**351,291**	**481.2**	**189,658**	**65,274**	**21,510**	**20,952**

GLOSSARY

AIRLINE CODES

4O	Interjet
AA	American Airlines
AS	Alaska Airlines
DL	Delta Air Lines
F9	Frontier Airlines
G4	Allegiant Air
UA	United Airlines
WN	Southwest Airlines

AIRPORT CATCHMENT AREA (ACA)

The geographic area surrounding an airport from which that airport can reasonably expect to draw passenger traffic. The airport catchment area is sometimes called the service area.

AIRPORT CODES

DAL	Dallas-Love Field, TX
DCA	Washington-National, DC
DFW	Dallas-Fort Worth, TX
HOU	Houston-Hobby, TX
IAH	Houston-Intercontinental, TX
ICT	Wichita, KS
JFK	New York-Kennedy, NY
LGA	New York-LaGuardia
LHR	London-Heathrow, UK
MCO	Orlando-International, FL
OKC	Oklahoma City, OK
ORD	Chicago-O'Hare, IL

AIRPORT CODES (CONTINUED)

PHX	Phoenix-Sky Harbor, AZ
SWO	Stillwater, OK
TUL	Tulsa, OK

ARC

Acronym for Airline Reporting Corporation.

AVERAGE AIRFARE

The average of the airfares reported by the airlines to the U.S. DOT. The average airfare does not include taxes or passenger facility charges and represents one-half of a roundtrip ticket.

CAGR

Abbreviation for compounded annual growth rate, or the average rate of growth per year over a given time period.

DESTINATION AIRPORT

Any airport where the air traveler spends four hours or more. This is the Federal Aviation Administration definition.

DIVERSION

Passengers who do not use the local airport for air travel, but instead use a competing airport to originate the air portion of their trip.

FAA

Acronym for the Federal Aviation Administration.

HUB

An airport used by an airline as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destination. Also an airport classification system used by the FAA (e.g., non-hub, small hub, medium hub, and large hub.

INITIATED (ORIGIN) PASSENGERS

Origin and destination passengers who began their trip from within the catchment area.

LOAD FACTOR

The percentage of airplane capacity that is used by passengers.

LOCAL MARKET

The number of air travelers who travel between two points via nonstop air service.

MICRO

Acronym for Micropolitan Statistical Area. Micros have at least one urban cluster with a population ranging from 10,000 to 50,000 that has a high degree of social and economic integration with the core as measured by commuting ties.

NARROW-BODY JET

A jet aircraft with a single aisle designed for seating over 100 passengers.

NONSTOP FLIGHT

Air travel between two points without stopping at an intermediate airport.

ONBOARD PASSENGERS

The number of passengers transported on one flight segment.

ORIGIN AND DESTINATION (O&D) PASSENGERS

Includes all originating and destination passengers. In the context of this report, it describes the passengers arriving and departing an airport.

ORIGINATING AIRPORT

The airport used by an air traveler for the first enplanement of a commercial air flight.

PASSENGER FACILITY CHARGE

Fee imposed by airports of $1 to $4.50 on enplaning passengers. The fees are used by airports to fund FAA approved airport improvement projects.

PAX

Abbreviation for passengers.

PDEW

Abbreviation for passengers daily each way.

POINT-TO-POINT

Nonstop service that does not stop at an airline's hub and whose primary purpose is to carry local traffic rather than connecting traffic.

REFERRED PASSENGERS

Origin and destination passengers who began their trip from outside the catchment area.

REGIONAL JET

A jet aircraft with a single aisle designed for seating fewer than 100 passengers.

RETAINED PASSENGERS

Passengers who use the local airport for air travel instead of using a competing airport to originate the air portion of their trip.

TRUE MARKET

Total number of air travelers, including those who are using a competing airport, in the geographic area served by SWO. The true market estimate includes the size of the total market and for specific destinations.

TURBOPROP AIRCRAFT

A type of engine that uses a jet engine to turn a propeller. Turboprops are often used on regional and business aircraft because of their relative efficiency at speeds slower than, and altitudes lower than, those of a typical jet.

U.S. DOT

Acronym for U.S. Department of Transportation.

WIDE-BODY JET

A jet aircraft with two aisles designed for seating greater than 175 passengers.

FOR MORE INFORMATION, PLEASE CONTACT
JEFFREY HARTZ | 959 REDCEDAR WAY | COPPELL, TX 75019
360-600-6112 | JEFFREY.HARTZ@MEADHUNT.COM | WWW.MEADHUNT.COM

Mead & Hunt

APPENDIX THREE. FAA TAF Comparison Tables

AIRPORT NAME: STILLWATER REGIONAL AIRPORT

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2020	17,410	17,410	0%
Base yr. + 5yrs.	2025	28,000	28,964	-3%
Base yr. + 10yrs.	2030	31,830	28,964	10%
Base yr. + 15yrs.	2035	36,150	28,964	25%
Commercial Operations				
Base yr.	2020	1,920	1,920	0%
Base yr. + 5yrs.	2025	2,284	2,517	-9%
Base yr. + 10yrs.	2030	2,284	2,645	-14%
Base yr. + 15yrs.	2035	2,180	2,776	-21%
Total Operations				
Base yr.	2020	62,643	62,643	0%
Base yr. + 5yrs.	2025	77,354	80,967	-4%
Base yr. + 10yrs.	2030	85,234	84,121	1%
Base yr. + 15yrs.	2035	91,200	87,423	4%

NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).

Template for Summarizing and Documenting Airport Planning Forecasts

A. Forecast Levels and Growth Rates

AIRPORT NAME: STILLWATER REGIONAL AIRPORT **Specify base year:** 2020

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Average Annual Compound Growth Rates: Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15
Passenger Enplanements									
Air Carrier	1,308	1,600	1,600	1,600	1,600	22.3%	4.1%	2.0%	1.4%
Commuter	16,102	13,900	26,400	30,230	34,550	-13.7%	10.4%	6.5%	5.2%
TOTAL	17,410	15,500	28,000	31,830	36,150	-11.0%	10.0%	6.2%	5.0%
Operations									
Itinerant									
Air carrier	30	94	348	1,180	1,388	212.0%	63.3%	44.4%	29.1%
Commuter/air taxi	1,890	1,899	1,936	1,104	792	0.5%	0.5%	-5.2%	-5.6%
Total Commercial Operations	1,920	1,993	2,284	2,284	2,180	3.8%	3.5%	1.8%	0.9%
General aviation	25,654	27,980	31,260	34,760	38,640	9.1%	4.0%	3.1%	2.8%
Military	1,314	1,310	1,310	1,310	1,310	-0.3%	-0.1%	0.0%	0.0%
Local									
General aviation	31,858	34,500	40,610	44,990	47,180	8.3%	5.0%	3.5%	2.7%
Military	1,897	1,890	1,890	1,890	1,890	-0.4%	-0.1%	0.0%	0.0%
TOTAL OPERATIONS	62,643	67,673	77,354	85,234	91,200	8.0%	4.3%	3.1%	2.5%
Instrument Operations	4,737	5,034	5,643	5,983	6,255	6.3%	3.6%	2.4%	1.9%
Peak Hour Operations	30	31	37	41	43	4.7%	4.5%	3.2%	2.6%
Cargo/mail (enplaned+deplaned tons)	42	43	46	51	51	2.0%	2.0%	2.0%	1.3%
Based Aircraft									
Single Engine (Nonjet)	72	73	76	80	84	1.2%	1.0%	1.0%	1.1%
Multi Engine (Nonjet)	6	8	8	7	6	33.3%	5.9%	1.6%	0.2%
Jet Engine	2	2	2	2	3	0.7%	1.0%	0.9%	2.7%
Helicopter	0	0	0	1	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Other	0	0	1	1	1	0.0%	0.0%	0.0%	0.0%
TOTAL	80	83	87	91	96	3.6%	1.7%	1.3%	1.2%

B. Operational Factors

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.
Average aircraft size (seats)					
Air carrier	164	150	85	79	78
Commuter	46	46	50	48	45
Average enplaning load factor					
Air carrier	74%	70%	55%	69%	67%
Commuter	58%	60%	65%	59%	67%
GA operations per based aircraft	719	754	825	872	895

U.S. Department of Transportation
Federal Aviation Administration

Federal Aviation Administration
Southwest Region, Airports Division
AR/OK Airports Development Office

FAA-ASW-630
10101 Hillwood Pkwy.
Fort Worth, Texas 76177

March 17, 2022

Paul Priegel
Airport Director
Stillwater Regional Airport
723 South Lewis
Stillwater, OK 74074-4652

Federal Aviation Administration (FAA)
Stillwater Regional Airport (SWO) Aviation Activity Forecast Approval
Airport Improvement Program Grant Number 3-40-0090-033-2021

The FAA Airports District Office has reviewed the aviation forecast for the Stillwater Regional Airport (SWO) Airport Master Plan dated December 3, 2021. The FAA approves these forecasts for airport planning purposes, including the existing and future critical aircraft.

Our approval is based on the following:

- The forecast is supported by reasonable planning assumptions and current data
- The forecast appears to be developed using acceptable forecasting methodologies
- The difference between the FAA Terminal Area Forecast (TAF) and the Airport's forecast for total operations is within the 10 percent and 15 percent allowance for the 5 and 10 year planning horizons.

Approval of this forecast does not automatically justify any of the capital improvements shown on the ALP or recommended in the master plan. All future projects will need to be justified by current activity levels at the time of proposed implementation. Lastly, the approved forecasts may be subject to additional analysis, or the FAA may request a sensitivity analysis if this data is to be used for environmental or Part 150 noise planning purposes.

This forecast was prepared at the same time as the evolving impacts of the COVID-19 public health emergency. Forecast approval is based on the methodology, data, and conclusions at the time the document was prepared. However, consideration of the impacts of the COVID-19 public health emergency on aviation activity is warranted to acknowledge the reduced confidence in growth projections using currently-available data.

Accordingly, FAA approval of this forecast does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is

requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify AIP funding for eligible projects.

If you have any questions about this forecast approval, please call me at (817) 222-5641.

Sincerely,

Phuong Tran

Arkansas/Oklahoma
Airports District Office
Southwest Region

Enclosures: TAF Summary Report for Stillwater Regional Airport
Forecast of Aviation Activities and Critical Aircraft Designations

cc: Kelly Maddoux, AICP, Mead & Hunt
Tim House, FAA Program Manager

APPENDIX FOUR. Runway Length Analysis

The runway length analysis recommends the length necessary to meet existing and future aircraft demands. The determination of runway recommendation for airport planning purposes uses the methodology found in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. This AC states the design objective for primary runways is to provide a runway length for all aircraft that will regularly use the runway without causing operational weight restrictions. AC 150/5000-17, *Critical Aircraft and Regular Use Determination* defines regular use as 500 annual operations, excluding touch-and-go local operations.

RUNWAY LENGTH METHODOLOGY

FAA AC 150/5325-4B describes five steps to determine recommended runway lengths. The information from these steps is to be used for airport design and not for flight operations. The five steps are:

1. Identify potential design aircraft
2. Identify the most demand aircraft
3. Determine appropriate methodology
4. Determine the recommended runway length
5. Apply necessary adjustments as needed.

Design Aircraft and Most Demanding Aircraft

The existing design aircraft (and most demanding aircraft) for Runway 17/35 has been determined to be the Embraer ERJ 145. The future design aircraft (and most demanding aircraft) is the Embraer ERJ 175.

The existing and future design aircraft (and most demanding aircraft) for Runway 4/22 has been determined to be the family grouping of small aircraft (i.e., aircraft with maximum takeoff weight equal to or less than 12,500 pounds) that have approach speeds greater than 50 knots but have less than 10 passenger seats excluding crew (i.e., pilot and copilot) as defined by AC 150/5325-4B. This family grouping of small aircraft is further divided into two categories according to percentage of fleet: 95 percent and 100 percent. The differences between the two percentage categories are based on the airport's location and amount of existing or planned aviation activities.

The 95 percent of the fleet category is intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. It also includes those airports that are primarily intended to service low-activity locations, small population communities, and remote recreational areas. The 100 percent of the fleet category is intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. Stillwater and aircraft activity at SWO are best represented by the 95 percent category.

Determine Appropriate Methodology

Following guidance provided in AC 150/5325-4B, individual Airport Planning Manuals (APMs) produced and published by aircraft manufacturers should be used for regional jets or aircraft with Maximum Takeoff Weight (MTOW) greater than 60,000 pounds. Therefore, the APMs for the ERJ 145 and ERJ 175 will be used to determine a recommended length for Runway 17/35; the family grouping of small aircraft will be used to determine a recommended length for Runway 4/22.

The performance requirements of the design aircraft determine recommended runway length. Factors that affect aircraft performance capabilities include the airport elevation, air temperature, aircraft payload, fuel load, and wind conditions. These factors are explained below.

Elevation

Aircraft performance declines at higher altitudes because the air is less dense. Higher elevations negatively impact thrust produced by the aircraft on takeoff and the aerodynamic performance of the aircraft. An elevation of 1,000 feet above mean sea level (AMSL) is used for this analysis.

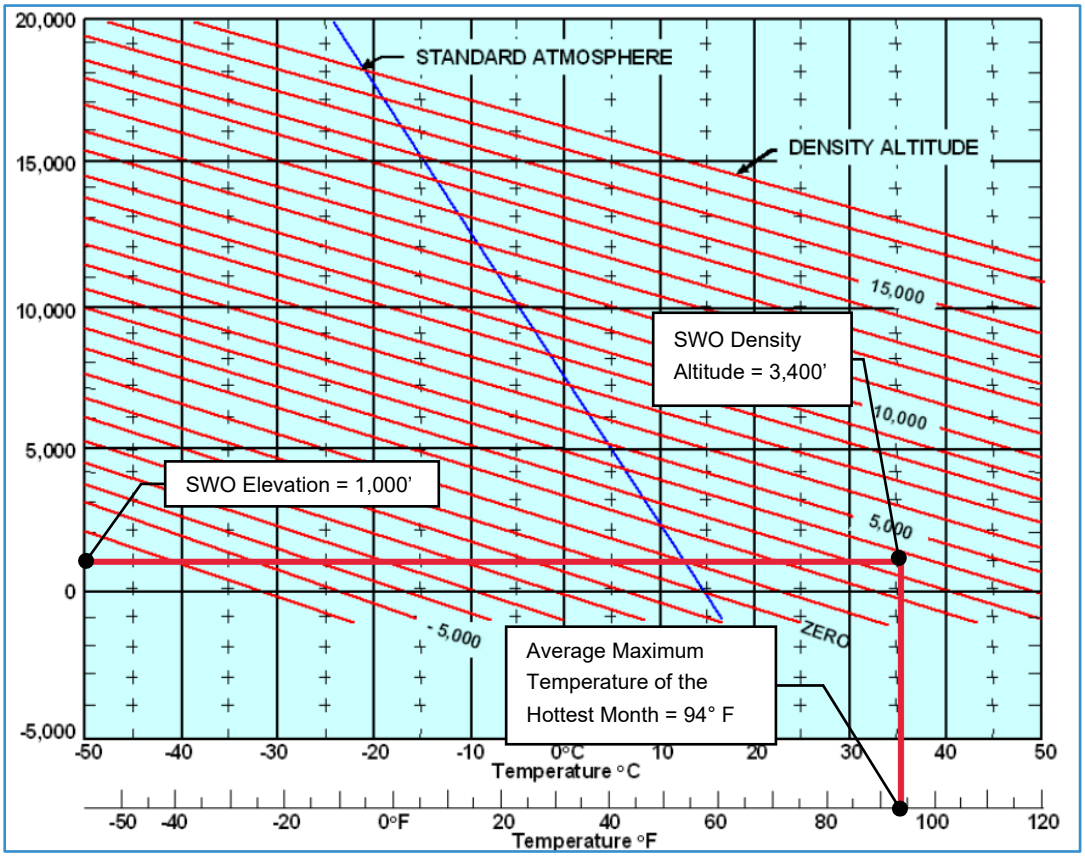
International Standard Atmosphere (ISA)

International Standard Atmosphere (ISA) is a mathematical model that describes how the earth's atmosphere, or air pressure and density, changes relative to altitude. The atmosphere is less dense at higher elevations. ISA is frequently used in aircraft performance calculations because conditions that deviate from ISA will affect aircraft performance. ISA at sea level occurs when the temperature is 59 degrees Fahrenheit. According to the 1976 Standard Atmosphere Calculator, the ISA at SWO's 1,000 feet AMSL occurs when the temperature is 55 degrees Fahrenheit.

Density Altitude (DA)

Density Altitude (DA) compares air density to ISA at a point in time and specific location and is also a critical component of aircraft performance calculations. DA is used to describe how aircraft performance differs from the performance that would be expected under ISA. DA is primarily influenced by elevation and air temperature. **Figure 4-1** illustrates how DA is impacted when factoring in the average maximum temperature of the hottest month. The SWO DA during the hottest month, when the ambient air temperature is 94 degrees Fahrenheit, is 3,400 feet AMSL. As a measure of high temperature impacts on aircraft performance, this DA is used in aircraft performance assessment.

Figure 4-1: Density Altitude for SWO



Takeoff Weight and Destination

Aircraft takeoff weight is directly related to the distance of the flight and the load that the aircraft is carrying. For shorter distances, aircraft may depart with a full passenger load and less than full fuel tanks. In those instances, the aircraft will typically be departing below MTOW and will not require as long of a runway. Aircraft require more fuel for longer trips, and the longest trips may require payload restrictions on the passengers, baggage, and cargo that can be carried. An aircraft with full passenger load and fuel will be near its MTOW.

Currently, Envoy Airlines provides twice daily non-stop service to Dallas Fort Worth International Airport (DFW), which is approximately 200 nautical miles (NM) from Stillwater. Additional long-term potential destinations that could be served by commercial air carriers include Denver International Airport (DEN) and Chicago O'Hare International Airport (ORD), which are located approximately 225 NM and 550 NM from Stillwater, respectively.

Recommended Runway Length Determination

Runway 17/35

The runway 17/35 length analysis is based on the payload and range table and the takeoff performance charts in the APMs for the existing and future design aircraft. AC 150/5325-4B allows for runway length determination to be based on MTOW. As seen in **Figure 4-2**, the runway length for the E-145 at 48,502 pounds MTOW and at SWO's DA of 3,400 feet AMSL is approximately 8,200 feet (represented by the red dashed line). However, using SWO's existing runway length of 7,401 feet, the operational takeoff weight is approximately 46,200 pounds (represented by the solid red line), about 2,500 pounds less than its MTOW. It is understood that the ERJ 145s departing SWO currently fly to DFW, do not need full fuel capacity, and are not routinely carrying full passenger loads. In other words, the ERJ 145s are not required to takeoff at MTOW.

Figure 4-2: E-145 Takeoff Runway Length Requirements

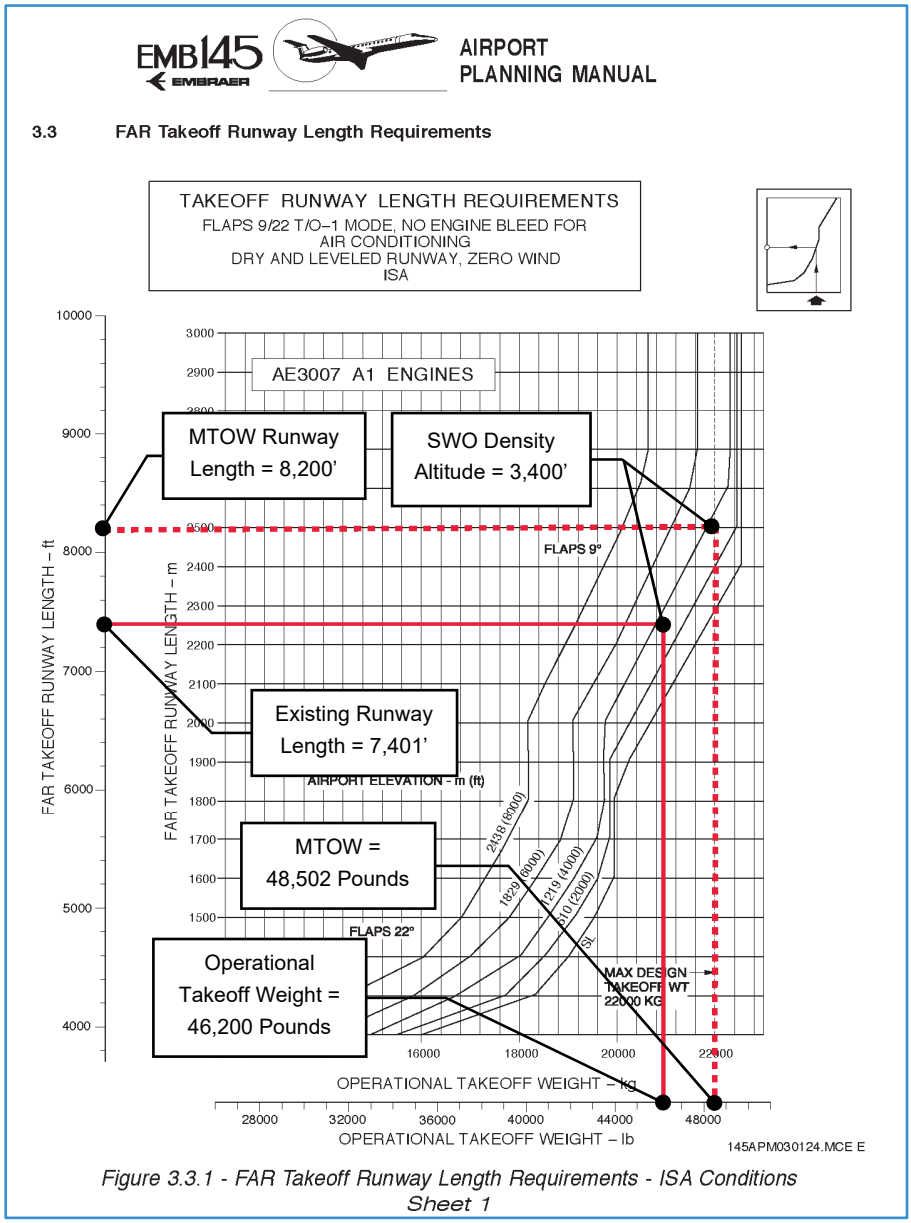


Figure 3.3.1 - FAR Takeoff Runway Length Requirements - ISA Conditions
Sheet 1

Source: Mead & Hunt analysis using Embraer E 145 Airport Planning Manual.

When using the payload versus range chart (see **Figure 4-3**), it is only when an approximate 650-NM range is required does the ERJ 145 begin to experience maximum payload restrictions. Since payload is a measure of passengers, baggage, and cargo (i.e., not including fuel), the MTOW reductions do not affect the future destinations most likely to be served by air carriers from SWO because the reduced weight can be met with less fuel and not fewer passengers. As detailed above, the most likely future destinations to be served from SWO are DEN and ORD, which are within the range of the maximum payload allowed.

Figure 4-3: E-145 Payload Versus Range

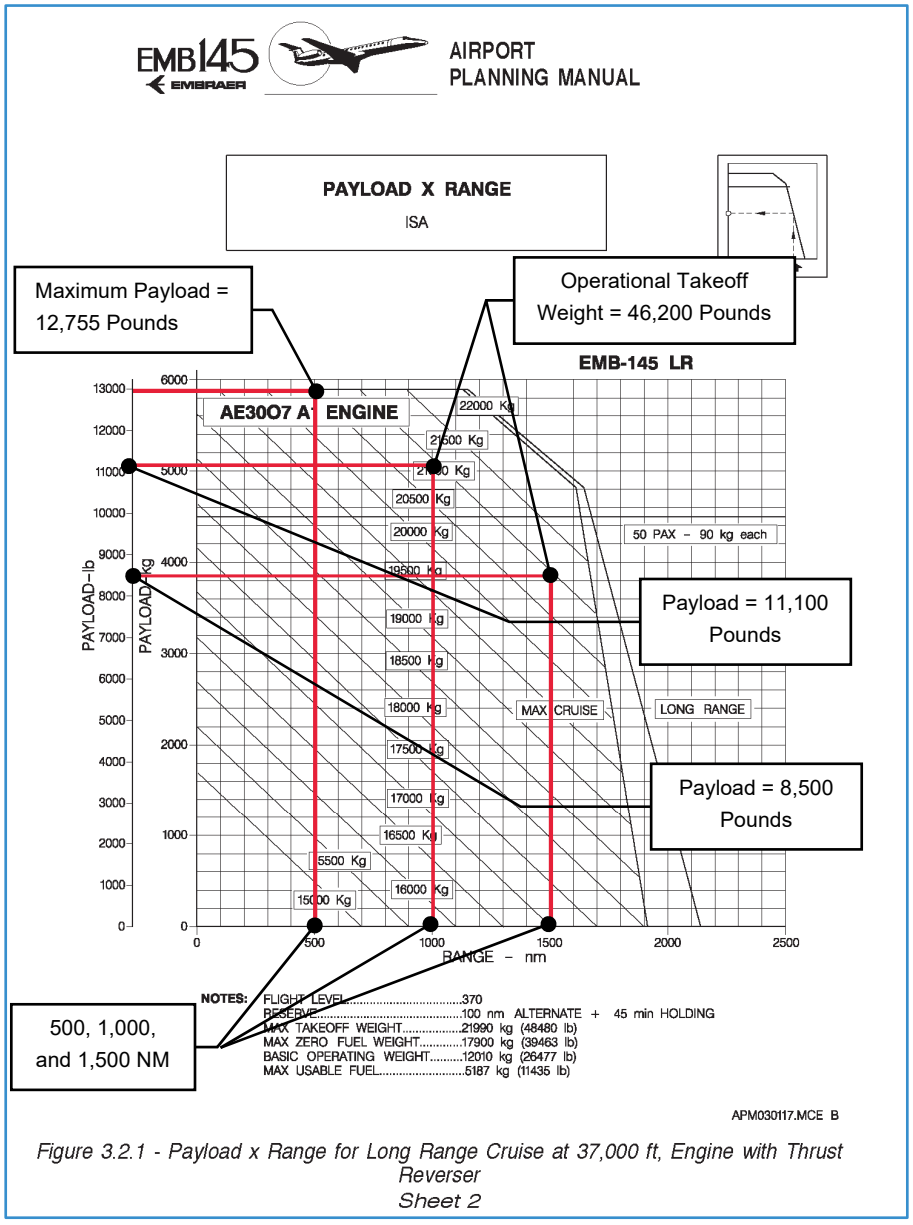


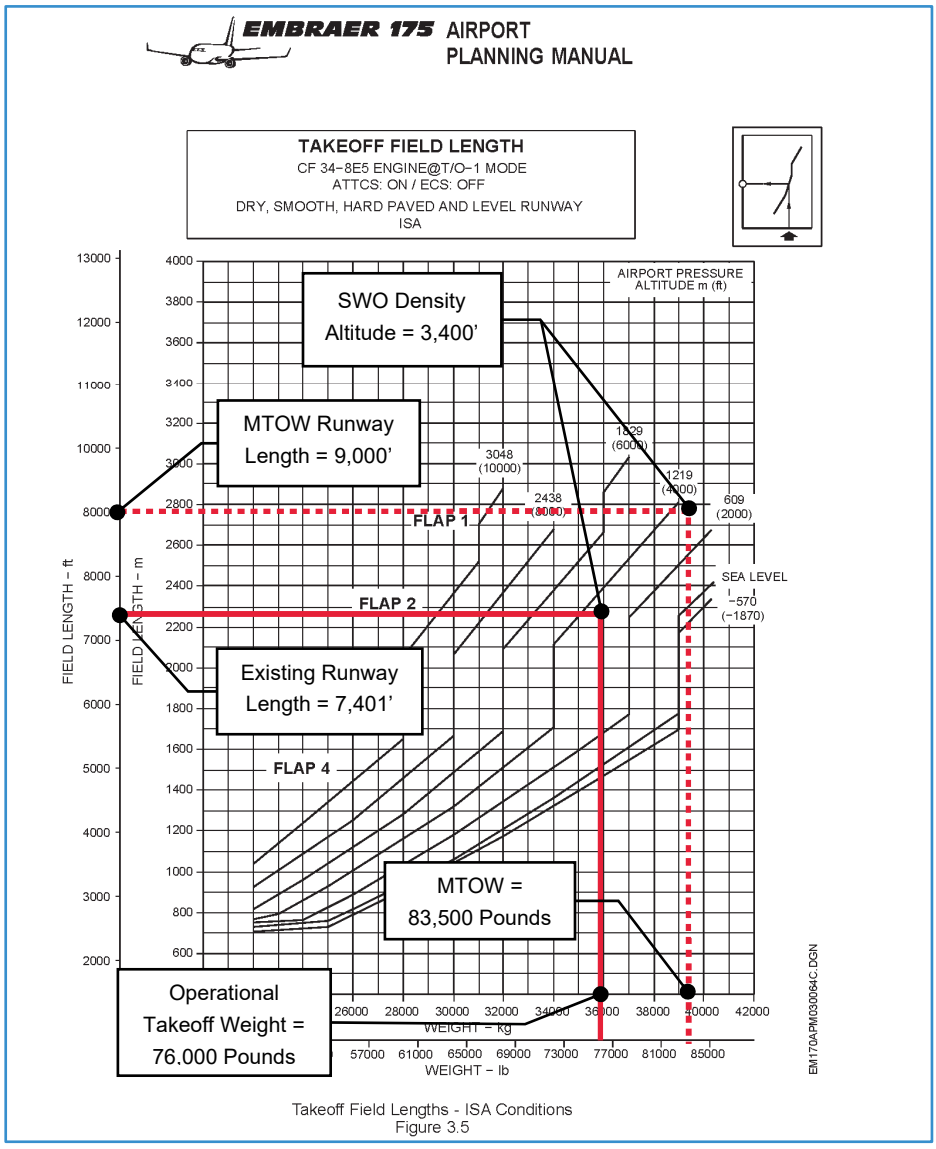
Figure 3.2.1 - Payload x Range for Long Range Cruise at 37,000 ft, Engine with Thrust Reverser
Sheet 2

Source: Mead & Hunt analysis using Embraer E 145 Airport Planning Manual.

Figure 4-4 presents the runway length requirements of the ERJ 175. The runway length required at the 83,500 MTOW and DA of 3,400 feet AMSL is approximately 9,000 feet. Using SWO's existing runway length of 7,401 feet indicates the operational takeoff weight is approximately 76,000 pounds, about 7,500 pounds less than MTOW. However, as with the ERJ 145s, it is not expected that ERJ 175s departing SWO will be required to operate at MTOW. This is verified by **Figure 4-5**, which indicates that not until an approximate

1,300-NM range is required does the E-175 experience maximum payload restrictions. The reduced MTOW can be met with less fuel and not fewer passengers.

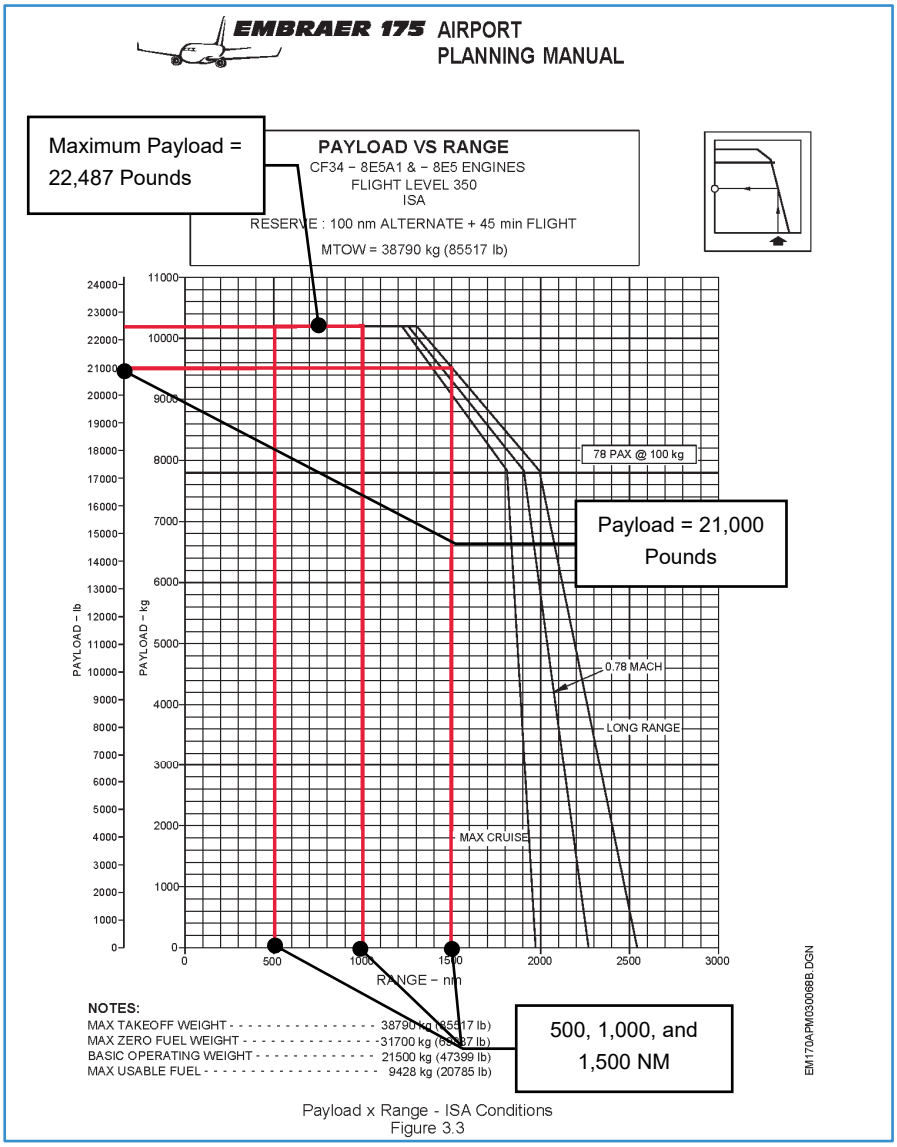
Figure 4-4: E-175 Takeoff Runway Length Requirements



Source: Mead & Hunt analysis Embraer E 175 Airport Planning Manual.

Note: There is a typo of 8,000 feet in field length rather than 9,000 feet.

Figure 4-5: E-175 Payload Versus Range

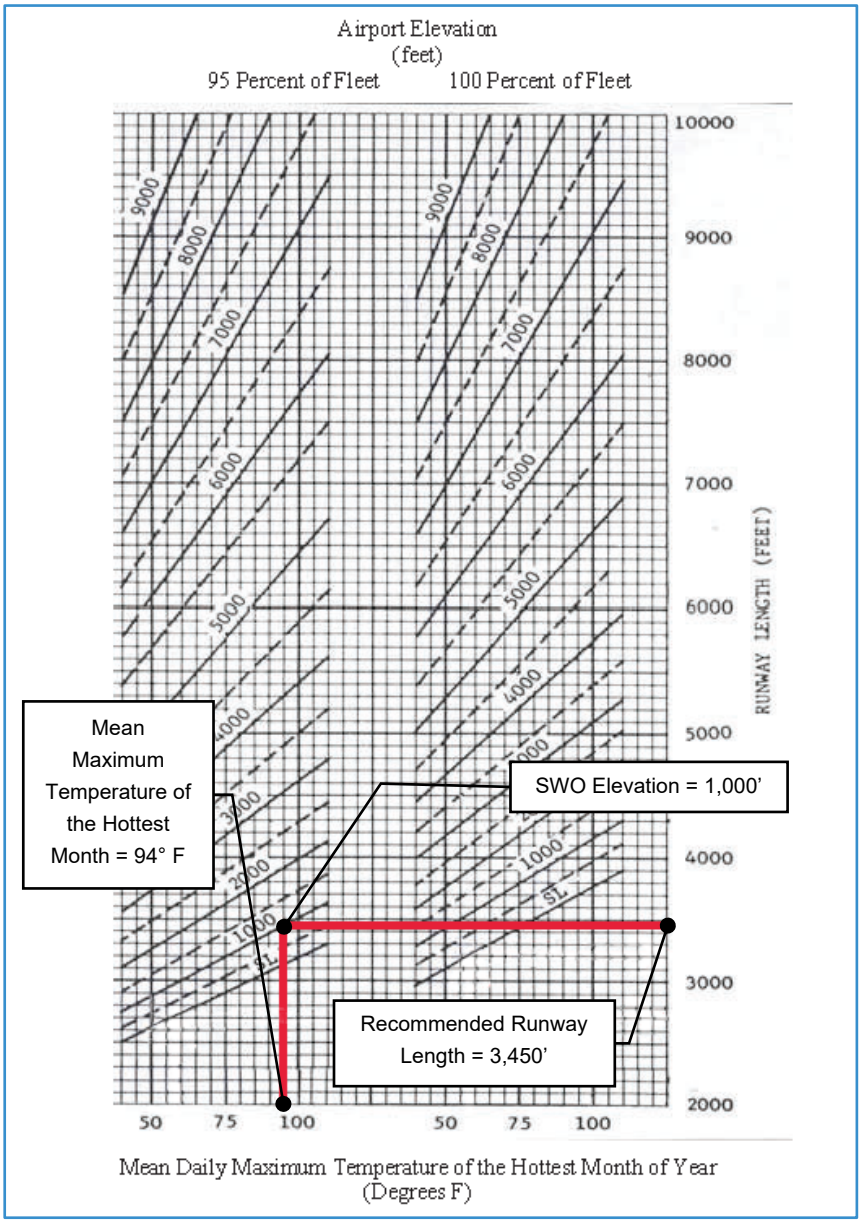


Source: Mead & Hunt analysis using Embraer E 175 Airport Planning Manual.

Runway 4/22

Figure 4-6 uses the 95 percent of the small aircraft fleet with approach speeds greater than 50 knots and less than 10 passenger seats. Using SWO's elevation of 1,000 feet (not the DA of 3,400 feet) and the mean maximum temperature of the hottest month (94 degrees Fahrenheit), a runway length of approximately 3,450 feet is recommended as shown in the chart.

Figure 4-6: Small Aircraft with Less Than 10 Passenger Seats Takeoff Runway Length Requirements



Source: Mead & Hunt analysis using FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Apply Necessary Adjustments

AC 150/5325-4B allows for the adjustment of runway lengths for non-zero effective runway gradients (i.e., runways having a difference in centerline elevation that is not equal to zero). The adjustment increases the takeoff length thy 10 feet for every 1-foot of maximum elevation difference of the runway centerline. For Runway 17/35 an adjustment of 430 feet is provided since the maximum centerline elevation difference is 43

feet. For Runway 4/22 an adjustment of 280 feet is afforded since the maximum centerline elevation difference is 28 feet.

Table 4-1 provides the recommended runway lengths after applying the adjustments.

Table 4-1: Runway Length Recommendations with Adjustments

Runway	Recommended Runway Length	Maximum Centerline Elevation Difference	Adjustment	Final Recommended Runway Length
17/35				7,401
Existing Design Aircraft (E-145)	8,200' (MTOW)	43'	430'	8,630'
Future Design Aircraft (E-175)	9,000' (MTOW)	43'	430'	9,430'
4/22				5,002
Existing and Future Design Aircraft (C 172)	3,450'	28'	280'	3,730'

Source: Mead & Hunt using airport planning manuals and FAA AC 150/5325-4B methodology.

RUNWAY LENGTH CONCLUSION

The runway length analysis suggests that Runway 17/35, with an existing length of 7,401 feet is slightly deficient to accommodate both the existing and future design aircraft when operating at MTOW. However, since the existing destination for Envoy Airlines aircraft is DFW and the most likely destinations for air carriers to provide long-term future service from SWO is DEN and ORD, which are within the ranges of both the ERJ 145 and 175 aircraft without requiring payload restrictions, this indicates that the Runway 17/35 length is sufficient, and no additional runway length is recommended. This is supported by the fact that no airport users have indicated runway length is insufficient for their operations and have not requested a runway extension.

APPENDIX FIVE. ATO and Ground Operations Analysis

Table 5-1 shows a detailed breakdown of the proposed Airline Ticket Offices (ATO) and ground operations areas.

Table 5-1: Airline Ticketing and Operations Office Space Program

Location	Quantity	Calculation	Notes
Airline Ticket Office			
Ticket Counters	3		Additional Counter
Counter Length w/ Bagwell	12’		
Counter Depth to Back Wall	12.5’		
Total Ticketing Area (sq ft)	150		
Station Manager (sq ft)	108		Enclosed Office
Supervisor's Office (sq ft)	90		
Agent Check-In/Cash-Out Workstations (sq ft)	70	2 x 35	Counters
Break & Conference Room (sq ft)	150		Kitchen Setup
Sub-Total ATO Space (sq ft)	568		
Airline Ground Operations Space (sq ft)			
Workstation Load & Balance	108		
MOD Desk	108		
Equipment Shelves – Radios/Chargers, Manuals	50	5 x 10	
Tow Bars	90	15 x 6	
Aircraft Maintenance Stores	100	10 x 10	
Lockers & Heavy Weather Gear Storage	100		Full Height Lockers
Sub-Total Operations Space	556		
Sub-Total ATO & Operations Space	1,124		
Circulation (10%)	112		Back of House
Total ATO & Ground Operations Space (sq ft)	**1,236**		
GSE Equipment Storage (sq ft)	**800**		**1 Tug and 1 Cart**
Grand Total ATO and Ground Operations Space (sq ft)	**2,036**		

Source: Mead & Hunt analysis.

APPENDIX SIX. Financial Implementation Analysis Schedules

The Schedules used in the Financial Implementation Analysis are presented on the following pages and described below.

- **Schedule E-1 – Estimated Project Costs and Development Schedule:** This schedule presents the CIP including estimated costs and anticipated development schedule for individual projects in the program. The schedule provides practical approaches for matching capital expenditure amounts with capital funding availability in the Phase I, Phase II, and Phase III planning periods. This schedule also applies inflation adjustments to provide escalated development costs for projects implemented throughout the entire 20-year planning period.
- **Schedule E-2 – Projected Capital Funding Sources:** This schedule lists each of the CIP projects, their estimated costs (escalated for inflation) and the assumed funding sources and amounts. The schedule applies specific capital funding sources to each individual project in the capital program.
- **Schedule E-3 – Statewide Hangar Loan Program Funded Debt:** This schedule provides the details of the debt issue through the State Hangar Loan Program, which may be required in 2024 to partially fund the construction of a new Group Hangar. The schedule includes the anticipated terms of the loan and the resulting annual debt service requirements including associated interest costs. Debt service is planned to be funded with additional revenues from the tenant(s) of the hangar.
- **Schedule E-4 – Actual, Budgeted, and Projected Operations & Maintenance Expenses:** This schedule reflects the past three years of actual operations and maintenance expenses, budgeted 2023 and 2024 operations and maintenance expenses, and projections of these expenses through the Phase I, Phase II, and Phase III planning periods. This schedule also provides a comparison of SWO's annual expenses per enplaned passenger with the industry average of other non-hub airports.
- **Schedule E-5 – Actual, Budgeted, and Projected Operating Revenues:** This schedule reflects the past three years of actual operating revenues, budgeted 2023 and 2024 operating revenues, and projections of these revenues through the Phase I, Phase II, and Phase III planning periods. These revenues are organized into categories for airline revenues, non-airline revenues and non-operating revenues, and provides statistical comparisons of SWO's airline cost per enplaned passenger and operating revenues per enplaned passenger with other non-hub airport industry averages.
- **Schedule E-6 – Financial Analysis Summary and Implementation Plan – Budgeted and Projected Net Revenues, Capital Funding, and Capital Expenditures:** This schedule includes a Capital Cash Flow section that presents a summary of projected capital funding (from **Schedule E-2**) and scheduled capital expenditures (from **Schedule E-1**) with the cash flow that results from implementing the CIP. It also includes an Operating Cash Flow section that summarizes totals for operating revenues (from **Schedule E-5**) and operating expenses (from **Schedule E-4**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities.

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

13-Feb-24

Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Short Term Projects (2023-2027)										
Capital Projects 2023										
A.1 Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225	$78,225					$78,225			$78,225
A.2 Design Terminal Building	1,874,438	1,874,438					1,874,438			1,874,438
A.3 Prepare Airport Traffic Control Tower (ATCT) Siting Study	100,000	100,000					100,000			100,000
A.4 Prepare Airport Traffic Control Tower (ATCT) EA	200,000	200,000					200,000			200,000
A.5 Replace Two Primary Mower Apparatus	30,000	30,000					30,000			30,000
2022 SRE Equipment - FY22 Grant Carryover	280,829	280,829					280,829			280,829
Total Capital Projects 2023	$2,563,492	$2,563,492	$0	$0	$0	$0	$2,563,492	$0	$0	$2,563,492
Capital Projects 2024										
A.6 Construct New Group Hangar	$2,500,000		$2,575,000				$2,575,000			$2,575,000
A.7 Design and Construct Terminal Building including Demolition of Group Hangar #1, Phase 1	19,000,000		19,570,000				19,570,000			19,570,000
A.8 Design and Construct Terminal Area Roadways and Parking Lots, Phase 1	907,000		934,210				934,210			934,210
A.9 Crack Seal, and Re-Mark Taxiway A	60,000		61,800				61,800			61,800
A.10 Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	200,000		206,000				206,000			206,000
Total Capital Projects 2024	$22,667,000	$0	$23,347,010	$0	$0	$0	$23,347,010	$0	$0	$23,347,010

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Capital Projects 2025										
A.11 Construct Terminal Building, Phase 2	$1,500,000			$1,591,350			$1,591,350			$1,591,350
A.12 Construct Terminal Area Roadways and Parking Lots, Phase 2	615,000			652,454			652,454			652,454
A.13 Construct One Corporate Hangar with Pavement	2,213,000			2,347,772			2,347,772			2,347,772
Total Capital Projects 2025	$4,328,000	$0	$0	$4,591,575	$0	$0	$4,591,575	$0	$0	$4,591,575
Capital Projects 2026										
A.14 Construct Terminal Building, Phase 3	$1,400,000				$1,529,818		$1,529,818			$1,529,818
A.15 Construct Terminal Area Roadways and Parking Lots, Phase 3	653,500				714,097		714,097			714,097
A.16 Replace Mower	80,000				87,418		87,418			87,418
A.17 Remove Rubber, Crack Seal, and Re-Mark Runway 17/35 and Taxiway A	150,000				163,909		163,909			163,909
A.18 Construct Portions of Perimeter Road, Phase 1	107,000				116,922		116,922			116,922
Total Capital Projects 2026	$2,390,500	$0	$0	$0	$2,612,164	$0	$2,612,164	$0	$0	$2,612,164
Capital Projects 2027										
A.19 Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 1	$10,888,889					$12,255,541	$12,255,541			$12,255,541
A.4 Reimburse Airport Traffic Control Tower (ATCT) EA	0					0	0			0
A.20 Implement Airport Safety Management System (SMS)	90,000					101,296	101,296			101,296

STILLWATER REGIONAL AIRPORT (SWO)
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Master Plan - Financial Implementation Analysis
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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
A.21 Construct One OSU Flight School Maintenance Hangar, Including Pavement	5,349,000					6,020,347	6,020,347			6,020,347
A.22 Construct One 10-Unit T-hangar	1,200,000					1,350,611	1,350,611			1,350,611
Total Capital Projects 2027	$17,527,889	$0	$0	$0	$0	$19,727,793	$19,727,793	$0	$0	$19,727,793
Total Short Term Project Costs	$49,476,881	$2,563,492	$23,347,010	$4,591,575	$2,612,164	$19,727,793	$52,842,035	$0	$0	$52,842,035

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Mid Term Projects (2028-2032)										
B.1 Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 2	$1,000,000						$0	$1,211,831		$1,211,831
B.2 Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	1,920,000						0	2,326,715		2,326,715
B.3 Demolish Existing ATCT	40,000						0	48,473		48,473
B.4 Install Whole Airport Facility Back-Up Power Generator	3,000,000						0	3,635,492		3,635,492
B.5 Expand Fuel Farm: One 12,000-gallon Jet A Tank and one 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	1,178,000						0	1,427,537		1,427,537
B.6 Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	2,000,000						0	2,423,661		2,423,661
B.7 Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	7,576,000						0	9,180,830		9,180,830
B.8 Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	731,000						0	885,848		885,848
B.9 Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	51,000						0	61,803		61,803
B.10 Construct SRE/Maintenance Facility	2,000,000						0	2,423,661		2,423,661

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
B.11 Remodel Existing Terminal and Demolish Existing ARFF Facility	1,200,000						0	1,454,197		1,454,197
B.12 Expand Terminal Parking Lots, Phase 4	317,000						0	384,150		384,150
B.13 Construct South GA Development Access Road	611,000						0	740,429		740,429
B.14 Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	7,468,000						0	9,049,952		9,049,952
B.15 Runway and Taxiway Pavement Maintenance	2,000,000						0	2,423,661		2,423,661
B.16 Construct One Corporate Hangar with Pavement	2,213,000						0	2,681,781		2,681,781
B.17 Install Two Electric Aircraft Charging Stations	416,000						0	504,122		504,122
B.18 Construct Two Box Hangars	2,969,000						0	3,597,925		3,597,925
B.19 Construct Portions of Perimeter Road, Phase 2	446,000						0	540,477		540,477
B.20 Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	280,767						0	340,242		340,242
B.21 Rehabilitate Airport Drainage System	500,000						0	605,915		605,915
B.22 Rehabilitate PAPIs for Runways 17, 35, and 4	1,195,425						0	1,448,653		1,448,653
B.23 Acquire Airfield De-icing Vehicle	500,000						0	605,915		605,915
Total Mid Term Project Costs	$39,612,192	$0	$0	$0	$0	$0	$0	$48,003,271	$0	$48,003,271

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Long Term Projects (2033-2042)										
C.1 Reconstruct and Realign Taxiway F1, Including CATEX	$800,000						$0		$1,210,072	1,210,072
C.2 Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	940,000						0		1,421,834	1,421,834
C.3 Relocate Taxiway F, Including CATEX or EA	1,292,000						0		1,954,266	1,954,266
C.4 Expand Terminal Parking Lots, Phase 5	439,000						0		664,027	664,027
C.5 Runway and Taxiway Pavement Maintenance	1,076,000						0		1,627,547	1,627,547
C.6 Construct One 10-Unit T-hangar with Pavement	2,400,000						0		3,630,215	3,630,215
C.7 Construct Two Box Hangars	2,969,000						0		4,490,879	4,490,879
C.8 Construct Two Corporate Hangars with Pavement	4,406,000						0		6,664,470	6,664,470
C.9 Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	7,711,000						0		11,663,579	11,663,579
C.10 Construct Taxiway West of Runway 17/35, Including EA	27,822,853						0		42,084,562	42,084,562
C.11 Runway and Taxiway Pavement Reconstruction	20,000,000						0		30,251,794	30,251,794
C.12 Construct Portions of Perimeter Road, Phase 3	680,000						0		1,028,561	1,028,561
C.13 Update Airport Master Plan	750,000						0		1,134,442	1,134,442
C.14 e Purchase ARFF Vehicle	1,000,000						0		1,512,590	1,512,590
Total Long Term Project Costs	$72,285,853	$0	$0	$0	$0	$0	$0	$0	$109,338,839	$109,338,839
Total Project Costs	$161,374,926	$2,563,492	$23,347,010	$4,591,575	$2,612,164	$19,727,793	$52,842,035	$48,003,271	$109,338,839	$210,184,145

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

13-Feb-24

	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement and BIL-AIG Funding	AIP Discretionary/ BIL-ATP-ATCT Funding	Total Federal Funding	Oklahoma Aeronautics Commission Grants	Other Federal/ State Grants (FEMA/BRIC, FAA F&E)	Passenger Facility Charges (PAYG)	City Contribution	Private 3rd Party Funding (Inc. OSU)	Debt Proceeds	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Short Term Projects (2023-2027)														
Capital Projects 2023														
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225	$70,403		$70,403								$7,823	$78,225
A.2	Design Terminal Building	1,874,438	1,406,388		1,406,388				Assumes Local Match + 15% ineligible >>>>				468,051	1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	100,000	90,000		90,000								10,000	100,000
A.4	Prepare Airport Traffic Control Tower (ATCT) EA	200,000			0			Reimb in 2027>>>	200,000				0	200,000
A.5	Replace Two Primary Mower Apparatus	30,000			0								30,000	30,000
2,022	SRE Equipment - FY22 Grant Carryover	280,829	252,746		252,746				28,083				0	280,829
	Total Capital Projects 2023	$2,563,492	$1,819,536	$0	$1,819,536	$0	$0	$0	$228,083	$0	$0	$0	$515,873	$2,563,492
Capital Projects 2024														
A.6	Construct New Group Hangar	$2,575,000			$0						$1,750,000	$825,000	$0	$2,575,000
A.7	Design and Construct Terminal Building including Demolition of Group Hangar #1, Phase 1	19,570,000	1,468,361	12,136,184	13,604,545	1,000,000			$2,482,859			700,000	1,782,596	19,570,000
A.8	Design and Construct Terminal Area Roadways and Parking Lots, Phase 1	934,210	840,789		840,789				93,421				0	934,210
A.9	Crack Seal, and Re-Mark Taxiway A	61,800			0							61,800	0	61,800
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	206,000			0							206,000	0	206,000
	Total Capital Projects 2024	$23,347,010	$2,309,150	$12,136,184	$14,445,334	$1,000,000	$0	$0	$2,576,280	$0	$1,750,000	$1,792,800	$1,782,596	$23,347,010
Capital Projects 2025														
A.11	Construct Terminal Building, Phase 2	$1,591,350	$1,432,475		$1,432,475				$158,875				$0	$1,591,350
A.12	Construct Terminal Area Roadways and Parking Lots, Phase 2	652,454	587,208		587,208				65,245				0	652,454
A.13	Construct One Corporate Hangar with Pavement	2,347,772			0					2,347,772			0	2,347,772
	Total Capital Projects 2025	$4,591,575	$2,019,683	$0	$2,019,683	$0	$0	$0	$224,121	$2,347,772	$0	$0	$0	$4,591,575
Capital Projects 2026														
A.14	Construct Terminal Building, Phase 3	$1,529,818	$1,376,996		$1,376,996				$152,822				$0	$1,529,818
A.15	Construct Terminal Area Roadways and Parking Lots, Phase 3	714,097	642,687		642,687				71,410				0	714,097
A.16	Replace Mower	87,418			0							87,418	0	87,418
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35 and Taxiway A	163,909			0							163,909	0	163,909
A.18	Construct Portions of Perimeter Road, Phase 1	116,922			0							116,922	0	116,922
	Total Capital Projects 2026	$2,612,164	$2,019,683	$0	$2,019,683	$0	$0	$0	$224,232	$0	$0	$368,249	$0	$2,612,164
Capital Projects 2027														
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 1	$12,255,541	$728,834	$8,800,000	$9,528,834	$1,000,000		$350,000				$1,376,707	$0	$12,255,541
A.4	Reimburse Airport Traffic Control Tower (ATCT) EA	0	180,000		180,000				-200,000				20,000	0
A.20	Implement Airport Safety Management System (SMS)	101,296	91,166		91,166							10,130	0	101,296
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	6,020,347			0					6,020,347			0	6,020,347
A.22	Construct One 10-Unit T-hangar	1,350,611			0					1,350,611			0	1,350,611
	Total Capital Projects 2027	$19,727,793	$1,000,000	$8,800,000	$9,800,000	$1,000,000	$0	$350,000	-$200,000	$7,370,957	$0	$1,386,836	$20,000	$19,727,793
	Total Short Term Project Funding	$52,842,035	$9,168,052	$20,936,184	$30,104,236	$2,000,000	$0	$350,000	$3,052,715	$9,718,729	$1,750,000	$3,547,885	$2,318,469	$52,842,035

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

13-Feb-24

	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement and BIL-AIG Funding	AIP Discretionary/ BIL-ATP-ATCT Funding	Total Federal Funding	Oklahoma Aeronautics Commission Grants	Other Federal/ State Grants (FEMA/BRIC, FAA F&E)	Passenger Facility Charges (PAYG)	City Contribution	Private 3rd Party Funding (Inc. OSU)	Debt Proceeds	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Mid Term Projects (2028-2032)														
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 2	$1,211,831	$1,000,000		$1,000,000							$211,831	$0	$1,211,831
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	2,326,715	956,374	1,137,669	2,094,043							232,671	0	2,326,715
B.3	Demolish Existing ATCT	48,473	43,626		43,626							4,847	0	48,473
B.4	Install Whole Airport Facility Back-Up Power Generator	3,635,492			0		2,726,619					908,873	0	3,635,492
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and one 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	1,427,537			0					1,427,537			0	1,427,537
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	2,423,661			0							2,423,661	0	2,423,661
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	9,180,830			0		9,180,830						0	9,180,830
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	885,848			0		885,848						0	885,848
B.9	Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	61,803	55,623		55,623							6,180	0	61,803
B.10	Construct SRE/Maintenance Facility	2,423,661	1,944,377	236,918	2,181,295							242,366	0	2,423,661
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	1,454,197			0							1,454,197	0	1,454,197
B.12	Expand Terminal Parking Lots, Phase 4	384,150			0							384,150	0	384,150
B.13	Construct South GA Development Access Road	740,429			0							740,429	0	740,429
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	9,049,952			0					9,049,952			0	9,049,952
B.15	Runway and Taxiway Pavement Maintenance	2,423,661	1,000,000	1,181,295	2,181,295			242,366					0	2,423,661
B.16	Construct One Corporate Hangar with Pavement	2,681,781			0					2,681,781			0	2,681,781
B.17	Install Two Electric Aircraft Charging Stations	504,122			0					504,122			0	504,122
B.18	Construct Two Box Hangars	3,597,925			0					3,597,925			0	3,597,925
B.19	Construct Portions of Perimeter Road, Phase 2	540,477			0							540,477	0	540,477
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	340,242			0							340,242	0	340,242
B.21	Rehabilitate Airport Drainage System	605,915			0							605,915	0	605,915
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	1,448,653			0		1,448,653						0	1,448,653
B.23	Acquire Airfield De-icing Vehicle	605,915			0			605,915					0	605,915
	Total Mid Term Project Funding	$48,003,271	$5,000,000	$2,555,883	$7,555,883	$0	$14,241,950	$848,282	$0	$17,261,317	$0	$8,095,840	$0	$48,003,271
Long Term Projects (2033-2042)														
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$1,210,072	1,089,065		$1,089,065			$121,007					$0	$1,210,072
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	1,421,834	1,279,651		1,279,651			142,183					0	1,421,834
C.3	Relocate Taxiway F, Including CATEX or EA	1,954,266	1,145,495	613,344	1,758,839			195,427					0	1,954,266
C.4	Expand Terminal Parking Lots, Phase 5	664,027			0							664,027	0	664,027
C.5	Runway and Taxiway Pavement Maintenance	1,627,547	1,464,792		1,464,792			162,755					0	1,627,547
C.6	Construct One 10-Unit T-hangar with Pavement	3,630,215			0					3,630,215			0	3,630,215
C.7	Construct Two Box Hangars	4,490,879			0					4,490,879			0	4,490,879
C.8	Construct Two Corporate Hangars with Pavement	6,664,470			0					6,664,470			0	6,664,470
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	11,663,579			0					11,663,579			0	11,663,579
C.10	Construct Taxiway West of Runway 17/35, Including EA	42,084,562	2,000,000	35,876,105	37,876,105			300,000				3,908,456	0	42,084,562
C.11	Runway and Taxiway Pavement Reconstruction	30,251,794	1,000,000	26,226,615	27,226,615			300,000				2,725,179	0	30,251,794
C.12	Construct Portions of Perimeter Road, Phase 3	1,028,561			0							1,028,561	0	1,028,561
C.13	Update Airport Master Plan	1,134,442	1,020,998		1,020,998			113,444					0	1,134,442
C.14	Purchase ARFF Vehicle	1,512,590	1,000,000	361,331	1,361,331			151,259					0	1,512,590
	Total Long Term Project Funding	$109,338,839	$10,000,000	$63,077,396	$73,077,396	$0	$0	$1,486,075	$0	$26,449,144	$0	$8,326,224	$0	$109,338,839
Total Project Funding		$210,184,145	$24,168,052	$86,569,463	$110,737,515	$2,000,000	$14,241,950	$2,684,357	$3,052,715	$53,429,190	$1,750,000	$19,969,949	$2,318,469	$210,184,145

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

SWO - MP - 2023 - 6

Schedule E-3

Master Plan - Financial Implementation Analysis
Statewide Hangar Loan Program Funded Debt

13-Feb-24

Debt Issue Structure

Issue Date:	01-Jan-24
Interest:	1.8%
Term:	10 Years
Project Funding Requirement:	$1,750,000
Debt Service Reserve Fund Requirement (MADS):	0
Capitalized Debt Issue Costs (0%):	0
Total Debt Requirement:	$1,750,000

Debt Service Schedule

Payment Number	Year	Beginning Principal	Annual Debt Service	Interest Payment	Principal Payment	Ending Principal
1	2024	$1,750,000	$192,788	$31,500	$161,288	$1,588,712
2	2025	1,588,712	192,788	28,597	164,192	1,424,520
3	2026	1,424,520	192,788	25,641	167,147	1,257,373
4	2027	1,257,373	192,788	22,633	170,156	1,087,217
5	2028	1,087,217	192,788	19,570	173,218	913,999
6	2029	913,999	192,788	16,452	176,336	737,663
7	2030	737,663	192,788	13,278	179,510	558,152
8	2031	558,152	192,788	10,047	182,742	375,411
9	2032	375,411	192,788	6,757	186,031	189,380
10	2033	189,380	192,788	3,409	189,380	0
	Totals		$1,927,884	$177,884	$1,750,000	

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operations & Maintenance Expenses

13-Feb-24

				Phase I (0 - 5 Years)						Phase II	Phase III
	Actual	Actual	Actual	Budget	Budget	Projected				(6 - 10 Years)	(11 - 20 Years)
Operations & Maintenance Expenses	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**	**2028-2032**	**2033-2042**
Personnel Compensation and Benefits	$931,380	$1,022,892	$1,128,603	$1,083,722	$1,136,965	$1,171,074	$1,206,206	$1,242,392	$5,840,359	$6,793,911	$17,006,452
Travel and Training	10,318	14,914	26,086	33,235	30,000	30,900	31,827	32,782	158,744	179,264	448,733
Insurance	7,851	7,851	26,765	46,960	31,000	31,930	32,888	33,875	176,652	185,240	463,691
Utilities and Telecommunications	7,522	8,840	12,641	26,500	15,000	15,450	15,914	16,391	89,254	89,632	224,366
Dues and Subscriptions	4,928	5,095	5,905	5,000	5,000	5,150	5,305	5,464	25,918	29,877	74,789
Advertising and Promotion	9,523	575	3,824	7,300	3,800	3,914	4,031	4,152	23,198	22,707	56,839
Janitorial Services and Supplies	8,221	28,040	39,410	44,500	44,500	45,835	47,210	48,626	230,671	265,909	665,620
Contract for Services	8,422	52,645	60,555	57,500	60,000	61,800	63,654	65,564	308,518	358,529	897,466
Parts and Supplies	33,774	20,201	33,980	37,500	27,500	28,325	29,175	30,050	152,550	164,326	411,338
Chemicals	22,754	21,387	23,940	25,000	25,000	25,750	26,523	27,318	129,591	149,387	373,944
Clothing and Uniforms	1,857	3,117	3,392	6,000	6,000	6,180	6,365	6,556	31,102	35,853	89,747
Equipment and Other Rentals	6,023	1,905	1,905	2,300	2,300	2,369	2,440	2,513	11,922	13,744	34,403
Repairs and Maintenance	74,549	34,647	79,917	41,146	36,750	37,853	38,988	40,158	194,894	219,599	549,698
Fuel and Oil	42,170	19,444	34,756	26,000	26,000	26,780	27,583	28,411	134,774	155,362	388,902
Supplies, Minor Tools, Safety Equipment	19,580	8,523	9,422	8,300	8,300	8,549	8,805	9,070	43,024	49,596	124,149
Professional Services	64,362	4,405	4,000	54,000	4,000	4,120	4,244	4,371	70,735	23,902	59,831
Software Maintenance	0	4,600	3,600	44,600	3,600	3,708	3,819	3,934	59,661	21,512	53,848
Technology and PC Hardware	1,068	4,439	506	7,200	1,000	1,030	1,061	1,093	11,384	5,975	14,958
Office Supplies and Postage	15	686	1,141	1,250	1,250	1,288	1,326	1,366	6,480	7,469	18,697
Direct Costs	8,272	19,727	19,727	19,727	19,727	20,319	20,928	21,556	102,257	117,878	295,072
Indirect Costs	19,602	23,913	23,913	23,913	23,913	24,630	25,369	26,130	123,956	142,892	357,685
Miscellaneous Expenses	6,033	734	279	1,680	1,680	1,730	1,782	1,836	8,708	10,039	25,129
Contingency	0	350	0	11,444	100,000	103,000	106,090	109,273	429,807	597,548	1,495,776
Total Operations & Maintenance Expenses	$1,288,222	$1,308,929	$1,544,268	$1,614,777	$1,613,285	$1,661,684	$1,711,534	$1,762,880	$8,364,160	$9,640,151	$24,131,134
Annual Growth Rate	-	1.6%	18.0%	4.6%	-0.1%	3.0%	3.0%	3.0%	2.7%	3.0%	3.0%
Operating Expenses Per Enplaned Passenger:											
Stillwater Regional Airport	$104.62	$64.39	$70.12	$67.68	$62.42	$59.35	$59.58	$59.81	$61.54	$60.54	$62.47
Non-Hub Industry Average	$65.89	$75.95	$75.83	$75.71	$75.60	$75.48	$75.37	$75.25	$75.48	$74.90	$74.05

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-5

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operating Revenues

13-Feb-24

Revenues	Actual 2020	Actual 2021	Actual 2022	Phase I (0 - 5 Years) Budget 2023	Budget 2024	Projected 2025	Projected 2026	Projected 2027	Total	Phase II (6 - 10 Years) 2028-2032	Phase III (11 - 20 Years) 2033-2042
						LDW - Landed Weight Growth + Inflation					
						ENP - Enplanement Growth + Inflation					
AIRLINE REVENUES											
Landing Fees	28,758	22,959	36,821	25,325	29,325	$31,463	$32,828	$34,252	$153,194	$194,866	$538,539
Terminal Rent	47,676	51,731	50,889	51,000	51,000	52,530	54,106	55,729	264,365	304,749	762,846
Stand By ARFF Fee	21,310	14,310	23,140	7,000	20,000	20,600	21,218	21,855	90,673	119,510	299,155
Security Fee	18,030	13,565	18,755	14,000	19,000	19,570	20,157	20,762	93,489	113,534	284,197
Total Airline Revenues	$115,774	$102,565	$129,605	$97,325	$119,325	$124,163	$128,309	$132,598	$601,720	$732,659	$1,884,738
Annual Growth Rate	-	-11.4%	26.4%	-24.9%	22.6%	4.1%	3.3%	3.3%	0.5%	3.4%	3.4%
Airline Cost Per Enplaned Passenger:											
Stillwater Regional Airport	$9.40	$5.05	$5.89	$4.08	$4.62	$4.43	$4.47	$4.50	$4.43	$4.60	$4.88
Non-Hub Industry Average	$12.02	$13.13	$13.11	$13.09	$13.07	$13.05	$13.03	$13.01	$13.05	$12.95	$12.80
NON-AIRLINE REVENUES											
Fuel Sales (Profit from Fuel Sales, Net with Purchases)	$16,748	-$5,416	$44,794	$0	$0	$0	$0	$0	$0	$0	$0
Room Rental	54,917	55,579	59,562	59,000	59,000	60,770	62,593	64,471	305,834	352,553	882,508
Pasture Rental	26,725	28,837	34,404	25,000	29,000	29,870	30,766	31,689	146,325	173,289	433,775
Hangar Rental	83,927	87,008	94,771	85,000	88,000	90,640	93,359	96,160	453,159	525,842	1,316,283
Land Rental	38,953	116,059	123,842	120,000	120,000	123,600	127,308	131,127	622,035	717,057	1,794,931
Concessions	1,660	840	1,209	900	1,000	1,116	1,179	1,246	5,441	7,374	22,494
Landing Fee - Non-Airline	750	675	675	675	675	724	756	788	3,618	4,485	12,396
Fuel Flowage Fee	81,782	83,168	108,747	82,000	92,000	98,709	102,990	107,458	483,157	611,344	1,689,534
Parking Fee	15,650	27,478	29,088	21,600	22,000	22,660	23,340	24,040	113,640	131,461	329,071
ID/Access Card Fee	0	0	1,050	0	0	0	0	0	0	0	0
Vendor Sales Sharing	11,962	5,697	8,961	7,400	8,000	8,240	8,487	8,742	40,869	47,804	119,662
Interest on Loan	160	60	0	40	0	0	0	0	40	0	0
Miscellaneous Revenue	4,965	4,488	7,055	18,000	5,000	5,150	5,305	5,464	38,918	29,877	74,789
Ad Sales	0	0	0	4,800	0	0	0	0	4,800	0	0
Workers' Comp Contributions	0	0	0	0	0	0	0	0	0	0	0
Nonaviation Fuel Sales	8,150	5,096	7,459	0	7,000	7,210	7,426	7,649	29,285	41,828	104,704
Total Non-Airline Revenues	$346,349	$409,570	$521,617	$424,415	$431,675	$448,689	$463,509	$478,834	$2,247,122	$2,642,916	$6,780,148
Annual Growth Rate	-	18.3%	27.4%	-18.6%	1.7%	3.9%	3.3%	3.3%	-1.7%	3.3%	3.3%
NON-OPERATING REVENUES											
Interest Income	$0	$7,160	$9,313	$0	$0	$0	$0	$0	$0	$0	$0
Gain on Sale of Assets	0	0	22,680	0	0	0	0	0	0	0	0
COVID Relief Funding	0	0	0	997,569	0	0	0	0	997,569	0	0
Total Non-Operating Revenues	$0	$7,160	$31,993	$997,569	$0	$0	$0	$0	$997,569	$0	$0
Annual Growth Rate	-	-	346.9%	3018.1%	-100.0%	-	-	-	-	-	-
Total Revenues	$462,123	$519,295	$683,215	$1,519,309	$551,000	$572,852	$591,819	$611,431	$3,846,411	$3,375,575	$8,664,886
Annual Growth Rate	-	12.4%	31.6%	122.4%	-63.7%	4.0%	3.3%	3.3%	-2.2%	3.3%	3.3%
Operating Revenues Per Enplaned Passenger:											
Stillwater Regional Airport	$37.53	$25.19	$29.57	$21.87	$21.32	$20.46	$20.60	$20.75	$20.96	$21.20	$22.43
Non-Hub Industry Average	$61.02	$74.06	$73.94	$73.83	$73.71	$73.60	$73.49	$73.38	$73.60	$73.04	$72.20

Schedule E-6

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Financial Plan Summary
Budgeted and Projected Net Revenues, Capital Funding and Capital Expenditures

13-Feb-24

Operating/Capital Cash Flow	Phase I (0 - 5 Years)						Phase II	Phase III
	Budget	Budget	Projected				(6 - 10 Years)	(11 - 20 Years)
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042
Passenger Enplanements	23,858	25,846	28,000	28,727	29,473	135,904	159,236	386,282
Annual Growth Rate	-	8.33%	8.33%	2.60%	2.60%	5.43%	2.59%	2.58%
Operating Cash Flow								
Revenues:								
Airline Revenues	$97,325	$119,325	$124,163	$128,309	$132,598	$601,720	$732,659	$1,884,738
Non-Airline Revenues	424,415	431,675	448,689	463,509	478,834	2,247,122	2,642,916	6,780,148
Non-Operating Revenues	997,569	0	0	0	0	997,569	0	0
Subsidy Required to Fund Operating Deficit	95,468	1,062,285	1,088,831	1,119,716	1,151,449	4,517,749	6,264,576	15,466,248
Total Revenues	$1,614,777	$1,613,285	$1,661,684	$1,711,534	$1,762,880	$8,364,160	$9,640,151	$24,131,134
Operations & Maintenance Expenses	(1,614,777)	(1,613,285)	(1,661,684)	(1,711,534)	(1,762,880)	(8,364,160)	(9,640,151)	(24,131,134)
Total Net Operating Cash Flow Available For Capital Expenditures	$0	$0	$0	$0	$0	$0	$0	$0
Capital Cash Flow								
Beginning Cash Balance	$2,319,155	$1,803,282	$20,686	$20,686	$20,686	$2,319,155	$686	$686
Other Capital Funding Sources:								
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Gra	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577
City Contribution	228,083	2,576,280	224,121	224,232	-200,000	3,052,715	0	0
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224
Total Other Capital Funding Sources	$2,047,619	$21,564,414	$4,591,575	$2,612,164	$19,707,793	$50,523,565	$48,003,271	$109,338,838
Total Funds Available for Capital Expenditures	$4,366,774	$23,367,696	$4,612,261	$2,632,849	$19,728,479	$52,842,720	$48,003,957	$109,339,524
Capital Improvement Program Expenditures	2,563,492	23,347,010	4,591,575	2,612,164	19,727,793	52,842,035	48,003,271	109,338,839
Ending Cash Balance	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685

APPENDIX SEVEN. Airport Obstacle Action Plan

INTRODUCTION

Airports are required to protect approach and departure paths from encroachment by objects to ensure the safety of people on the ground and in aircraft. The City of Stillwater is responsible for maintaining clear approach and departure surfaces at Stillwater Regional Airport (SWO). This responsibility is derived from FAA grant assurances attached to all FAA-administered airport financial assistance programs. Specifically, the following grant assurances apply to maintaining clear airport approaches:

- Grant Assurance 19 states that the airport shall be operated in a safe and serviceable conditions and in accordance with appropriate minimum standards required by applicable agencies.
- Grant Assurance 20 states that an airport sponsor must also take appropriate action to ensure that terminal airspace will be adequately cleared and protected by removing, lowering, lighting, or otherwise mitigating existing airport hazards and by preventing the establishment of future hazards.
- Grant Assurance 21 states that an airport sponsor must take appropriate action, to the extent practicable, including the adoption of zoning laws, to restrict the use of land adjacent to the airport to uses compatible with normal airport operations.
- Grant Assurance 29 says the airport sponsor must keep the Airport Layout Plan (ALP) up to date (obstacles are generally shown on the ALP plan and profile sheets).

The Federal Aviation Administration (FAA) has issued a reminder memo regarding airport sponsors' requirements and the FAA's policies (see Attachment One). The objective of this Obstacle Action Plan (OAP) is to identify existing obstructions, recommend steps for their removal, and provide means and methods for addressing future obstructions based on the ultimate airport configuration.

OBSTRUCTION ANALYSIS

Imaginary Surfaces

The determination of surrounding objects as obstacles is based on a set of imaginary surfaces established to identify and evaluate obstacles. Both existing and future surfaces are utilized. Existing surfaces are designed to identify objects that penetrate or come close to penetrating surfaces of the existing airport configuration. The OAP will identify initial action steps to remove these obstacles. The future surfaces are designed to protect for the long-term airport configuration and address long-term action steps for removing and preventing obstructions.

A variety of imaginary surfaces have been established to aid airport sponsors in evaluating objects in the surrounding airspace and prioritize steps for their removal. The following surfaces are used in the OAP, which were detailed and evaluated in the Master Plan.

- Threshold Siting Surface (TSS).
- Straight-In Visual Portion of the Final Approach Segment Surface (20:1 TERPS Surface)
- Vertical Guidance Surface (VGS).
- Precision Approach Path Indicator (PAPI) Obstacle Clearance Surface.
- Inner Approach Obstacle Free Zone (IAOFZ).
- Federal Aviation Regulations (FAR) Part 77.

Because the 20:1 TERPS Surface is virtually identical to the TSS (only slightly narrower at the outer edge), it is considered in the TSS analysis that follows.

Obstacle Identification

Since trees are the primary tall objects surrounding SWO and not manmade objects, this OAP will focus on tree analysis. To determine existing tree obstacles, data provided in the Airport Geographical Information System (AGIS) is used for object identification, height, and location. Some trees that are very close together and of similar height may not be collected as individual points by the AGIS data. Depending on the density and height of trees, there may be more than one tree at a particular AGIS identified location.

RECOMMENDATIONS

Based on the data and analysis Runway Ends 4, 22, and 35 have obstacles that penetrate the FAR Part 77 imaginary surfaces, as identified in **Table 7-1**.

Recommendation 1

Remove obstacles that penetrate the FAR Part 77 Surfaces.

Action

It is recommended that SWO negotiate with property owners and remove off-airport trees that penetrate the FAR Part 77 surfaces identified in **Table 7-1**. Removal of trees is preferred since Airport Improvement Program (AIP) grant funds may not be used to address the same obstacle more than once. SWO should remove on airport trees and bushes as soon as possible to maintain clear approaches to the runways. Grading of ground on SWO property should commence with the next major projects near Runway Ends 4 and 35.

Justification

Obstacles to these surfaces have a negative effect on the ability to retain existing nighttime approaches or approaches with vertical guidance.

Table 7-1: Existing FAR Part 77 Surface Obstacles, By Runway End

Runway End/ Obstacle No.	Description	Latitude	Longitude	Top Elevation	Proposed Mitigation
Runway 4					
24026	Tree	W 97° 05' 32.193"	N 36° 09' 13.766"	977.9'	Remove
33875	Tree	W 97° 05' 29.953"	N 36° 09' 11.370"	980.4'	Remove
GROUND	Terrain	Varies	Varies	965.0'	Grade
Runway 22					
25775	Tree	W 97° 04' 42.641"	N 36° 10' 00.075"	1001.9'	Remove
25816	Tree	W 97° 04' 27.013"	N 36° 09' 59.711"	1033.1'	Remove
33899	Bush	W 97° 04' 42.548"	N 36° 09' 59.852"	996.6'	Remove
33907	Bush	W 97° 04' 42.125"	N 36° 09' 59.833"	996.4'	Remove
33915	Bush	W 97° 04' 42.317"	N 36° 10' 00.734"	997.7'	Remove
33923	Bush	W 97° 04' 42.685"	N 36° 10' 00.585"	998.2'	Remove
33931	Bush	W 97° 04' 42.199"	N 36° 10' 00.072"	996.6'	Remove
Runway 35					
19625	Ground	W 97° 05' 17.924"	N 36° 09' 05.161"	966.5'	Grade
35263	Tree	W 97° 05' 04.771"	N 36° 08' 57.231"	982.7'	Remove
35271	Tree	W 97° 05' 04.881"	N 36° 08' 57.108"	982.1'	Remove
35279	Tree	W 97° 05' 04.696"	N 36° 08' 55.970"	986.6'	Remove
35287	Tree	W 97° 05' 04.670"	N 36° 08' 55.612"	988.6'	Remove
35311	Tree	W 97° 05' 03.665"	N 36° 08' 54.056"	990.9'	Remove
35303	Tree	W 97° 05' 04.658"	N 36° 08' 54.982"	987.0'	Remove

Source: Mead & Hunt analysis.

Information Needed

- Property owner's names.
- Property deeds.

Action Steps

- Review deeds and property information to verify any existing easements.
- Perform site visits to confirm location and number of individual trees at each location.
- Meet with property owners, verify owner information is correct, and discuss proposed mitigation measures (removal of trees).
- Remove trees within five years.

APPENDIX EIGHT. Airport Layout Plan

Mead & Hunt

Stillwater REGIONAL AIRPORT

SWO

RESOLUTION NO. CC-2025-8

"A RESOLUTION OF THE STILLWATER CITY COUNCIL ADOPTING AN OPERATING BUDGET FOR THE FISCAL YEAR 2025-26."

WHEREAS, the Oklahoma Municipal Budget Act, 11 O.S. 17-201 *et. seq.* establishes procedures for adopting an annual municipal budget; and

WHEREAS, the requirements of said statutes have been met; and

WHEREAS, agreement has been reached relative to the estimated revenues, and necessary appropriations for the various accounts within various funds for the 2025-26 fiscal year; and

WHEREAS, such appropriations must be approved by resolution.

NOW, THEREFORE BE IT RESOLVED BY THE STILLWATER CITY COUNCIL:

Section 1. That the 2025-26 fiscal year operating budget be adopted in the amounts reflected in this resolution's Attachment A which lists expenditures by department and classifications as required by 11 O.S. 17-213.

Section 2. That the resolution and a copy of the adopted budget be transmitted to the Oklahoma State Auditor and Inspector and one copy be transmitted to the Clerk of this municipality.

Section 3. That sinking fund requirements be filed with the Payne County Excise Board.

PASSED, APPROVED AND ADOPTED by the Stillwater City Council and SIGNED by the Mayor of the City of Stillwater, this 2nd day of June, 2025.

CITY OF STILLWATER, OKLAHOMA

_____
WILLIAM H. JOYCE, MAYOR

(SEAL)

ATTEST:

_____
TERESA KADAVY, CITY CLERK

APPROVED AS TO FORM AND LEGALITY on this 2nd day of June, 2025.

_____
KIMBERLY CARNLEY, CITY ATTORNEY

City of Stillwater
Budget for Fiscal Year 2026
Stillwater, Oklahoma

	General Fund	Pooled Cash Fund	General Fund Reserve	Debt Service Fund	City Capital Fund	Visitor Tax Fund	Rural Fire Fund	Grants Fund	Opioid Settlement Fund	CDBG Grants Fund	Home Buyer's Assistance Fund	Stormwater Mgmt Fund	Transportation Fee Fund	Park Donations Fund	Transportation Sales Tax Fund	General Obligation Bond Fund	G.M.Koch Donation Fund	Bostick Gym Fund	Self Insurance Fund	Tax Increment District #3	Airport Fund	TOTAL
Resources and Transfers																						
Beginning Balance	$0	$680,000	$11,596,149	$794,097	$1,204,177	$552,929	$438,481	$0	$738,882	$2,542	$14,444	$1,121,636	$262,268	$0	$18,452,571	$2,397	$48,114	$20,489	$1,165,749	$54,907	$432,282	$37,582,114
Sales Tax	30,000,000														10,000,000							40,000,000
Use Tax	4,600,000																					4,600,000
Other Tax	2,084,000			1,005,000		1,800,000														1,060,000		5,949,000
Grants	50,000																					50,000
Fines and Forfeits	746,000																					746,000
Fees and Rental	424,000						176,000						129,000								3,448,800	4,177,800
Interest	0	1,012,000	105,000																			1,117,000
Licenses & Permits	338,000																					338,000
Other	265,000																		1,440,000		300,000	2,005,000
Stormwater Fees												950,000										950,000
Indirect Cost Reimbursement	2,060,621																					2,060,621
Transfers In	23,683,909				150,823						60,556								13,550,811		1,809,251	39,255,350
Total Resources and Transfers	**64,251,530**	**1,692,000**	**11,701,149**	**1,799,097**	**1,355,000**	**2,352,929**	**614,481**	**0**	**738,882**	**2,542**	**75,000**	**2,071,636**	**391,268**	**0**	**28,452,571**	**2,397**	**48,114**	**20,489**	**16,156,560**	**1,114,907**	**5,990,333**	**138,830,885**
Expenditures and Transfers																						
City Manager																						
Personal Services	1,035,227																					1,035,227
Materials & Supplies	3,000																					3,000
Other Services & Fees	14,500																					14,500
Capital																						0
Debt																						0
Communications																						0
Personal Services	321,032																					321,032
Materials & Supplies	3,500																					3,500
Other Services & Fees	131,500																					131,500
Capital																						0
Debt																						0
Information Technology																						0
Personal Services	1,123,544																					1,123,544
Materials & Supplies	41,400																					41,400
Other Services & Fees	929,500																					929,500
Capital																						0
Debt	381,805																					381,805
Human Resources																						0
Personal Services	406,982																		11,750,000			12,156,982
Materials & Supplies	9,500																					9,500
Other Services & Fees	121,800																		2,787,810			2,909,610
Capital																						0
Debt																						0
Finance																						0
Personal Services	989,493																					989,493
Materials & Supplies	24,000																					24,000
Other Services & Fees	167,800																					167,800
Capital																						0
Debt																						0
Municipal Court																						0
Personal Services	325,286																					325,286
Materials & Supplies	3,700																					3,700
Other Services & Fees	7,355																					7,355
Capital																						0
Debt																						0
Development Services																						0
Personal Services	1,401,507																					1,401,507
Materials & Supplies	19,050																					19,050
Other Services & Fees	46,750																					46,750
Capital																						0
Debt																						0
Engineering																						0
Personal Services	809,522																					809,522
Materials & Supplies	29,850																					29,850
Other Services & Fees	147,660																					147,660
Capital																						0
Debt																						0
Public Works																						0
Personal Services	2,578,100																					2,578,100

Attachment A

City of Stillwater
Budget for Fiscal Year 2026
Stillwater, Oklahoma

	General Fund	Pooled Cash Fund	General Fund Reserve	Debt Service Fund	City Capital Fund	Visitor Tax Fund	Rural Fire Fund	Grants Fund	Opioid Settlement Fund	CDBG Grants Fund	Home Buyer's Assistance Fund	Stormwater Mgmt Fund	Transportation Fee Fund	Park Donations Fund	Transportation Sales Tax Fund	General Obligation Bond Fund	G.M.Koch Donation Fund	Bostick Gym Fund	Self Insurance Fund	Tax Increment District #3	Airport Fund	TOTAL
Materials & Supplies	435,040																					435,040
Other Services & Fees	262,550																					262,550
Capital																						0
Debt	97,270																					97,270
Parks & Community Resources																						0
Personal Services	852,939																					852,939
Materials & Supplies	86,099																					86,099
Other Services & Fees	1,127,888																					1,127,888
Capital																						0
Debt																						0
Police																						0
Personal Services	13,680,171																					13,680,171
Materials & Supplies	647,500																					647,500
Other Services & Fees	283,975																					283,975
Capital																						0
Debt	126,054																					126,054
Emergency Management																						0
Personal Services	351,674																					351,674
Materials & Supplies	23,150																					23,150
Other Services & Fees	87,430																					87,430
Capital																						0
Debt					1,355,000																	1,355,000
Fire																						0
Personal Services	8,634,173						10,145															8,644,318
Materials & Supplies	198,600						53,000															251,600
Other Services & Fees	285,870						32,000															317,870
Capital																						0
Debt	322,920			835,200			325,475															1,483,595
Library																						0
Personal Services	1,125,006																					1,125,006
Materials & Supplies	114,050																					114,050
Other Services & Fees	91,590																					91,590
Capital																						0
Debt																						0
Legal																						0
Personal Services	594,020																					594,020
Materials & Supplies	34,000																					34,000
Other Services & Fees	116,000																					116,000
Capital																						0
Debt																						0
General Government																						0
Personal Services	11,626																					11,626
Materials & Supplies	8,730																					8,730
Other Services & Fees	2,612,110										75,000								618,750	375,000		3,680,860
Capital																						0
Debt																						0
Stormwater																						0
Personal Services												138,804										138,804
Materials & Supplies												28,035										28,035
Other Services & Fees												139,215										139,215
Capital																						0
Debt																						0
Airport																						0
Personal Services																					1,441,441	1,441,441
Materials & Supplies																					3,187,450	3,187,450
Other Services & Fees																					510,649	510,649
Capital																						0
Debt																						0
Indirect Cost												26,805									227,846	254,651
Transfers Out	20,967,732			175,915		1,800,000				2,542		47,935								685,000	604,587	24,283,711
Total Expenditures and Transfers	**64,251,530**	**0**	**0**	**1,011,115**	**1,355,000**	**1,800,000**	**420,620**	**0**	**0**	**2,542**	**75,000**	**380,794**	**0**	**0**	**0**	**0**	**0**	**0**	**15,156,560**	**1,060,000**	**5,971,973**	**91,485,134**
Ending Balance	**$0**	**$1,692,000**	**$11,701,149**	**$787,982**	**$0**	**$552,929**	**$193,861**	**$0**	**$738,882**	**$0**	**$0**	**$1,690,842**	**$391,268**	**$0**	**$28,452,571**	**$2,397**	**$48,114**	**$20,489**	**$1,000,000**	**$54,907**	**$18,360**	**$47,345,751**
Restricted/Internally Designated	$0	$1,692,000	$11,701,149	$787,982	$0	$552,929	$193,861	$0	$738,882	$0	$0	$1,690,842	$391,268	$0	$28,452,571	$2,397	$48,114	$20,489	$1,000,000	$54,907	$18,360	$47,345,751
Unrestricted	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	$0	$1,692,000	$11,701,149	$787,982	$0	$552,929	$193,861	$0	$738,882	$0	$0	$1,690,842	$391,268	$0	$28,452,571	$2,397	$48,114	$20,489	$1,000,000	$54,907	$18,360	$47,345,751

Attachment A

City of Stillwater
Budget for Fiscal Year 2026
Stillwater, Oklahoma

	General Fund	Pooled Cash Fund	General Fund Reserve	Debt Service Fund	City Capital Fund	Visitor Tax Fund	Rural Fire Fund	Grants Fund	Opioid Settlement Fund	CDBG Grants Fund	Home Buyer's Assistance Fund	Stormwater Mgmt Fund	Transportation Fee Fund	Park Donations Fund	Transportation Sales Tax Fund	General Obligation Bond Fund	G.M.Koch Donation Fund	Bostick Gym Fund	Self Insurance Fund	Tax Increment District #3	Airport Fund	TOTAL
																						$0

RESOLUTION NO. CC-2025-9

"A RESOLUTION OF THE CITY COUNCIL ADOPTING THE UPDATED MASTER PLAN FOR STILLWATER REGIONAL AIRPORT"

WHEREAS, the current Stillwater Regional Airport Master Plan was last updated in 2008; and

WHEREAS, since that time the Stillwater Regional Airport has commenced commercial airline service, and additional development including the construction of a new airport terminal building; and

WHEREAS, on August 30, 2020, pursuant to Resolution CC-2020-14, the City Council authorized submission of a grant application to the Federal Aviation Administration (FAA) for federal grant funds to support updates to the Master Plan; and

WHEREAS, Stillwater Regional Airport was awarded FAA grant funds to support updates to its Master Plan; and

WHEREAS, Stillwater Regional Airport engaged the professional services of Mead and Hunt to assist with the Master Plan Update; and

WHEREAS, Stillwater Regional Airport held two public meetings on September 8, 2022 and June 26, 2024 to present updates to the Master Plan and provide an opportunity for public engagement and feedback; and

WHEREAS, Stillwater Regional Airport has revised and updated the Master Plan based upon engagement and recommendations from the public, airport tenants, city staff, and the FAA; and

WHEREAS, the FAA has approved updates to the Airport Layout Plan (ALP) as part of the airport master plan update process; and

WHEREAS, the updated Master Plan will enhance the operational efficiency and future development planning for airport users, particularly commercial airline service;

NOW THEREFORE, BE IT RESOLVED, that the City of Stillwater hereby adopts the updated Stillwater Regional Airport Master Plan which is attached hereto.

PASSED AND APPROVED by the City Council of Stillwater, Oklahoma, and signed this 2nd day of June, 2025.

CITY OF STILWATER, OKLAHOMA
a Municipal Corporation

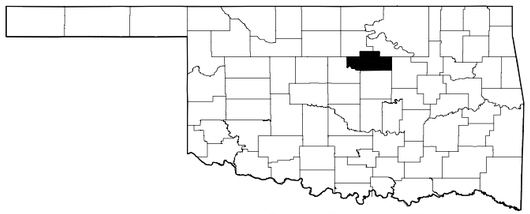
_____
WILLIAM H. JOYCE, MAYOR

(SEAL)
ATTEST:

_____
TERESA KADAVY, CITY CLERK

APPROVED AS TO FORM AND LEGALITY THIS 2ND DAY OF JUNE, 2025.

_____
KIMBERLY CARNLEY, CITY ATTORNEY

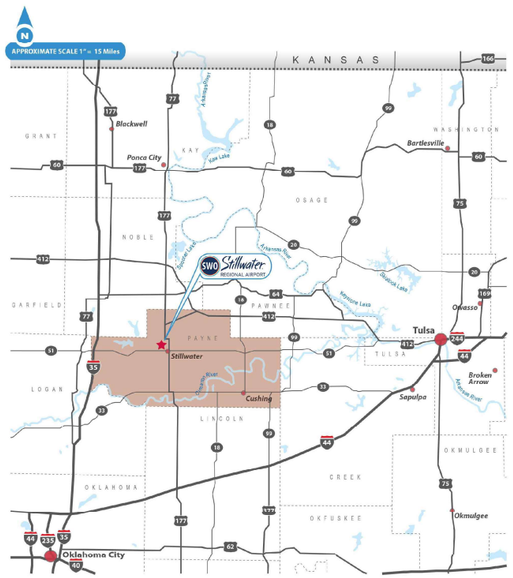


PAYNE COUNTY

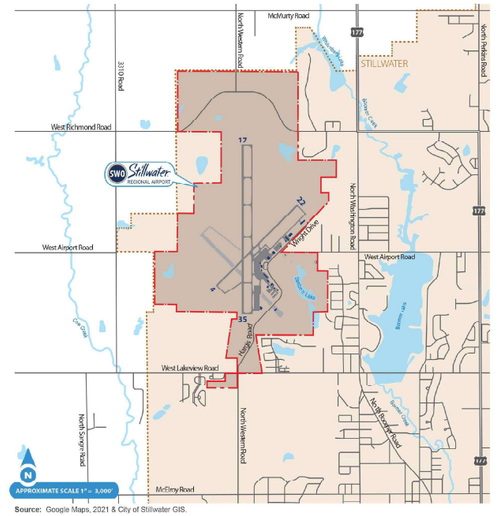
STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

LOCATION MAP



VICINITY MAP



Source: Google Maps, 2021 & City of Stillwater GIS.

AIRPORT LAYOUT PLAN SET

Sheet Number	Sheet Title	Revision
1	TITLE SHEET	
2	AIRPORT DATA	
3	AIRPORT LAYOUT PLAN	
4	AIRPORT AIRSPACE PLAN	
5	AIRPORT AIRSPACE PLAN RUNWAY 17 APPROACH	
6	AIRPORT AIRSPACE PLAN RUNWAY 35 APPROACH	
7	AIRPORT AIRSPACE RUNWAY 17-35 PROFILE	
8	AIRPORT AIRSPACE RUNWAY 4-22 PROFILE	
9	RUNWAY CENTERLINE PROFILES	
10	RUNWAY 17 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
11	RUNWAY 35 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
12	RUNWAY 4 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
13	RUNWAY 22 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE	
14	RUNWAY 17-35 DEPARTURE SURFACE PLAN & PROFILE	
15	RUNWAY 4-22 DEPARTURE SURFACE PLAN & PROFILE	
16	TERMINAL AREA PLAN	
17	AIRPORT LAND USE PLAN	
18	AIRPORT PROPERTY MAP	

FAA APPROVAL

FEDERAL AVIATION ADMINISTRATION
Southwest Region

Approved - Subject to Conditions in the Letter of Conditional Approval included in this electronic ALP

Glenn Bolas

Manager, Arkansas/Oklahoma
Airports District Office

SPONSOR APPROVAL

K R

Kellie Reed (Airport Director)
Stillwater Regional Airport

REVISIONS AND NOTES

NO.	DESCRIPTION	DATE	FIRM	BY

NOTES:
1. THIS DRAWING REFLECTS PLANNING STANDARDS SPECIFIC TO THIS AIRPORT, AND IS NOT A PRODUCT OF DETAILED ENGINEERING DESIGN ANALYSIS. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION DOCUMENTATION OR NAVIGATION.
2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.

Mead & Hunt

Mead and Hunt, Inc.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120
phone: 918-585-8844
meadhunt.com

SWO Stillwater REGIONAL AIRPORT

These documents shall not be used for any purpose or project for which it is not intended. Mead & Hunt shall be indemnified by the client and held harmless and defended from all claims, damages, liabilities, losses, and expenses, including attorneys' fees and costs, arising out of such misuse or reuse of the documents. In addition, unauthorized reproduction of these documents, in part or as a whole, is prohibited.

STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

ISSUED

NOT FOR CONSTRUCTION

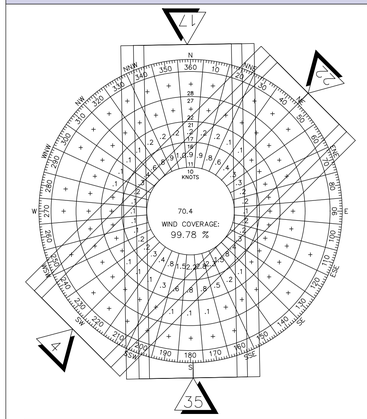
M&H NO.: 3261200-182363.01
DATE: MAY 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
DO NOT SCALE DRAWINGS

SHEET CONTENTS
TITLE SHEET

SHEET NO.
1

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\3261200\182363.01\TECH\CAD\AIRPORTLAYOUTPLAN\TITLE SHEET.DWG
5/5/2025 8:35:37 AM

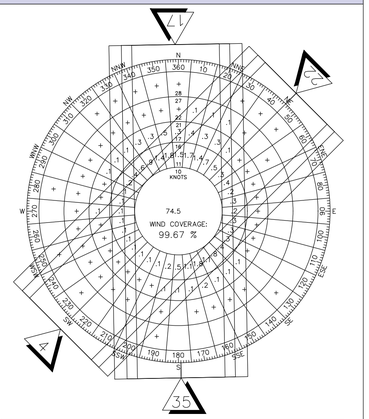
ALL WEATHER WIND ROSE



ALL WEATHER WINDROSE			
RUNWAY	10.5-KNOTS	13-KNOTS	16-KNOTS
17/35	95.63%	97.93%	99.40%
17	76.52%	77.89%	78.89%
35	64.38%	65.87%	66.96%
4/22	83.81%	91.45%	97.65%
4	69.77%	73.59%	77.13%
22	68.87%	74.99%	80.21%
COMBINED	97.78%	99.18%	99.78%

SOURCE: NOAA (ISD) STATION 723545. PERIOD OF RECORD 2011-2020

IFR WIND ROSE



IFR WEATHER WINDROSE			
RUNWAY	10.5-KNOTS	13-KNOTS	16-KNOTS
17/35	94.96%	97.43%	99.15%
17	67.05%	68.04%	69.57%
35	78.43%	80.23%	81.59%
4/22	85.84%	92.32%	97.77%
4	79.87%	84.72%	88.89%
22	64.12%	67.98%	71.73%
COMBINED	97.31%	98.92%	99.67%

SOURCE: NOAA (ISD) STATION 723545. PERIOD OF RECORD 2011-2020

NAVAID OWNERSHIP

RUNWAY	NAVAID	OWNER
RUNWAY 17	PAPI	STATE
	MALSR	FAA
	ILS	FAA
	MIRL	STATE
	RNAV (GPS	FAA
RUNWAY 35	PAPI	STATE
	REIL	STATE
	MIRL	STATE
RUNWAY 4	PAPI	STATE
	MIRL	STATE
RUNWAY 22	PAPI	STATE
	MIRL	STATE

AIRPORT DATA

	EXISTING	FUTURE
AIRPORT REFERENCE CODE	C-II	C-III
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	94 °F (JULY)	N/A
AIRPORT ELEVATION (AMSL NAVD88)	1000.3'	1000.3'
ELECTRONIC NAVIGATION AIDS	RNAV, VOR/DME, NDB,VORTAC, ILS/DME	RNAV, VOR/DME, NDB,VORTAC, ILS/DME
UNICOM (MHz)	122.95	122.95
CONTROL TOWER (MHz)*	125.35	125.35
AIRPORT REFERENCE POINT (ARP)-NAD 83	N36° 09' 41.0"	N36° 09' 41.0"
	W97° 05' 09.2"	W97° 05' 09.2"
MISCELLANEOUS FACILITIES	MALSR, PAPI, VASI, REIL, ASOS, WINDCONE,SEGMENTED CIRCLE, BEACON	MALSR, PAPI, VASI, REIL, ASOS, WINDCONE,SEGMENTED CIRCLE, BEACON
CRITICAL AIRCRAFT	CRJ 700	ERJ 175
AIRPORT MAGNETIC VARIATION (JUNE 2022)	3° 2' E ± 0° 22'	0° 6' W ANNUAL RATE OF CHANGE
NPIAS CATEGORY	NONHUB PRIMARY	NONHUB PRIMARY
STATE EQUIVALENT SERVICE ROLE	COMMERCIAL SERVICE	COMMERCIAL SERVICE
AIRPORT PROPERTY (ACRES)	1,488	1,602

MODIFICATION OF STANDARDS

NO.	DESCRIPTION	STANDARD	EXISTING	DISPOSITION	PROPOSED	APPROVED
1	NONE REQUIRED					
2						
3						
4						

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
PAPI OBSTACLE CLEARANCE SURFACE	PAPI	PAPI
VASI OBSTACLE CLEARANCE SURFACE	VASI	VASI
VERTICAL GUIDANCE SURFACE	VGS	VGS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE	X	X
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM	MALSR	MALSR
PRECISION APPROACH PATH INDICATOR (PAPI)		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		

RUNWAY DATA

	RUNWAY 17		RUNWAY 35		RUNWAY 4 ***		RUNWAY 22 ***	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
UTILITY/OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	OTHER THAN UTILITY	UTILITY	OTHER THAN UTILITY	UTILITY
RUNWAY DESIGN CODE	C-II-2400	C-III-2400	C-II-4000	C-III-2400	A-I-VIS-SMALL	A-I-4000 SMALL	A-I-VIS-SMALL	A-I-4000 SMALL
APPROACH REFERENCE CODE	D/IV/2400	D/IV/2400	D/IV/4000	D/IV/2400	B/I(S)/4000	B/I(S)/4000	B/I(S)/4000	B/I(S)/4000
DEPARTURE REFERENCE CODE	D/IV	D/IV	D/IV	D/IV	B/I	B/I	B/I	B/I
STRENGTH BY WHEEL LOADING (IN 1000 LBS.)	S-100, D-157,DT-310	S-100, D-157,DT-310	S-100, D-157,DT-310	S-100, D-157,DT-310	S-34, D-60	S-34, D-60	S-34, D-60	S-34, D-60
STRENGTH BY PCN*	582/R/C/W/T	582/R/C/W/T	582/R/C/W/T	582/R/C/W/T	158/R/C/W/T	158/R/C/W/T	158/R/C/W/T	158/R/C/W/T
RUNWAY PAVEMENT SURFACE/CONDITION	CONCRETE/GOOD	CONCRETE/GOOD	CONCRETE/GOOD	CONCRETE/GOOD	ASPHALT/GOOD	ASPHALT/GOOD	ASPHALT/GOOD	ASPHALT/GOOD
RUNWAY SURFACE TREATMENT	GROOVED	GROOVED	GROOVED	GROOVED	NONE	NONE	NONE	NONE
EFFECTIVE RUNWAY GRADIENT %	0.46%	0.46%	0.46%	0.46%	0.48%	0.48%	0.48%	0.48%
RUNWAY WIDTH AND LENGTH	7,401' X 100'	7,401' X 100'	7,401' X 100'	7,401' X 100'	5,002'x 75'	5,002'x 75'	5,002'x 75'	5,002'x 75'
RUNWAY SHOULDER WIDTH	25'	25'	25'	25'	N/A	N/A	N/A	N/A
RUNWAY SAFETY AREA LENGTH BEYOND RW END	1000'	1000'	1000'	1000'	240'	240'	240'	240'
RUNWAY SAFETY AREA LENGTH PRIOR TO LANDING THRESHOLD	600'	600'	600'	600'	240'	240'	240'	240'
RUNWAY SAFETY AREA WIDTH	500'	500'	500'	500'	120'	120'	120'	120'
RUNWAY END COORDINATES	N36° 10' 20.32"	N36° 10' 20.32"	N36° 09' 07.14"	N36° 09' 07.14"	N36° 09' 19.33"	N36° 09' 19.33"	N36° 09' 54.60"	N36° 09' 54.60"
	W97° 05' 12.69"	W97° 05' 12.69"	W97° 05' 11.89"	W97° 05' 11.89"	W97° 05' 26.04"	W97° 05' 26.04"	W97° 04' 43.29"	W97° 04' 43.29"
RUNWAY END ELEVATIONS	1000.3'	1000.3'	966.0'	966.0'	960.9'	960.9'	985.7'	985.7'
RUNWAY LIGHTING TYPE	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL	MIRL
RUNWAY PROTECTION ZONE DIMENSIONS (INNER WIDTH X LENGTH X OUTER WIDTH)	1,000' x 2,500 x 1,750'	1,000' x 2,500 x 1,750'	1,000' x 1,700 x 1,510'	1,000' x 2,500 x 1,750'	250' x 1000' x 450'	1,000' x 1,700 x 1,510'	250' x 1000' x 450'	1,000' x 1,700 x 1,510'
RUNWAY MARKING TYPE	PRECISION	PRECISION	PRECISION	PRECISION	BASIC	NON-PRECISION	BASIC	NON-PRECISION
14 CFR PART 77 APPROACH CATEGORY	PIR (50:1 SLOPE)	PIR (50:1 SLOPE)	D (34:1 SLOPE)	PIR (50:1 SLOPE)	A (V) (20:1 SLOPE)	A (NP) (34:1 SLOPE)	A (V) (20:1 SLOPE)	A (NP) (34:1 SLOPE)
14 CFR PART 77 APPROACH TYPE	PRECISION	PRECISION	NON-PRECISION	PRECISION	VISUAL	NON-PRECISION	VISUAL	NON-PRECISION
APPROACH VISIBILITY MINIMUMS	1/2- MILE	1/2- MILE	3/4-MILE	1/2-MILE	VISUAL	3/4-MILE	VISUAL	3/4-MILE
TYPE OF AERONAUTICAL SURVEY REQUIRED	VERTICALLY GUIDED	VERTICALLY GUIDED	VERTICALLY GUIDED	VERTICALLY GUIDED	NON-VERTICALLY GUIDED	VERTICALLY GUIDED	NON-VERTICALLY GUIDED	VERTICALLY GUIDED
RUNWAY DEPARTURE SURFACE	YES	YES	YES	YES	N/A	YES	N/A	YES
RUNWAY OBJECT FREE AREA LENGTH BEYOND RW END	1000'	1000'	1000'	1000'	240'	240'	240'	240'
RUNWAY OBJECT FREE AREA LENGTH PRIOR TO LANDING THRESHOLD	600'	600'	600'	600'	240'	240'	240'	240'
RUNWAY OBJECT FREE AREA WIDTH	800'	800'	800'	800'	250'	250'	250'	250'
OBSTACLE FREE ZONE LENGTH BEYOND RW END	200'	200'	200'	200'	200'	200'	200'	200'
OBSTACLE FREE ZONE WIDTH	400'	400'	400'	400'	250'	250'	250'	250'
THRESHOLD SITING SURFACE**	TYPE 5,6	TYPE 5,6	TYPE 5,6	TYPE 5,6	TYPE 2	TYPE 4	TYPE 2	TYPE 4
INNER APPROACH OBSTACLE FREE ZONE LENGTH	2,600'	2,600'	N/A	N/A	N/A	N/A	N/A	N/A
INNER APPROACH OBSTACLE FREE ZONE WIDTH	400'	400'	N/A	400'	N/A	N/A	N/A	N/A
INNER-TRANSITIONAL OBSTACLE FREE ZONE WIDTH	1,578'	1,600'	N/A	2,011'	N/A	N/A	N/A	N/A
PRECISION OBSTACLE FREE ZONE DIMENSIONS	200' X 800'	200' X 800'	N/A	200' X 800'	N/A	N/A	N/A	N/A
VISUAL AND INSTRUMENT NAVAIDS	LOC, GS,MALSR, PAPI	LOC, GS,MALSR, PAPI	PAPI, REILS	MALSR,PAPI	PAPI	PAPI	PAPI	PAPI
TOUCHDOWN ZONE ELEVATIONS	1000.3'	1000.3'	965.8'	965.8'	965.8'	965.8'	984.6'	984.6'
RUNWAY CL TO TAXIWAY CL SEPARATION	400'	400', 600'	400'	400', 600'	525'	240'	525'	240'
RUNWAY CL TO HOLDLINE SEPARATIONS	260'	260'	260'	260'	200'	200'	200'	200'
RUNWAY CL TO AIRCRAFT PARKING SEPARATIONS	790'	790'	790'	790'	540'	540'	540'	540'
VERTICAL AND HORIZONTAL DATUM	NAVD88, NAD83				NAVD88, NAD83			
CRITICAL AIRCRAFT	CRJ 700	ERJ 175	CRJ 700	ERJ 175	CESSNA 172	CESSNA 172	CESSNA 172	CESSNA 172
WINGSPAN	76.27'	85.33'	76.27'	85.33'	36.08'	36.08'	36.08'	36.08'
TAIL HEIGHT	24.83'	32.33'	24.83'	32.33'	8.92'	8.92'	8.92'	8.92'
APPROACH SPEED	135 KNOTS	142 KNOTS	135 KNOTS	142 KNOTS	62 KNOTS	62 KNOTS	62 KNOTS	62 KNOTS
MAIN GEAR WIDTH	16.39'	20.50'	16.39'	20.50'	8.4'	8.4'	8.4'	8.4'
COCKPIT TO MAIN GEAR	49.25'	41.33'	49.25'	41.33'	5.42'	5.42'	5.42'	5.42'
MAXIMUM TAKEOFF WEIGHT	72,750 LBS	82,700 LBS	72,750 LBS	82,700 LBS	2,600 LBS	2,600 LBS	2,600 LBS	2,600 LBS

NOTES: APPROACH VISIBILITY MINIMUMS ARE SHOWN FOR THE LOWEST APPROACH FOR EACH RUNWAY AND MAY ONLY BE APPLICABLE FOR CATEGORY A AIRCRAFT

* - PCN VALUE NOT AVAILABLE. PCR VALUE PROVIDED BY OKLAHOMA AERONAUTICAS COMMISSION, APRIL 2023.

** - THRESHOLD SITING SURFACES BASED ON A/C150-5300 13B

***-CURRENT RUNWAY CONFIGURATION EXCEEDS DESIGN CRITERIA FOR CRITICAL AIRCRAFT (B-I SMALL A/C).

DECLARED DISTANCES

ITEM	RUNWAY 17		RUNWAY 35		RUNWAY 4		RUNWAY 22	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
TAKEOFF RUN AVAILABLE (TORA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
TAKEOFF DISTANCE AVAILABLE (TODA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '
LANDING DISTANCE AVAILABLE (LDA)	7,401 '	7,401 '	7,401 '	7,401 '	5,002 '	5,002 '	5,002 '	5,002 '

EXISTING TAXIWAYS/TAXILANES SERVING RUNWAY 17/35

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY A	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	343'
TAXIWAY A1	90'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A2	90'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A3	60'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY A4	100'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY B	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY C	55'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY D	55'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY E	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

ULTIMATE TAXIWAYS/TAXILANES SERVING RUNWAY 17/35

NAME	WIDTH	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY G	75'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

EXISTING TAXIWAYS/TAXILANES SERVING RUNWAY 4/22

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY B	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A
TAXIWAY F	50'	35'	N/A	II	2	79'	131'	7.5'	MITL	N/A	75'
TAXIWAY F1	50'	50'	N/A	III	3	118'	186'	10'	MITL	N/A	N/A

ULTIMATE TAXIWAYS/TAXILANES SERVING RUNWAY 4/22

NAME	WIDTH (EXISTING)	WIDTH (STANDARD)	SHOULDER	ADG	TDG	TSA	TOFA	TESM	LIGHTING	OBJECTS INSIDE TSA AND TOFA	SEPARATION FROM TAXIWAY CL TO FIXED MOVABLE OBJECT
TAXIWAY B	25'	25'	N/A	I	1a	49'	89'	5'	MITL	N/A	N/A
TAXIWAY F	25'	25'	N/A	I	1a	49'	89'	5'	MITL	N/A	N/A

NOTES

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2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.

REVISIONS

NO.	DESCRIPTION	DATE

Mead & Hunt

Mead and Hunt, Inc.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120
phone: 918-585-8844
meadhunt.com

SWO Stillwater REGIONAL AIRPORT

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

ISSUED

DRAFT

NOT FOR CONSTRUCTION

M&H NO.: 3261200-182363.01
DATE: APRIL 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
DO NOT SCALE DRAWINGS

SHEET CONTENTS
AIRPORT DATA

SHEET NO.
2

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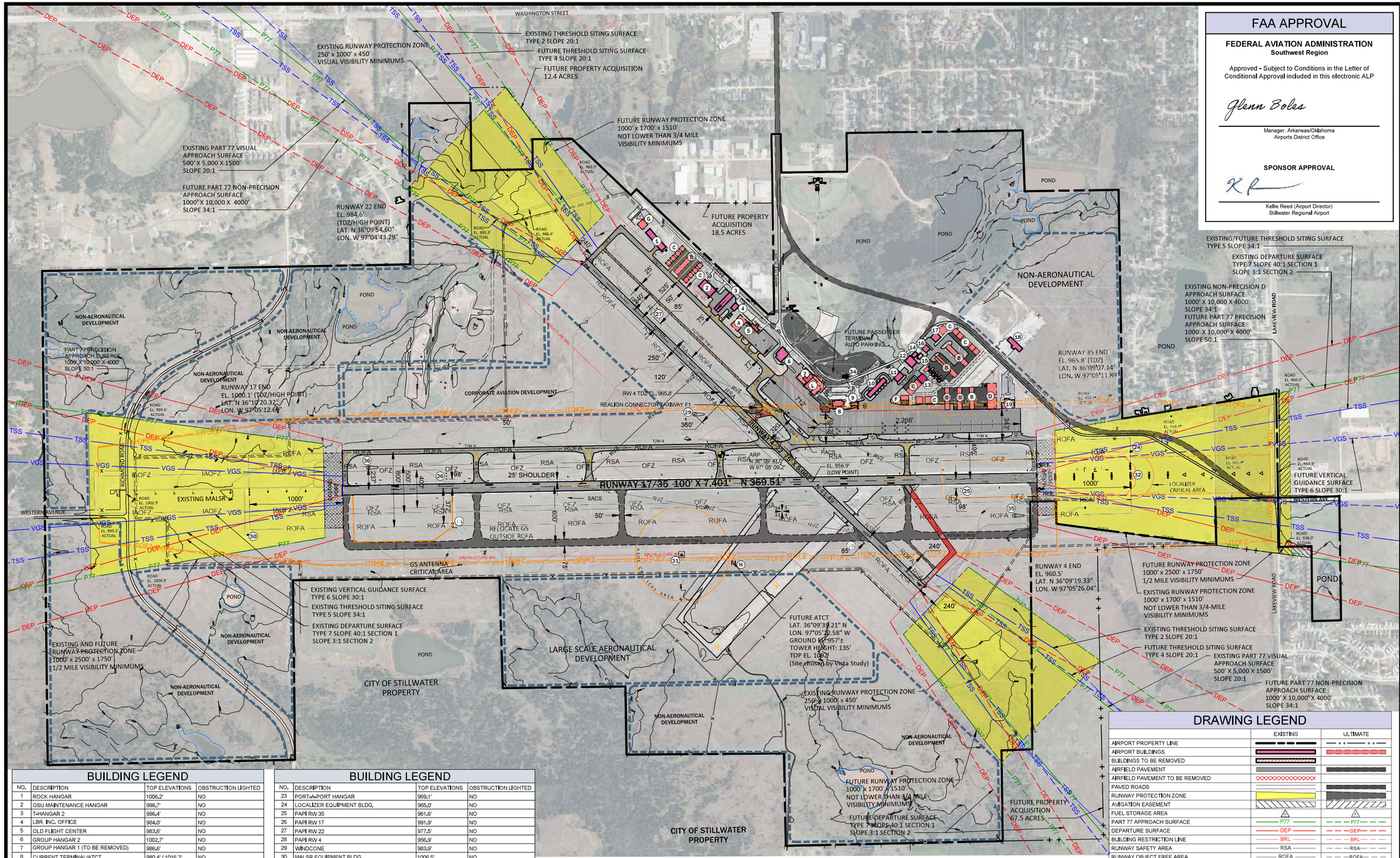

FAA APPROVAL

FEDERAL AVIATION ADMINISTRATION
Southwest Region

Approved - Subject to Conditions in the Letter of Conditional Approval included in this electronic ALP

Glenn Boles

Manager, Arkansas/Oklahoma
Airports District Office

SPONSOR APPROVAL

Kellie Reed (Airport Director)
Stillwater Regional Airport

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
1	ROCK HANGAR	1006.2'	NO
2	OSU MAINTENANCE HANGAR	998.7'	NO
3	T-HANGAR 2	986.4'	NO
4	LBR, INC. OFFICE	984.0'	NO
5	OLD FLIGHT CENTER	983.6'	NO
6	GROUP HANGAR 2	1002.7'	NO
7	GROUP HANGAR 1 (TO BE REMOVED)	986.6'	NO
8	CURRENT TERMINAL/ATCT	980.4' / 1016.2'	NO
9	ARFF	974.0'	NO
10	T-HANGAR 1	967.0'	NO
11	COWBOY HANGAR	972.0'	NO
12	AIRPORT OPERATIONS & MAINTENANCE	977.3'	NO
13	HANGAR 10	978.6'	NO
14	ADMINISTRATION BUILDING	972.0'	NO
15	AIRCRAFT WASH BAY	975.1'	NO
16	WAITS HOLDING HANGAR	976.7'	NO
17	DETMILER HANGAR	980.5'	NO
18	WASTE MANAGEMENT BLDG. AND FACILITY	983.2'	NO
19	NEW OSU FLIGHT CENTER	991.4'	NO
20	PORT-A-PORT HANGAR	968.0'	NO
21	PORT-A-PORT HANGAR	968.1'	NO
22	PORT-A-PORT HANGAR	969.1'	NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
23	PORT-A-PORT HANGAR	969.1'	NO
24	LOCALIZER EQUIPMENT BLDG.	965.0'	NO
25	PAPI RW 35	961.6'	NO
26	PAPI RW 17	991.9'	NO
27	PAPI RW 22	977.5'	NO
28	PAPI RW 4	956.9'	NO
29	WINDCONE	983.9'	NO
30	MALSR EQUIPMENT BLDG.	1006.5'	NO
31	ASOS	968.0'	NO
32	LOCALIZER ANTENNA	967.8'	NO
33	GLIDE SLOPE EQUIPMENT BLDG.	994.0'	NO
34	AIRPORT BEACON	1009.2'	NO
35	WINDCONE	985.0'	NO
36	WINDCONE	994.1'	NO
A	GROUP HANGAR 1		
B	FUTURE T-HANGAR		
C	FUTURE HANGAR		
D	FUTURE MAINTENANCE HANGAR		
E	FUTURE PASSENGER TERMINAL		
F	FUTURE ARFF/SRE MAINTENANCE BUILDING		
G	FUTURE OFF-SEASON STORAGE FACILITY		
H	FUTURE AIRPORT TRAFFIC CONTROL TOWER		

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		
LAND USE DEVELOPMENT AREA		

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M&H NO.: 3261200-182363.01
DATE: MAY 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
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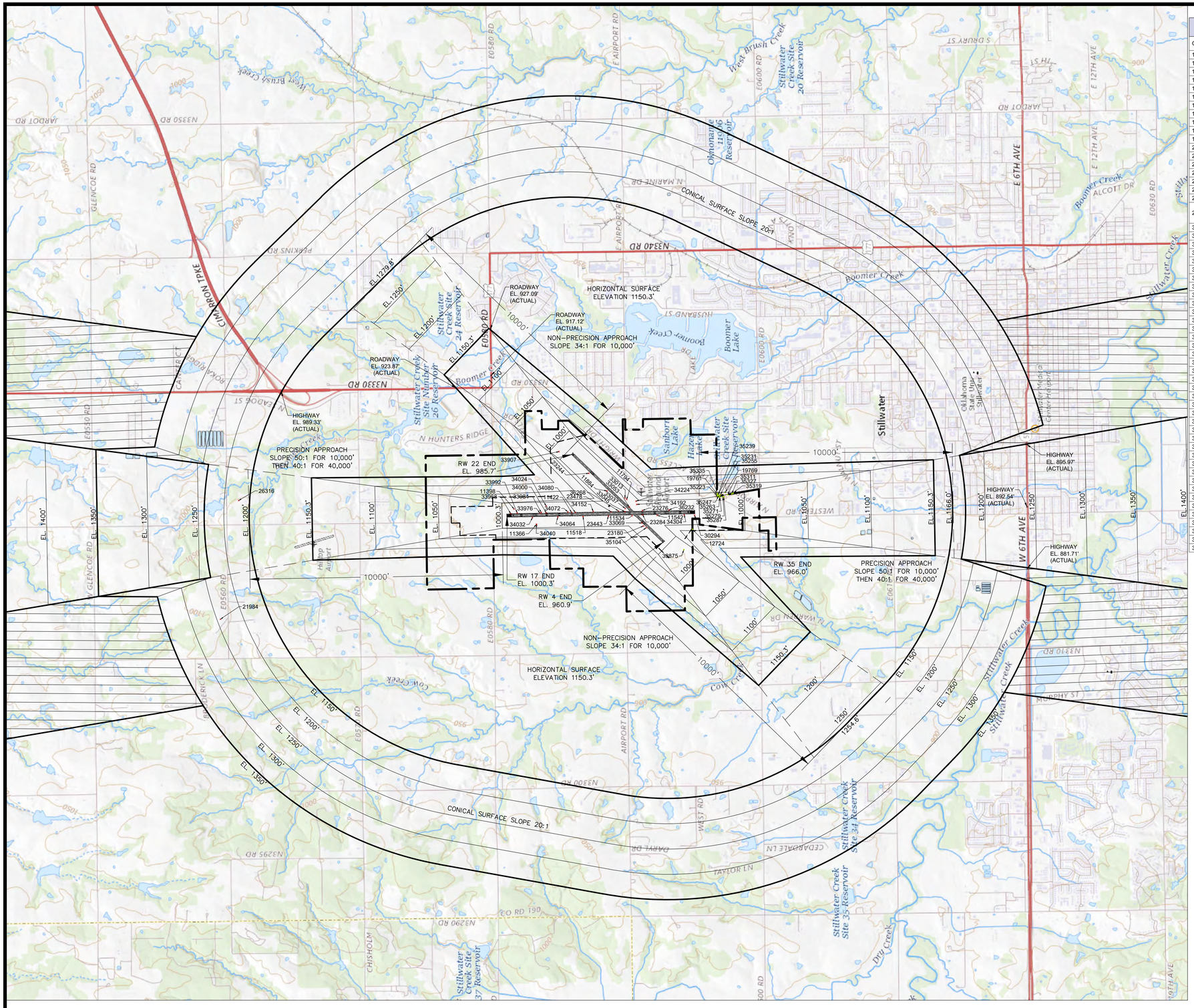
SHEET CONTENTS
AIRPORT LAYOUT PLAN

SHEET NO.
3

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\326120018236 3.01\TECH\CAD\AIRPORTLAYOUTPLAN\3 AIRPORT LAYOUT PLAN.DWG
5/5/2025 8:37:25 AM


CONICAL SURFACE SLOPE 20:1
HORIZONTAL SURFACE ELEVATION 1150.3'
NON–PRECISION APPROACH SLOPE 34:1 FOR 10,000'
PRECISION APPROACH SLOPE 50:1 FOR 10,000' THEN 40:1 FOR 40,000'
ROADWAY EL. 927.09' (ACTUAL)
ROADWAY EL. 917.12' (ACTUAL)
ROADWAY EL. 923.87' (ACTUAL)
HIGHWAY EL. 989.33' (ACTUAL)
HIGHWAY EL. 895.97' (ACTUAL)
HIGHWAY EL. 892.54' (ACTUAL)
HIGHWAY EL. 881.71' (ACTUAL)
RW 22 END EL. 985.7'
RW 35 END EL. 966.0'
RW 17 END EL. 1000.3'
RW 4 END EL. 960.9'
EL. 1279.8'
EL. 1250'
EL. 1200'
EL. 1150.3'
EL. 1100'
EL. 1050'
EL. 1000'
EL. 1150.3'
EL. 1166.0'
EL. 1200'
EL. 1250'
EL. 1300'
EL. 1350'
EL. 1400'
10000'
1000.3'
1050'
1100'
1150.3'
1200'
1250'
1234.8'
Stillwater
Boomer Lake
Sanborn Lake
Hazel Lake
Stillwater Creek Site 24 Reservoir
Stillwater Creek Site 25 Reservoir
Stillwater Creek Site 20 Reservoir
Stillwater Creek Site 34 Reservoir
Stillwater Creek Site 35 Reservoir
Stillwater Creek Site 37 Reservoir
Ohonaire 115 MG Reservoir
Oklahoma State Univ. Stillwater
Stillwater Municipal Airport
Boomer Creek
Stillwater Creek
West Brush Creek
Cow Creek
Dry Creek
E0580 RD
E0600 RD
E0630 RD
N3330 RD
N3310 RD
N3290 RD
N3295 RD
E AIRPORT RD
W AIRPORT RD
W 6TH AVE
E 6TH AVE
E 12TH AVE
CARBON TPKE
GLENCOE RD
ROCK RIDGE RD
N HUNTERS RIDGE
N MARINE DR
ALCOTT DR
HUSBAND ST
WESTWOOD DR
CEDARDALE LN
TAYLOR LN
MURPHY ST
CHISHOLM
CO RD 190
21984
26316
33907
33992
34024
34000
34080
33983
33998
11398
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34072
34064
34032
11366
34040
11518
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35875
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11884
11704
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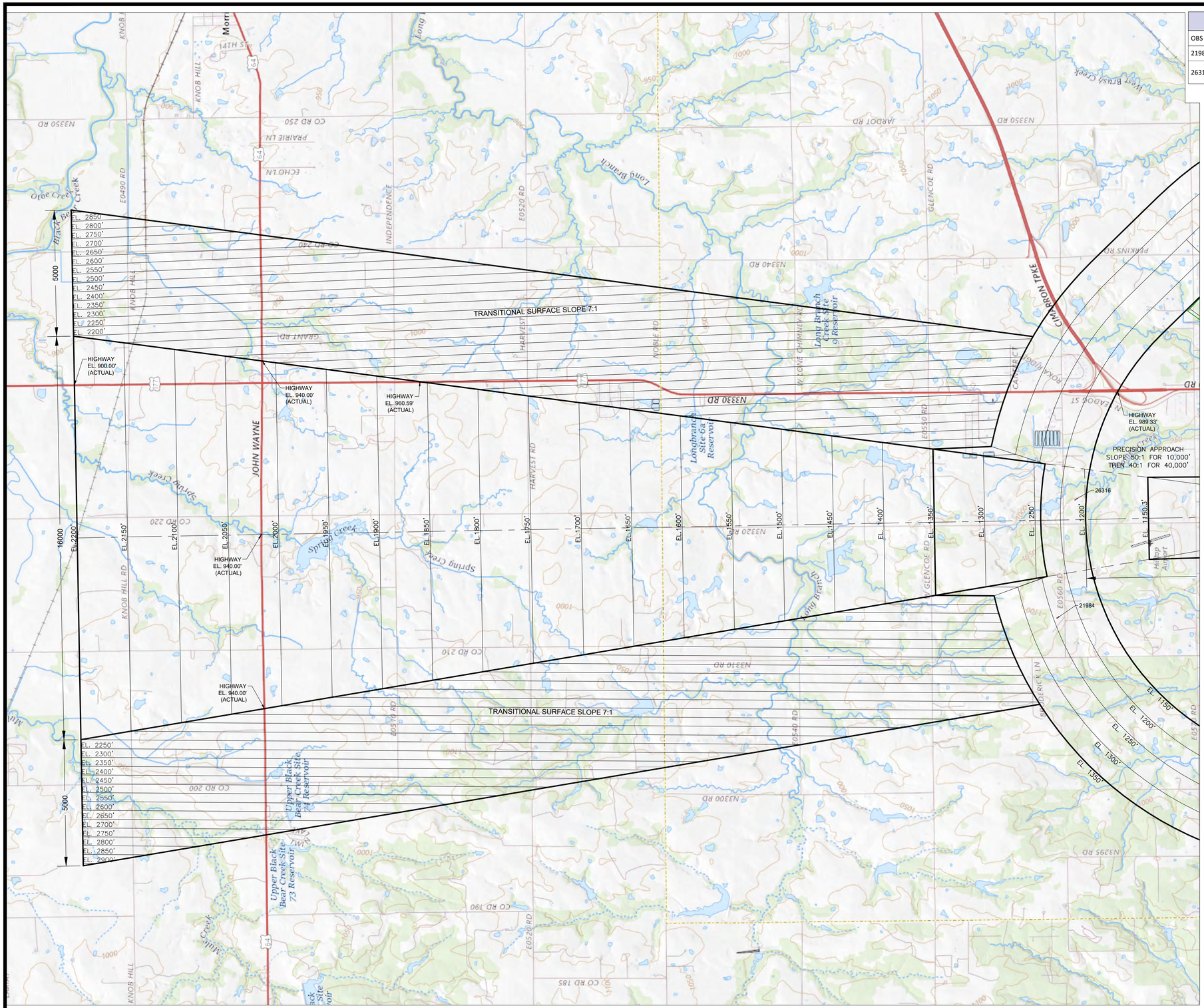

OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
21984	WATER TOWER	1206.2	1	1118.4	CONCAL	TO REMAIN
26316	POWER TRANSMISSION TOWER	1075.8	-88	1004.5	CONICAL	TO REMAIN

AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 2000 4000

REVISIONS

NOTES

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Mead & Hunt

Mead and Hunt, Inc.
Cherry Street Building
1616 East 15th Street
Tulsa, OK 74120
phone: 918-585-8844
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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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DRAFT

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M&H NO.: 3261200-182363.01
DATE: APRIL 2025
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SHEET CONTENTS
AIRPORT AIRSPACE PLAN RUNWAY 17 APPROACH

SHEET NO.
5

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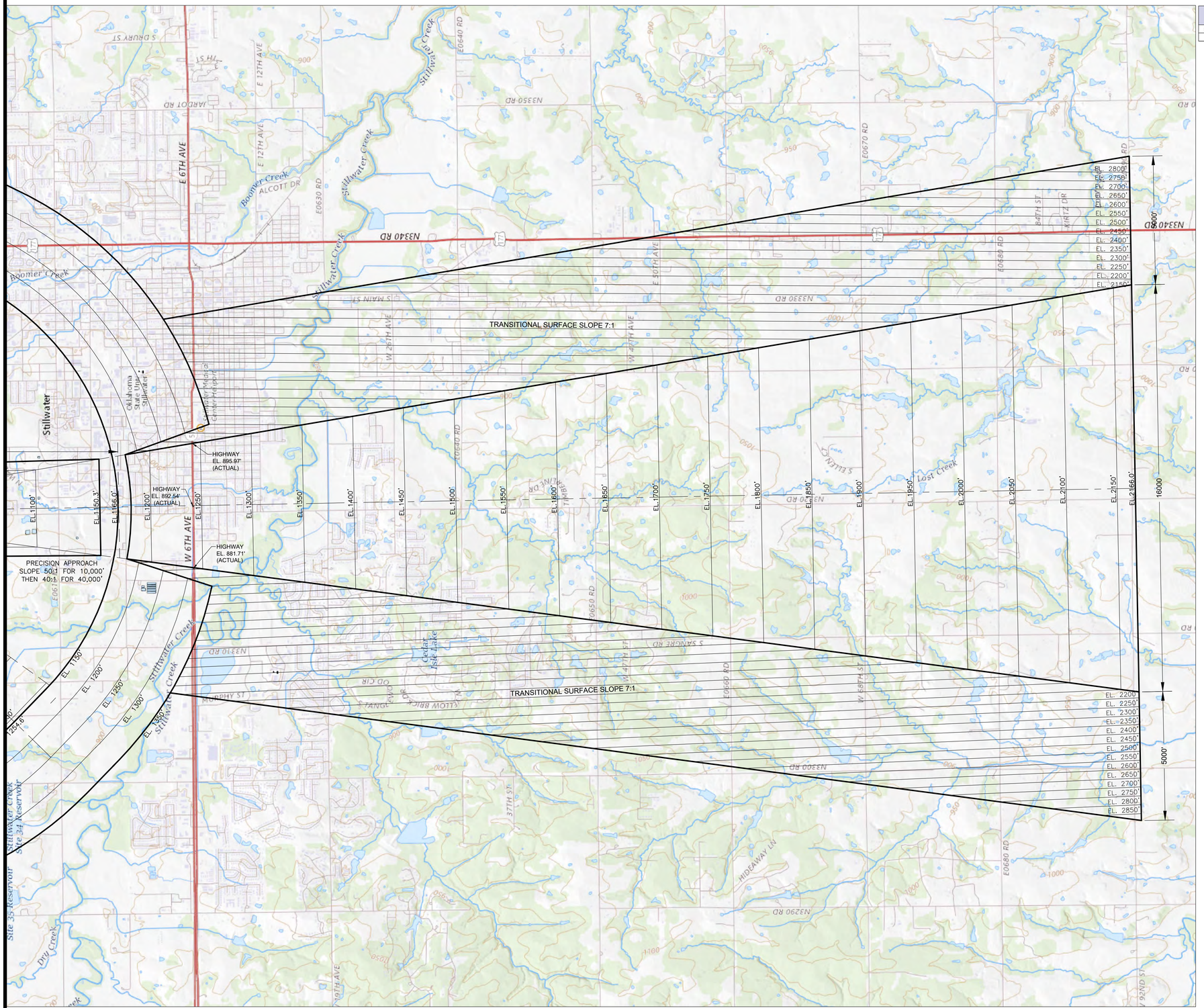

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

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SHEET CONTENTS
AIRPORT AIRSPACE PLAN RUNWAY 35 APPROACH

SHEET NO.
6

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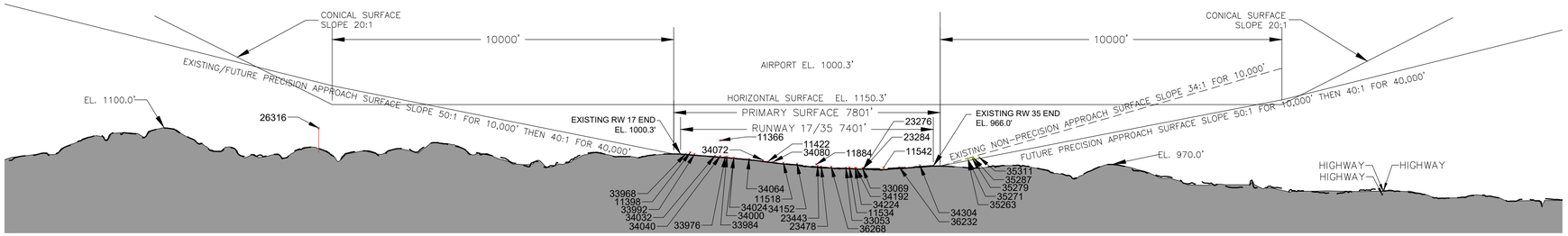
NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.



Runway 17/35 - Approach Profile View

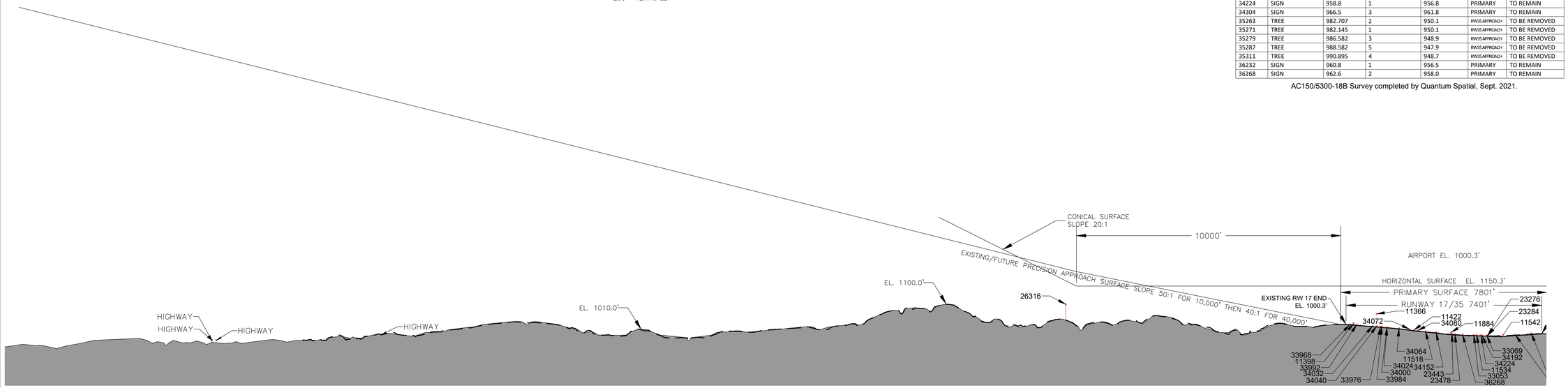
0 2000 4000

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
11366	ANTENNA	1039.9	48	984.1	PRIMARY	TO REMAIN
11398	WINDSOCK	1004.9	6	994.0	PRIMARY	TO REMAIN
11422	SIGN	978.0	1	975.6	PRIMARY	TO REMAIN
11518	SIGN	974.4	2	970.2	PRIMARY	TO REMAIN
11534	SIGN	961.0	3	956.4	PRIMARY	TO REMAIN
11542	SIGN	960.0	2	955.3	PRIMARY	TO REMAIN
23276	SIGN	958.7	1	954.0	PRIMARY	TO REMAIN
23284	SIGN	958.3	1	955.9	PRIMARY	TO REMAIN
23443	SIGN	965.1	2	960.7	PRIMARY	TO REMAIN
23478	SIGN	962.9	1	960.2	PRIMARY	TO REMAIN
26316	POWER TRANSMISSION TOWER	1075.8	-88	1004.5	CONICAL	TO REMAIN
33053	SIGN	959.6	1	957.4	PRIMARY	TO REMAIN
33069	SIGN	958.6	1	956.4	PRIMARY	TO REMAIN
33968	SIGN	1000.2	1	998.1	PRIMARY	TO REMAIN
33976	SIGN	991.1	1	989.0	PRIMARY	TO REMAIN
33984	SIGN	992.2	2	987.9	PRIMARY	TO REMAIN
33992	SIGN	999.8	2	995.3	PRIMARY	TO REMAIN
34000	SIGN	989.0	1	987.0	PRIMARY	TO REMAIN
34024	SIGN	989.1	1	986.8	PRIMARY	TO REMAIN
34032	SIGN	994.6	2	990.2	PRIMARY	TO REMAIN
34040	BUILDING	993.9	2	984.3	PRIMARY	TO REMAIN
34072	SIGN	982.0	3	977.2	PRIMARY	TO REMAIN
34080	SIGN	976.8	1	974.5	PRIMARY	TO REMAIN
34152	SIGN	971.3	2	967.0	PRIMARY	TO REMAIN
34192	SIGN	958.5	1	956.1	PRIMARY	TO REMAIN
34224	SIGN	958.8	1	956.8	PRIMARY	TO REMAIN
34304	SIGN	966.5	3	961.8	PRIMARY	TO REMAIN
35263	TREE	982.707	2	950.1	RWY35 APPROACH	TO BE REMOVED
35271	TREE	982.145	1	950.1	RWY35 APPROACH	TO BE REMOVED
35279	TREE	986.582	3	948.9	RWY35 APPROACH	TO BE REMOVED
35287	TREE	988.582	5	947.9	RWY35 APPROACH	TO BE REMOVED
35311	TREE	990.895	4	948.7	RWY35 APPROACH	TO BE REMOVED
36232	SIGN	960.8	1	956.5	PRIMARY	TO REMAIN
36268	SIGN	962.6	2	958.0	PRIMARY	TO REMAIN

AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.

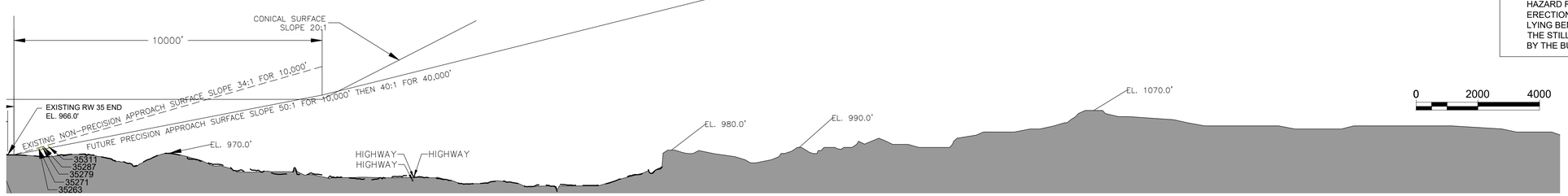


NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

Runway 17 - Extended Approach Profile View

0 2000 4000

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY



Runway 35 - Extended Approach Profile View

0 2000 4000

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

REVISIONS

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AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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M&H NO.: 3261200-182363.01
DATE: APRIL 2025
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: KJM
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SHEET CONTENTS
AIRPORT AIRSPACE
RUNWAY 17-35
PROFILE

SHEET NO.
7

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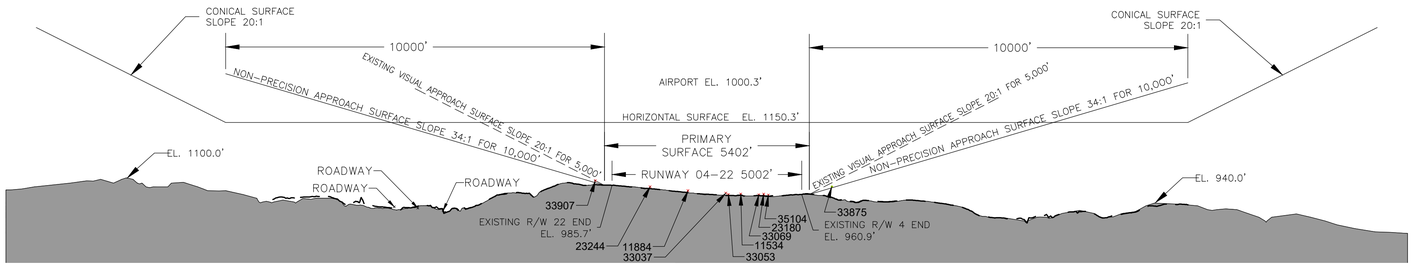
OBSTRUCTIONS						
OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
11534	SIGN	961.0	3	956.4	PRIMARY	REMAIN
11884	SIGN	969.8	3	965.2	PRIMARY	REMAIN
23180	SIGN	960.5	3	955.0	PRIMARY	REMAIN
23244	SIGN	979.8	3	975.0	PRIMARY	REMAIN
33037	SIGN	963.2	5	958.4	PRIMARY	REMAIN
33053	SIGN	959.6	1	957.4	PRIMARY	REMAIN
33069	SIGN	958.6	1	956.4	PRIMARY	REMAIN
33875	TREE	980.4	1	957.0	RW 4 APPROACH	REMOVE
33907	BUSH	996.4	1	988.5	RW 22 APPROACH	REMOVE
35104	UTIL BOX	958.0	1	954.8	PRIMARY	RELOCATE

AC150/5300-18B Survey completed by Quantum Spatial, Sept. 2021.

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.



Runway 4/22 - Approach Profile View

1" = 2000' HORIZONTALLY
1" = 200' VERTICALLY

0 2000 4000

REVISIONS

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SHEET CONTENTS
AIRPORT AIRSPACE
RUNWAY 4-22
PROFILE

SHEET NO.
8

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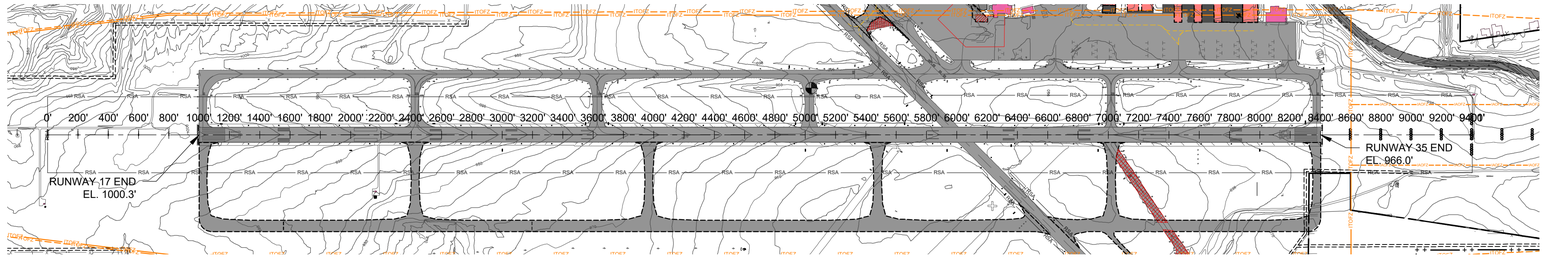
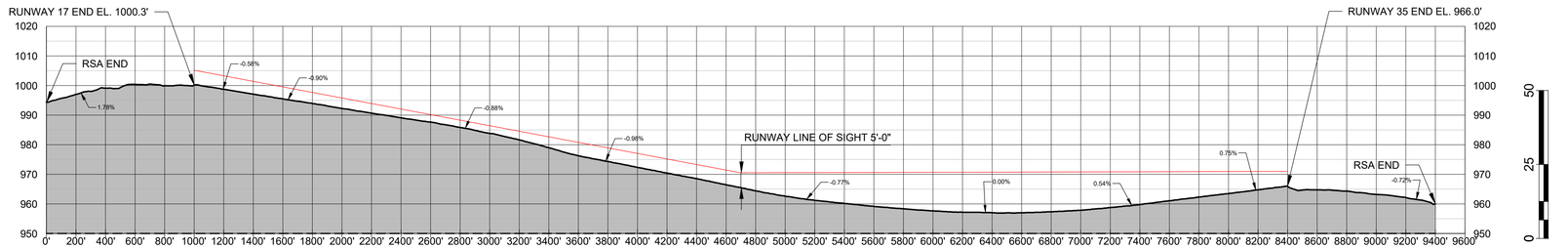
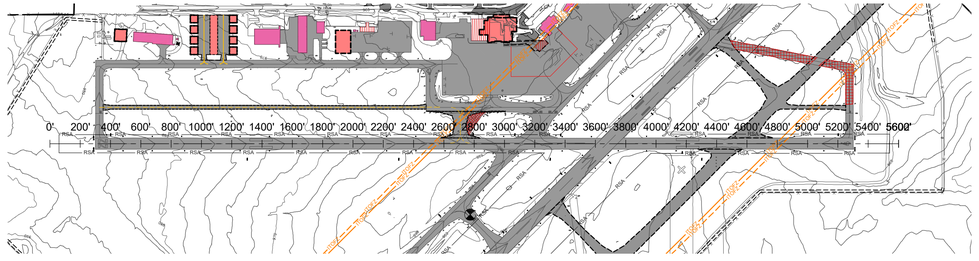




RUNWAY 17/35 CENTERLINE PROFILE

0 500 1000



RUNWAY 4/22 CENTERLINE PROFILE

0 500 1000

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SHEET CONTENTS
RUNWAY CENTERLINE PROFILES

SHEET NO.
9

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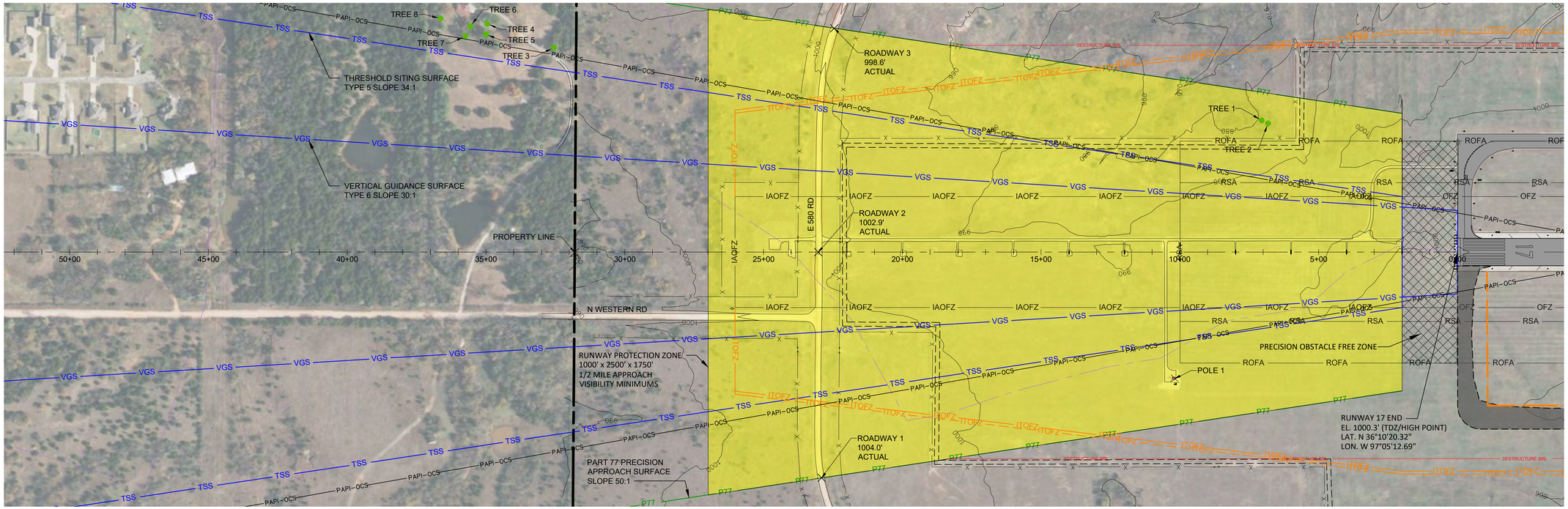

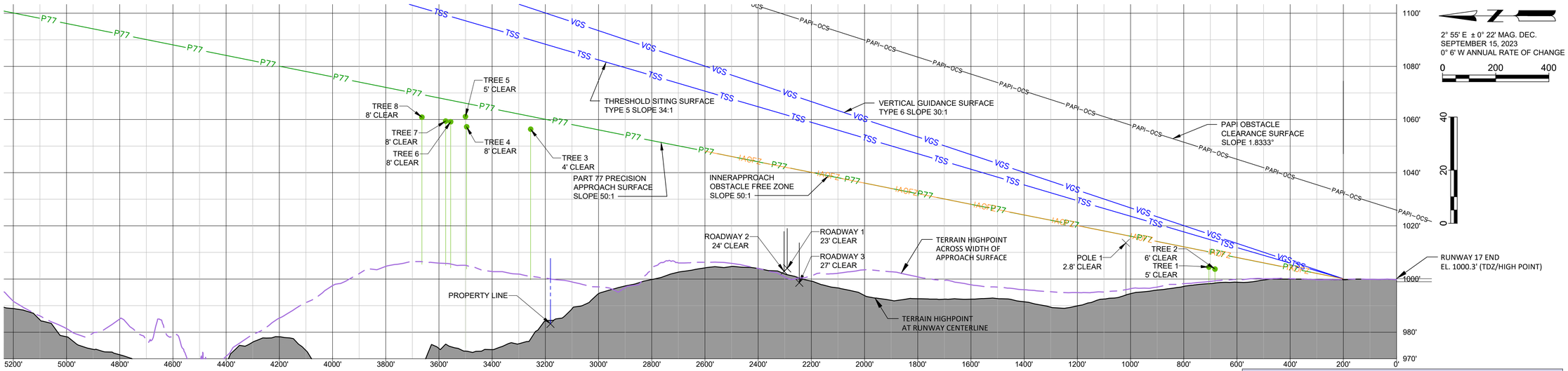

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400

0 20 40

PART 77 APPROACH OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PAPI OBSTACLE CLEARANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

VERTICAL GUIDANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

OBSTACLE FREE ZONE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

THRESHOLD SITING OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

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3. AC150/5300-18B SURVEY COMPLETED BY QUANTUM SPATIAL, SEPT 2021.

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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Stillwater REGIONAL AIRPORT

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

ISSUED

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M&H NO.: 3261200-182363.01
DATE: APRIL 2025
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DRAWN BY: JWB
CHECKED BY: KJM
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SHEET CONTENTS

RUNWAY 17 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.

10

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\3261200\182363.01\TECH\CAD\AIRPORTLAYOUTPLAN\RUNWAY 17 INNER APPROACH.DWG
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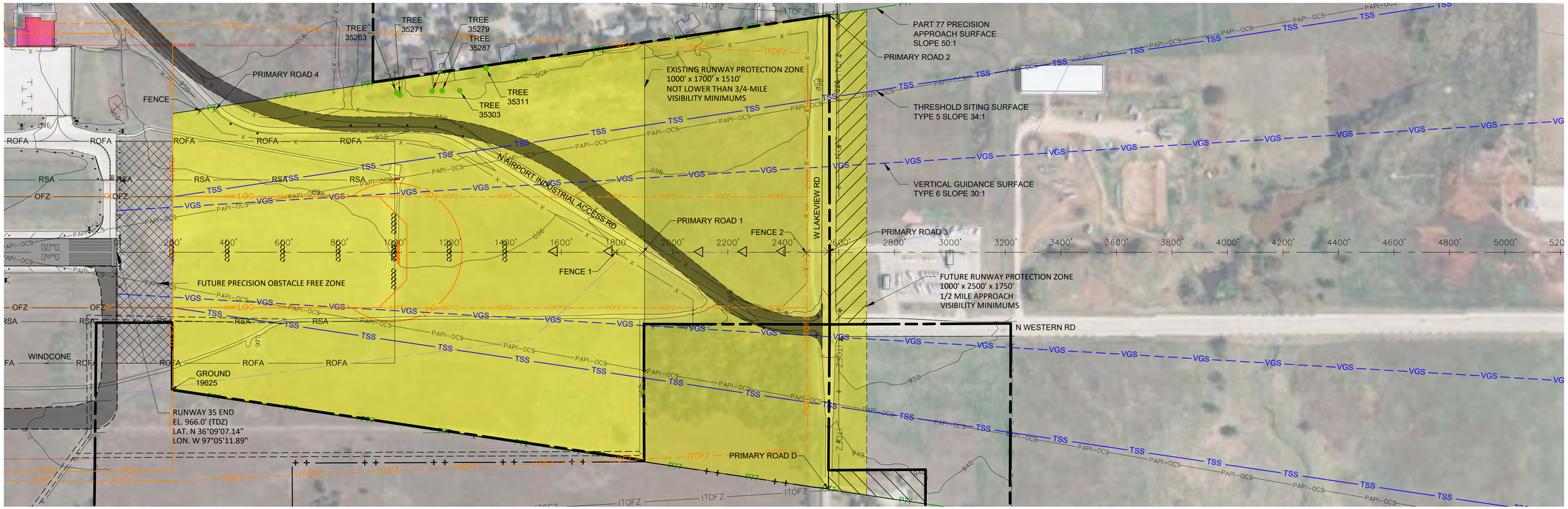

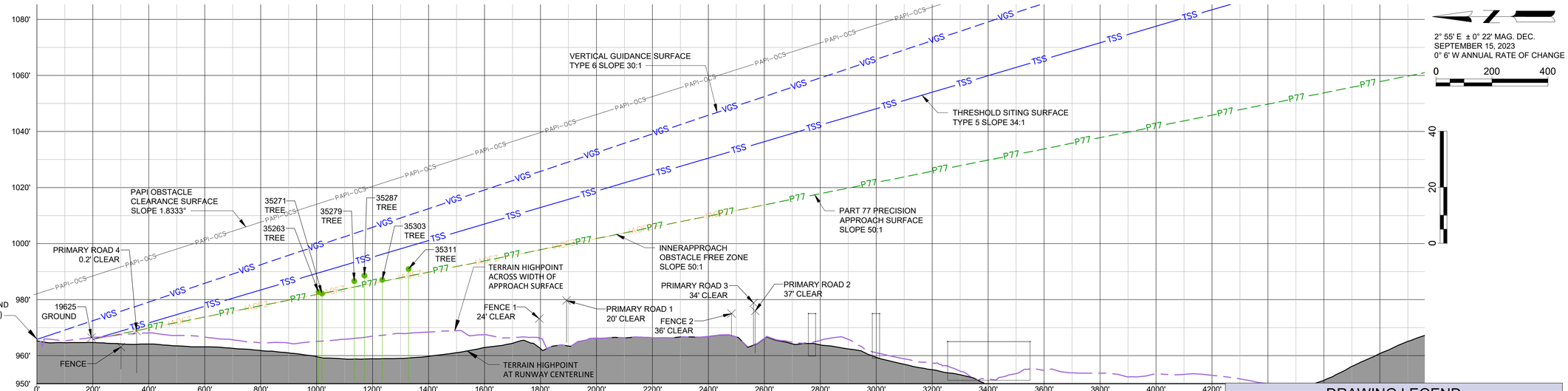

PAPI OBSTACLE CLEARANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

VERTICAL GUIDANCE SURFACE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

OBSTACLE FREE ZONE

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PART 77 APPROACH OBSTRUCTIONS

OBS #	DESCRIPTION	EASTING	NORTHING	ELEVATION	PENETRATION	SURFACE	DISPOSITION
19625	GROUND	2237653.0	420406.0	966.5	0.7	PRIMARY	GRADED
35263	TREE	2238739.2	419614.4	982.7	2	PART 77 APPROACH	REMOVE
35271	TREE	2238730.3	419601.8	982.1	1	PART 77 APPROACH	REMOVE
35279	TREE	2238746.6	419486.8	986.6	3	PART 77 APPROACH	REMOVE
35287	TREE	2238749.0	419450.7	988.6	5	PART 77 APPROACH	REMOVE
35303	TREE	2238750.6	419450.7	987.0	1	PART 77 APPROACH	REMOVE
35311	TREE	2238832.9	419387.0	990.9	4	PART 77 APPROACH	REMOVE

THRESHOLD SITING OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

REVISIONS

NOTES

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2. ALL LAT/LONG COORDINATES ARE NAD 83 AND NAVD 88.
3. AC150/5300-18B SURVEY COMPLETED BY QUANTUM SPATIAL, SEPT 2021.

DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER TRANSITIONAL OBSTACLE FREE ZONE	ITOFZ	ITOFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	IAOFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	x	x x
RUNWAY END IDENTIFIER LIGHTS (REIL)		

Mead & Hunt

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AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
STILLWATER, OK 74075

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SHEET CONTENTS

RUNWAY 35 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.

11

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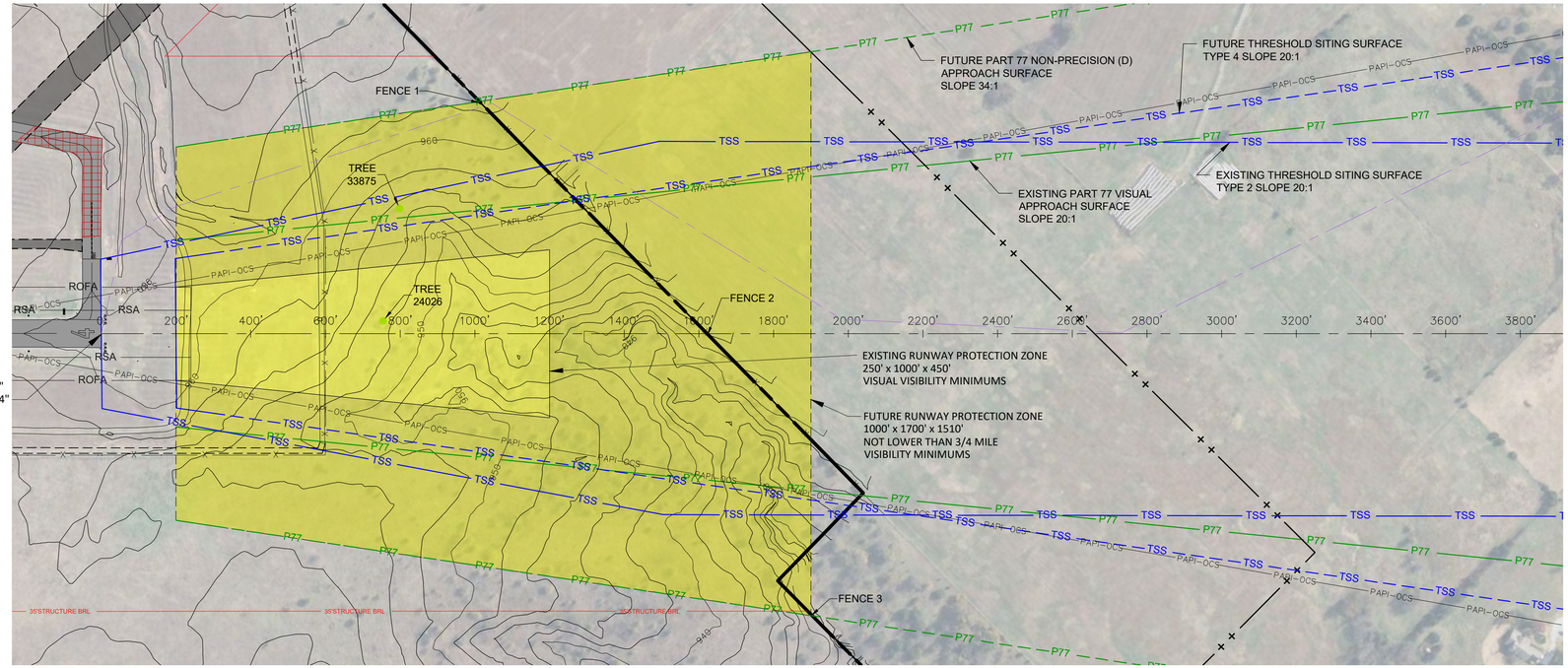
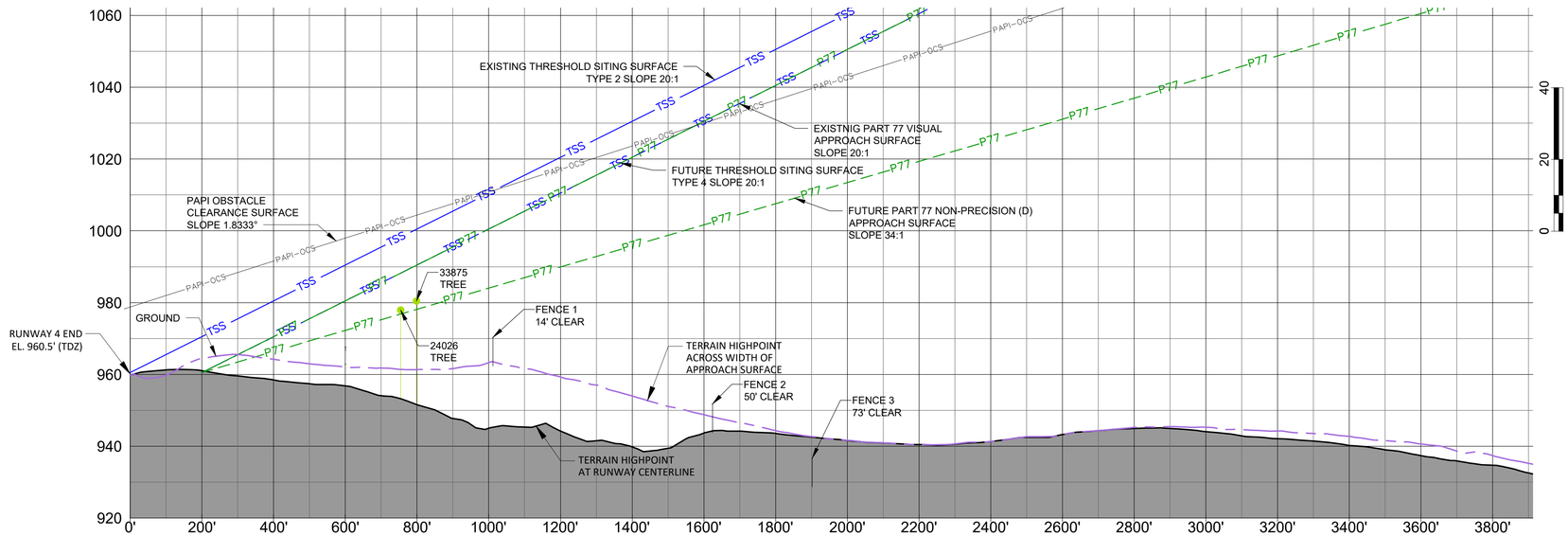


2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400



PART 77 OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
24026	TREE	977.9	1	PART 77 APPROACH	REMOVE
33875	TREE	980.4	1	PART 77 APPROACH	REMOVE
GROUND	TERRAIN	965.0	4.5	FUTURE PART 77 APPROACH	GRADE

PAPI OBSTACLE CLEARANCE SURFACE

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

THRESHOLD SITING OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA	A	A
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	x	x x
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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STILLWATER REGIONAL AIRPORT
AIRPORT LAYOUT PLAN

3304 N AIRPORT INDUSTRIAL ACCESS RD
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SHEET CONTENTS
RUNWAY 4 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.
12

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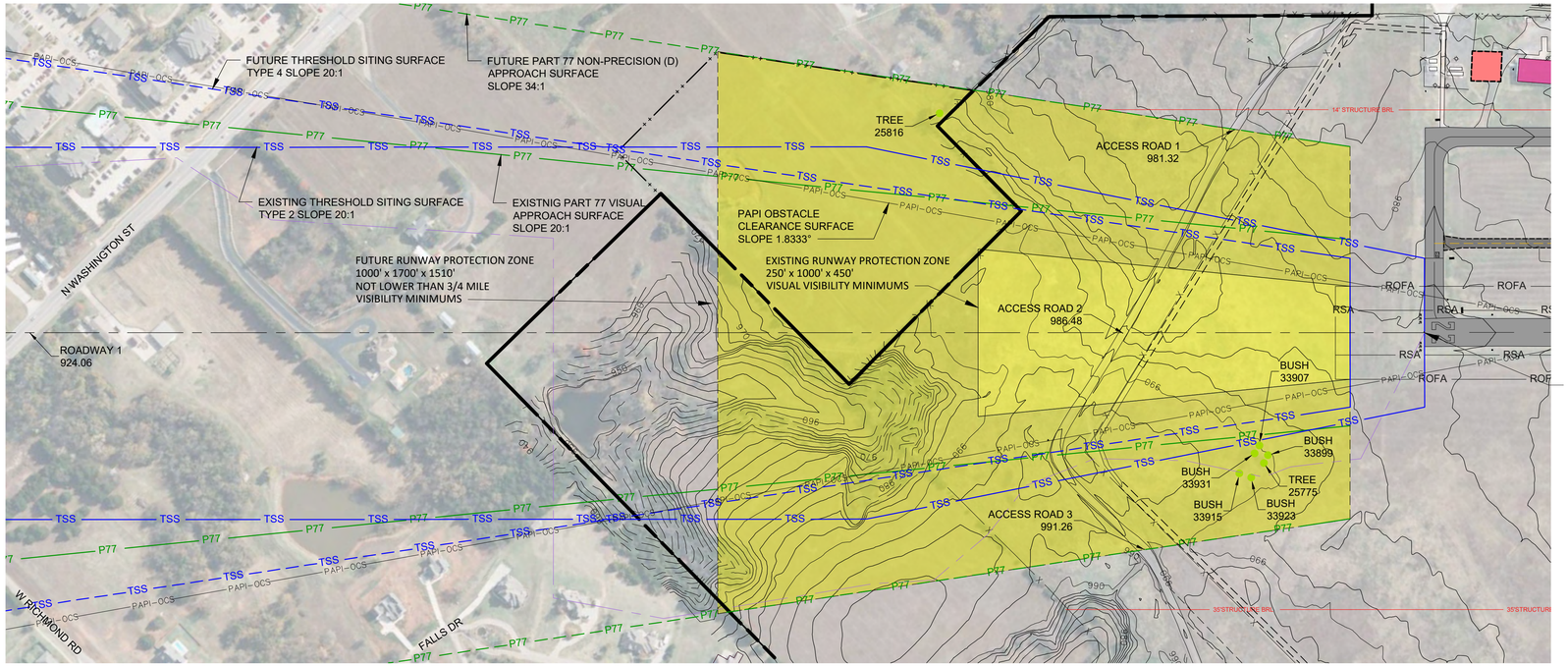
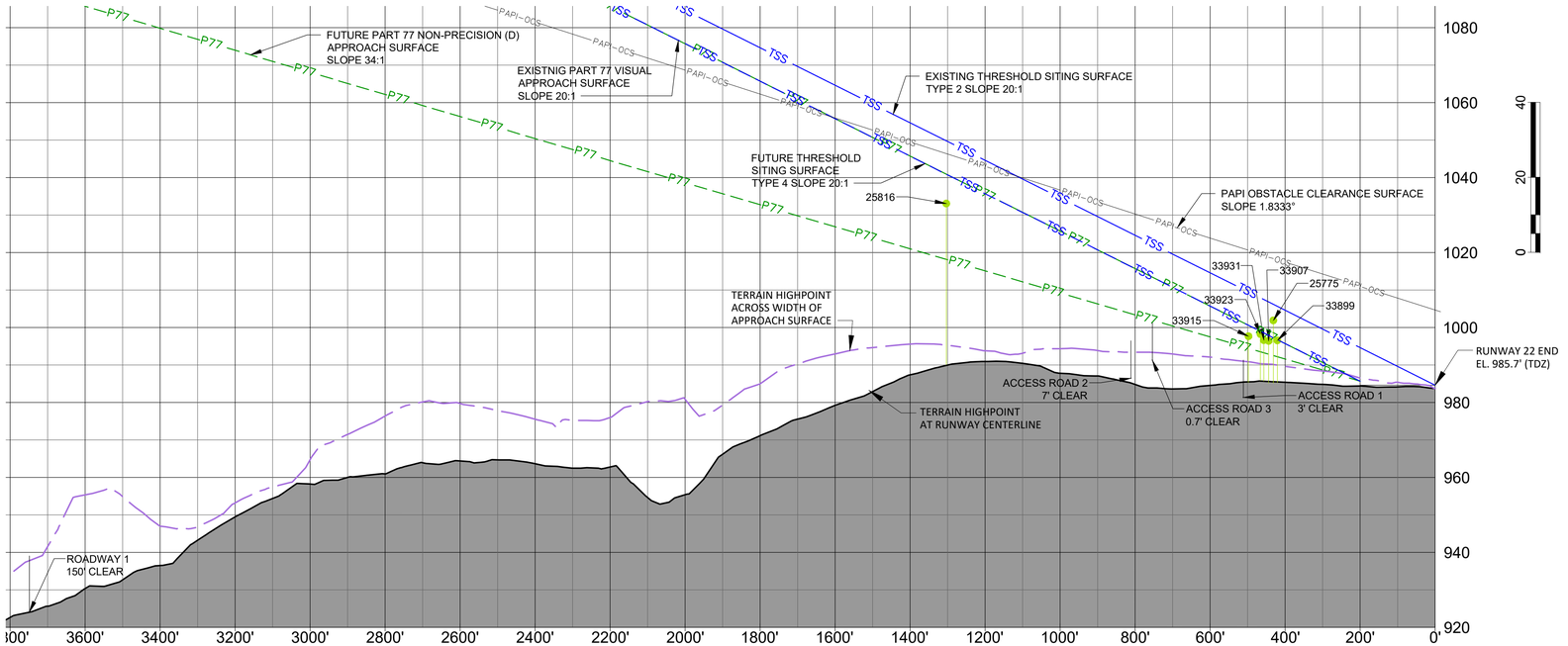


RUNWAY 22 END
EL. 985.7' (TDZ/HIGHPOINT)
LAT. N 36°09'54.60"
LON. W 97°04'43.29"

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400



THRESHOLD SITING OBSTRUCTIONS

OBS#	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PAPI OBSTACLE CLEARANCE SURFACE

OBS#	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
	NONE				

PART 77 OBSTRUCTIONS

OBS #	DESCRIPTION	ELEVATION	PENETRATION	GROUND ELEVATION	SURFACE	DISPOSITION
25775	TREE	1001.9	10	960.2	FUTURE PART 77 APPROACH	REMOVE
25816	TREE	1033.1	16	960.2	FUTURE PART 77 APPROACH	REMOVE
33899	BUSH	996.6	5	957.0	FUTURE PART 77 APPROACH	REMOVE
33907	BUSH	996.4	1	988.5	FUTURE PART 77 APPROACH	REMOVE
33915	BUSH	997.7	4	988.5	FUTURE PART 77 APPROACH	REMOVE
33923	BUSH	998.2	6	988.5	FUTURE PART 77 APPROACH	REMOVE
33931	BUSH	996.6	4	988.5	FUTURE PART 77 APPROACH	REMOVE

REVISIONS

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AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
PRECISION OBSTACLE FREE ZONE		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	X X
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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SHEET CONTENTS
RUNWAY 22 INNER PORTION OF THE APPROACH SURFACE PLAN & PROFILE

SHEET NO.
13

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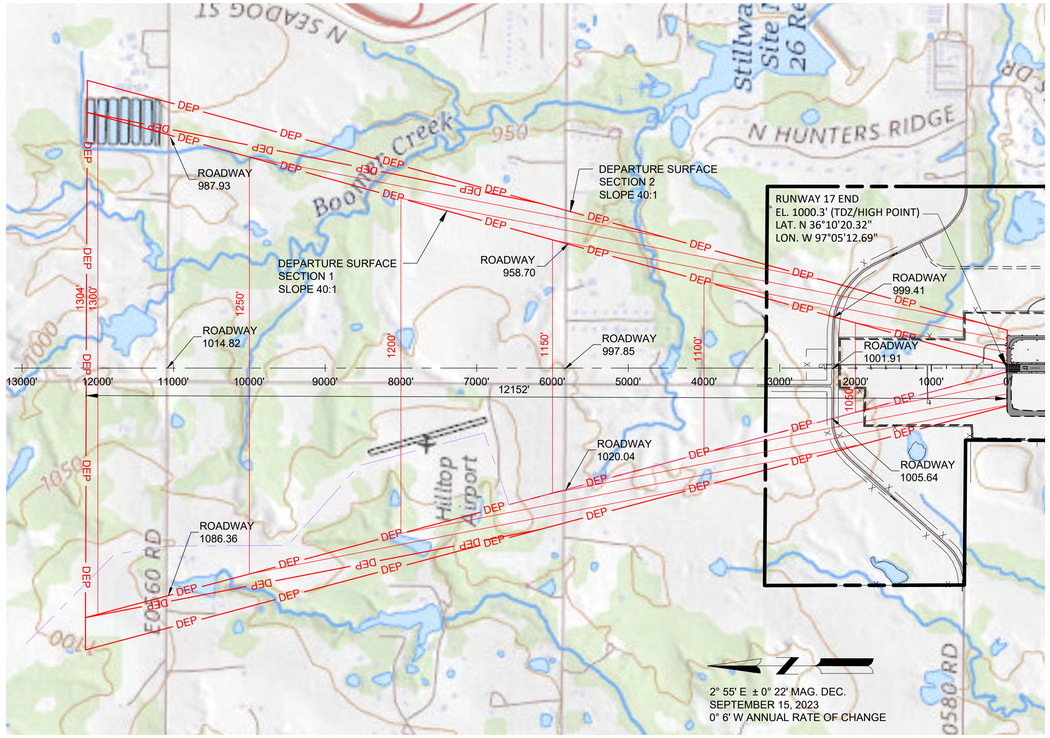

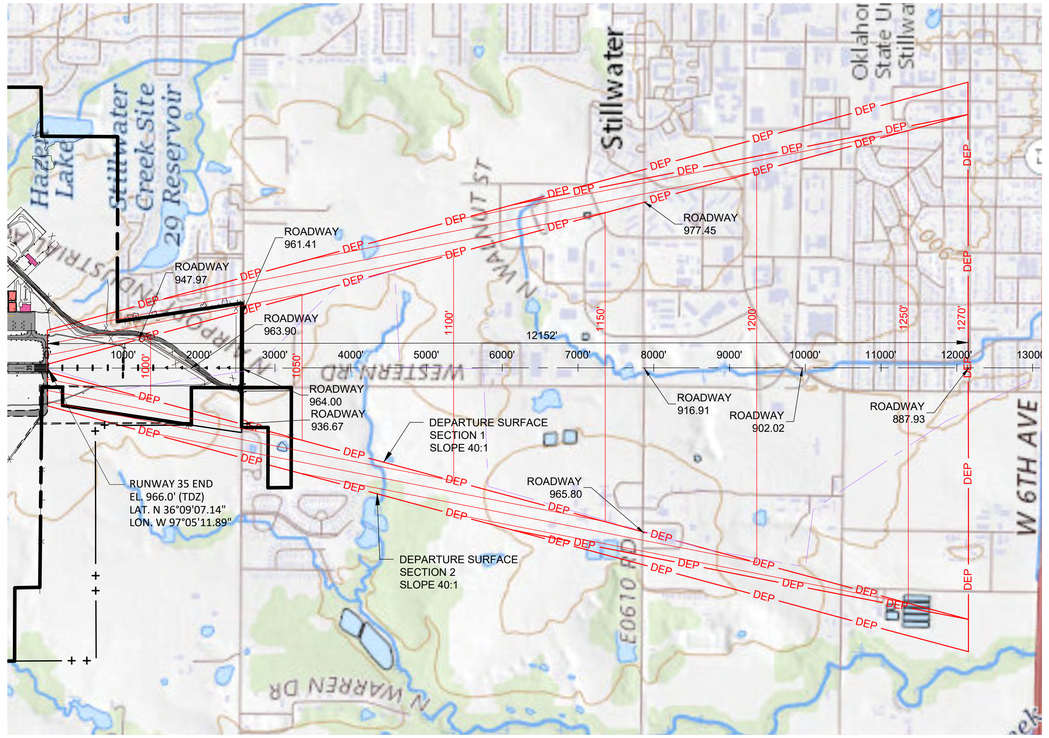

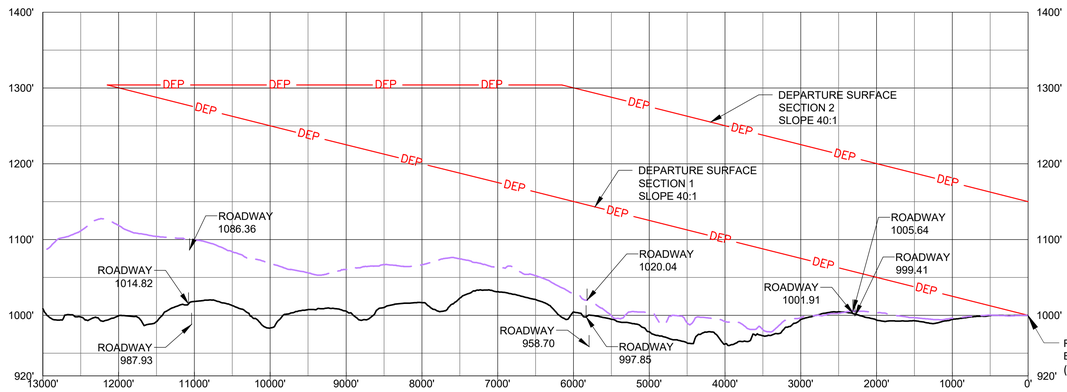

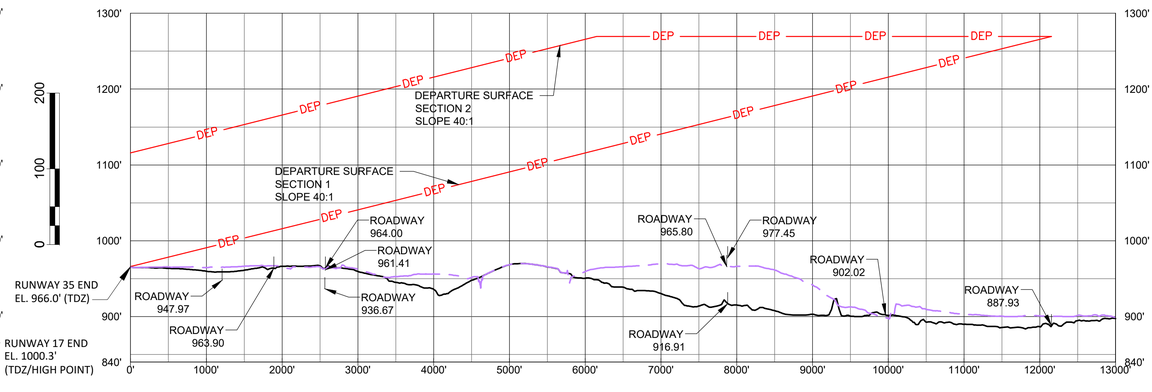

DEPARTURE SURFACE OBSTRUCTIONS

NONE IDENTIFIED

REVISIONS

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DRAWING LEGEND

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		++ ++
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
DEPARTURE SURFACE	DEP	DEP
AIRPORT SECURITY FENCE (8 FT)	x	x x

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SHEET CONTENTS
RUNWAY 17-35 DEPARTURE SURFACE PLAN & PROFILE

SHEET NO.
14

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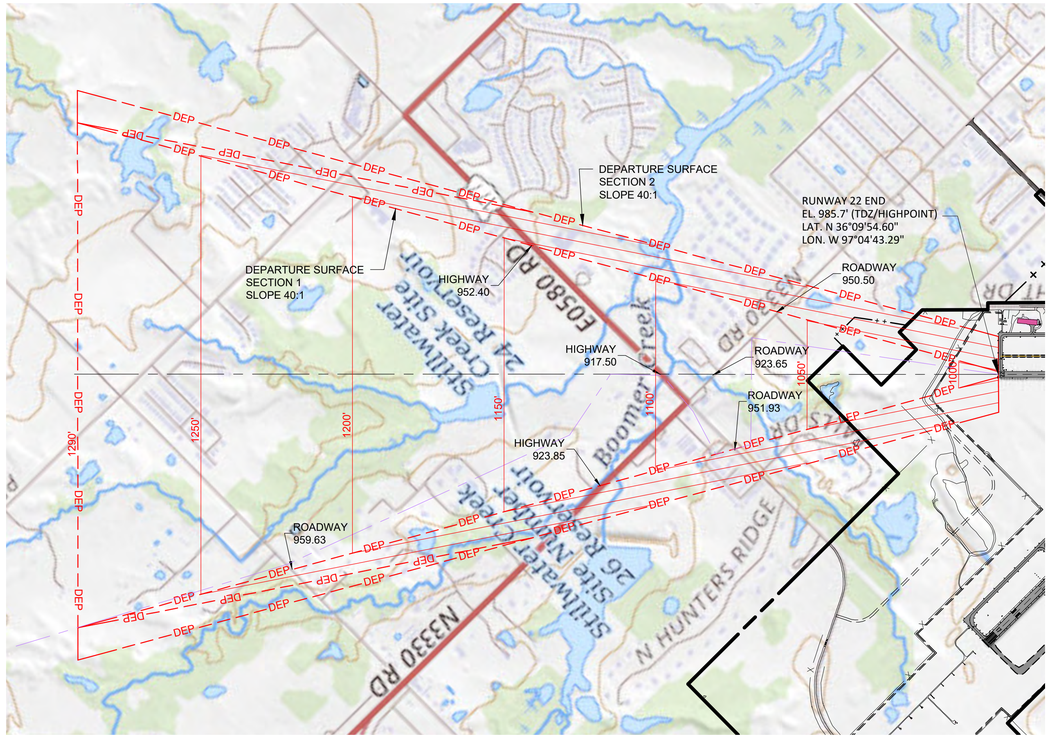

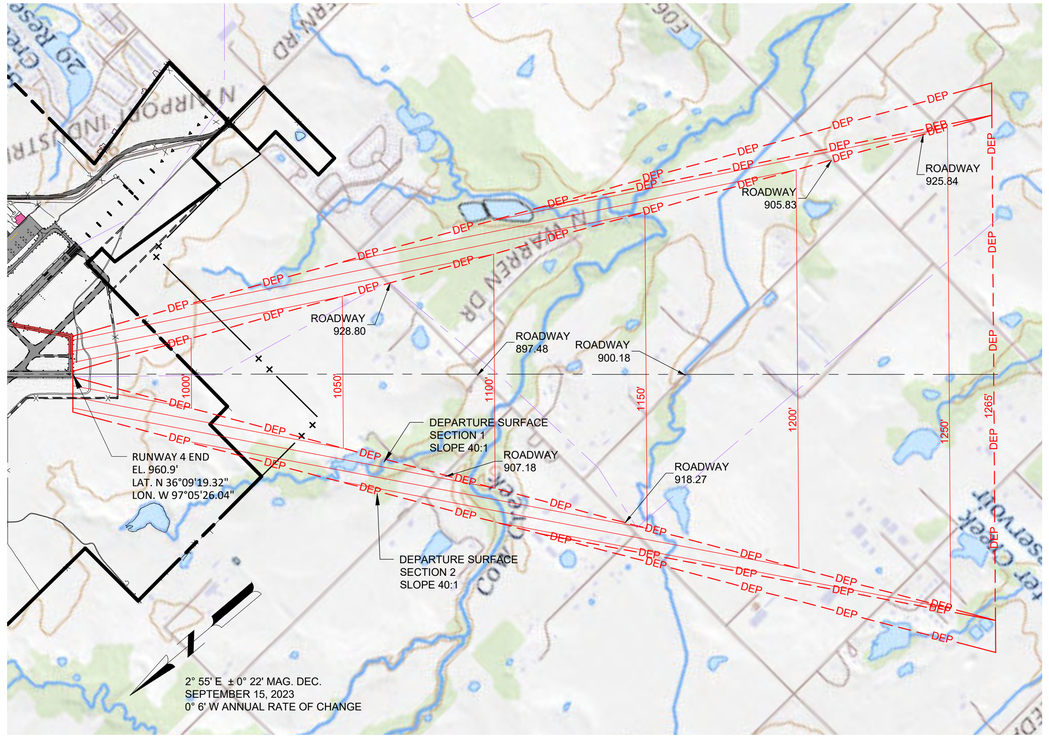

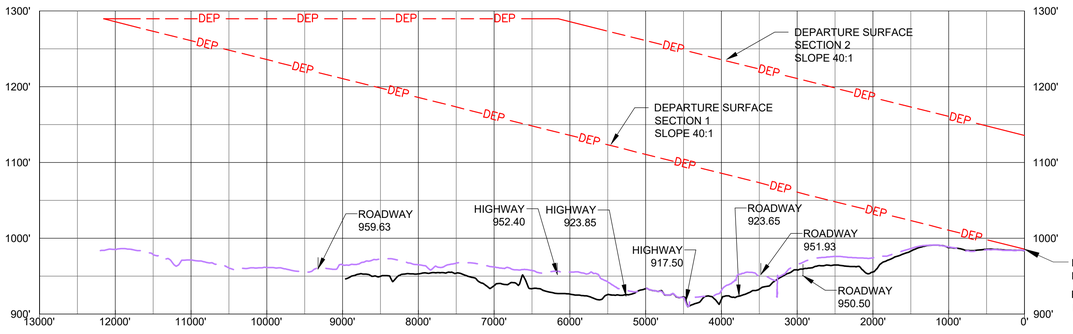

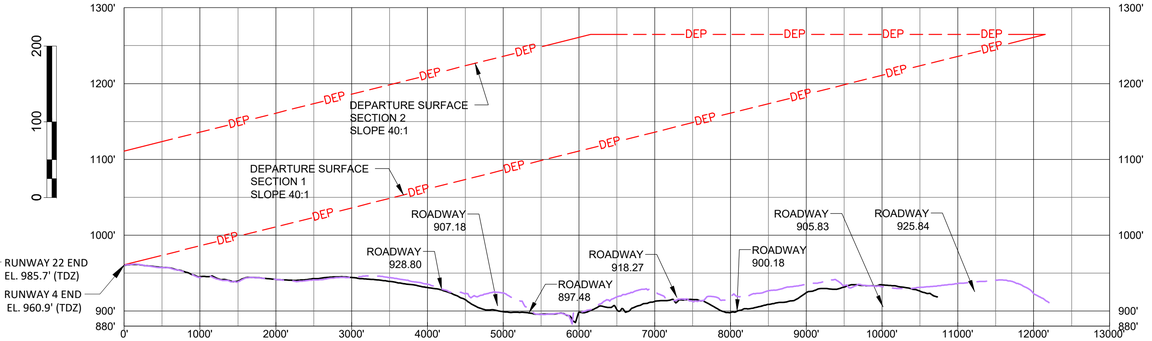

DEPARTURE SURFACE OBSTRUCTIONS

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AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
DEPARTURE SURFACE	DEP	DEP
AIRPORT SECURITY FENCE (8 FT)	x	x x

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SHEET CONTENTS
RUNWAY 4-22 DEPARTURE SURFACE PLAN & PROFILE

SHEET NO.
15

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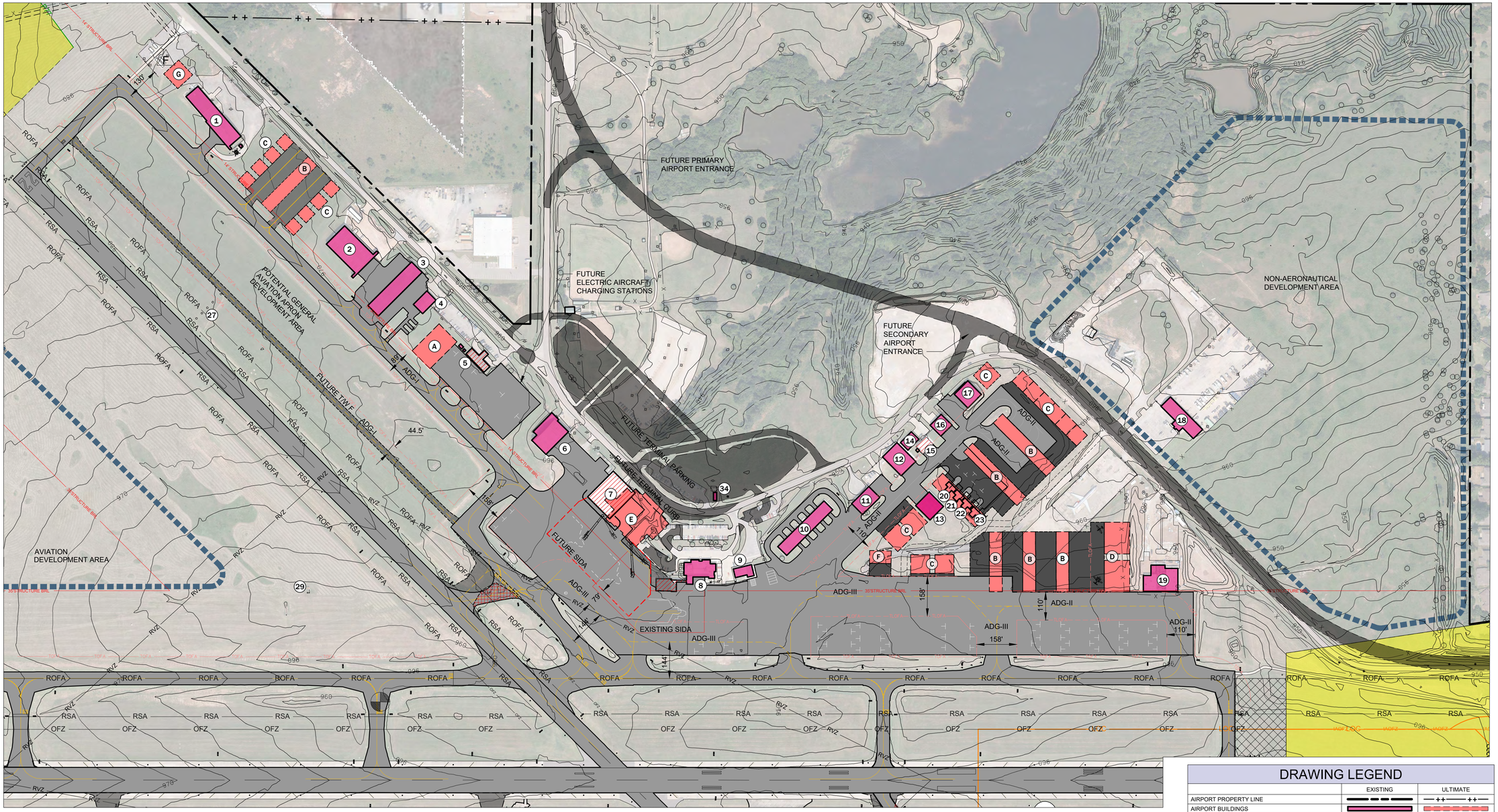

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
1	ROCK HANGAR	1006.2'	NO
2	OSU MAINTENANCE HANGAR	998.7'	NO
3	T-HANGAR 2	986.4'	NO
4	LBR, INC. OFFICE	984.0'	NO
5	OLD OSU FLIGHT CENTER	983.6'	NO
6	GROUP HANGAR 2	1002.7'	NO
7	GROUP HANGAR 1 (TO BE REMOVED)	986.6'	NO
8	CURRENT TERMINAL/ATCT	980.4' / 1016.2'	NO
9	ARFF	974.0'	NO
10	T-HANGAR 1	967.0'	NO
11	COWBOY HANGAR	972.0'	NO
12	AIRPORT OPERATIONS & MAINTENANCE	977.3'	NO
13	HANGAR 10	978.6'	NO
14	ADMINISTRATION BUILDING	972.0'	NO
15	AIRCRAFT WASH BAY	975.1'	NO
16	WAITS HOLDING HANGAR	976.7'	NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
17	DETWILER HANGAR	980.5'	NO
18	WASTE MANAGEMENT BLDG. AND FACILITY	983.2'	NO
19	NEW OSU FLIGHT CENTER	991.4'	NO
20	PORT-A-PORT HANGAR	968.0'	NO
21	PORT-A-PORT HANGAR	968.1'	NO
22	PORT-A-PORT HANGAR	969.1'	NO
23	PORT-A-PORT HANGAR	969.1'	NO
24	LOCALIZER EQUIPMENT BLDG.	965.0'	NO
25	PAPI RW 35	961.6'	NO
26	PAPI RW 17	991.9'	NO
27	PAPI RW 22	977.5'	NO
28	PAPI RW 4	956.9'	NO
29	WINDCONE	983.9'	NO
30	MALSR EQUIPMENT BLDG.	1006.5'	NO
31	ASOS	968.0'	NO
32	LOCALIZER ANTENNA	967.8'	NO
33	GLIDE SLOPE EQUIPMENT BLDG.	994.0'	NO
34	AIRPORT BEACON	1009.2'	NO
35	WINDCONE	985.0'	NO
36	WINDCONE		NO

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATIONS	OBSTRUCTION LIGHTED
A	GROUP HANGAR 1		
B	FUTURE T-HANGAR		
C	FUTURE HANGAR		
D	FUTURE MAINTENANCE HANGAR		
E	FUTURE PASSENGER TERMINAL		
F	FUTURE ARFF/SRE MAINTENANCE BUILDING		
G	FUTURE OFF-SEASON STORAGE FACILITY		

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

0 200 400

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	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
BUILDINGS TO BE REMOVED		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
AVIGATION EASEMENT		
FUEL STORAGE AREA		
PART 77 APPROACH SURFACE	P77	P77
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
THRESHOLD SITING SURFACE	TSS	TSS
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE	X	XX
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT BEACON		
SUPPLEMENTAL WIND CONE		
AUTOMATIC SURFACE OBSERVATION SYSTEM		
VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE		
LAND USE DEVELOPMENT AREA		
SECURITY IDENTIFICATION DISPLAY AREA (SIDA)		

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TERMINAL AREA PLAN

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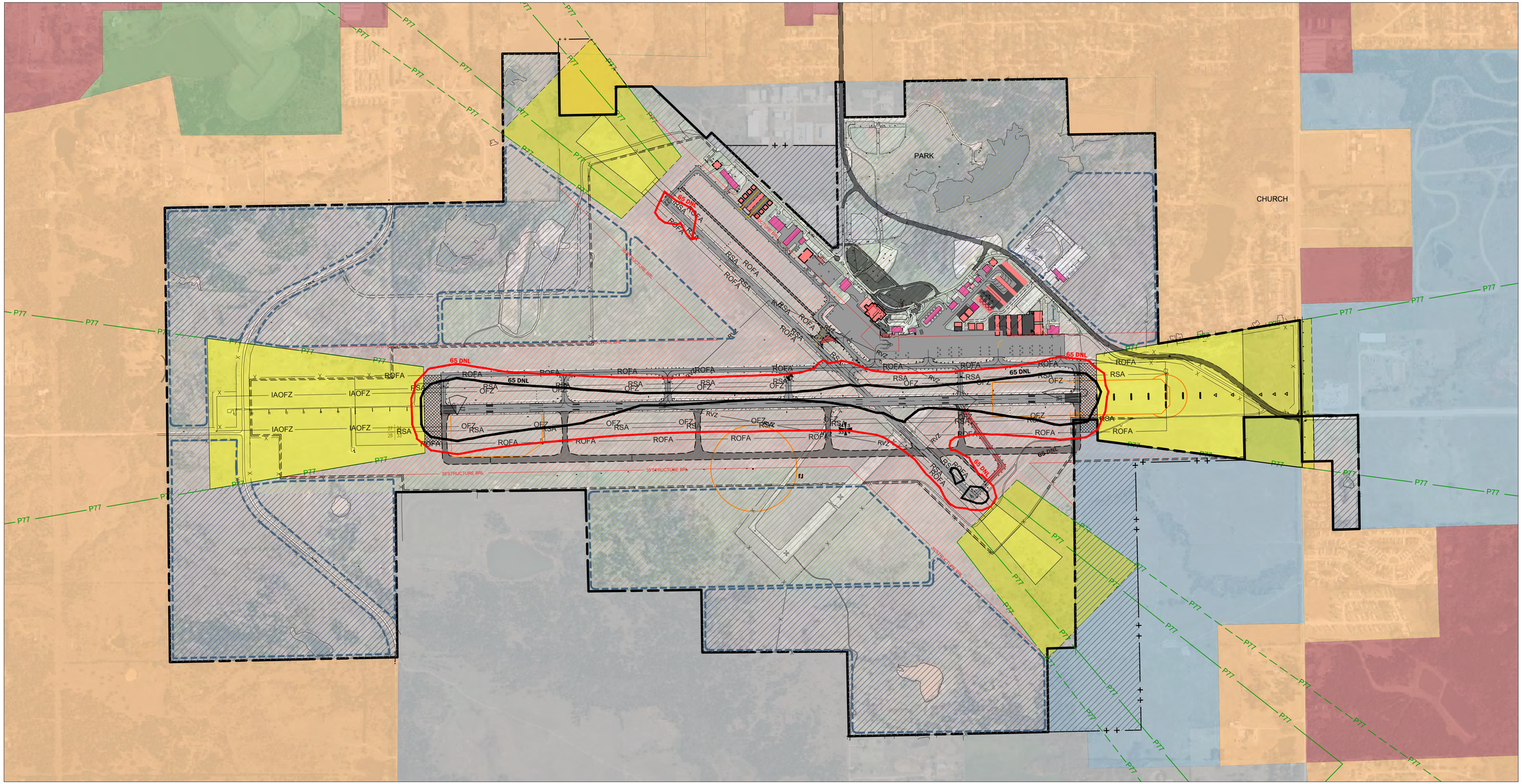

ON AIRPORT LAND USE

- Aircraft Operations Protected Area
- Aviation Development
- Open Space
- Non-Aviation Development
- Runway Protection Zone

OFF AIRPORT LAND USE

- Residential
- Commercial
- Public/University
- Parks/Open Space
- Industrial

65 DNL NOISE CONTOURS

- Existing
- Future

2° 55' E ± 0° 22' MAG. DEC.
SEPTEMBER 15, 2023
0° 6' W ANNUAL RATE OF CHANGE

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AIRPORT PROPERTY LINE		
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BUILDINGS TO BE REMOVED		
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AIRFIELD PAVEMENT TO BE REMOVED		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
PART 77 APPROACH SURFACE	P77	P77
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
OBSTACLE FREE ZONE	OFZ	OFZ
RUNWAY VISIBILITY ZONE	RVZ	RVZ
AIRPORT SECURITY FENCE (8 FT)	X	X X
AIRPORT REFERENCE POINT (ARP)		

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EASEMENTS GRANTED

TRACT NO.	GRANTOR	GRANTEE	TYPE OF INTEREST	ACRES	DATE	CONVEYANCE INSTRUMENT	LIBER/BOOK & PAGE
UE1	STILLWATER AIRPORT AUTHORITY BOARD	CITY OF STILLWATER	EASEMENT	2.34	12/16/1993	GENERAL UTILITY EASEMENT	1035 @ 896-898
UE2	STILLWATER AIRPORT AUTHORITY BOARD	CITY OF STILLWATER	EASEMENT		11/30/1998	GENERAL UTILITY EASEMENT	1216 @ 670-671
UE3	CITY OF STILLWATER	CITY OF STILLWATER	RIGHT OF WAY	0.98	1/3/2005	DEDICATION DEED	1546 @ 149-150
UE4	CITY OF STILLWATER	CITY OF STILLWATER	EASEMENT	0.06	3/12/2010	GENERAL UTILITY EASEMENT	1881 @ 104
UE5	CITY OF STILLWATER	CITY OF STILLWATER	RIGHT OF WAY	0.23	11/4/2024	DEED OF DEDICATION - PERMANENT RIGHT OF WAY	---

RELEASED AIRPORT PROPERTY DATA

TRACT NO.	ACRES	TYPE OF INTEREST	GRANTOR	GRANTEE	LIBER/BOOK & PAGE	DATE
15	6.6	WARRANTY DEED	CITY OF STILLWATER	STATE OF OKLAHOMA	400 @ 25-27	8/21/1978

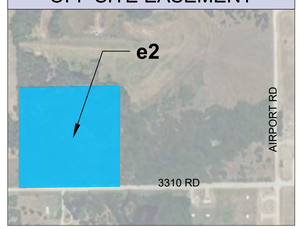
AIRPORT PROPERTY TO BE ACQUIRED DATA

TRACT NO.	INTEREST	ACRES	PURPOSE
A	FEE	12.50	APPROACH PROTECTION
B	FEE	60.30	APPROACH PROTECTION
C	FEE	18.00	APPROACH PROTECTION
D	EASEMENT	4.60	APPROACH PROTECTION
E	FEE	18.50	NON-AERONAUTICAL DEVELOPMENT

EXISTING AIRPORT PROPERTY DATA

TRACT NO.	GRANTOR	TYPE OF INTEREST	ACRES	DATE	CONVEYANCE INSTRUMENT	LIBER/BOOK & PAGE	PURPOSE FOR ACQUISITION	FAA PARTICIPATION
1	---	FEE	955.00	---	---	---	---	---
1a	COMMISSIONERS OF THE LAND OFFICE OF THE STATE OF OKLAHOMA	FEE	57.36	7/3/1943	PATENT	75M @ 123	AERONAUTICAL	NONE
1b	NANETAH OERKE, ET AL	FEE	126.90	8/13/1943	REPORT OF COMMISSIONERS	76M @ 108	AERONAUTICAL	NONE
1c	A.J. THOMAS, ET AL	FEE	15.10	8/13/1943	REPORT OF COMMISSIONERS	76M @ 110	AERONAUTICAL	NONE
1d	A.J. THOMAS	FEE	105.50	8/13/1943	REPORT OF COMMISSIONERS	76M @ 106	AERONAUTICAL	NONE
1e	OKLAHOMA STATE UNIVERSITY	FEE	281.03	9/24/1984	GENERAL WARRANTY DEED	660 @ 758-760	AERONAUTICAL	NONE
1f	SARAH M. CURRY, ET AL	FEE	60.00	8/13/1943	REPORT OF COMMISSIONERS	76M @120	AERONAUTICAL	NONE
1g	OKLAHOMA STATE UNIVERSITY	FEE	4.56	3/18/1988	GENERAL WARRANTY DEED	873 @ 600-601	AERONAUTICAL	NONE
1h	OKLAHOMA STATE UNIVERSITY	FEE	0.73	---	---	---	AERONAUTICAL	NONE
1i	OKLAHOMA STATE UNIVERSITY	FEE	0.70	9/21/1984	QUIT CLAIM DEED	660 @757	AERONAUTICAL	NONE
1j	OKLAHOMA STATE UNIVERSITY	FEE	1.44	3/18/1988	GENERAL WARRANTY DEED	873 @ 600-601	AERONAUTICAL	NONE
2	SOUTHWEST TITLE & TRUST CO. INC.	FEE	38.00	5/12/1967	WARRNATY DEED	196 @ 300	APPROACH PROTECTION	FAA #9-34-050-C6C3
3a			26.80		---	---	AERONAUTICAL	ADAP #8-40-0090-02
3b			8.40	---	---	---	AERONAUTICAL	NONE
4	AURVIL J. JR. & VICTORIA M. KETCH, JOSEPH L. & PAMELA HANEY	FEE	79.60	8/23/2000	WARRANTY DEED	1269 @ 119	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	NONE
5	SHIRLEY ANN SWIM, EMMA ADELE BENNETT, LEVA FAIRWEATHER, MELVIN I. THOMASON	FEE	22.09	1/8/1999	JOURNAL ENTRY	1200 @ 41-42	APPROACH PROTECTION	NONE
6	JAMES B. & JACQUELINE M. CUMMINS	FEE	9.90	1/6/1992	WARRANTY DEED	969 @ 705	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	NONE
7	GERTRUDE MAE CONDREAY, CLARA LUELLA SNEARY, BONITA . STADLER	FEE	10.82	5/9/2001	REPORT OF COMMISSIONERS	1200 @ 499-501	APPROACH PROTECTION	NONE
8	---	FEE	9.20	---	---	---	---	ADAP #5-40-0090-05/06-07
9	---	FEE	4.20	---	---	---	---	ADAP #5-40-0090-05/06-07
10	STILLWATER INDUSTRIAL FOUNDATION	FEE	3.12	1/23/1973	WARRANTY DEED	220DR @ 74	NON-AERONAUTICAL DEVELOPMENT	NONE
11	OKLAHOMA STATE UNIVERSITY	FEE	14.30	9/3/2002	DEDICATION DEED	1374 @ 172	APPROACH PROTECTION	AIP 3-40-0090-012-2002
12	GLENN P. & LANELDA J. MCDANIEL	FEE	127.20	3/23/2000	WARRANTY DEED	1249 @ 929	APPROACH PROTECTION/NON-AERONAUTICAL DEVELOPMENT	AIP 3-40-0090-013-2003
13a	ARLIE MELVIN & BARBARA THOMASON, EARL THOMASON	FEE	38.10	8/20/2003	WARRANTY DEED	1235 @ 268-269	APPROACH PROTECTION	AIP 3-40-0090-013-2003
13b	ARLIE MELVIN & BARBARA THOMASON, EARL THOMASON	FEE	110.50	8/20/2003	WARRANTY DEED	1235 @ 268-269	NON-AERONAUTICAL DEVELOPMENT	AIP 3-40-0090-014-2003
14	ANN COCHRAN ENIX	FEE	26.00	12/31/2019	WARRANTY DEED	2544 @ 590-591	APPROACH PROTECTION	NONE
16	STILLWATER INDUSTRIAL FOUNDATION	ASSIGNMENT	0.76	2/21/1995	DEDICATION DEED	1065 @ 528-529	NON-AERONAUTICAL	NONE
17	JON AND DANA VAUGHT	FEE	0.61	10/27/2023	WARRANTY DEED	2788 @ 448-492	NON-AERONAUTICAL	NONE
18	STATE OF OKLAHOMA	FEE	0.05	1/8/2025	DEED OF DEDICATION - PERMANENT RIGHT OF WAY	---	NON-AERONAUTICAL	NONE
19	---	ANNEXATION	3.10	3/29/1961	ORDINANCE	145M @ 321-323	NON-AERONAUTICAL	NONE
e1	---	EASEMENT	0.70	---	---	---	---	ADAP #5-40-0090-05/06-07
e2	CITY OF STILLWATER	EASEMENT	10.00	1/5/2004	AVIGATION EASEMENT	1475 @ 646	APPROACH PROTECTION	NONE
	NOTES: --- INFORMATION NOT AVAILABLE							

OFF SITE EASEMENT



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AIRPORT SECURITY FENCE (8 FT)	X	X X
AIRPORT REFERENCE POINT (ARP)		
EASEMENTS		

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AIRPORT PROPERTY MAP

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Stillwater
REGIONAL AIRPORT

MASTER PLAN

SWO

Stillwater REGIONAL AIRPORT

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MASTER PLAN

FINAL REPORT – MAY 2025

THE Mead & Hunt TEAM

110 South Hartford, Suite 1010
Tulsa, OK 74120
918-585-8844
www.meadhunt.com

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Tulsa, OK

McFarland Architects
Tulsa, OK

Olsson Engineering
Oklahoma City, OK

Leibowitz & Horton AMC
Greenwood Village, CO

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Executive Summary

INTRODUCTION

Stillwater Regional Airport (SWO or the Airport) was originally constructed in 1929 when the City of Stillwater acquired 239 acres of land north of town and provided the first runway consisting of a half-mile long grass strip. The U.S. Navy leased the Airport in 1942 and continued operations until six months following the end of World War II. The City of Stillwater resumed control and operation in 1980 and continues operating the Airport today as a commercial service airport while serving a large General Aviation (GA) user base. Oklahoma State University (OSU) is the largest user of SWO, operating a flight training program at the OSU Flight Center.

SWO encompasses approximately 1,484 acres and consists of two runways, numerous taxiways, a passenger terminal building, a commercial apron, a general aviation (GA) apron, and various hangars and buildings. Runway 17/35, the primary runway is 7,401 feet in length and 100 feet in width. Runway 4/22, the crosswind runway is 5,002 feet in length and 75 feet in width. Taxiway A is the parallel taxiway serving Runway 17/35. Taxiway F is the partial parallel taxiway serving the northeast end of Runway 4/22; Taxiway B is the partial parallel taxiway serving the southwest end of Runway 4/22. The Airport is located within the City of Stillwater's city limits, approximately three miles northwest of the central business district, within Payne County, in the north-central portion of Oklahoma. The Airport is approximately 60 miles north of Oklahoma City and 60 miles west of Tulsa.

This Master Plan Study (Study) assists in documenting the current state of aviation industry at SWO, and ultimately supports the modernization and improvement of Airport facilities. The findings can serve as the strategic guide for overall economic development opportunities and sustainability recommendations, as well as provide data and support for continued development of existing and future commercial air service.

OUTREACH AND COMMUNICATIONS PLAN

The Master Plan includes an Outreach and Communications Plan that defines the proposed communication and community engagement process for the project including overall goals, key community audiences, information needs and messages, and proposed community engagement activities.

Throughout the Study, SWO and the project team form several goals. These goals include:

- Establish a process to inform stakeholders and the broader community about the master planning process in a collaborative setting.
- Support Airport Staff and the Mead & Hunt Team in developing the Master Plan.
- Consult with those most affected by SWO operations and development to foster collaboration.
- Collaborate with the Study Committee (SC) to identify recommendations for incorporation into the Master Plan, to the extent possible.

- Build community and stakeholder awareness and understanding of the Master Plan process, establishing realistic expectations for what will be considered and accomplished.
- Inform the public on how they can be involved and how their input will be considered.
- Collect substantive and meaningful public input at appropriate milestones.
- Conduct a public engagement process that is efficient, effective, and results in informed and engaged stakeholders and community members.

AVIATION ACTIVITY FORECASTS

To provide a defined rationale for necessary improvements needed at SWO as demand increases, aviation activity forecasts were developed using approaches outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. The aviation activity forecasts were developed for the 20-year planning period based on historic activity, industry trends, local socioeconomic data, anticipated growth rates, uncertainties surrounding the recovery of the COVID-19 pandemic, and changes that had occurred at SWO since the completion of previous planning studies.

Following the post COVID-19 pandemic recovery, SWO is on pace to exceed the 20-year enplanements forecast by 2026.

Following the completion, review, and FAA approval of SWO's forecasts in March 2022, which is contained in **Chapter B – Forecasts of Aviation Activity**, SWO rebounded from the COVID-19 pandemic much faster than the Study's forecasts anticipated. Passenger enplanements for Fiscal Year 2023 indicate SWO enplaned 34,398 passengers. This exceeds the 31,830 enplanements the Study forecast to occur in 2030. Recent monthly trends indicate annual enplanements could approach 36,000 for 2024, which nearly surpass the forecasted 36,150 in 2035. Thus, SWO is on pace to exceed the Study's 20-year enplanements forecasts by 2026; an excellent achievement given the uncertainties surrounding the post pandemic planning assumptions. **Table 1** presents the updated historical passenger enplanements from 2009 through 2023.

Table 1: Passenger Enplanements, 2009-2023

Fiscal Year	Air Carrier	Air Taxi/Commuter	Total	Percent Change
2009	2,028	214	2,242	N/A
2010	1,718	288	2,006	-10.5%
2011	1,304	141	1,445	-28.0%
2012	2,115	79	2,194	51.8%
2013	1,888	0	1,888	-13.9%
2014	1,588	32	1,620	-14.2%
2015	1,642	0	1,642	1.4%
2016	1,386	2,131	3,517	114.2%
2017	1,929	25,825	27,754	689.1%
2018	1,629	24,689	26,318	-5.2%
2019	1,441	27,523	28,964	10.1%
2020	1,308	16,102	17,410	-39.9%
2021	990	15,467	16,457	-5.5%
2022	2,010	25,110	27,120	64.8%
2023	2,461	31,937	34,398	26.8%
CAGR (2017-2023)	**4.1%**	**3.6%**	**3.6%**	**N/A**

Sources: [1] FAA TAF, 2024.

Over the next 20 years, the types of aircraft projected to operate at SWO generally remain the same as those presently operating at the Airport, including small single engine piston aircraft, business jet aircraft, and regional jet commercial passenger service aircraft. However, as with the passenger enplanements, after the completion, review, and FAA approval of SWO's forecasts, Envoy/SkyWest Airlines accelerated the retirement of the 50-seat ERJ 145 from their fleet, which are now completely removed from regional service. These were replaced by the 65-seat Bombardier CRJ 700 in November 2022, which reclassified the flights from air taxi to air carrier. This aircraft up-gauge required SWO to transition from a partial security program to a complete security program. In February 2024, Envoy/SkyWest Airlines temporarily up-gauged to the 65-seat ERJ 170, with some 76-seat ERJ 175 aircraft being used periodically. SWO assisted this change by purchasing a larger passenger boarding bridge supporting the larger aircraft. This transition was anticipated and accounted for in the Study forecasts. Thus, the CRJ 700 is the existing (i.e., 2022 to 2024) critical aircraft and the Embraer ERJ 175 is the future critical aircraft, as shown in **Figure 1**.

Figure 1: Existing and Future Runway 17/35 Critical Aircraft

Overall, total aircraft operations, passenger enplanements, and based aircraft at SWO are anticipated to increase over the course of the 20-year planning period. **Table 2** is a summary of the Study's aviation activity forecast to occur at SWO, which as noted above, passenger enplanements have rebounded much quicker than provided in the table.

Table 2: Summary of Aviation Activity Forecasts, 2020-2040

Activity	2020	2025[5]	2030[5]	2035[5]	2040[5]
Enplanements					
Total	**17,410[1]**	**28,000**	**31,830**	**36,150**	**41,060**
Operations					
Commercial Service	***1,920***	***2,284***	***2,284***	***2,180***	***2,284***
Air Carrier	30[1]	348	1,180	1,284	1,492
Narrow Body Jets	*30[2]*	*348*	*1,180*	*1,284*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,000	792	792
Regional Jets	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
GA Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	***57,512[1]***	***71,870***	***79,750***	***85,820***	***91,560***
Itinerant	25,654[1]	31,260	34,760	38,640	42,140
Local	31,858[1]	40,610	44,990	47,180	49,420
Military	***3,211[1]***	***3,200***	***3,200***	***3,200***	***3,200***
Itinerant	1,314[1]	1,310	1,310	1,310	1,310
Local	1,897[1]	1,890	1,890	1,890	1,890
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**
Based Aircraft					
Total	**80[4]**	**87**	**91**	**96**	**101**
Critical Aircraft					
Runway 17/35	ERJ 145	ERJ 145	ERJ 175	ERJ 175	ERJ 175
Runway 4/22	Cessna 172	Cessna 172	Cessna 172	Cessna 172	Cessna 172

Sources: [1] FAA TAF, 2021.
[2] TFMSC Direct – Operations obtained directly from TFMSC data.
[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.
[4] SWO staff.
[5] Mead & Hunt projections.

FACILITY REQUIREMENTS

Facility requirements examine the landside and airside facilities necessary to meet aviation demand. These estimates are based upon an airport's aviation activity forecasts, but they are also determined via the FAA's design standards. These two elements account for the efficiency and utility of an airport, as well as the efficiency of the airfield environment. Some major airside development considerations at SWO include:

- Implementation of a Global Positioning System (GPS) based Instrument Approach Procedure (IAO) providing visibility minimums of 1/2 mile to Runway 35.
- Implementation of Non-Precsion Approach (NPA) IAPs to Runways 4 and 22.
- Remediation of FAA taxiway design standard deficiencies associated with Taxiways B, F, and F1.

Major landside development considerations at SWO include:

- Design and construct new terminal building with vehicle access and parking that accommodates anticipated passenger demand.
- Construct Airport Traffic Control Tower (ATCT) building in a new, physically separated location from the terminal building.
- Reserve space for future terminal support development.
- Provide a new Aircraft Rescue and Fire Fighting (ARFF) building.
- Provide a new Snow Removal Equipment (SRE) and Airport Maintenance Facility.
- Reserve space for large scale aeronautical and non-aeronautical facilities.
- Construct perimeter road within perimeter fence for security inspections.
- Install comprehensive security system hardware and software updates to monitor and control access to Security Identification Display Area (SIDA) and Air Operations Area (AOA).

ALTERNATIVES AND DEVELOPMENT PLAN

To accommodate the forecasted growth and needed facilities at SWO, a set of alternatives was developed. The alternatives analysis was preceded by several goals intended to guide the Master Plan and inform future development. These goals include:

- Provide effective direction for future development through the preparation of a rational plan and adherence to the adopted development program.
- Plan and develop SWO to be capable of accommodating the future needs of the City of Stillwater, Payne County, and the surrounding area.
- Program the construction of facilities when demand is realized (construction is to be demand driven, not forecast driven).
- Plan SWO to accommodate the aviation forecasts safely and efficiently with needed facilities. The primary potential facilities improvement under consideration include:
    - The terminal building.
    - A standalone Airport Traffic Control Tower (ATCT).
    - Improved landside vehicle roadway access and parking facilities.
    - An ARFF Facility and a SRE and Airport Maintenance Facility.
    - Aircraft storage hangars and aprons.
    - Terminal landside development.
- Enhance the self-sustaining capability of SWO and the financial feasibility of future development.
- Integrate the needs of existing tenants with future development plans, recognizing and accommodating the needs of general aviation including corporate and flight training.

- Plan and develop airport facilities to be environmentally compatible with their surroundings, minimizing the potential environmental impact to both on and off airport property.
- Encourage the protection of existing public and private investment in land and facilities, and advocate for the resolution of any potential land use conflicts.

Several alternatives addressing needed facilities were examined, including perhaps most notably the provision of a new passenger terminal building. Siting considerations and other long-term planning and space reservation factors that were considered in the passenger terminal building alternatives evaluation were:

- Accommodate a single-story building consisting of approximately 32,000 square feet.
- Accommodate a minimum of two airlines, including two gates/holdrooms and two parking positions for Boeing 737-800 aircraft.
- Allow for the development of vehicle parking accommodating the forecast passenger demand.
- Minimize the conflicts between commercial service and GA functions.
- Consider the impacts of the passenger terminal building improvements on existing buildings and infrastructure in the terminal area (e.g., continuation of existing commercial service operations during construction, Group Hangar 1, ARFF Facility, and Fixed Base Operator (FBO) facilities).
- Maximize use of the existing Terminal Ramp pavement, including consideration of providing Passenger Boarding Bridges (PBB) and ensuring the provision of commercial service aircraft parking positions and on-apron aircraft taxilanes.

Subsequent to the ATCT siting analysis contained in this Study, an FAA Tower Siting Study was conducted and a site nearly matching the parameters of Alternative Location One was evaluated and approved. Improvements to the SWO taxiway system, a taxiway re-naming study, FAA design standards, implementation of improved IAPs, and provision of additional OSU Flight Center facilities, GA hangars, large-scale aeronautical and non-aeronautical facilities were also addressed. This analysis result in the Conceptual Development Plan (CDP) presented in **Figure 2**.

IMPLEMENTATION

The Capital Improvement Plan (CIP) for airport development projects outlines the long-term development program for SWO and includes planning level cost estimates for each project. Airport improvement projects are addressed in the three phases to best incorporate funding mechanisms over time:

- **Phase I –** Short-Term (0-5 years)
- **Phase II –** Mid-Term (6-10 years)
- **Phase III –** Long-Term (11-20 years).

The primary objective of the Financial Implementation Analysis is to evaluate SWO's capability to implement, fund, and finance the CIP, airport operations, and maximize the potential to receive federal and state grant funds. The analysis includes development of a detailed Financial Implementation Plan that presents the

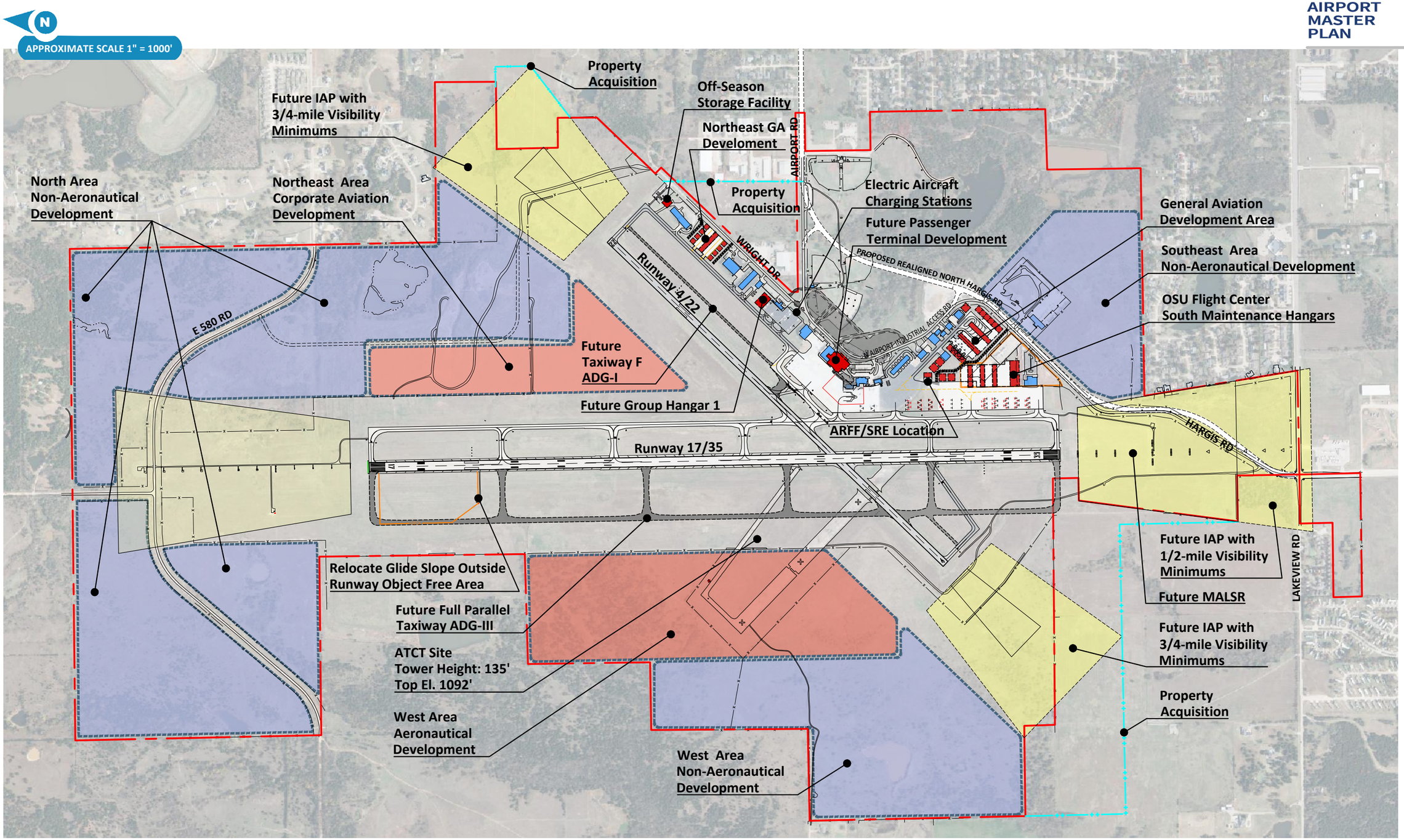


Figure 2:
Conceptual Development Plan

results of the implementation evaluation and provides practical guidelines for matching an appropriate amount and timing of financial sources with the planned use of funds.

Projects are placed in a specific phase based upon priority and available funding. Those projects with lower priorities are placed in later phases, but several projects can and will be phased over multiple years due to their funding needs or length to complete. **Tables 2**, **3**, and **4** provide the projects and costs in each phase of the development program.

Table 2: Phase I (1-5 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Year 1 (2023)		
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225
A.2	Design Terminal Building, Parking, and Utility Relocation	$1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	$100,000
A.4	Prepare ATCT EA	$200,000
A.5	Replace Two Primary Mower Apparatus	$30,000
2022	SRE Equipment – FY 22 Grant Carryover	$280,829
	Year 1 Totals	**$2,563,492**
Year 2 (2024)		
A.6	Construct New Group Hangar	$2,500,000
A.7	Design and Construct Terminal Building (Phase One), Including Demolition of Group Hangar #1	$19,000,000
A.8	Design and Construct Terminal Area Access Road and Parking Lots (Phase One)	$907,000
A.9	Crack Seal, and Re-Mark Taxiway A	$60,000
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	$200,000
	Year 2 Totals	**$22,667,000**
Year 3 (2025)		
A.11	Construct Terminal Building (Phase Two)	$1,500,000
A.12	Construct Terminal Area Access Road and Parking Lots (Phase Two)	$615,000
A.13	Construct One Corporate Hangar with Pavement	$2,213,000
	Year 3 Totals	**$4,328,000**
Year 4 (2026)		
A.14	Construct Terminal Building (Phase Three)	$1,400,000
A.15	Construct Terminal Area Access Road and Parking Lots (Phase Three)	$653,500
A.16	Replace Mower	$80,000
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35	$150,000
A.18	Construct Portions of Perimeter Road (Phase One)	$107,000
	Year4 Totals	**$2,390,500**
Year 5 (2027)		
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase One)	$10,888,889
A.20	Implement Airport Safety Management System (SMS)	$90,000
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	$5,349,000
A.22	Construct One 10-Unit T-hangar	$1,200,000
	Year 5 Totals	**$17,527889**
Subtotal Phase I		**$49,476,881**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Table 3: Phase II (6-10 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 6-10 (2028-2032)		
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase Two)	$1,000,000
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	$1,920,000
B.3	Demolish Existing ATCT	$40,000
B.4	Install Whole Airport Facility Back-Up Power Generator	$3,000,000
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and One 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	$1,178,000
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	$2,000,000
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	$7,576,000
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	$731,000
B.9	Install Comprehensive Airport Access Control System/Security Upgrades	$300,000
B.10	Construct Snow Removal Equipment (SRE) and Airport Maintenance Facility	$2,000,000
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	$1,200,000
B.12	Expand Terminal Parking Lots (Phase Two)	$317,000
B.13	Construct South GA Development Access Road	$611,000
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	$7,468,000
B.15	Runway and Taxiway Pavement Maintenance	$2,000,000
B.16	Construct One Corporate Hangar with Pavement	$2,213,000
B.17	Install Two Electric Aircraft Charging Stations	$416,000
B.18	Construct Two Box Hangars	$2,969,000
B.19	Construct Portions of Perimeter Road (Phase Two)	$446,000
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	$280,767
B.21	Rehabilitate Airport Drainage System	$500,000
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	$1,195,425
B.23	Acquire Airfield De-icing Vehicle	$500,000
Subtotal Phase II		**$39,861,192**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Table 4: Phase III (11-20 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 11-20 (2033-2042)		
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$800,000
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	$940,000
C.3	Relocate Taxiway F, Including CATEX or EA	$1,292,000
C.4	Expand Terminal Parking Lots (Phase Three)	$439,000
C.5	Runway and Taxiway Pavement Maintenance	$1,076,000
C.6	Construct One 10-Unit T-hangar with Pavement	$2,400,000
C.7	Construct Two Box Hangars	$2,969,000
C.8	Construct Two Corporate Hangars with Pavement	$4,406,000
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	$7,711,000
C.10	Construct Taxiway West of Runway 17/35, Including EA	$27,822,853
C.11	Runway and Taxiway Pavement Reconstruction	$20,000,000
C.12	Construct Portions of Perimeter Road (Phase Three)	$680,000
C.13	Update Airport Master Plan	$750,000
C.14	Purchase ARFF Vehicle	$1,000,000
Subtotal Phase III		**$72,285,853**
GRAND TOTAL		**$161,623,926**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

A. Inventory of Existing Conditions

INTRODUCTION

The purpose of this Master Plan Study (Study) is to formulate a long-term comprehensive development plan that meets the unique goals and objectives of Stillwater Regional Airport (SWO or the Airport). The Study will seek to address SWO's operational, maintenance, and improvement considerations, incorporate the City of Stillwater's priorities, enhance the natural environment, embrace land use compatibility considerations, improve SWO's fiscal viability, and comply with all relevant Federal Aviation Administration (FAA) requirements.

The foundation of any Study begins with a thorough review of an airport's pertinent background data, as well as a physical inventory of its airside, landside, and airspace components and facilities. Documenting SWO's existing conditions serves as the baseline for subsequent chapters of the Study. This chapter presents the five basic elements of SWO: airport facilities, the surrounding airspace system, the surrounding environs, the financial conditions, and a strategic evaluation.

Airport History

SWO was originally constructed in 1929 when the City of Stillwater acquired 239 acres of land north of town. The first runway was a half-mile grass strip and early airport facilities included a steel hangar and a wood-framed office. SWO formally opened on December 7, 1929. After many improvements, the U.S. Navy leased the Airport in 1942 and continued operation for an additional six months following the end of World War II.

In 1949, Oklahoma Agricultural and Mechanical College (forerunner of Oklahoma State University) took charge of the Airport, known as Searcy Field at the time, and operated the Airport for 25 years. Central Airlines offered the first commercial service in 1953, providing daily flights between Stillwater and Dallas. This service ceased in 1968 when Central merged with Frontier Airlines. Lone Star Airlines provided commercial service to Dallas, Memphis, and other cities beginning in 1984, but it ceased service in 1987.

The Airport was renamed Stillwater Municipal Airport in 1977 and the City of Stillwater resumed responsibility for operating the Airport in 1980. The Airport became known as Stillwater Regional Airport in 1999.

Airport Location and Vicinity

SWO is in the north-central portion of Oklahoma, approximately three miles northwest of the City of Stillwater within Payne County. Stillwater is approximately 50 miles north of Oklahoma City and 60 miles west of Tulsa. **Figure A-1** illustrates SWO's location within the state, and **Figure A-2** presents the location of SWO relative to the City of Stillwater and surrounding area.

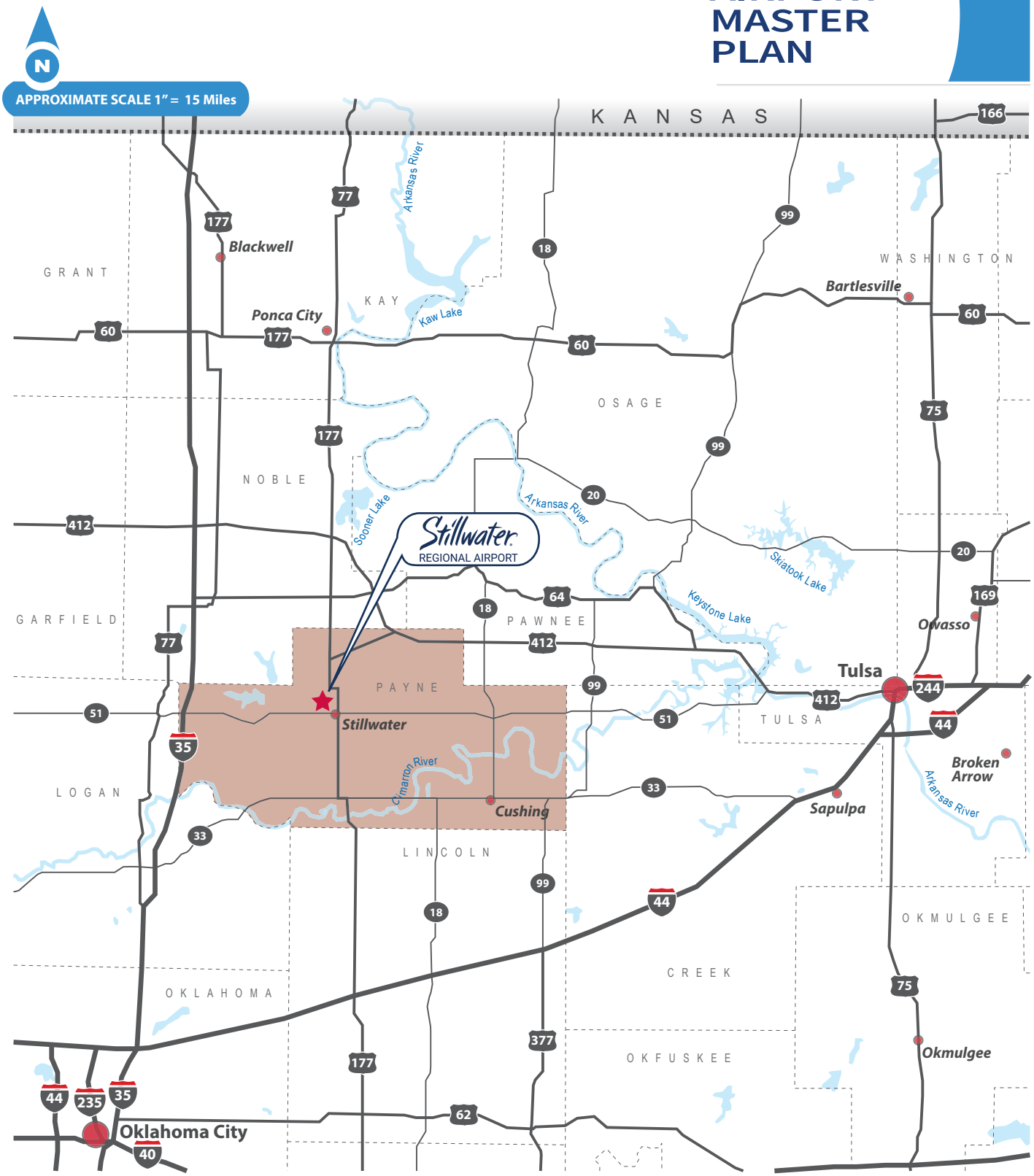
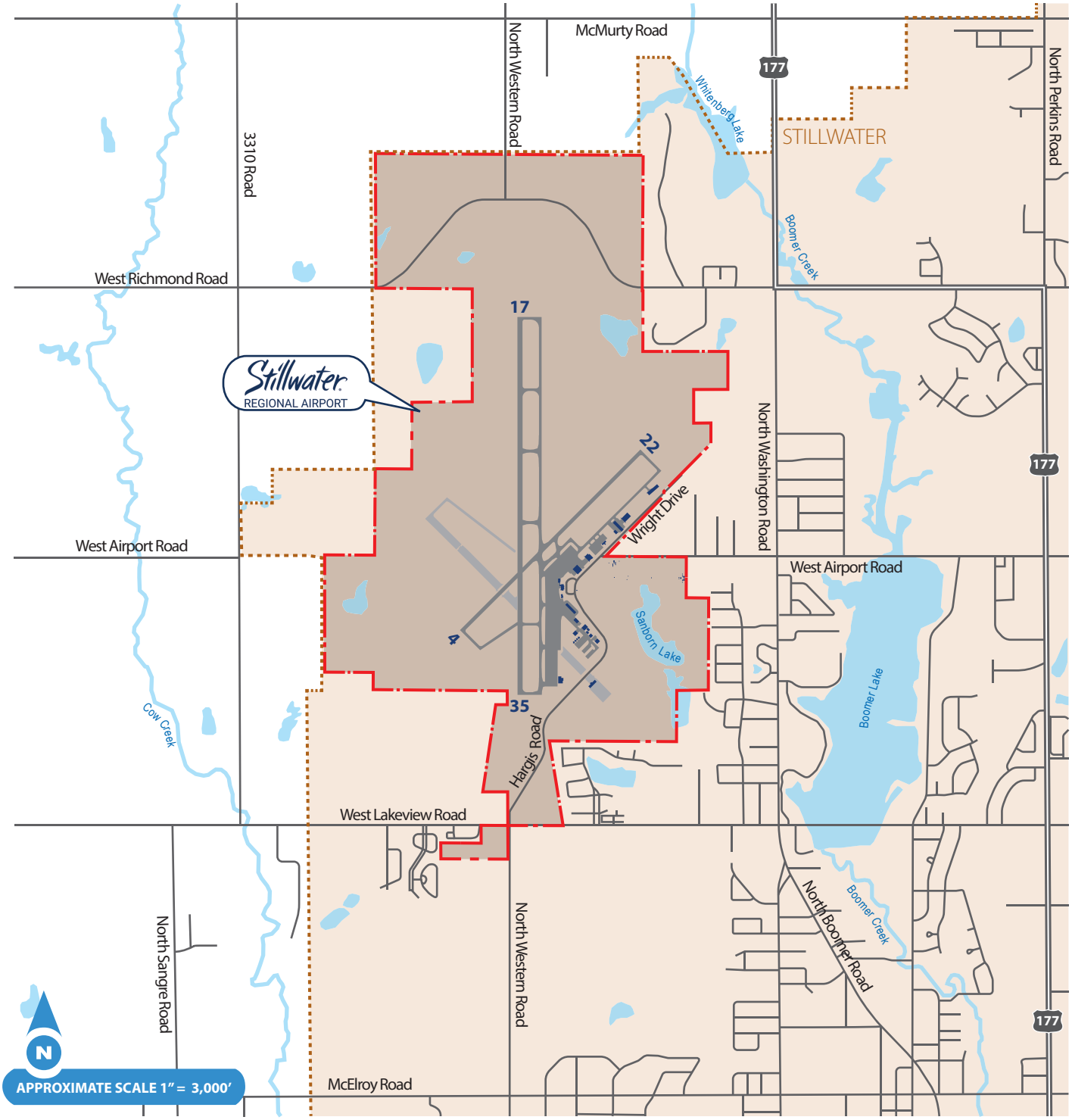


Figure A-1
Airport Location Map



Source: Google Maps, 2021 & City of Stillwater GIS.

Figure A-2
Airport Vicinity Map

SWO Stillwater REGIONAL AIRPORT

Airport Ownership Structure and Role

SWO is a public use airport owned and operated by the City of Stillwater. Within the City's government structure, SWO is in the Airport Department. The Stillwater Regional Airport Advisory Board (Board) has been established to act in an advisory capacity to the Stillwater City Council. The Board consists of five voting members appointed by the City Council who serve three-year terms. The City Manager and the Chamber of Commerce Chief Executive Officer serve as non-voting ex-officio members. According to the SWO website, the functions of the Board are:

- Annually review the schedule of airport rates and charges and make necessary recommendations regarding these items to the City Council for the upcoming Fiscal Year.
- Periodically review terms and conditions for standard airport leases and contract documents.
- Review airport ordinances, regulations, rules, standards, and operational policies as needed and make appropriate recommendations to the City Council.
- Direct planning activities for SWO and the establishment of the Airport Master Plan and present the same to the City Council for consideration and adoption.
- Study, review, analyze, and mark reports, findings, and recommendations to the City Council concerning the betterment of aviation within the City of Stillwater.
- Carry out other airport-related tasks assigned by the City Council.

An airport's role indicates the type of service it provides to the community and how it performs within the national and state airport systems. The FAA's National Plan of Integrated Airport Systems (NPIAS) 2021-2025 consists of 3,310 existing and proposed airports considered significant to national air transportation. As part of the NPIAS, SWO is classified as a nonhub primary airport. A primary airport is defined by statute as a public use airport receiving scheduled air carrier service with 10,000 or more annual enplaned passengers. Primary airports are divided into four categories based on the percentage of total U.S. passenger enplanements, with nonhub airports accounting for less than 0.05 percent of the total.

AIRPORT FACILITIES

SWO contains a variety of airside, landside, and support facilities that facilitate aircraft operations and passenger movement. Airside facilities are those in which aircraft, support vehicles, and equipment are located and in which aviation-specific operational activities take place. They consist of such components as airfield pavements, navigational aids, weather reporting equipment, lighting, and signage. Landside facilities are those designed to serve passengers or other airport users, typically located outside aircraft movement areas. They consist of such components as aircraft parking aprons, terminal buildings, and general aviation (GA) facilities. Support facilities are airport components such as Aircraft Rescue and Fire Fighting (ARFF) facilities and the Airport Traffic Control Tower (ATCT). **Figure A-3** graphically depicts the major airside facilities at SWO.

N SCALE 1" = 1,200'

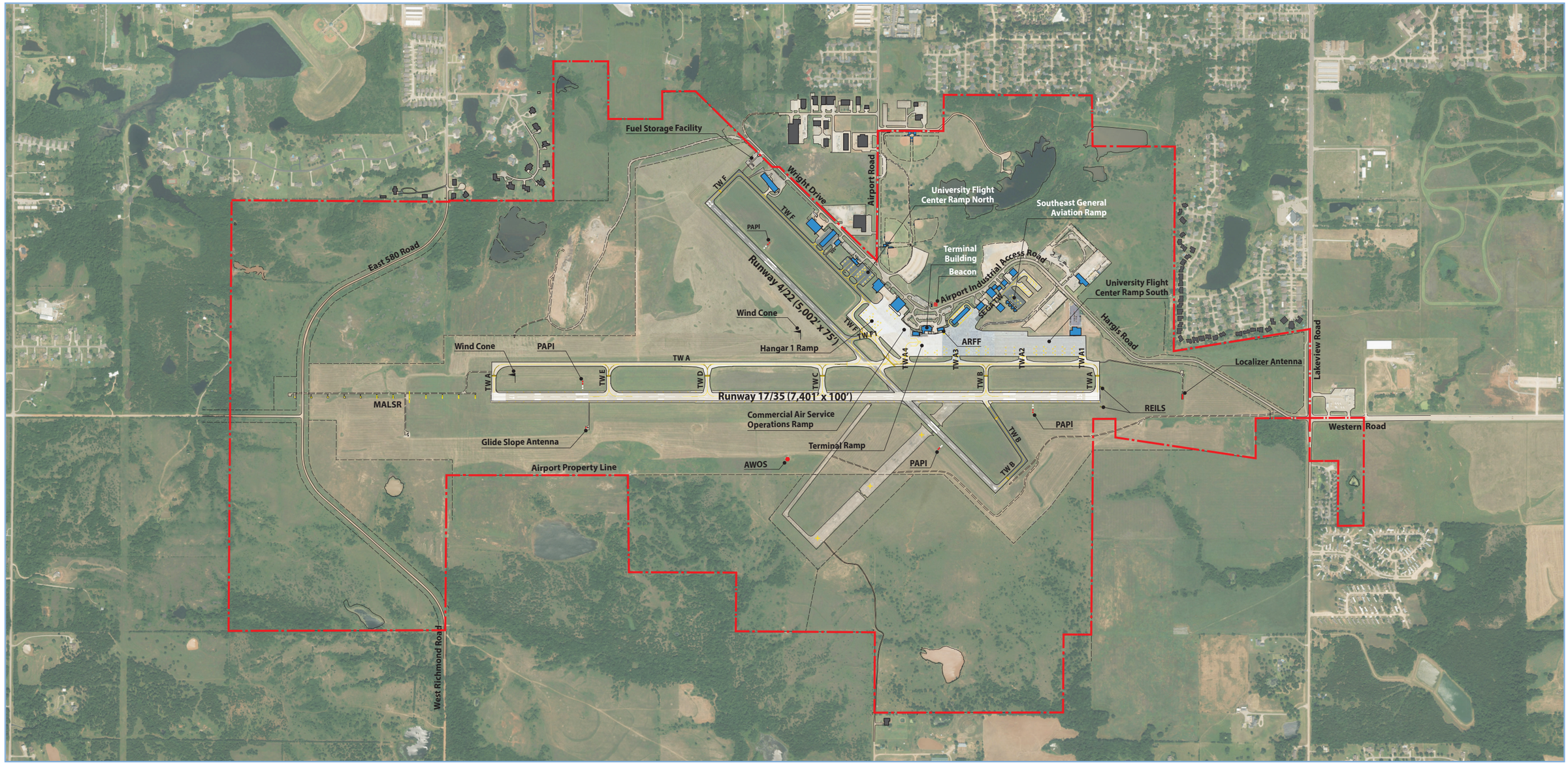


Figure A-3
Airport Facilities

Airside Facilities

Airfield Pavements

Airfield pavements consist of runways and taxiways. These pavements are the framework of an airport system, supporting and connecting aircraft activities to non-movement areas and landside facilities. A general description and condition of the existing airside pavements are provided below.

Pavement Strength

Pavement weight bearing capacity does not limit the size of aircraft that can use the pavement but does indicate the size of aircraft for which the pavement is designed. Continuous use of aircraft heavier than the designated weight-bearing capacity can result in increased pavement maintenance and lead to premature pavement failure requiring replacement. Current pavement strengths at SWO were listed in **Table A-1**.

Runways

SWO operates with two runways, the north-south oriented Runway 17/35, and the northeast-southwest oriented Runway 4/22. **Table A-1** summarizes the characteristics of both runways.

Table A-1: Existing Runways

Facility Component	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Length and Width	7,401' x 100'		5,002' x 75'	
Pavement Surface/Condition	Concrete – Good condition		Asphalt – Good condition	
Pavement Treatment	Grooved		None	
Pavement Strength	100,000 pounds Single Wheel (SW) 157,000 pounds Double Wheel (DW) 310,000 pounds Double Tandem Wheel		34,000 pounds Single Wheel (SW) 60,000 pounds Double Wheel (DW)	
Elevation	1,000.1'	965.8'	960.5'	984.6'
True Heading	179°	359°	45°	225°
Threshold Crossing Height	48'	26'	35'	39'
Visual Glide Path Angle	3°	3°	3°	3°

Source: Airport Master Record Form 5010, FAA.

Taxiways

SWO is equipped with one full-length parallel taxiway, one partial parallel taxiway, four entrance taxiways at each runway end, multiple exit taxiways, and a series of connector taxiways. **Table A-2** summarizes the taxiway characteristics at SWO, informed by the 2008 Airport Layout Plan (ALP).

Table A-2: Existing Taxiways

Taxiway Segment	Taxiway A	Taxiway A1	Taxiway A2	Taxiway A3
Type	Full Parallel/Entrance	Connector	Connector	Connector
Location	• 400 feet east of Runway 17/35 • Both Runways 17 and 35	Between Taxiway A and University Flight Center Ramp South at south end of Taxiway A	Between Taxiway A and University Flight Center Ramp South at north end of University Flight Center Ramp South	Between Taxiway A and Terminal Ramp at south end of Terminal Ramp
Width	50’	90’	90’	60’
Pavement Surface	Concrete	Concrete	Concrete	Asphalt
Edge Lighting	Medium Intensity (MITL)	MITL	MITL	MITL
Taxiway Segment	**Taxiway A4**	**Taxiway B**	**Taxiway C**	**Taxiway D**
Type	Connector	Entrance/Connector/Exit	Exit	Exit
Location	Between Taxiway A and Terminal Ramp at north end of Terminal Ramp	• Entrance to Runway 4 • Connector between Runways 4/22 and 17/35 • Exit at 1,385’ north of Runway 35	2,400’ north of the intersection of Runways 17/35 and 4/22	1,000’ north of the intersection of Runways 17/35 and 4/22
Width	100’	50’	55’	55’
Pavement Surface	Concrete	Asphalt/Concrete	Concrete	Concrete
Edge Lighting	MITL	MITL	MITL	MITL
Taxiway Segment	**Taxiway E**	**Taxiway F**	**Taxiway F1**	**Southeast GA Taxiway**
Type	Exit	Partial Parallel/Entrance	Exit/Connector	Connector
Location	1,425’ south of Runway 17	• 525 feet southeast of Runway 4/22 from Runway 22 to the Hangar 1 Ramp • 240’ feet southeast of Runway 4/22 from Taxiway A to the end of the Hangar 1 Ramp • Entrance to Runway 22	• 2,400’ southwest of Runway 22 • Between Taxiway F and Hangar 1 Ramp	Southeast of the Terminal Ramp
Width	50’	50’	50’	50’
Pavement Surface	Concrete	Concrete/Asphalt	Concrete	Asphalt
Edge Lighting	MITL	MITL	MITL	None

Source: Stillwater Regional Airport ALP.

Runway Protection Zones

A Runway Protection Zone (RPZ) is a trapezoidal area off the end of the runway designed to enhance safety for aircraft operations and for people and objects on the ground. **Table A-3** summarizes the Arrival and Departure RPZ information.

Table A-3: Existing Runway Protection Zone Dimensions

RPZ	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Approach RPZ	**Precision**	**Non-Precision**	**Visual**	**Visual**
Length	2,500’	1,700’	1,000’	1,000’
Inner Width	1,000’	1,000‘	500’	500’
Outer Width	1,750’	1,510’	700’	700’
Departure RPZ				
Length	1,700’	1,700’	1,000’	1,000’
Inner Width	500’	500’	500’	500’
Outer Width	1,010’	1,010’	700’	700’

Source: Stillwater Regional Airport ALP, 2009.

Pavement Marking, Lighting, and Signage

Airfield Marking

Runway markings are white and indicate the Instrument Approach Procedure (IAP) category for each runway threshold. Runways 17 and 35 have markings for precision approaches (i.e., an IAP provided with course and vertical path guidance with visibility minimums lower than 3/4 statute mile), although the Runway 35 precision approach has an IAP with visibility minimums not lower than 3/4 mile. Runways 4 and 22 have visual markings.

Airfield Lighting

Runway lighting systems enable aircraft to use the runways during periods of low visibility and assist in identifying the runway environment during instrument landings. Runway lights are white. Both Runways 17/35 and 4/22 are equipped with Medium Intensity Runway Lights (MIRL).

Approach lighting systems allow pilots to visually identify the runway environment and align the aircraft with the runway upon arriving at a prescribed point on an IAP. Runway 17 is equipped with a Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 35 is equipped with Runway End Identifier Lights (REILs). REILs are flashing strobe lights that help to identify runway ends during night and low visibility approaches.

Visual Glide Slope Indicators (VGSI) are ground-based visual aids that use lights to help pilots monitor their angle of descent during landing. All four runway ends have a four-box Precision Approach Path Indicator (PAPI) located on the left-hand side of the runway as seen by the pilot on approach.

Airfield Signage

FAA Advisory Circular 150/5340-18G, *Standards for Airport Signs Systems* (AC 5340-18G) states that airports with frequent turbojet aircraft operations shall include distance remaining signs. Both Runways 17/35 and 4/22 have distance remaining signs. The runway and taxiway signage facilities at SWO support the existing airfield operations, support IAPs, and comply with the airfield signage plan. The 2021 Part 139 commercial airport certification inspection found that several markings on Taxiway A were faded or damaged but have been remarked. No other deficiencies with markings, lighting, and signage were identified at SWO. **Table A-4** summarizes the airfield marking types, lighting equipment, and airside signage at SWO.

Table A-4: Markings, Lighting, and Signage Summary

Facility Component	Runway 17/35		Runway 4/22	
	Runway 17	Runway 35	Runway 4	Runway 22
Runway Markings	Precision – Good Condition	Precision – Good Condition	Basic – Good Condition	Basic – Good Condition
Aim Points	Yes		Yes	
Centerline	Yes		Yes	
Threshold Bars	Yes		No	
Edge Lines	Yes		No	
Touchdown Zone Markings	Yes		No	
Edge Lights	MIRL		MIRL	
Approach Lighting System	MALSR	No	No	No
Visual Approach Path Guidance	PAPI-4L	PAPI-4L	PAPI-4L	PAPI-4L
Runway End Identifier Lights	No	Yes	No	No
Runway and Taxiway Signage				
Distance Remaining Signage	Yes		Yes	
Runway Entry Hold Signs	Yes		Yes	
Taxiway Location Signs	Yes		Yes	
Taxiway Directional Signs	Yes		Yes	

Source: Airport Master Record Form 5010, FAA.

Airfield Grading and Drainage and Storm Water Management

The terrain at SWO is relatively flat (slopes of 1-5 percent) with overall drainage from north to south. Rainfall east of Runway 17/35 primarily drains to the southeast; rainfall west of Runway 17/35 drains to the southwest. SWO has a self-contained drainage system of swales, inlets, and culverts.

Landside Facilities

Aircraft Parking Aprons

SWO has six main aprons: the Terminal Ramp, the Commercial Air Service Operations Ramp, the Hangar 1 Ramp, the University Flight Center Ramp North, the University Flight Center Ramp South, and the Southeast General Aviation Ramp. **Table A-5** summarizes the aircraft parking aprons at SWO.

Table A-5: Existing Aprons

Item	Description
Terminal Ramp	• 113,600 square feet • Located west of the Terminal Building • One commercial service aircraft parking space • 9 Tie-down spaces
Commercial Air Service Operations Ramp	• 18,500 square feet • Located northeast of the Terminal Building • 6 Tie-down spaces
Hangar 1 Ramp	• 53,000 square feet • Located north of the Commercial Air Service Operations Ramp, northwest of Taxiway F • 15 Tie-down spaces
University Flight Center Ramp North	• 69,000 square feet • Located northeast of Hangar 1 Ramp • 20 Tie-down spaces
University Flight Center Ramp South	• 310,000 square feet • Located south of the Terminal Ramp • 51 Tie-down spaces
Southeast General Aviation Ramp	• 30,000 square feet • Located southeast of the Terminal Ramp • 8 Tie-down spaces

Source: SWO Ultimate Aircraft Parking Plan (March 2020).

Tenant Building and Ground Facilities

This section describes the existing tenant buildings and ground facilities, entrance roadways, access points, vehicle circulation, truck routes, service and perimeter roadways, property interests, emergency response, utilities, wildlife hazards, and perimeter security. **Table A-6** lists the buildings and square footage of each facility. **Figure A-4** depicts the layout and locations of major facilities.

Table A-6: Tenant Buildings and Ground Facilities

Description	Square Feet
Administration Building	2,470
Cowboy Hangar	5,745
Hangar 10	6,000
OSU Flight Center (Old)	3,100
OSU Flight Center (Existing)	16,000
Group Hangar 1	17,082
Group Hangar 2	12,212
Airport Operations and Maintenance	6,392
LBR, Inc. Office/Hangar	3,900
OSU Maintenance Hangar	16,500
Port-A-Ports	4,375
Rock Hangar	7,700
Detwiler Hangar	3,682
T-Hangar 1	12,470
T-Hangar 2	13,750
Waits Holding Hangar	10,160
Waste Management Building/Facility	10,170 (8.06 acres)

Administration Building

The administration building is owned by the City of Stillwater. The building is between Airport Industrial Access Road and the Southeast GA Taxilane and is a total of 2,400 square feet. The building is roughly ten years old and is in good condition.

Cowboy Hangar

The Cowboy Hangar is currently owned by Oklahoma State University (OSU) and is near the intersection of the Terminal Ramp and the Southeast GA Taxilane. This hangar has a contractual reversion to the City of Stillwater that is effective during the 2060s. The Cowboy Hangar has a total of 5,740 square feet and retains its structural stability.

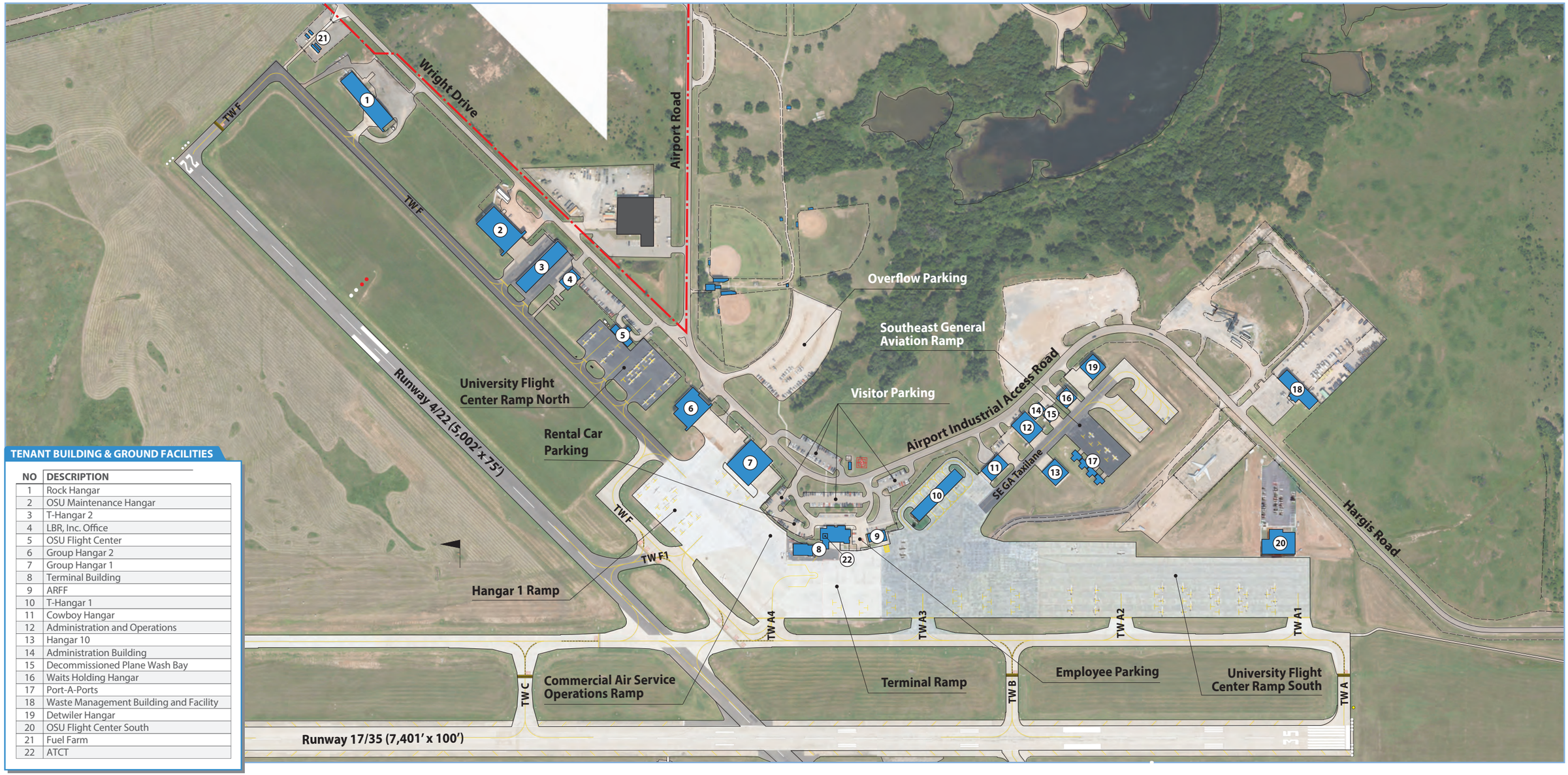
Hangar 10

Hangar 10 is currently owned by Simmons with a contractual reversion to the City of Stillwater. Hangar 10 is southwest of the Southeast GA Taxilane opposite the Cowboy Hangar. The Simmons Hangar is in excellent condition and consists of 6,000 square feet.

Group Hangar 1

Group Hangar 1 is owned by the City of Stillwater. The hangar is just northeast of the terminal building. Business activity here includes the office and hangar use for both Hangar 1 Flight School and Quality Aircraft Maintenance. At 70 to 80 years old, the structure remains structurally sound, but the exterior needs repairs and upgrades. The space is a total of 17,082 square feet and is scheduled for demolition in the Summer of 2024 for construction of the new termina building.

N APPROXIMATE SCALE 1" = 400'



TENANT BUILDING & GROUND FACILITIES

NO	DESCRIPTION
1	Rock Hangar
2	OSU Maintenance Hangar
3	T-Hangar 2
4	LBR, Inc. Office
5	OSU Flight Center
6	Group Hangar 2
7	Group Hangar 1
8	Terminal Building
9	ARFF
10	T-Hangar 1
11	Cowboy Hangar
12	Administration and Operations
13	Hangar 10
14	Administration Building
15	Decommissioned Plane Wash Bay
16	Waits Holding Hangar
17	Port-A-Ports
18	Waste Management Building and Facility
19	Detwiler Hangar
20	OSU Flight Center South
21	Fuel Farm
22	ATCT

Figure A-4
Landside Facilities

Group Hangar 2

Group Hangar 2 is owned by the City of Stillwater. The hangar is between Taxiway F and Airport Road just northeast of Group Hangar 1 and southwest of the existing OSU Flight Center. Group Hangar 2 business activity includes the hangar space and mechanic shop for Stillwater Aircraft Services. Group Hangar 2 is also 70 to 80 years old and requires exterior updates. This hangar provides 12,212 total square feet.

Airport Operations and Maintenance

The Airport Operations and Maintenance building is owned by the City of Stillwater. The hangar is directly south of the Cowboy Hangar and north of the Administration Building. This building is structurally sound, only limited exterior needs have been identified, and it consists of 6,392 total square feet.

LBR, Inc. Office/Hangar

The LBR, Inc. office/hangar is currently owned by LBR with a contractual reversion to the City of Stillwater. The building is between Taxiway F and Wright Drive south of T-Hangar 2 and north of the OSU Flight Center (Existing). The structure is in fair condition and is approximately 3,900 square feet.

OSU Flight Center (Old)

The old OSU Flight Center is owned by the City of Stillwater and is on Wright Drive near the intersection of West Airport Road and Wright Drive. This structure provides 3,100 square feet of space.

OSU Flight Center (Existing)

The existing OSU Flight Center is at the south end of the airfield near the approach end of Runway 35, just east of Taxiway A. The center is currently owned by OSU with a contractual reversion to the City of Stillwater. The center provides a total of 16,016 square feet.

OSU Maintenance Hangar

The OSU Maintenance Hangar is between Taxiway F and Wright Drive north of T-Hangar 2. The hangar is currently owned and operated by OSU with a contractual reversion to the City of Stillwater, which is expected to occur upon completion of the new OSU Flight Center. The hangar is used to perform maintenance on and store OSU aircraft. The hangar is structurally sound and is 16,500 square feet in total.

Port-a-Port Hangars

The Port-a-Port hangars are owned by the City of Stillwater and are south of Hangar 10. By design, Port-a-Port hangars are not long-term structures, and their current location is on the site of future hangar development. In total the space is a combined 4,375 square feet spread among four structures.

Rock Hangar

The Rock Hangar is at the northeast end of Taxiway F and is owned by the City of Stillwater. The Hangar is currently used by RPX Technology for aircraft storage; the City of Stillwater uses the Hangar for miscellaneous storage, including Emergency Management Equipment. Needed upgrades include electrical, water, and sewer systems. The total space provided is 7,700 square feet.

Detwiler Hangar

The Detwiler Hangar is currently owned by Alex Detwiler with reversion back to the City of Stillwater. The hangar is south of the Waits Holding Hangar and east of the SE GA Taxilane. The hangar is in excellent condition with no needs. Its total space is 3,682 square feet.

T-Hangar 1

Containing the corporate office for the Stillwater Flight Center, the Fixed Base Operator (FBO) serving SWO, this hangar is owned by the City of Stillwater and is over 40 years old. The total space this t-hangar provides is 12,470 square feet and 10 individual storage units. The hangar is south of the ARFF facility near the intersection of the Terminal Ramp and the Southeast GA Taxilane.

T-Hangar 2

Owned by the City of Stillwater, this hangar is over 40 years old and is structurally in fair condition with recent rehabilitation. The total space it provides is 13,750 square feet and 10 individual storage units. The hangar is between Taxiway F and Wright Drive, roughly at the halfway point of Taxiway F.

Waits Holding Hangar

The Waits Holding Hangar is currently owned by Waits with reversion back to the City of Stillwater in six years. This hangar is in excellent condition and provides 10,160 square feet of total space. The hangar is east of the Southeast GA Taxilane just south of the Airport Administration Building.

Waste Management Building and Facility

This facility is currently owned by the City of Stillwater and leases the facilities to Waste Management. This is an older building that has been well maintained. The building provides is 10,170 square feet of space and the overall site consists of just over 8 acres. The building is the southernmost facility south of North Airport Industrial Access Road (recently renamed as Hargis Road).

FAA Airfield Facilities

SWO's lease with the FAA includes five facilities: the MALSR, the Localizer/Distance Measuring Equipment (LOC/DME), the Glideslope antenna, the Remote Communications Outlet (RCO), and the Automated Surface Observation System (ASOS). The leases include facility sites, equipment shelters, restricted critical areas, access roads, a sensor group site, and Aircraft Cooling Unit (ACU) space in the terminal building.

Hay and Pasture Lease

Within and around SWO property, vacant property is leased for hay and pasture that consists of a total of 1,215 acres and 13 different tracts. The leased properties are spread in and around SWO among undeveloped parcels. The lease is for an initial five-year period, and the parties have the option to extend the lease for one additional five-year period by written agreement of the parties prior to expiration of the initial term.

Terminal Building

Historically the terminal building has served both commercial airline passengers and general aviation activity, including FBO facilities. The terminal building was originally constructed and put into operation in 1952. The building has been extensively altered and remodeled several times over the past seven decades. Commercial passenger flights serving Stillwater started in April 1953 with daily flights to Dallas by Central Airlines (later Central merged with Frontier airlines). Other airlines serving SWO through the mid-1980s included Metro Airlines, Lone Star Airlines, and Exec Express. From the mid-1980s to 2016, SWO had no scheduled airline service. American Airlines began operation in August 2016 with service to Dallas/Fort Worth International Airport (DFW). This service continues today.

Terminal Building Facilities

The terminal building is on the east side of Runway 17/35, south of the runway's mid-point. The first floor of the terminal building contains commercial passenger facilities consisting of ticketing, bag claim, checked bag screening, non-secure arrival/departure waiting areas, airline, and Transportation Security Administration (TSA) offices and restrooms. In addition, the first floor contains FBO facilities, including service counter/dispatch, pilot's flight planning room and ready room/rest areas. The total area of the first floor is approximately 7,200 square feet, with approximately 1,000 square feet being used for FBO/GA facilities and the remainder being primarily focused on commercial passenger facilities.

The first floor of the terminal building was extensively remodeled in preparation for the beginning of American Airline service in 2016. This included the construction of a modular building to accommodate TSA passenger screening facilities, along with a secure passenger waiting area. The modular building, which is just to the northwest of the terminal building, has a total floor area of approximately 2,700 square feet. The use of the terminal building spaces is illustrated in **Figure A-5**.

SCALE 1" = 20'

Source: McFarland Architects.

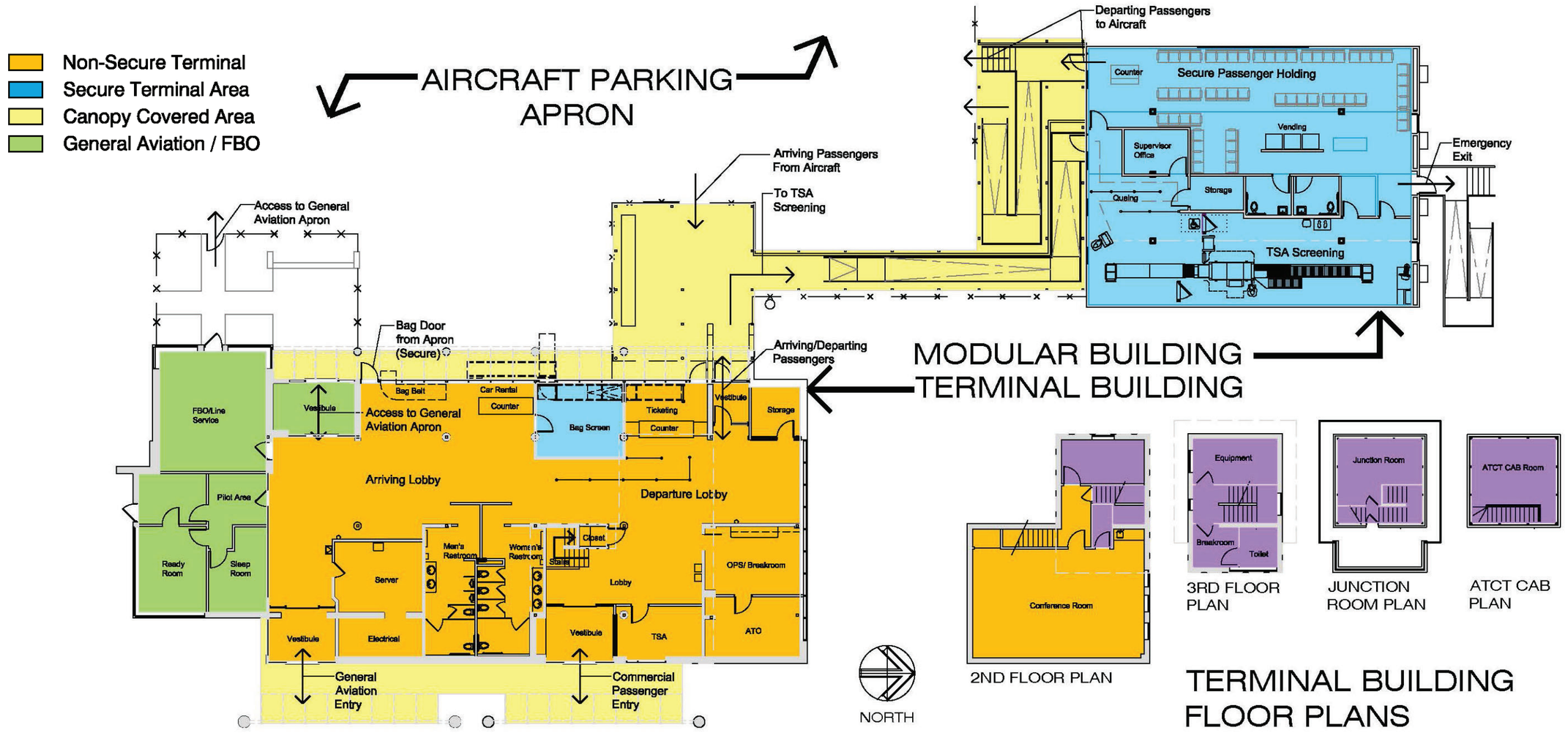
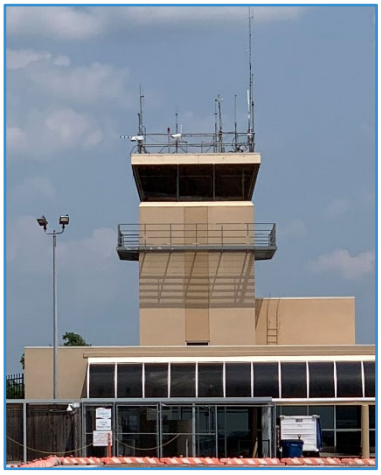


Figure A-5
Terminal Building Floor Plans



The terminal building also has a second-floor conference room (approximately 1,000 square feet), a third floor Airport Traffic Control Tower (ATCT) office, and a top floor containing the ATCT cab (total ATCT area is approximately 600 square feet). The ATCT is operational from 8:00 a.m. to 10:00 p.m. Central Standard Time (CST).

Aircraft Rescue and Fire Fighting (ARFF) Facility

SWO currently maintains an ARFF Index B classification, meaning that the largest aircraft to regularly depart the airport an average of five times daily is longer than 90 feet but shorter than 126 feet. Commercial passenger aircraft regularly operating at SWO fit into this category. Some longer models such as the Boeing 737-800 and Airbus A321, used by Oklahoma State University and visiting university football teams, are ARFF Index C, meaning their length is at least 126 feet, but less than 159 feet. SWO will provide Index C services with prior arrangement.

The ARFF facility at SWO is south of the terminal building. The facility is comprised of one vehicle bay staffed on-demand for scheduled and non-scheduled commercial flights. An additional bay is leased in tandem with the adjoining apartment that serves as the residence of the FBO manager. **Table A-7** lists the ARFF equipment at SWO.

Table A-7: ARFF Vehicles

Equipment	Year	Water (gal)	Dry Chem (lbs)	AFFF[1] (lbs)
Oshkosh T-1500	2000	1,500	500	210
Ford F350 (with skid)	2002	-	500	-
Rosenbauer Class 4 Panther 4x4 Unit	2021/22	1,500	500	200

Source: Stillwater Regional Airport personnel.

Note: [1]AFFF (Aqueous Film Forming Foam).

Fuel Storage Facilities

The SWO fuel storage facility is southeast of Runway 22. The facility consists of three aboveground tanks owned and operated by SWO. There are two 12,000-gallon Jet A fuel tanks and one 20,000-gallon AVGAS tank. Stillwater Flight Center operates two 3,000-gallon Jet A fuel delivery trucks, one 1,200-gallon and one 1,000-gallon AVGAS fuel delivery trucks.

Snow Removal and Airport Maintenance

SWO does not currently have a dedicated Snow Removal Equipment (SRE) facility; SWO stores equipment indoors and outdoors where space is available. Limited indoor equipment storage space is used in the

Operations Center (Hangar 3). SWO staff use SRE to clear the runways, taxiways, and aprons during snowfall events. **Table A-8** lists the SRE equipment at SWO.

Table A-8: SRE Equipment

Equipment	Year
Blizzard Buster 3616 tow-behind broom	1988
Blizzard Buster 3616 tow-behind broom	1988
Wylie 800-gallon agricultural sprayer	2019
Snow Dog Plow 9-foot truck mounted	Unknown
Tractor-mounted 12-foot snow pusher box	Unknown

Source: Stillwater Regional Airport personnel.

Vehicle Access, Parking, and Circulation

Entrance Roads

SWO is accessible by vehicle, truck, and bus. Primary access to SWO is provided by West Airport Road and North Hargis Road. West Airport Road is oriented east and west, intersecting with North Washington Street to the east and Airport Industrial Access Road to the west. North Hargis Road is oriented north and south and connects the intersection of Western Road and Lakeview Road on the south to the intersection of Airport Industrial Access Road to the north. Wright Drive provides access to the GA hangars, existing OSU Flight Center, OSU Maintenance Hangar, and Fuel Farm east of Taxiway F via its intersection with West Airport Road.

Public transportation is provided by the OSU/Stillwater Community Transit System. Bus routes are operated within the Stillwater City Limits and on the OSU Campus for a small fee. The Blue Route travels to SWO Monday through Friday beginning at 6:20 a.m. and ending at 7:00 p.m.

Parking Facilities

Free short-term and long-term parking is available at SWO. This includes two primary lots, one on either side of Hargis Road: a 50-space lot to the west of the road and a 43-space lot to the east. An unpaved overflow lot is located to the east adjacent to the ballfields in Sanborn Lake Park and Sports Complex. An additional 52-space parking lot is located to the northeast of the terminal building, and a 23-space lot is located to the southeast of the terminal building. Employee parking is provided immediately south of the terminal building and east of the ARFF buildings.

Parking provided along the curb in front of the terminal building is allowed only for loading and unloading. Vehicles must be accompanied at all times in this area. Vehicles left unattended are subject to ticketing and towing. Parking is available in the lot directly across from the terminal building. Handicap accessible drop off is provided just east of the curbside drop off spaces east of the terminal building.

Enterprise and Avis car rentals are available at SWO with prior reservations. Hertz has an office in the terminal building and provides customer service during regular business hours. There are 34 designated rental car spaces along the east side of the lot north of the main lot. Uber and Lyft are also available at SWO.

Access Points

All access points at SWO are required to be controlled and monitored. There are currently airport restricted area vehicle access control points at SWO along Airport Industrial Access Road, Airport Road, Wright Drive, and Hargis Road. Of those, there are a mix of access-controlled gates and lock and key gates. Most SWO restricted area pedestrian gates and doors are access controlled, some are lock and key controlled.

Vehicle Circulation

Vehicle circulation is conducted on Hargis Road, Airport Industrial Access Road, Airport Road, and Wright Drive. All employees, tenants, and any other ground operators have access to these roads and the entrances provided. Currently roadway circulation improvement plans are in progress to realign Hargis Road to locate it further east of the terminal building. Once Hargis Road is relocated, the existing roadway will be utilized as an access and entrance road and will connect to the relocated Hargis Road at two locations.

Truck Routes

Trucks headed east-west may depart SWO to the south via Hargis Road. Hargis Road eventually becomes North Western Road, which then merges with Highway 51 two miles to the south. Northbound and southbound trucks use West Airport Road heading east to North Washington Street. Trucks can then proceed north along North Washington Road for one mile before reaching State Highway 177.

Service and Perimeter Roads

SWO has service roads accessing the navigational and electronic equipment on the airfield. The service road network is comprised of paved and unpaved surfaces. Parts of airport property do not have a dedicated, paved service road, so communication with the ATCT is necessary when using taxiways and runways by ground vehicles. Service roads that may interfere with aircraft operations also require communication with the ATCT. SWO lacks a full perimeter road surrounding the airfield, and SWO remains inaccessible from the west.

Airport Property Interests

Currently SWO owns 1,487 acres of land in fee simple and 0.7 acres controlled through an easement. A breakdown of these areas is presented in **Table A-9**. The 2008 ALP identifies 242.9 acres for future acquisition that is still unacquired. The easement is located just south of Lakeview Road.

Table A-9: Airport Property Interests

Tract	FAA Project Number	Interest	Acres
1	Original Airport	Fee Simple	955.0
2	FAA #9-34-050-C6C3	Fee Simple	38.0
3a	ADAP #8-40-0090-02	Fee Simple	26.8
3b	NON - FAA	Fee Simple	8.4
4	-	Fee Simple	79.6
5	-	Fee Simple	24.0
6	-	Fee Simple	9.9
7	-	Fee Simple	11.9
8	ADAP #5-40-0090-05/06-07	Fee Simple	9.2
9	ADAP #5-40-0090-05/06-07	Fee Simple	4.2
10	-	Fee Simple	3.9
11	AIP 3-40-0090-012-2002	Fee Simple	14.3
12	AIP 3-40-0090-013-2003	Fee Simple	127.2
13a	AIP 3-40-0090-013-2003	Fee Simple	38.1
13b	AIP 3-40-0090-014-2003	Fee Simple	110.5
B	-	Fee Simple	26.0
E1	ADAP #5-40-0090-05/06-07	Easement	0.7

Source: Airport Property Map by Barnard Dunkelberg & Company, 2008. SWO staff.

Utilities

The major utility systems at SWO include water, sanitary sewer, stormwater drainage, electric, natural gas, and communications.

Water

Water to SWO is supplied by the City of Stillwater. The City's water source is Kaw Lake north of Stillwater. The water system consists of 2-, 6-, and 12-inch lines.

Sanitary Sewer

The City of Stillwater Public Works Department operates and maintains the sanitary sewer system surrounding SWO. A 6-inch pipe is located along the south side of Lakeview Road. A few various stretches of sanitary sewer extend north according to the City of Stillwater Atlas. An 8-inch line runs along the east side of North Hargis Road beginning at the Stillwater Water and Wastewater Maintenance Building. This line extends roughly 500 feet then crosses under the road to the west servicing all the major SWO buildings.

Stormwater

Rainfall at SWO is collected by sheet flow, area inlets, or culverts from the airfield and conveyed to tributaries of Cow Creek to the west and Sanborn Lake or Hazen Lake to the east. All the rainfall that does not infiltrate the ground or evaporate will eventually flow to Stillwater Creek on the south side of the City of Stillwater.

Electric

Electric service at SWO is provided by the City of Stillwater, referred to as Stillwater Utilities Authority (SUA). Overhead electric lines supplying SWO are primarily from Airport Road to the east and Lakeview Road to the

south. Several overhead and underground facilities run throughout the area supplying power to buildings, hangars, and streetlights.

Natural Gas

Oklahoma Natural Gas provides service to SWO. An existing 4-inch steel line is located on the north side of Lakeview Road in an east-west direction. Existing gas lines also run along the north end of SWO property connecting all the major buildings.

Telephone/Fiber Optic Communications

Data and voice communication lines run along Lakeview Road and North Hargis Road. Communication services are provided by AT&T, Chickasaw Telecom, and Sudden Link.

Perimeter Fencing and Gates

SWO's airfield is surrounded by an 8-foot perimeter fence. Security gates provide access to airside uses including the hangars, OSU facilities, and controlled movement areas of the airfield. Additional gates to the north and south provide access to either end of Runway 17/35.

Wildlife Hazards

Wildlife strikes by birds and other animals are the most significant wildlife hazards faced by an airport. While no habitats or significant congregations of any animal exist on SWO property, wildlife management practices should be followed to minimize wildlife strikes. **Threatened and Endangered Species** discusses in further detail the wildlife found on or near SWO.

AIRSPACE, NAVIGATIONAL AIDS (NAVAIDS), AND COMMUNICATIONS

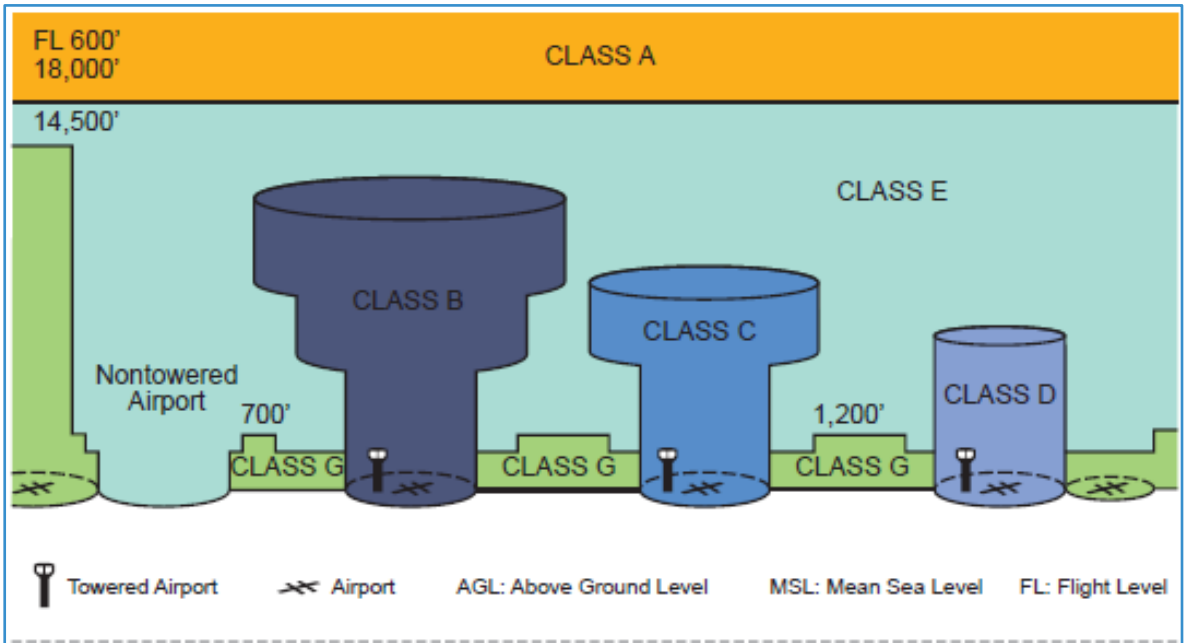
Airspace

SWO functions as all airports do within the National Airspace System (NAS). The NAS consists of various classifications of airspace regulated by the FAA. Airspace is either controlled or uncontrolled. Pilots flying in controlled airspace are subject to Air Traffic Control (ATC) and must follow either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) requirements. These requirements include combinations of operating rules, aircraft equipment and pilot certification, and vary depending on the class of airspace. A graphical representation of the different airspace classes is shown in **Figure A-6**. General definitions of the classes of airspace are provided below:

- **Class A Airspace -** Airspace from 18,000 feet Mean Sea Level (MSL) up to and including flight level (FL) 600, or approximately 60,000 feet MSL.
- **Class B Airspace -** Airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements.
- **Class C Airspace -** Generally, airspace from the surface to 4,000 feet above the airport elevation (MSL) surrounding those airports that have an ATCT.

- **Class D Airspace -** Airspace from the surface up to 2,500 feet above the airport elevation (MSL) surrounding those airports with an ATCT.
- **Class E Airspace -** Generally, controlled airspace that is not designated Class A, B, C or D.
- **Class G Airspace -** Generally, uncontrolled airspace that is not designated Class A, B, C, D, or E.
- **Victor Airways -** These airways are low altitude flight paths between ground-based Very High Frequency (VHF) Omni-Directional Range receivers (VORs).

Figure A-6: Airspace Classes



Airspace Class	Communication with Air Traffic Control (ATC)	Entry Requirements	Seperation Services	Special VFR in Service Area
A	Required for All Operations	ATC Clearance	All	N/A (No Surface Area)
B	Required for All Operations	ATC Clearance	All	Yes
C	Required for All Operations	Two-way Communications Required Prior to Entry	VFR/IFR	Yes
D	Required for All Operations	Two-way Communications Required Prior to Entry	Runway Operations	Yes
E	Required for All Operations	Required for IFR Operations	Required for IFR Opeartions Only	Yes
G	Not Required	None	None	N/A (No Surface Area)

SWO is situated under Class D airspace during the ATCT's operational hours from 8:00 a.m. to 10:00 p.m. CST. The Class D airspace begins at the surface and extends to 2,500 feet above the airport elevation (charted in MSL). Aircraft operating within Class D airspace are required to establish communications with the ATCT. There are extensions of the Class D airspace to accommodate instrument approaches into SWO. When the ATCT is not operational, the Class D airspace is reclassified as uncontrolled Class G. Aircraft can continue to operate at SWO when the ATCT is closed and the airspace is uncontrolled, but pilots are expected to announce their positions and intentions to other aircraft on the ATCT radio frequency known as the Common Traffic Advisory Frequency (CTAF). The traffic patterns at SWO are standard left-hand traffic for all runways. Traffic Pattern Altitude (TPA) is the standard 1,000 feet above ground level (AGL). A depiction of the airspace and other elements surrounding SWO is found on the VFR sectional chart as shown in **Figure A-7**.

Air Traffic and Aviation Communications

Air Route Traffic Control Centers (ARTCC) are responsible for providing navigational assistance in 22 geographic areas to aircraft en route along airways and other portions of airspace. SWO is within the Kansas City ARTCC coverage area operating on frequency 127.8. Airports in parts of Oklahoma, Kansas, Missouri, and Texas are also under the Kansas City ARTCC jurisdiction.

Aviation communications facilities associated with SWO include the CTAF frequency 125.35, a Universal Communications (UNICOM) frequency 122.95. The SWO ATCT frequency is 125.35 and Stillwater Ground Control is frequency 121.6.

Navigational Aids (NAVAIDs)

NAVAIDs provide guidance and positional information to aircraft. NAVAIDs include ground-based radio beacons, satellite-based Global Positioning System (GPS) signals, signage, marking, and lighting systems. NAVAIDs can transmit weather and airport operational information to en route aircraft and allow pilots to operate during periods of poor visibility.

SWO is served by a ground based VOR collocated with Distance Measuring Equipment (DME) (VOR/DME SWO 108.4) that is located approximately 3 ½ miles to the north. The FAA owns the VOR/DME, which guides the non-precision IAPs to Runways 17 and 35. The VOR/DME also serves as a NAVAID identifying airway intersections for aircraft en route along low altitude airways.

Runway 17 is equipped with an Instrument Landing System (ILS) that comprises two components working together to guide precision instrument approaches. The ILS localizer antenna is installed 1,000 feet south of Runway 35 and provides final course guidance. The Glideslope antenna, providing vertical guidance on the descent path, is located approximately 1,170 feet south of Runway 17 and 375 feet west of the runway centerline.

Figure A-7: NAVAIDS Map

Source: FAA Wichita, Kansa City, and Dalla – Ft. Worth Aeronautical Charts.

SWO is also equipped with an ASOS, a rotating beacon, and a wind indicator. The ASOS is located approximately 3,560 feet south of Runway 17 and 750 feet west of the Runway 17/35 centerline. The ASOS broadcasts weather and wind data on frequency 133.725. The rotating beacon is located east of the terminal building, east of Hargis Road. SWO has three wind cones, two east of Runway 17/35, one near Runway 17

and the other near the intersection of Runway 4/22 and Taxiway A, and one on the southwest side of Runway 17/35.

Instrument Approach Procedures

SWO has three precision and two non-precision IAPs providing for the orderly transfer of aircraft from the beginning of the initial approach to landing. Runway 17 is equipped with an ILS approach, a satellite-based Area Navigation (RNAV) GPS approach, and a ground-based VOR approach. Runway 35 is equipped with a RNAV (GPS) approach and a VOR/DME approach. Runway 4/22 is a visual approach only runway. IAPs are categorized by aircraft approach speed and by the visibility and altitude to which an aircraft can follow the approach until the pilot can execute the landing. **Table A-10** lists SWO's IAPs.

Table A-10: Instrument Approaches and Lowest Minimums

Runway End	Procedure	Procedure Type	Aircraft Categories	Minimum Descent Altitude (Feet AGL)	Visibility Minimums (Statute Mile)
17	ILS	Precision	A, B, C, D	200	1/2
17	RNAV (GPS)	Precision	A, B, C, D	200	1/2
35	RNAV (GPS)	Precision	A, B, C, D	200	3/4
17	VOR	Non-Precision	A, B, C	460	3/4
			D	460	1
35	VOR/DME	Non-Precision	A, B	414	1
			C, D	414	1-1/4

Source: FAA published Instrument Approach Procedures.

EXISTING LAND USE, ZONING, AND PUBLIC INFRASTRUCTURE

An inventory of existing zoning, land uses, and various land use planning and control mechanisms used to guide property development surrounding SWO is an important element in the airport planning process. Land use compatibility with airport development is achieved through knowledge of what land uses are proposed and what, if any, changes need to be made.

Existing Zoning

SWO property is currently zoned as Public (P), Light Industrial (IL), and University (U) under the City of Stillwater. IL zoning encompasses the industrial development areas east of Hargis Road and north of West Airport Road. The OSU Research Range Airport Pasture, located on the southwestern edge of the property, is zoned U, and all remaining land is zoned P.

Surrounding property zoning includes a mixture of residential, commercial, industrial, university, and public land uses as defined by the City of Stillwater:

- **Residential –** Small Lot Single-Family Residential (RSS) provides the bulk of residential zoning around SWO, with significant single-family housing located southwest, southeast, and east of SWO. Other higher density zones, such as Two/Multi-Family Residential (RTM) are scattered amongst the RSS zoning.
- **Commercial –** Similar to residential, commercial zones are found south, southeast, and east of SWO. Most commercial uses are located along North Boomer Road and US-177 to the southeast.

- **Industrial –** Industrial zones are located directly east of SWO.
- **University –** OSU owns a significant portion of the land south of SWO.
- **Public –** Additional public zones located east of SWO are Boomer Lake Park and the Lakeside Memorial Golf Course.

The existing zoning is provided in **Figure A-8**. Only zoning directly attributed to the City of Stillwater is shown.

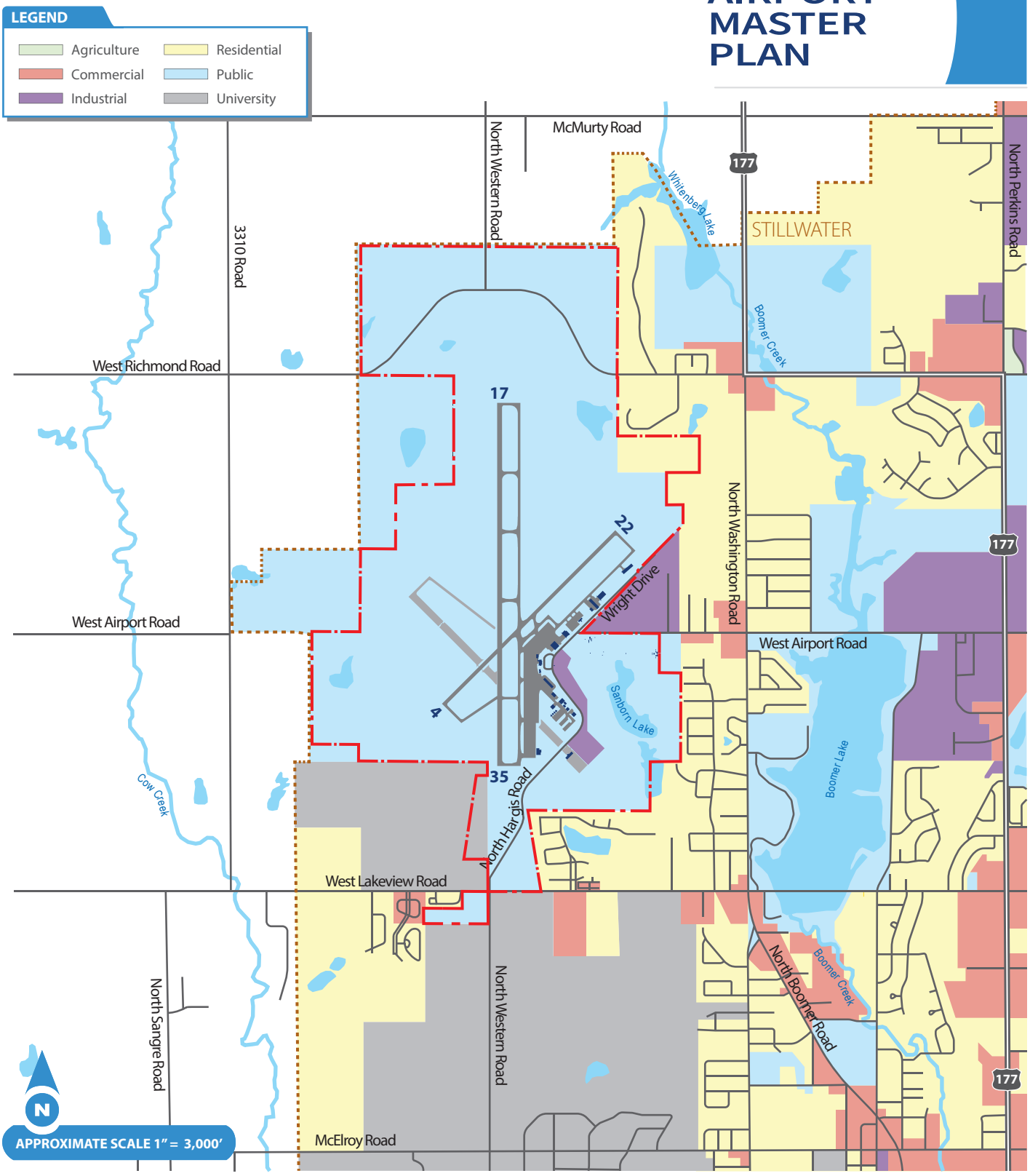
Existing Land Use

Land uses to the north and west of SWO consist primarily of agricultural and scattered rural residential. OSU-owned land immediately abuts SWO to the south, and additional medium density residential and downtown commercial uses are located further south. Land uses to the south and east include a mix of residential, commercial, and industrial developments. Parklands and greenways are scattered throughout the City of Stillwater, with several located immediately east of SWO. Existing land uses are depicted in **Figure A-9**.

Future Land Use

It is important that future land use planning efforts consider the compatibility of off-airport development to avoid creating obstacles to the safe and efficient use of the airspace surrounding an airport. Non-compatible future land uses planned for the areas surrounding an airport can negatively impact current and future airport operations.

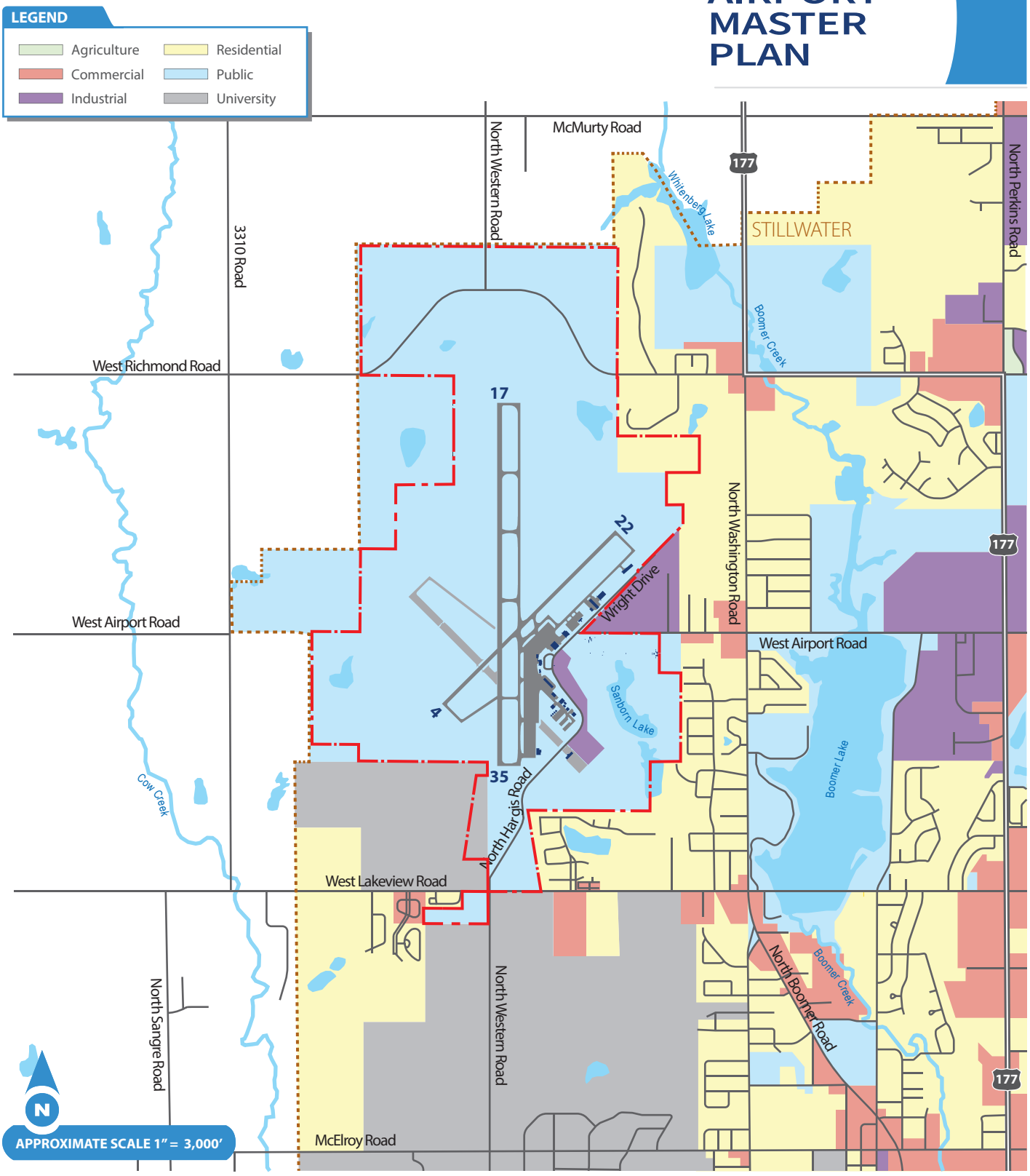
Future land uses of the areas immediately north and west of SWO skew towards low-density residential development interspersed among agricultural croplands. Additional industrial land is indicated west of the airport property line. Additional land to the south is provided for the expansion of OSU. Significant expansion of commercial uses is anticipated along Stillwater's major thoroughfares, including North Washington Road, North Boomer Road, and US-177. High density residential, or densities of 12 to 150 dwelling units per acre, are planned around areas of increased commercial development. Future land use is shown in **Figure A-10**.



Source: Google Maps, 2021; City of Stillwater GIS.

Figure A-8
Generalized Existing Zoning

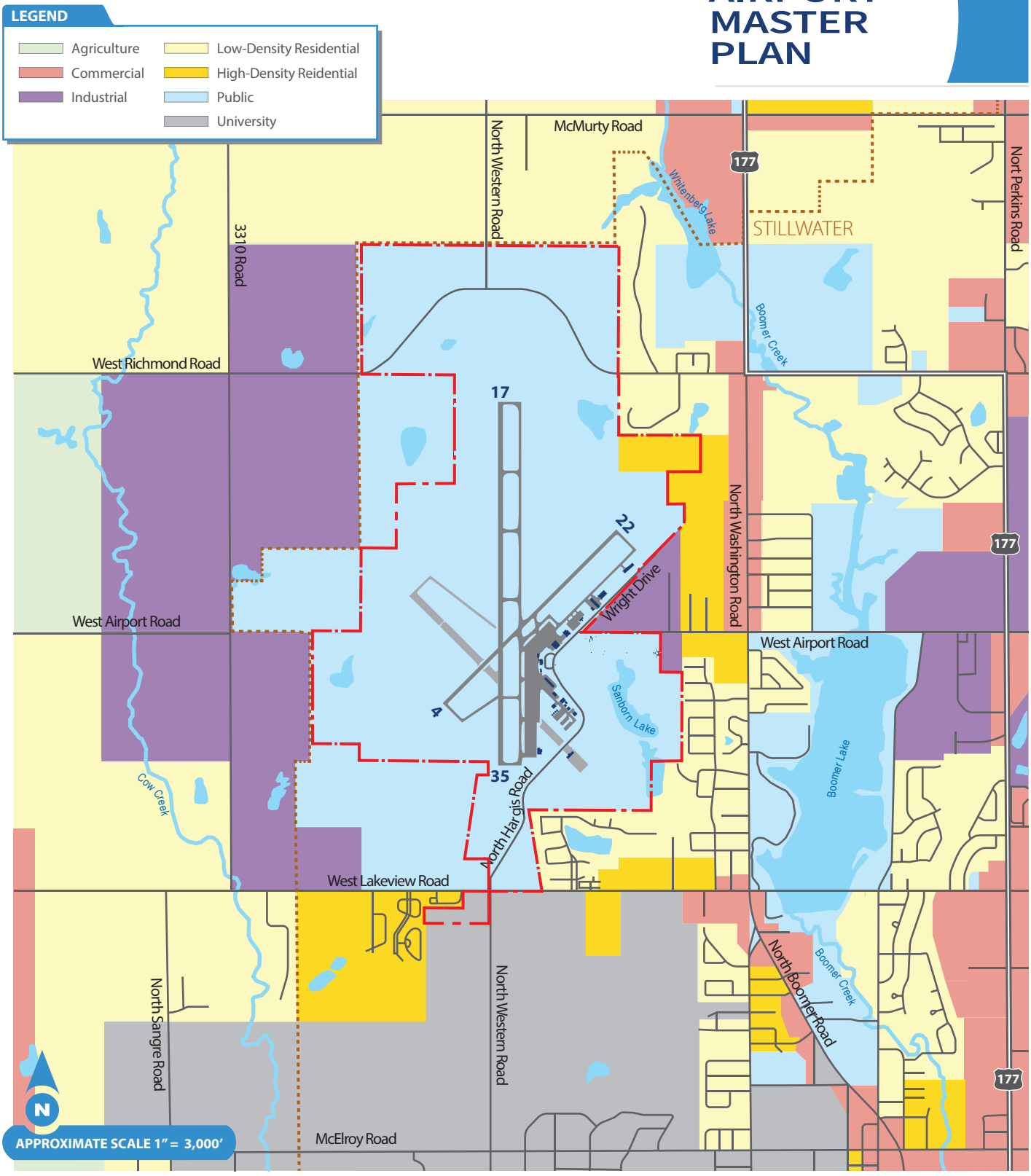
SWO Stillwater REGIONAL AIRPORT



Source: Google Maps, 2021; City of Stillwater GIS.

Figure A-8
Generalized Existing Zoning

SWO Stillwater REGIONAL AIRPORT



Source: Google Maps, 2021; City of Stillwater Comprehensive Plan 2030.

Figure A-10
Generalized Future Land Use

ENVIRONMENTAL CONDITIONS INVENTORY

Understanding the environment on and surrounding SWO allows for efficient planning of future development and compliance with federal and state regulations. Awareness of the surrounding environment also affords the opportunity to understand how SWO affects the environment and neighboring community. The following narrative details environmental factors at SWO, surrounding the Airport, and within Payne County.

This environmental inventory section is not intended to satisfy environmental clearance requirements outlined in FAA Order 1050.1F, *Environmental Impacts and Procedures*, nor is it intended to fulfill requirements of the National Environmental Policy Act (NEPA). It does provide a baseline condition of environmental resources that are known to occur on or near SWO. The intent is to assist in the identification and analysis of airport development alternatives throughout the airport master planning process. The following environmental categories are not discussed as they are not relevant to SWO and/or they only relate to impacts from a specific project:

- Coastal Resources
- Light Emissions and Visual Impacts
- Natural Resources, Energy Supply, and Sustainable Designs
- Secondary (Induced) Impacts
- Wild and Scenic Rivers

Air Quality

As required by the Clean Air Act, the Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants considered harmful to public health and the environment: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Pollution (PM; both 10 micron and 2.5 micron), and Sulfur Dioxide (SO_2). An attainment area is one in which air pollutants do not exceed the NAAQS. Nonattainment areas are those in which a criteria pollutant has exceeded the NAAQS for a period of time. Payne County is in attainment for all six criteria pollutants.

Compatible Land Use

Compatible land use protects the health, safety, and welfare of those living and working near SWO, while protecting airspace for safe and efficient aircraft operations. Airports that receive federal funds must prevent the development of incompatible uses on land. They must also ensure that proposed airport actions, including the adoption of zoning laws, have or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft.

The compatibility of existing and planned land uses near airports is typically determined in relation to the level of aircraft-generated noise. Federal guidelines for a variety of compatible land uses are provided in the Code of Federal Regulations (CFR) under 14 CFR part 150, Appendix A, Table 1, *Land Use Compatibility with*

Yearly Day-Night Average Sound Levels, which is included here as **Table A-11**. The table identifies land use types as compatible, incompatible, or compatible if conducted within a sound-attenuated structure. Developed by the FAA, the table acts as a guide to local municipalities for land use planning and control and provides a tool to compare relative land use impacts resulting from planning alternatives.

Table A-10: Land Use Compatibility Matrix

LAND USE	YEARLY DAY-NIGHT NOISE LEVEL (DNL) IN DECIBELS 65-70	70-75	75-80	80-85	OVER 85
RESIDENTIAL					
Residential, other than mobile homes and transient lodgings	N(1)	N(1)	N	N	N
Mobile home parks	N	N	N	N	N
Transient lodgings	N(1)	N(1)	N(1)	N	N
PUBLIC USE					
Schools	N(1)	N(1)	N	N	N
Hospitals and nursing homes	25	30	N	N	N
Churches, auditoriums and concert halls	25	30	N	N	N
Governmental services	Y	25	30	N	N
Transportation	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE					
Offices, business and professional	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	25	30	N	N
Utilities	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	25	30	N	N
MANUFACTURING AND PRODUCTION					
Manufacturing, general	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y(6)	Y(7)	N	N	N
Mining and fishing resource production and extraction	Y	Y	Y	Y	Y
RECREATIONAL					
Outdoor sports arenas and spectator sports	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	N	N	N	N	N
Nature exhibits and zoos	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	25	30	N	N

Numbers in parentheses refer to NOTES.

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

TABLE KEY

SLUCM	Standard Land Use Coding Manual.
Y(Yes)	Land Use and related structures compatible without restrictions.
N(No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30 or 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

NOTES

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided that special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Land uses around SWO largely remain compatible with airport operations. Agricultural, industrial, commercial, and university land uses can generally function under airport flight paths with minimal impairment. Residential developments under flight paths, such as those to the northeast, are not ideal. In the Noise section that follows, existing and future noise contours are compared with the surrounding land use to determine the compatible nature of the existing land uses.

Construction Impacts

FAA Advisory Circular (AC) 150/5370-10H, *Standards for Specifying Construction of Airports*, contains provisions to minimize impacts to air quality, water quality, and soil erosion associated with projects. The AC directs that construction and demolition debris be disposed of according to applicable state and federal criteria.

The construction of proposed master plan projects can cause temporary impacts associated with construction noise, air quality, traffic impacts on local roads, and the use and storage of fuel to operate construction vehicles and equipment. Best management practices are available to avoid or reduce temporary construction impacts. Potential construction impacts will be considered in forthcoming environmental analyses performed in accordance with NEPA.

Department of Transportation Section 4(f) Properties

Section 4(f) provides that the Secretary of Transportation "may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land and the program or project includes all possible planning to minimize harm resulting from the use." The U.S. Department of Transportation Act – Section 4(f) protects certain properties from use for Department of Transportation projects unless the FAA determines there is no feasible and prudent alternative.

The Sanborn Lake Park and Sports Complex is located on SWO property occupying most of the area east of Hargis Road and south of West Airport Road. The following Section 4(f) properties are located near SWO:

- **Lakeside Memorial Golf Course –** Located 0.5 miles northeast of the Airport along US 177.
- **Boomer Lake Park –** Located immediately east of North Washington Street.
- **Western Fields football field –** Located 0.5 miles south of SWO.

Farmlands

The Farmland Protection Policy Act (FPPA) was enacted to minimize the extent to which federal actions and programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The FPPA classified farmland as prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Unique farmland is land other than prime farmland used to produce specific high-

value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Farmland of statewide or local importance includes soils that do not meet prime farmland criteria, but economically produce high yields of crops when treated and managed. A federal action that may result in conversion of farmland to non-agricultural use requires coordination with the U.S. Department of Agriculture Natural Resource Conservation Services (NRCS).

The NRCS online web soil survey system was used to identify soil types on the airport and adjacent property. Mapping and table details regarding the mapped soils within PSC are contained within the USDA/NRCS Soil Report. Airport soils are listed in **Table A-11**.

Table A-11: Airport Soils

Map Unit Name	Rating	Acres in AOI	Percent of AOI
Coyle loam, 3 to 5 percent slopes	Prime farmland	10.4	0.7%
Renfrow silt loam, 1 to 3 percent slopes	Prime farmland	18.3	1.3%
Renfrow silt loam, 3 to 5 percent slopes	Prime farmland	73.2	5.0%
Zaneis loam, 3 to 5 percent slopes	Prime farmland	10.9	0.7%
Coyle loam, 1 to 3 percent slopes	Prime farmland	4.5	0.3%
Grainola-Lucien complex, 1 to 5 percent slopes	Prime farmland	30.0	2.1%
Kirkland silt loam, 1 to 3 percent slopes	Prime farmland	67.3	4.6%
Zaneis-Huska complex, 1 to 5 percent slopes	Prime farmland	140.6	9.6%
Zaneis loam, 1 to 3 percent slopes	Prime farmland	20.6	1.4%
Total Prime Farmland		**375.8**	**25.7%**
Coyle loam, 3 to 5 percent slopes, eroded	Not prime farmland	10.0	0.7%
Pulaski fine sandy loam, 0 to 1 percent slopes, frequently flooded	Not prime farmland	25.4	1.7%
Renfrow loam, 3 to 5 percent slopes, eroded	Not prime farmland	166.3	11.4%
Renfrow and Grainola soils, 3 to 8 percent slopes, severely eroded	Not prime farmland	61.7	4.2%
Mulhall loam, 3 to 5 percent slopes, eroded	Not prime farmland	21.3	1.5%
Masham silty clay loam, 5 to 20 percent slopes	Not prime farmland	82.2	5.6%
Zaneis loam, 3 to 5 percent slopes, eroded	Not prime farmland	3.9	0.3%
Coyle and Zaneis soils, 3 to 5 percent slopes, severely eroded	Not prime farmland	3.7	0.3%
Renfrow-Urban land complex, 1 to 5 percent slopes	Not prime farmland	393.7	27.0%
Huska silt loam, 1 to 3 percent slopes	Not prime farmland	66.0	4.5%
Doolin silt loam, 1 to 3 percent slopes	Not prime farmland	28.0	1.9%
Grainola-Ashport frequently flooded-Mulhall complex, 0 to 8 percent slopes	Not prime farmland	76.7	5.3%
Grainola-Lucien complex, 5 to 12 percent slopes	Not prime farmland	125.4	8.6%
Water	Not prime farmland	17.4	1.2%
Total Non-Prime Farmland		**1,081.3**	**74.3%**
Totals for Area of Interest		**1,457.1**	**100%**

Source: USDA, NRCS, Soil Resource Report for SWO property (Area of Interest), August 2021.
Note: AOI = Area of Interest

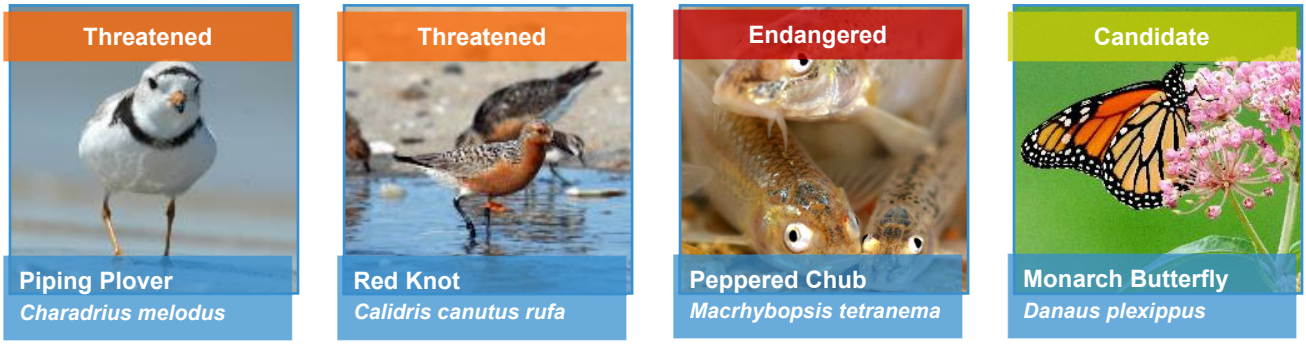
According to the NRCS, there is a variety of soil types on SWO property. The most prominent soil by percentage is the Renfrow-Urban land complex with 1 to 5 percent slopes, which accounts for 27 percent of the airport area. In addition to other non-prime farmland soils, roughly three quarters of SWO is rated as non-prime farmland.

Threatened and Endangered Species

The Endangered Species Act (ESA), as amended, requires each "federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species." The U.S. Fish and Wildlife Service is responsible for listing federal threatened and endangered species protected by the ESA. The Oklahoma Department of Wildlife Conservation (ODWC) lists the U.S. Fish and Wildlife Service federal threatened and endangered species along with the state threatened and endangered species.

The U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) System was used to identify species of concern. Species listed as threatened or endangered, or candidates that may be found within the Airport vicinity are depicted in **Figure A-11**.

Figure A-11: Listed Species Potentially Located on SWO Property



Source: U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) Species Report, August 10, 2022.

No critical habitats for any threatened or endangered species were found at SWO, nor were any National Wildlife Refuge Lands or fish hatcheries.

Some birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Certain migratory birds are listed by the USFWS Birds of Conservation Concern (BCC) list as species of potential concern. Migratory birds that may be impacted by operations at SWO are listed in **Figure A-12**.

Figure A-12: Migratory Birds Potentially Located on SWO Property

Source: U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) Species Report, August 10, 2022.

The presence of threatened or endangered species, including bald eagles and other migratory birds, does not necessarily impair operational capabilities at SWO. Certain projects, should they have the potential to disturb or kill endangered species, may require permits to proceed.

Hazardous Material, Pollution Prevention, and Solid Waste

Hazardous materials are defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) 42 United States Code (USC) 6901-6992. Hazardous materials include substances

that, due to their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment.

The two statutes of concern to the FAA are the RCRA, as amended by the Federal Facilities Compliance Act, and the CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA) and by the Community Environmental Response Facilitation Act. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of release of a hazardous substance, excluding petroleum, into the environment.

Sites of interest are defined as state cleanup sites, federal superfund cleanup sites, hazardous waste generators, solid waste facilities, underground storage tanks, dairies, and enforcement actions. The U.S. EPA lists four sites of interest at SWO. These are listed in **Table A-12**.

Table A-12: EPA-Regulated Facilities Near SWO

Site Name	Site Address (Stillwater, OK 74075)
The Brinkman Corporation	1616 W Airport Rd
Oklahoma Military Department / Stillwater Readiness Center	1616 W Airport Rd
Oklahoma Army National Guard OMS #4	1207 W Airport Rd
Sanborn Baseball Fields	1201 W Airport Rd

Source: US EPA Envirofacts.

Note: None of the addresses listed by the EPA are on SWO property.

Historical, Architectural, Archaeological, and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the impacts of their undertakings on historic properties, which include archeological sites, buildings, structures, objects, and districts. The NHPA also requires federal agencies to allow the Advisory Council of Historic Preservation the opportunity to comment on the undertaking. The National Park Service (NPS) maintains the National Register of Historic Places (NRHP), which lists all historic sites that meet criteria.

According to the NRHP, there are no historical sites, buildings, structures, or objects on airport property. The nearest historical sites are located in or around OSU and downtown Stillwater, approximately 1.5 miles south of SWO.

Noise

Noise is generally defined as unwanted sound that can disturb routine activities (such as sleep, conversation, or student learning) and cause annoyance. The determination of acceptable levels is subjective. The standard unit of measurement for the loudness of sound is the decibel (dB). The FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activity must be established in terms of a yearly day-night average sound level (DNL). DNL is a 24-hour, time-weighted energy average noise level based on the “A” weighted decibel (dBA), in which “A” weighted refers to the sound scale pertaining to the human ear, or the overall noise energy level experienced during an entire day. Time-weighted refers to the fact that noise occurring between the hours of 10:00 p.m. and 7:00 a.m. is penalized by

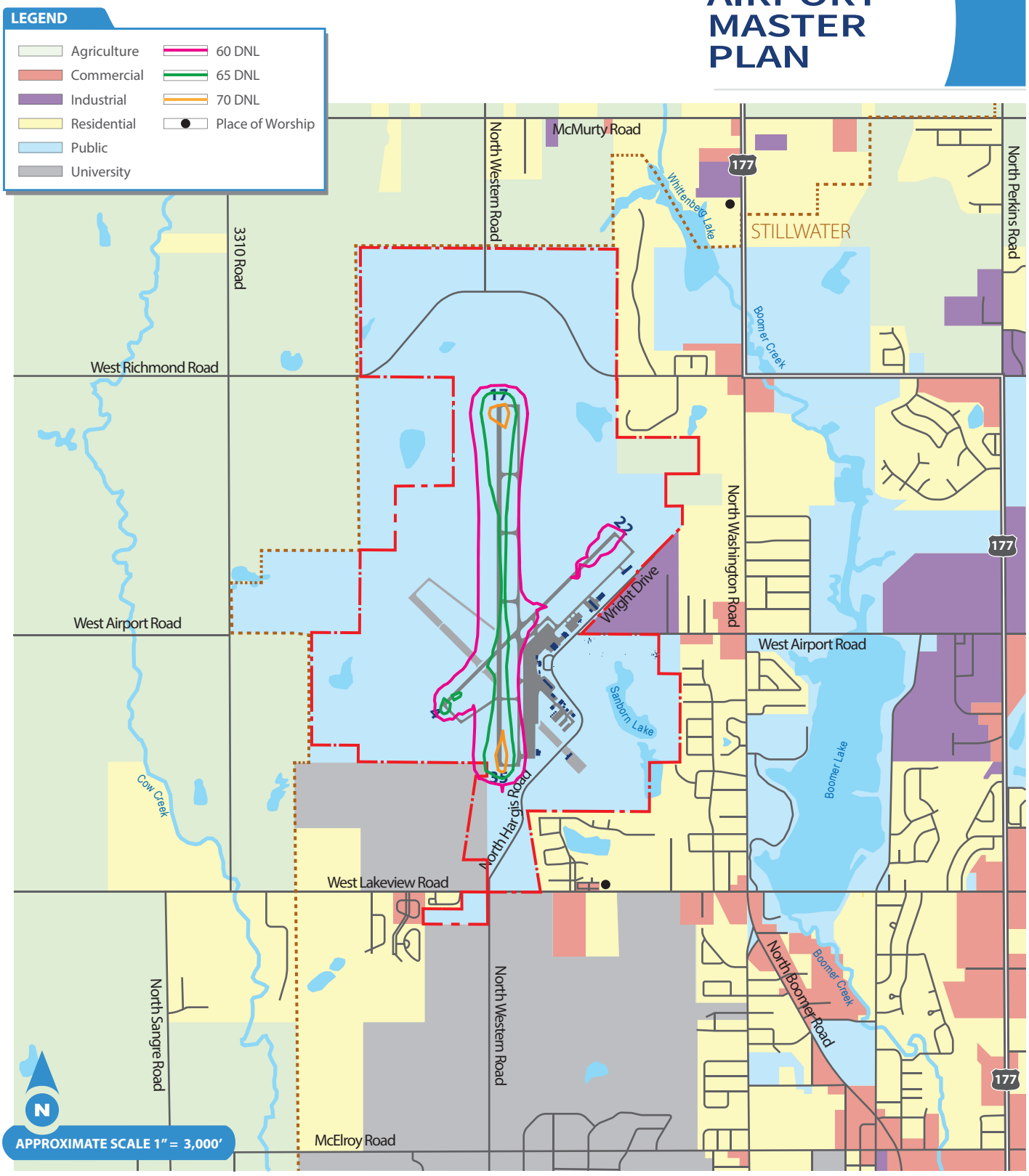
10 dBA to account for the higher sensitivity to noise during nighttime hours and the expected decrease in background noise levels.

DNL noise levels are depicted as noise contours, which show interpolations of noise levels based on the center of grid cells. Grid cells are squares of land of a specific size entirely characterized by a noise level. Noise contours connect the points of comparable noise levels, similar to topographical contours, and form concentric footprints around a noise source. These footprints surrounding an airport are used to predict community response to noise from aircraft using the airport.

As presented earlier in **Table A-10**, FAA guidelines indicate the 65 DNL noise contour is the threshold of significance for land use analysis. **Figure A-13** provides the existing noise contours generated using the 2020 aircraft operational activity presented in **Chapter B – Forecasts of Aviation Activity**, overlaid on the existing land uses surrounding SWO. As can be seen, the existing 65 DNL noise contour does not extend beyond airport property. The existing 60 DNL noise contour does extend slightly beyond airport property west of Runway End 35 into land owned by OSU. This property is undeveloped.

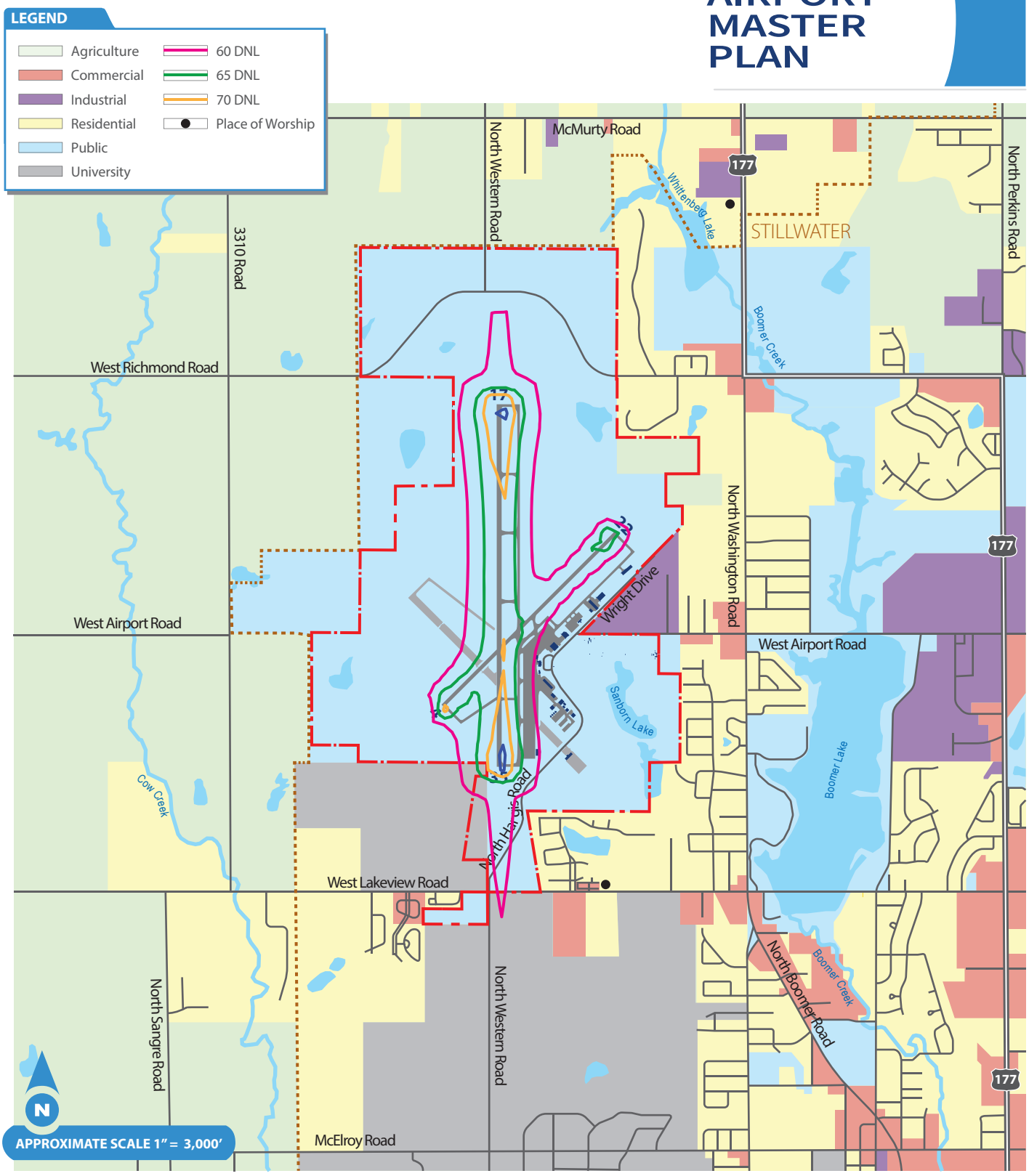
Figure A-14 provides the future noise contours generated using the 2040 forecast of aircraft operational activity also presented in **Chapter B – Forecasts of Aviation Activity** and overlaid on the existing land uses surrounding SWO. As provided, the future 65 DNL noise contour extends slightly into land owned by OSU west of the Runway 35 End. Again, this land is currently undeveloped. The future 60 DNL noise contour extends further into the OSU-owned land in this same general area, as well as into OSU-owned land south of West Lakeview Road. This land is currently used by OSU for its bus transportation fleet storage and Compressed Natural Gas (CNG) fueling facility.

Based on this analysis, there are no land use incompatibilities associated with existing or future noise levels generated by aircraft operations at SWO.



Source: Google Maps, 2021; City of Stillwater and Payne County GIS.

Figure A-13:
Existing (2020) Noise Contours
With Generalized Existing Land Use



Source: Google Maps, 2021; City of Stillwater and Payne County GIS.

Figure A-14:
Future (2040) Noise Contours
With Generalized Existing Land Use

SWO Stillwater REGIONAL AIRPORT

Socioeconomic, Environmental Justice, and Children's Health and Safety Risks

Council on Environmental Quality regulations in 40 CFR, Section 1508, requires environmental documents prepared for federally funded projects to address potential social impacts. The evaluation of a proposed project on the human environment must address the following:

- Disproportionate impacts to low-income and minority populations
- Potential relocation of homes or businesses
- Division or disruption of an established community
- Disruptions to orderly planned development
- Notable project-related changes in employment
- Impacts on health and safety risks to children.

Demographics for the City of Stillwater are shown in **Table A-13**. It should be noted that the population of OSU students population during the academic year (i.e., August through May) increases the Stillwater population to near 80,000.

Table A-13: Demographics for Stillwater, Oklahoma

Demographic Category	2010	Percent	2019	Percent
Population	**44,681**		**49,952**	
Male	22,465	50.3%	25,842	51.7%
Female	22,216	49.7%	24,110	48.3%
Age				
Under 18 years	6,324	14.2%	7,964	15.9%
18-64 years	34,628	77.5%	37,412	74.9%
65 years and over	3,729	8.3%	4,576	9.2%
Median Age (years)	23.8		23.5	
Race				
White	35,642	79.8%	38,601	77.3%
Black or African American	1,691	3.8%	2,306	4.6%
American Indian and Alaska Native	1,919	4.3%	2,031	4.1%
Asian	2,695	6.0%	3,354	6.7%
Native Hawaiian and Other Pacific Islander	21	0.0%	63	0.1%
Other	315	0.7%	387	0.8%
Two or more races	2,398	5.4%	3,210	6.4%
Persons Below the Poverty Level	**12,352**	**31.1%**	**15,069**	**35.2%**

Source: U.S. Census Bureau, American Community Survey.

Socioeconomic Impacts

Improvements at SWO are not expected to create significant change in population, public service, and economic activity, but are expected to have positive impacts through creation of employment opportunity, business growth, and economic activity. Coordination with resource agencies should be a priority prior to implementation. As shown in **Table A-13**, the poverty rate for the City of Stillwater was 35.2 percent in 2019.

FAA Order 1050.1F states, “If acquisition of real property or displacement of persons is involved, 49 CFR Part 24 (implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970), as amended, must be met for federal projects and projects involving federal funding. Otherwise, the FAA, to the fullest extent possible, observes all state and local laws, regulations, and ordinances concerning zoning, transportation, economic development, housing, etc. when planning, assessing, or implementing the proposed action or alternative(s).”

Environmental Justice

Environmental justice assessments seek to identify the health disparities across a community’s disadvantaged and underrepresented populations as defined by race, ethnicity, and socioeconomic status. FAA Order 1050.1F states, “…the FAA must provide for meaningful public involvement by minority and low-income populations. In accordance with Department of Transportation Order 5610.2(a), this public involvement must provide an opportunity for minority and low-income populations to provide input on the analysis, including demographic analysis, which identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.”

Environmental justice impacts, including cancer, asthma, obesity, and mental health issues, can be exacerbated through the construction and operation of new facilities and those impacts tend to affect low-income or minority populations at a disproportionately higher rate. In cases where the population in or around a project area have been identified to be disadvantaged or underrepresented, the environmental documents are expected to include the following:

- Demographic information about the affected populations
- Information about the population(s) that have an established use for the significantly affected resource, or to whom that resource is important (e.g., subsistence fishing)
- Results of analysis to determine if a low-income or minority population using the resource sustains more of the impact than any other population segments
- Identification of disproportionately affected low-income and minority populations
- Discussion of alternatives that would reduce the effect on these populations
- Description of possible mitigation to reduce the effect on the disproportionately affected low-income and minority populations.

The NEPA process requires environmental justice review and impact analysis for airport improvements. According to a search of the American Community Survey (2010-2019), the percentage of minority (non-white) populations as of 2019 was 22.7 percent in the City of Stillwater. The Climate and Economic Justice Screening Tool (CEJST) published by the White House Council on Environmental Quality (CEQ) indicated that there were no identified disadvantaged communities near SWO.

Children's Environmental Health and Safety Risks

FAA Order 1050.1F states "Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, Federal agencies are directed to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to."

Locations with concentrated populations of children near SWO are Will Rogers Elementary and Stillwater High School 1.25 miles to the southeast, and Richmond Elementary School 1.75 miles to the northeast. Boomer Lake Park east of SWO could also attract concentrated adolescent populations. According to the American Community Survey, 15.9 percent of the population, or 7,964 individuals, are under the age of 18 in Stillwater.

Water Resources

Water resources are surface and ground waters that are vital to society because they provide drinking water as well as support recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. Surface water, ground water, floodplains, and wetlands do not function as separate and isolated components of the watershed, but rather as a single, integrated natural system. Disruption of any one part of this system can result in consequences to the functioning of the entire system, which must be considered along with potential impacts to the quality of water resources throughout this Master Plan.

Wetlands

The Clean Water Act (CWA) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Federal regulations require that proposed actions avoid, to the greatest extent possible, long-term and short-term impacts to wetlands, including the destruction and altering of the functions and values of wetlands.

The USFWS National Wetlands Inventory (NWI) online mapping system was reviewed to identify mapped wetlands near SWO. According to the NWI, two freshwater wetlands are located in the easternmost portion of SWO property: one wetland is located north of Sanborn Lake and the other north of Hazen Lake. A freshwater emergent wetland is also located north of Sanborn Lake. This system is fed by a stream that continues off SWO to the south.

Floodplains

A floodplain is generally a flat, low-lying area adjacent to a stream or river that is subject to inundation during high flows. The relative elevation of a floodplain determines its frequency of flooding.

Executive Order 11988 requires federal agencies “to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of 100-year floodplains (i.e., areas subject to inundation by a 1 percent annual chance of flood) and to avoid direct or indirect support of floodplain development whenever there is a practical alternative.”

According to the Federal Emergency Management Agency National Flood Hazard Layer Viewer, SWO is entirely located within an area of minimal flood hazard (Zone X). Areas within Zone X are areas are outside the 500-year flood plain. Boomer Lake and its surrounding watersheds is designated as Zone AE, which is within the 100-year floodplain and has a base flood elevation.

Surface Waters

Protected by the Safe Drinking Water Act (SDWA) and CWA, surface waters are considered waters of the United States and include streams, rivers, lakes, ponds, statuaries, and oceans. The Oklahoma Water Resources Board (OWRB) monitors surface water throughout the state. In addition to Sanborn Lake on SWO’s southeastern edge, several freshwater ponds are scattered throughout SWO. These ponds are usually connected by streams that flow off the property and connect with other nearby surface waters.

Groundwater

Groundwater is a subsurface water that occupies the space between sand, clay, and rock formations. Aquifers are the geologic layers that store or transmit groundwater to wells, springs, and other water sources. The SDWA and its implementing regulations (40 CFR Parts 141-149) prohibit federal agencies from funding actions that would contaminate an EPA-designated sole source aquifer or its recharge area. State and local agencies may also promulgate regulations to protect sole source aquifers and their recharge areas.

No groundwater aquifers were identified by the OWRB at or near SWO. There are two wells located on SWO property, as well as a regulated underground storage tank used for jet fuel.

CLIMATE AND WIND DATA

Weather conditions impact aircraft performance and influence airport design. The design process must account for temperature, precipitation, winds, visibility, and cloud ceiling heights. Wind patterns impact runway use and must be assessed to determine runway design requirements.

Wind

The historical pattern of prevailing winds influences desirable runway orientation and runway use. The FAA has determined that crosswinds pose a hazard to the safe operation of aircraft, particularly to small and light aircraft. Therefore, an airport’s primary runway should align with the prevailing winds.

Wind coverage is defined as the average percentage of time that a runway is not subjected to crosswinds of magnitude greater than the allowable crosswind component for each runway. FAA defines the desirable minimum wind coverage of an airport’s runway configuration as 95 percent of wind velocity and direction observations over the most recent 10-year period. The allowable crosswind component used to compute the

wind coverage for a given runway is based on the Runway Design Code (RDC) of the most demanding aircraft expected to use the runway. RDC categories, FAA crosswind components, and aircraft types are listed in **Table A-14**.

Table A-14: Crosswind Component RDC Categories

Runway Design Code (RDC)	Aircraft Types	FAA Crosswind Component
A-I and B-I: Includes A-I and B-I Small (Small Aircraft of 12,500 pounds or less)	Piston	10.5-Knot
A-II and B-II	Small Jets and Turboprops	13-Knot
A-III, B-II | C-I to C-III | D-I to D-III	Large Jets and Turboprops	16-Knot
A-IV and B-IV | C-IV to C-VI | D-IV to D-VI	Large Jet Transports	20-Knot

Source: FAA Advisory Circular (AC) 150/5300-13A, Change 1.

Wind data is reported to and available from the National Oceanic and Atmospheric Administration (NOAA) by an ASOS located at SWO. Wind data from 2010 to 2020 is grouped in three categories presented in **Table A-15**.

Table A-15: Ceiling and Visibility Categories

Wind Coverage	Definition	Occurrence
All Weather	All wind observations	N/A
Instrument Flight Rules (IFR)	Cloud ceiling less than 1,000' and/or visibility less than 3 miles, but cloud ceiling greater or equal to 200 feet and visibility greater than or equal to 1/2 miles	Approximately 13 percent of the time from 2011 to 2020
Visual Flight Rules (VFR)	Could celling greater than or equal to 1,000 feet and visibility greater than or equal to 3 miles	Approximately 87 percent of the time from 2011 to 2020

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. August 2021. Wind data provided by NOAA Integrated Surface Database (ISD). Station 723545. Period of Record 2011-2020.

The FAA's Airport Data and Information Portal (ADIP) wind analysis program was used to determine the wind coverage for SWO's runway orientations, both individually and combined as presented in **Table A-16**. Runway 17/35 and Runway 4/22 align with the prevailing winds and together provide greater than 95 percent wind coverage for the 10.5-, 13-, and 16-knot crosswind components.

Table A-16: Wind Coverage

Runway	10.5-Knot	13-Knot	16-Knot
All Weather			
Runway 17/35	95.63%	97.93%	99.40%
Runway 4/22	83.81%	91.45%	97.65%
Combined	97.78%	99.18%	99.78%
IFR Weather			
Runway 17/35	94.96%	97.43%	99.15%
Runway 4/22	85.84%	92.32%	97.77%
Combined	97.31%	98.92%	99.67%
VFR Weather			
Runway 17/35	95.72%	98.01%	99.45%
Runway 4/22	83.43%	91.28%	97.62%
Combined	97.85%	99.23%	99.80%

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. August 2021. Wind data provided by NOAA Integrated Surface Database (ISD). Station 723545. Period of Record 2011-2020.

Climate

Stillwater lies near the western edge of the country's humid subtropical climate region as well as where the Rocky Mountain rain shadow has faded. Therefore, the climate is characterized by hot, humid summers and generally mild to cool winters. Rainfall is evenly distributed throughout the year. **Table A-17** presents the basic monthly and annual average climate data for Stillwater using data obtained from the NOAA.

Table A-17: Climate Data

Month	Precipitation (inches)	Mean Maximum Temperature (°F)	Mean Minimum Temperature (°F)	Mean Average Temperature (°F)
January	0.92	50.7	26.7	38.7
February	1.33	55.5	30.7	43.1
March	2.22	64.8	39.5	52.1
April	3.72	73.4	48.5	60.9
May	4.58	80.9	58.5	69.7
June	4.49	89.6	67.6	78.6
July	3.12	95.4	72.1	83.7
August	3.28	95.0	70.5	82.7
September	3.11	86.7	61.9	74.3
October	2.94	75.3	49.4	62.3
November	1.95	62.8	37.8	50.3
December	1.51	52.3	29.5	40.9
Annual Average	**33.17**	**73.5**	**49.4**	**61.5**

Source: NOAA, U.S. Climate Normals Quick Access Tool. August 2021.

STRATEGIC EVALUATION

As a strategic planning process, this Study is structured to be responsive to the overall mission of SWO while being inclusive of broader community needs. Knowing that plans involving diverse participation are more successful and widely accepted than those without, a Study Committee (Committee) was assembled

specifically for this Study. The Committee serves in an advisory capacity and consists of aviation and non-aviation constituents selected to provide well-rounded perspectives. The Committee provides continuous participation, engages at key decision-points, and guides Study recommendations reflecting airport user needs, aligning with community interests, and supporting the City of Stillwater's plan and vision. The Committee is charged with reviewing materials, attending meetings, providing comment on findings, and encouraging awareness and adoption of the Study recommendations. Committee feedback is incorporated, as appropriate, into the final Study documentation.

As part of the strategic planning process, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted to determine the appropriate strategic visions for SWO, and specific goals and objectives to be addressed throughout the Study. The SWOT analysis is a process for synchronizing strategic decision-making factors and helps categorize the Airport's and city's internal and external characteristics, qualities, and merits. The SWOT factors help formulate goals, provide the basis to pragmatically assess recommendations, and guide the Study's overall development policy. The full SWOT analysis is contained in **Appendix One**.

B. Forecasts of Aviation Activity

INTRODUCTION

Aviation activity forecasts evaluate future demand at an airport. The development of accurate and defensible forecasts is a key element in the Master Plan Study process. Forecasts inform the determination of future airport requirements, analysis of alternative development plans, assessment of the possible environmental effects of proposed plans, and the determination of the economic implications of future growth and development. While forecasting, by nature, is not an exact science, it does establish general estimates for future aviation activity levels and provides a defined rationale for necessary airport facility changes as demands increase.

Principally, local airport factors, aviation industry trends, and overarching regional socioeconomic market conditions influence aviation activity forecasts. They are developed to meet five main objectives:

- Provide a realistic and sustainable estimate.
- Be based on the latest available data.
- Reflect current conditions at the Airport.
- Be supported by information in the Master Plan Study.
- Provide adequate justification for future airport development.

The forecasts have a base year of 2020 and use the Federal Aviation Administration (FAA) Fiscal Year (FY) from October to September. The forecast period is 20 years from the base year with reporting intervals of every five years. In keeping with the industry standards, data from the past 10 years is used as the basis for historical trends. Using the previous 10 years helps the forecasts account for various economic conditions and provides a perspective of the effects of economic change on aviation activity. This Master Plan places an additional focus on economic and aviation activity since 2020 because of the COVID-19 pandemic impacts.

Data Sources

A variety of data sources were used in this chapter, as listed in **Table B-1**. However, most of the aviation activity occurring at Stillwater Regional Airport (SWO or the Airport) is derived from the FAA 2020 Terminal Area Forecast (TAF). The TAF is the official FAA forecast that is prepared annually by FAA Headquarters for each airport in the FAA National Plan of Integrated Airport Systems (NPIAS). TAF data comes from the U.S. Department of Transportation (USDOT) T-100 database, Airport Traffic Control Tower (ATCT) records, and FAA Form 5010, which airports submit annually to the FAA.

The TAF is generally reliable. However, its most recent data may lag a year behind other available records, and values for 2020 onward feature updates with data available from other databases and records. Therefore, 2021 year-to-date (at the time of forecast preparation, June 2021 was the most recent data available) and the most recent 12-months of data (when available) are presented.

Table B-1: Data Sources

Source	Description
FAA Terminal Area Forecasts (TAF)	The FAA TAF provides historical records and forecasts for passenger enplanements, aircraft operations and based aircraft. It does not forecast operations by aircraft type, peak activity level, critical aircraft, or air cargo. These forecasts serve as a comparison for forecasts prepared as part of this planning effort and provide historical information on aircraft activity. The 2020 TAF used in this forecast was released in May 2021.
FAA Traffic Flow Management System Counts (TFMSC)	TFMSC includes data collected from flight plans. These operations are categorized by aircraft type and used to identify trends in the SWO fleet mix. The advantage of the TFMSC data is its degree of detail and its insights into the itinerant users of SWO. A disadvantage of TFMSC data is that it does not include local operations or operations that did not file a flight plan. As such, the utility of TFMSC data is limited to larger aircraft, including scheduled commercial passenger, air cargo, charter operations, and private business jets.
FAA Aerospace Forecasts	The Aerospace Forecast 2021-2041 is a national-level forecast of aviation activity. The Aerospace Forecast helps guide local forecasts by serving as a point of comparison between local trends and national trends.
U.S. Department of Transportation (USDOT) T-100 Database	Scheduled, charter passenger, and air cargo airlines fill out the T-100 form monthly. The T-100 database is an online repository of the data recorded on the forms, such as number of seats sold, number of seats available, freight transported, aircraft used, and departures performed. The T-100 provides a detailed look at the operations of passenger and cargo airlines.
Woods & Poole Inc.	Socioeconomic data is provided by data vendor Woods & Poole Inc. (W&P), which is a data vendor providing socioeconomic data for gap years in the U.S. Census. The W&P dataset considers the Stillwater Metropolitan Statistical Area (MSA) equivalent to the boundary of Payne County. The dataset provides 124 data categories with records from 1970 to 2020 and forecast through 2050. Data categories considered include population, employment, earnings and income, and Gross Regional Product (GRP).
Operations Network (OPSNET)	OPSNET is the source of National Airspace System (NAS) air traffic operations and delay data. Provided information for monthly aircraft operations for 2020 and 2021, as well as Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) operations.
Stakeholder Interviews/Data Gathering	The Consultant conducted interviews with stakeholders during site visits and made contact via phone and email with others. Interviews included the Air Traffic Control Tower (ATCT), Transportation Security Administration (TSA), Aircraft Rescue and Fire Fighting (ARFF), Fixed Based Operator (FBO), the City of Stillwater, the Oklahoma State University (OSU) Flight Center, Envoy Airlines, and Martinaire Aviation LLC (SWO's air cargo operator).

One of the primary drivers in the difference between the TAF and other records of data available is the operations that occur when the ATCT is closed. The SWO ATCT is open from 8:00 a.m. to 10:00 p.m., and it records aircraft operations that occur during this time. Operations occurring outside these hours are not reported. Therefore, TAF data is supplemented with data from the airport or tenants, TFMSC, or USDOT 1-100 when determined to be accurate. This data may include sources such as air carrier aircraft operations occurring when the ATCT is closed.

The FAA reviews airport master plan forecasts by comparing them to the TAF. Forecasts within 10 percent of the TAF over the first five-year period and within 15 percent within the 10-year period can be approved by the Airports District Offices. Forecasts outside these tolerances go to FAA Headquarters for review. Therefore, every preferred forecast component that has a corresponding TAF category is compared to the TAF for consistency.

EXISTING CONDITIONS AND ASSUMPTIONS

The level and type of aviation activity is dependent upon many factors, but it is generally reflective of:

- Local and national airline activity trends.
- Airport services available to the aviation community.
- Specific activity and businesses located on the airport or within the community the airport serves.
- General socioeconomic conditions prevalent within the surrounding area.

Regional Profile

Several regional underlying conditions were evaluated to develop a series of assumptions serving as a foundation for these forecasts. They represent a variety of locational, operational, and socioeconomic considerations that may affect aviation activity at SWO to varying degrees.

Regional Socioeconomic Conditions

Socioeconomic data generally correlates with aviation activity within the same geographic region. Population, employment, income, and gross domestic product (GDP) are indicators that typically influence aviation activity. Population is an indication of the general number of persons served by an airport, and therefore influences the potential customer base. Employment levels gauge economic activity and vitality. Income statistics reflect the degree to which an airport's customer base has sufficient disposable income to spend on aviation activities such as airline ticket purchases, pilot training, aircraft ownership, and aircraft charter or rental. GDP is the value of goods and services produced in an area and serves as an index for the health of the overall economy.

Despite significant short-term impacts, Woods & Poole determined that COVID-19 did not appear to have made a quantifiable long-term economic impact affecting the forecasts.

(Woods & Poole, Inc., *2020 Regional Projections and Database*)

The economic and demographic forecasting firm Woods & Poole, Inc, is used for most of the socioeconomic historical data and all the future projections in this Master Plan. When the data and projections were published in mid-2020 (using data through 2018), the effects on COVID-19 on the U.S. economy were being experienced. Sharp and significant declines in monthly retail sales, GDP, and employment were already evident through the first four months of the year. Woods & Poole analyzed the preliminary monthly data to determine what, if any conclusions about 2020 annual totals could be made and included in their models. The inclusion of a revised 2020 estimate of historical data that incorporated the COVID-19 impacts was decided against because the data were unclear about what the estimate should be and because the long-term impact of an estimate could not be made reliably. No doubt, many of the COVID-19 related economic impacts have been mitigated by the various federal government actions such as the Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020, the Coronavirus Response and Consolidated Appropriations Act of 2021, and the American Rescue Plan (ARP) of 2021.

Population

According to Woods & Poole data, the Stillwater MSA population has seen a steady but slight increase since 2010. This compares favorably to both the state and national growth rates. Future growth expectations for both the city and state are slightly less than national rates. **Table B-2** details the population data over the past 10 years, contains projected conditions 20 years into the future, and shows the respective associated Compound Annual Growth Rates (CAGR).

Table B-2: Population Data, 2010-2040

Year	Stillwater	Oklahoma	United States
Historical			
2010	78,223	3,759,632	309,326,026
2015	81,324	3,909,831	320,745,038
2020	83,095	3,989,697	331,472,851
CAGR	**0.7%**	**0.6%**	**0.7%**
Projected			
2025	85,698	4,105,730	342,330,653
2030	88,147	4,217,120	353,002,641
2035	90,370	4,321,153	363,262,483
2040	92,313	4,415,738	372,934,650
CAGR	**0.5%**	**0.5%**	**0.6%**

Source: Woods & Poole, Inc., 2020.

Employment

Historical employment growth within Stillwater has lagged both the state and national growth rates. However, the unemployment rate within Stillwater has been lower than the historical state and national averages.

Evaluating the unemployment rates for Stillwater, Oklahoma, and the United States by quarter through 2020 and the first half of 2021, both Stillwater and Oklahoma have clearly returned to near pre-pandemic levels. The national unemployment rate, while declining, has not yet reached its pre-pandemic level.

Woods & Poole employment projections throughout the 20-year future period indicate a smaller growth rate for Stillwater than the state and nation. **Table B-3** details the historical and projected employment data for the City of Stillwater, the state, and nation.

Table B-3: Employment Data, 2010-2040

Year	Stillwater		Oklahoma		United States	
	Employment[1]	Unemployment Rate[2]	Employment[1]	Unemployment Rate[2]	Employment[1]	Unemployment Rate[2]
Historical						
2010	46,674	5.1	2,130,129	6.5	172,901,690	9.6
2015	49,123	3.3	2,286,959	4.3	190,315,792	5.3
2020	51,304	4.8	2,413,383	6.1	206,901,316	8.1
CAGR	**1.0%**	**N/A**	**1.3%**	**N/A**	**1.8%**	**N/A**
2020-2021 by Quarter[2]						
1Q 2020	---	2.5	---	3.3	---	4.1
2Q 2020	---	9.3	---	10.3	---	12.9
3Q 2020	---	4.6	---	6.3	---	8.9
4Q 2020	---	3.1	---	4.7	---	6.5
1Q 2021	---	3.4	---	4.8	---	6.5
2Q 2021	---	2.8	---	3.6	---	5.8
Projected						
2025	53,752	---	2,541,470	---	221,248,604	---
2030	55,994	---	2,661,667	---	234,749,589	---
2035	58,100	---	2,776,376	---	247,922,569	---
2040	60,105	---	2,886,756	---	260,952,286	---
CAGR	**0.8%**	**N/A**	**0.9%**	**N/A**	**1.2%**	**N/A**

Sources: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Labor Statistics, 2021.

Notes: --- Data not available.

With over 6,000 employees, Oklahoma State University (OSU) is Stillwater's largest employer. Because of its public education function, OSU is not as affected by variations of the local, state, or national economies as private entities, and is therefore less prone to large employment swings. OSU's employment is expected to remain steady and will continue to be Stillwater's largest employer throughout the planning period.

Other top employers within Stillwater and Payne County include:

- **Stillwater Medical Center** (over 1,000 employees)
- **Stillwater Public Schools** (over 750 employees)
- **City of Stillwater** (over 550 employees)
- **Stillwater Design/Kicker** (over 175 employees)
- **ASCO Aerospace** USA (over 150 employees)
- **National Standard** (over 150 employees)
- **OnCue** (over 150 employees)
- **Meridian Technology Center** (over 125 employees)
- **Frontier Electronic Systems** (over 100 employees)
- **Stan Clark Companies** (over 100 employees)
- **Armstrong World Industries** (over 100 employees).

Income

Personal per capita income growth within Stillwater has also historically lagged both the state and national growth rates. Using quarterly state and national data from the Bureau of Economic Analysis, the COVID-19

pandemic clearly has had a negative effect on income levels in the third and fourth quarters of 2020. However, income levels have rebounded to pre-pandemic levels by the first quarter of 2021.

Woods & Poole projections continue the trend that income growth within Stillwater will be behind the state and national rates, although the City's per capita income rate is expected to make up ground in both the state and national growth rates during the 20-year future period. **Table B-4** details the historical and projected employment data for the city, state, and nation.

Table B-4: Per Capita Personal Income Data, 2010-2040

Year	Stillwater	Oklahoma	United States
Historical[1]			
2010	$30,912	$36,544	$40,546
2015	$35,455	$44,245	$48,977
2020	$39,646	$48,752	$57,668
CAGR	**2.5%**	**2.9%**	**3.6%**
2020-2021 by Quarter[2]			
1Q 2020	---	$47,644	$57,523
2Q 2020	---	$52,502	$62,060
3Q 2020	---	$48,683	$60,184
4Q 2020	---	$48,293	$59,532
1Q 2021	---	$55,504	$66,889
Projected[1]			
2025	$48,247	$59,531	$71,114
2030	$60,293	$74,663	$89,940
2035	$75,952	$94,387	$114,601
2040	$95,749	$119,390	$146,088
CAGR	**4.5%**	**4.6%**	**4.8%**

Source: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Economic Analysis, 2021.

Notes: --- Data not available.

Gross Domestic Product

Historical GDP for Stillwater has consistently increased but has not equaled both state and national growth rates. Quarterly data from the Bureau of Economic Analysis indicates the GDP for both the state and nation declined in the second quarter of 2020 but has regained and exceeded those levels by the first quarter of 2021.

Woods & Poole projects the City's GDP growth rate will still be below state and national rates but will increase at a slightly greater rate than the historical growth rate. Meanwhile, expectations for the state and nation are a decrease in the future growth rate compared to the historical rates. **Table B-5** lists the historical and projected GDP breakdown of the city, state, and nation.

Table B-5: GDP Data (In Millions), 2010-2040

Year	Stillwater	Oklahoma	United States
Historical[1]			
2010	$2,987	$159,774	$155,562,809
2015	$3,173	$180,442	$175,776,505
2020	$3,250	$194,054	$198,107,361
CAGR	**0.8%**	**2.0%**	**2.4%**
2020-2021 by Quarter[2]			
1Q 2020	---	$195,606	$215,611,390
2Q 2020	---	$173,061	$195,201,140
3Q 2020	---	$186,883	$211,702,520
4Q 2020	---	$190,776	$214,947,310
1Q 2021	---	$198,008	$220,615,030
Projected[1]			
2025	$3,444	$209,939	$220,128,092
2030	$3,618	$225,596	$242,580,423
2035	$3,782	$241,402	$265,938,763
2040	$3,938	$257,486	$290,419,913
CAGR	**1.0%**	**1.4%**	**1.9%**

Sources: [1] Woods & Poole, Inc., 2020.
[2] Bureau of Economic Analysis, 2021.

Notes: --- Data not available.

Community/Airport Location and Potential

Stillwater is centrally located between two large metropolitan areas: Tulsa 65 miles to the east and Oklahoma City 60 miles to the south. North-central Oklahoma provides a strong and definable market area for all forms of aviation activity.

SWO is less than 3 miles northwest of downtown Stillwater. With over 1,400 acres of undeveloped property and development potential remaining high, SWO is poised to attract additional aviation and non-aviation development in the future. SWO's largest tenant, the OSU Flight Center, provides flight instruction, on-site classroom instruction, simulator technology, and aircraft maintenance for its current aircraft fleet. There are approximately 300 students enrolled in the six undergraduate and graduate degree programs.

Community Support

SWO benefits from an exceptional relationship with and support from the City of Stillwater, as well as OSU, local industry, and surrounding citizens. SWO is recognized as a vital asset that contributes to the stability and future of the city and region's economy. The overall position of the populace is one of continued growth and development, with special focus on the incentive of a commercial service airport continuing to attract additional economic and industrial development to the area.

Air Carrier Service Profiles

Envoy Airlines, one of nine regional air carriers operating as American Eagle under a codeshare agreement with American Airlines, initiated service in 2016 and is the only commercial air carrier currently serving SWO

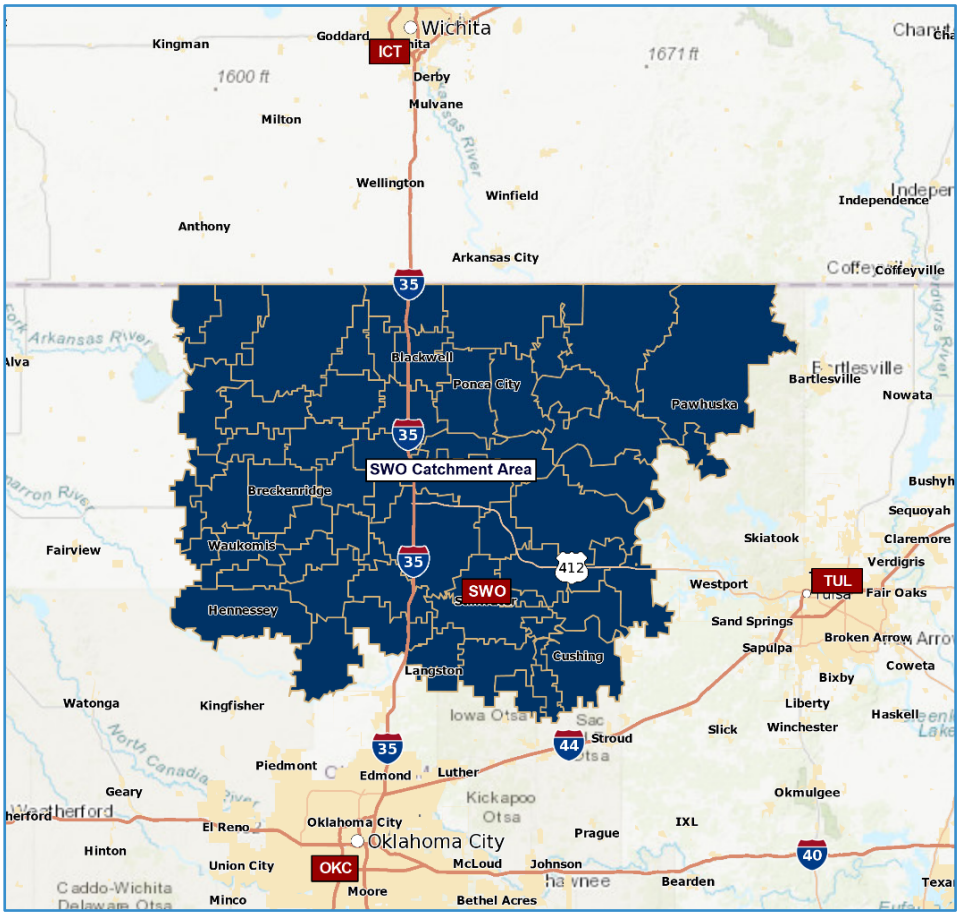
(although SkyWest Airlines also operates at SWO at the discretion of American Airlines). The carrier currently provides two daily flights between SWO and Dallas-Fort Worth International Airport (DFW). Up to mid-2021, the flights used both the 50-seat Embraer ERJ-145 and the 44-seat Embraer ERJ-140 aircraft. In mid-2021, Envoy/SkyWest Airlines discontinued use of the ERJ-140.

Martinaire Aviation, LLC is a FAR Part 135 air cargo carrier based in Dallas, Texas, that has served SWO since 2009. They currently provide an approximate weekly schedule to SWO through Cessna C208 Caravan aircraft. Other air cargo at SWO is transported in the belly compartments of Envoy/SkyWest Airlines commercial service aircraft or via non-scheduled chartered air cargo aircraft.

Catchment Area/True Market

An airport catchment area is the surrounding geographic area containing the population of passengers who should reasonably be expected to use the airport considering drive times to competing airports. It is also representative of the local market and most travelers using or expected to use the airport. The area is presented in the Passenger Demand Analysis prepared separately (see **Appendix Two**) and portrayed in **Figure B-1**. SWO's catchment area comprises 60 zip codes and has a 2020 population of 250,782.

Figure B-1: SWO's Catchment Area



An airport's true market estimate is based on data from the airline's reporting origin and destination statistics to the U.S. DOT and by ticket data from Airline Reporting Corporation (ARC). ARC data includes tickets sold through travel agencies as well as via online travel agencies by passengers using SWO within the catchment area. It does not include tickets issued directly by airline websites or reservation offices. As presented in the Passenger Demand Analysis, SWO's 2020 true market is estimated at 351,291 origin and destination passengers. This is mostly representative of domestic passengers (318,455 or 91 percent), with the remainder being international passengers (32,836 or 9 percent).

Airfares

According to the Passenger Demand Analysis, SWO's 2020 overall average domestic airfare was 209 dollars. This is 25 dollars higher than average domestic airfares at Oklahoma City's Will Rogers' World Airport (OKC), 23 dollars higher than Tulsa International Airport (TUL), and 19 dollars higher than Dallas Fort Worth International Airport (DFW). From 2017 through 2020, overall airfares increased at a lower CAGR at SWO compared to DFW, but were higher than OKC, TUL, and Wichita Dwight D. Eisenhower National Airport (ICT).

New Air Service Opportunities

While SWO is one of the few airports in the country that had no commercial air service since airline deregulation and was able to successfully recruit traditional legacy service, it is unlikely to add service to a new hub either through American Airlines or a different air carrier, although additional service is one of the highest priority goals for SWO to accomplish. According to the Passenger Demand Analysis, the benchmarks indicating the need to consider additional service are improvement in passenger numbers on existing flights (i.e., higher boarding load factors) and consistent revenue per available seat mile that is on par or above peer markets. Long-term, service to Chicago O'Hare International Airport (ORD) on American Airlines or new service via United Airlines to Denver International Airport (DEN) would be the most likely candidates.

Potential Challenges

Few negative factors have the potential to significantly impact future aviation activity at SWO. However, as part of the planning process, considering broad factors that could have a negative or neutralizing effect is important.

COVID-19

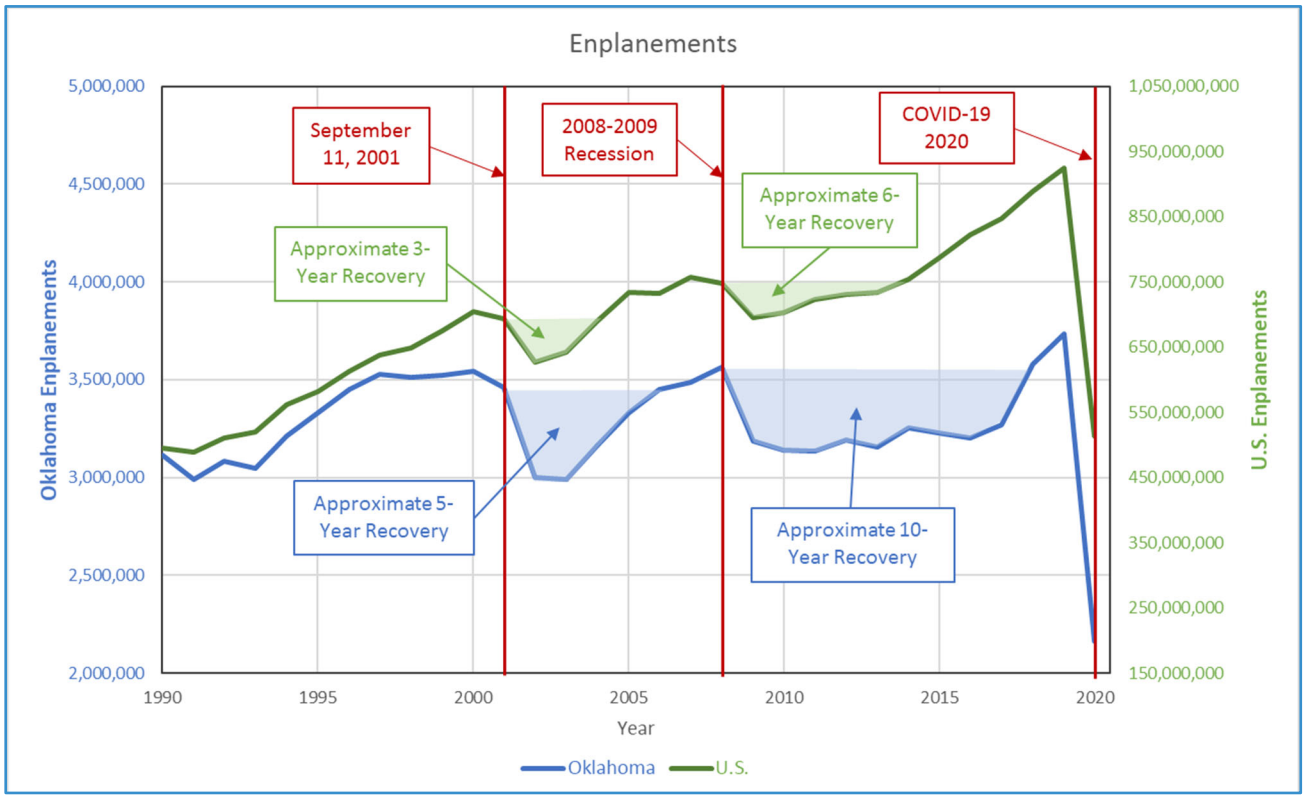
The effects of the COVID-19 pandemic and the emergence of the COVID-19 Delta variant in the summer of 2021 are lingering concerns. Beginning in March 2020 and continuing through the fall/winter of that year, the pandemic and resulting lockdowns had serious negative effects on worldwide economies, and in particular, the aviation industry. Airline travel was severely affected, causing air carriers to reduce flights, cut back services, and ground aircraft, thus reducing system-wide capacity. Service to SWO was reduced from three daily flights in the summer of 2019 to one daily flight in the spring of 2020. By summer 2020 the second flight had been reinstated but service was once again reduced to one daily flight in late summer. However, in mid-summer 2021, the second daily flight was reinstated.

The length of time required for enplanements to recover from the COVID-19 pandemic might be gleaned by examining recovery times from recent past global economic crises. **Figure B-2** illustrates the historical TAF data for statewide and nationwide enplanements since 1990, with a focus on enplanements recovery after the September 11, 2001, terrorist attacks and the 2008-2009 recession. Both events took a toll on passenger enplanements, but the impact of the COVID-19 pandemic is even more severe than those two events.

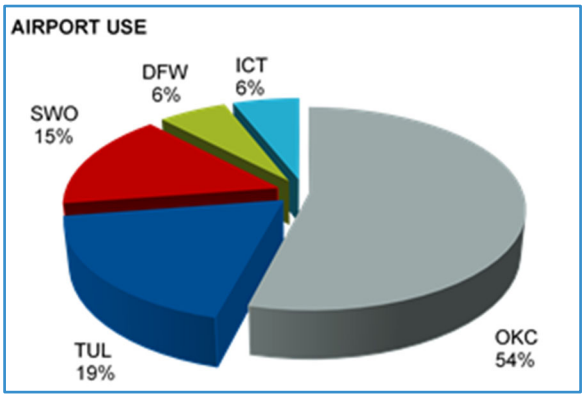
Nationwide enplanements decreased a total of 9.4 percent from FY 2001 to 2002, 7.0 percent from FY 2008 to 2009, and 44.4 percent from FY 2019 to 2020. Statewide enplanements decreased 13.4 percent from FY 2001 to 2002, 10.5 percent from FY 2008 to 2009, and 42.1 percent from FY 2019 to 2020. Since SWO did not have scheduled passenger service until mid-2016, historical passenger enplanement data is not relevant. However, SWO passenger enplanements decreased 20.9 percent from FY 2019 to 2020. The data indicates that an average of four years were required for nationwide passenger enplanements to recover after each event. Statewide numbers show longer recovery times, where an average of seven years was required for passenger enplanements to recover to pre-event levels. This indicates the post-COVID pandemic passenger

level recovery may be prolonged since the reduction was much more drastic in terms of total passenger enplanement decreases.

Figure B-2: State and National Enplanements, 1990-2020



Proximity to Other Commercial Service Airports



Stillwater's proximity and relative ease of vehicle access to both OKC and TUL make it challenging to retain commercial service passengers and expand air service. In addition to using OKC or TUL rather than SWO, local airport users were shown to travel out of state to DFW in Texas and ICT in Kansas. According to the Passenger Demand Analysis, of the total SWO true market, only 15 percent of the domestic passengers and 14 percent of the international passengers used SWO. OKC captured the most domestic and international passengers of SWO's true market, with 55 percent and 47 percent, respectively. TUL captured 19 percent and 14 percent of domestic and international passengers, respectively, of SWO's true market.

Because of the presence of low-cost carriers such as Allegiant and Frontier at the competing airports, it is thought that many residents within SWO's catchment area will continue to choose the over one-hour drives to either OKC or TUL.

State of General Aviation

Other potential challenges could include the relatively slow growth in general aviation (GA) activity nationally for the past 20 years. New general aviation aircraft deliveries and active general aviation aircraft have declined. According to the General Aviation Manufacturer Association (GAMA) Annual Report 2020, worldwide shipments of all GA aircraft declined by more than 23 percent since 2000. Fewer planes being produced would suggest less demand for planes, which indicates fewer planes used worldwide. This is confirmed by data published in the FAA's Aerospace Forecasts 2021-2041, which reports active GA aircraft in the United States declined by over 8 percent from 2010 to 2020, resulting in a CAGR of -0.9 percent. The FAA Aerospace Forecasts also reported that GA aircraft operations at towered airports declined by over 6 percent from 2010 to 2020, a CAGR of -0.6 percent.

HISTORICAL AND EXISTING AVIATION ACTIVITY PROFILE

Aviation activity forecasting commences by using the present time as a starting point, supplemented with historical data obtained from various sources. Normal activity profiles use data from the previous 10 years (i.e., 2010 to 2020) for historical trends in an attempt to explain the changes that have occurred. This Master Plan includes an analysis from the 10-year period of 2009 to 2019 to draw conclusions prior to the COVID-19 pandemic for projecting what a long-term recovery might look like. The Master Plan also, where records are available, includes SWO's activity for FY 2021 Year-to-Date (i.e., October 2020 through June 2021) and for the previous 12 months (i.e., July 2020 through June 2021) for the most recent data to evaluate how SWO is currently recovering since the full effects of the COVID-19 pandemic began in March 2020. The historical profile serves as a baseline for the forecasts and includes information on passengers, air carrier, air cargo, GA, and military aviation activity.

The SWO ATCT records flights from 8:00 a.m. to 10:00 p.m. Operations that occur outside of these hours are not included in records submitted to the FAA. Commercial airline operations are reported to the DOT and capture operations occurring outside of ATCT operating hours. USDOT does not record GA operations.

Commercial Service

Commercial service encompasses scheduled passenger flights, cargo flights, and non-scheduled charter flights. The following sections describe the passenger enplanements, commercial operations, and air cargo service at SWO.

Passenger Enplanements and Airline Operations

The FAA TAF defines a passenger enplanement as a passenger who boards a scheduled commercial or chartered aircraft with more than nine seats for turboprops (or any number of seats for jet aircraft). The

aircraft must be operating under Title 14 Code of Federal Regulations (CFR) Part 121 that applies to air carriers and commercial operators. Passenger enplanements include revenue and non-revenue passengers who paid taxes and passenger facility charges (PFC) for their carriage. Passenger enplanements do not include pilots, flight attendants, and any other members of the airline crew.

Passenger enplanements are categorized as air carrier or air taxi/s based on the type of carrier that is operating the route. For example, passengers on an American Airlines B 737 would be categorized as air carrier enplanements, whereas passengers on an American Eagle ERJ 145 would be categorized as air taxi enplanements. Airline operations are categorized based on aircraft seating capacity. Aircraft operating with more than 60 seats are classified as air carrier; aircraft with 60 or fewer seats are classified as air taxi.

TAF Airline Classification System

Classification	Air Carrier	Air Taxi
Enplanements	Operated by a mainline carrier	Operated by a regional carrier
Operations	More than 60 seats	60 or fewer seats

Enplanements for 2009 to 2021 are shown in **Table B-6**. The air carrier enplanements are primarily the result of university athletic teams using chartered mainline air carrier flights into and out of SWO. SWO air carrier enplanements have fluctuated but remained somewhat steady throughout the years (averaging 1,665) with an overall decrease, resulting in a CAGR of -3.4 percent between 2009 to 2019 (10-year pre-pandemic analysis), and by a decrease of 2.7 percent decrease from 2010 to 2020 (10-year analysis to include the pandemic).

Since scheduled commercial service is provided by Envoy/SkyWest Airlines (i.e., regional carriers), the airline enplanements are classified as air taxi/commuter. With the resumption of scheduled passenger air service in mid-2016, the air taxi/commuter enplanements analysis is limited to the changes experienced since 2017, the first full year of service. Air taxi/commuter enplanements increased at a CAGR of 3.2 percent between 2017 and 2019 prior to the COVID-19 pandemic. While only a two-year dataset, this is reflective of healthy growth. With the sharp enplanement declines experienced in 2020, the three-year CAGR was a decrease of 14.6 percent.

Table B-6: Passenger Enplanements, 2009-2021

Fiscal Year	Air Carrier	Air Taxi/Commuter	Total	Percent Change
2009[1]	2,028	214	2,242	N/A
2010[1]	1,718	288	2,006	-10.5%
2011[1]	1,304	141	1,445	-28.0%
2012[1]	2,115	79	2,194	51.8%
2013[1]	1,888	0	1,888	-13.9%
2014[1]	1,588	32	1,620	-14.2%
2015[1]	1,642	0	1,642	1.4%
2016[1]	1,386	2,131	3,517	114.2%
2017[1]	1,929	25,825	27,754	689.1%
2018[1]	1,629	24,689	26,318	-5.2%
2019[1]	1,441	27,523	28,964	10.1%
CAGR	**-3.4% (2009-2019)**	**3.2% (2017-2019)**	**2.2% (2017-2019)**	**N/A**
2020[1]	1,308	16,102	17,410	-39.9%
CAGR	**-2.7% (2010-2020)**	**-14.6% (2017-2020)**	**-14.4% (2017-2020)**	**N/A**
2021 (YTD)	887[2]	10,951[3]	11,838	-32.0%
2021 (Previous 12 Months)	1,066[2]	13,683[3]	14,749	-15.3%
CAGR (2017-2021)	**-13.8**	**-14.7%**	**-15.4%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] SWO staff.
[3] Envoy Airlines SWO station manager and SWO staff (includes revenue and non-revenue passengers, plus 538 athletic sports team passengers boarding chartered air aircraft with 60 seats or less).

Notes: YTD=Year-to-Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

The year-to-date (i.e., October 2020 through June 2021) and previous 12-month total (i.e., July 2020 through June 2021) analysis indicates that enplanements are behind 2020 levels. However, this is to be expected as FY 2020 enplanements included five months of non-pandemic enplanements that were on pace to exceed FY 2019 enplanements before the full effects of COVID-19 pandemic were felt. Additionally, from May 2019 through February 2020, SWO did not experience a decrease in monthly enplanements from the previous year, averaging a monthly increase of 10.9 percent from the previous year. Finally, during the fall and winter of 2020-2021, the OSU administration imposed seating restrictions on its athletic events reducing most athletic facilities to 25 percent of maximum capacity. These restricted seating events, especially during the fall football season, had an additional negative impact on passenger enplanements as some ticket holders who would normally have flown commercially were unable or chose not to attend the athletic events. These seating restrictions have since been lifted and are not expected to be reimposed.

The TAF also divides commercial service operations (an operation is defined as either a takeoff or a landing) into two categories: air carrier and air taxi/commuter. Air carrier operations are defined as activity by aircraft of more than 60 seats and air cargo aircraft with more than 18,000 pounds of payload capacity. Air taxi/commuter activity is defined as aircraft with 60 seats or fewer that transport regional passengers on scheduled commercial flights, non-scheduled or for-hire flights, and air cargo flights with 18,000 pounds or less payload. The air taxi category includes all air cargo and non-airline operations that involve direct on-demand transactions rather than a regularly scheduled flight. Air carrier operations include all scheduled

operations with a commercial component regardless of number of seats, such as operations through Envoy Airlines Embraer ERJ 140 and 145, which are 44- and 50-seat aircraft, respectively. As shown in **Table B-7**, air carrier commercial service aircraft operations have decreased during the historical timeframe with the exception being 2017, when ATCT personnel mistakenly recorded a portion of Envoy Airlines' 50-seat aircraft as air carrier operations instead of commuter. Historical air taxi/commuter commercial service aircraft operations have remained relatively stable with an overall increase. The increases experienced since 2017 are the result of the successful reinstated daily service of Envoy/SkyWest Airlines.

Table B-7: Commercial Service Operations, 2009-2021

Fiscal Year	Air Carrier	Air Taxi/ Commuter	Total	Percent Change
2009[1]	61	1,120	1,190	N/A
2010[1]	80	965	1,045	-12.2%
2011[1]	51	1,284	1,335	27.8%
2012[1]	73	1,167	1,240	-7.1%
2013[1]	69	717	786	-36.6%
2014[1]	57	1,075	1,132	44.0%
2015[1]	41	859	900	-20.5%
2016[1]	85	646	731	-18.8%
2017[1]	362	1,635	1,997	173.2%
2018[1]	38	2,664	2,702	35.3%
2019[1]	32	2,485	2,517	-6.8%
CAGR (2009-2019)	**-6.2%**	**8.3%**	**7.8%**	**N/A**
2020[1]	30	1,890	1,920	-23.7%
CAGR (2010-2020)	**-9.3%**	**7.0%**	**6.3%**	**N/A**
2021 (YTD)[2]	22	1,472	1,494	-22.2%
2021 (Previous 12 Months)[2]	22	1,951	1,973	2.8%
CAGR (2011-2021)	**-8.1%**	**4.3%**	**4.0%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), 2021.

Notes: YTD=Year to Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

Air Cargo

As stated previously, air cargo transported at SWO is provided primarily by Martinaire Aviation, LLC with approximately one flight per week using Cessna Caravan 208 aircraft. Additional air cargo is either shipped in the belly compartments of air carrier aircraft or transported by non-scheduled charter air cargo aircraft. **Table B-8** shows the air cargo transported exclusively by Martinaire Aviation at SWO over the past approximate two and one-half years (this is the only data available). The short trend expressed by this data suggests a stable amount of annual cargo transported with ample payload capacity available in the existing aircraft operations.

Using data provided by the USDOT T-100 database, the information presented in **Table B-9** indicates air cargo volume transported in the belly compartments of air carrier aircraft or non-scheduled charter air cargo aircraft at SWO had increased through 2020, with the 10-year CAGRs of 24.1 percent from 2009 to 2019, and 41.0 percent from 2010 to 2020. It was only during the more recent 10-year period from 2011 to 2021 that a decreasing CAGR was experienced at -7.8 percent.

Table B-8: Martinaire Aviation Air Cargo Volumes, 2019-2021

Calendar Year	Cargo Out	Cargo In	Total Cargo	Percent Change	Operations	Payload	Percent of Payload
2019	17,399	34,737	52,136	N/A	96	336,000	15.5%
2020	12,230	24,827	37,057	-28.9%	92	322,000	11.5%
2021 (YTD)	7,472	17,568	25,040	-32.4%	56	196,000	12.8%
CAGR (2019-2020)	**-29.7%**	**-28.5%**	**-28.9%**	**N/A**	**-4.2%**	**-4.2%**	**N/A**
2021 (Previous 12 Months)	11,915	27,917	39,832	7.5%	96	336,000	11.9%
CAGR (2019-2021)	**-17.2%**	**-10.4%**	**-12.6%**	**N/A**	**0.0%**	**0.0%**	**N/A**

Source: Martinaire Aviation LLC, August 2021.

Notes: YTD=Year to Date (January through July 2021). Previous 12 Months=August 2020 through July 2021.

Table B-9: Air Cargo Volumes, 2009-2021

Calendar Year	Cargo Out	Cargo In	Total Cargo	Percent Change
2009	2,713	4,660	7,373	N/A
2010	875	616	1,491	-79.8%
2011	32,131	21,275	53,406	3481.9%
2012	18,315	22,570	40,885	-23.4%
2013	6,124	9,142	15,266	-62.7%
2014	16,660	9,710	26,370	72.7%
2015	33,037	19,740	52,777	100.1%
2016	32,333	27,198	59,531	12.8%
2017	37,959	29,556	67,515	13.4%
2018	32,785	16,619	49,404	-26.8%
2019	33,427	30,390	63,817	29.2%
CAGR (2009-2019)	**28.5%**	**20.6%**	**24.1%**	**N/A**
2020[1]	38,593	7,797	46,390	-27.3%
CAGR (2010-2020)	**46.0%**	**28.9%**	**41.0%**	**N/A**
2021 (YTD)	251	303	554	-98.8%
2021 (Previous 12 Months)	16,345	7,898	24,243	-47.7%
CAGR (2011-2021)	**-6.5%**	**-9.4%**	**-7.6%**	**N/A**

Source: USDOT T-100, September 2021.

Notes: YTD = Year to Date (January through June 2021). Previous 12 Months=July 2020 through June 2021.

General Aviation

GA refers to flight activities that do not include scheduled air services, unscheduled air transport operations, or military operations. GA activities include, but are not limited to, flight training, recreational flying, private and corporate air transportation, and flight testing.

Itinerant GA Operations

Itinerant operations are those that originate and terminate at different airports. These operations include business travelers coming to and from the community, recreational pilots, and student pilots performing cross country training flights. Itinerant operations made up 45 percent of overall GA operations in 2020 and have been increasing at an average annual rate of 2.5 percent between 2010 and 2020. This is down from the 3.0

percent CAGR experienced between 2009 and 2019. Year-to-date (June 2021) and the previous 12 months' levels seem to indicate that itinerant GA activity is rebounding from the COVID-impacted 2020 level.

Local GA Operations

Local operations are those that originate and terminate at the same airport. These operations are generally performed by pilots practicing landings. Touch-and-go operations, where aircraft land, slow, then accelerate and takeoff without leaving the runway, count as two operations. Depending on the traffic pattern, an aircraft can perform more than six operations in an hour when practicing touch-and-goes. Local operations are highly sensitive to the amount of flight training occurring at an airport. As mentioned previously, SWO has two flight schools, the OSU Flight Center and Hangar 1 Flight Center. Local GA operations made up 55 percent of overall GA operations in 2020 and have been increasing at an average annual rate of 1.3 percent between 2010 and 2020. Like itinerant GA operations, local GA operations were increasing at a faster rate prior to 2020, experiencing a CAGR of 2.5 percent between 2009 and 2019. Unlike itinerant GA operations, local GA operations experienced year-to-date and the previous 12 months do not indicate a rebound to pre-COVID levels.

However, discussions with OSU Flight Center personnel indicate their training levels will increase in the future. Currently, approximately 300 students are in the flight training program. With small, incremental changes, OSU intends to increase student enrollment in the program to approximately 400 in the future. This represents a 33 percent increase in student pilots. The OSU Flight Center also has plans to upgrade their existing training fleet, replacing older Cessna 152s with Cirrus SR20 and Piper PA-44 Seminole aircraft.

Total GA operations have fluctuated during the past decade, but overall SWO has experienced healthy growth. **Table B-10** presents SWO itinerant, local, and total GA operations since 2009. **Figure B-3** shows the breakdown graphically.

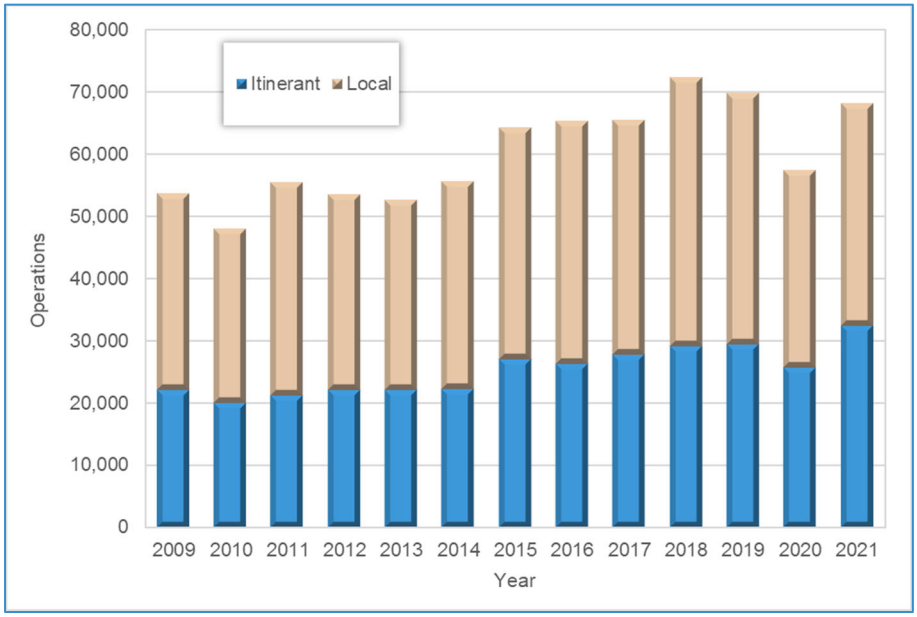
Table B-10: GA Operations, 2009-2021

Fiscal Year	Itinerant Operations	Percent Change	Local Operations	Percent Change	Total Operations	Percent Change
2009[1]	21,921	N/A	31,526	N/A	53,447	N/A
2010[1]	19,959	-9.0%	28,045	-11.0%	48,004	-10.2%
2011[1]	21,195	6.2%	34,305	22.3%	55,500	15.6%
2012[1]	22,020	3.9%	31,551	-8.0%	53,571	-3.5%
2013[1]	21,994	-0.1%	30,731	-2.6%	52,725	-1.6%
2014[1]	22,180	0.8%	33,553	9.2%	55,733	5.7%
2015[1]	27,009	21.8%	37,355	11.3%	64,364	15.5%
2016[1]	26,291	-2.7%	39,119	4.7%	65,410	1.6%
2017[1]	27,782	5.7%	37,787	-3.4%	65,569	0.2%
2018[1]	29,113	4.8%	43,310	14.6%	72,423	10.5%
2019[1]	29,455	1.2%	40,501	-6.5%	69,956	-3.4%
CAGR (2009-2019)	**3.0%**	**N/A**	**2.5%**	**N/A**	**2.7%**	**N/A**
2020[1]	25,654	-12.9%	31,858	-21.3%	57,512	-17.8%
CAGR (2010-2020)	**2.5%**	**N/A**	**1.3%**	**N/A**	**1.8%**	**N/A**
2021 (YTD)[2]	23,945	N/A	24,604	N/A	48,549	N/A
2021 (Previous 12 Months)[2]	32,375	26.2%	35,879	12.6%	68,254	18.7%
CAGR (2011-2021)	**4.3%**	**N/A**	**0.4%**	**N/A**	**2.1%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), August 2021.

Notes: YTD=Year to Date (October 2020 through June 2021). Previous 12 Months=July 2020 through June 2021.

Figure B-3: Itinerant and Local General Aviation Operations, 2009-2021



Military

SWO does not have based military aircraft. The aircraft operations are mainly related to training or touch-and-go flights and fueling of various aircraft and mission types. Military activity is driven by the needs of the U.S. Department of Defense rather than by economic forces. Therefore, for planning purposes, military operations are projected to remain flat at the 2020 levels. Historical military operations are provided in **Table B-11**.

Table B-11: Military Operations, 2009-2021

Fiscal Year	Itinerant	Local	Total	Percent Change
2009[1]	709	1,207	1,916	N/A
2010[1]	1,523	1,876	3,399	77.4%
2011[1]	1,363	2,044	3,407	0.2%
2012[1]	1,146	1,863	3,009	-11.7%
2013[1]	1,187	1,676	2,863	-4.9%
2014[1]	1,384	2,344	3,728	30.2%
2015[1]	1,115	1,492	2,607	-30.1%
2016[1]	1,099	1,551	2,650	1.6%
2017[1]	1,107	1,405	2,512	-5.2%
2018[1]	1,326	1,734	3,060	21.8%
2019[1]	1,485	1,324	2,809	-8.2%
CAGR (2009-2019)	**7.6%**	**0.9%**	**3.8%**	**N/A**
2020[1]	1,314	1,897	3,211	14.3%
CAGR (2010-2020)	**-1.5%**	**0.1%**	**-0.6%**	**N/A**
2021 (YTD)[2]	1,137	1,207	3,642	N/A
2021 (Previous 12 Months)[2]	1,872	2,634	4,506	N/A
CAGR (2011-2021)	**3.2%**	**2.6%**	**2.8%**	**N/A**

Sources: [1] FAA TAF, 2021.

[2] FAA The Operations Network (OPSNET), 2021.

Existing Operations by Aircraft Type

Table B-12 shows the total breakdown of aircraft operations at SWO and their percentage of total operations. The breakdown by type for Commercial Service and GA turboprop and jet activity come directly from the FAA TFMSC data since the confidence level regarding the accuracy of the data recorded in TFMSC is very high. The TFMSC confidence level for the accuracy of other aircraft types is not as high, and therefore various degrees of estimation have been applied to arrive at these operational numbers. SWO ATCT personnel reviewed and approved the data as being accurate according to their estimation.

Table B-12: Existing Operations by Aircraft Type, 2019, 2020, and 2021

Aircraft Type	FY 2019 Operations	Percentage	FY 2020 Operations	Percentage	FY 2021 Operations[1]	Percentage
Commercial Service	**2,517[2]**	**3.3%**	**1,920[2]**	**3.1%**	**1,973[1]**	**2.6%**
Air Carrier[2]	32	1.3%	30	1.6%	22	1.1%
Narrow Body Jet[3]	32	100.0%	30	100.0%	22	100.0%
Air Taxi/Commuter[2]	2,485	98.7%	1,890	98.4%	1,951	98.9%
Regional Jet[3]	1,791	72.1%	1,312	69.4%	991	50.8%
Air Cargo[3]	100	4.0%	92	4.9%	94	4.8%
GA Types[4]	584	23.9%	486	25.7%	866	44.4%
General Aviation	**69,956[2]**	**92.9%**	**57,512[2]**	**91.8%**	**68,254[1]**	**91.3%**
Single Engine Piston[6]	62,162	88.9%	51,277	89.2%	62,311	91.3%
Multi-Engine Piston[5]	6,347	9.1%	4,911	8.5%	4,461	6.5%
Turboprop[3]	564	0.8%	623	1.1%	693	1.0%
Jet[3]	883	1.3%	697	1.2%	787	1.2%
Helicopter[3]	0	0.0%	4	0.0%	2	0.0%
Military	**2,809[2]**	**3.7%**	**3,211[2]**	**5.1%**	**4,506[1]**	**6.0%**
Piston[7]	2,099	74.7%	2,661	82.9%	3,830	85.0%
Turboprop[3]	476	16.9%	350	10.9%	516	11.5%
Jet[3]	216	7.7%	192	6.0%	150	3.3%
Helicopter[3]	18	0.6%	8	0.2%	10	0.2%
Total[1]	**75,282[2]**	**100%**	**62,643[2]**	**100%**	**74,733[1]**	**100%**

Sources: [1] Previous 12 Months (July 2020 through June 2021) using FAA OPSNET, 2021.

[2] FAA TAF, 2021.

[3] TFMSC Direct – Operations obtained directly from TFMSC data.

[4] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[5] TFMSC Derived – Operations derived from applying the ratio of MEP to all piston operations contained in TFMSC to the remainder of GA operations when turboprop, jet and helicopter operations are removed.

[6] TFMSC Derived – Operations derived from subtracting the sum of GA MEP, turboprop, jet, and helicopter operations from total GA operations.

[7] TFMSC Derived – Operations derived from subtracting the sum of turboprop, jet, and helicopter operations from total Military operations.

Based Aircraft

The FAA categorizes based aircraft by engine with the main categories being single engine piston, multi-engine piston, jet aircraft with turbine engines (includes both turboprops and turbojets), helicopters, and other, which includes experimental sport, glider, and ultralight aircraft. Based aircraft are those stored in a hangar or apron at SWO and do not include itinerant aircraft temporarily stored. **Table B-13** shows the based aircraft records from 2009 to 2021. Based aircraft at SWO have remained steady with a slight overall increase.

As of 2021, 90 percent of based aircraft at SWO are single engine, 7.5 percent are multi-engine piston, and 2.5 percent are jet (which are single engine turboprop aircraft). No aircraft categorized as “Other” have been based at SWO since 2009. Growth in single engine piston and jet aircraft have offset the decline in multi-engine piston and helicopter.

Table B-13: Based Aircraft, 2009-2021

Fiscal Year	Single Engine Piston	Multi-Engine Piston	Jet	Helicopter	Other	Total	Percent Change
2009[1]	66	10	0	1	1	78	N/A
2010[1]	62	8	0	1	0	71	-9.0%
2011[1]	63	6	0	1	0	70	-1.4%
2012[1]	64	6	0	1	0	71	1.4%
2013[1]	64	6	0	1	0	71	0.0%
2014[1]	68	5	0	2	0	75	5.6%
2015[1]	65	5	0	2	0	72	-4.0%
2016[1]	64	5	0	1	0	70	-2.8%
2017[1]	64	5	0	1	0	70	0.0%
2018[1]	64	5	0	1	0	70	0.0%
2019[1]	66	5	0	0	0	71	1.4%
CAGR (2009-2019)	**0.0%**	**-6.7%**	**N/A**	**-100%**	**-100%**	**-0.9%**	**N/A**
2020[1]	67	5	0	0	0	72	1.4%
CAGR (2010-2020)	**0.8%**	**-4.6%**	**N/A**	**-100%**	**N/A**	**0.1%**	**N/A**
2021[2]	72	6	2	0	0	80	11.1%
CAGR (2011-2021)	**1.3%**	**0.0%**	**200%**	**-100%**	**N/A**	**1.3%**	**N/A**

Sources: [1] FAA TAF, 2021.
[2] SWO staff.

FORECAST DOCUMENTATION REVIEW

Prior to forecasting future activity levels at SWO, examining historical aviation activity data, existing and emerging trends, and projections made by other independent organizations is important for context. The following reports, studies, and publications and their associated projections were reviewed, and their relevance to the SWO is discussed.

2008 Stillwater Regional Airport Master Plan

The 2008 Stillwater Regional Airport Master Plan has a base year of 2006 and forecasted aviation activity through the year 2026. Prepared almost a full decade before the reinstatement of commercial air carrier service, the total enplanements were forecasted to minimally increase from 1,436 to 2,970 (CAGR of 3.7 percent), relying primarily on the increase in the transportation of college athletic teams and the occasional charter service to gambling destinations such as Laughlin, Arizona, and Reno, Nevada. Air carrier and charter aircraft operations were projected to increase from 250 to 360 operations (CAGR of 1.8 percent); GA operations were projected to increase from 78,415 in 2006 to 119,091 by 2026 (GACR of 2.0 percent). Based aircraft were expected to increase from 77 in the 2006 to 102 by 2026 (CAGR 1.4 percent). A comparison of the forecast to actual activity levels indicates from 2006 to 2016 operations and based aircraft grew at slower rates than anticipated; enplanements far exceeded the forecast.

2015 Stillwater Regional Airport Air Service Environmental Assessment

The 2015 Stillwater Regional Airport Air Service Environmental Assessment provided forecasts for the base year of commercial air carrier service (2016) and a five-year with and without air carrier service future forecast (2021). The project forecasts anticipated initial year and five-year projections for commercial service passengers to equal a total of 57,938 (28,969 enplanements). This was an estimation based on two daily flights with 77 percent occupancy of a 50-seat aircraft and the charter flights of college athletic teams. Air carrier operations were also anticipated not to increase during the five-year forecast period, remaining at 1,517 operations. Air Taxi and Commuter aircraft operation increases were expected to grow from 1,108 in 2016 to 1,193 by 2021 (CAGR of 1.5 percent). GA operations were projected to increase from 22,549 in 2016 to 23,933 in 2021 (CAGR of 1.2 percent).

FAA's Terminal Area Forecast (TAF)

The TAF is an FAA developed forecasting tool that the FAA updates annually and uses to determine budget and staffing needs. Due to limited staff resources, the FAA cannot forecast to the same degree of detail at smaller regional airports as they can at large airports. However, the TAF provides a guideline for developing forecasts and is utilized by FAA to compare scenario-driven forecasts with the forecasts developed by the FAA. The TAF projects enplanements at SWO to increase from 17,410 in 2020 to 28,964 by 2025, remaining constant at this level through 2045 (CAGR of 2.1 percent). Total commercial service operations are projected to increase from 1,920 in 2020 to 3,061 in 2045 (CAGR of 1.9 percent). GA operations are expected to increase from 57,512 in 2020 to 88,248 by 2045 (CAGR of 1.7 percent). The TAF predicts SWO's based aircraft to increase from 72 in 2020 to 123 in 2045 (CAGR of 2.2 percent).

FAA's Aerospace Forecasts Fiscal Years 2021-2041

The FAA Aerospace Forecasts, updated annually, are aeronautical activity projections by major industry sectors used to understand future demands on the national airport and airspace systems. Many factors are considered in the FAA's development of the forecasts. Some of the most important include U.S. and international economic forecasts and anticipated trends in fuel costs. The FAA Aerospace Forecasts are used for the SWO forecasts to correlate with past activity trends, assimilate nationwide industry patterns, comprehend the basis for the major forecast rationale and methodology, and to quantify growth patterns and rates of change relative to specific industry activity and utilization components.

Major assumptions employed in the forecasts and the projections relevant to SWO are summarized here:

- Airline activity, capacity, and profitability were drastically affected by the COVID-19 pandemic. Extreme cost cutting measures and business modifications were implemented that will shape the industry for many years.
- It is thought that airlines will be smaller. Fleets have and will continue to be much younger and more fuel efficient with older aircraft retirement, and future growth will be restricted as airlines carry higher levels of debt and restrain capital spending and investment.

- Due to pent-up demand experienced by consumers in late 2020 and early 2021, domestic leisure passenger traffic has led the airline recovery so far, and domestic business passenger travel should increase in the short term.
- Over the long term, FAA sees the strengths and capabilities developed by airlines pre-COVID will return, and aviation growth will be driven by improving U.S. and world economies.
- Following three years of expected double-digit growth during the short-term recovery from 2021, U.S. air carrier domestic passenger growth is expected to level off at an average growth rate of 2.3 percent, resulting in a 20-year average growth rate of 4.9 percent per year.
- Nationwide, domestic passengers are expected to return to 2019 levels by early 2024.
- Air taxi and commuter aircraft operations are expected to increase by 1.1 percent annually at towered airports.
- The U.S. active GA aircraft fleet is expected to increase slightly at 0.1 percent annual growth.
- Active piston-powered fixed-wing aircraft are projected to decrease 0.9 percent annually. Active single engine piston-powered aircraft are forecast to decline 0.9 percent annually, while active multi-engine piston-powered aircraft are projected to decline by 0.4 percent annually.
- Active turbine-powered, fixed-wing aircraft are expected to increase 1.7 percent annually. Turboprop aircraft are expected to increase 0.6 percent annually, while turbojet aircraft are projected to increase 2.3 percent annually.
- Active light sport aircraft (i.e., aircraft with weight, capacity, and performance restrictions) are projected to increase significantly by 4.0 percent annually.
- Anticipated GA aircraft hours flown will increase 1.0 percent annually through 2041. GA operations at towered airports are expected to increase 0.8 percent annually.

AVIATION ACTIVITY FORECASTS

The role and importance of SWO will continue to support a wide range of activities including commercial service, flight training, GA activity, and military. The planning period forecasts aviation activity into the future, from baseline data collected in 2021 to the end of the period in 2040. SWO is expected to see steady growth over the next 20 years, but near-term airport activities have been adversely affected and will likely continue to be adversely affected by COVID-19. The methods, assumptions, risks, and uncertainties associated with the forecasts are presented. As stated earlier, each preferred forecast is compared with the FAA's TAF for consistency.

Forecast Approach and Methodology

Various statistical forecast methods are available to address aviation activity and overall demand. A technique's effectiveness depends on the availability and accuracy of the data. The three most common

methodologies considered and assessed for applicability in developing a range of reasonable forecast scenarios are described below.

Regression Analysis

In a regression analysis forecast, the value being estimated or forecast (called the dependent variable) is related to other variables (called the independent or explanatory variables, which help "explain" the estimated value). A correlation coefficient is calculated for each pairing of dependent to independent variables to quantify this link. One major advantage of regression analysis is that if the independent variables are more readily projected than the forecasts or dependent available, then deriving a forecast is relatively easy.

Market Share Analysis

A market share analysis is a relatively easy method to use and can be applied to any measure for which a reliable higher-level (i.e., larger aggregate) forecast is available. Historical shares are calculated and used as a basis for projecting future shares. This approach is a "top-down" method of forecasting, since forecasts of larger aggregates (e.g., national aviation forecasts) are used to derive forecasts for smaller areas (e.g., individual airport aviation forecasts).

Trend Analysis

Trend analysis relies on projecting historical trends into the future. In trend analysis, a regression equation is used, with time as the independent variable. It is one of the fundamental techniques used to analyze and forecast aviation activity. While it is frequently used as a back-up or expedient technique, it is highly valuable because it is simple to apply. Sometimes trend analysis can be used as a reasonable method of projecting variables that would be complicated to project by other means.

Correlation Analysis

Correlation analysis, which is part of the regression analysis methodology, ignores units and orders of magnitude and instead measures how closely different variables change in proportion to one another using percentages. Correlation can be negative, indicating that as one index grows, the other declines. Correlation is measured by the correlation coefficient, which ranges from -1.00 to +1.00. A score close to +/-1.00 suggests stronger positive/negative correlation, and a score closer to zero suggests that the two variables are not correlated. Scores with a coefficient greater than 0.8 are considered highly correlated.

While correlation shows potential interrelatedness between variables, it cannot be the sole factor to determine that growth of one variable is caused by the other. Often there are unrelated factors and additional variables that impact the growth in both variables. Correlation analysis usually does not fully explain why variables behave the way they do, but does help suggest a connection, or lack thereof, between variables that may be subject to the same market forces. Correlation is augmented by professional judgement that helps explain the correlation.

Passenger Enplanements

Forecasts of passenger enplanements serve as the foundation of other commercial service activity forecasts and provide a basis for determining future requirements for facilities integral to the accommodation of passengers.

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO's historical passenger enplanements from 2017 through 2020, which corresponds to the reinstatement of commercial service at SWO. The three variables with the highest correlation to SWO passenger enplanements are:

- Domestic revenue passenger enplanements on U.S. regional carriers as recorded in the FAA's Aerospace Forecasts 2021-2041 (correlation of 0.983).
- Domestic revenue passenger enplanements on U.S. commercial air carriers as recorded in the FAA's Aerospace Forecasts, 2021-2041 (correlation of 0.979).
- Enplanements within the State of Oklahoma (correlation of 0.958).

However, since SWO enplanements are a subset of these three variables, a market share analysis is considered more appropriate and was performed. SWO's market share, expressed as a percentage of the three variables, is provided in **Table B-14**.

Table B-14: Passenger Enplanement Market Share Comparison, 2017-2020

Fiscal Year	SWO[1]	U.S. Regional Carriers Domestic Revenue Enplanements[2]	SWO Market Share	Domestic Revenue Enplanements U.S. Commercial Air Carrier[2]	SWO Market Share	Oklahoma Enplanements[1]	SWO Market Share
2017	27,754	148,599,874	0.019%	743,717,643	0.0037%	3,271,695	0.85%
2018	26,318	153,668,408	0.017%	780,654,359	0.0034%	3,579,505	0.74%
2019	28,964	159,331,828	0.018%	813,109,423	0.0036%	3,733,601	0.78%
2020	17,410	93,780,639	0.019%	462,559,228	0.0038%	2,162,525	0.81%
Average Market Share			**0.018%**		**0.0036%**		**0.79%**

Sources: [1] FAA TAF, May 2021.
[2] FAA Aerospace Forecast 2021-2041.

Forecast Scenarios

There were five passenger enplanement forecast scenarios evaluated and presented. They are based on a variety of assumptions that consider a range of potential scenarios related to the COVID-19 pandemic recovery, socioeconomic drivers, and long-term economic sustainability. Each scenario uses 17,410 enplanements in 2020 as the base year, which includes 1,308 passengers enplaned by chartered aircraft transporting university athletic teams. The number of chartered passengers is expected to increase slightly to its 10-year historical average of approximately 1,600 by FY 2022 and remain at this level throughout the planning period. The scenarios described below are compared against each other and to the 2020 TAF in **Table B-15**. **Figure B-4** graphically portrays the forecast scenarios.

Scenario One

This scenario uses linear projection by applying the expected City of Stillwater MSA population growth rate from 2020 to 2040 to forecast passenger enplanements expected to occur at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with enplanements of -0.75, not a significant correlation so this scenario is eliminated from consideration.

Scenario Two

This scenario uses trend projection by applying SWO's passenger enplanement growth rate experienced from 2017 to 2019 to future enplanements. This results in a CAGR of 4.4 percent. The limited three-year historical period does not provide a significant trend line to warrant sufficient confidence in this analysis. This scenario is eliminated from consideration.

Scenario Three

This scenario uses market share to estimate future passenger enplanements at SWO as a function of nationwide domestic revenue enplanements on regional air carriers. SWO's four-year average market share is 0.018 percent. Applying this same ratio to projected domestic revenue enplanements on regional air carriers as contained in the FAA's Aerospace Forecast 2021-2041 results in a CAGR of 4.7 percent.

Scenario Four

This scenario also uses SWO's market share of nationwide domestic revenue enplanements on regional air carriers but applies a slightly decreasing average market share from 0.019 percent in 2021 to 0.014 percent in 2040. This does not fully demonstrate SWO's historic market share trend, rather just assumes that it is reasonable to expect SWO's limited catchment area population base will not keep pace with expected nationwide growth but will at least remain similar to the past four years. Applying the decreasing ratio to projected domestic revenue enplanements on regional air carriers as contained in the FAA's Aerospace Forecast 2021-2041 results in a CAGR of 3.3 percent.

Scenario Five

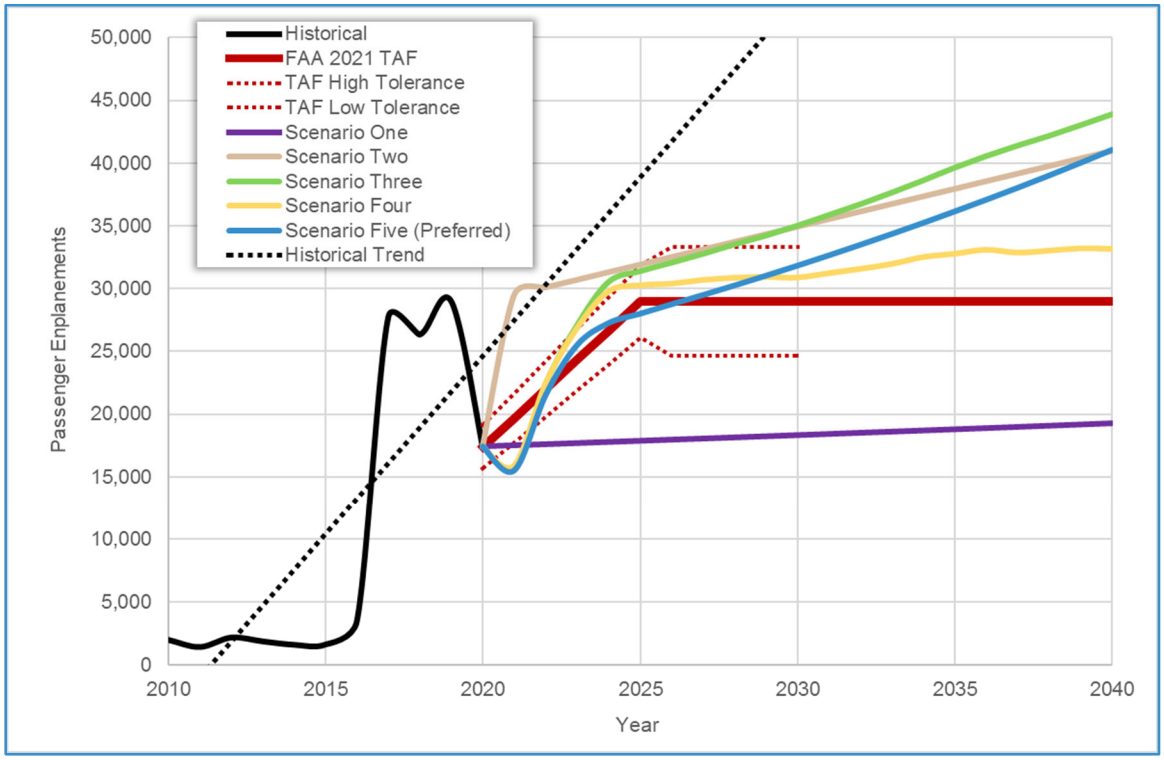
This scenario applies the longer enplanement recovery times experienced by airports in Oklahoma after the events of September 11, 2001, and the economic recession of 2008-2009 to SWO. Unlike the FAA's Aerospace Forecast 2021-2041 expectation that domestic passenger enplanements will return to pre-pandemic 2019 levels by early 2024, this scenario does not anticipate SWO's enplanements will surpass 2019 numbers until 2026. This is based primarily on the uncertainty of business travel returning to pre-pandemic levels and when OSU will rescind restrictions on staff travel enacted during the pandemic. Thereafter, this scenario uses linear projection by applying the TAF's 20-year CAGR rate of 2.6 percent applied to SWO enplanements throughout the remainder of the forecast period. This scenario results in an overall CAGR of 4.4 percent.

Table B-15: Passenger Enplanement Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2017-2020 Trend)	Scenario Three (Average Market Share)	Scenario Four (Decreasing Market Share)	Scenario Five (Deferred Recovery/TAF CAGR - Preferred)
2020[1]	17,410	17,410	17,410	17,410	17,410	17,410
2021[2]	19,721	17,500	29,490	15,620	15,930	15,500
2022[2]	22,031	17,580	30,100	22,380	22,460	21,500
2023[2]	24,343	17,670	30,700	27,070	26,870	25,500
2024[2]	26,653	17,760	31,310	30,520	29,790	27,250
2025[2]	28,964	17,850	31,910	31,380	30,270	28,000
2030[2]	28,964	18,300	34,940	35,010	30,890	31,830
2035[2]	28,964	18,760	37,960	39,640	32,780	36,150
2040[2]	28,964	19,240	40,990	43,900	33,160	41,060
CAGR	2.6%	0.5%	4.4%	4.7%	3.3%	4.4%

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-4: Passenger Enplanement Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for passenger enplanements at SWO. As presented above, it is thought that it will take several years for SWO's passenger enplanements to return to pre-pandemic levels primarily based on the uncertainty of business travel returning to normal. Some business travel will be found

unnecessary as discovered during pandemic related shutdowns and travel restrictions. The advent and proliferation of technology that allows virtual meetings and presentations is thought to supplant a certain but unknown percentage of business travel. However, as the situation returns to more normal conditions, it is thought that business travel will return, and OSU will lift staff travel restrictions. The improving national economic conditions underlying the long-term forecasts contained in the FAA Aerospace Forecasts and TAF and the steadily improving local socioeconomic factors will eventually drive SWO's enplanements to reach levels suggested by the 2017 to 2019 trend.

Table B-16 shows a side-by-side comparison of the preferred enplanement forecasts with the 2020 TAF. As can be seen, the preferred forecast is slightly below the TAF initial five-year forecast by approximately -3.3 percent, but slightly above the TAF 10-year forecast by approximately 9.9 percent. These are well within TAF tolerances.

Table B-16: Passenger Enplanement Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	17,410	17,410	0	0.0%
2025[2]	28,000	28,964	-964	-3.3%
2030[2]	31,830	28,964	2,866	9.9%
2035[2]	36,150	28,964	7,186	24.8%
2040[2]	41,060	28,964	12,096	41.8%
CAGR	**4.4%**	**2.6%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Commercial Service Passenger Aircraft Operations

Commercial aircraft operations are performed by scheduled and charter passenger airlines, and air cargo aircraft and Part 135 on-demand are performed by air taxi operations. Private business aircraft operations are counted as general aviation operations rather than commercial operations.

Approximately 97 percent of commercial service aircraft operations at SWO are scheduled passenger regional jet and air cargo turboprop operations. The remaining 3 percent were performed by charter airlines using narrow-body aircraft. As stated previously, Envoy/SkyWest Airlines and Martinaire Aviation LLC are the scheduled passenger and air cargo air carriers, respectively, at SWO. This is likely to remain so throughout the planning period. Martinaire Aviation LLC aircraft operations are addressed in the subsequent Air Cargo section. This section only considers scheduled passenger aircraft operations by Envoy/SkyWest Airlines and the on-demand air carriers transporting collegiate athletic teams travelling to and from SWO.

Methodology

The establishment of projected passenger enplanements is required to properly project commercial service operations, as there is usually a direct relationship between enplanements and commercial service operations. If enplanements increase, operations will generally increase to accommodate the demand.

However, the relationship can vary significantly, in that enplanements can increase without increasing operations, or even increase following a decrease in operations. Often, this is a result of airlines using larger aircraft with greater seating capacity, or more efficient scheduling with increased passenger load factors. The load factor is a ratio of the number of actual enplanements compared to the total number of departure seats (e.g., if an aircraft has 50 seats and 25 passengers board, the load factor is 50 percent).

The commercial aircraft operations forecast is based on the following assumptions:

- Air carriers will add service to meet the level of demand in the passenger enplanement forecast.
- Air carrier regional jets with 50 seats or fewer will be retired by 2031 following expectations of the FAA Aerospace Forecast 2021-2041.
- The average number of seats per departure will increase as smaller regional jets are replaced by narrow-body aircraft. Air carriers typically adjust flight frequency to keep load factors at profitable levels (striving for 80 percent). However, as air carriers transition to larger aircraft, load factors are expected to decrease with an adjustment period before rising. The growth in enplanements at SWO leads to an increase in overall operations. However, the projected increase in operations is tempered by the up gaging of aircraft, with the number of forecast operations otherwise being even higher.

Forecast Scenario

Table B-17 presents the information for existing and future non-scheduled commercial service aircraft operations at SWO. As the number of university athletic teams transported to and from SWO on both air carrier aircraft (i.e., more than 60 seats) and air taxi/commuter aircraft (i.e., 60 or fewer seats) returns to pre-pandemic conditions, the number of operations is expected to remain stable throughout the planning period.

Table B-17: Non-Scheduled Commercial Service Passenger Aircraft Operations Forecast, 2020-2040

Year	Enplanements	Air Carrier Charter		Air Taxi/Commuter Charter		Total Operations
		Departures	Operations	Departures	Operations	
2020[1]	1,308	15	30	286	572	602
2025[2]	1,600	18	36	350	700	736
2030[2]	1,600	18	36	350	700	736
2035[2]	1,600	18	36	350	700	736
2040[2]	1,600	18	36	350	700	736
CAGR	**1.0%**	**0.9%**	**0.9%**	**1.0%**	**1.0%**	**1.0%**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt.

Table B-18 presents the existing and forecast scheduled commercial service (i.e., regional air carrier Envoy Airlines/SkyWest Airlines) passenger aircraft operations at SWO. As presented earlier, the FAA Aerospace Forecast 2021-2041 expects all 50-seat regional jet aircraft to be retired from airline fleets nationwide by 2031. Therefore, the number of air taxi/commuter aircraft operations at SWO is expected to decrease through the first half of the planning period, eventually being eliminated altogether by 2035. This decrease is offset by the gradual replacement of the 50-seat regional jets by 76-seat narrow body jets, both nationally and at SWO. The resulting changes in the fleet mix and seating capacities indicate that scheduled commercial service

passenger aircraft operations will slightly increase at the end of the planning period, resulting in a CAGR of 0.9 percent.

Table B-18: Scheduled Commercial Service Passenger Aircraft Operations Forecast, 2020-2040

Year	Enplanements	Air Carrier Departures	Air Taxi/ Commuter Departures	Load Factor	Total Seats	Seats/ Departure	Total Operations
2020	16,102[1]	0	613[2]	57.7%	27,914[3]	46	1,226
2025[4]	26,400	156	572	65.3%	40,456	56	1,456
2030[4]	30,230	572	156	59.0%	51,272	70	1,456
2035[4]	34,550	676	0	67.2%	51,376	76	1,352
2040[4]	39,460	728	0	71.3%	55,328	76	1,456
CAGR	**4.6%**	**N/A**	**-99.9%**	**N/A**	**3.5%**	**N/A**	**0.9%**

Sources: [1] FAA TAF, May 2021.
[2] Envoy/SkyWest Airlines, August 2021.
[3] USDOT T-100 data, September 2021.
[4] Mead & Hunt.

Preferred Forecast Scenario and Comparison to TAF

Table B-19 shows a side-by-side comparison of the preferred commercial service aircraft operations forecasts with the 2020 TAF. As can be seen, the preferred forecasts are within the TAF tolerances in both the initial five-year and 10-year forecast periods. Nevertheless, it seems the TAF did not fully anticipate the retirement of 50-seat regional aircraft, and the phased introduction of 76-seat aircraft by the air carriers serving SWO and overestimated total commercial service aircraft forecast operations. Introduction of larger commercial service aircraft with almost 50 percent more seats per departure indicates air carriers will not increase flight frequency at the rate anticipated by the TAF.

Table B-19: Commercial Service Aircraft Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	1,920	1,920	0	0.0%
2025[2]	2,284	2,517	-233	-9.3%
2030[2]	2,284	2,645	-361	-13.6%
2035[2]	2,180	2,776	-596	-21.5%
2040[2]	2,284	2,915	-631	-21.6%
CAGR	**0.9%**	**2.1%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.
Note: Includes air cargo aircraft operations.

Air Cargo

Methodology

Because air cargo volume transported in the belly compartments of commercial service aircraft at SWO fluctuated wildly over the past decade, a strong, discernable correlation could not be established with any aviation or socioeconomic variables. The highest correlation coefficient was 0.70 with local GA operations in

the State of Oklahoma and 0.64 with Stillwater's historical population and retail sales. These are not statistically significant correlations, and they exclude regression forecasting from consideration. Additionally, with air cargo volumes transported by Martinaire LLC air cargo aircraft only available back to 2019, no discernable correlation can be established with any aviation or socioeconomic variables.

Over the past several years, the U.S. domestic air cargo market trends have declined due to security regulations and the shift from air to other modes of transportation (especially truck) as carriers face price competition from ground shipping methods. National online retailers like Amazon and Walmart incentivize their customers to use "free" two-day shipping rather than overnight at cost. The two-day day shipping allows for more cargo to be transported via truck instead of air, which is a cheaper alternative in most cases.

In the absence of correlated data, historical trends at SWO and GDP growth rates are used in air cargo forecasting because they better reflect the local economic conditions and historically nationwide air cargo activity tends to track with national GDP. Three methods considered for the air cargo volume forecasts, whether transported in the belly compartments of commercial service aircraft or in dedicated air cargo aircraft, are the following:

- Trend forecast carrying forward air cargo volume data.
- Stillwater MSA GDP growth rate time series analysis.
- National GDP growth rate time series analysis.

Dedicated air cargo aircraft operations provided by Martinaire LLC are expected to remain flat in the next 20 years as cargo payload capacities from 2019 through year-to-date 2021 has averaged 8 percent for outbound cargo and 18 percent for inbound cargo. This indicates any increases in air cargo volume experienced by Martinaire LLC can be accommodated within the existing aircraft operations.

Forecast Scenarios

There were three air cargo volume forecast scenarios analyzed and presented for both air cargo transported in the belly compartments of airline aircraft and in dedicated air cargo aircraft. These scenarios are shown in **Table B-20**.

Scenario One

This scenario uses trend projection by applying SWO's historical air cargo trends to future years. For air cargo transported in the belly compartments of air carrier aircraft, this results in a CAGR of 5.7 percent. This appears high given the historical amounts have fluctuated wildly and never surpassed 70,000 pounds. For air cargo transported by Martinaire LLC aircraft, this results in a negative CAGR. This scenario has been eliminated from consideration.

Scenario Two

This scenario uses linear projection by applying the expected Stillwater MSA GDP future growth rates from 2020 to 2040 to forecast air cargo volume. This results in CAGRs of 1.0 percent for both belly compartment and dedicated aircraft air cargo volumes throughout the 20-year planning period. Considering that neither the

belly compartment nor dedicated aircraft air cargo volumes reach the amounts experienced at SWO in 2019, this scenario has been eliminated from consideration.

Scenario Three

This scenario uses linear projection by applying national expected GDP future growth rates from 2020 to 2040. This results in a CAGR of 2.0 percent for belly compartment transported air cargo volumes and 1.9 percent for dedicated aircraft transported air cargo volumes. Using this scenario brings the 20-year planning period air cargo volumes back to near historical highs experienced at SWO.

Table B-20: Air Cargo Volume Forecast, 2020-2040

	Scenario One		Scenario Two		Scenario Three	
Year	Martinaire	Airlines	Martinaire	Airlines	Martinaire	Airlines
2020	37,057[1]	46,390[2]	37,057[1]	46,390[2]	37,057[1]	46,390[2]
2021[3]	21,980	66,760	37,460	46,900	37,800	47,320
2022[3]	6,900	70,670	38,880	47,420	38,550	48,260
2023[3]	---	74,570	38,290	47,940	39,330	49,230
2024[3]	---	78,470	38,710	48,470	40,110	50,210
2025[3]	---	82,380	39,140	49,000	40,910	51,220
2030[3]	---	101,890	41,340	51,750	45,170	56,550
2035[3]	---	121,400	43,020	54,390	49,150	62,430
2040[3]	---	140,910	45,220	57,160	54,000	68,930
CAGR	N/A	5.7%	1.0%	1.0%	1.9%	2.0%

Sources: [1] Martinaire Aviation LLC, August 2021.
[2] USDOT T-100, September 2021.
[3] Mead & Hunt.

Preferred Forecast Scenario

Scenario Three is the preferred forecast for air cargo volume. The unpredictable nature and limited historical data of air cargo volumes at SWO make accurate predictions challenging. Growth in the local economy would reasonably be expected to increase overall air cargo volumes. However, as stated earlier, the trend is changing from cargo transported by air to more ground-based transportation due to cost and the development of service centers spread throughout the country that make expedited ground deliveries feasible.

General Aviation Aircraft Operations

Itinerant General Aviation Operations

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO historical itinerant GA operations from 2010 through 2020. The four most highly correlated variables:

- Local GA operations within the State of Oklahoma (correlation of 0.89).
- Population of Stillwater (correlation of 0.88).
- Retail sales within Stillwater (correlation of 0.85).

- The Standard & Poor's (S&P) 500 stock market index average annual close (correlation of 0.84).

These four variables were tested using regression analysis. The validity of each test is measured by the R-squared (R^2) value. The R^2 value describes how well the variables explain variance in the dependent market (i.e., itinerant GA operations). R^2 is the percent of variance explained by the model. The closer the R^2 value is to 1.00 (100 percent of variance explained), the more confidence can be placed in the model's ability to explain historical variability rather than by chance.

To account for the effects of the different but strongly correlated variables, multi-variable regression models were tested against historical itinerant GA operations. Multi-variable models allow the forecast to account for local (i.e., population and retail sales), statewide (i.e., local GA operations in Oklahoma), and national (i.e., S&P 500 stock market index) forces. In the case of multi-variable regression, the adjusted R^2 value is used to decide the level of confidence each model has displayed. Every variable added to a model increases the R^2 and never decreases it, which can lead to an incorrectly high R^2 value. The adjusted R^2 value accounts for this effect and avoids the issue of not knowing if the R^2 value is high due to the model being better or because it has more predictor variables. **Table B-21** shows the adjusted R^2 value of the four variables, and various combinations of the four variables. As can be seen, only one combination of variables, the analysis of all four variables, produced an R^2 value greater than 0.9. Therefore, the regression analysis will use this combination of variables for forecasting itinerant GA operations.

Table B-21: Multi-Variable Adjusted R2 Regression Analyses

Variable	Adjusted R^2 Value
Local OK GA Operations, MSA Population, MSA Retail Sales, S&P 500	0.928
Local OK GA Operations	0.777
MSA Population	0.745
MSA Population and MSA Retail Sales	0.720
MSA Population and S&P 500	0.714
MSA Retail Sales	0.697
MSA Population, MSA Retail Sales, S&P 500	0.684
S&P 500	0.673
MSA Retail Sales and S&P 500	0.663

Sources: [1] FAA TAF, 2021.
[2] FAA The Operations Network (OPSNET), 2021.

Forecast Scenarios

As with the passenger enplanements forecast, five itinerant GA operations forecast scenarios were evaluated and presented. They too are based on a variety of assumptions and considerations unique to SWO. The FAA Aerospace Forecasts 2021-2041 indicate that the GA sector of aviation was less affected by the COVID-19 pandemic than other sectors, especially airlines. Thus, the recovery for GA activity is not expected to take nearly as long. Each scenario uses 25,654 operations in 2020 as the base year.

Itinerant GA operations at SWO have fluctuated during the past 10 years with an overall increase of 2.5 percent. This is the inverse experienced at the national level, where the same period was -1.6 percent. The

methods used in the FAA Aerospace Forecasts 2021-2041 indicate national itinerant GA operations will increase at a CAGR of 0.9 percent. **Table B-22** and **Figure B-5** show the itinerant GA forecasts.

Scenario One. This scenario uses linear projection by applying the expected Stillwater MSA population growth rate from 2020 to 2040 to forecast itinerant GA Operations at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with itinerant GA operations of 0.88, a fairly high correlation. However, as stated previously, when checked using the regression analysis, population only resulted in R^2 value of 0.745, not a significant correlation. This scenario is eliminated from consideration.

Scenario Two. This scenario uses trend projection by applying the growth rate established from 2010 through 2020 to future itinerant GA operations. This results in a 20-year CAGR of 3.1 percent.

Scenario Three. This scenario uses market share to forecast the itinerant GA operations at SWO as a function of the nationwide itinerant GA operations. SWO's 2020 market share of national itinerant GA operations was 0.235 percent. Application of this percentage to projections contained in the FAA Aerospace Forecasts 2021-2041 results in a CAGR of 1.1 percent.

Scenario Four. This scenario also uses market share to forecast itinerant GA operations but uses SWO's market share of itinerant GA operations historically occurring in Oklahoma. The 2020 market share of 4.90 percent is increased rapidly to 5.30 percent in the initial five-year period to be in line with recent historical shares of 2018 and 2019, where SWO's market shares were 5.36 and 5.48, respectively. The reason for the rapid increase is the expected return to pre-pandemic levels of Stillwater's economic indicators at a much faster pace than experienced nationally or statewide. Application of the increasing ratio results in a 20-year CAGR of 0.8 percent.

Scenario Five. This scenario applies multi-variable regression analysis using the four variables stated previously (i.e., local GA operations within the State of Oklahoma, Stillwater's population, Stillwater's retail sales and the S&P stock market index average annual close). The equation is displayed below:

$$y = m_1(x_1) + m_2(x_2) + m_3(x_3) + m_4(x_4)+b$$

y = Itinerant GA operations, b = Intercept from Regression Analysis

y =(1.45×Population) + (0.0000099 × MSA Retail Sales) + (-3.64 × S&P) 500) + (0.057 × OK Local GA Operations) - 125,712.59

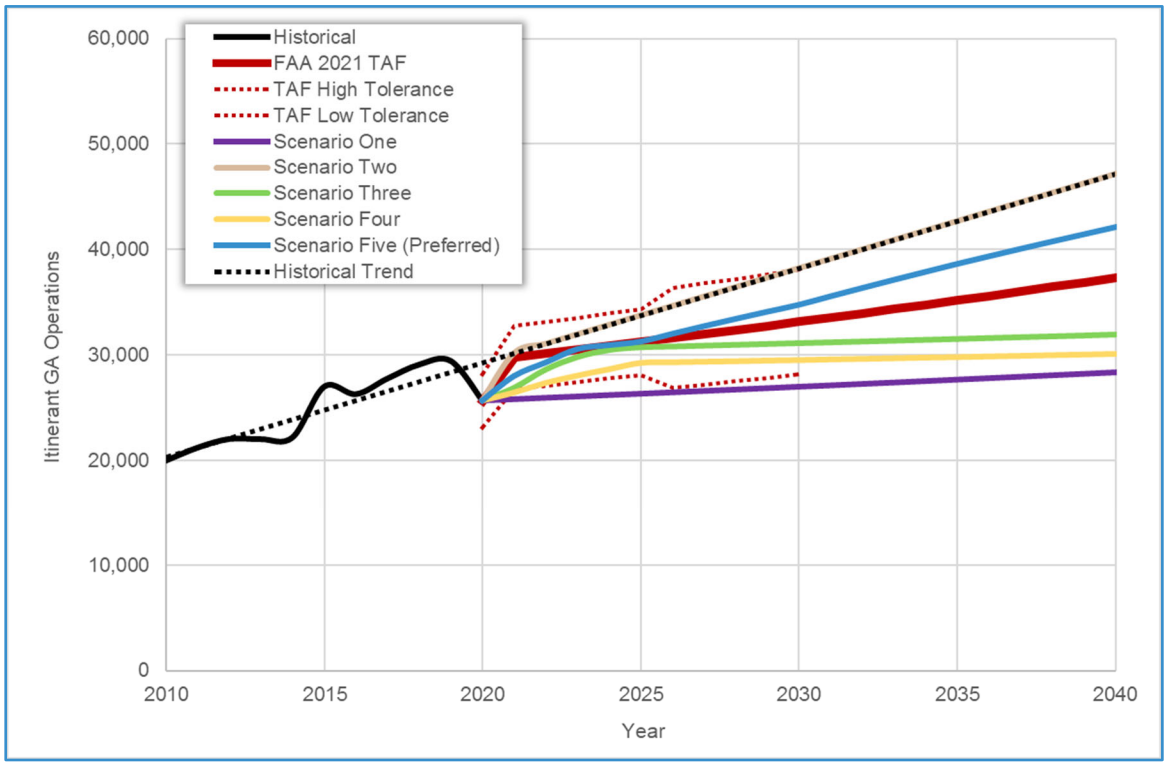
The multi-variable regression methodology incorporates a statical analysis to give confidence that the chosen variables have exhibited a degree of correlation with itinerant GA operations in the past. This scenario results in an overall CAGR of 2.5 percent.

Table B-22: Itinerant GA Operations Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2010-2020 Trend)	Scenario Three (Average Market Share)	Scenario Four (Increasing Market Share)	Scenario Five (Regression - Preferred)
2020[1]	25,654	25,654	25,654	25,654	25,654	25,654
2021[2]	29,770	25,780	30,160	26,860	26,410	27,980
2022[2]	30,128	25,910	31,050	28,610	27,320	29,270
2023[2]	30,488	26,040	31,950	29,800	28,010	30,540
2024[2]	30,854	26,170	32,840	30,470	28,610	30,920
2025[2]	31,224	26,300	33,740	30,730	29,210	31,260
2030[2]	33,144	26,970	38,220	31,120	29,480	34,760
2035[2]	35,180	27,650	42,690	31,520	29,760	38,640
2040[2]	37,342	28,340	47,170	31,940	30,060	42,140
CAGR	**1.9%**	**0.5%**	**3.1%**	**1.1%**	**0.8%**	**2.5%**

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-5: Itinerant GA Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for itinerant GA operations at SWO. Because FAA Aerospace Forecasts 2021-2041 project slight growth in the national itinerant GA aircraft operations, growth at SWO is supported. While the overall usage of piston-powered aircraft is anticipated to decline nationally, other

categories including turbine-powered, experimental, and light sport aircraft are growing. The facilities at SWO can accommodate larger turboprop and business jet aircraft operations and will not constrain growth. The preferred scenario incorporates regression forecasting using four strong correlated independent variables. Additionally, the preferred forecast mirrors increased growth by the TAF expected at SWO.

Table B-23 shows a side-by-side comparison of the preferred itinerant GA aircraft operations forecast with the 2020 TAF. As can be seen, the preferred forecasts vary from the TAF by less than 1 percent in initial five-year forecast period, and by less than 5 percent in the 10-year forecast period.

Table B-23: Itinerant GA Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	25,654	25,654	0	0.0%
2025[2]	31,260	31,224	36	0.1%
2030[2]	34,760	33,143	1,617	4.9%
2035[2]	38,640	35,180	3,460	9.8%
2040[2]	42,140	37,342	4,798	12.8%
CAGR	**2.5%**	**1.9%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Local General Aviation Operations

Methodology

Correlation analysis tested multiple aviation and socioeconomic variables with SWO historical local GA operations from 2010 through 2020. The highest correlated variable with SWO's local GA operations was local GA operations within the State of Oklahoma, which has a correlation of 0.78. This is not a statistically significant correlation and excludes regression forecasting from consideration.

In the absence of correlated data, historical trends and market share analyses are employed because they better reflect local conditions. Additionally, current plans to increase student enrollment in the OSU Flight Center over time are factored and considered. Flight Center staff report that current training hours have been averaging 1,800 per month for the past several months, exceeding their normal 1,000 hours per month. The staff estimate this is from unmet demand resulting from students having limited training opportunities during mid to late 2020 after the COVID-19 pandemic began.

Forecast Scenarios

Five local GA operations forecast scenarios were evaluated and presented, which are based on a variety of assumptions and considerations unique to SWO. As stated previously, the GA sector of aviation was less affected by the COVID-19 pandemic, and the recovery is not expected to take nearly as long as the air carrier sector. Each forecast scenario uses 31,858 operations in 2020 as the base year.

Local GA operations at SWO have fluctuated during the past 10 years with an overall increase of 1.3 percent. This is a greater rate increase than experienced at the national level, where an increase of only 0.5 percent

was experienced during the same period. Methodology used in the FAA Aerospace Forecasts 2021-2041 indicate national local GA operations will slightly increase at a CAGR of 0.6 percent. **Figure B-6** and **Table B-24** show the local GA forecasts.

Scenario One. This scenario uses linear projection by applying the expected City of Stillwater MSA population growth rate from 2020 to 2040 to forecast itinerant GA Operations at SWO. This results in a CAGR of 0.5 percent. Population resulted in a correlation coefficient with local GA operations of 0.67, which is not a high correlation factor. This scenario is eliminated from consideration.

Scenario Two. This scenario uses trend projection by applying the growth rate established from 2010 through 2020 to future local GA operations. This results in a rather high 20-year CAGR of 3.0 percent.

Scenario Three. This scenario uses market share to forecast the local GA operations at SWO as a function of the nationwide local GA operations. SWO's 2020 national market share of local GA operations was 0.2583 percent. Application of this percentage to projections contained in the FAA Aerospace Forecasts 2021-2041 results in a CAGR of 0.8 percent.

Scenario Four. This scenario also uses market share to forecast local GA operations but uses SWO's market share of local GA operations historically occurring in Oklahoma. The 2020 market share of 6.056 percent is increased during the planning period to 7.7 percent – a return to a pre-pandemic high experienced in 2018. The presence of the OSU Flight Center and other flight training operations at SWO indicates that a higher growth rate in flight training will be expected at SWO than the rest of Oklahoma. Application of the increasing ratio results in a 20-year CAGR of 1.6 percent.

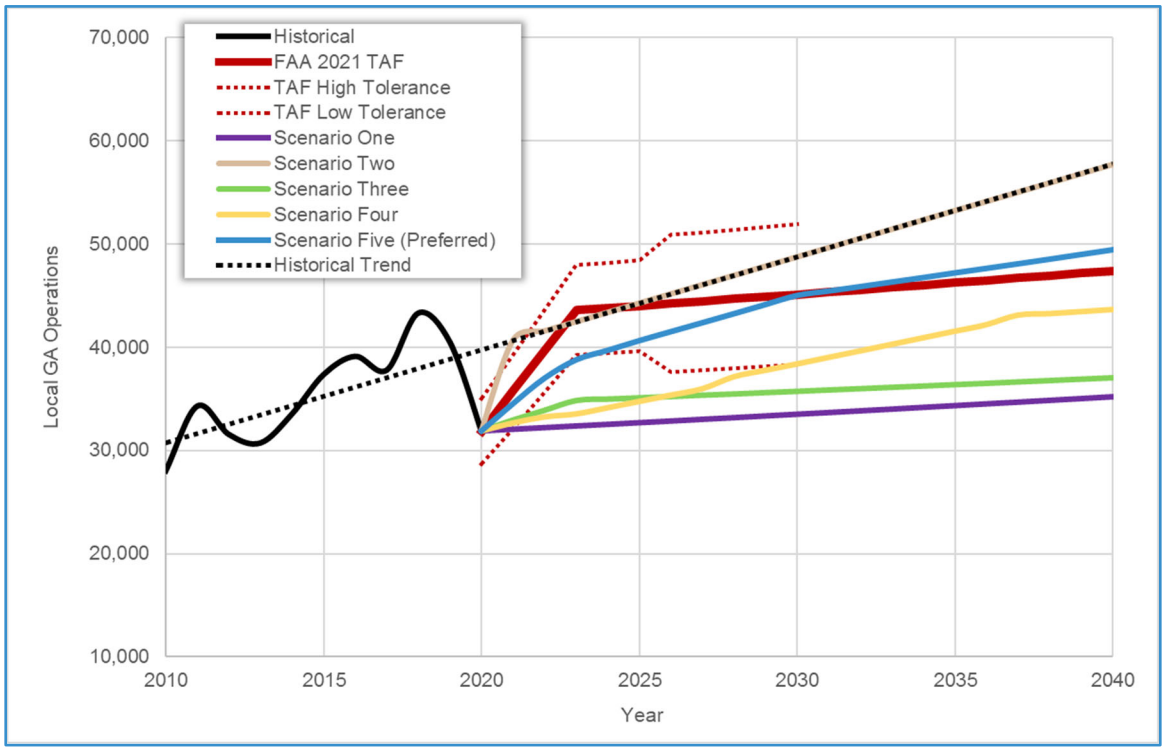
Scenario Five. This scenario reflects the continuation of the OSU Flight Center monthly training exceeding normal operations for the next two years, thereafter, slowly returning to a more normal training regimen once the unmet demand is satisfied. The scenario also applies the expected increase of student enrollment in the Flight Center pilot program from 300 to 400 by 2030. After that, a modest increase 0.6 percent growth rate is applied which corresponds to the local GA operations projected to occur nationally in the FAA Aerospace Forecast 2021-2041. The scenario also applies the growth rates projected in the TAF for SWO local operations in each of the five-year time periods to the non-OSU Flight Center estimated flight training operations (i.e., 6.7 percent during the first five years, 3.5 percent during the next five years, 2.5 percent during the five years after that, and 2.0 percent during the final five years). When combined, this scenario results in an overall CAGR of 2.2 percent.

Table B-24: Local GA Operations Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Population)	Scenario Two (2010-2020 Trend)	Scenario Three (2020 Market Share)	Scenario Four (Increasing Market Share)	Scenario Five (Local Conditions - Preferred)
2020[1]	31,858	31,858	31,858	31,858	31,858	31,858
2021[2]	35,765	32,020	40,670	32,920	32,630	34,500
2022[2]	39,673	32,180	41,570	33,870	33,220	36,970
2023[2]	43,580	32,340	42,470	34,820	33,510	38,750
2024[2]	43,797	32,500	43,370	34,960	34,110	39,670
2025[2]	44,015	32,660	44,270	35,090	34,730	40,610
2030[2]	45,122	33,490	48,760	35,720	38,380	44,990
2035[2]	46,256	34,330	53,250	36,370	41,560	47,180
2040[2]	47,419	35,200	57,740	37,040	43,670	49,420
CAGR	2.0%	0.5%	3.0%	0.8%	1.6%	2.2%

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-6: Local GA Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred forecast for local GA operations at SWO. No strong correlations exist with any national aviation variables, nor were any correlations found to exist with local or national socioeconomic variables. The presence of the OSU Flight Center as well as the other flight training companies at SWO supports strong growth in local GA aircraft operations. Fulfilling unmet demand created by limited flight

training opportunities during 2020 and the expected gradual increase in student enrollment at the OSU Flight Center by over 30 percent is cause for expected substantial increase during the initial 10-year forecast period. Strong growth shown in local GA aircraft operations at SWO in the TAF further supports the expected growth shown in the preferred forecast.

Table B-25 provides a side-by-side comparison of the preferred local GA aircraft operations forecast with the 2020 TAF. As can be seen, the preferred forecasts vary from the TAF by less than 8 percent in initial five-year period and less than 1 percent in the 10-year period.

Table B-25: Local GA Operations Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	31,858	31,858	0	0.0%
2025[2]	40,610	44,015	-3,405	-7.7%
2030[2]	44,990	45,122	-132	-0.3%
2035[2]	47,180	46,256	924	2.0%
2040[2]	49,420	47,419	2,001	4.2%
CAGR	**2.2%**	**2.0%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Military Aircraft Operations

As a percentage of annual aircraft operations, the number of military operations at SWO has historically been relatively insignificant. No factors have been identified that would significantly increase the number of military operations in the future. Therefore, military aircraft operations are projected to remain at the approximate 2020 level of 3,200 throughout the forecast period.

Aircraft Fleet Mix

A further assessment of the forecasts involves the individual and collective use of SWO by various aircraft types. Knowledge of the aircraft types expected to use SWO assists in determining the amount and type of storage facilities needed to meet the aviation demand.

Data for FY 2020 comes from applying data derived from the FAA's TFMSC. TFMSC data has a very high confidence level for recording virtually all commercial service aircraft as well as GA business jet and turboprop aircraft operations. However, since TFMSC only records aircraft filing IFR flight plans, it does not record touch-and-go operations and most single and multi-engine piston aircraft operations. Therefore, some degree of estimation, as presented in the sources section of **Table B-26** is applied to arrive at these types of aircraft operations.

Methodology

Table B-26 depicts the approximate level of use by aircraft type projected to use SWO throughout the 20-year planning period. As presented earlier, it is anticipated that 50-seat regional jet aircraft such as the CRJ 200

and ERJ 145 will be phased out of service by 2031. At SWO, they are anticipated to be replaced by 76-seat ERJ 175 aircraft. Since these aircraft have more than 60 seats they are classified as narrow body air carrier aircraft in the table and thus explain the future increases. It is anticipated that some 50-seat regional jets will continue to be used to transport university athletic teams via charter so they will remain operational at SWO throughout the planning period.

The table reflects a growing percentage of turbine-powered, multi-engine GA aircraft anticipated to operate at SWO, and a decreasing percentage of both single and multi-engine piston-powered aircraft. This is a national GA trend where smaller piston-power aircraft are being flown less due to several factors including, but not limited to, the cost of owning and flying personal aircraft (which tend to be piston-powered) and turbine-powered aircraft being used more for business purposes increasing as a percentage of total operations. The decreases in traditional single engine, piston-powered aircraft will be offset somewhat by the expected growth in light sport or experimental aircraft and helicopter operations.

Table B-26: Summary of Total Operations by Aircraft Type, 2020-2040

Aircraft Type	2020	2025	2030	2035	2040
Commercial Service	**1,920[1]**	**2,284**	**2,284**	**2,180**	**2,284**
Air Carrier	30[1]	348	1,180	1,388	1,492
Narrow Body Jet	*30[2]*	*348*	*1,180*	*1,388*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,104	792	792
Regional Jet	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
General Aviation Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	**57,512[1]**	**71,870**	**79,750**	**85,820**	**91,560**
Single Engine Piston	51,277[5]	64,064	70,750	75,934	81,022
Multi-Engine Piston	4,911[4]	6,146	6,794	7,160	7,416
Turboprop	623[2]	790	1,010	1,300	1,460
Jet	697[2]	860	1,116	1,332	1,552
Helicopter[2]	4	10	80	94	110
Military	**3,211[1]**	**3,200**	**3,200**	**3,200**	**3,200**
Piston	2,661[6]	2,652	2,652	2,652	2,652
Turboprop	350[2]	350	350	350	350
Jet	192[2]	190	190	190	190
Helicopter	8[2]	8	8	8	8
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**

Sources: [1] FAA TAF, 2021.

[2] TFMSC Direct – Operations obtained directly from TFMSC data.

[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[4] TFMSC Derived – Operations derived from applying the ratio of MEP to all piston operations contained in TFMSC to the remainder of GA operations when GA turboprop, jet and helicopter operations are removed.

[5] TFMSC Derived – Operations derived from subtracting the sum of GA MEP, turboprop, jet, and helicopter operations from total GA operations.

[6] TFMSC Derived – Operations derived from subtracting the sum of Military turboprop, jet, and helicopter operations from total Military operations.

Peak Period Forecasts

Peak forecasts estimate when certain airport facilities will be the busiest. Peak forecasts are used to assess level of service of airfield and terminal facilities and to right-size improvement projects. Improvement projects are not typically designed for the busiest day of the year specifically, as such a design would lead to over-building. The peak period forecasts are based on examining the average day of the busiest month of the year, in accordance with FAA Advisory Circular 150/5070-6B, Change 2.

Methodology

The methodology used to forecast future peaking is based on the historical record; therefore, it is essential that peak forecasts be reevaluated if a change in user or aircraft type occurs. **Table B-27** presents the peak forecasts for enplanements, total passengers, and aircraft operations.

Table B-27: Peak Period Forecasts, 2020-2040

Category	Period	Factor	2020	2025	2030	2035	2040
Enplanements and Deplanements	**Annual**	100%	16,102[1]	26,400	30,230	34,550	39,460
	Peak Month	9.9%	2,850[2]	2,614	2,993	3,420	3,907
	Average Day	3%	95	87	100	114	130
	Peak Hour – Enplanements	51%	48	44	51	58	66
	Peak Hour – Deplanements	49%	45	43	49	56	64
Total Passengers	**Annual**	100%	32,204[2]	52,800	60,460	69,100	78,920
	Peak Month	9.9%	5,592[2]	5,227	5,986	6,841	7, 813
	Peak Day	3%	186	174	200	228	260
	Peak Hour	50%	93	87	100	114	130
Aircraft Operations	**Annual**	100%	62,643[3]	77,354	85,234	91,200	97,044
	Peak Month	13%	8,077[3]	10,056	11,080	11,856	12,616
	Peak Day	3%	269	335	369	395	421
	Peak Hour	11%	30	37	41	43	46

Sources: [1] Actual, FAA TAF, 2021.
[2] Actual, Envoy/SkyWest Airlines, October 2019.
[3] Actual, FAA The Operations Network (OPSNET), 2021.

The peak passenger enplanement and deplanement forecast is determined by the growth in the total number of passengers traveling through SWO and the trends in air carriers transitioning from smaller to larger aircraft. Air carrier records show May has historically been the peak month for enplanements during the non-COVID time frame. This overlaps with the end of school when some university students may be travelling home and the beginning of the summer vacation season when families tend to travel together. October has been the busiest month for aircraft operations five out of the previous 12 Fiscal Years, with September being the peak month in four of the previous 12 Fiscal Years. These two months overlap the peak of the home games during the OSU football season and typically include some of the best flying weather for fans travelling to the games.

Future peaking analysis assumes that peak percentages shown in **Table B-27** will remain the same into the future.

Based Aircraft

The number and type of aircraft to be based at an airport is an important component in developing a plan for future facilities. GA operators are particularly sensitive to both quality and location of the basing facilities. Many factors affect the decision of aircraft owners to base their aircraft at an airport, including:

- Radio communications
- Available facilities and services
- Proximity to home and work
- Airport accessibility
- Basing capacity at nearby airports.

Methodology

Based aircraft at SWO did not exhibit strong historical correlation with any socioeconomic variables considered; the highest correlation coefficient was 0.66 with Stillwater's historical earnings and 0.65 with Stillwater's historical GRP. This seems to be caused by based aircraft only mildly fluctuating over the past decade, ranging between 71 and 75 as reported in the TAF, until increasing drastically to 80 based aircraft in the most recent data provided by SWO staff. For this reason, regression analysis using socioeconomic indicators was eliminated from consideration.

In the absence of correlated data, various methods and assumptions are employed to project the number and composition of SWO's based aircraft fleet. The methods and assumptions applied to the based aircraft include:

- Application of the FAA's Aerospace Forecast, 2021-2041 growth rates for each component of the GA fleet.
- Assumption that SWO will maintain a similar based aircraft market share in Oklahoma.
- Expectation that one helicopter and two "Other" (e.g., light sport or experimental aircraft) will be based at SWO by the end of the planning period.
- Discussions with OSU Flight Center staff regarding their plans for aircraft fleet and student enrollment.
- There is currently a wait list of 25 aircraft owners desiring to base their aircraft at SWO if hangar space was available, indicating a strong local demand for hangar space, particularly T-hangars.

Forecast Scenarios

There were five based aircraft forecast scenarios evaluated and presented. They were based on a combination of methods and assumptions presented above and are shown in **Table B-28** and **Figure B-7**.

Scenario One

This scenario uses linear projection by applying SWO's 10-year CAGRs for the individual based aircraft categories to future years. This results in a total based aircraft CAGR of 1.4 percent.

Scenario Two

This scenario uses trend analysis by applying SWO's trend projections for the individual based aircraft categories experienced from 2010 to 2020 to future years. This results in essentially no total based aircraft growth, only reaching the existing level of 80 based aircraft at the end of the forecast period.

Scenario Three

This scenario uses linear projection by applying the growth rate for each individual active GA fleet category contained in the FAA Aerospace Forecast 2021-2041 to the individual based aircraft categories at SWO to forecast future growth. Application of these individual growth rates results in a negative CAGR of 0.6 percent. This scenario is eliminated from consideration.

Scenario Four

This scenario uses market share analysis to forecast the individual categories of based aircraft at SWO as a percentage of nationwide active GA fleet contained in the FAA Aerospace Forecast 2021-2041. Applying SWO's 10-year average market share of each individual component to the individual components forecasts in the FAA Aerospace Forecast also results in a negative CAGR of 1.3 percent. This scenario is also eliminated from consideration.

Scenario Five

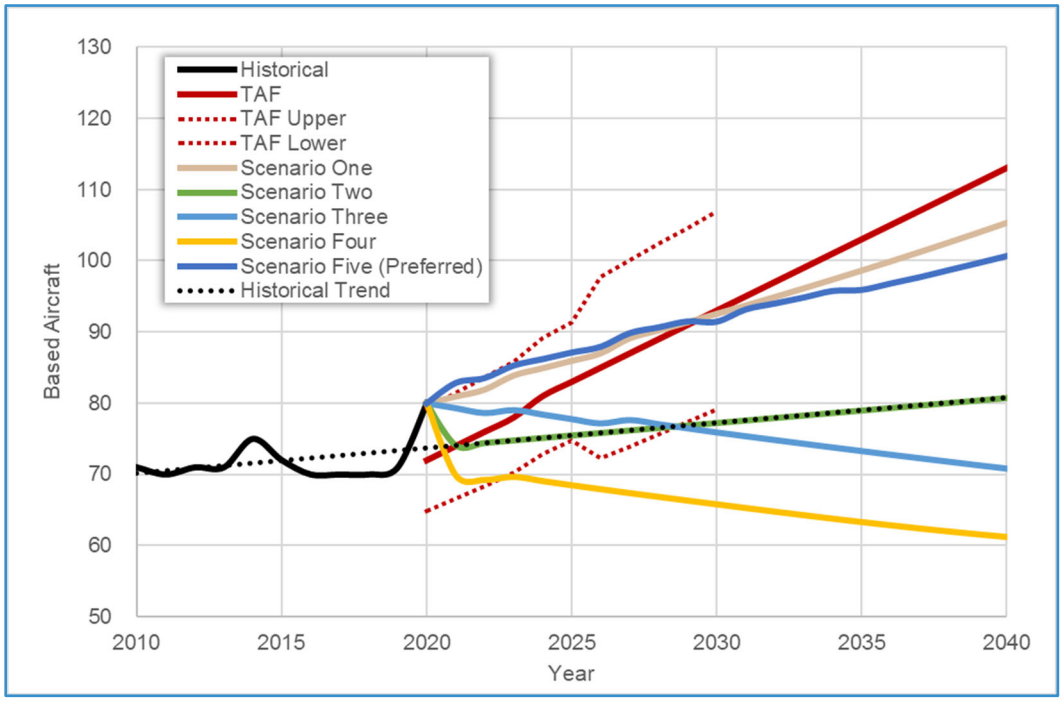
This scenario, a hybrid scenario uses the market share of SWO's based aircraft as a ratio of based aircraft in the State of Oklahoma recorded by the TAF. The 2020 market share experienced by SWO's individual based aircraft categories is applied to the TAF-forecasted State of Oklahoma based aircraft. However, it also applies the expected increase of two additional Piper PA 42 twin engine piston aircraft to the OSU Flight Center's aircraft fleet by the end of 2022. Thereafter, the projected gradual decrease of piston-powered aircraft as presented in the FAA Aerospace Forecast 2021-2041 is applied to the multi-engine piston aircraft expected to be based at SWO. Application of these assumptions results in a CAGR of 1.2 percent.

Table B-28: Based Aircraft Forecasts, 2020-2040

Year	2020 TAF	Scenario One (Historical Growth Rates)	Scenario Two (2010-2020 Trend)	Scenario Three (FAA Aerospace Forecast)	Scenario Four (Average Market Share)	Scenario Five (Local Conditions - Preferred)
2020	72	80[1]	80[1]	80[1]	80[1]	80[1]
2021[2]	74	81	74	79	70	83
2022[2]	76	82	74	79	69	84
2023[2]	78	84	75	79	70	85
2024[2]	81	85	75	78	69	86
2025[2]	83	86	75	78	68	87
2030[2]	93	93	77	76	66	91
2035[2]	103	99	79	73	63	96
2040[2]	113	105	81	71	61	101
CAGR	**2.3%**	**1.4%**	**0.0%**	**-0.6%**	**-1.3%**	**1.2%**

Sources: [1] Actual.
[2] Mead & Hunt projections.

Figure B-7: Based Aircraft Forecasts, 2010-2040



Preferred Forecast Scenario and Comparison to TAF

Scenario Five is the preferred based aircraft forecast at SWO. The FAA Aerospace Forecast 2021-2041 expects nationwide decreases of 0.9 percent in active single engine piston aircraft and 0.4 percent in active multi-engine piston aircraft. Increases are expected in turboprop and jet active aircraft by CAGRs of 0.6 and 2.3 percent, respectively by 2041. Increases are also expected in helicopter and light sport aircraft by CAGRs of 1.4 and 4.0 percent, respectively. While there are no helicopter or aircraft categorized as “Other” currently based at SWO, historically there has been as many as two helicopters based at the Airport and the growing light sport and experimental aircraft market is expected to become more common as they replace a growing percentage of aging single engine piston aircraft. The preferred forecast accounts for the OSU Flight Center adding aircraft to their fleet to accommodate the expected increase in student enrollment.

Table B-29 provides a side-by-side comparison of the preferred based aircraft forecast with the 2020 TAF. As can be seen, the preferred forecast varies from the TAF by 5 percent in the initial five-year period and by less than 2 percent in the 10-year period. This occurs even with the 11 percent variance of the based aircraft recorded in the TAF compared to the actual based aircraft reported by SWO staff.

Table B-29: Based Aircraft Forecasts – TAF Comparison, 2020-2040

Fiscal Year	Preferred Forecast	2020 TAF	Difference	Percent Difference
2020[1]	80	72	8	11.1%
2025[2]	87	83	4	5.0%
2030[2]	91	93	-2	-1.7%
2035[2]	96	103	-7	-6.9%
2040[2]	101	113	-12	-10.9%
CAGR	**1.2%**	**2.3%**	**N/A**	**N/A**

Sources: [1] FAA TAF, May 2021.
[2] Mead & Hunt projections.

Table B-30 shows the preferred based aircraft forecast broken down by aircraft type at SWO. The future aircraft mix is expected to remain proportionally similar to the current based aircraft mix. However, in line with both local and national expectations, growth in helicopter and light sport aircraft will offset the decreases in piston-powered aircraft. Additionally, the presence of the OSU Flight Center and their aircraft fleet mix will offset the nationwide trend of decreased piston-powered aircraft.

Table B-30: Based Aircraft Forecast by Type, 2020-2040

Fiscal Year	Single Engine Piston	Multi-Engine Piston	Jet	Helicopter	Other	Total
2020[1]	72	6	2	0	0	80
2021	73	8	2	0	0	83
2022	74	8	2	0	0	84
2023	74	8	2	0	1	85
2024	75	8	2	0	1	86
2025	76	8	2	0	1	87
2030	80	7	2	1	1	91
2035	84	6	3	1	2	96
2040	88	6	4	1	2	101
CAGR	**1.0%**	**0.0%**	**3.5%**	**N/A**	**N/A**	**1.2%**

Sources: [1] Actual, as reported by SWO staff.

Runway Utilization

Runway utilization is defined by the distribution and frequency of aircraft operations on the runway system. Runway utilization at SWO is based on ATCT personnel observations collected during stakeholder outreach conversations, and to a lesser extent, the direction and wind speed used in the wind coverage analysis presented in **Chapter A – Inventory of Existing Conditions**. **Figure B-8** is a graphical representation of the estimated runway utilization, by percentage of total operations provided by ATCT personnel.

Figure B-8: Runway Utilization

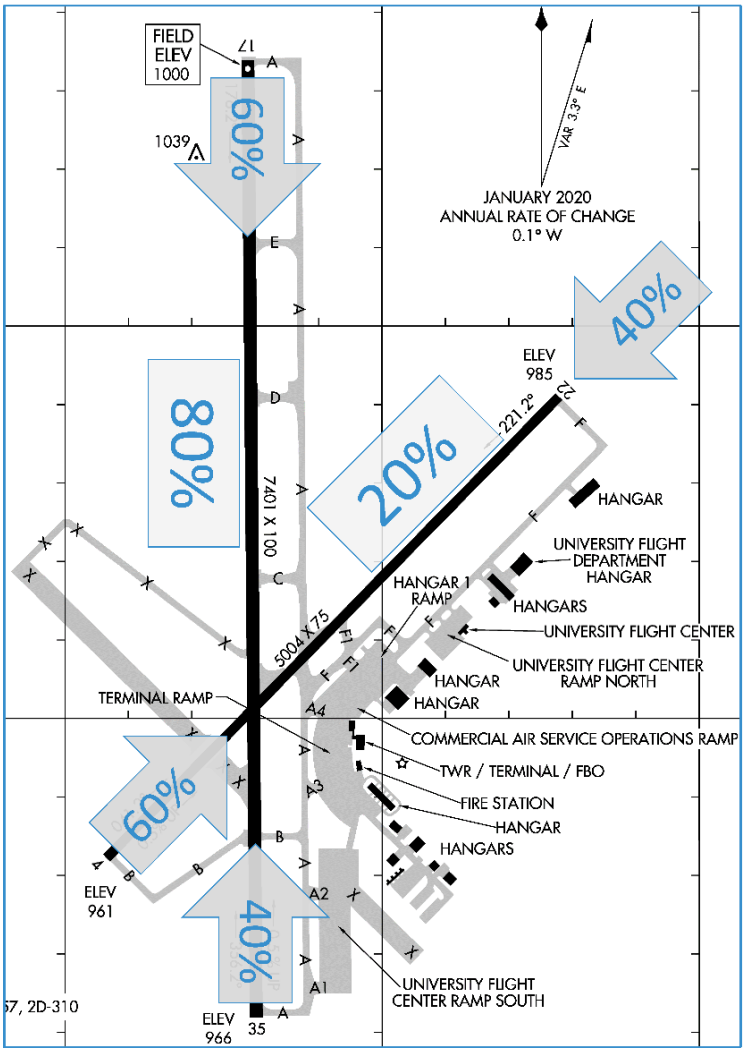


Table B-31 presents the runway utilization by RDC based on total aircraft operations and the wind coverage analysis. Runway 17/35 provides almost 96 percent wind coverage for the 10.5-knot crosswind component during all weather conditions, and almost 98 percent wind coverage for the 13-knot crosswind component. The 10.5-knot crosswind component is considered the maximum crosswind component for small aircraft with RDCs A-I and B-I. The 13-knot crosswind component is considered the maximum crosswind component for aircraft with RDCs A-II and B-II, which includes turboprops and small jets. ATCT personnel estimate that only 20 percent of single engine aircraft use Runway 4/22; the remainder of all other aircraft types use Runway 17/35. However, based on the wind coverage analysis, a small percentage of multi-engine piston, turboprop, and small business jet aircraft would need to use Runway 4/22 during excessive crosswind conditions. Therefore, an approximate four percent of multi-engine piston aircraft and two percent of turboprop and small business jet aircraft are estimated to use Runway 4/22.

Table B-31: Runway Utilization by Runway, 2020-2040

Runway	2020	2025	2030	2035	2040
Runway 17/35	**50,280**	**61,884**	**68,188**	**72,960**	**77,634**
Runway 17	30,168	37,130	40,912	43,776	46,580
Runway 35	20,112	24,754	27,276	29,184	31,054
Runway4/22	**12,363**	**15,470**	**17,046**	**18,240**	**19,410**
Runway 4	7,418	9,282	10,226	10,944	11,646
Runway 22	4,945	6,188	6,820	7,296	7,764
Total[1]	**62,643**	**77,354**	**85,234**	**91,220**	**97,044**

Sources: [1] FAA TAF, 2021.

[2] Percentage estimates provided by SWO ATCT personnel and Mead & Hunt calculations based on wind coverage analysis.

Night Operations

Night operations at SWO have been defined as the aircraft activity occurring between 10:00 p.m. and 7:00 a.m. local time. This differs from the definition provided in Title 14 of the Code of Federal Regulations (14 CFR) part 61, which refers to one hour after sunset and ending one hour before sunrise. The reason is the local time matches the definition used in FAA's noise modeling program Aviation Environmental Design Tool (AEDT). When aircraft noise modelling is performed, aircraft operations occurring between 10:00 p.m. and 7:00 a.m. are deemed more intrusive. In fact, AEDT penalizes the noise energy from aircraft operations at night by ten decibels to compensate for the perceived greater disturbance on sleep habits.

Since SWO's ATCT is closed between the hours of 10:00 p.m. and 8:00 a.m. local time, no official aircraft activity is recorded during these hours. However, the second daily Envoy/SkyWest Airlines flight into SWO has a scheduled arrival at 10:30 p.m., remains overnight, and has a scheduled departure time of 6:00 a.m. Additionally, ATCT and SWO staff estimate that 15 percent of total GA operations at SWO occur during nighttime hours. Therefore, based on this information, the estimated number of night operations for this Master Plan are provided in **Table B-32**. As the shift from commercial service 50-seat regional jets to 76-seat narrow body jets fully occurs by 2035 at SWO, the need for twice daily flights throughout an average week decreases. Therefore, the annual nighttime commercial service aircraft operations decrease throughout the planning period.

Table B-32: Estimated Existing and Forecast Night Operations, 2020-2040

Aircraft Type	2020[1]	2025[2]	2030[2]	2035[2]	2040[2]
Commercial Service	728	728	570	520	520
Itinerant GA	640	780	870	970	1,050
Local GA	3,980	5,080	5,620	5,900	6,180
Total[1]	**5,350**	**6,590**	**7,060**	**7,390**	**7,750**

Sources: [1] Actual, based on Envoy/SkyWest Airlines current schedule and estimate of itinerant and local GA operations.

[2] Mead & Hunt.

Runway Design Code/Critical Aircraft Analysis

The critical aircraft, often referred to as the design aircraft is defined in FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination* as the most demanding type or grouping of aircraft with similar

characteristics, that make regular use of an airport. Regular use is defined as 500 annual operations, including itinerant and local, but excluding touch-and-go operations. The 500 annual operations regular use threshold is not a cap or limit on aircraft operations, but rather a planning metric for consideration of the potential need to upgrade airport facilities.

Critical aircraft type is defined by the RDC, which consists of the Aircraft Approach Category (AAC) and the Airport Design Group (ADG). The AAC, depicted by a letter relates to the aircraft approach speed. The ADG, depicted by a Roman numeral relates to the aircraft wingspan and tail height. The FAA's specified criteria for AAC and ADG, as referenced in AC 150/5300-13A are presented in **Table B-33** and **Table B-34**.

Table B-33: Aircraft Approach Category (AAC)

AAC	V_{Ref}/Approach Speed
A	Less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

Source: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Table B-34: Airplane Design Group (ADG)

AAC	Wingspan	Tail Height
I	Less than 49'	Less than 20'
II	Greater than 49' but less than 79'	Greater than 20' but less than 30'
III	Greater than 79' but less than 118'	Greater than 30' but less than 45'
IV	Greater than 118' but less than 171'	Greater than 45' but less than 60'
V	Greater than 171' but less than 214'	Greater than 60' but less than 66'
VI	Greater than 214' but less than 262'	Greater than 66' but less than 80'

Source: FAA AC 150/5300-13A, Change 1, *Airport Design*.

Critical Aircraft by Runway

To determine the SWO critical aircraft, existing operations by aircraft type are derived from the TFMSC data. Forecasts of commercial service critical aircraft operations are based on commercial service aircraft fleet changes through airline orders currently being fulfilled or yet to be delivered. GA critical aircraft forecasts are based on the changing use patterns outlined in the aircraft fleet mix section presented earlier. Military aircraft are not considered for critical aircraft consideration because the critical aircraft designation is a key component in FAA decision making for project justification.

Runway 17/35

Table B-35 presents the existing and forecasted operations occurring on Runway 17/35 broken down by AAC and ADG. In 2020, the Embraer ERJ 140 had the most operations of any single commercial service aircraft with 621. The Embraer ERJ 145/145 EX followed closely with 541 operations. Both aircraft have a RDC of C-II. However, Envoy/SkyWest Airlines have retired their ERJ 140 aircraft and by June 2021, only 32 operations were recorded at SWO. By comparison, the ERJ 145/145 EX recorded 407 operations by June 2021. This

indicates the existing critical aircraft for Runway 17/35 is the ERJ 145 and the existing RDC is C-II. The 50-seat ERJ 145s flown by Envoy/SkyWest Airlines are expected to be phased out of service during the planning period, replaced by 76-seat ERJ 175 aircraft. This aircraft has a RDC of C-III. Therefore, for Runway 17/35 the ERJ 175 is the future critical aircraft and the future RDC is C-III. **Figure B-9** shows the existing and future critical aircraft for Runway 17/35.

Table B-35: Summary of Runway 17/35 Operations Forecasts by RDC, 2020-2040

Typical Aircraft	RDC	2020[1]	2025	2030	2035	2040
Cessna 172, Cirrus SR-20	A-I	45,732	56,340	61,270	65,490	69,634
Pilatus PC-12	A-II	115	146	154	164	176
Beech King Air 90, Raytheon Beechjet 400	B-I	964	1,196	1,326	1,444	1,550
Cessna 208 Caravan, Beech 200 Super King Air	B-II	520	650	732	780	864
Saab 2000	B-III	6	10	10	12	14
Bombardier Learjet 60, Hawker 800	C-I	36	48	64	72	96
Embraer ERJ 140/145, Bombardier Challenger 600/601/604	C-II	1,242	1,466	1,704	1,830	2,012
ERJ 175, Boeing 737-400	C-III	18	370	1,202	1,414	1,522
Lockheed C-130	C-IV	4	6	8	8	8
Northrop T-38	D-I	2	4	4	4	4
Gulfstream G IV/G400	D-II	2	2	2	4	4
Boeing 737-900, Gulfstream G V/G500	D-III	22	32	34	38	40
Total[2]		**48,662**	**60,270**	**66,510**	**71,260**	**75,924**

Sources: [1] Mead & Hunt estimates using FAA TFMSC, 2021 and runway utilization analysis.
[2] Military aircraft and helicopter operations not included.

Figure B-9: Existing and Future Runway 17/35 Critical Aircraft

Runway 4/22

Applying the runway utilization analysis presented earlier to the TFMSC data, **Table B-36** shows the existing and forecasts operations estimated to occur on Runway 4/22 broken down by AAC and ADG. In 2020, the

Cessna 172 had the most operations of any single aircraft with an estimated 7,095. The Cirrus SR-20 had the next highest number of operations with an estimated 2,522 in 2020. Both aircraft have a RDC of A-I and are used extensively by the OSU Flight Center. The OSU Flight Center has plans to increase its SR-20 fleet by an additional six aircraft in 2022. This indicates the existing and future critical aircraft is the Cessna 172 and the existing and future RDC is A-I. **Figure B-10** shows the existing and future critical aircraft for Runway 4/22.

Table B-36: Summary of Runway 4/22 Operations Forecasts by RDC, 2020-2040

Typical Aircraft	RDC	2020[1]	2025	2030	2035	2040
Cessna 172, Cirrus SR-20	A-I	10,723	13,810	15,366	16,538	17,672
Pilatus PC-12	A-II	5	8	12	20	32
Beech King Air 90, Raytheon Beechjet 400	B-I	28	38	50	58	70
Cessna 208 Caravan, Beech 200 Super King Air	B-II	10	16	20	26	36
Total[2]		**10,766**	**13,872**	**15,448**	**16,642**	**17,810**

Sources: [1] Mead & Hunt estimates using FAA TFMSC, 2021 and runway utilization analysis.
[2] Military aircraft and helicopter operations not included.

Figure B-10: Existing and Future Runway 4/22 Critical Aircraft

SUMMARY

A summary of aviation activity forecasts prepared for SWO is provided in **Table B-37**. This information is used as a background to develop the remaining portions of the Master Plan (analyze facility requirements, aid development of alternatives, and guide the preparation of the plan and program of future airport facilities). In other words, the aviation activity forecasts are the foundation from which plans will be developed and implementation decisions will be made.

Table B-37: Summary of Aviation Activity Forecasts, 2020-2040

Activity	2020	2025[5]	2030[5]	2035[5]	2040[5]
Enplanements					
Total	**17,410[1]**	**28,000**	**31,830**	**36,150**	**41,060**
Operations					
Commercial Service	***1,920***	***2,284***	***2,284***	***2,180***	***2,284***
Air Carrier	30[1]	348	1,180	1,284	1,492
Narrow Body Jets	*30[2]*	*348*	*1,180*	*1,284*	*1,492*
Air Taxi/Commuter	1,890[1]	1,936	1,000	792	792
Regional Jets	*1,312[2]*	*1,310*	*532*	*200*	*140*
Air Cargo	*92[2]*	*92*	*92*	*92*	*92*
GA Types	*486[3]*	*534*	*480*	*500*	*560*
General Aviation	***57,512[1]***	***71,870***	***79,750***	***85,820***	***91,560***
Itinerant	25,654[1]	31,260	34,760	38,640	42,140
Local	31,858[1]	40,610	44,990	47,180	49,420
Military	***3,211[1]***	***3,200***	***3,200***	***3,200***	***3,200***
Itinerant	1,314[1]	1,310	1,310	1,310	1,310
Local	1,897[1]	1,890	1,890	1,890	1,890
Total[1]	**62,643[1]**	**77,354**	**85,234**	**91,200**	**97,044**
Based Aircraft					
Total	**80[4]**	**87**	**91**	**96**	**101**
Critical Aircraft					
Runway 17/35	ERJ 145	ERJ 145	ERJ 175	ERJ 175	ERJ 175
Runway 4/22	Cessna 172	Cessna 172	Cessna 172	Cessna 172	Cessna 172

Sources: [1] FAA TAF, 2021.

[2] TFMSC Direct – Operations obtained directly from TFMSC data.

[3] TFMSC Derived – Operations derived from subtracting the sum of Air Taxi/Commuter regional jet and air cargo operations from total Air Taxi/Commuter operations.

[4] SWO staff.

[5] Mead & Hunt projections.

FORECAST APPROVAL

According to FAA language contained in Review and Approval of Aviation Forecasts, regional airports division offices or airports district offices are responsible for aviation forecast approvals at local airports. As stated previously, airport master plan forecasts that are consistent with the FAA's TAF (i.e., the airport master plan forecast differs by less than 10 percent in the first 5 years and differs by less than 15 percent in the 10-year forecast period) do not need to be coordinated with FAA headquarters (APP-400, APO-110). As noted in **Table B-38**, the forecasts estimated for this Master Plan are within the TAF tolerances during the five- and 10-year forecast periods. The actual FAA templates for **Table B-38** and **Table B-39** have been completed and are presented for reference in **Appendix Three**. The FAA forecast approval letter is also contained in **Appendix Three**.

Table B-38: Summary of Master Plan and TAF Comparison

	Year	Master Plan Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base Year	2020	17,410	17,410	0%
Base Year + 5 Years	2025	28,000	28,964	-3%
Base Year + 10 Years	2030	31,830	28,964	10%
Base Year + 15 Years	2035	36,150	28,964	25%
Commercial Operations				
Base Year	2020	1,920	1,920	0%
Base Year + 5 Years	2025	2,284	2,517	-9%
Base Year + 10 Years	2030	2,284	2,645	-14%
Base Year + 15 Years	2035	2,180	2,776	-21%
Total Operations				
Base Year	2020	62,643	62,643	0%
Base Year + 5 Years	2025	77,354	80,967	-4%
Base Year + 10 Years	2030	85,234	84,121	1%
Base Year + 15 Years	2035	91,200	87,423	4%

Source: Mead & Hunt.

Table B-39: Summary of Airport Planning Forecasts

Activity Forecasts						Average Annual Compound Growth Rate			
	Base Year (2020)	Base Yr. + 1 Yr. (2021)	Base Yr. +5 Yrs. (2025)	Base Yr. +10 Yrs. (2030	Base Yr. + 15 Yrs. (2035)	Base Yr. to + 1 Yr.	Base Yr. to + 5 Yrs	Base Yr. to + 10 Yrs	Base Yr. to + 15 Yrs.
Passenger Enplanements									
Air Carrier	1,308	1,600	1,600	1,600	1,600	22.3%	4.1%	2.0%	1.4%
Commuter	16,102	13,900	26,400	30,230	34,550	-13.7%	10.4%	6.5%	5.2%
Total	**17,410**	**15,500**	**28,000**	**31,830**	**36,150**	**-11.0%**	**10.4%**	**6.2%**	**5.0%**
Operations									
Itinerant									
Air Carrier	30	94	348	1,180	1,388	212.0%	63.3%	44.4%	29.1%
Commuter/air taxi	1,890	1,899	1,936	1,104	792	0.5%	0.5%	-5.2%	-5.6%
Total Commercial Operations	**1,920**	**1,993**	**2,284**	**2,284**	**2,180**	**3.8%**	**3.5%**	**1.8%**	**0.9%**
General aviation	25,654	27,980	31,260	34,760	38,640	9.1%	4.0%	3.1%	2.8%
Military	1,314	1,310	1,310	1,310	1,310	-0.3%	-0.1%	0.0%	0.0%
Local									
General aviation	31,858	34,500	40,610	44,990	47,180	8.3%	5.0%	3.5%	2.7%
Military	1,897	1,890	1,890	1,890	1,890	-0.4%	-0.1%	0.0%	0.0%
Total Operations	**62,643**	**67,673**	**77,354**	**85,234**	**91,200**	**8.0%**	**4.3%**	**3.1%**	**2.5%**
Instrument Operations	4,737	5,034	5,643	5,983	6,255	6.3%	3.6%	2.4%	1.9%
Peak Hour Operations	30	31	37	41	43	4.7%	4.5%	3.2%	2.6%
Cargo/mail (enplaned +deplaned tons)	42	43	46	51	51	2.0%	2.0%	2.0%	1.3%
Based Aircraft									
Single Engine (Nonjet)	72	73	76	80	84	1.2%	1.0%	1.0%	1.1%
Multi Engine (Nonjet)	6	8	8	7	6	33.3%	5.9%	1.6%	0.2%
Jet Engine	2	2	2	2	3	0.7%	1.0%	0.9%	2.7%
Helicopter	0	0	0	1	1	N/A	N/A	N/A	N/A
Other	0	0	1	1	1	0.0%	0.0%	0.0%	0.0%
Total	**80**	**83**	**87**	**91**	**96**	**3.6%**	**1.7%**	**1.3%**	**1.2%**
Average aircraft size (seats)									
Air carrier	164	150	85	79	78				
Commuter	46	46	50	48	45				
Average enplaning load factor									
Air carrier	74%	70%	55%	69%	67%				
Commuter	58%	60%	65%	59%	67%				
GA operations per based aircraft	**719**	**754**	**825**	**872**	**895**				

Source: Mead & Hunt.

C. Facility Requirements

INTRODUCTION

In efforts to determine an airport's future facility needs, it is necessary to translate the forecasted aviation activity into specific physical development requirements. Using the Federal Aviation Administration (FAA) design standards and guidelines, this chapter analyzes the actual types and quantities of facilities and/or the required improvements to existing facilities needed to accommodate the projected demand in a safe and efficient manner. For those components determined to be deficient, the type, size, or number of facilities required to meet the demand is identified and explained using FAA standards and guidelines.

Although the analysis uses the forecasts presented in the previous chapter for establishing future development, it is not intended to dismiss the possibility that either consistently higher or lower growth levels may occur. Aviation activity levels should be monitored for consistency with the forecasts. Since the facility improvements are identified to resolve existing deficiencies, accommodate projected growth, and satisfy airport development goals, the resulting recommendations respond to demand rather than being planned for a specific year.

Airport Design Standards

The geometric design of an airport is based on the Runway Design Code (RDC) standards specified in FAA's Advisory Circular (AC) 150/5300-13B, *Airport Design* and introduced in the previous chapter, **Chapter B – Forecasts of Aviation Activity**. Although the RDC is based on the Critical Aircraft or Design Aircraft defined in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, and is used for planning and design, it does not limit the aircraft that may be able to operate at an airport. Critical aircraft can take the form of one aircraft or a composite of aircraft representing a collection of aircraft with similar characteristics. FAA AC 150/5300-13B allows for the application of different RDCs to individual runways based on the critical aircraft operating or expected to operate on each runway.

The previous chapter and FAA Forecast Approval Letter contained in **Appendix Three** identified the Runway 17/35 existing critical aircraft as the Embraer ERJ 145, which has a RDC of C-II. The future critical aircraft is identified as the Embraer ERJ 175, which has a RDC of C-III. The Cessna 172 was identified as the Runway 4/22 critical aircraft, which has a RDC of A-I. Since the Cessna 172 has a maximum gross takeoff weight of less than 12,500 pounds, it is considered a small aircraft.

In addition to the aircraft approach speed (AAC) and wingspan components (ADG) comprising the RDC introduced in the previous chapter, a third component exists that is related to the lowest Instrument Approach Procedure (IAP) visibility minimums. An IAP is a series of predetermined maneuvers designed to transition aircraft under instrument flight conditions from the en route portion of the flight to a point where a landing can be made visually. Runways provide maximum utility when they can be used in less-than-ideal weather conditions. This translates to visibility minimums in terms of the distance to see and identify prominent

unlighted objects by day and lighted objects by night. Pilots must be able to see the runway or associated lighting at a certain distance from and height above the runway to land during periods of limited visibility. Ultimate runway development should be designed for one of the following visibility categories:

- **Visual –** Runways that support Visual Flight Rules (VFR) operations only, except circle-to-land approaches.
- **Non-Precision Approach (NPA) –** Runways designed to accommodate straight-in approaches with only lateral guidance provided. NPA runways will only support Instrument Flight Rules (IFR) approach operations with visibility minimums of 3/4 mile or greater.
- **Approach Procedure with Vertical Guidance (APV) –** Runways designed to accommodate approaches where the navigation system provides vertical guidance down to 250 feet above the threshold and visibility minimums of 3/4 mile or greater.
- **Precision Approach (PA) –** Runways designed to accommodate approaches where the navigation system provides vertical guidance lower than 250 feet above the threshold and visibility minimums lower than 3/4 mile.

For airport facility geometric design purposes, the instrument approach visibility minimums are expressed as Runway Visual Range (RVR) values in feet. **Table C-1** provides the instrument approach visibility minimums and corresponding RVR value.

Table C-1: RVR Values

Instrument Flight Visibility Minimum Category (miles)	RVR (feet)[1]
Visual	VIS
Not Lower Than 1 Mile	5000
Lower Than 1 Mile but Not Lower Than 3/4 Mile	4000
Lower Than 3/4 Mile but Not Lower Than 1/2 Mile	2400
Lower Than 1/2 Mile but Not Lower Than 1/4 Mile	1600
Lower Than 1/2 Mile	1200

Source: FAA AC 150/5300-13B, *Airport Design*.
Notes: [1] RVR values are not exact equivalents.

As presented in **Chapter A – Inventory of Existing Conditions**, SWO is equipped with an Instrument Landing System (ILS) Instrument Approach Procedure (IAP) and an Area Navigation (RNAV) Global Positioning System (GPS) IAP to Runway 17 that have visibility minimums as low as 1/2 mile. Runway 4/22 is a visual approach only runway. Therefore, the full expression of the Runway 17/35 existing RDC is C-II-2400 and the Runway 4/22 existing RDC is A-I-VIS (small aircraft only). Future IAP improvements will be evaluated in the next section that will determine the future RDC designations for both runways.

AIRSIDE FACILITY REQUIREMENTS

The analysis of airside facility requirements focuses on the determination of needed facilities and spatial considerations related to the actual operation of aircraft at an airport. The FAA is responsible for the overall safety of civil aviation in the United States. Therefore, the FAA design standards and policy focus first and

foremost on safety, with secondary emphasis on efficiency and utility. The evaluation of airside facilities contained in this section includes the application of appropriate design standards to the aircraft operating surfaces (i.e., runways and taxiways), the desired IAP improvements, the sufficiency of the approach areas, and the resulting navigation and lighting needs.

Instrument Approach Procedures and Navigational Aids Analysis

Since many appropriate airport design standards are determined upon the lowest visibility minimums, an evaluation of IAP improvements should be established first that provide an understanding of the benefits received, the implementation required, and the methodology employed.

Instrument Approach Procedures

Increased airport access can be improved by reducing the ceiling and/or visibility minimums associated with IAPs. Further analysis of SWO's climatological conditions presented in **Chapter A – Inventory of Existing Conditions** indicates the existing IAPs to Runway 17/35 are slightly lacking for providing IFR accessibility. As presented in **Table C-2**, the IFR wind analysis indicates that Runway 35 offers slightly better wind coverage during IFR weather conditions than Runway 17. Additionally, Runway 17/35 offers less than 95 percent IFR wind coverage for the 10.5-knot crosswind component. Providing at least one IAP to Runway 4/22 would increase the amount of time that smaller aircraft are able to access SWO during excessive crosswind conditions under IFR weather conditions.

The existing Airport Layout Plan (ALP) indicates a future IAP with visibility minimums not lower than 1/2 mile is planned for implementation to Runway 35. It also shows future IAPs with visibility minimums not lower than 3/4 mile planned for Runways 4 and 22. Therefore, it is recommended that this Master Plan evaluate the possibility of implementing IAPs with lower visibility minimums to Runways 35, 4, or 22 in the next chapter. This would include an evaluation of any required Approach Lighting Systems (ALS).

Table C-2: IFR Wind Coverage by Runway End

Runway	10.5-Knots	13-Knot	16-Knot
17/35	**94.96%**	**97.43%**	**99.15%**
17	67.05%	68.04%	69.57%
35	78.43%	80.23%	81.59%
4/22	**85.84%**	**92.32%**	**97.77%**
4	79.87%	84.72%	88.89%
22	64.12%	67.98%	71.73%
Combined	**97.31%**	**98.92%**	**99.67%**

Source: Mead & Hunt using the FAA Airport Data and Information Portal (ADIP), Wind Analysis. February 2022.
Wind data provided by NOAA Integrated Surface Database (ISD), Station 723545.
Period of Record 2011-2020.

Navigational Aids

FAA AC 150/5070-6B defines Navigational Aids (NAVAIDs) as aids to navigation that provide pilots with information that assist in locating an airport and to provide horizontal and/or vertical positional guidance

during landing. The type, mission, and volume of aeronautical activity, in association with airspace, meteorological conditions, and capacity data determine the need and eligibility for NAVAIDs. NAVAID requirements are based on guidelines contained in FAA Handbook 7031.2C, *Airway Planning Standard Number One* and FAA AC 150/5300-13B, *Airport Design*.

As presented above, Runway 35 is equipped with a ground-based ILS IAP. Two antennae comprise the ILS and work in tandem to provide both vertical and horizontal guidance to approaching aircraft. The localizer antenna provides the horizontal guidance, and the glide slope antenna provides the vertical guidance. The localizer antenna south of Runway 35 is located approximately 1,000 feet from the threshold and the glide slope antenna is located approximately 1,170 feet south of the Runway 17 threshold and 370 feet west of the runway centerline.

A Very High Frequency Omni-Directional Range/Distance Measuring Equipment (VOR-DME) station is located approximately 3.1 miles north/northeast of Runway 17. This ground-based facility is utilized for en route navigation for airways as well as the NPA IAPs to Runways 17 and 35.

For many years, the FAA has been transitioning away from IAPs that use ground-based NAVAIDS to those that utilize the satellite-based Global Positioning System (GPS). SWO has two PA GPS-based IAPs that have no associated ground-based facilities or equipment. It is anticipated that any future IAP improvements will be implemented using GPS technology and no ground-based NAVAIDS will be utilized at SWO.

Instrument Approach Procedure and Navigational Aids Conclusion

The operational capacity for each runway regarding wind coverage and navigational aids is sufficient to enable an unincumbered system to support existing and future airport operations. However, the ability to implement a GPS-based IAP providing visibility minimums of 1/2 mile to Runway 35 and NPA IAPs providing visibility minimums not less than 3/4 mile to Runways 4 and 22 would enhance SWO's access during adverse weather conditions. It is recommended that SWO evaluate the potential to implement these types of IAPs, including the impact on developable area within the terminal area, in the next chapter.

Airfield Design Standards Analysis

Runway Design Standards

Runway design standards are established to assure that runway facilities are designed, constructed, and operated in a safe and efficient manner and represent the minimum standards to be achieved. To determine if existing facilities meet the required standards, this analysis compares the dimensional requirements associated with the appropriate RDC to the existing airport facilities. NAVAIDS classified as fixed-by-function within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA), as listed in Table 6-1 of FAA AC 150/5300-13B, *Airport Design*, are excluded from the analysis.

Runway 17/35

Runway Object Free Area (ROFA). An area centered on the surface of the runway provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects that need to be in the OFA for air navigation or aircraft ground maneuvering purposes. (FAA AC 150/5300-13B, *Airport Design*)

Table C-3 presents the existing dimensions and applicable design standards for Runway 17/35. As contained in the table, Runway 17/35 does not mee the ROFA width dimensional criteria because of two objects. The first is the glideslope equipment building and antenna located 370 feet west of the runway centerline, while the second is a frangible windsock located 250 feet east of the runway centerline. However, the windsock was recently constructed in this location with FAA approval. Therefore, it is not considered an obstruction or non-standard condition within the ROFA. The glideslope equipment building and antenna are non-standard conditions and results in a ROFA width deficiency of 30 feet, providing only a total width of 770 feet.

Table C-3: Runway 17/35 Design Standards

Item	Design Standard (C-III-2400)[1]	Existing Dimensions	
		Runway 17	Runway 35
Runway Design			
Runway Width	100’	100’	
Shoulder Width[2]	20’	25’	
Blast Pad Width[2]	140’	N/A	N/A
Blast Pad Length[2]	200’	N/A	N/A
Runway Safety Area (RSA)			
Length Beyond Departure End	1,000’	1,000’	1,000’
Length Prior to Threshold	600’	600’	600’
Width	500’	500’	
Runway Object Free Area (ROFA)			
Length Beyond Departure End	1,000’	1,000’	1,000’
Length Prior to Threshold	600’	600’	600’
Width	800’	**770’**	
Runway Obstacle Free Zone (ROFZ)			
Length	200’	200’	200’
Width[3]	400’	400’	
Runway Separation			
Runway Centerline to:			
Holding Position[4]	260’	260’	
Parallel Taxiway/Taxilane Centerline	400’	400’	

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Standards based on aircraft with maximum gross takeoff weight of less than 150,000 pounds.

[2] Paved runway shoulders and blast pads are recommended, but not required for runways accommodating ADG III and below aircraft. Stabilized shoulders of turf are acceptable.

[3] Standard based on 400 feet for operations by large aircraft.

[4] Standard based on 250 feet plus one foot for each 100 feet above sea level (SWO elevation is 1,001 feet).

N/A = Not Applicable.

Bold = Standard not met.

Runway 4/22

Table C-4 presents the existing dimensions and applicable design standards for Runway 4/22. There are no design standard deficiencies associated with this runway.

Table C-4: Runway 4/22 Design Standards

Item	Design Standard (A-I-VIS Small)	Existing Dimensions	
		Runway 4	Runway 22
Runway Design			
Runway Width	60’	75’	
Shoulder Width[1]	10’	0’	
Blast Pad Width[1]	80’	N/A	N/A
Blast Pad Length[1]	60’	N/A	N/A
Runway Safety Area (RSA)			
Length Beyond Departure End	240’	240’	240’
Length Prior to Threshold	240’	240’	240’
Width	120’	120’	
Runway Object Free Area (ROFA)			
Length Beyond Departure End	240’	240’	240’
Length Prior to Threshold	240’	240’	240’
Width	250’	250’	
Runway Obstacle Free Zone (ROFZ)			
Length	200’	200’	200’
Width[2]	250’	250’	
Runway Separation			
Runway Centerline to:			
Holding Position	125’	200’	
Parallel Taxiway/Taxilane Centerline	150’	240’ +	

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved runway shoulders and blast pads are recommended, but not required for runways accommodating ADG III and below aircraft. Stabilized shoulders of turf are acceptable.

[2] Standard based on 250 feet for operations by small aircraft with approach speeds of 50 knots or more.

N/A = Not Applicable.

Bold = Standard not met.

Runway Design Standards Conclusion

Most of the runway design standards for each of SWO’s two runways are met. However, deficiencies in the Runway 17/35 ROFA width was noted and is shown in **Figure C-1**. Alternatives addressing the ROFA width deficiency will be considered in the next chapter.

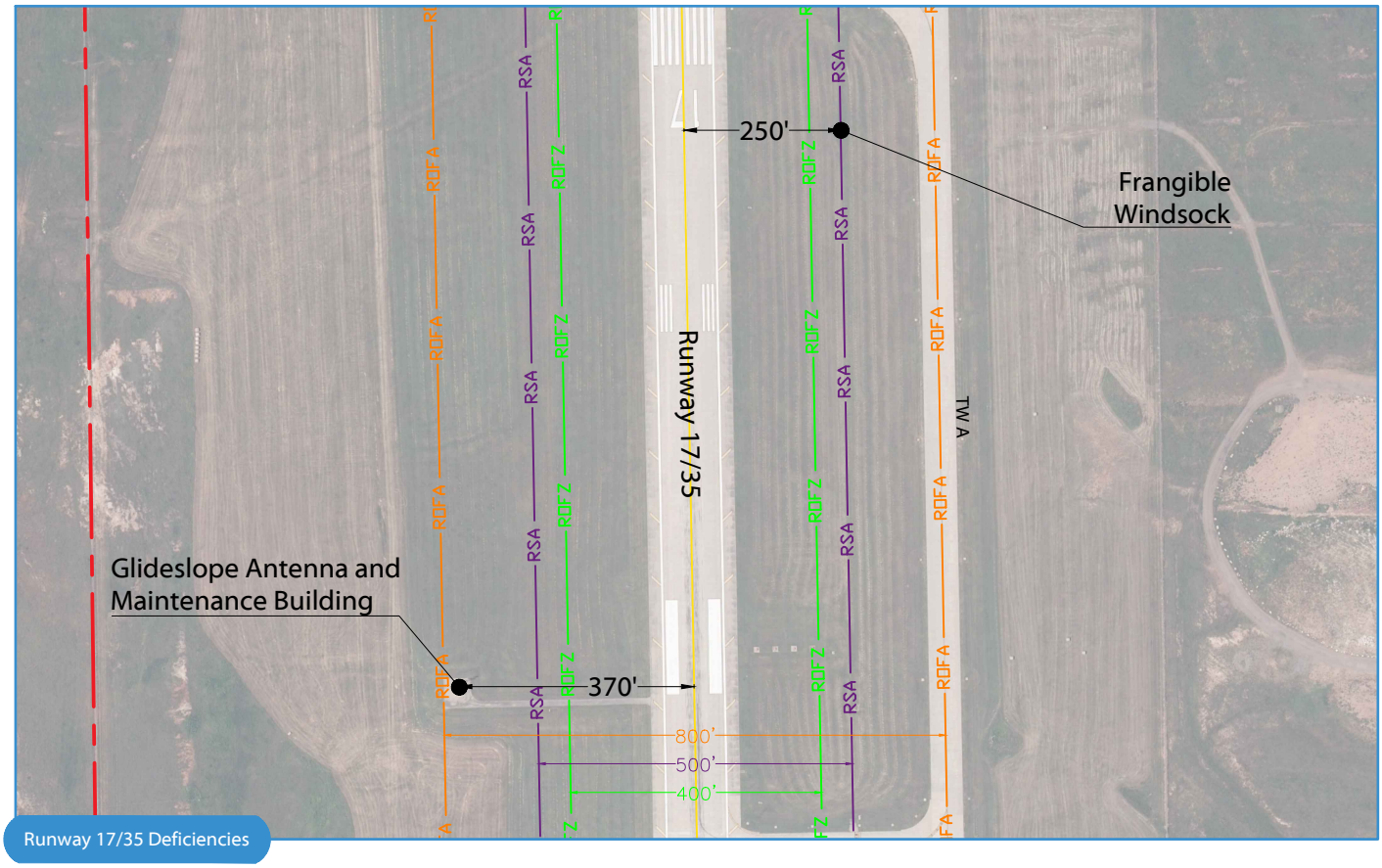


Figure C-1
Runway Dimensional Standard Deficiencies

Runway Line of Sight

Line of sight standards exist to allow pilots to observe runway and taxiway surfaces for assurance that they are clear of aircraft, vehicle, wildlife, and other hazardous objects. According to the longitudinal (i.e., along the length of the runway) line of sight standards contained in FAA AC 150/5300-13B, any two points located five feet above the runway centerline must be mutually visible for the entire length of the runway. However, if the runway is served by a full-length parallel taxiway, the requirement is reduced to one half the runway length.

The longitudinal profile evaluation from each end of Runway 17/35 and 4/22 to the individual runway midpoint at five feet above the runway surface indicates a clear line of sight is achieved. Both Runway 17/35 and 4/22 have an overall longitudinal gradient of approximately 0.48 percent.

When airfield geometry includes intersecting runways, line of sight standards indicate that there must be an unobstructed view from any point five feet above the runway centerline to any other point five feet above the intersecting runway within the Runway Visibility Zone (RVZ). At SWO, the RVZ is defined as an area formed by the imaginary lines connecting the two runways' line of sight points. Because all runway ends are more than 1,500 feet from the runway intersection, the line of sight points are established one-half the distance from the intersecting runway centerline to the runway ends. An analysis was conducted using SWO's GIS survey data collected in 2021 and no obstructions to the RVZ line of sight were found.

Runway Line of Sight Conclusion

The analysis indicated there were no identified line of sight deficiencies for either Runway 17/35 or 4/22.

Pavement Strength

FAA pavement design considers the pavement strength needed to accommodate the expected aircraft fleet to frequently use the pavement. No single critical aircraft is designated for pavement strength. Pavement design strength does not necessarily prohibit airport use by heavier aircraft. However, if routine use by an aircraft heavier than the pavement strength is anticipated, then it would be recommended that pavement strength be increased.

As identified in **Chapter A – Inventory of Existing Conditions**, the pavement of Runway 17/35 and 4/22 is rated in good condition. It should be noted that portions of Runway 17/35 were most recently reconstructed between 2001 and 2009, while a full-depth rehabilitation of Runway 4/22 occurred in 2018. SWO noted a need for rehabilitation on both runways, with minor cracks requiring sealing followed by remarking of the runways. A series of full depth repairs on various runway shoulder areas and edges is anticipated.

SWO's aprons remain in good condition, with SWO staff noting the pavement around T-hangar 2 is exhibiting signs of wear that might need to be addressed, but overall no major pavement improvements are anticipated. The following taxiways were noted for crack sealing and remarking:

- Taxiway A
- Taxiway B
- Taxiway E
- Taxiways A1 through A4
- Taxiway D
- Taxiways F and F1

Pavement Strength Conclusion

Information provided by airport staff indicates that the pavement strength of the runways, taxiways, and aprons remain generally suitable for the SWO fleet mix. Apron surrounding T-hangar 2 will be monitored for wear and pavement rehabilitation programmed as needed.

Runway Length Analysis

The runway length analysis recommends the length necessary to meet existing and future aircraft demands. The analysis considers aircraft design characteristics, airport elevation, temperature, and destinations, among other factors. The detailed runway length methodology and analysis is contained in **Appendix Four**.

Runway Length Methodology

The determination of runway recommendations for airport planning purposes uses the methodology found in FAA AC 150/5325-4B, *Runway Length Requirements*. This AC states the design objective for primary runways is to provide a runway length for all aircraft that will regularly use the runway without causing operational weight restrictions. AC 150/5000-17, *Critical Aircraft and Regular Use Determination* defines regular use as 500 annual operations, excluding touch-and-go local operations.

Runway 17/35 serves air carrier and the full range of general aviation (GA) aircraft. Runway 4/22 serves primarily smaller GA aircraft. The existing design aircraft (and most demanding aircraft) for Runway 17/35 has been determined to be the Embraer ERJ 145. The future design aircraft (and most demanding aircraft) is the Embraer ERJ 175. The existing and future design aircraft (and most demanding aircraft) for Runway 4/22 has been determined to be the 95 percent family grouping of small aircraft (i.e., aircraft with maximum takeoff weight equal to or less than 12,500 pounds) that have approach speeds greater than 50 knots but have less than 10 passenger seats excluding crew (i.e., pilot and copilot).

Runway Length Analysis

The runway length analysis uses the takeoff performance table and payload and range charts contained in the Airport Planning Manuals (APMs) of the design aircraft. The APMs base aircraft performance on airport temperature and elevation. SWO has an airport elevation of 1,000 feet above mean sea level (AMSL) and a mean maximum temperature of the hottest month of 94 degrees Fahrenheit. Combined, SWO's Density Altitude (DA) is calculated at 3,400 feet AMSL. **Table C-5** presents SWO's recommended runway lengths.

Table C-5: Runway Length Recommendations

Runway	Recommended Runway Length
17/35	**7,401' Actual**
Existing Design Aircraft (E-145)	8,630' (MTOW)
Future Design Aircraft (E-175)	9,430' (MTOW)
4/22	**5,002' Actual**
Existing and Future Design Aircraft (C 172)	3,730'

Source: Mead & Hunt using airport planning manuals and FAA AC 150/5325-4B methodology.

Aircraft have different ranges depending on the amount of weight carried. The recommended runway length will vary based on payload (i.e., passengers, baggage, and cargo), fuel load, and destinations as described by stage length in nautical miles (NMs). The longer the stage length, the more fuel that is required. The amount of fuel required to reach a given destination determines if payload restrictions are required. As stated in **Chapter B – Forecasts of Aviation Activity**, Envoy/SkyWest Airlines currently provide service to Dallas Fort Worth International Airport (DFW) and the most likely long-term future destinations to be served by air carriers are Denver International Airport (DEN) and Chicago O'Hare International Airport (ORD). DFW, DEN, and ORD are located approximately 200, 225, and 550 NMs from SWO, respectively.

Runway Length Conclusion

The runway length analysis suggests that Runway 17/35, with an existing length of 7,401 feet is slightly insufficient to accommodate both the existing and future design aircraft operating at MTOW. However, neither the Embraer ERJ 145 nor the ERJ 175 experience payload restrictions until stage lengths of 650 and 1,300 NMs, respectively, are required. Therefore, the existing Runway 17/35 length is determined to be sufficient, and no runway extensions are recommended.

Runway Protection Zones

Runway Protection Zones (RPZs) are trapezoidal areas beginning 200 feet beyond the threshold of a runway; their dimensions are determined by function (i.e., approach or departure RPZ), critical aircraft size, and the appropriate AAC; and the lowest IAP visibility minimums. Their purpose is to enhance the protection of people and property on the ground. This is accomplished through airport control of the RPZ areas, preferably exercised through fee simple ownership by the airport sponsor. It is desirable to clear all above ground objects from within RPZs. Where this is impractical, airport sponsors should work with property owners to maintain the RPZ clear of all facilities supporting incompatible activities. In consideration of the existing IAP visibility minimums and aircraft type the runways are designed to accommodate, **Table C-6** provides a comparison of the existing RPZ dimensional requirements.

Table C-6: Runway Protection Zone Dimension Criteria

Item	Inner Width	Length	Outer Width	Airport Controls Entire RPZ
Runway 17/35				
17 (Approach)	1,000’	2,500'	1,750’	Yes
17 (Departure)	500’	1,700’	1,010’	Yes
35 (Approach)	1,000’	1,700’	1,510’	Yes
35 (Departure)	500’	1,700’	1,010’	Yes
Runway 4/22				
4 (Approach)	250’	1,000’	450’	Yes
4 (Departure)	250’	1,000’	450’	Yes
22 (Approach)	250’	1,000’	450’	Yes
22 (Departure)	250’	1,000’	450’	Yes

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

Runway Protection Zone Conclusion

SWO currently owns all the property within the existing RPZs. Any changes to RPZs in the future will be analyzed in the next chapter.

Runway End Siting Surfaces

FAA AC 150/5300-13B provides criteria for the proper siting of runway ends and thresholds. The criteria are in the form of imaginary evaluation surfaces that are typically trapezoidal shaped and extend away from the runway ends along the centerline at specific slopes, expressed in horizontal feet by vertical feet (e.g., a 20:1 slope rises one foot vertically for every 20 feet horizontally). The specific size, slope, and starting point of the trapezoid depends upon the visibility minimums and the type of IAP associated with the runway end.

Approach Surfaces

Thresholds are located to provide proper clearance over obstacles for landing aircraft on approach to a runway end. When an object penetrates the approach surface required for aircraft to land at the beginning of the runway, and it is beyond the airport sponsor’s ability to remove, relocate, or lower, the landing threshold may require a location other than the end of the pavement (i.e., a displaced threshold). The existing criteria and analysis prepared for SWO are presented in **Table C-7**. According to this analysis there are no obstructions to the threshold siting surfaces.

Table C-7: Approach Surface Dimensions

Runway End	Distance From Runway End	Inner Width	Length	Outer Width	Slope	Existing Obstructions
17	200’	400’	10,000’	3,400’	34:1	None
35	200’	400’	10,000’	3,400’	20:1	None
4	0’	250’	5,000’	700’	20:1	None
22	0’	250’	5,000’	700’’	20:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

IAPs With Vertical Guidance Surfaces

Runway ends equipped with IAPs providing vertical guidance require an additional level of approach surface analysis. When objects penetrate this imaginary surface that cannot be mitigated, then an approach with vertical guidance is not authorized. The size, shape, slope, and criteria for these surfaces, and the analysis conducted for Runways 17 and 35 are presented in **Table C-8**. Runways 17 and 35 are the only runway ends currently equipped with IAPs providing vertical guidance. There are no objects that penetrate these surfaces.

Table C-8: IAPs With Vertical Guidance Threshold Siting Surface Dimensions

Runway End	Distance From Runway End	Inner Width	Length	Outer Width	Slope	Existing Obstructions
17	0’	300	10,200’	1,520’	30:1	None
35	0’	300	10,200’	1,520’	30:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Departure Surfaces

Departure ends of runways normally mark the end of the full-strength runway pavement available and suitable for departures. Departure surfaces, when clear of obstacles, allow pilots to follow standard departure procedures. If obstacles penetrate the departure surface, then the obstacles must be evaluated through the Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process. After the OE/AAA process, departure procedure amendments such as non-standard climb rates, non-standard (higher) departure minimums, or a reduction in the length of takeoff distance available may be required. The size, shape, slope, and criteria of the departure surfaces, as well as the analysis conducted for Runways 17 and 35 are presented in **Table C-9**. No obstructions were observed in the analysis of the departure surfaces.

Table C-9: Departure Runway Surface Dimensions

Runway End	Distance From Departure Runway End	Inner Width Section One	Inner Width Section Two	Length	Outer Width	Slope	Existing Obstructions
17	0’	100’	450’	12,152’	7,512’	40:1	None
35	0’	100’	450’	12,152’	7,512’	40:1	None

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Runway End Siting Conclusion

There were no obstructions identified in the existing approach surfaces, IAP with vertical guidance evaluation, or departure surfaces. Should any improvements or changes to the existing IAPs be proposed or the location of any runway thresholds change, then additional runway end siting analysis will be required.

Pavement Marking, Lighting, and Signage

The minimum requirements for surface marking schemes used for runways are a direct function of the approach category for each runway end.

Runway and Taxiway Markings

Runway 17/35 is provided with white precision markings consisting of landing designator numbers, centerline, threshold markings, aiming points, touchdown zone, and edge markings. The markings are consistent with the requirements of runways having precision IAPs. The markings are outlined in black to enhance the contrast with the concrete pavement and are in good condition. Yellow angled shoulder markings are provided between the edge markings and the pavement edge for additional delineation of the runway shoulders as unusable runway pavement.

Runway 4/22 is provided with white basic markings consisting of landing designator numbers, centerline, and aiming points. The markings exceed the requirements of runways with visual only approaches and are in good condition.

All taxiways at SWO are provided with yellow centerline markings. Taxiways that intersect a runway are provided with holding position markings, surface painted holding position signs, and enhanced centerline markings. The surface painted holding position signs and enhanced centerline markings are supplemental visual cues to alert pilots of an upcoming holding position marking in efforts to minimize potential runway incursions. Taxiway markings located on concrete pavements are outlined in black to enhance the contrast with the concrete. The taxiway markings at SWO meet all requirements for Part 139 airports.

Runway and Taxiway Lighting

Runway 17/35 is equipped with Medium Intensity Runway Lights (MIRL) and four-box Precision Approach Path Indicator (PAPI) at each runway end. Runway 35 is equipped with Runway End Identifier Lights (REILs) and Runway 17 has a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 4/22 is equipped with MIRL and four-box PAPI. These lighting systems are consistent with the existing IAP visibility minimums requirements and recommendations. If an IAP with visibility minimums lower than 3/4 mile is implemented to Runway 35, then AC 150/5300-13B indicates a full approach light system, such as a MALSR, would be required.

All taxiways providing access to the runway system at SWO are equipped with Medium Intensity Taxiway Lights (MITL). This practice is recommended for any additional taxiways serving the runway system.

Runway and Taxiway Signage

Both Runways 17/35 and 4/22 have distance remaining signs, which is consistent with requirements of airports frequented by turbojet aircraft as contained in FAA AC 150/5340-18G, *Standards for Airport Signs Systems*. The taxiway signage, consisting of runway entry hold signs, taxiway location signs, and taxiway directional signs is consistent with requirements for Part 139 airports.

Pavement Marking, Lighting, and Signage Conclusion

In conjunction with the Runway 35 potential IAP improvement of visibility minimums to 1/2 mile mentioned above, it is recommended that SWO evaluate the potential installation of a full approach light system such as a MALSR. Likewise, if a NPA IAP is implemented to either Runway 4 or 22, then the non-precision markings will be maintained. It is recommended that LED edge lighting replace all existing incandescent lighting.

Taxiway/Taxilane System

Taxiways provide defined movement corridors for aircraft between the runway system and the various functional landside areas on an airport. Some taxiways are necessary simply to provide access between aircraft parking aprons and runways, whereas other taxiways become necessary to provide more efficient and safer use of the airfield. Parallel taxiways eliminate the use of a runway for taxiing, referred to as back taxiing, which increases an airport's capacity and protects the runway under low visibility conditions. Taxiway turns and intersections are designed for safe and efficient taxiing by aircraft while minimizing excess pavement.

Taxilanes are provided for low speed, precis taxiing of aircraft that are usually, but not always, located outside the aircraft movement area. They normally provide aircraft access from taxiways to apron parking positions or hangar areas.

Taxiway/Taxilane Design Standards

Taxiways and taxilanes are designed for cockpit over centerline taxiing, with enough pavement width to allow for a certain amount of wander. Potential runway incursions should be minimized by using design criteria contained in FAA AC 150/5300-13B. Taxiway and taxilane clearance standards are based on wingspan and wingtip clearance criteria determined by the ADG of the critical aircraft. Taxiway and taxilane pavement design standards are based on the landing gear dimension determined by the Taxiway Design Group (TDG).

SWO's existing critical aircraft, the Embraer ERJ 145, has an ADG designation of II and a TDG designation of 2. The future critical aircraft (Embraer E 175) has an ADG III and TDG 3 designation, so the design standards associated with ADG III and TDG 3 will be evaluated for taxiways serving Runway 17/35. **Table C-10** presents the design criteria, design standards, and existing conditions for taxiways serving Runway 17/35.

Table C-10: Taxiway Design Standards for Taxiways Serving Runway 17/35

Design Criteria	Design Standard		Existing Dimension		
			Taxiway A	Taxiways A1 – A4	Taxiway B
ADG Design Criteria	**II**	**III**			
Taxiway Safety Area Width	79’	118’	118’	118’	118’
Taxiway Object Free Area Width	124’	171’	186’	186’	186’
Taxiway Centerline to:					
Parallel Taxiway/Taxilane Centerline	102’	144’	N/A	600’ +	1,350’ +
Fixed or Movable Object	62’	85.5’	93’	93’	93’
TDG Design Criteria	**2**	**3**			
Taxiway Width	35’	50’	50’	60’ +	50’
Taxiway Shoulder Width	15’	20’[1]	N/A	N/A	N/A

Design Criteria	Design Standard		Existing Dimension		
			Taxiway C	Taxiway D	Taxiway E
ADG Design Criteria	**II**	**III**			
Taxiway Safety Area Width	79’	118’	118’	118’	118’
Taxiway Object Free Area Width	124’	171’	186’	186’	186’
Taxiway Centerline to:					
Parallel Taxiway/Taxilane Centerline	102’	144’	1,400’ +	1,200’ +	1,200’ +
Fixed or Movable Object	62’	85.5’	93’	93’	93’
TDG Design Criteria	**2**	**3**			
Taxiway Width	35’	50’	55’	55’	50’
Taxiway Shoulder Width	15’	20’[1]	N/A	N/A	N/A

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved taxiway shoulders are recommended, but not required for taxiways, taxilanes, and aprons accommodating ADG-III and below aircraft. Stabilized shoulders of turf are acceptable.

The taxiway design standards analysis indicates the existing conditions of Runway 17/35 meet or exceed the FAA design criteria. However, Taxiway B west of Runway 17/35 does not intersect the runway at a right-angle. FAA design recommendations are that taxiways should intersect runways at right angles unless specifically designed as high-speed exit taxiways to increase capacity of a runway. Therefore, Taxiway B west of Runway 17/35 should be redesigned to a right-angled taxiway when pavement condition warrants.

Taxiway design criteria for taxiways serving Runway 4/22 are based on the critical aircraft Cessna 172, which has an ADG of I and a TDG of 1A. **Table C-11** presents the design criteria, design standards, and existing conditions for taxiways serving Runway 4/22.

Table C-11: Taxiway Design Standards for Taxiways Serving Runway 4/22

Design Criteria	Design Standard	Existing Dimension		
		Taxiway B	Taxiway F	Taxiway F1
ADG Design Criteria	**I**			
Taxiway Safety Area Width	49’	49’	49’	49’
Taxiway Object Free Area Width	89’	89’	89’	89’
Taxiway Centerline to:				
Parallel Taxiway Centerline	70’	2,000’	2,450’	450’ +
Taxiway Centerline to Fixed or Movable Object	44.5’	45’	45’	45’
TDG Design Criteria	**1A**			
Taxiway Width	25’	50’	50’	50’
Taxiway Shoulder Width	10’[1]	N/A	N/A	N/A

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Notes: [1] Paved taxiway shoulders not required for taxiways accommodating ADG-I aircraft. Stabilized shoulders of turf are acceptable.

While the existing dimensions of Runway 4/22 meet or exceed the FAA design criteria, Taxiway F1 is a non-standard taxiway. The design and location of Taxiway F1 nearly leads directly from the Hangar 1 Ramp to Runway 4/22. To reduce the probability of inadvertent runway incursions, proper taxiway design requires a turn be executed by the pilot when leaving an apron before entering the runway system. The suggested design requires two 90-degree turns instead of one approximate 30-degree turn, as the current design provides. SWO staff report that Taxiways A and F, near the intersection with Runway 4/22 have been known to cause pilot confusion. However, this confusion is often remedied with Airport Traffic Control Tower (ATCT) instructions.

Exit Taxiways

Optimally located exit taxiways minimize runway occupancy times and allow the airfield to be used more efficiently. Figure 4-17 in AC 150/5300-13B provides the cumulative percentages of aircraft able to exit runways at specific exit taxiway locations, given in 1,000-foot increments. Percentages for both right-angled and acute-angled taxiway configurations are included for each AAC.

Runway 17/35 Exit Taxiways

Table C-12 presents the location of current exit taxiways serving Runway 17/35 and the approximate percentages of landing aircraft types that can exit the runway in a safe and efficient manner.

Table C-12: Runway 17/35 Exit Taxiway Analysis

Runway / Taxiway	Distance From Runway Threshold	Percentage of Landing Aircraft Exit Probability		
		AAC A	AAC B	AAC C
Runway End 17				
Taxiway E	1,425’	3	1	0
Taxiway D	2,625’	71	18	0
Taxiway C	4,025’	100	76	2
Taxiway B	6,015’	100	100	88
Taxiway A	7,375’	100	100	100
Runway End 35				
Taxiway B	1,385’	2	0	0
Taxiway C	3,375’	96	50	0
Taxiway D	4,775’	100	95	23
Taxiway E	5,975’	100	100	88
Taxiway A	7,375’	100	100	100

Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

The taxiways of Runway 17/35 appear suitably spaced to accommodate all aircraft sizes from either direction.

Runway 4/22 Exit Taxiways

Runway 4/22 does not have a high-speed exit taxiway but Taxiways A and F1 are obtuse-angled taxiways for aircraft landing to Runway 22. For aircraft landing to Runway 4 they are acute-angled but do not meet the requirements for high-speed exit taxiways. Therefore, they will be analyzed as right-angled taxiways. **Table C-13** presents the location of existing exit taxiways serving Runway 4/22 and the approximate percentages of landing aircraft types that can exit the runway in a safe and efficient manner.

Table C-13: Runway 4/22 Exit Taxiway Analysis

Runway / Taxiway	Distance From Runway Threshold	Percentage of Landing Aircraft Exit Probability		
		AAC A	AAC B	AAC C
Runway End 4				
Taxiway A	2,140’	33	5	0
Taxiway F1	2,600’	81	27	0
Taxiway F	4,975’	100	97	37
Runway End 22				
Taxiway F1*	2,400’	71	20	0
Taxiway A*	2,875’	88	33	0
Taxiway B	4,975’	100	97	37

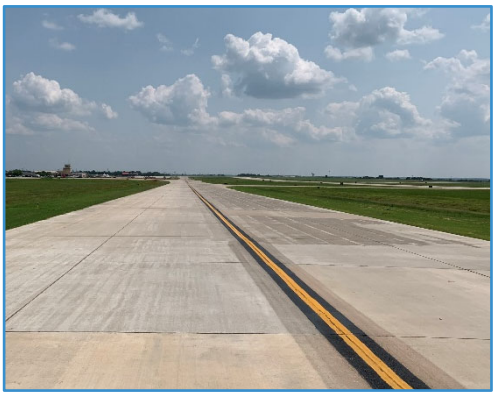
Source: Mead & Hunt analysis using FAA AC 150/5300-13B, *Airport Design*.

Note: * Acute-angled taxiways.

Most of the taxiways serving Runway 4/22 are sufficiently placed to ensure adequate exits for small aircraft. Taxiway F1, with its non-standard design, hinders the ability of aircraft to use F1 from both directions. Aircraft landing to the northeast on Runway 4 are met with a sharp turn of approximately 150 degrees at Taxiway F1, which limits the ability of aircraft to exit on F1 from that direction.

Taxiway/Taxilane System Conclusion

The existing taxiway/taxilane system in place at SWO meets most FAA standards. However, the non-standard design and location of Taxiway F1 nearly connects Runway 4/22 directly to the Hangar 1 Ramp. Taxiway F1's angle also introduces potential issues for aircraft exiting Runway 4/22 when landing to the northeast. As pavement conditions warrant, a redesign of Taxiways B (west of Runway 17/35) and F1 to right-angled taxiways is recommended. This will alleviate the non-right-angled taxiway intersections and the direct access from the Hangar 1 Ramp to the runway environment.



AIRFIELD CAPACITY ANALYSIS

The capacity of an airfield is primarily a function of the major aircraft operating surfaces that compose the facility and the configuration of those surfaces (runways and taxiways). However, it is also related to and considered in conjunction with environmental conditions, wind coverage, airspace utilization, and the availability and type of navigational aids. Capacity refers to the number of aircraft operations that a facility can accommodate either on an hourly or yearly basis. It does not refer to the size or weight of aircraft.

The evaluation method used to determine airfield capacity comes from AC 150/5060-5, *Airport Capacity and Delay*. From this methodology, airfield capacity for long-range planning is defined in the following terms:

- **Hourly Capacity of Runways:** The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period during both VFR and IFR conditions.
- **Annual Service Volume (ASV):** A reasonable estimate of an airport's annual capacity (i.e., level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

Airfield Capacity Factors

Airfield capacity for long-range planning is a function of several factors, including the layout of the airfield, local environmental conditions, specific characteristics of local aviation demand, and air traffic control requirements.

Airfield Layout and Runway Use

The arrangement and interaction of airfield components (i.e., runways, taxiways, and ramp entrances) refers to the layout or "design" of the airfield. Runway use is primarily defined by the orientation of the active runways with prevailing winds, the available IAP capabilities, and the distribution and frequency of aircraft operations on the airfield facilities. SWO operates with a two intersecting runway configuration (Runways 17/35 and 4/22) that are supported by a system of parallel and connecting taxiways. Intersecting runways do

not maximize overall capacity as they cannot be used simultaneously because when aircraft are using one runway, aircraft on the other runway must wait.

As presented in the previous chapter, SWO ATCT staff indicate that Runway 17/35 is used approximately 80 percent of the time, with Runway 17 used approximately 60 percent and Runway 35 used approximately 40 percent. Runway 4/22 is estimated to be used approximately 20 percent of the time, with Runway 4 utilized an estimated 60 percent of the time and Runway 22 used approximately 40 percent.

Meteorological Conditions

Low cloud ceilings and reduced visibility typically reduce capacity. Three categories of ceiling and visibility minimums are considered. Visual Flight Rules (VFR) conditions occur when the cloud ceiling is greater than or equal to 1,000 feet above ground level (AGL), and visibility is greater than or equal to three statute miles. National Oceanic and Atmospheric Administration (NOAA) data shows that these conditions occur 78 percent of the time at SWO. Instrument Flight Rules (IFR) conditions occur when the cloud ceiling is less than 1,000 feet AGL, or visibility is less than three statute miles. These conditions occur 22 percent of the time at SWO. Poor visibility and ceiling conditions exist whenever the cloud ceiling is less than 200 feet AGL, or visibility is less than 1/2 statute mile. These conditions are lower than the ILS minimums, effectively closing SWO. These conditions occur less than 1 percent of the time at SWO.

Aircraft Mix

Aircraft mix is the relative percentage of aircraft operations that have a MTOW over 12,500 pounds. The aircraft mix index is determined by the equation (C+3D), where C is the percent of aircraft with MTWO over 12,500 pounds but under 300,000 pounds, and D represents the percent of aircraft over 300,000 pounds MTOW. **Table C-14** outlines the data used to determine the aircraft mix index.

Percent Arrivals

Runway capacity is significantly influenced by the percentage of all operations that are arrivals. Because aircraft on final approach are travelling at a reduced speed and are typically given absolute priority over departures, higher percentages of arrivals during peak periods of operations will reduce the ASV. The operations mix at SWO reflects a general balance of arrivals to departures. Therefore, for the capacity calculations arrivals equal departures during the peak period.

Table C-14: Aircraft Fleet Mix, 2020-2040

Year	VFR Conditions			IFR Conditions		
	Class A & B	Class C	Class D	Class A & B	Class C	Class D
2020	97%	3%	0%	95%	5%	0%
2025	97%	3%	0%	95%	5%	0%
2030	97%	3%	0%	95%	5%	0%
2035	97%	3%	0%	95%	5%	0%
2040	97%	3%	0%	95%	5%	0%

Source: Existing percentages Future percentages estimated by Mead & Hunt.

Notes: Class A = Small Single Engine, < 12,500 pounds. Class B = Small Twin-Engine, < 12,500 pounds.
Class C = 12,500 – 300,000 pounds. Class D = > 300,000 pounds.

Touch-and-Go Operations

As presented in the previous chapter, touch-and-go operations represent 54 percent total annual operations being conducted at SWO. It is anticipated that by 2040 the overall percentage of touch-and-go activity will decrease slightly to 53 percent.

Exit Taxiways

The amount, spacing, and design of exit taxiways influence the length of time aircraft occupy runways by providing aircraft the ability to exit runways as quickly and safely as possible. SWO generally has an adequate exit system in place to minimize runway occupancy times and maximize airfield capacity. The lone exceptions would be Taxiways A and F1 since they are obtuse angled for aircraft landing to Runway 4. Aircraft landing to the northeast would have to be travelling at a slower speed to make these exits than aircraft landing to the southwest. While these taxiways have additional pavement design to accommodate exiting aircraft landing to the northeast, some aircraft using Runway 4 might not have the ability to slow down in sufficient time to make the exits and would have to travel to the end of the runway before exiting at Taxiway F. Because Taxiway A is the parallel taxiway service the primary runway, it will remain. However, a reconstruction of Taxiway F1 to a right-angled taxiway would provide a slight benefit for aircraft with faster landing speeds using Runway 4. Additionally, as presented previously, a redesign that alleviates the nearly direct access from the Hangar 1 Ramp to the Runway 4/22 environment would reduce the probability of runway incursions.

Air Traffic Control Rules

The FAA specifies aircraft separation criteria and operational procedures for aircraft in the vicinity of airports, contingent upon aircraft size, availability of radar, sequencing of operations, and noise abatement procedures that may be in effect at an airport. The impact of air traffic control on airfield capacity is most influenced by aircraft separation requirements dictated by aircraft mix. Presently, there are no special air traffic control rules in effect at SWO that significantly affect airfield capacity.

Airfield Capacity Analysis

As previously indicated in this section, the determination of ASV and hourly capacity for long-range planning purposes uses the methodology described in AC 150/5060-5. Several assumptions are incorporated in these capacity calculations, which are:

- Arrivals equal departures
- Percentage of touch-and-go operations is between zero and 50 percent
- There is a full-length parallel taxiway with ample exits and no taxiway crossing problems
- There are no airspace limitations
- There is at least one runway equipped with and ILS and the necessary air traffic control facilities to carry out operations in a radar environment
- IFR weather conditions occur roughly 10 percent of the time
- Approximately 80 percent of the time the airport is operated with the runway use configuration that produces the greatest hourly capacity.

It is recognized that SWO does not conform to all the assumptions listed above, mainly that the percentage of touch-and-go operations exceeds 50 percent.

Applying the information generated from the preceding analyses, guidelines, and assumptions, SWO's ASV is calculated at approximately 230,000 annual aircraft operations, with a VFR hourly capacity of 98 operations and an IFR hourly capacity of 59 operations. As presented in **Table C-15**, SWO's current operations are at approximately 27.2 percent of ASV and will be at 42.2 percent of ASV in 2040.

Table C-15: Annual Service Volume and Demand Capacity Analysis, 2020-2040

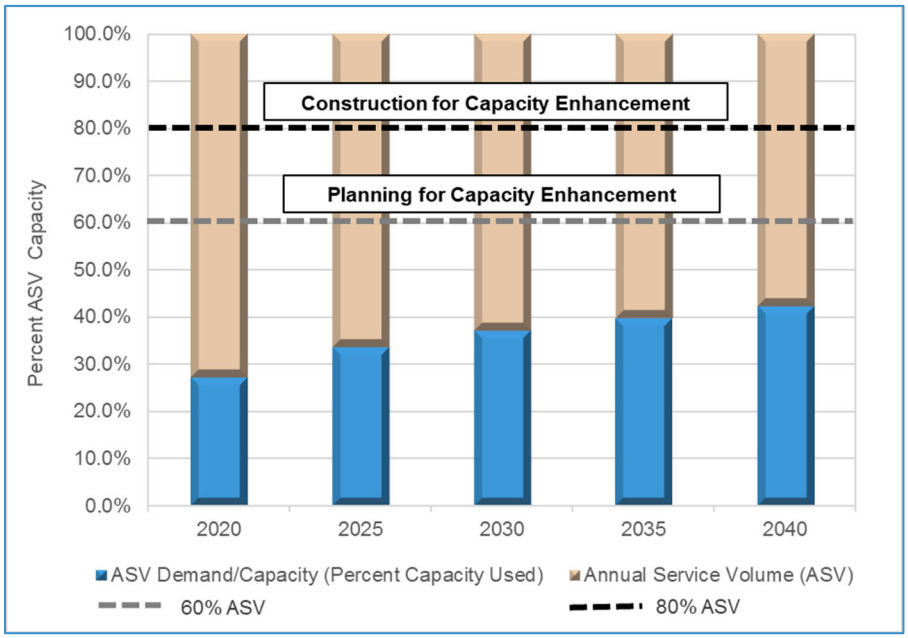
ASV Capacity Components	2020	2025	2030	2035	2040
Annual Aircraft Operations	62,643	77,354	85,234	91,200	97,044
Airport Operational Peaking					
Peak Month Operations	8,077	10,056	11,080	11,856	12,616
Average Day of Peak Month Operations	269	335	369	395	421
Peak Hour Operations	30	37	41	44	46
Hourly Capacity VFR/IFR	98/59	98/59	98/59	98/59	98/59
ASV	230,000	230,000	230,000	230,000	230,000
ASV Demand/Capacity (Percent Capacity Used)	**27.2%**	**33.6%**	**37.1%**	**39.7%**	**42.2%**

Source: Mead & Hunt analysis using FAA AC 150/5060-5.

Notes: SWO critical aircraft, [E] – Existing, [F] – Future.

Figure C-2 compares the calculated ASV to the existing and projected aircraft operations expressed as a percentage of ASV. FAA guidelines indicates that when 60 percent to ASV is reached, an airport should begin planning ways to increase capacity, and when 80 percent of ASV is reached then construction of facilities needed to increase capacity should be initiated. The ASV analysis does not indicate areas of systemic airfield capacity challenges occurring either on an hourly basis (both VFR and IFR) or an annual basis.

Figure C-2: Annual Service Volume and Demand Comparison



Source: Mead & Hunt analysis.

Airfield Capacity Conclusion

The existing airfield configuration provides adequate capacity for the operations forecast through 2040. Future operations are not expected to exceed the 60 percent threshold to trigger planning for airfield capacity improvements.

LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those facilities that support the airside facilities but are not actually a part of the aircraft operating surfaces. These consist of such elements as the terminal building, aircraft parking aprons, corporate and GA hangars, Fixed Base Operator (FBO) facilities, Aircraft Rescue and Fire Fighting (ARFF) facilities, fuel storage and dispensing systems, aeronautical and non-aeronautical development, utilities, perimeter security, and access roads. Following an analysis of these existing facilities, current deficiencies can be noted in accommodating both existing and future needs.

Terminal Building Requirements

The terminal building is the face of SWO to the community and the front door for many visitors to Stillwater. Quality amenities and adequate space encourage visitors and the local community to use SWO, add value to the passenger experience, and improve the perception of SWO.

The objective of noting facility requirements for the terminal building is to identify the type, quality, and quantity of the facilities that are required for the terminal to operate safely and efficiently through the planning

period. While some of the recommendations made for SWO intend to address specific shortfalls, others are to improve general performance. This section largely analyzes the future needs based on forecasted activity levels of a new, fully reconstructed terminal building, rather than requirements for the existing terminal building.

Methodology

Given the size of SWO and the forecasted passenger levels throughout the planning period, terminal building components are calculated using peak hour enplanements. Enplanement figures were taken from **Table B-27** of the previous chapter and reprised in **Table C-16**, which have been multiplied by industry standards for space per passenger to yield the total space requirements for the terminal building. Component performance was measured by processing and wait times, with the latter representing the amount of time passengers wait at a ticket counter agent position and in the queue. These elements are then translated into component level of service.

Table C-16: Peak Hour Enplanements, Deplanements, and Total Passengers 2020-2040

Peak Period Activity	2020	2025	2030	2035	2040
Peak Hour Enplanements	48	44	51	58	66
Peak Hour Deplanements	45	43	49	56	64
Total Peak Hour Passengers	**93**	**87**	**100**	**114**	**130**

Source: Mead & Hunt projections.

Future component capacity requirements are based on forecasted demand. When demand begins to exceed capacity, this represents a point at which the system will become stressed and may possibly exceed available space at individual components and within the overall space. Such a breakdown in performance can result in increased passenger processing and wait times, queues, congestion, interference with adequate circulation, and diminished passenger level of service. This is normally evident at peak seasonal travel periods, with a potential decline in level of service occurring for a limited period prior to flight departure. In general, this is expected and acceptable. However, once the decline extends beyond a certain threshold of time and/or space, additional capacity must be provided.

For SWO, calculating the capacity of terminal components has an allowance for university athletic teams travelling on non-scheduled charter flights. These intermittent flights increase the throughput capacity on selected terminal components. Currently, security screening of the chartered passengers is conducted by outside security contractors using temporary metal detectors and tables in the lobby near the Stillwater Flight Center office. Screened passengers exit the terminal building through doors with direct apron access and board the chartered aircraft via apron loading. Accommodating non-scheduled chartered passengers within the future terminal building can be accomplished by one of two means:

- Sharing scheduled commercial service programmed facilities.
- Increasing the terminal size to account for desired level of service and potential overlap of operations.

This analysis uses the first scenario, in which scheduled commercial service dictates the component evaluations which are available for university athletic teams' chartered aircraft with seating capacity of approximately 150 seats.

For the purposes of this study, the following references are used in determining the terminal building requirements:

- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- 10th and 11th Editions of the IATA *Airport Development Reference Manual* (ADRM)[1]
- ACRP Report 25*, Airport Passenger Terminal Planning and Design, Volumes 1 & 2: Guidebook and Analysis Worksheets*

Analysis

Terminal Gates and Aircraft Parking Positions

The new terminal building will require one gate and one aircraft parking position based on forecasted enplanements. Aircraft apron area is listed under **Table C-17**. The table includes aircraft to be used at SWO, which support enplanements over the planning period. Envoy/SkyWest Airlines currently operate twice daily flights using the 50-seat ERJ 145 aircraft at SWO. As stated in the previous chapter, 76-seat ERJ 175 aircraft are expected to completely replace the ERJ 145s nationwide by 2031, and possibly sooner at SWO. Additionally, Boeing 737-800 aircraft are representative of the narrow body charters used by university athletic teams. It is also the largest aircraft on SWO's apron. The total commercial service apron area required for simultaneous occupancy by one ERJ 175 and one Boeing 737-800 is 43,545.

Table C-17: Terminal Aircraft Apron Area by Aircraft Type with Minimum Setback from Building

Aircraft Capacity			Gate Requirements and Total Area				
			Aircraft Specs		Aircraft Apron Area		
ADG	Terminal Design Aircraft	Design Aircraft Seats	Wing Span	Length	Aircraft Separation	Setback Nose to Building	Gate Area (sq ft)
II	ERJ 145	50	65.75'	87.83'	25'	35'	11,638
III	ERJ 175	76	93.92'	103.92'	25'	35'	20,793
IV	B 737-800	150	117.42'	129.50'	25'	35'	22,752'

Source: Mead & Hunt analysis.

SWO has paved a large area of apron, including within the area designated previously as the preferred future terminal building site. SWO has the option of striping only the area of apron that will serve the scheduled and non-schedule air carrier aircraft operated during the planning period. This will allow the remaining apron to be used for GA use.

[1] *Airport Development Reference Manual, 10th Edition, October 2016, and 11th Edition, March 2020, The International Air Transport Association.*

Main Entrance Hall

There are three separate areas of public circulation: the departures, entrance, and arrivals halls. The depth of this corridor was determined by the ticket hall, which begins at the face of the ticket counters. This provides passenger processing depth and bypass circulation of 8 feet (i.e., the 3 feet a passenger occupies at the counter plus a 5-foot clear walkway for passengers), passenger queue of 10 feet, corridor circulation of 12 feet, and passenger seating of 5 feet, for a total width requirement of 35 feet. The length of the corridor is dependent upon the terminal layout plan and orientation of the security checkpoint. The ticketing and claim hall circulation areas are listed in each component's area summary. The main entrance hall is calculated at 40 feet in length by 35 feet in width, for a total area of 1,400 square feet.

Passenger Ticketing and Check-In

Calculating airline ticketing and queueing areas to support departing passengers is dependent upon when passengers arrive at the terminal. The normal departing passenger arrivals curve (i.e., the time passengers arrive at the terminal prior to their flight) typically shows most passengers arrive between 100 to 40 minutes prior to departure. This period represents the peak hour. However, a shorter period of one-half hour and a smaller percentage of the total peak, 49 percent, was used for this passenger demand analysis because it tends to represent a peak period within the peak hour. This places greater demand on the component thus requiring greater capacity. It is akin to adding a more accurate surge factor.

The ticketing and check-in area calculations include both kiosks and counter positions, with the latter providing full services, boarding pass, baggage tags, and baggage check. Passengers may print boarding passes prior to arrival but may still use either kiosks or counters to obtain baggage tags. All passengers checking bags will contact the ticket counters. **Table C-18** details the airline ticketing area requirements.

Table C-18: Airline Ticketing and Check-In Assumptions and Requirements

Passenger Ticketing and Check-In Demand Profile	2020	2025	2030	2035	2040
Design Hour Departing Passengers	48	44	51	58	66
Percent of Passengers in Peak 30 Minute Period	49%	49%	49%	49%	49%
Percent of Passengers Using Ticketing	75%	75%	75%	75%	75%
Peak 30-Minute Originating Passengers	18	16	19	21	24
Processing Time Per Passenger (Average)	2.5	2.5	2.5	2.5	2.5
Service Level Maximum Wait Time	10	10	10	10	10
Queue Results					
Number of Staffed Service Positions Required	2	2	2	2	2
Average Queue Wait Time	1	1	1	1.5	3
Maximum Queue Wait Time	2	1	2	3.5	6
Maximum Number of Passengers Waiting in Queue	**1**	**1**	**2**	**3**	**5**

Source: Mead & Hunt analysis.

Ticket counter frontage, which is the amount of linear footage each counter provides, is important in managing passenger queues. Airports may opt to increase counter length to provide more area for passenger queues, which can reduce the depth of the ticket hall. It also allows for additional staff during anticipated peak passenger demand times (e.g., seasonal holidays) providing a greater level of service and capacity for

processing customers to meet scheduled departure times. Adequate counter length has been included in the program to meet the potential requirements for a second airline or second peak-hour flight int eh future. **Table C-19** shows the ticket hall requirements.

Table C-19: Ticket Hall Requirements

Terminal Ticket Hall Requirements	Measurement
Ticket Counter and Concourse Length (ft)	24
Passenger Check-In, Circulation, Queue Seating Area (sq ft)	840
Seating Area (sq ft)	120
Total Terminal Ticket Hall Area (sq ft)	**960**

Source: Mead & Hunt analysis.

Airline Ticket Offices (ATOs) are areas consisting of airline ticketing, check-in, baggage check (i.e., the area behind the ticket counters), and the private offices and operations areas that support the airlines' business. These areas typically include a manager and supervisors' office, an agent check-in and check-out area, a break room, a locker room, office equipment, and supplies storage. The operations area includes workstations for supervisors and managers (e.g., aircraft load and balance figures/statistics), as well as equipment storage, radio chargers, and baggage tugs and carts. Airlines will need at least one parking space for a company SUV at the apron area adjacent to their operations space. **Table C-20** details the calculations for ATO space needs. A detailed breakdown of the proposed ATO and ground operations areas is included in **Appendix Five**

Table C-20: Airline Ticket Offices and Ground Operations Area

Airline Ticket Offices and Ground Operations Requirements	Area (sq ft)
Airline Ticket Offices	568
Airline Ground Operations	556
Sub-Total	**1,124**
Circulation (10%)	112
Subtotal ATO and Ground Operations	**1,236**
GSE Equipment Storage	800
Total ATO and Ground Operations Space	**2,036**
Total Area for Two ATO and Ground Operations Spaces	**4,072**

Source: Mead & Hunt analysis.

Checked Baggage Inspection Screening

The Transportation Security Administration (TSA) operates checked baggage inspection screening manually, using Explosive Trace Detection (ETD) devices in the process. This is not anticipated to change during the planning period. **Table C-21** lists the number of ETD devices required during the 20-year planning period.

Table C-21: Checked Baggage Inspection Screening Assumptions and Area Requirements

Baggage Screening Demand Profile	2020	2025	2030	2035	2040
Peak Hour Passengers Checking In	48	44	51	58	66
Percent of Passengers Checking Bags	65%	65%	65%	65%	65%
Average Number of Bags Per Passenger	1	1	1	1	1
Number of Bags to Process in Peak Hour	31	28	33	38	43
Percent of Over & Odd-Size Bags	2%	2%	2%	2%	2%
Total Number of Bags to Process	31	29	33	38	43
Process Rates Per Hour ETD	24	24	24	24	24
Number of ETD Required	2	2	2	2	2
Total Area Required (sq ft)	**300**	**300**	**300**	**300**	**300**

Source: Mead & Hunt analysis.

Airline Outbound Baggage Make-Up Room

The values shown in **Table C-22** were calculated for scheduled flights in each period based on its forecasted critical aircraft. Area calculations use a runout conveyor from the TSA's screening room into the make-up area, usually running along the back wall of the space. Baggage carts are manually set perpendicular to the conveyor so they can be pulled directly out of the make-up room by the baggage tug driver. The loading area is protected and closed after the flights have departed. The make-up room has been programmed for a single ERJ 175 aircraft, with space allocated for loading two carts per flight. This allows for seasonal increases in checked baggage. If needed, university athletic team charter flights can use this facility.

Table C-22: Airline Outbound Baggage Make-Up Room Area

Baggage Make-Up Demand Profile	2020	2025	2030	2035	2040
Narrow-Body Equivalent Aircraft	0.7	0.7	0.7	0.7	0.7
Scheduled Departures Per Gate in 2 – 3 Hour Period	1	1	1	1	1
Staged Carts per Equivalent Aircraft	1	1	1	1	1
Area Required per Cart (sq ft)	200	200	200	200	200
Make-Up Area Required (sq ft)	300	300	300	300	300
Conveyor and Circulation (sq ft)	250	250	250	250	250
Total Make-Up Area (sq ft)	**950**	**950**	**950**	**950**	**950**

Source: Mead & Hunt analysis.

Passenger Security Screening Checkpoint

The TSA has one security screening checkpoint in the existing terminal building. Given that passengers typically arrive at the terminal over a period greater than one hour, a single checkpoint will remain sufficient to manage demand and process the number of enplanements on scheduled commercial flights through 2040. TSA's innovations in security screening have been installed at major airports, the most recent with an announcement that Analog Computed Tomography (CT) scanning devices are being installed throughout the country. SWO's existing screening device will likely be replaced when a new terminal is built; TSA's new checkpoint layout standards were released in December 2021, thereby affecting all new installations. The Analog CT scanner or another similar device will be installed at SWO in the future as these are representative of the TSA's technology program for security screening checkpoints.

The values in **Table C-23** list results for the anticipated departing passenger demand. The null, or zero, maximum wait time shown in the chart is considered a very good level of service during the peak hour.

Table C-23: TSA Security Screening Checkpoint Requirements and Area

Security Screening Demand Profile	2020	2025	2030	2035	2040
Design Hour Departing Passengers	48	44	51	58	66
Number of Passengers in Peak 30-Minute Period	25	24	29	34	39
Screening Throughput Rate per Hour	150	150	150	150	150
Passengers Processed Per Minute Per Lane	2.5	2.5	2.5	2.5	2.5
Maximum Target Wait Time in Queue	10	10	10	10	10
Minimum Required Number of Screening Lanes	1	1	1	1	2
Maximum Wait Time in Queue	-	-	-	-	-
Checkpoint Space Requirements (sq ft)	**2,100**	**2,100**	**2,100**	**2,100**	**2,100**

Source: Mead & Hunt analysis.

TSA's field office operations space requirements are listed in **Table C-24**.

Table C-24: TSA Field Office Area

TSA Field Office Requirements	2020	2025	2030	2035	2040
Transportation Security Manager-on-Duty	120	120	120	120	120
Break/Training Room	150	150	150	150	150
Training Storage	100	100	100	100	100
IT Room	30	30	30	30	30
Total TSA Field Office (sq ft)	**400**	**400**	**400**	**400**	**400**

Source: Mead & Hunt analysis.

Passenger Departures Lounge

Passenger departures lounge space requirements were initially calculated to serve ERJ 145 aircraft. Up-gauging the aircraft to the next higher seat capacity aircraft (i.e., ERJ 175) would have a limited effect on overall passenger level of service in this area due to the area per passenger provided in the calculations. However, it would be prudent to plan and program the terminal building with the larger seat capacity of the ERJ 175 from the beginning, which is included in the following space calculations. Various lounge seating types and arrangements would be possible within this space. Concessions amenities would be provided for this area, increasing the total number of seats and space. A service animal relief area will also be provided adjacent to this space. Passenger departures lounge seating area and ancillary space requirements are presented in **Table C-25**.

Table C-25: Passenger Departures Lounge Requirements

Passenger Departures Lounge Demand Profile	2020	2025	2030	2035	2040
Peak Hour Departing Passengers	48	44	51	58	66
Departures Lounge Seating Area (sq ft)	1,296	1,245	1,380	1,635	1,775
Gate Podium Width / Depth	4 / 8	4 / 8	4 / 8	4 / 8	4 / 8
Area per Podium Position (sq ft)	32	32	32	32	32
Number of Podium Positions	1	1	1	1	1
Total Podium and Queue Area (sq ft)[1]	100	100	100	100	100
Boarding Corridor Width / Lounge Depth	6 / 25	6 / 25	6 / 25	6 / 25	6 / 25
Total Boarding Corridor (sq ft)	150	150	150	150	150
Total Departures Lounge Area (sq ft)	**1,160**	**1,545**	**1,680**	**1,885**	**2,025**
Total Area for Two Departure Lounges (sq ft)	**2,320**	**3,090**	**3,610**	**3,770**	**4,050**

Source: Mead & Hunt analysis.

Note: [1] Assumes a 25-foot lounge depth.

Concessions

Proposed concessions for SWO are comprised of a restaurant serving the public pre-secure area, so that it can become viable through airport business patronage. A small news/gift store located within the public concourse that has proximity and visibility to both departing and arriving passengers should also be provided. A news/gift store and cafe that includes both fresh bakery as well as pre-prepared packaged sandwiches, and other refrigerated foods, would best serve passengers in the post-security area of the terminal building. Small airports have successfully managed a dual operation that allows the larger restaurant to serve both pre-secure and post-secure spaces; this would also be the recommendation for food and beverage service at SWO. Terminal concessions requirements are shown in **Table C-26**.

Table C-26: Terminal Concessions

Terminal Concessions Requirements	Area (sq ft)
Public Pre-Secure Space	
Restaurant [1]	1,500
News and Gifts	150
Passenger Post-Security Space	
News/Gifts and Cafe	225
Seating Area	150
Total Concessions Area (sq ft)	**2,025**

Source: Mead & Hunt analysis.

Note: [1] Restaurant space includes kitchen and refrigerator storage.

Secure Concourse Circulation

Secure concourse circulation is determined broadly by calculating the number of equivalent aircraft in the flight schedule.[2] One aircraft is currently operated at SWO, an ERJ 145, which counts as one equivalent aircraft. Using an aircraft wingtip separation of 25 feet and aircraft wingspan of 79 feet for ADG II, concourse

[2] Using ACRP Report 25, Equivalent Aircraft value equals .70 for an Embraer 145 aircraft and is rounded up in the worksheets. An EJR 175 aircraft also counts as on Equivalent Aircraft.

length circulation is equal to 104 feet multiplied by the corridor width of 15 feet to equal a total of 1,560 square feet of secure concourse circulation area.

As stated previously, accommodating the ERJ 175 aircraft in the initial terminal building planning and programming is prudent. With a larger wingspan than the ERJ 145, ERJ 175 increases the ADG from II to III. Under the circumstances, using the smaller 94-foot wingspan of the ERJ 175 rather than the full 118-foot width of the ADG III category would be more appropriate for determining the overall width of the secure circulation space.

Using a premise of two parking positions would translate into 213 total feet of secure concourse length and corresponding departure lounge; however, this length would be considered greater than necessary during the early timeframe of the planning period. Depending on terminal arrangement, this building length might be required due to activities on the non-secure public side of the building. A balance must be struck between the departures lounge efficiency on the secure side of the terminal and the activities on the non-secure public side. Applying a depth of 15 feet provides the total square footage of the secure concourse circulation needs.

A lounge depth of 25 feet is considered the minimum for passenger queueing at the gate during boarding to keep the circulation corridor from becoming congested. Other uses can fill the space between the lounges but overflow of passengers from one lounge to the other might be compromised. A reduced initial secure concourse length may be appropriate, with an understanding that expansion of the concourse beyond the planning period might be necessary to meet requirements. This is left to the design team's discretion based upon location, adjacency, and layout of the components.

Restrooms

Secure and non-secure restroom programming figures fall below the threshold of 3.0 equivalent aircraft (EQA) requirement noted in the reference guide ACRP Report 130: *Guidebook for Airport Terminal Restroom Planning and Design*. Using this guidance, a minimum of six fixtures are required per men's restroom. Men's fixtures serve as the basis for calculating women's restroom fixture requirements with parity set at a 1.25 factor, or a 56 percent to 44 percent ratio of women to men. Women's restrooms are therefore calculated to have eight fixtures. Since secure restrooms are calculated using arriving passengers as a basis for planning, the figures are also appropriate for serving a narrow body charter aircraft at SWO.

Non-secure restrooms are typically smaller than secure restrooms, as the number of passengers and visitors in the departures or arrivals areas will see stable usership over time instead of a spike. This is compared to deplaning passengers, who will use a restroom during a very short period immediately following a flight. For SWO, four fixtures for men and five for women is appropriate. This provides one accessible and one standard water closet and two urinals for the men's restroom, and one accessible and four standard water closets for the women's restroom. The latter is equivalent to one fixture per 30 passengers and visitors for a combined arrival and departure flight. The restroom area is calculated as fixtures multiplied by 135 square feet per fixture. Restroom requirements are shown in **Table C-27**.

Table C-27: Restroom Fixtures and Area

Restroom Requirements	Fixtures	Area (sq ft)
Public Pre-Secure Space		
Men's Restroom	4	540
Women's Restroom	5	675
Family Restroom	1	120
Mother's Room [2]	-	100
Janitor	-	80
Total Fixtures and Area	**10**	**1,435**
Passenger Post-Security Space		
Men's Restroom	5	675
Women's Restroom	6	810
Family Restroom	1	120
Mother's Room	-	100
Janitor	-	100
Total Fixtures and Area	**12**	**1,705**
Grand Total Fixtures and Area	**22**	**3,140**

Source: Mead & Hunt analysis.

Notes: [1] Restroom space is calculated using 135 square feet per fixture, which accounts for the fixture, lavatory, circulation, and plumbing access.

[2] Mother's room is included with the restroom program. However, it is preferable for this function to be located away from the restroom block to a quieter area of the terminal.

One family restroom is located inside both the secure and non-secure areas as part of the restroom block. A mother's room should be planned and designed as a part of the terminal public and secure passenger space. The location should be convenient to both arrivals and departures halls but should remain separate from the restroom area. A service animal relief area (SARA) of at least 150 square feet is also required on the secure side of the terminal.

Baggage Claim

Baggage claim device display length is calculated using a peak 20-minute period for arriving passengers. At SWO, all passengers will arrive at the claim hall within 20 minutes of disembarking their flight. The area of the claim hall is determined by the device length, the number of passengers claiming bags, and industry standards for claim hall space. **Table C-28** lists these factors and results of the analysis.

The baggage claim area consists of the claim device, passenger queueing area around the device, and the circulation area. A baggage services office is likely not required initially, since the airline will keep unclaimed baggage at their ticket office.

Table C-28: Baggage Claim Assumptions and Device Length

Baggage Claim Demand Profile	2020	2025	2030	2035	2040
Design Hour Arriving Passengers	45	43	49	56	64
Passengers Arriving in Peak 20-Minute Period	45	43	49	56	64
Percent of Passengers Checking Bags	65%	65%	65%	65%	65%
Passengers Checking Bags	29	28	32	37	42
Average Number of Bags Per Passenger	1	1	1	1	1
Number of Bags to Process in Peak Period	29	28	32	37	42
Average Passenger Party Size	1.2	1.2	1.2	1.2	1.2
Number of Passenger Parties	24	23	27	31	35
Percent of Additional Visitors at Claim	10%	10%	10%	10%	10%
Total People at Claim Device	27	25	29	34	39
Claim Device Display Frontage per Person	1.5	1.5	1.5	1.5	1.5
Total Length of Baggage Claim Device Display (ft)	**40**	**38**	**44**	**51**	**58**

Source: Mead & Hunt analysis.

With the option for allowing university athletic teams use of the baggage claim device, additional length would have the additional benefit of reducing passenger congestion during normal use. An alternative is to provide a single run-out belt along the length of the outside wall of the baggage claim area. This would allow the larger bags for team members' gear to be delivered in an orderly manner. Passengers can queue in the adjacent baggage claiming area, and smaller bags can still be delivered to the claim device. The run-out belt could serve scheduled commercial service passengers travelling with odd or oversize bags

Providing a baggage claim device with 75 linear feet of display frontage will provide additional length to account for seasonal travel. **Table C-29** details the baggage claim area requirements.

Table C-29: Baggage Claim Area

Baggage Claim Demand Profile	2020	2025	2030	2035	2040
Length of Baggage Claim Device Display	40	38	44	51	58
Passenger Claim Area	750	570	660	765	870
Circulation Factor	1.25	1.25	1.25	1.25	1.25
Passenger Area	695	712	825	956	1,088
Claim Device Area	282	262	322	392	462
Total Claim Area (sq ft)	**977**	**974**	**1,147**	**1,348**	**1,550**
Claim Hall Circulation (sq ft)	**1,750**	**1,750**	**1,750**	**1,750**	**1,750**

Source: Mead & Hunt analysis.

Rental Car Agencies

Enterprise and Avis car rentals are available with prior reservations, and Hertz has an office in SWO's terminal building. Space for Hertz's counter and operations offices will be provided, as will be space for an additional car rental company so it's available when the need occurs. The standard counter and operations office is 150 square feet with an allowance for passenger queueing set at eight feet from the counter. This equates to a total of 230 square feet for each rental car company.

Building Support and Envelope Space

Building systems, chases, and interior and exterior wall structures represent approximately 15 percent of the total area of the terminal building. The terminal space summary is detailed in **Table C-30**.

Table C-30: Terminal Space Summary

Terminal Space Summary by Component (sq ft)	2020	2025	2030	2035	2040
Main Entrance Hall	1,400	1,400	1,400	1,400	1,400
Terminal Ticket Hall	960	960	960	960	960
Airline Ticket Office & Ground Operations	4,072	4,072	4,072	4,072	4,072
Checked Baggage Inspection Screening	300	300	300	300	300
Airline Outbound Baggage Make-Up	950	950	950	950	950
Passenger Security Screening Checkpoint & Exit Lane	2,100	2,100	2,100	2,100	2,100
Secure Concourse Exit Lane [1]	520	520	520	520	520
TSA Field Office	400	400	400	400	400
Secure Concourse Circulation	3,195	3,195	3,195	3,195	3,195
Passenger Departures Lounge	2,320	3,090	3,360	3,770	4,050
Concessions					
Non-Secure	1,650	1,650	1,650	1,650	1,650
Secure	375	375	375	375	375
Restrooms					
Non-Secure	1,435	1,435	1,435	1,435	1,435
Secure	1,705	1,705	1,705	1,705	1,705
Inbound Baggage Drop-Off	1,200	1,200	1,200	1,200	1,200
Baggage Claim	977	974	1,147	1,348	1,550
Baggage Claim Hall	1,750	1,750	1,750	1,750	1,750
Car Rental	230	230	230	230	230
SARA	150	150	150	150	150
Sub-Total Building	**25,689**	**26,456**	**26,899**	**27,510**	**27,992**
Building Systems, Structure @ 15% of Program Space	3.853	3,968	4,035	3,821	4,199
Total Building	**29,542**	**30,424**	**30,934**	**31,637**	**32,191**

Source: Mead & Hunt analysis.

Note: [1] Based on a 65-foot-long checkpoint (including document check stations) and an 8-foot wide corridor.

Terminal Curbside

Vehicular access to the existing terminal curbside is via the approximately 20-foot wide, one-way frontage road accessible from North Hargis Road/West Airport Road, which runs from north to south. Upon reaching the primary terminal curbside, the frontage road splits into four lanes. The first lane is adjacent to the terminal frontage sidewalk, is the main terminal curbside; and is the most frequently used lane. The second lane may be used as an outer curb, for vehicle stacking, as a temporary double-parking lane, or as a pull-out lane. This lane can increase curb capacity equal to the inner lane, depending on maneuverability factors. The third lane serves as a through-lane. The fourth lane, on the east edge of the roadway, is reserved for handicap parking.

The terminal curbside is roughly divided between the arrivals and departures areas of the terminal building. This distinction is recommended to continue for SWO's future terminal plans due to the likely secondary entrance to the ticket hall, an exit from the baggage claim, and a central entrance to the security checkpoint. A bus and hotel courtesy van drop-off/pick-up stop is located at the south end of the existing curb. Vehicle

curb lanes will serve all vehicle types: private cars, taxis, transportation network company (TNC) vehicles, ride-hailing services, buses, and hotel courtesy vans.

Curb length methodology requirements are based upon peak hour enplanements. The premise of this formula is that a curbside lane is considered a series of stopping or parking spaces, each accommodating one vehicle and the average number of vehicles each space can serve during a given period is inversely proportional to the average length of time a vehicle occupies a space. Industry standard factors used in the analysis are shown in **Table C-31**.

Table C-31: Percent of Passengers Using Each Travel Mode and Average Vehicle Dwell Time

Mode	Percent	Wait Time (minutes)
Private Vehicle	80%	3
Taxi and TNC	12%	2
Hotel Shuttle	6%	3
Bus	2%	4

Source: ACRP Report 25, Vol. 2, *Terminal Planning Spreadsheet Model, Transportation Research Board, 2010;* Mead & Hunt analysis.

Vehicle curb frontage requirements were determined using peak hour enplanements and deplanements factored by 45 percent for a peak 15-minute period within the peak hour. This represents a peak surge demand of approximately 10 percent. Vehicle stacking or double-parking increases curb frontage capacity, but this should be limited to a maximum of 50 percent of the frontage to maintain maneuverability for vehicles exiting the inner curb and to limit congestion in the bypass lane. Arrivals curb requirements are more significant to account for higher vehicle dwell times. Pedestrian crosswalks needed to access terminal parking areas would increase the linear curbside frontage requirements and should be added to the figures in **Table C-32**.

Table C-32: Vehicle Curb Frontage Requirements

Curb Frontage	2025	2030	2035	2040
Departures	88	100	114	129
Arrivals	94	110	120	138
Total Curbside (linear feet)	**182**	**210**	**234**	**267**

Source: Mead & Hunt analysis.

Vehicle Parking

Passenger and visitor vehicle parking is currently distributed across five parking lots near the existing terminal building. The lots contain over 200 spaces, of which 34 spaces are dedicated to car rental companies. Five spaces are allocated to air traffic control employees in the lot north of the terminal building. The total number of existing spaces available for passenger and visitor parking is over 200. A summary of parking space allocation by lot is shown in **Table C-33**.

Table C-33: Existing Terminal Parking and Occupancy

Parking Lot	Existing	Occupancy	Percent
West (of Hargis Road)	50	45	90.0%
East (of Hargis Road)	43	41	95.3%
South	23	21	91.3%
North	36	36	100%
Overflow	Undesignated[1]	Unknown	---
Total	**152[2]**	**143**	**94.1%**

Source: Mead & Hunt analysis.

Notes: [1]Overflow lot is shared with the Sanborn Park ballfields and does not have designated parking spaces.
[2]Total parking spaces is over 200 when including the overflow lot.

As shown in the table, SWO's total parking occupancy rate is 94 percent. This parking occupancy is well above the industry threshold of 85 percent, the level at which additional spaces should be provided. Above 85 percent passengers and visitors begin to search for a parking space which can negatively impact their schedules. It has been assumed that the existing figures shown in **Table C-33** represent an average day of the peak month.

Parking figures are typically determined using annual enplanements and utilization figures from peak hour enplanements as a basis for determining future requirements. Using 85 percent as a minimum requirement for planning, the number of required existing parking spaces has been increased by 15 percent of the current total to yield 198. A factor of 4.125 spaces results from dividing 198 by the 2020 peak hour enplanements of 48. Applying this factor to each time period's peak hour enplanements provides the minimum number of parking spaces required. By increasing the factor to 4.75 provides approximately 115 percent of 2020 enplanements, allowing for additional growth over the planning period and additional flexibility during peak activity. **Table C-34** summarizes the parking requirements at SWO throughout the planning period.

Table C-34: Passenger and Visitor Parking

Passenger and Visitor Parking (Including Rental Cars)	2020	2025	2030	2035	2040
Peak Hour Enplanements	48	44	51	58	66
Parking Space Minimum Requirements	230	210	240	275	315

Source: Mead & Hunt analysis.

Use of the parking methodology assumes a duration-of-stay consistent with the existing parking counts. Should future parking surveys (e.g., counting vehicle license plates that remain overnight) indicate that average duration-of-stay increases over time, the parking factor can be increased accordingly. Conducting the surveys at different times of the year would also provide a better understanding of SWO's true customer needs.

Terminal Building Conclusion

The amount of space required to provide sufficient public non-secure and secure area within a future terminal building was calculated to accommodate one scheduled commercial service flight during the peak hour, with the understanding that passengers travelling aboard charter flights could use the terminal when there is no

scheduled commercial activity. This practice could improve chartered air carrier and airport operations by removing passengers from the terminal apron during departures and arrivals, assuming a passenger boarding bridge is included in the new terminal (which is recommended).

The analysis indicates that, including university athletic team charter flights, the aircraft size, passenger seats, and potential passenger demand essentially support a two-gate replacement terminal. The use of B 737 aircraft for charter flights requires the following standard to be met as outlined by the FAA's Private Charter Standard Security Program:

> *"The Private Charter Standard Security Program (PCSSP) is for operators with an FAA Part 121, 125, or 135 certificate using aircraft with a maximum certificated takeoff weight greater than 100,309.3 pounds (45,500 kg) or configured with 61 or more passenger seats. The cost of this type of operation is provided by a single entity, not individual passengers. This program includes requirements to screen passengers and their accessible property."*

If charter airlines or SWO allow passengers the use of the departures lounge prior to boarding, this may be perceived as a higher level of service. With a potential for light concessions sales, passengers could purchase goods, food, or beverages and use the restrooms for boarding.

Constructing the initial terminal building with sufficient space to accommodate existing scheduled commercial service and non-scheduled charter service will allow for post-planning period growth, the introduction of a second air carrier during the planning period, or the introduction of an unanticipated second early morning flight to an additional airport. Including the additional space in the new terminal building would benefit SWO and the community by offering opportunity to support these events should they occur. This could increase the community's options, maximize opportunity for competition, and raise the level of passenger service within a modern facility.

An initial two-gate terminal building would increase area requirements, mainly through the addition of a second departures lounge and aircraft apron parking position. The cost of the lounge area would be less than if it were added at a future date. Sufficient space for additional ticketing counters has been provided in the ticket hall should the university athletic teams' charter flights, or a second commercial air carrier, want to lease ticket counters and the accompanying secure operations area. SWO would be responsible for this option, but the cost could be postponed until such time as an air carrier might request these facilities. Providing flexibility for a building with a lifespan of 30 to 40 years will provide SWO the means to adapt to changes in air transportation through and beyond the planning period. It is also recommended that the new terminal building use a single parking lot that can accommodate the full parking needs of SWO's passengers and visitors.

Landside and Terminal Area Support Facilities

General Aviation Facilities

GA facilities support and serve the based and transient airport users through aircraft storage, pilot and passenger amenities and services, and aircraft maintenance. GA traffic at SWO represented approximately 91.8 percent of total operations in 2020 and is expected to compromise 94.3 percent by 2040. Based aircraft are expected to increase from 80 in 2020 to approximately 101 in 2040.

Fixed Base Operators

FBOs are businesses providing aircraft services such as fuel sales, aircraft maintenance, flight training, and aircraft storage. Currently, Stillwater Flight Center is the sole FBO at SWO. The facility requirements for FBOs depend on staffing and equipment needs to keep up with an anticipated increase in demand. New or expanded FBO buildings might be necessary as the existing facility reaches capacity.

Aircraft Hangar Storage

Based on the high investment of owning and operating aircraft, hangar storage is generally the most desired option for both short- and long-term aircraft storage. Aircraft hangar storage at SWO consists of 20 T-hangar units, 19 large group storage hangars, and four individual "Port-A-Port" hangars. T-hangars are designed to house one small aircraft per space, while group hangars are designed to house larger aircraft or multiple smaller aircraft. Port-A-Port hangars are short-term T-hangars owned by the City of Stillwater. **Table C-35** presents the estimated aircraft hangar storage demand throughout the planning period.

Table C-35: Hangar Storage Analysis, 2020-2040

Hangar Type	2020	2025	2030	2035	2040
Based Aircraft	80	87	91	96	101
Total Hangar Spaces	**43**	**48**	**52**	**56**	**58**
T-Hangar Units	24	28	30	32	34
Group Hangars	19	20	22	23	24

Source: Mead & Hunt analysis using forecast projections.

As of 2020, there are 0.54 hangar spaces to every based aircraft at SWO, confirming that group hangars are storing multiple aircraft. This ratio is used to estimate future storage recommendations, as it is expected that future storage facilities will reflect many of the existing characteristics of the current storage patterns. While the existing Oklahoma State University (OSU) fleet of 37 aircraft are based almost exclusively outside on apron tiedowns, SWO personnel indicate no other based aircraft use apron tiedown storage.

The based aircraft forecast presented in **Chapter B – Forecasts of Aviation Activity** projected an increase of 16 single engine aircraft, two jet aircraft, one helicopter, and two light sport aircraft from 2020 to 2040. The number of multi-engine aircraft are not ultimately expected to change from 2020 to 2040. The OSU fleet of

aircraft is expected to increase somewhat during the planning period, and these aircraft will likely remain based outside until such time that funding can be arranged to construct covered parking. In consideration of similar storage preference characteristics, it is expected that additional T-hangar units will be needed to correspond with the increase in single engine aircraft. Group hangars should be added to accommodate any additional single engine aircraft as well as the other larger aircraft types. The actual number, size, and location of future hangars will depend on user needs and financial feasibility at the time demand occurs.

Aircraft Apron Storage

As previously listed in **Chapter A – Inventory of Existing Conditions**, there are six aprons at SWO that will collectively provide approximately 109 aircraft tiedowns when all aprons are constructed.

GA apron storage requirements typically are based on the estimated amount of itinerant and based aircraft using tiedowns or apron storage spaces. Itinerant aircraft typically only require short-term, temporary storage on an apron, while based aircraft, if using tiedowns, typically have need of longer-term requirements until additional hangar spaces are provided.

Apron space calculations use 400 square yards of apron per itinerant aircraft and 300 square yards of apron per based aircraft. There are two reasons for this:

- Itinerant aircraft users will not be as familiar with the layout and circulation patterns at SWO so additional maneuvering space is essential.
- Whereas typically smaller, single engine based aircraft use apron storage, itinerant aircraft of various sizes do and will continue to use temporary apron storage at SWO.

Larger military aircraft are also regularly accommodated on the aprons. Therefore, it is necessary to provide additional apron area to accommodate the larger aircraft. As presented in **Table C-36**, the amount of anticipated demand for GA apron space is expected to exceed existing capacity during the planning period.

Table C-36: Apron Storage Requirements, 2010-2040

Apron Type	2020	2025	2030	2035	2040
Projected Apron Requirements	**34,786**	**39,719**	**42,799**	**46,543**	**50,283**
Itinerant GA Aprons	22,576	27,509	30,589	34,003	37,083
Based GA Aprons[1]	12,210	12,210	12,210	12,540	13,200
Existing Apron Area	**39,502**	**39,502**	**39,502**	**39,502**	**39,502**
Itinerant GA Aprons[2]	21,166	21,166	21,166	21,166	21,166
Based GA Aprons[3]	18,335	18,335	18,335	18,335	18,335

Source: Mead and Hunt analysis using forecast projections.

Notes: Apron areas calculated for area available for aircraft parking.

[1] The total number of OSU based aircraft is expected to remain stable through 2030 as older aircraft are replaced. A slight increase is expected thereafter through 2040.

[2] Itinerant aprons are currently located on the Terminal, Hangar 1, and Southeast General Aviation Ramps.

[3] Based GA aprons are currently located on the University Flight Center North and South Ramps, and they are only used for basing OSU aircraft.

Following completion of the University Flight Center South Ramp, all OSU based aircraft will be moved to tiedowns in this area. The existing University Flight Center North Ramp is then likely to be used for itinerant aircraft tiedowns.

With the evolving technologies of electric propulsion and enhanced battery capacity, electric Urban Air Mobility (UAM) and Vertical Takeoff and Landing (eVTOL) aircraft are expected to become a larger part of the nationwide fleet in the future. SWO should plan and program for adequate area to accommodate at least one electric aircraft charging station accommodating ADG II aircraft. This translates into an approximate 9,300 square feet of apron area (including adequate wingtip clearance). The preferred location would be near the edge of the designated itinerant apron where adequate electrical power supply can be accessed.

General Aviation Facilities Conclusion

To accommodate the projected growth in single-engine aircraft, T-hangar structures should be increased by approximately 10 over the planning period. Group hangars should be increased by approximately five to account for the forecasted growth in the remaining aircraft. It is anticipated that additional GA apron space for itinerant aircraft will be required, including one charging station for electric aircraft.

Air Cargo Facilities

Currently, air cargo aircraft use the terminal apron just southwest of the terminal building for loading and unloading of air cargo directly onto the aircraft to and from the delivery trucks. This location provides easy access for the delivery trucks to the apron. It is expected that this location will continue to be utilized for air cargo loading throughout the planning period.

Air Cargo Facilities Conclusion

The air cargo facilities are sufficient in size and can accommodate air cargo throughout the planning period.

Large Scale Aeronautical Facilities

The presence of the recently completed OSU Flight Center at SWO is part of the continued expansion of the Oklahoma Aerospace Institute for Research and Education (OAIRE) that was announced in late 2021. It will be the first Aerospace Institute in the state of Oklahoma and twice the size of any facility in the country. Coupled with OSU's Research and Development (R&D) opportunities for Unmanned Aerial Systems (UAS) and the State Department of Commerce's strong support for aeronautical development, many potential opportunities exist to provide additional offerings for training, educating, and certifying students for careers in the aviation industry. Careers in aircraft Maintenance, Repair, and Overhaul (MRO), education, and experimental aircraft enterprises can be expected. With the likely influx of aviation-focused students, SWO will become more attractive for additional aviation entities to invest in facilities.

Large Scale Aeronautical Facilities Conclusion

It is not anticipated that SWO's west side property will be required for GA facilities within the planning period. Therefore, the reservation of adequate space for large-scale aeronautical development immediately west of Runway 17/35 and northwest of Runway 4/22 should be planned and protected for non-GA aeronautical uses.

Airport Traffic Control Tower (ATCT)

The existing ATCT is located atop the terminal building connected to the ticketing area with an open stair from the common area up to the conference room on the second level. Access to the upper three levels that define the ATCT facilities is controlled though a secure locking mechanism at the second-floor door opened only with the correct entry of numerical codes. The level directly above the conference room is an equipment room; the level above that is a breakroom/toilet area for the ACTC personnel. The 600 square feet of space within the ATCT cab is the highest structure within the building.

Siting requirements for ATCTs are found in FAA Order 6480.4B, *Airport Traffic Control Tower Siting Process*, and AC 150/5300-13B, *Airport Design*. Accessibility requirements for people with disabilities to public buildings is described in Title II of the 2010 Standards for Accessibility, commonly called the Americans with Disabilities Act (ADA).

ATCT Requirements

Generalized ATCT requirements are summarized below. ATCT buildings must:

- Provide sufficient height to have unobstructed views of all controlled aircraft movement areas including runways, taxiways, and ramp areas, as well as airborne traffic patterns and runway approaches, having a perpendicular line-of-sight (LOS) with the primary runway/taxiway system.
- Provide sufficient height such that the LOS angle of incidence to the key point on the airfield is equal to or greater than 0.80 degrees.
- Orient so the primary operational view faces north, or alternatively east, west, or south in that order of preference.

- Prevent the impairment of visibility by direct or indirect external light sources, sunlight, reflective surfaces, naturally occurring atmospheric conditions, and industrial/municipal discharges.
- Prevent degrading or affecting the performance of existing or planned communications, navigation, or surveillance equipment.
- Avoid adverse impacts to any current or planned terminal instrument procedures.
- Comply with Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace* and all airport design criteria surfaces.
- Comply with the ADA public access requirements if the existing terminal building is remodeled and the existing ATCT is to remain.
- Comply with all safety and security regulations contained in FAA Order 1600.69C, *FAA Facility Security Management Program* commensurate with the Facility Security Level (FSL) assigned to the ATCT.

ATCT Analysis

An analysis of the existing ATCT LOS indicates that no obstructions block the view of any runway surfaces and most taxiway surfaces. However, as illustrated in **Figure C-3** the tops of Group Hangars 1 and 2 obscure a segment of Taxiway F from ATCT LOS, as are all the ramps northeast of Group Hangar 1 including the OSU Flight Center Ramp North. Additionally, most of the Southeast GA Taxilane is obscured from ATCT LOS by the hangars located north of the taxilane. In interviews, ATCT personnel have confirmed these LOS issues. They also report that a taller cab elevation at the current location might eliminate the LOS issue and taller windows in the cab would be preferrable.

The existing LOS angle of incident as calculated to the key point on the airfield (i.e., Runway 17) is 0.04, meaning the controller eye height elevation (1003.7 feet AMSL) is barely above the Runway 17 elevation (1,000 feet AMSL). This angle of incident does not meet the requirements in FAA Order 6480.4B, which as previously stated is a minimum 0.80 degrees.

The status of the life safety requirements such as exit requirements and smoke proof enclosures along with fire rated partition locations have not been documented. Fire protection and fire and smoke detection are also potentially out of date.

Security concerns exist regarding reasonable provisions for employee parking. Currently, there is inadequate parking at the terminal and the ATCT personnel share parking spaces with other users on the terminal building.

The current equipment room is a little larger than a closet and does not have adequate heating, ventilation, and air conditioning (HVAC), leading to equipment overheating and the inability for the tower to install additional equipment needed for backup and redundancy purposes. The employee breakroom and restroom are extremely small by modern standards.

The existing ATCT is not accessible to people with disabilities. However, the multi-story buildings Section 206.2.3 of Title II of the ADA states that air traffic control towers have an exemption from the requirements to

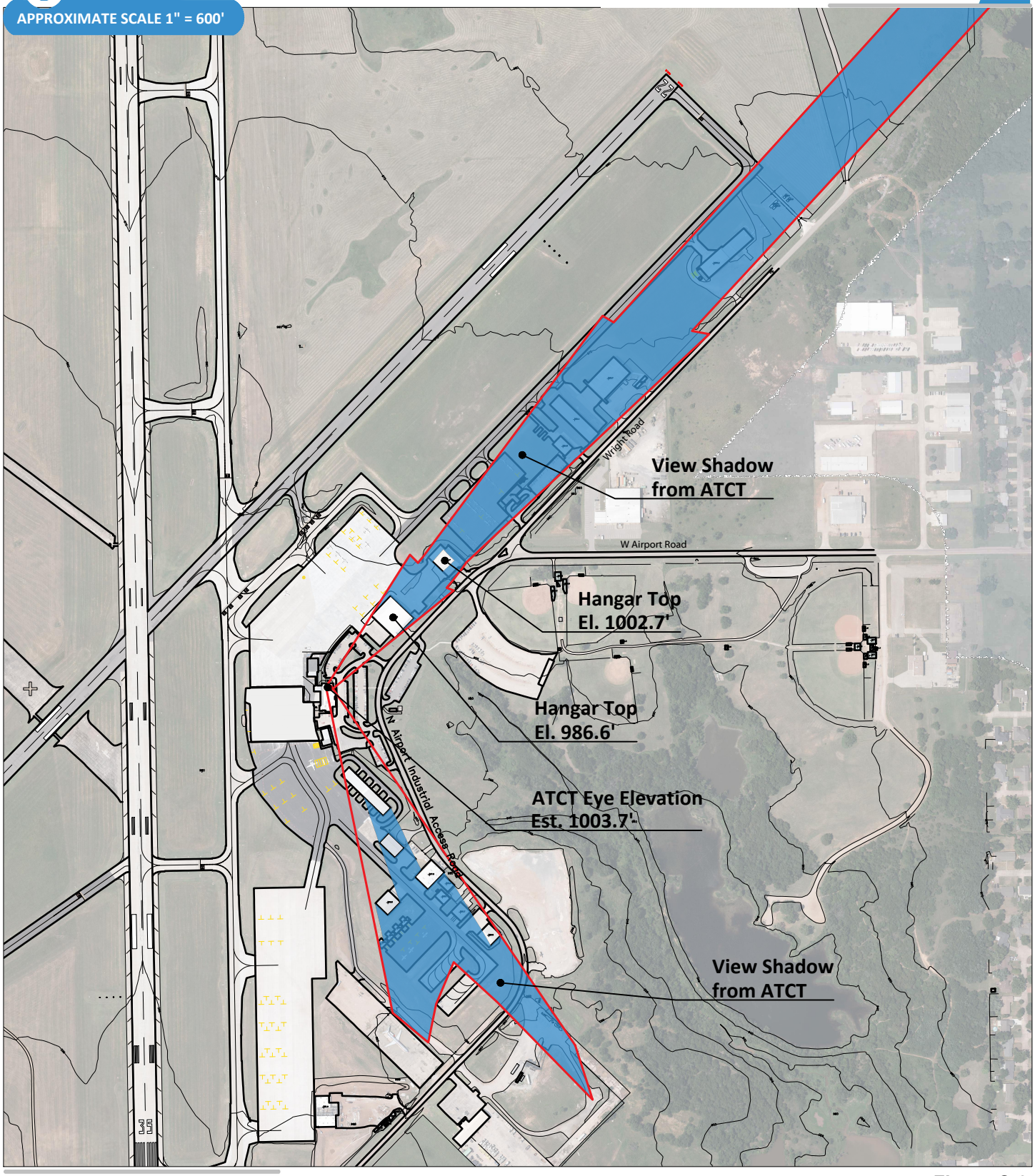


Figure C-3
ATCT Line of Sight Analysis

have an elevator that serves both the cab and one floor below. Given that the space located two-levels below is an equipment room, this level would be exempt from the elevator requirements also. Title II of the ADA does not allow for elevator exemptions for all public areas of new or renovated airport terminals. Therefore, should the decision be made to remodel the existing terminal building and retain the existing ATCT in its present location, ADA requirements include the installation of either an elevator or a vertical platform lift to the second floor of the existing terminal (i.e., the airport conference room) as part of the renovation process.

To improve security, it is expected that the conference room will be set aside for use by ATCT personnel only. Controlled access will require a separate entrance into the facility and will be designed to minimize the usability of the existing terminal building.

Airport Traffic Control Tower Conclusion

Given that the existing ATCT is located atop the existing terminal building, the sizable cost to provide an elevator or vertical platform lift to the second floor if the existing terminal building is remodeled will be questionably spent. Spending construction monies on improving the ATCT in the existing location is not practical considering a replacement facility will likely be constructed in less than ten years due to the antiquated design. Long-term cost savings can be achieved by separating the tower from the terminal during the upcoming remodel rather than performing another renovation a few years later. Segregating a secure entrance and providing secure parking for ATCT personnel will minimize the usability of the existing terminal building and parking areas. Additionally, it is unknown at this time if the existing ATCT will structurally support additional height that would alleviate the unobstructed LOS issues with Taxiway F and the Southeast GA Taxilane, and the inadequate LOS angle of incident.

It is recommended that a future ATCT location be evaluated. Since the primary runway (Runway 17/35) is oriented north-south, and perpendicular LOS is preferred with an east facing view being the second-most advantageous orientation, a site on the west side of SWO is recommended for evaluation in the next chapter, **Chapter D – Alternatives Analysis**.

While this Master Plan will evaluate and recommend a future ATCT location, the use of the Airport Facilities Terminal Integration Laboratory (AFTIL) method or the Alternate Siting Process (both outlined in Order 6480.4B) is required. A follow-on ATCT Siting Study will need to be prepared separate from this Master Plan to either confirm the recommended site or select another location. Close coordination with and review by the Technical Operation Services Air Traffic Organization (AJW) Terminal Facilities Execution will be conducted before an official written decision memorandum of a new ATCT site can be provided.

Aircraft Rescue and Fire Fighting Facility

According to Code of Federal Regulations (CFR) Part 139.315, ARFF equipment and staffing requirements are based upon the length of the largest air carrier aircraft that serves an airport with an average of five or more daily departures. **Table C-37** presents the ARFF Index, aircraft length criteria, and representative air carrier aircraft.

Table C-37: ARFF Support Requirements

ARFF Index	Aircraft Length	Representative Aircraft
A	Less than 90'	ERJ 135, CRJ 200
B	At least 90' but less than 126'	CRJ 900, A319/A320, **ERJ 145^{E}/175^{F}**
C	At least 126' but less than 159'	ERJ 195, A321, B 737-800/900
D	At least 159' but less than 200'	B 757, B 767, A330
E	At least 200'	B 747, B 777, A340

Source: CFR Part 139.315 ARFF Index Determination.

Notes: **Bold** = SWO critical aircraft, ^{E} – Existing, ^{F} – Future.

SWO currently holds an ARFF index designation of B, with Index C services provided with prior arrangement. The Index B designation is due to the average commercial operations of two departures daily of the ERJ 145, which is the existing critical aircraft. The ERJ 175 is the forecasted future critical aircraft. Both aircraft are within the ARFF index B classification. The Index C provided services accommodate the longer aircraft used by OSU and visiting universities athletic teams.

The existing ARFF facility is centrally located on the east edge of the terminal apron just south of the terminal building. It provides approximately 1,110 square feet and is comprised of one vehicle storage bay. An additional bay is leased in tandem with the adjoining apartment. While an older structure the ARFF is in good functioning condition. SWO's ARFF facility currently operates two vehicles, which were detailed in **Chapter A – Inventory of Existing Conditions**. The existing equipment can accommodate the necessary requirements for its current ARFF index. However, SWO desires to store both ARFF vehicles indoors with ample equipment and material storage and maintenance space provided.

ARFF Conclusion

It is recommended that alternative locations for a new ARFF building providing two vehicle bays and ample storage and maintenance area be analyzed in the next chapter. Additionally, SWO should engage with an engineering or architectural firm to right-size the ARFF building space and layout to best conform with FAA guidance, as well as with local codes and ordinances.

Snow Removal Equipment and Airport Maintenance Facility

Airport maintenance is responsible for the upkeep, protection, and preservation of airport facilities and snow removal equipment (SRE) is used for snow and ice removal from airport pavements. Facilities that are right sized to store equipment and material is an important part of the airport planning process. Currently, SWO does not have a dedicated SRE facility, so equipment is stored outdoors and indoors where space is available.

FAA AC 150/5220-20A, *Airport Snow and Ice Control Equipment*, provides guidance in the purchase of AIP-eligible SRE. AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, provides siting factors and space allocation calculation for SRE facilities. FAA AC 150/5200-30D, *Airport Field Condition Assessments and Winter Operations Safety*, provides guidance to airport sponsors in developing snow and ice control plans.

SRE Requirements

The minimum SRE requirements at commercial service airports are primarily based on three factors: the total square footage of designated Priority 1 paved area identified in the winter storm management plans, the annual aircraft operations, and the amount (in tonnage) of snow to be removed in a given time period. Priority 1 paved areas are defined as the primary runway, parallel taxiway, terminal ramp, control tower access, and ARFF access. In SWO's *Snow and Ice Control Plan*, approved by the FAA in June 2021, the following are identified as Priority 1 areas:

- Runway 17/35
- Taxiways A, A3, A4, and C
- Terminal/airline apron
- ARFF access ramp
- Southeast GA Taxiway to the Airport Operations and Maintenance Center and Administration Offices
- ILS equipment roadways (glideslope and localizer antennas)
- PAPIs

This amounts to over 1,335,000 square feet of Priority 1 pavement, which classifies SWO as a large airport by AC 150/5220-18A.

Commercial service airports with more than 40,000 aircraft operations should have equipment to clear the Priority 1 surfaces of one inch of snow weighing up to 25 pounds per cubic foot in 30 minutes. The calculations for SWO indicated approximately 3,980 tons of snow is removed per hour assuming one inch of snow accumulation. However, SWO's current *Snow and Ice Control Plan* sets the removal time at one hour.

The FAA online snow removal equipment calculator provides a recommended amount of SRE. It is possible for equipment to be multi-purpose that combines multiple functions on one platform (e.g., a plow truck may also double as a hopper spreader, and an assortment of quick-change attachments allow a vehicle to convert from one function to another). **Table C-38** presents the existing SRE equipment at SWO and the equipment recommendations based on these calculations. Based on the assumptions and calculations presented in this analysis, SWO is eligible for two Class III high-speed rotary plows with the capacity to cast 2,500 tons of snow per hour a distance of 100 feet. The rotary plows should be supported by four snowplows of equal snow removal capacity, equaling 40 feet of actual blade length with a 30-degree plow cutting angle and a 20-mile per hour operating speed.

SWO currently meets these minimum equipment requirements; however, it appears that SWO is eligible for two sweepers that are available at its discretion through AIP funding. It is recommended that SWO replace or supplement the existing SRE vehicles that do not meet the requirements or that have exceeded the expected useful lifespan (i.e., generally 10 to 15 years). SWO is planning to replace the two existing rotary plows with newer equipment in Fiscal Year 2022. The existing SRE vehicle inventory that does not meet the

recommendations could be used to clear secondary and tertiary paved areas such as GA aprons, taxilanes, hangar areas, access roads, automobile parking, and off-airside surfaces.

Table C-38: AIP Eligible SRE Recommendations

Equipment	Existing	Recommended
Rotary Plows (Snow Blowers)	• Two Blizzard Buster 12-foot Tow-Behind Brooms	• Two Class III
Plows	• Snow Dog Plow 9-foot truck mounted • Tractor mounted 12-foot snow pusher box • Dump Truck mounted 11-foot plow • Sand truck mounted 10-foot plow • Motor grader with 14-foot blade	• Four Class III with a total 40-foot blade length
Multi-Purpose Equipment	• Wyle 800-gallon towed motorized chemical de-ice sprayer with 42'foot boom • New Holland Skid Steer with bucket • ATV-mounted de-ice granular spreader	• Two Sweepers • Two Hopper Spreaders

Source: SWO Snow and Ice Control Plan, dated June 10, 2021, and Mead & Hunt analysis using FAA AC 150/5220-20A.

SRE and Airport Maintenance Facility Requirements

SRE is a costly piece of complex and technologically advanced equipment. To protect and service equipment, and to protect local and federal investment, specifically designed maintenance and storage buildings are needed. SRE should be housed in a building capable of maintaining a temperature of 50 degrees Fahrenheit to prolong the useful life of the equipment and to enable more rapid response to operational needs.

Total space allocation for an SRE facility is based on the total of three individual areas determined necessary to meet different functional purposes:

- **Storage area** (including equipment parking, snow and ice control materials, and equipment parts)
- **Support area** (including administrative and equipment maintenance areas)
- **Special equipment area** (including heating, ventilation air conditioning, steam generation, emergency power, and machine rooms).

Space allocation for each area is determined by local building code and ordinance, values provide by tables in AC 150/5220-18A, and applying equipment clearance values as determined by using equipment safety zone concepts.

Using this guidance, a total SRE and airport maintenance facility consisting of approximately 15,500 square feet[3] is recommended. Thus, since the existing facility is approximately 9,000 square feet, with plans to expand to expand to approximately 13,000 square feet, the SRE needs exceed the existing conditions.

SRE and Airport Maintenance Facility Conclusion

It is recommended that SWO continue programming for the replacement of the existing antiquated SRE vehicles that do not meet the recommendations presented in this analysis or have exceeded their useful

[3] Includes storage area allocation for two self-propelled rotary snowplows, four trucks and/or tractors for snowplow operations, four 10-foot-long snow blades, two 10-foot sweepers, and two spreader hoppers. Support area allocation does not include sleeping quarters but does include a lunchroom, kitchen, a cleaning bay, and a repair bay.

lifespans with equipment that are eligible for AIP funding. Alternative sites for a future SRE and Airport Maintenance Facility will be examined in the next chapter. Additionally, as with the ARFF building, SWO should engage with an engineering or architectural firm to right-size the SRE building space and layout to best conform with FAA guidance, as well as with local codes and ordinances.

Fuel Storage Facility

The City of Stillwater owns the SWO fuel storage facility, which provides both Jet A and 100LL AVGAS. According to fuel sales records provided by SWO, there has been an average of 123,456 gallons of Jet A and 123,456 gallons of 100LL AVGAS sold during the past four years (i.e., 2017-2020). Based on the 2020 total aircraft operations, this equates to approximately 79.7 gallons of Jet A fuel sold per turbine-powered aircraft operation and 2.0 gallons of 100LL AVGAS fuel sold per piston-powered aircraft operation.

Typically, as operations increase, fuel storage requirements can be expected to increase proportionately. Current aircraft trends at SWO indicate that GA aircraft are more frequently used for business purposes and less for recreation or leisure purposes. The distance travelled for aircraft being used for business purposes is typically longer compared to recreation or leisure aircraft. Coupled with the continued increase in training operations by the OSU Flight Center, aviation fuel trends suggest that the ratio of 100LL AVGAS gallons sold per operation will slightly increase throughout the planning period. Additionally, with the airlines transitioning from 50-seat aircraft to larger 76-seat aircraft, and larger business jets continuing to use SWO, the ratio of Jet A gallons sold per operation will also increase. Using the increasing gallons sold per operation ratio, an estimate of fuel storage needs can be calculated as a two-week supply during the peak month of operations, which is an industry rule-of-thumb planning standard. **Table C-39** presents the demand for fuel storage compared to the existing capacity.

Table C-39: Fuel Storage Requirements, 2020-2040

Fuel Type	2020	2025	2030	2035	2040
Jet A					
Average Day of Peak Month Turbine-Powered Aircraft Operations	15	18	20	22	24
Two Weeks of Operations	213	256	287	311	39
Gallons Per Operation	79.7	80.0	82.0	84.0	86.0
Forecast Fuel Storage Demand	17,000	20,480	23,515	26,110	29,140
Actual Fuel Storage (gallons)[1]	24,000	24,000	24,000	24,000	24,000
Fuel Storage Excess/Deficiency (gallons)	2,200	-1,280	-4,315	-6,910	-9,940
100LL AVGAS					
Average Day of Peak Month Piston-Powered Aircraft Operations	254	317	349	373	396
Two Weeks of Operations	3,556	4,437	4,884	5,222	5,548
Gallons Per Operation	2.0	2.2	2.3	2.3	2.3
Forecast Fuel Storage Demand	7,105	9,760	11,230	12,010	13,315
Actual Fuel Storage (gallons) [2]	20,000	20,000	20,000	20,000	20,000
Fuel Storage Excess/Deficiency (gallons)	8,895	6,240	4,770	3,990	2,685

Source: Mead & Hunt analysis.

Notes: [1] Existing Jet A fuel storage capacity (80 percent of storage tank capacity is considered full).

[2] Existing 100LL AVGAS fuel storage capacity (80 percent of storage tank capacity is considered full).

Fuel Storage Facility Conclusion

It appears that the existing Jet A fuel storage capacity is somewhat undersized and additional capacity may be needed in the future based on the generalized planning standard. The existing fuel storage area has sufficient space to either include additional fuel storage tanks or replace older tanks with new larger tanks.

Non-Aeronautical Tenants and Ground Facilities

SWO-owned property provides opportunities for potential non-aeronautical tenants to occupy space and generate revenue to help fund airport operations and future improvements. Continued population and job growth are the result of a desirable quality of life, a well-educated labor base, a high-quality public institution in OSU, a central presence in the United States, and strong community support. These competitive strengths and assets provide the opportunity to accommodate a variety of non-aeronautical land use needs on portions of airport property, thereby benefitting SWO, the City of Stillwater, and the surrounding region.

According to Woods & Poole projections, Payne County is expected to add over 8,800 jobs from 2020 to 2040, representing an approximate 0.8 percent Compound Annual Growth Rate (CAGR). As the largest city in Payne County, Stillwater would be expected to add the most jobs within the county. SWO has ample undeveloped property to accommodate some of this job growth as it relates to non-aeronautical tenants.

The continued growth and cultivation of commercial passenger service at SWO over time should stimulate non-aeronautical development related to ancillary travel services. With the nearby softball fields, a right-sized hotel may be supportive of both the commercial air carrier passengers and crew using SWO, as well as the users of the adjacent public use facilities. Commercial establishments, such as convenience stores, gas stations, and restaurants serving both SWO and the surrounding community, could be viable options for development. With the current and planned configuration of the road system along the east side of SWO, access and capacity would be attractive for these types of future small-scale development. Currently, the closest hotel is more than three miles from SWO.

The west side of SWO not reserved for aeronautical development affords the opportunity for development of large-scale non-aeronautical tenants. These property parcels are currently zoned as public/light industrial. This property is situated in a favorable location for long-term opportunities as the needs arise and supporting infrastructure can be supplied. The area surrounding SWO is not generally a preferred location for office and commercial space users, so market expectations seem to support R&D facilities and light industrial type development on SWO's west side. It could also include facilities consisting of warehouses or cargo handling and sorting facilities. Any large-scale development would need to be sited and constructed in consideration of Federal Aviation Regulations (FAR) Part 77 imaginary surfaces regulating height restrictions.

Non-Aeronautical Tenants and Ground Facilities Conclusion

It is recommended that options for the provision of non-aeronautical facilities, and the infrastructure needed to support it be evaluated and identified in the next chapter, **Chapter D – Alternatives Analysis**. This includes property on both the east and west sides of SWO.

Airport Access, Circulation, and Truck Routes

Stillwater's major access roadways are the north-south oriented US Highway 177 and east-west oriented State Highway 51, which meet in the middle of the City of Stillwater. State Highway 51 intersects with Interstate 35 (I-35) approximately 16 miles west of Stillwater and US Highway 177 intersects with the Cimarron Turnpike Spur approximately five miles to the north.

SWO is accessible by vehicle, truck, and bus. The primary access to SWO from the south is Airport Industrial Road (recently renamed North Hargis Road), which runs from the intersection of North Western Road and West Lakeview Road to the intersection of West Airport Road just east of the terminal building. West Airport Road is SWO's primary access from the east, which intersects with North Washington Street (US Highway 177) approximately 3/4 miles to the east. Current plans include a complete proposed realignment of North Hargis Road so that it would be located further east of the terminal area, as illustrated in **Figure C-4**.

When Hargis Road is realigned, the existing roadway network will continue to provide access and entrance points for all passengers, employees, tenants, and other ground operators, including access to the terminal parking areas. Connectivity with the realigned Hargis Road will be maintained at two locations at the north and south ends.

The proposed realigned North Hargis Road will be a two-lane roadway constructed of asphalt. Using the Highway Capacity Software, the one-way capacity of a 35 mile per hour (mph) roadway with no curb and gutter results in an Annual Average Traffic (AADT) of 1,650 cars per day. The capacity for a two-lane facility doubles to 3,300 cars per day, which is the effective AADT of the proposed realigned North Hargis Road. According to traffic counts for Hargis Road measured approximately one quarter mile north of the intersection with West Lakeview Road, AADT for 2022 is equal to 1,822 cars per day. Using an annual increase in traffic of about 2.0 percent yields approximately 2,404 cars per day by 2042. The capacity of North Hargis Road is well over the existing and forecasted demand for the vehicle traffic. Once North Hargis Road is realigned, there will be no need for further improvements except for additional access points as needed to serve future tenants.

West Airport Road is a two-lane road, and thus also has a capacity of 3,300 cars per day. According to traffic counts for West Airport Road measured approximately one quarter mile west of the intersection with North Washington Street/Highway 177, AADT for 2022 is equal to 2,413 cars per day. Using an expected annual traffic increase of about 2.6 percent, AADT is expected to increase to 3,480 cars per day. Based on this analysis, future traffic on West Airport Road will likely exceed the road's capacity. It is recommended to closely monitor traffic conditions so that demand does not exceed capacity before improvements are provided.

With the potential development of SWO's west side property, there will be a need to provide vehicular access. Most likely this access will be provided by improvements made to West Airport Road from the west via 3310 Road and its connection to West Lakeview Road.

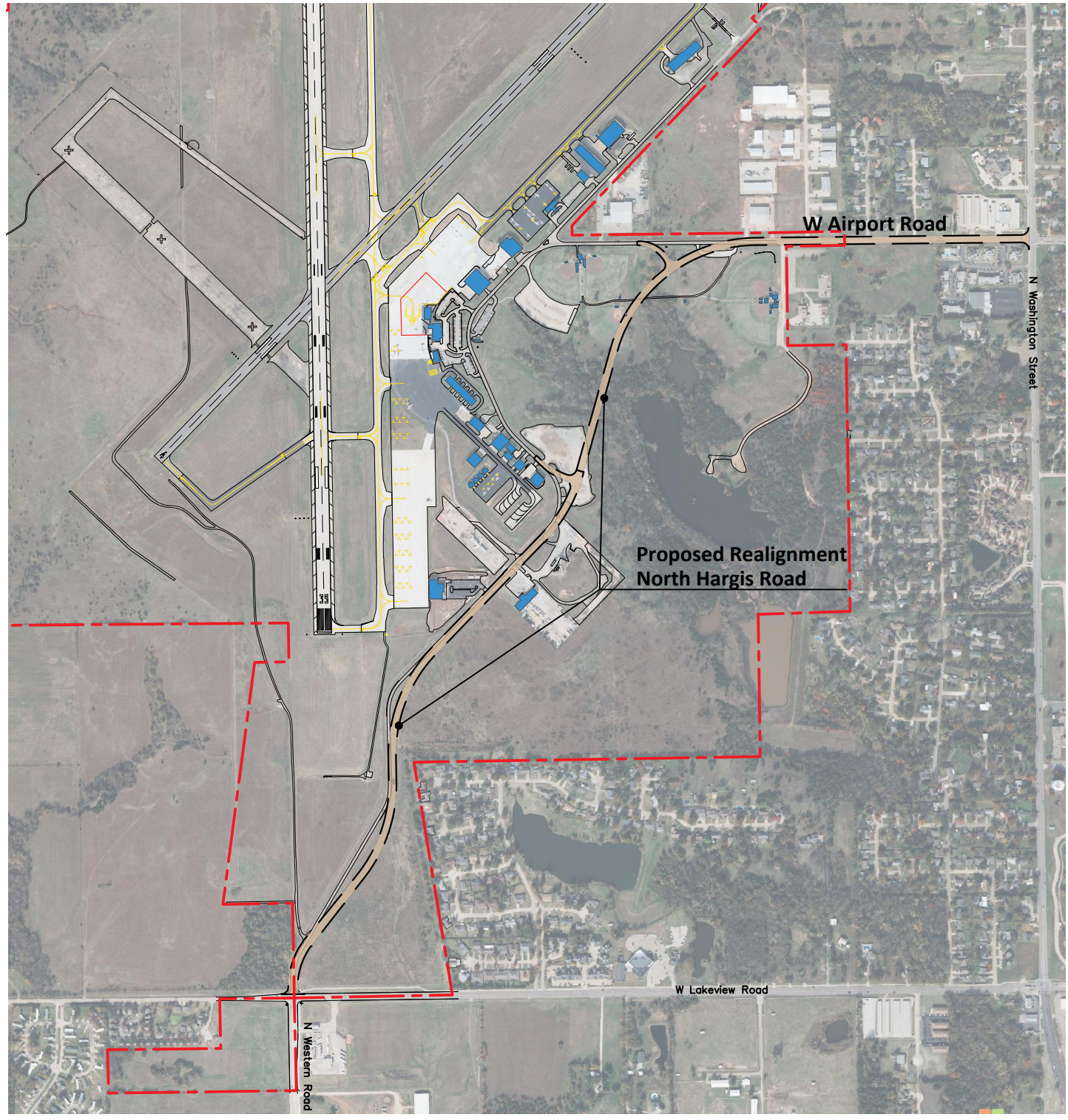


Figure C-4:
North Hargis Road Proposed Realignment

Considering vehicle circulation at the terminal and the provision of future parking areas, it is recommended that terminal reconfiguration alternatives be evaluated that increase parking areas and improve passenger pick up/drop off vehicle lanes. This could be accomplished while maintaining clear routes to the GA facilities to both the north and south of the terminal area.

According to the National Highway Freight Network, there are two primary truck routes that pass within approximately 30 miles of SWO. These routes are I-35, running north/south through the center of the state, and Interstate 44, running northeast/southwest from Oklahoma City to Tulsa. Neither truck route has or is planned to have an impact on SWO.

There is a railroad that runs through the City of Stillwater, called the Stillwater Central Railroad. This railroad continues to the north and then connects into the BNSF railroad network. Presently there are no stubs that extend to SWO property, and it is not anticipated that a connection will be provided during the planning period.

Access, Circulation, and Truck Routes Conclusion

It is recommended that the current airport access be maintained in the existing location once North Hargis Road is realigned. In conjunction with the terminal building alternatives evaluation, various vehicle access points, circulation routes, and parking facilities will be analyzed and considered. Traffic conditions on West Airport Road east of the intersection with the proposed realigned North Hargis Road should be monitored so that capacity improvements can be provided accordingly.

Utilities

The major utility systems at SWO include water, sanitary sewer, stormwater drainage, electric, natural gas, and communications, which were assessed for their ability to accommodate the requirements of any future development that might reasonably be expected to occur at SWO (e.g., hangar development, apron expansion, and new or expanded aeronautical or non-aeronautical facilities). Water and waste water are analyzed separately below, but the existing stormwater drainage, electric, natural gas, and communications utilities are adequate to meet the existing and anticipated demand.

Water Usage

Metered water usage information was gathered from the City of Stillwater's billing system for all meters registered to the city from 2015 through 2019, which includes meters serving the terminal building and various SWO support facilities. Not included in this review were meters registered to private third parties, which support private hangars and other establishments.

Meter water usage was compared to passenger enplanement, commercial service operations, and air cargo volume on an annual basis. No correlation was found between metered water usage and passenger enplanement, commercial service operations, or air cargo volume for the period reviewed. While commercial service operations and air cargo volume remained relatively steady for all five years and passenger enplanement was relatively stable from 2017 through 2019, annual metered water usage varied from a high of

244,000 gallons in 2016 to a low of 66,000 gallons in 2019. The reason for the variation in water usage was not known, but it could be attributed to construction activities or variations in operation and maintenance procedures. An average of 4.4 gallons of water per passenger enplanement were used for the period of 2017 through 2019.

The peak month water usage during the review period was October of 2016. This month's usage was 46,800 gallons, an average usage rate of one gallon per minute or 1,560 gallons per day. SWO's metered water usage has historically been very low, particularly compared to its fire flow demands. If adequate capacity for fire protection is maintained for SWO, sufficient domestic flow would surely be maintained for even very large increases in passengers, air cargo, or commercial service operations. SWO is served by a 12-inch water line and 8-inch sanitary sewer line, which, by observation, should be more than sufficient to serve the airport's domestic needs.

Utilities Conclusion

The utility systems at SWO are observed to be sufficient for the existing and future needs, and no alterations are necessary.

Perimeter Security

The security fence that surrounds the airport property is an 8-foot chain link topped with three strands of barb wire. There are 21 secure vehicle gates placed at strategic locations around the perimeter fence providing access from the non-secure landside areas to the secure landside and airside facilities. There are ten pedestrian gates providing secure access to aprons, hangars, and airside facilities. Three are near the airport administration building providing access to the south corporate hangar ramp, with an additional gate currently being provided near the Cowboy Hangar. Four are located near the terminal building and four are in the northeast hangar development area. SWO staff indicate that the existing perimeter security system is generally adequate for existing and future needs. However, increased cameras and automated gates would improve security at SWO.

There is no existing continuous perimeter roadway system. SWO has used gravel and millings from city roadway projects to improve the rougher areas near the security fence for what are the beginnings of a perimeter road. A continuous paved perimeter road would make the patrolling of the airport perimeter possible in all weather conditions.

Perimeter Security Conclusion

SWO staff indicate the security perimeter fencing and access gate system are generally adequate for existing and future needs. However, increased cameras for improved airfield surveillance, additional automated gates, and a continuous paved perimeter road are recommended.

SUMMARY

The information provided in this chapter provides the basis for understanding the facility improvements that are needed at SWO to accommodate future aviation demand efficiently and safely. Following are the major improvement considerations that have been identified in this chapter.

Airside Considerations

Instrument Approach Procedures and Navigational Aids

- Evaluate the potential to implement a GPS-based IAP providing visibility minimums of 1/2 mile to Runway 35 and NPA IAPs providing visibility minimums not less than 3/4 mile to Runways 4 and 22.

Airfield Design Standards

- Evaluate remediation of the deficient Runway 17/35 ROFA width, as well as the deficient Runway 4/22 ROFA and ROFZ width.
- Monitor the pavement strength of the apron surrounding T-hangar 2.

Pavement Marking, Lighting, and Signage

- Evaluate potential installation of a full approach light system, such as a MALSR, in conjunction with the potential Runway 35 IAP improvement.
- Maintain the non-precision threshold markings in conjunction with the proposed NPA IAPs to Runways 4 or 22.
- Replace all LED edge lighting with incandescent lighting.

Taxiway/Taxilane System

- Redesign Taxiway F1 to a right-angled taxiway.

Landside Considerations

Terminal Building

- Construct a new terminal building approximately 32,000 square feet in total size incorporating appropriate programmed space needs to meet the anticipated passenger demand.

General Aviation Facilities

- Construct approximately 10 additional T-hangar spaces and five additional group hangars over the planning period.
- Evaluate additional GA apron space for itinerant aircraft.

Large Scale Aeronautical Facilities

- Evaluate property reservation west of Runway 17/35 and northwest of Runway 4/22 for non-GA aeronautical uses.

ATCT Facility

- Reconstruct ATCT building in a new, physically separated location from the terminal building.
- Evaluate suitable locations for the relocated ATCT building using the AFTIL Alternate Siting Process and a subsequent ATCT Siting Study.

ARFF Facility

- Reconstruct the ARFF building in a new location, right-sizing the space to best conform with FAA guidance or other local building codes.
- Evaluate suitable locations for the relocated ARFF building.

SRE and Airport Maintenance Facility

- Program the replacement of the existing SRE vehicles no longer fulfilling their primary function or exceeding their useful lifespans.
- Evaluate sites for a future SRE and Airport Maintenance Facility, right-sizing the space to best conform with FAA guidance or other local building codes.

Fuel Storage Facility

- Evaluate future expansion of Jet A fuel storage in accordance with demand.

Non-Aeronautical Tenants and Ground Facilities

- Evaluate property reservation for non-aeronautical facilities.

Access, Circulation, and Truck Routes

- Maintain airport access to North Hargis Road following its proposed realignment.
- Evaluate vehicle access points, circulation routes, and parking facilities in conjunction with the terminal building reconstruction.
- Monitor for capacity improvements on West Airport Road east of the intersection with the proposed realigned North Hargis Road.

Perimeter Security

- Program for additional cameras, automated gates, and a continuous perimeter road.

D. Alternatives Development and Recommendations

INTRODUCTION

This chapter presents the development alternatives analysis and recommendations for Stillwater Regional Airport (SWO) to satisfy the facility requirements described in **Chapter C – Facility Requirements**. It does so in terms of concepts and reasoning, and it provides a description of the various factors and influences that meet the needs of the airport users as well as fulfills the strategic vision for the City of Stillwater. The ultimate recommendations will form the basis for SWO's long-term development plan.

DEVELOPMENT ASSUMPTIONS AND GOALS

In concert with the role of SWO and informed by community input received during the planning process, a series of basic assumptions and goals have been established. These goals intend to guide and direct the evaluation process of future SWO development and maintain continuity throughout the process. They involve several categorical considerations relating to both the short- and long-term facility needs. These considerations include safety enhancement, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While some represent more tangible and physical activities than others, all are deemed important and appropriate for future airport development.

Development Assumptions

- **Assumption One:** SWO will be developed and operated in a manner that is consistent with local ordinances and codes, federal and state statutes, and Federal Aviation Administration (FAA) grant assurances and regulations.
- **Assumption Two:** The recognized role of SWO will continue to serve as a facility accommodating regional commercial service passenger activity, along with general aviation (private, corporate, and training) activity and a small amount of military aviation activity.
- **Assumption Three:** Runway 17/35 will be designed, constructed, and maintained to FAA-defined Runway Design Code (RDC) C-III-2400 dimensional standards.
- **Assumption Four:** While the existing and future RDC for Runway 4/22 has been determined to be A-I-VIS, SWO desires to maintain this runway in a manner that protects for the limited use of commercial air carrier aircraft operations. This creates redundancy when Runway 17/35 is inoperable due to long lasting maintenance or rehabilitation, or in the event of aircraft incidents. Standards to be maintained include the runway length and width, parallel taxiway separation standards, and instrument approach protection consistent with past recommendations contained on the existing Airport Layout Plan (ALP).
- **Assumption Five:** SWO will accommodate the forecast aviation activity reliably and safely.

- **Assumption Six:** The existing lengths provided by both runways are adequate to accommodate the needs of the existing and forecast aircraft fleet safely and efficiently.
- **Assumption Seven:** The plan for future airport development should strive to make the most efficient use of the available area for aviation-related activities because the amount of accessible landside development area is at a premium.
- **Assumption Eight:** To the maximum extent possible, future facilities will be designed compatible and complementary with the operation of SWO and the surrounding land uses.

Development Goals

- Provide effective direction for future development through the preparation of a rational plan and adherence to the adopted development program.
- Plan and develop SWO to be capable of accommodating the future needs of the City of Stillwater, Payne County, and the surrounding area.
- Program the construction of facilities when demand is realized (construction is to be demand driven, not forecast driven).
- Plan SWO to accommodate the aviation forecasts safely and efficiently with needed facilities. The primary potential facilities improvement under consideration include:
    - The terminal building.
    - A standalone Airport Traffic Control Tower (ATCT).
    - Improved vehicle roadway access and parking facilities.
    - An Aircraft Rescue and Fire Fighting (ARFF) Facility and a Snow Removal and Equipment (SRE)/Airport Maintenance Facility.
    - Aircraft storage hangars and aprons.
    - Terminal landside development.
- Enhance the self-sustaining capability of SWO and the financial feasibility of future development.
- Integrate the needs of existing tenants with future development plans, recognizing and accommodating the needs of general aviation including corporate and flight training.
- Plan and develop airport facilities to be environmentally compatible with their surroundings, minimizing the potential environmental impact to both on and off airport property.
- Encourage the protection of existing public and private investment in land and facilities, and advocate for the resolution of any potential land use conflicts.

AIRSIDE DEVELOPMENT CONCEPTS, ALTERNATIVES, AND RECOMMENDATIONS

Because all other functions relate to and revolve around the basic runway/taxiway layout and Instrument Approach Procedures (IAPs), airside development alternatives must first be examined and evaluated. The

primary objective of the airside alternatives analysis is to examine options that will result in the best and safest possible aircraft operating environment. The analysis has been prepared to provide SWO with a comprehensive outline of each alternative's key components, advantages, and disadvantages associated with each.

Airfield Design Standards

Runway 17/35 Design Standards

As presented in the previous chapter, an FAA-owned glideslope equipment building and antenna are located approximately 370 feet west of the Runway 17/35 centerline. Thus, the Runway Object Free Area (ROFA) width is deficient by 30 feet, providing only a total width of 770 feet. A frangible windsock was also located 250 east of the runway centerline; however, it was constructed recently with FAA approval and is not considered an obstruction or non-standard condition.

Recommendation. Plan and program the relocation of the glideslope antenna and equipment building a minimum of 30 feet to the west outside the ROFA.

Instrument Approach Procedure Improvement

As stated in the previous chapter, an evaluation of implementing improved GPS IAPs to Runways 35, 4, and 22 is warranted to enhance SWO's access during inclement weather conditions.

Runway 35

This runway is currently equipped with an Area Navigation (RNAV) Global Positioning Satellite (GPS) approach with visibility minimums as low as 3/4-mile and a Very High Frequency Omni-Directional Range (VOR) approach with visibility minimums as low as 1-1/4 mile. The installation of a Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR) on Runway 35 would provide lighting credit enabling a decrease of the visibility minimums to as low as 1/2-mile. In doing so, the RPZ and the runway end approach surface would increase in size accordingly. **Figure D-1** illustrates the location of the MALSR, increased RPZ, increased runway end approach surface, the existing vertical guidance approach surface, the Federal Aviation Regulations (FAR) Part 77 approach surface, and the Precision Obstacle Free Zone (POFZ) associated with this IAP improvement. The POFZ would extend beyond existing SWO property to the west (approximately 0.7 acres), and the future RPZ would extend beyond SWO property (approximately 12 acres) encompassing West Lakeview Road. Because public roadways are considered incompatible land uses within an RPZ, coordination with FAA headquarters is required before approval of this improved IAP can be granted. There are five tree obstructions penetrating the existing and improved FAR Part 77 approach surface.

Runway 4

The existing and future RDC for Runway 4/22 is A-I-VIS, so Runway 4 is a visual approach runway served by no IAPs. However as stated in Development Assumption Four, SWO wishes to maintain the runway for use

by commercial air carrier aircraft operations in emergencies. To achieve an IAP with visibility minimums as low as 3/4-mile to Runway 4, as designated on the existing ALP, installation of a RNAV (GPS) approach can be implemented. According to FAA Advisory Circular (AC) 150/5300-13B, an Approach Lighting System (ALS) is recommended but not required for this type of IAP. Non-precision markings are required and are currently provided on Runway 4. In implementing this type of IAP, the RPZ and threshold siting surface would increase in size accordingly. It is anticipated that this IAP would provide vertical guidance so a vertical guidance approach surface would be required that is free of any obstructions. **Figure D-2** illustrates the location of the larger RPZ, increased runway end approach surface, vertical guidance approach surface, and FAR Part 77 approach surface associated with this IAP improvement. The future RPZ would extend beyond SWO property (approximately 10.7 acres). There is a single tree obstruction penetrating the existing and improved FAR Part 77 surface and is within the larger RPZ.

Runway 22

Like Runway 4, Runway 22 is visual approach only but would be maintained to achieve IAP with visibility minimums as low as 3/4-mile. Installation of a RNAV (GPS) approach could also be implemented on Runway 22 to achieve an IAP with visibility minimums as low as 3/4-mile. An ALS is recommended but not required for this IAP, and non-precision markings are required and currently provided. **Figure D-3** illustrates the location of the larger RPZ, increased runway end approach surface, vertical guidance approach surface, and FAR Part 77 approach surface associated with this IAP improvement. The future RPZ would extend beyond SWO property (approximately 10.7 acres). A bush penetrates the improved FAR Part 77 surface and is within the larger RPZ.

Recommendation. Continue to include the improved visibility minimum IAPs as shown on the existing ALP to Runways 35, 4, and 22 for use by commercial air carrier aircraft operations. Obstruction removal is recommended at the time of IAP implementation. As indicated on the existing ALP, an avigation easement will be sought for property inside the future Runway 35 RPZ that extends south of West Lakeview Road and is outside existing SWO property. Property inside the larger Runway 35 RPZ north of West Lakeview Road and outside existing SWO property is recommended for fee simple acquisition. Property acquisition is recommended for property within the future Runway 4 and 22 RPZs that extend beyond existing SWO property. The cost to mitigate the incompatible land uses within the RPZs might outweigh the benefits gained, but preserving the airspace associated with the improved IAPs assures that future implementation is not impeded by obstructions created beyond SWO's boundary.

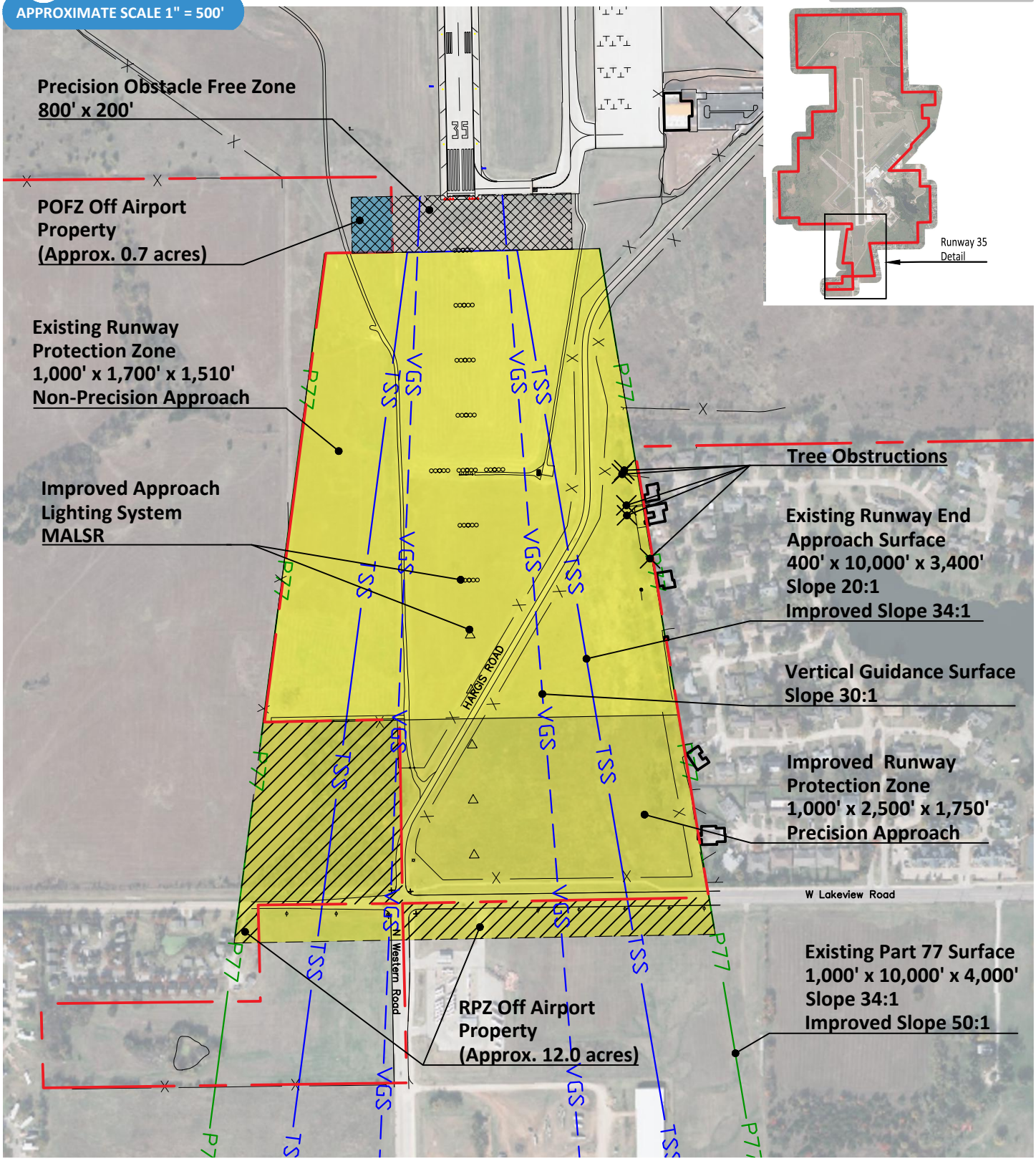


Figure D-1
Runway 35 IAP
Improvement Requirements

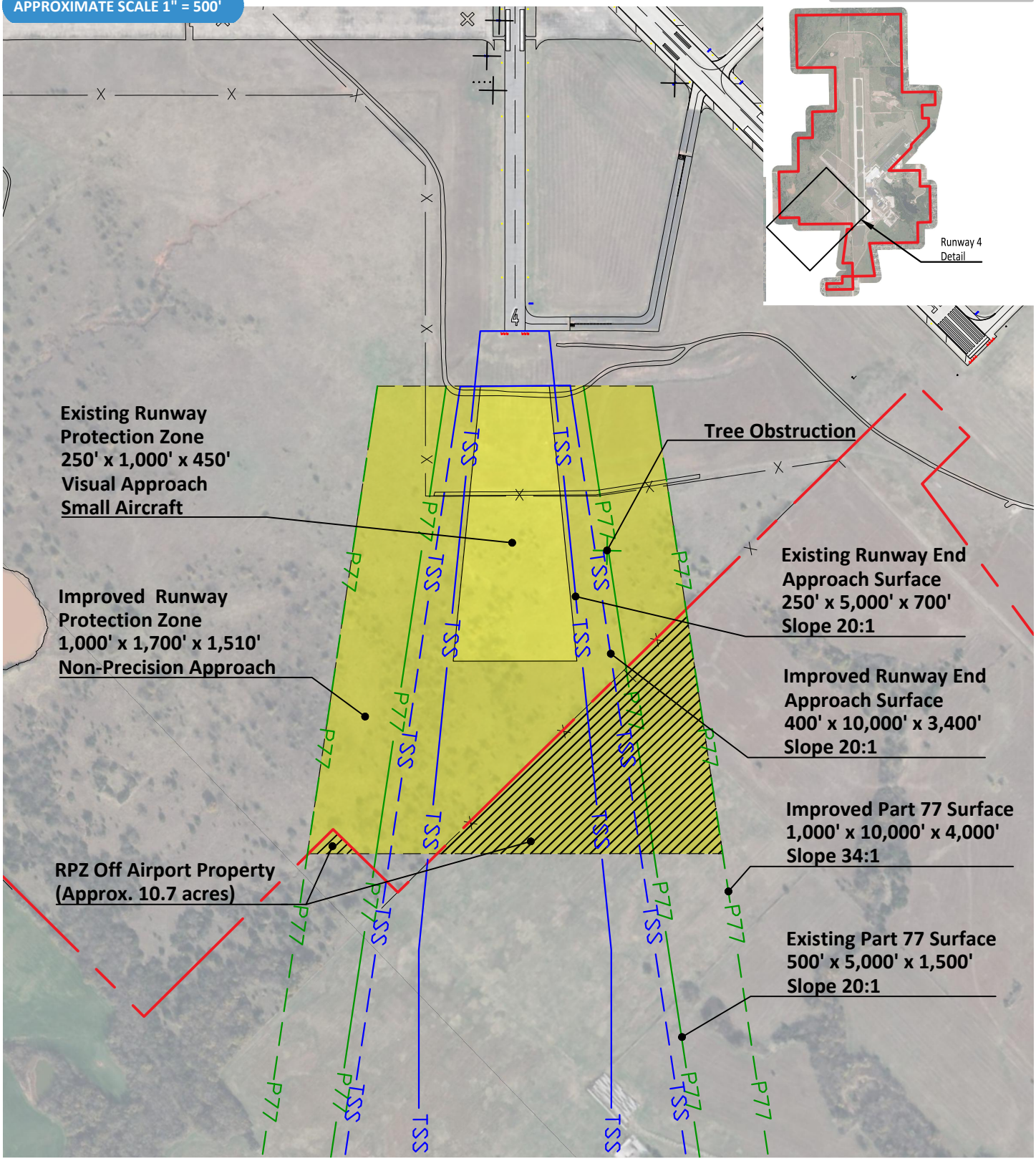


Figure D-2
Runway 4 IAP
Improvement Requirements

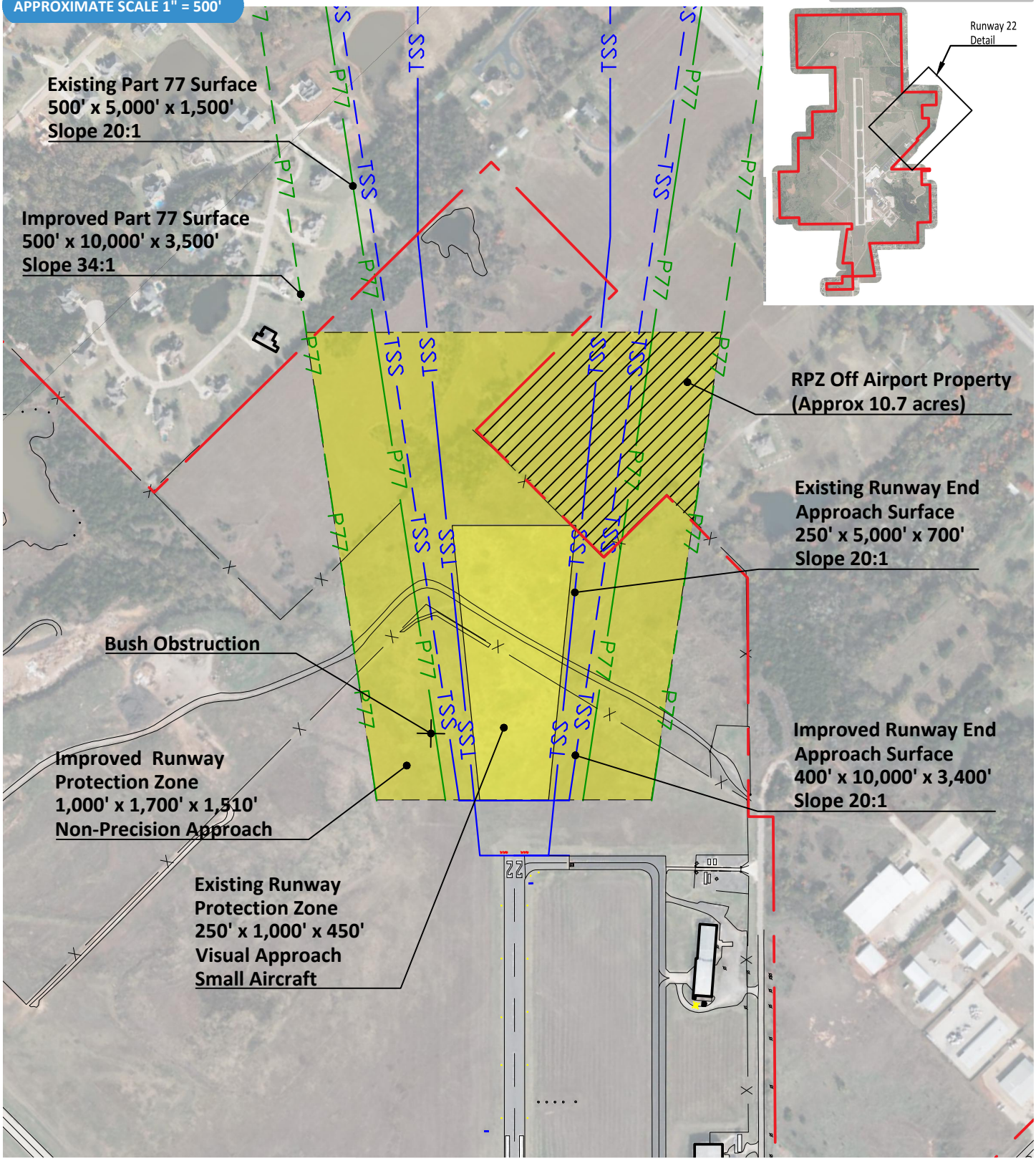


Figure D-3:
Runway 22 IAP
Improvement Requirements

Taxiway/Taxilane Design Standards

As presented in the previous chapter, Taxiway F1 nearly leads directly from the Hangar 1 Ramp to Runway 4/22, which could cause inadvertent runway incursions. Additionally, Taxiways F1 and B west of Runway 17/35 are not designed with the recommended right-angled taxiway geometry. The repositioning of Taxiway F northwest of the existing Taxiway F will provide a full-length taxiway parallel to Runway 22. The existing 530-foot separation of Taxiway F from the runway centerline will be reduced to 240 feet; this improvement has been on the existing ALP and is proposed to be continued.

Recommendation. When pavement age and conditions warrant, it is recommended to reconfigure Taxiway F1 to a right-angled intersection and located such that two 90-degree turns are required between the Hangar 1 Ramp and Runway 4/22. The realignment should also help alleviate some of the pilot confusion that occurs near the Taxiways A and F intersections with Runway 4/22. Taxiway B should also be reconfigured to a right-angled intersection perpendicular with Runway 17/35 when its pavement age and condition warrants reconstruction.

A taxiway renaming study and project is recommended to rename two of three separate taxiways that are currently designated Taxiway F.

When aeronautical development occurs on the west side of SWO, an ultimate parallel taxiway should be provided west of Runway 17/35. The location of this taxiway should be positioned outside the relocated glideslope antenna and its associated Critical Area (i.e., approximately 600 feet west of Runway 17/35, centerline to centerline). Additionally, the previous ALP presented a relocation of Taxiway F 290 feet to the northwest parallel to Runway 4/22. The relocated Taxiway F will be approximately 240 feet southeast of Runway 4/22, centerline to centerline. **Figure D-4** presents the ultimate layout of the taxiway system.

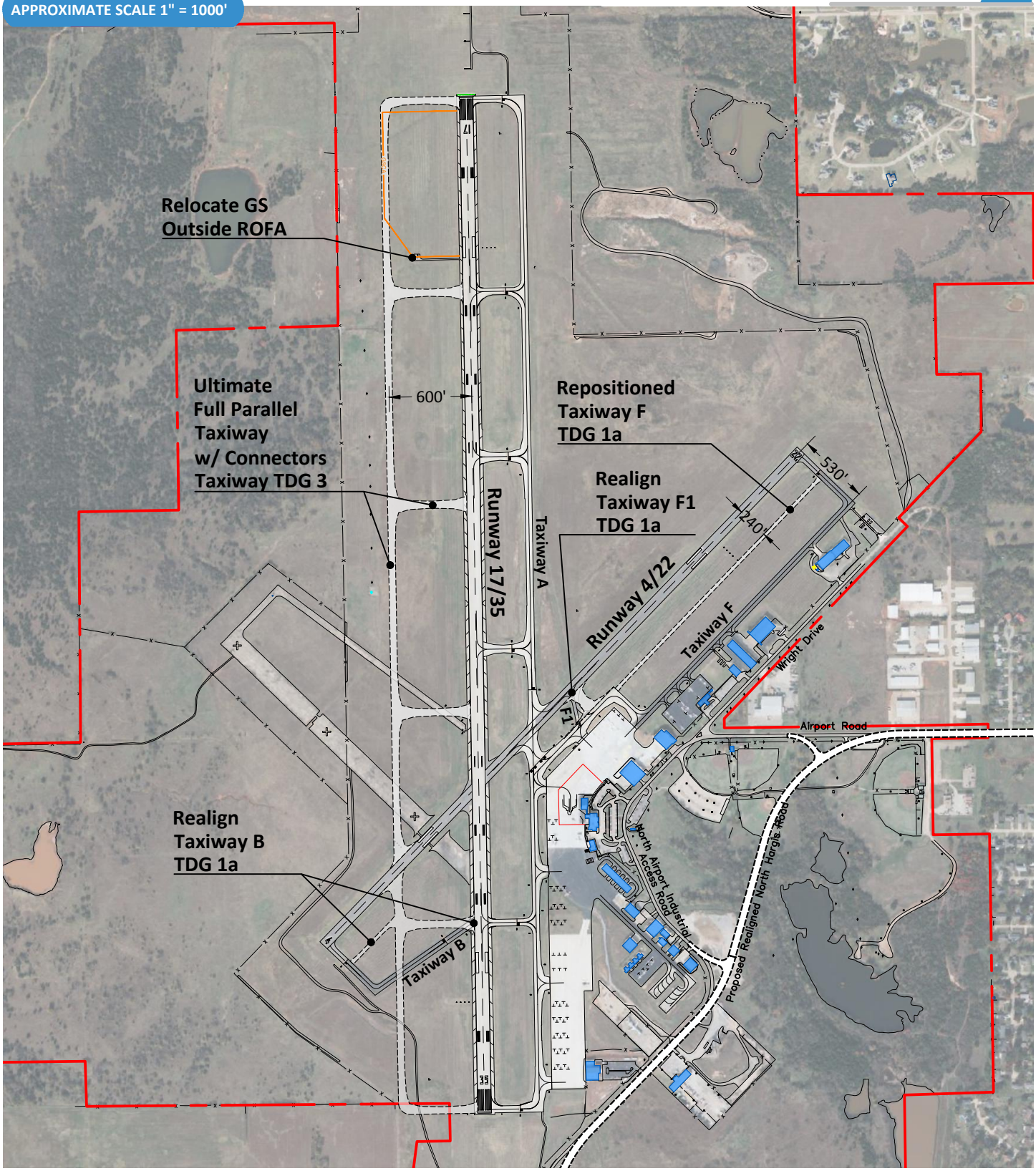


Figure D-4:
Ultimate Taxiway System

LANDSIDE DEVELOPMENT CONCEPTS, ALTERNATIVES, AND RECOMMENDATIONS

With the framework of SWO's ultimate airside development identified, placement of needed landside facilities can now be analyzed. The overall objectives of the landside plan is to provide conceptual development locations for facilities that are conveniently located, accessible to the community, and accommodate the specific requirements of SWO's users.

Passenger Terminal Building

As previously presented in **Chapter B - Forecasts of Aviation Activity** and **Chapter C - Facility Requirements**, programming for the expansion (or replacement) of the existing passenger terminal building at SWO is a critical factor in formulating the Master Plan recommendations.

The most important consideration in making a passenger terminal siting recommendation is the location of existing infrastructure. Locating the passenger terminal improvements where they can be easily accessed by existing utilities (i.e., water, sanitary sewer, electricity, fiber, telecommunications, etc.) is important; however, the real driving influences are:

- Airside access to the existing runway, taxiway, and aircraft parking Terminal Ramp pavement.
- Landside access to the local and regional roadway system.

The existing passenger terminal building area on the east side of SWO has these infrastructure prerequisites, which makes it the logical choice for future passenger terminal improvements.

Siting considerations and other long-term planning and space reservation factors that are considered in the passenger terminal building alternatives evaluation should:

- Accommodate a single-story building consisting of 32,000 square feet.
- Accommodate a minimum of two gates/holdrooms.
- Accommodate a minimum of two airlines.
- Accommodate a minimum of two parking positions for aircraft as large as the Boeing 737-800 (although the ERJ 175 is the critical commercial service aircraft used for the terminal improvement calculations).
- Allow for the development of vehicle parking with an area large enough to accommodate the needed 315 total parking spaces, which includes short-term, long-term, employee, and rental cars.
- Minimize the conflicts between commercial service and GA functions.
- Consider the impacts of the passenger terminal building improvements on existing buildings and infrastructure in the terminal area (e.g., continuation of existing commercial service operations during construction, Group Hangar 1, ARFF Facility, and Fixed Base Operator (FBO) facilities).

- Maximize use of the existing Terminal Ramp pavement, including consideration of providing Passenger Boarding Bridges (PBB) and ensuring the provision of commercial service aircraft parking positions and on-apron aircraft taxilanes.

Although the future passenger terminal building footprint should be reserved at 32,000 square feet with adequate space for PBBs, the passenger terminal building may be phased. The provision of PBBs may also be phased.

Additionally, even though the planning assumptions considered a single-story building, the final decision will be left to the design phase of the passenger terminal architectural project scheduled to begin in the fall of 2022.

Passenger Terminal Area Plan – Concept 1

Concept 1 proposes the development of a new passenger terminal building northeast of the existing facility. The new terminal would be rotated 45 degrees clockwise from its current configuration and provides a northwest-southeast façade orientation that maximizes the utilization of the Terminal Ramp pavement. The existing passenger terminal building would remain operational during the construction of the new facility and would later be modified to serve an FBO/GA terminal facility role. Siting of the new passenger terminal would also require removal of Group Hangar 1 and the removal of the existing ATCT and replacement with a new facility to provide increased separation from the adjacent GA facilities. A new passenger terminal parking area would be constructed southeast of the new terminal building accessible via the new airport loop access roadway system. The airport loop road will connect to West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 1 are presented in **Figure D-5**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Minimizes impacts to existing commercial service operations during construction.
- Maximizes sight-line visibility and prominence of passenger terminal building.
- Maximizes separation between commercial service and GA functions.
- Maximizes utilization of new Terminal Ramp pavement.
- Maximizes redevelopment opportunities of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).
- Potential reduction of construction costs due to site separation from existing passenger terminal building.
- Maximizes phasing options for ATCT removal.

Disadvantages

- Requires removal or relocation of Group Hangar 1.
- Group Hangar 1 removal or relocation impacts existing airport revenue generating tenants.

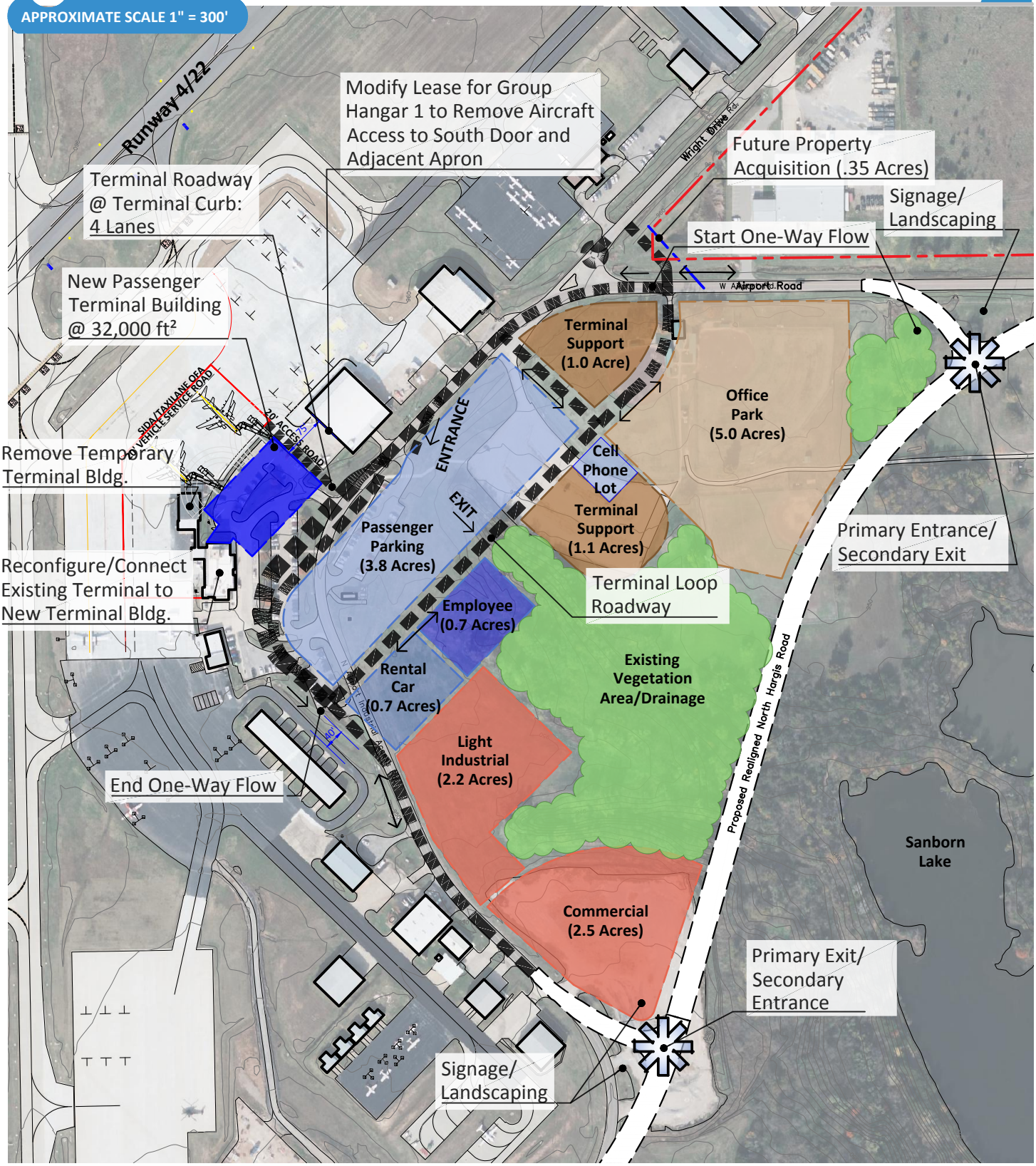


Figure D-6:
Terminal Area Plan - Concept 1A

Passenger Terminal Area Plan – Concept 1A

Like Concept 1, Concept 1A proposes the development of a new passenger terminal building northeast of the existing facility. Similarly, this terminal would also be rotated 45 degrees clockwise from its current configuration, providing a northwest-southeast orientation maximizing the utilization of the Terminal Ramp pavement. The existing passenger terminal building would remain operational during the construction of the new portion of the facility, and later be connected to the new terminal building. The existing terminal building would also be modified to serve as a component of the new passenger terminal as well as an FBO/GA terminal facility. Siting of this passenger terminal concept would also require relocation of the existing modular building of the current terminal and the removal of the existing ATCT. A new passenger terminal parking facility would be constructed southeast of the new terminal and would be accessible via the airport loop access roadway, West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 1A are presented in **Figure D-6**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Potentially minimizes impacts to existing commercial service operations during construction.
- Potentially minimizes construction costs from reusing portions of existing passenger terminal building.
- Improves separation between commercial service and GA functions.
- Improves utilization of new Terminal Ramp pavement.
- Facilitates redevelopment opportunities for portion of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).

Disadvantages

- Introduces construction phasing and operational complexities through integration of and connection to existing passenger terminal building.
- Provides fewer phasing options for ATCT removal compared to Concept 1.
- Improves, but does maximize, separation between commercial service and GA functions.
- Potentially accelerates phasing of ATCT removal.
- Minimizes site-line visibility and prominence of passenger terminal building compared to Concepts 1 and 2.

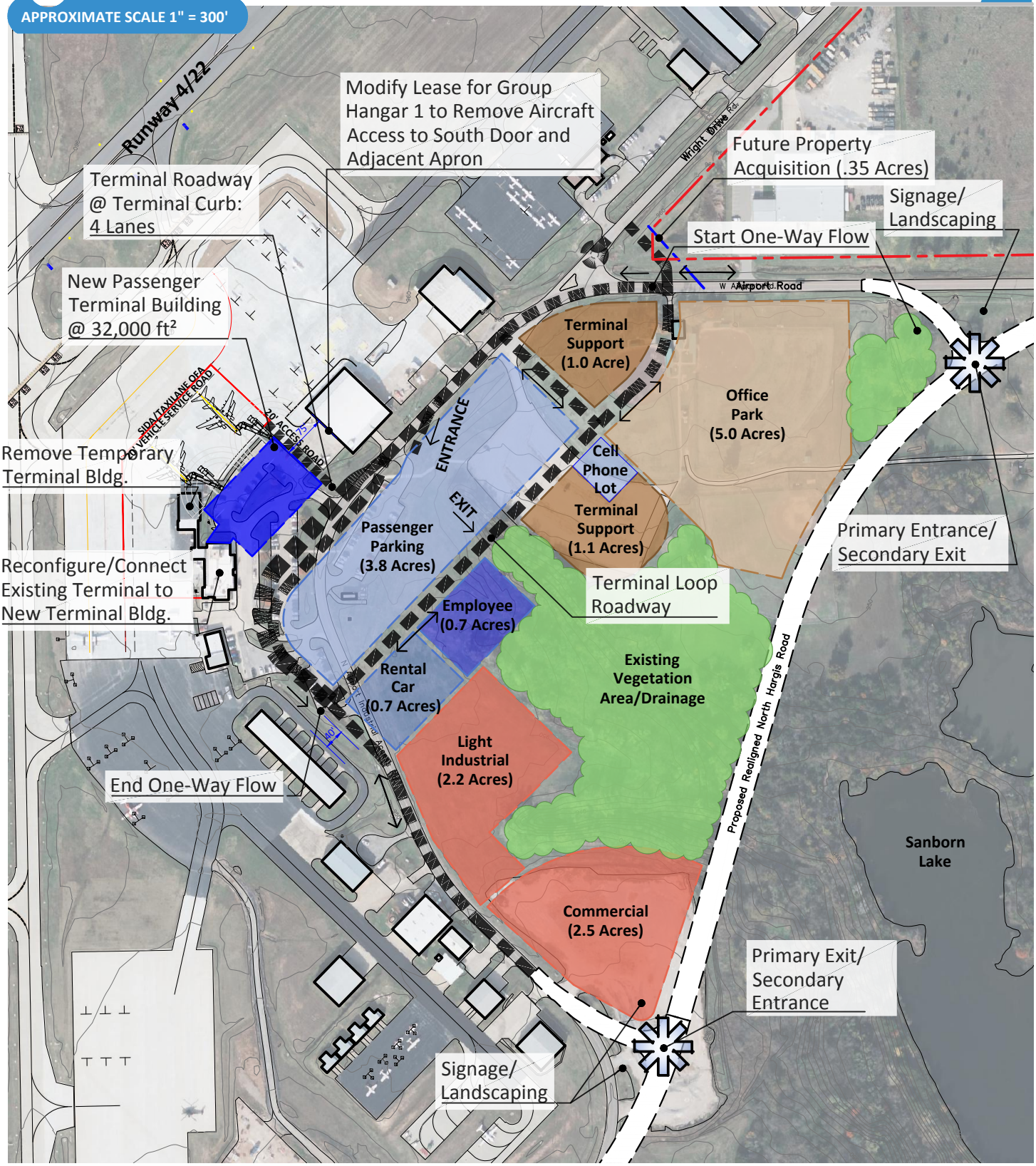


Figure D-6:
Terminal Area Plan - Concept 1A

Passenger Terminal Area Plan – Concept 2

Concept 2 proposes the development of a new passenger terminal building directly east of the existing facility while maintaining the existing east-west facing orientation. The existing passenger terminal building would remain operational during the construction of the new facility and later be removed (including the modular terminal building and ATCT) to accommodate a connection of the terminal apron. Siting of the new passenger terminal building will also require the relocation of the existing ARFF facility. A passenger terminal parking facility serving passenger autos, rental cars, and employees would be constructed east of the new terminal. As with Concepts 1 and 1A, the new parking facilities would be accessible via the airport loop access roadway and its connection to West Airport Road, North Airport Industrial Access Road, and the proposed realigned North Hargis Road.

Key elements and design considerations of Concept 2 are presented in **Figure D-7**. The relative advantages and disadvantages of this concept are outlined below.

Advantages

- Improves sight-line visibility and prominence of passenger terminal building compared to Concept 1A.
- Improves separation between commercial service and GA functions.
- Improves utilization of new Terminal Ramp pavement.
- Facilitates conversion or redevelopment opportunities for Group Hangar 1 for FBO and/or GA terminal uses.

Disadvantages

- Maximizes impacts to existing commercial service operations during construction.
- Potentially increases construction costs due to minimal site separation from existing passenger terminal building.
- Prohibits potential redevelopment opportunities of existing passenger terminal building (e.g., for FBO and/or GA terminal uses).
- Reduces phasing and scheduling options for ATCT removal.
- Requires relocation of existing Group Hangar 1 tenants for reusing or repurposing as FBO/GA terminal.

Recommendation

Passenger Terminal Area Plan Concept 1 is preferred for many reasons. It minimizes impacts to the existing commercial service operations of the existing passenger terminal building during construction, which potentially reduces construction costs. It creates several varied phasing options for the ATCT removal and maximizes separation of the commercial service functions from the GA functions. When construction of the new passenger terminal building is complete, Concept 1 allows the entire existing terminal building to be repurposed into an FBO/GA terminal. It also maximizes the site-line visibility and prominence of the passenger terminal building.

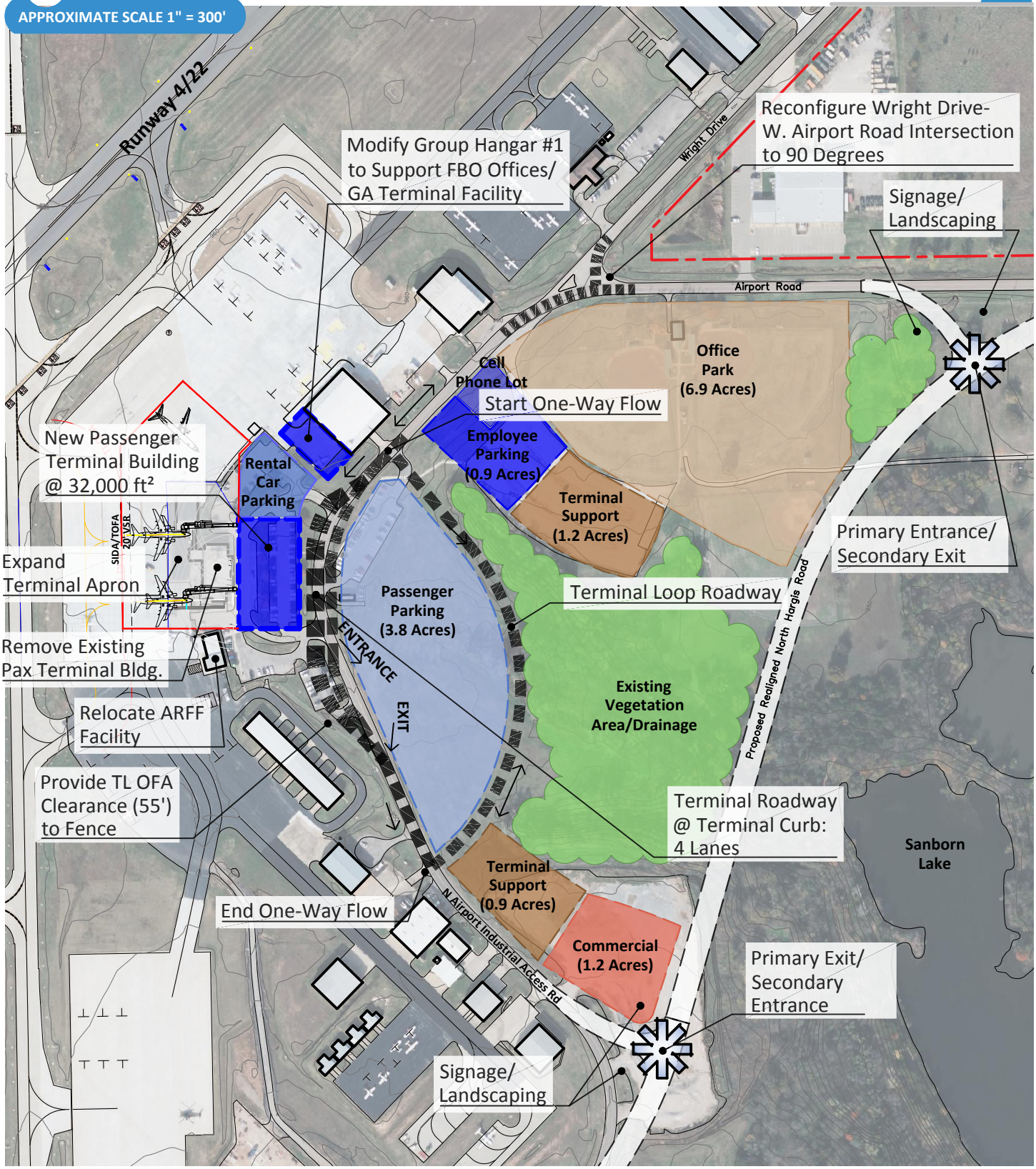


Figure D-7:
Terminal Area Plan - Concept 2

Terminal Area Landside Development

The terminal area landside development analysis focuses on the property directly east of the existing terminal building, between the proposed terminal building improvement options and the proposed realigned North Hargis Road. Landside facility improvements are evaluated on properties not needed to support the passenger terminal functions either directly or indirectly (e.g., vehicle parking facilities and roadway relocation or improvement). This section accounts for on-airport land uses, landside constraints and opportunities, and any physical and environmental constraints. An emphasis will be placed on potential revenue generation, existing and planned infrastructure, and vehicle access.

The alternatives reflect development on all appropriate developable sites. The alternatives all include similar increases in impervious surface, and the associated environmental impacts of the landside alternatives are likely to be very similar. The existing vegetation and drainage area, located roughly in the middle of the development site, remains largely intact and consistent within each development concept. The topography within this area makes development difficult and cost prohibitive. Retaining native vegetation, to the extent possible, benefits the natural environment and minimizes runoff and drainage into Sanborn Lake and other downstream detention facilities. Retention of the existing trees at the primary entrance/secondary exit provides an attractive backdrop for the proposed entrance monumentation signage.

Each passenger terminal building alternative previously presented, Concepts 1, 1A, and 2, has two landside development concepts prepared and presented here.

Terminal Area Landside Alternative – Concept 1-01

Terminal Area Landside Alternative - Concept 1-01, associated with Passenger Terminal Area Plan – Concept 1, proposes the reservation of space for future terminal parking expansion at the southwest end of the passenger parking lot. In the northeast area of Concept 1-01, multi-story office buildings providing a total of 100,000 square feet of space and the required parking are located just beyond the primary entrance/ secondary exit of the terminal area. The development of office buildings would provide a professional, welcoming experience for airport visitors.

In the south portion of the development area just beyond the terminal parking expansion reserve, a 17,000-square foot light industrial facility is proposed. Additionally, a multi-unit, 25,000-square foot commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. These uses can generate revenue for SWO while enhancing the overall visitor experience and surrounding community amenities.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1-01 are presented in **Figure D-8**.

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APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-8:
Terminal Area Landside Development Alternative - Concept 1-01

Terminal Area Landside Alternative – Concept 1-02

Terminal Area Landside Alternative - Concept 1-02, likewise associated with Passenger Terminal Area Plan – Concept 1, also proposes the reservation of space for future terminal parking expansion at the southwest end of the passenger parking lot. The multi-story office building development for this concept, providing approximately 80,000 square feet of space, is situated farther to the southwest when compared to Concept 1-01, adjacent the retained native vegetation and drainage area. Parking lots for the office buildings are located next to the buildings, which allows for a more attractive open landscape of native trees and prairie vegetation at the primary entrance/secondary exit. This also maximizes site lines to the proposed passenger terminal building as airport visitors enter and approach the terminal area.

In the south portion of the development area just beyond the terminal parking expansion reserve, a light industrial facility is proposed similar to Concept 1-01. However, this facility is slightly reoriented, and the parking lots are sited differently on the parcel. A smaller multi-unit commercial facility, that is also reoriented, and parking lots redesigned for the site are located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road.

Concept 1-02 also proposes the cell phone lot be located east of the proposed realigned North Hargis Road, near the primary entrance/secondary exit. This could be a shared use parking lot that also serves Sanborn Lake Park. Park improvements such as a shelter could be accommodated by this parking lot while also providing parking for airport visitors waiting to pick up arriving passengers.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1-02 are presented in **Figure D-9**.

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-9:
Terminal Area Landside Development Alternative - Concept 1-02

Terminal Area Landside Alternative – Concept 1A-01

Terminal Area Landside Alternative - Concept 1A-01, associated with Passenger Terminal Area Plan – Concept 1A, proposes the reservation of space for terminal parking expansion at the southeastern end of the passenger parking lot. A cell phone lot is also proposed in this area. The multi-story office building development for this concept is located just beyond the primary entrance/secondary exit of the terminal area. Similar to Concept 1-01, the development of approximately 100,000 square feet of office space would provide a professional and welcoming experience for airport visitors. Parking lots for the office buildings are located next to the buildings with a slightly different configuration compared to other concepts.

Two 20,000-square foot light industrial buildings are located on the west side of the development area, configured with loading access between the buildings. Like the previous concepts, multi-unit commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. However, Concept 1A-01 provides a unique orientation and configuration compared to the previous concepts. Subdivision of the commercial space could be provided to accommodate various potential tenants.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1A-01 are presented in **Figure D-10**.

Terminal Area Landside Alternative – Concept 1A-02

Terminal Area Landside Alternative - Concept 1A-02, also associated with Passenger Terminal Area Plan – Concept 1A, likewise proposes the reservation of space for terminal parking expansion at the southeast end of the passenger parking lot. This concept proposes two multi-story office buildings providing approximately 80,000 square feet of space, which are located just beyond the primary entrance/secondary exit of the terminal area. The parking lots designed for the office buildings are arranged in a quarter-circle west of the buildings, somewhat shielded from view of airport visitors as they approach the terminal area.

Two smaller light industrial buildings are located on the west side of the development area along the primary exit road. At the southwest corner of the site, near the primary exit/secondary entrance, there are commercial parcels that could be subdivided as needed to accommodate prospective tenants. Parking is located behind the buildings to provide architectural character along the proposed realigned North Hargis Road.

Across the proposed realigned North Hargis Road, a shared use parking lot is proposed that could serve as both the cell phone lot and as a trailhead for the nearby Sanborn Lake Park trails.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 1A-02 are presented in **Figure D-11**.

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-10:
Terminal Area Landside Development Alternative - Concept 1A-01

N

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-11:
Terminal Area Landside Development
Alternative - Concept 1A-02

Terminal Area Landside Alternative – Concept 2-01

Terminal Area Landside Alternative - Concept 2-01, associated with Passenger Terminal Area Plan – Concept 2, allocates the reservation of space for future terminal parking expansion at the southeastern end of the proposed passenger parking lot. With the proposed passenger terminal building located on the west side of the site, additional landside development area is available in the northeastern corner. Therefore, Concept 2-01 proposes three multi-story office buildings providing a total of 100,000 square feet of space located just beyond the primary entrance/secondary exit of the terminal area. The required parking is shown between the buildings, somewhat shielding it from airport visitors as they approach the terminal area.

Like the preceding concepts, commercial development is located near the primary exit/secondary entrance intersection with the proposed realigned North Hargis Road. Concept 2-01 shows a convenience store occupying this site, which would benefit the surrounding community, provide revenue to SWO, and provide fuel for drivers returning their rental cars.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 2-01 are presented in **Figure D-12**.

Terminal Area Landside Alternative – Concept 2-02

Terminal Area Landside Alternative - Concept 2-02, likewise associated with Passenger Terminal Area Plan – Concept 2, also proposes the reservation of space for future terminal parking expansion at the southeastern end of the proposed passenger parking lot. This concept provides for commercial development in the northeast corner of the site along the primary entrance road. Providing approximately 16,000 square feet of space, it may be subdivided as needed to accommodate prospective tenants. Southwest of the commercial development, adjacent to the retained native vegetation and drainage area, multi-story office building development is shown providing approximately 80,000 square feet of space. Parking lots for the office buildings are located to the north, which provides separation from the commercial land uses and maximizes the sight lines to the proposed passenger terminal building.

In the southern portion of the site, additional office development is proposed. This three-story building provides an additional 60,000 square feet of space, and ample parking is provided between the building and the primary exit/secondary entrance road. The preserved native vegetation and drainage area is used as an amenity area for the office park development. The office buildings are positioned next to the existing trees to help surround the office users with nature. Trails through the existing vegetation area could connect office users to each building as well as to the public trails at Sanborn Lake Park.

Key elements and design considerations of Terminal Area Landside Alternative - Concept 2-02 are presented in **Figure D-13**.

N

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-12:
Terminal Area Landside Development Alternative - Concept 2-01

APPROXIMATE SCALE 1" = 250'

Source: The Olsson Studio.

Figure D-13:
Terminal Area Landside Development Alternative - Concept 2-02

Recommendation

The six concepts presented in the preceding section represent various landside development schemes for the terminal area. No concept is selected as the preferred development at this time. SWO can use the concepts as a marketing tool for potential developers as demand occurs and financial realties are more defined.

ATCT

As presented in the previous chapter, the existing ATCT is not sited to provide adequate line of sight (LOS) angle of incidence to Runway 17 and unobstructed views to all aircraft movement areas. Additionally, the location atop the terminal building does not meet sufficient safety guidelines of separation from non-secure vehicles and persons, is not structurally sustainable, and is not compliant with the Americans with Disabilities Act (ADA). The evaluation of four new ATCT alternative sites is presented below.

Alternative Location One

Alternative One is located approximately 1,285 feet west of the Runway 17/35 centerline and 3,625 feet south of Runway 17. With a primary view to the east, this location affords excellent visibility to all approach areas and runway ends. Based on an eye height elevation of 1,054 feet, which is approximately 95 feet above ground level (AGL), a LOS angle of incidence of 0.80 degrees is achieved to Runway 17. As presented on **Figure D-14**, all aircraft movement areas are afforded unobstructed views. Total tower height would be approximately 120 feet AGL with an approximate top elevation of 1,079 feet[1]. This alternative is below all FAR Part 77 obstruction surfaces.

Alternative Location Two

Alternative Two is located approximately 1,142 feet east of the Runway 17/35 centerline and 972 feet northwest of the Runway 4/22 centerline. With a primary view to the west, this location affords acceptable visibility to the approach areas and Runways 17, 35, and 4. The Runway 22 approach area would be behind the primary viewing direction toward Runway 17/35 but is not expected to create controller viewing issues. Based on an eye height elevation of 1,039 feet, which is approximately 60 feet AGL, a LOS angle of incidence of 0.81 degrees is achieved to Runway 17. As presented on **Figure D-15**, most of the primary aircraft movement areas provide unobstructed views except for the Southeast GA Taxilane, which is virtually 100 percent obscured from controller views. Additionally, portions of the south end of the existing Terminal Ramp and the north end of the University Flight Center Ramp South would also be obscured. However, with the expected removal of the portable building housing the TSA security screening checkpoint and secure holding room, and the existing ATCT atop the existing terminal building, some, but not all, of the obstruction areas would be alleviated. Total tower height would be approximately 85 feet AGL with an approximate top elevation of 1,064 feet. This alternative is below all FAR Part 77 obstruction surfaces.

[1] All tower heights estimated at 25 feet above controller eye elevation.

Alternative Location Three

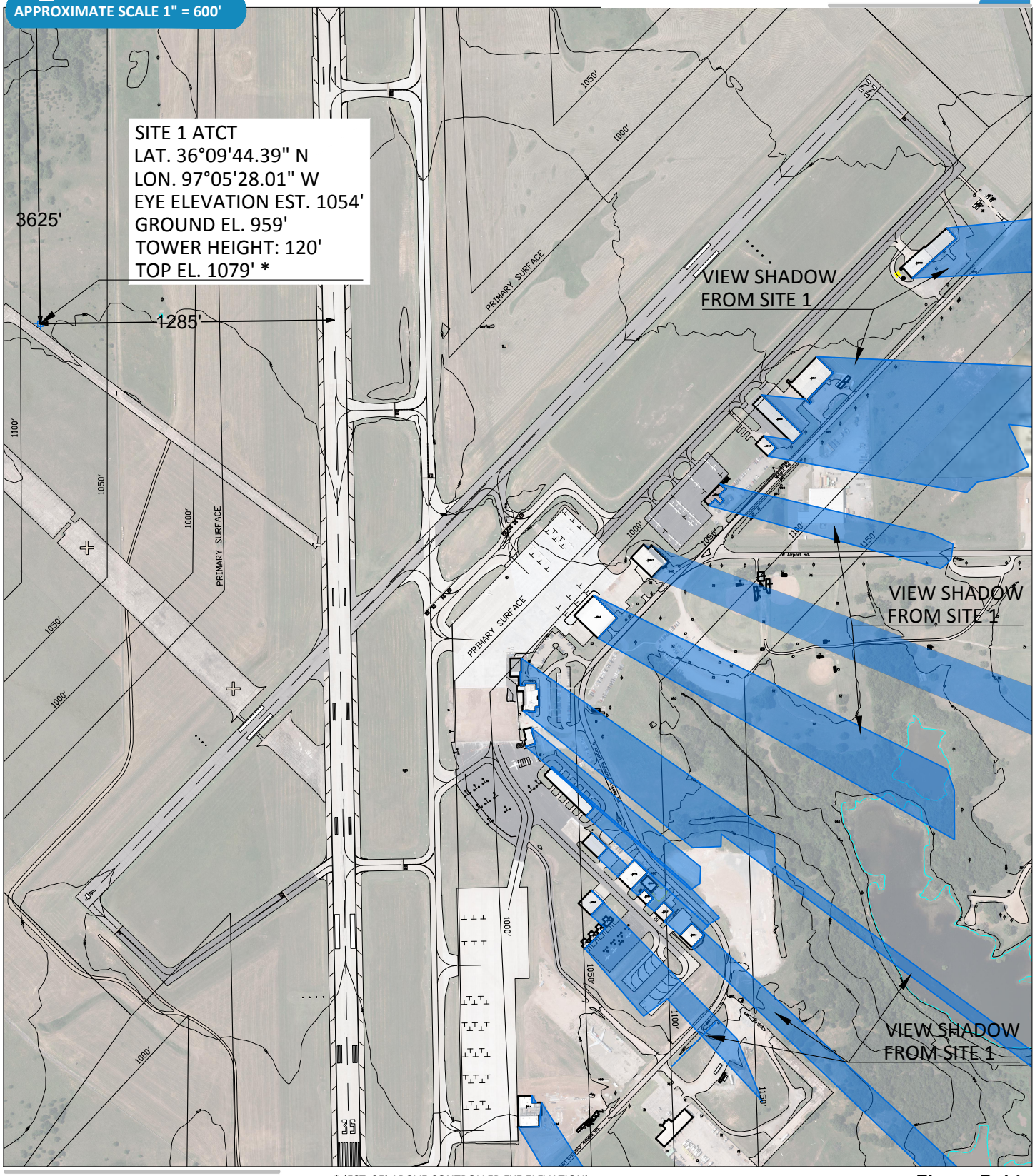
Alternative Three is located approximately 1,543 feet west of the Runway 17/35 centerline and 2,520 feet north of Runway 22. With a primary view to the east, this location affords excellent visibility to all approach areas and runway ends. Based on an eye height elevation of 1,072 feet, which is approximately 120 feet AGL, a LOS angle of incidence of 0.81 degrees is achieved to Runway 17. As presented on **Figure D-16**, all primary aircraft movement areas provide unobstructed views except for a portion of the southern end of the Southeast GA Taxilane. Total tower height would be approximately 145 feet AGL with an approximate top elevation of 1,097 feet. This alternative is below all FAR Part 77 obstruction surfaces.

Alternative Location Four

Alternative Four is located approximately 1,618 feet southwest of Runway 22 and 746 feet southeast of the Runway 4/22 centerline. With a primary view to the west, this location affords adequate visibility to the approach areas and Runways 17, 35, and 4. The Runway 22 approach area would be slightly behind the primary viewing direction toward Runway 17/35 but is not expected to create controller viewing issues. Based on an eye height elevation of 1,065 feet, which is approximately 100 feet AGL, a LOS angle of incidence of 0.80 degrees is achieved to Runway 17. As presented on **Figure D-17**, most primary aircraft movement areas provide unobstructed views except for parts of Taxiways A and B and the southern portion of the Terminal Ramp. With the expected removal of the portable building housing, the TSA security screening checkpoint, secure holding room, and the existing ATCT atop the terminal building, many of the obstructions would be alleviated. However, the existing terminal building would still obscure parts of the Terminal Ramp from the controller's eyesight. Total tower height would be approximately 125 feet AGL with an approximate top elevation of 1,090 feet. A taller tower would alleviate the obstructed views to the Terminal Ramp, but this alternative is above the existing FAR Part 77 obstruction surfaces; additional height will increase the amount of penetration.

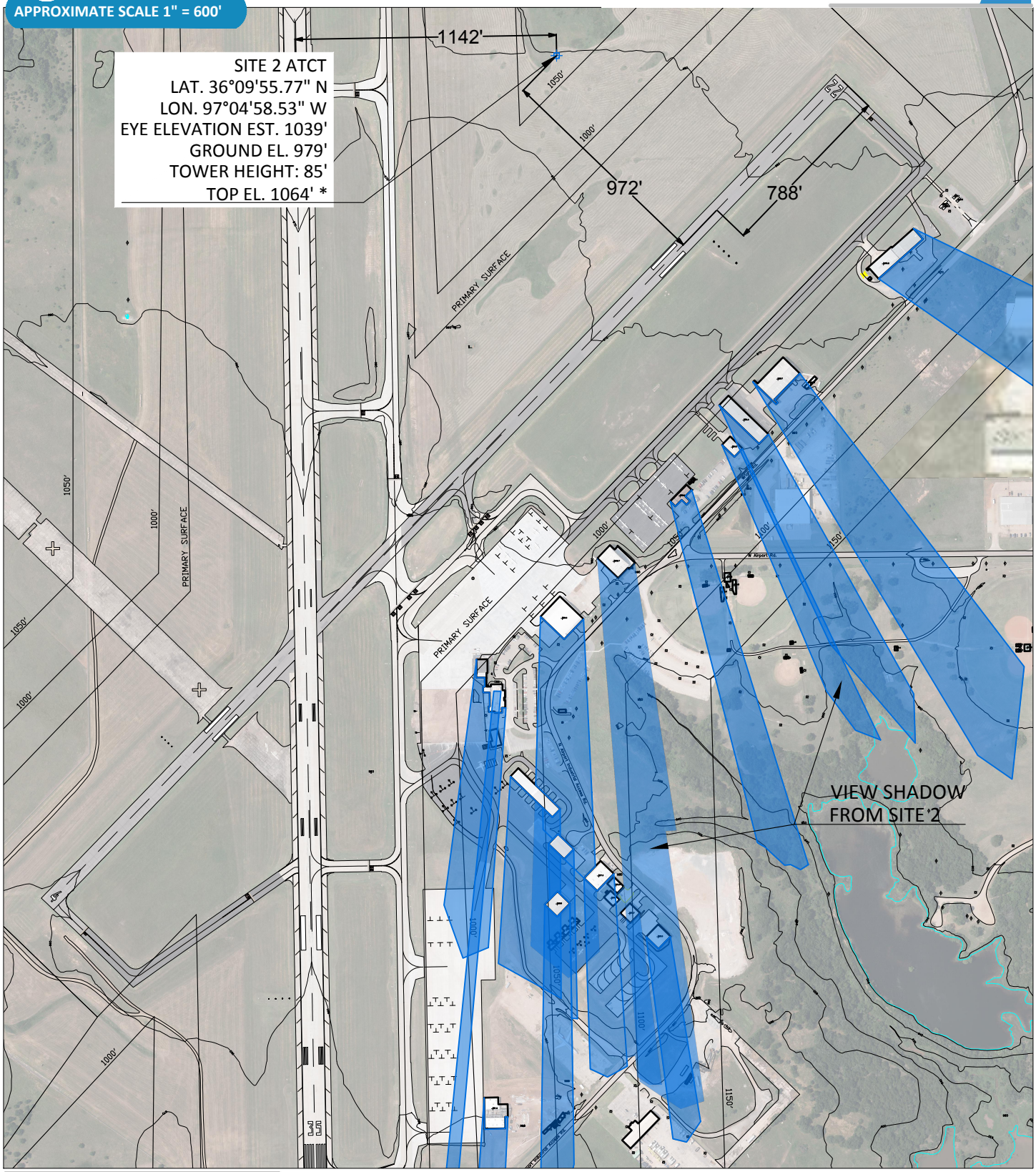
Recommendation

Alternative Location One is preferred because of its more central location of Runway 17/35, lower height, and better visibility to all approach areas, runway ends, and aircraft movement areas.



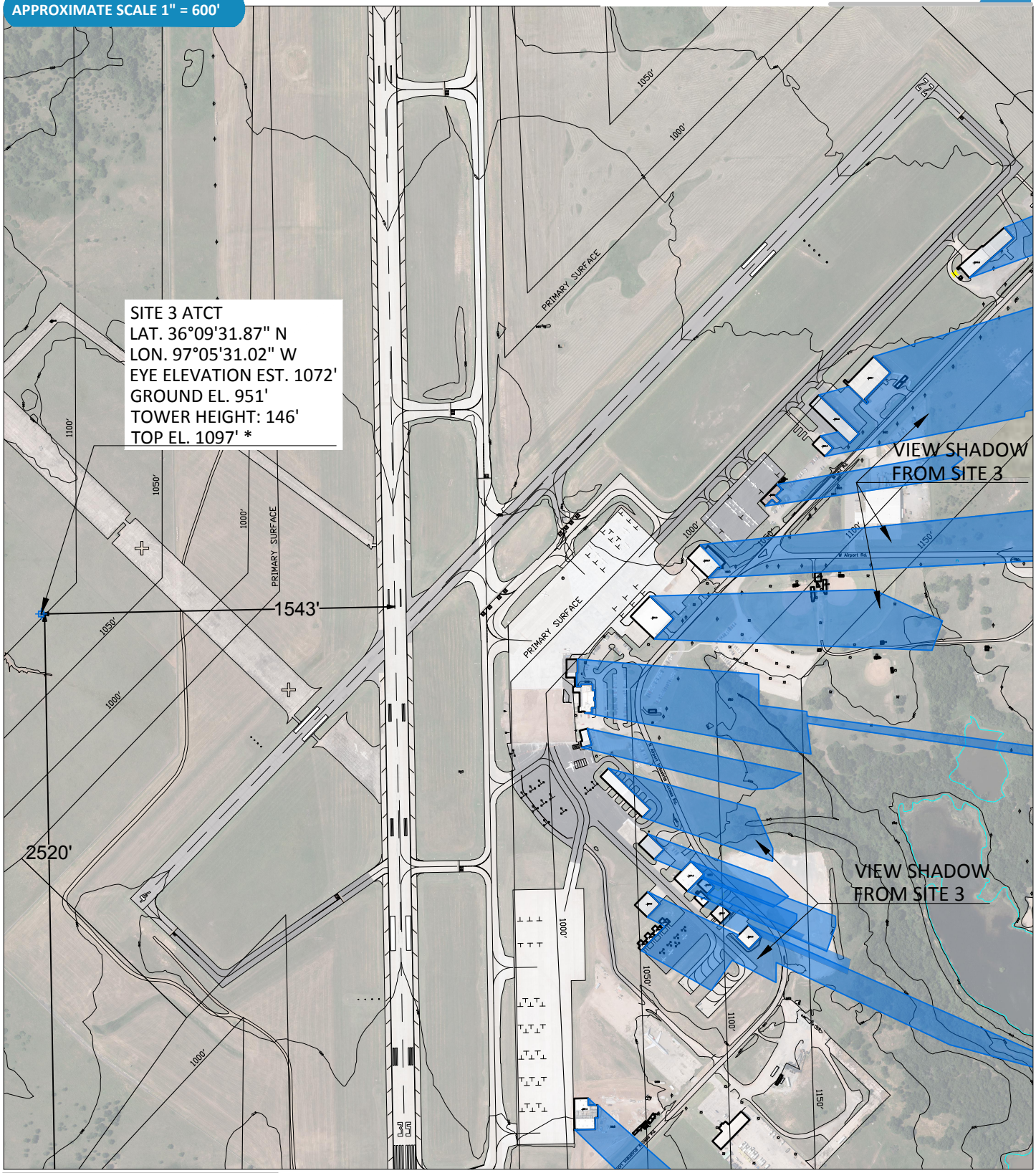
* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-14:
ATCT Alternative Location One Shadow Study



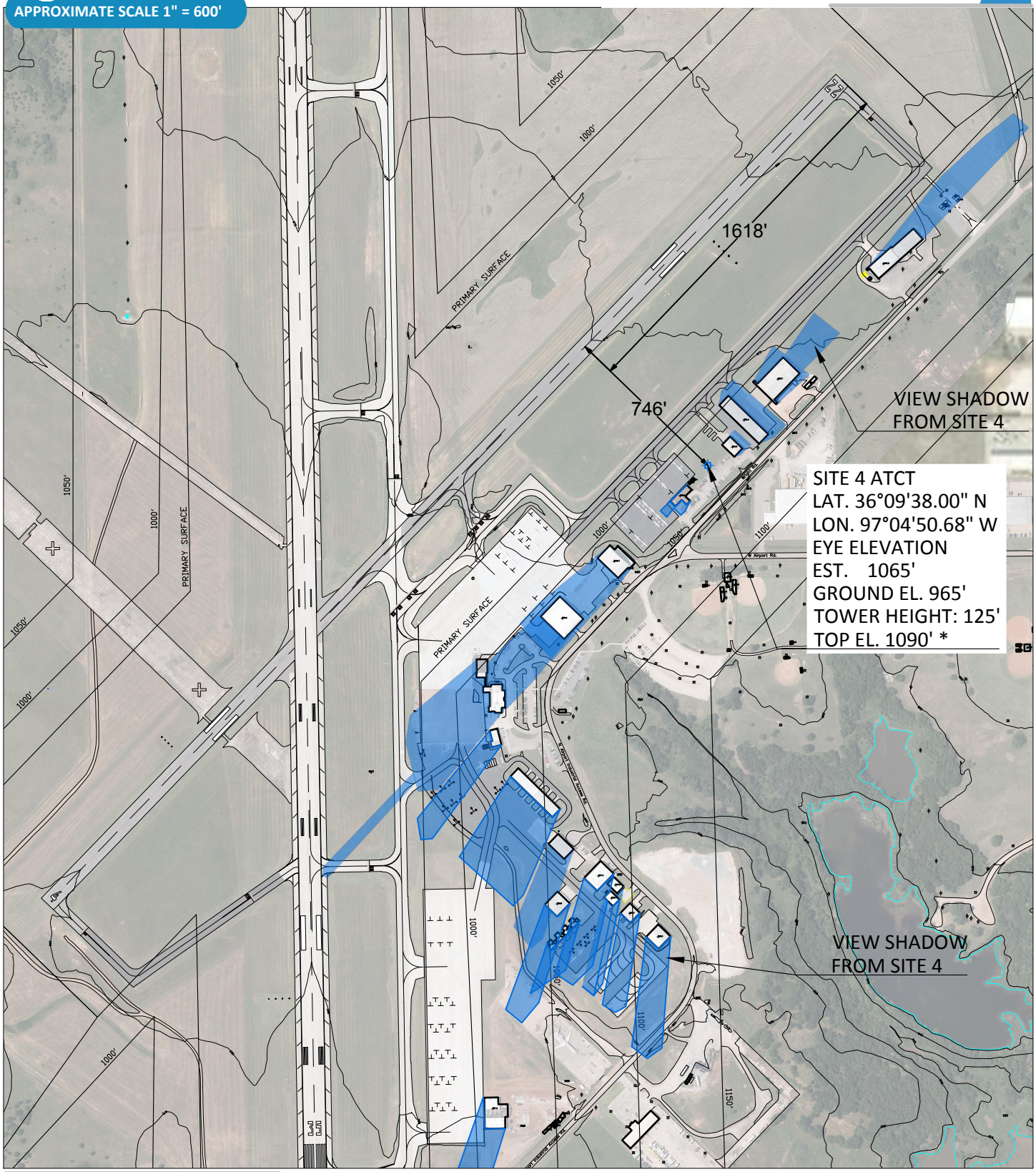
* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-15:
ATCT Alternative Location Two Shadow Study



* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-16:
ATCT Alternative Location Three Shadow Study



* (EST. 25' ABOVE CONTROLLER EYE ELEVATION)

Figure D-17:
ATCT Alternative Location Four Shadow Study

SWO Stillwater REGIONAL AIRPORT

ARFF Facility

As presented in the previous chapter, the existing ARFF Facility is not adequately sized to store both ARFF vehicles indoors, nor does it provide sufficient area for equipment and material storage. There is also generally insufficient space for ARFF related maintenance activities. With the redevelopment of the terminal area and the proposed reuse of the existing ARFF Facility for additional FBO facilities, alternative locations for a future ARFF facility meeting the siting requirements provided in FAA AC 150/5210-15A should be evaluated and a preferred site selected. Siting factors for an ARFF Facility are summarized below:

- One vehicle must be able to respond to the midpoint of the farthest runway serving air carrier aircraft within three minutes from the time an alarm sounds.
- Any other vehicles must respond within four minutes from the time an alarm sounds to the same point.
- Sites should provide immediate, unimpeded, and straight access to the airfield network with a minimum of turns.
- Direct access to the terminal apron that minimizes crossing of active runways.
- Provide maximum surveillance of the airfield.
- Minimize interference or obstruction from other airport uses such as fuel farms, access roads, and aircraft taxiing or parking areas.

There are four ARFF facility alternative locations presented in **Figure D-18** and the evaluation of each is outlined below.

Alternative Location One

This location is located near the north end of Taxiway A. Direct access to the airfield system can be provided via a connection to the north end of Taxiway A. Response times to the midpoint of Runway 17/35 within the prescribed period should be met from this location. Direct access to the Terminal Ramp is possible without crossing Runway 17/35. No additional airport uses are currently located at this location. This location does not maximize airfield surveillance when compared to Alternative Location Two. Joint use of the ARFF Facility and a City of Stillwater fire station is possible in this location, should SWO and the city choose to enter into a joint use agreement. Landside access can be provided through a road connection to East 580 Road.

Alternative Location Two

This location is located on the west side of SWO, west of Runway 17/35. Utilizing the access road and utilities installed for the preferred ATCT site would reduce the initial installation costs for this location. Airfield surveillance is maximized from this location, as are vehicle response times to the midpoint of Runway 17/35. However, Runway 17/35 would have to be crossed to access the Terminal Ramp. Airside access is less direct for this location compared to the other three alternatives, so an initial paved access road would need to be provided to Runway 17/35. This location also affords the opportunity for a joint ARFF Facility and City of Stillwater fire station.

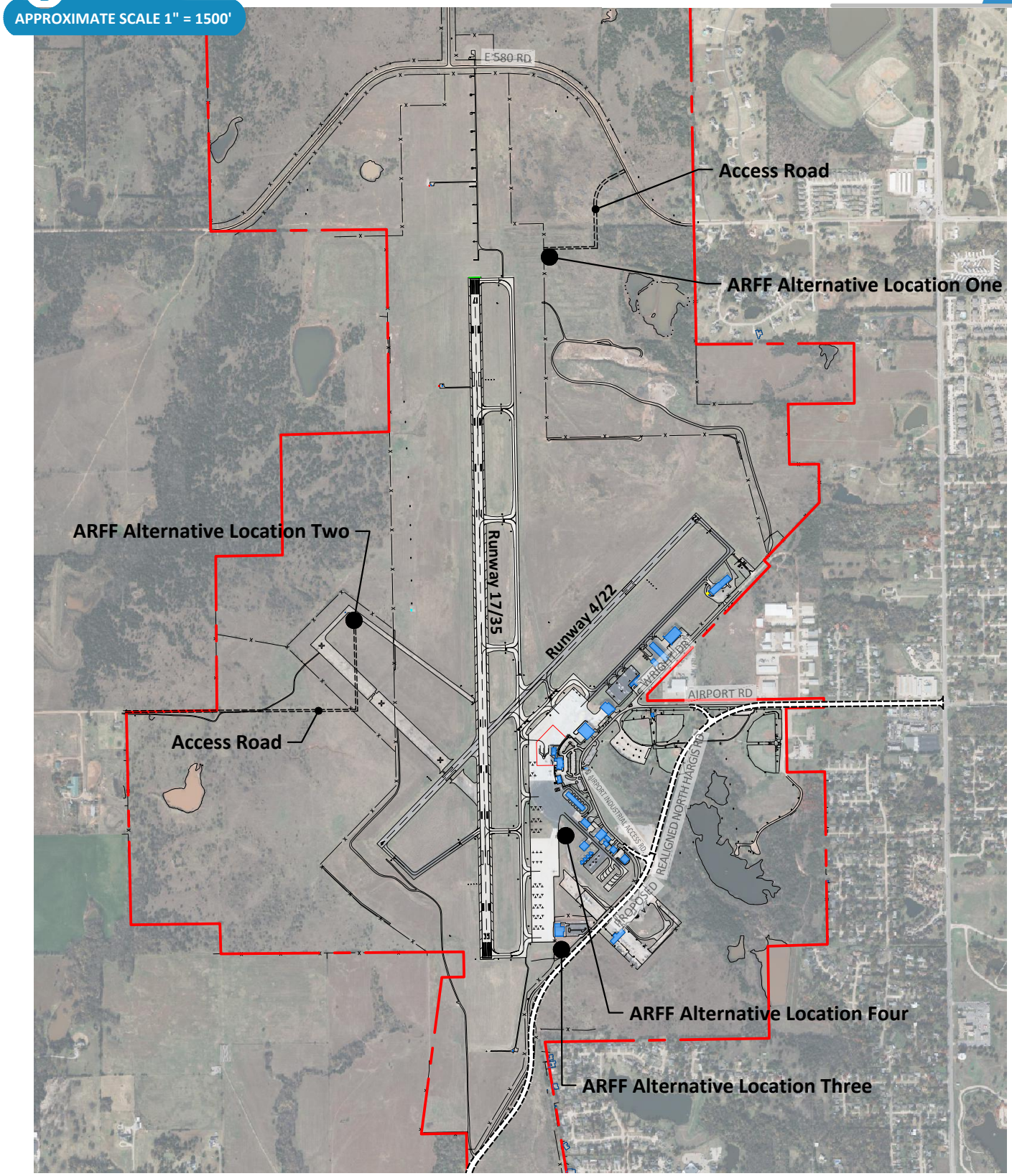


Figure D-18:
Airport Rescue and Fire Fighting Building Site Alternatives

Alternative Location Three

This location is at the south end of Taxiway A, south of the new OSU Flight Center. Currently, this site is the storm water detention facility for the OSU Flight Center facilities. Direct existing airside access is provided by Taxiway A1, thus response times to the midpoint of Runway 17/35 within the prescribed period should be met from this location. Direct access to the Terminal Ramp is provided without crossing Runway 17/35. The University Flight Center Ramp South is near this location, but the tie-down areas are north of Taxiway A1 and should not interfere with the ARFF vehicles responding to an emergency. Like Alternative Location One, this location does not maximize airfield surveillance when compared to Alternative Locations Two and Four. This location also affords the opportunity for a joint ARFF facility and City of Stillwater fire station through landside access directly via North Hargis Road.

Alternative Location Four

This location is at the south end of the Terminal Ramp, near the intersection of the Southeast GA Taxilane and the University Flight Center Ramp South. **Figure D-21**, which follows the South GA Area Alternative One analysis, provides more details about this site. It is centrally located, provides direct airside access via the Terminal Ramp, and response times to the midpoint of Runway 17/35 within the prescribed period would be met from this location. Aircraft tie-downs associated with both the University Flight Center Ramp South and the Terminal Ramp are close to this location, but these facilities should not interfere with ARFF vehicles responding to an emergency. Like Alternative Location Two, this location maximizes airfield surveillance when compared to Alternative Locations One and Three. Vehicle access can be provided by a new access route serving the future GA development in the area, but its location does not afford the opportunity for a joint ARFF Facility and City of Stillwater fire station.

Recommendation

Based on a central east side location providing excellent response times to the airfield and Terminal Ramp, Alternative Location Four is the preferred ARFF Facility location.

Snow Removal Equipment (SRE) and Airport Maintenance Facility

The previous chapter indicated that an ultimate SRE and Airport Maintenance Facility building totaling approximately 15,500 square feet is considered appropriate for SWO. Thus, alternative locations meeting siting factors outlined in FAA AC 150/5220-18A should be evaluated and a preferred site selected. Siting factors include:

- No interference with fire lanes used by the ARFF services and aircraft taxiing operations.
- Direct access to taxiways and runways without using airport perimeter roads to reduce wear and tear on equipment and prevent slow response times.
- Emphasis on the mitigation of runway incursions by eliminating the need for employee, private, and service vehicles to cross runways or taxiways to access the facility.

- Consideration of the effect on other existing facilities and avoidance of existing and future revenue-producing areas such as aprons and hangar areas.

There are six SRE and Airport Maintenance Facility alternative locations presented in **Figure D-19**, and the evaluation of each is outlined below.

Alternative Location One

This location is at the northeast end of Taxiway F, northeast of the existing fuel storage facility. Direct airside access is provided to Taxiway F and landside access through a connection to Wright Drive. Ample space is available for outdoor material storage and future expansion needs. This site is not anticipated to be developed for revenue-producing facilities because of its proximity to the fuel storage facility and distance from the airside facilities.

Alternative Location Two

This site is located near the north end of Taxiway A. If developed in conjunction with an ARFF facility, the site development costs could be reduced by combining utilities and vehicle access across two facilities. Near-direct airside access to Taxiway A is available and landside access can be provided by a road connection to East 580 Road.

Alternative Location Three

Located on the west side of SWO, this site can be developed in conjunction with the preferred future ATCT site and ARFF facility, thus benefitting from the utilities provided when the ATCT is constructed. Airside access is less direct than the other alternative locations, requiring an initial paved access road to Runway 17/35. Landside access can make use of the vehicle road provided for the ATCT.

Alternative Location Four

This location is at the south end of Taxiway A, south of the new OSU Flight Center. Currently, this site is the storm water detention facility for the OSU Flight Center facilities. Excellent direct airside access is provided via Taxiway A1 to Taxiway A, and landside access can be provided directly to North Hargis Road. The site's size prevents both an ARFF and SRE and Airport Maintenance Facility from being collocated in the same area, and it would only marginally accommodate a 15,500-square foot facility.

Alternative Location Five

This location is an expansion of existing facilities consisting of the current Airport Operations and Maintenance large group hangar, the plane wash bay, and the Administration Building. Constructing a facility that makes use of existing structures and reuse of space, to the extent practical provides a fiscally responsible alternative to a new stand-alone facility. With the proposed removal of Group Hangar 1 for terminal building development, a large group hangar is of increased need and demand. Continued Airport use of the existing Operation and Maintenance large group hangar prevents lease and associated revenue from this large group hangar.

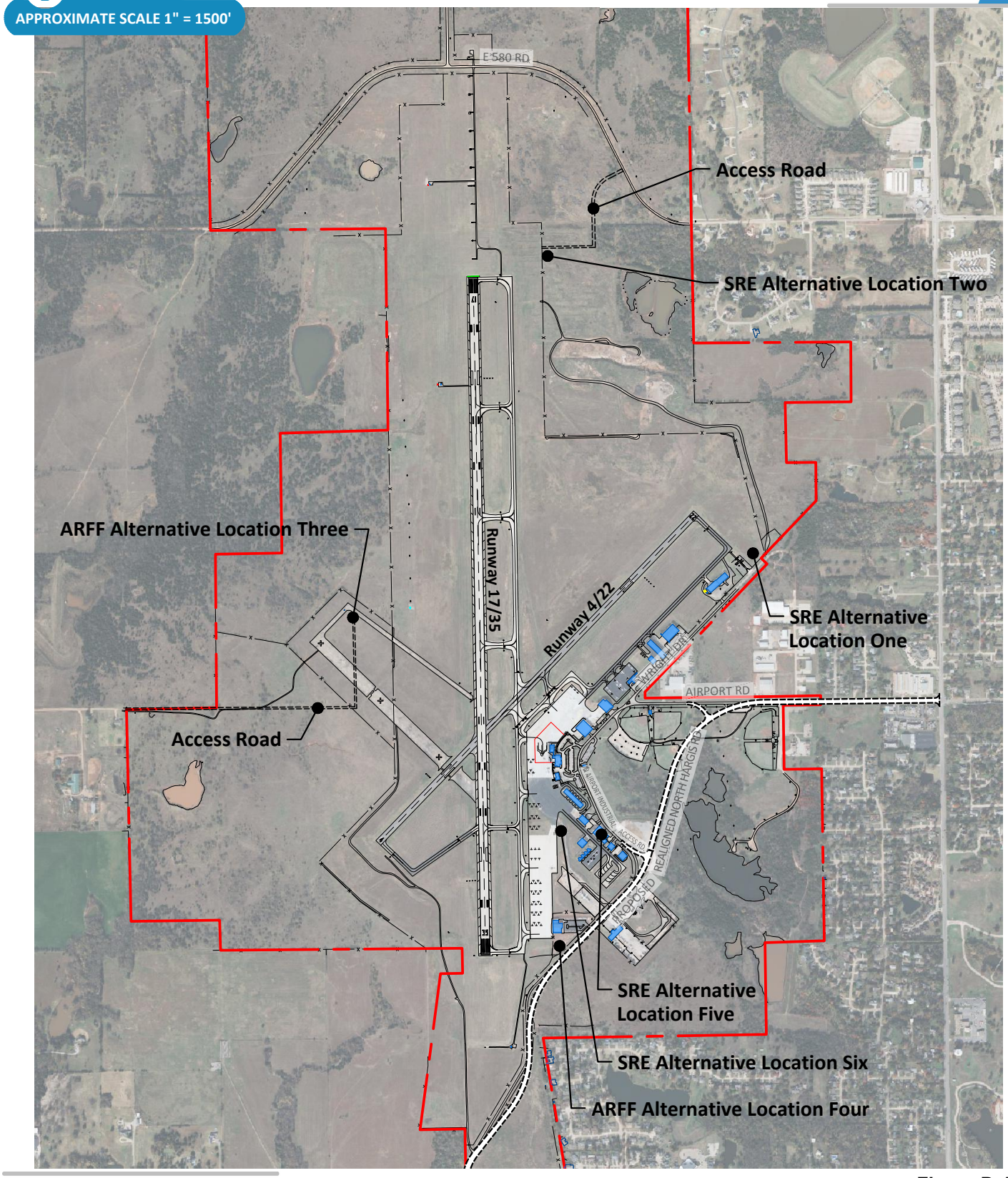


Figure D-19:
Snow Removal Equipment and Airport Maintenance Building Site Alternatives

Alternative Location Six

This location is co-located with the ARFF Alternative Location Four presented in the previous section, near the intersection of the Southeast GA Taxilane and the University Center Ramp South. Excellent direct airside access is provided via the Terminal Ramp to Taxiway A and is centrally located. Landside access can be provided by a new access route serving the future GA development in the area. Utilities are also readily available and accessible.

Recommendation

With the aforementioned recommendation of ARFF Alternative Location Four, the continuation of a centralized location for SRE, Airport Maintenance, and ARFF is most responsible. Therefore, Alternative Location Six, co-locating the SRE facility with the future ARFF location, is the preferred site.

General Aviation Facilities

As has been established in previous chapters, general aviation (GA) is a very diverse category of aviation uses considering aircraft size, technology and sophistication, mission of the organization operating the aircraft, and both airside and landside access requirements. GA as a category includes private aviation related to recreational flying, flight training, business transportation and storage, corporate aviation related to employee transportation and aircraft storage, and Fixed Base Operators (FBOs) or Specialized Aviation Service Operators (SASOs) providing aviation services. FBOs and SASOs may provide one or many services generally consisting of aircraft maintenance, aircraft charter and rental, aircraft storage, fuel sales, and aircraft manufacturing and/or refurbishment.

The diverse aviation use categories mentioned above will impact the appropriateness of a given location for specific GA uses. However, as in most cases, any given site can accommodate a variety of GA uses. The recommendations provided here attempt to identify the best types of facilities for a specific developable site. Ultimately, SWO must evaluate specific development proposals and make land use determinations based on the proposed site use efficiencies, striving to maximize the utilization of the available property in the most efficient and effective manner (i.e., the highest and best use of each property parcel), and for SWO's best business and financial practices.

With the configuration of the terminal building layout decided, alterative GA facilities can be considered and evaluated. SWO GA landside development is divided by the passenger terminal building into two separate areas: the northeast area and the south area. Conceptual level planning layouts are provided for these two areas in the following sections.

Northeast Area

The proposed GA layout in the northeast area of SWO assumes that Taxiway F will be relocated to the northwest by approximately 290 feet. When relocated, additional aviation development area is made available. However, because of the northeast area's proximity to Runway 4/22, the allowable height of any structures will be limited, so aircraft apron parking is the anticipated primary aviation use between existing

Taxiway F and the relocated Taxiway F, similar to the existing Hangar 1 Ramp. Additionally, as the timing of the taxiway relocation is unknown, most initial and intermediate period development will occur southeast of the existing Taxiway F.

A replacement location for the existing Group Hangar 1 to be built new is proposed at the northeastern edge of the old University Flight Center Ramp North. Relocation of this hangar is not feasible nor planned due to poor hangar condition, age, wear, and the prior master plan recommendation for removal or demolition. Ample space is available for a 10,000-square foot hangar and an adjoining 5,000-square foot office space. The vacated Flight Center building is proposed for demolition, providing development space for additional hangars or support facilities. Sufficient space for two electric aircraft charging stations is recommended at the south end of the apron.

Between the OSU Maintenance Hangar and the Rock Hangar, space is reserved for additional box hangars or T-hangars. An off-season storage building is currently proposed for construction between the fuel storage facility and the Rock Hangar. **Figure D-20** provides the layout of proposed GA facilities in this area.

South Area

Both South Area alternatives assume continued development of the OSU Flight Center facilities adjacent to the University Flight Center Ramp South. Minor variations to the existing layout are proposed. Additionally, development at the southeast end of the Southeast GA Taxilane reflects current plans for additional T-hangars, box hangars, and corporate hangars. A proposed airport road provides vehicle access from North Hargis Road along the northeast side of the MD-80 site.

South Area GA Alternative One

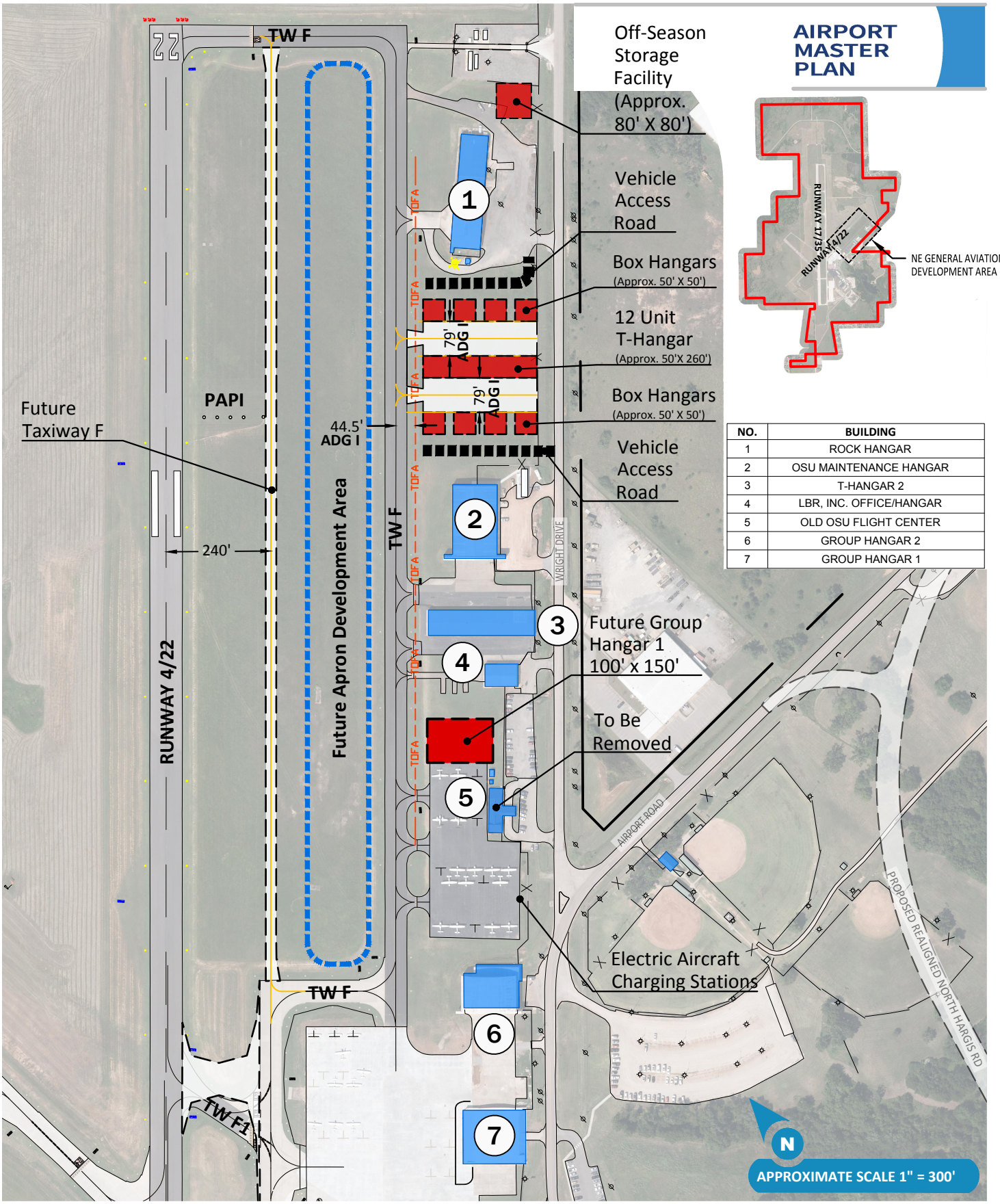
This alternative retains the two proposed OSU Maintenance Hangars north of the existing flight center. Aircraft parking apron is provided along the north ends of the hangars. The T-hangar layout remains unchanged.

Two corporate hangars are proposed north of the OSU T-hangars on the east edge of the University Flight Center Ramp South. Two additional corporate hangars are provided southwest of the Southeast GA Taxilane adjacent to the Simmons Hangar. An ARFF facility is proposed at the junction of the University Flight Center Ramp South and the Southeast GA Taxilane, as described above. **Figure D-21** shows the proposed South Area GA Development – Alternative One.

South Area GA Alternative Two

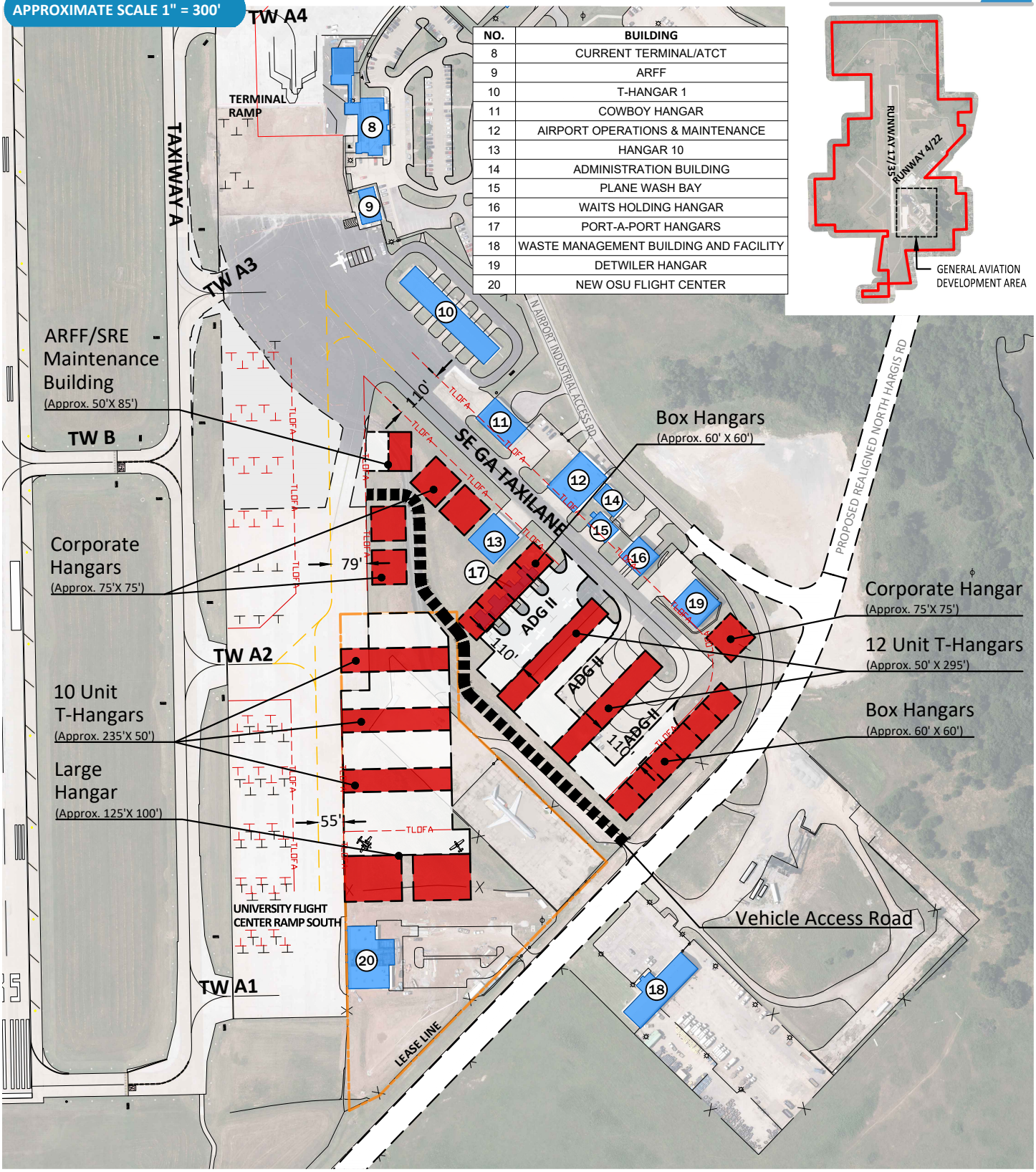
This alternative slightly modifies the current OSU Flight Center plans by proposing one maintenance hangar directly north of the existing flight center facility instead of two. Additional aircraft parking apron is proposed between the east edge of the University Flight Center Ramp South and the proposed Maintenance Hangar. The T-hangar layout remains unchanged.

Like Alternative One, this alternative proposes two corporate hangars north of the OSU T-hangars on the east edge of the University Flight Center Ramp South. One 10-unit T-hangar is proposed at the northwestern end



NO.	BUILDING
1	ROCK HANGAR
2	OSU MAINTENANCE HANGAR
3	T-HANGAR 2
4	LBR, INC. OFFICE/HANGAR
5	OLD OSU FLIGHT CENTER
6	GROUP HANGAR 2
7	GROUP HANGAR 1

Figure D-20:
Northeast Area General Aviation Proposed Development



NO.	BUILDING
8	CURRENT TERMINAL/ATCT
9	ARFF
10	T-HANGAR 1
11	COWBOY HANGAR
12	AIRPORT OPERATIONS & MAINTENANCE
13	HANGAR 10
14	ADMINISTRATION BUILDING
15	PLANE WASH BAY
16	WAITS HOLDING HANGAR
17	PORT-A-PORT HANGARS
18	WASTE MANAGEMENT BUILDING AND FACILITY
19	DETWILER HANGAR
20	NEW OSU FLIGHT CENTER

Figure D-21
South Area General Aviation Proposed Development - Alternative One

of the Southeast GA Taxilane. This alternative provides for an ARFF south of the existing OSU Flight Center. Provided with both excellent airside and landside access, this facility could be a joint use ARFF and city fire station facility, as described above. **Figure D-22** shows the proposed South GA Area Development – Alternative Two.

Recommendation

Alternative One is the preferred GA development concept for the south area.

Large Scale Aeronautical Development

As presented in the previous chapter, large scale aeronautical development should be reserved for such facilities as Unmanned Aerial System (UAS) research and development (R&D), aircraft Maintenance, Repair, and Overhaul (MRO), larger corporate aviation facilities, and aeronautical training and education industries. Two large areas on SWO property are reserved for this development:

- **Northeast Area** – East of Runway 17/35 and northwest of Runway 4/22.
- **West Area** – West of Runway 17//35 and northwest of Runway 4/22.

Northeast Area

The area east of Runway 17/35, consisting of approximately 60 acres, has excellent airside access via Taxiway A but is lacking in landside access and utilities. The current use is for a hay and pasture lease. This area should be reserved for development of corporate aviation facilities, utilizing the airside access provided by Taxiway A. Landside access can be provided via a connection to East 580 Road.

West Area

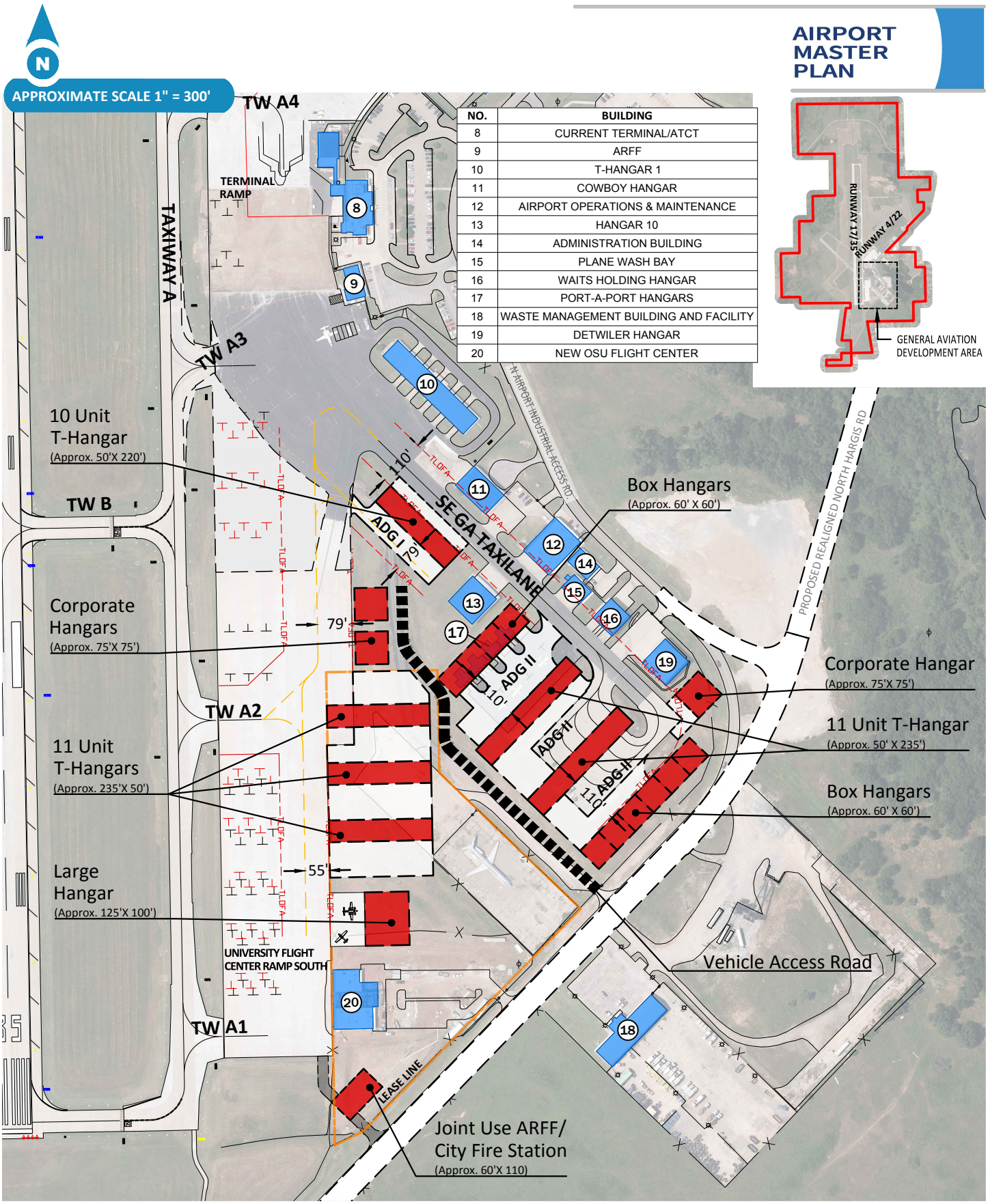
The west area, consisting of approximately 100 acres, is located west of Runway 17/35 and northwest of Runway 4/22. Currently, this area lacks both airside and landside access, is undeveloped, and leased for hay and pasture uses. It is recommended that this area be reserved for UAS R&D facilities, MRO hangars, and aeronautical training and education capabilities. Airside access can eventually be provided through a future parallel taxiway west of Runway 17/35 and northwest of Runway 4/22. Landside access can make use of the access road and utilities developed for the future ATCT.

Non-Aeronautical Development

There are three large areas of SWO property that are available for non-aeronautical development.

Southeast Area

This area is located southeast of the proposed realigned North Hargis Road. Current uses include Sanborn Lake Park, ballfields, and hiking trails in the eastern portion of the area. Hay and pasture lease comprise the southern and western portions. It is recommended that the recreation uses remain, acting as a buffer between airport facilities and the residential areas to the east. Trail head access improvements can be incorporated into the design of the proposed realign North Hargis Road. The hay and pasture leased land adjacent to



NO.	BUILDING
8	CURRENT TERMINAL/ATCT
9	ARFF
10	T-HANGAR 1
11	COWBOY HANGAR
12	AIRPORT OPERATIONS & MAINTENANCE
13	HANGAR 10
14	ADMINISTRATION BUILDING
15	PLANE WASH BAY
16	WAITS HOLDING HANGAR
17	PORT-A-PORT HANGARS
18	WASTE MANAGEMENT BUILDING AND FACILITY
19	DETWILER HANGAR
20	NEW OSU FLIGHT CENTER

Figure D-22
South Area General Aviation Proposed Development - Alternative Two

and southeast of the proposed realigned North Hargis Road (containing approximately 48 acres) is recommended for future light industrial, R&D facilities, city development, or cargo handling and sorting facilities as the demand materializes. Utilities to be provide along the proposed realigned North Hargis Road make this area valuable for short- and medium-term development. Zoning changes from Public to Industrial would be required, and it is recommended that a buffer remain between the existing residential development and any facilities recommended here.

North Area

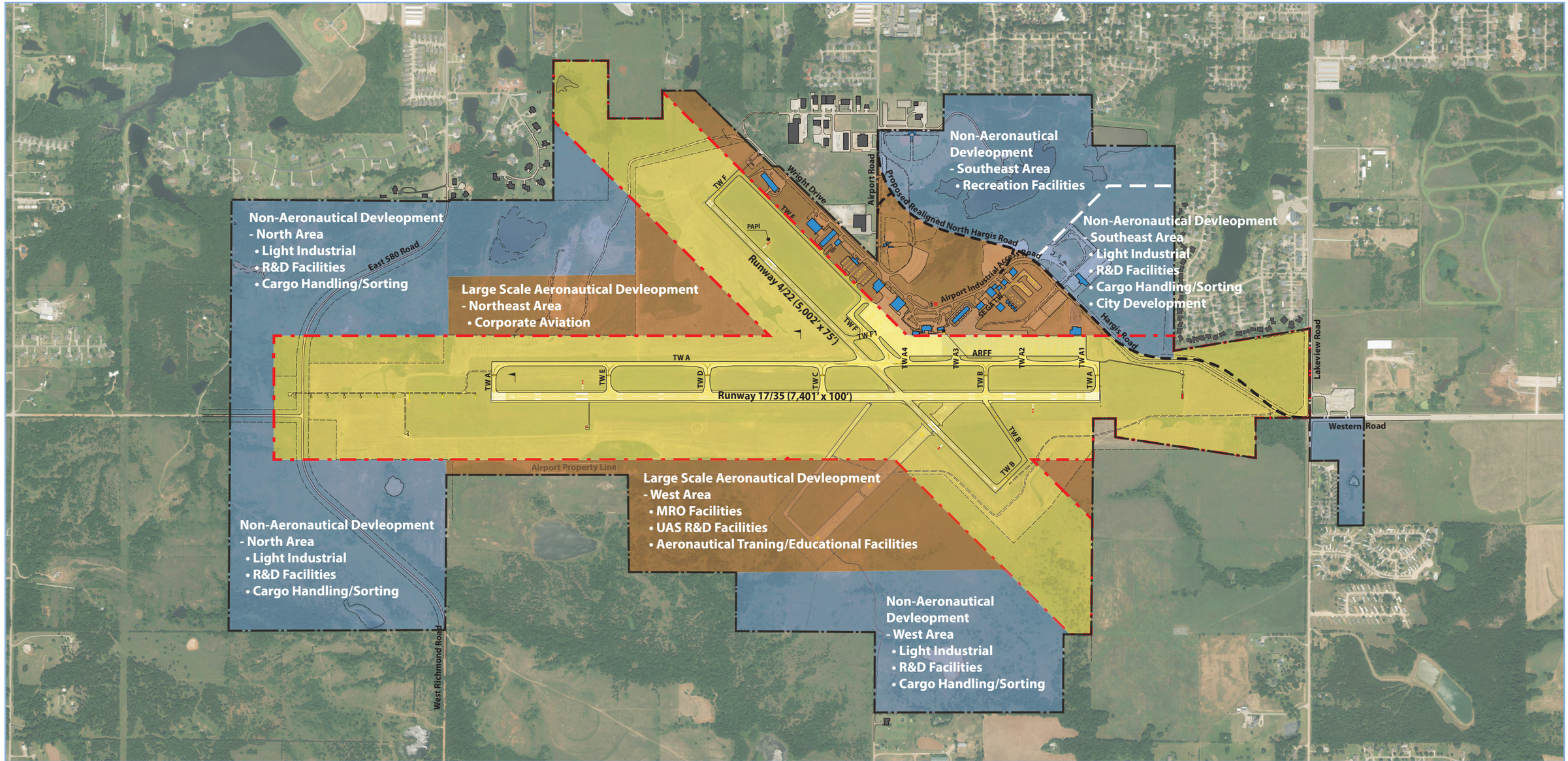
This area is in the far northern section of Airport property, both east and west of Runway 17/35 as well as north and south of East 580 Road. Consisting of approximately 260 acres, the area is currently undeveloped and leased for hay and pasture. Like the southeast area, it is recommended that the hay and pasture leases continue until such time as light industrial, R&D facilities, or cargo handling and sorting facilities demand is realized. Adequate utilities are presently lacking, so improvements are anticipated for future development. Zoning changes from Public to Industrial would also be required.

West Area

The area in the western part of Airport property, west of the proposed large-scale aeronautical development, is recommended for reservation of non-aeronautical development. Consisting of approximately 100 acres, this area is currently undeveloped and leased for hay and pasture. Like the other areas, it is recommended that the hay and pasture leases continue until such time as light industrial, R&D facilities, or cargo handling and sorting facilities demand is realized. Also like the other areas, adequate utilities are presently lacking and improvements are anticipated for future development. Zoning changes from Public to Industrial would similarly be required.

Figure D-23 presents the large scale aeronautical and non-aeronautical development areas within SWO property.

N SCALE 1" = 1,200'



LEGEND

- Airport Property Line
- Building Restriction Line
- Airfield Reserve
- Developable Area - Airside
- Developable Area - Landside Only

Stillwater REGIONAL AIRPORT

Figure D-23:
Large Scale Aeronautical and Non-Aeronautical Development

SUMMARY

The main goals for this chapter are to identify airport improvements that accommodate existing and future demand safely and efficiently, and to develop SWO in a financially feasible and environmentally sustainable manner as demand is realized. The alternative evaluation and selection are based on input and comments provided by airport users and key airport and community stakeholders.

Utilizing the recommended components of SWO's airside and landside development areas results in the Conceptual Development Plan presented in **Figure D-24**. The plan presents SWO with a comprehensive development scheme accommodating a wide range of aviation user groups and operational activities. As with any airport planning decision, the ultimate build-out of the various aviation and aviation-compatible development areas will be demand driven, and the depicted development far exceeds that which is projected during the 20-year planning period. The Conceptual Development Plan will be carried forward to the Capital Improvement Plan (CIP) and will be used for the preparation of the ALP set representing the ultimate long-term airport configuration.

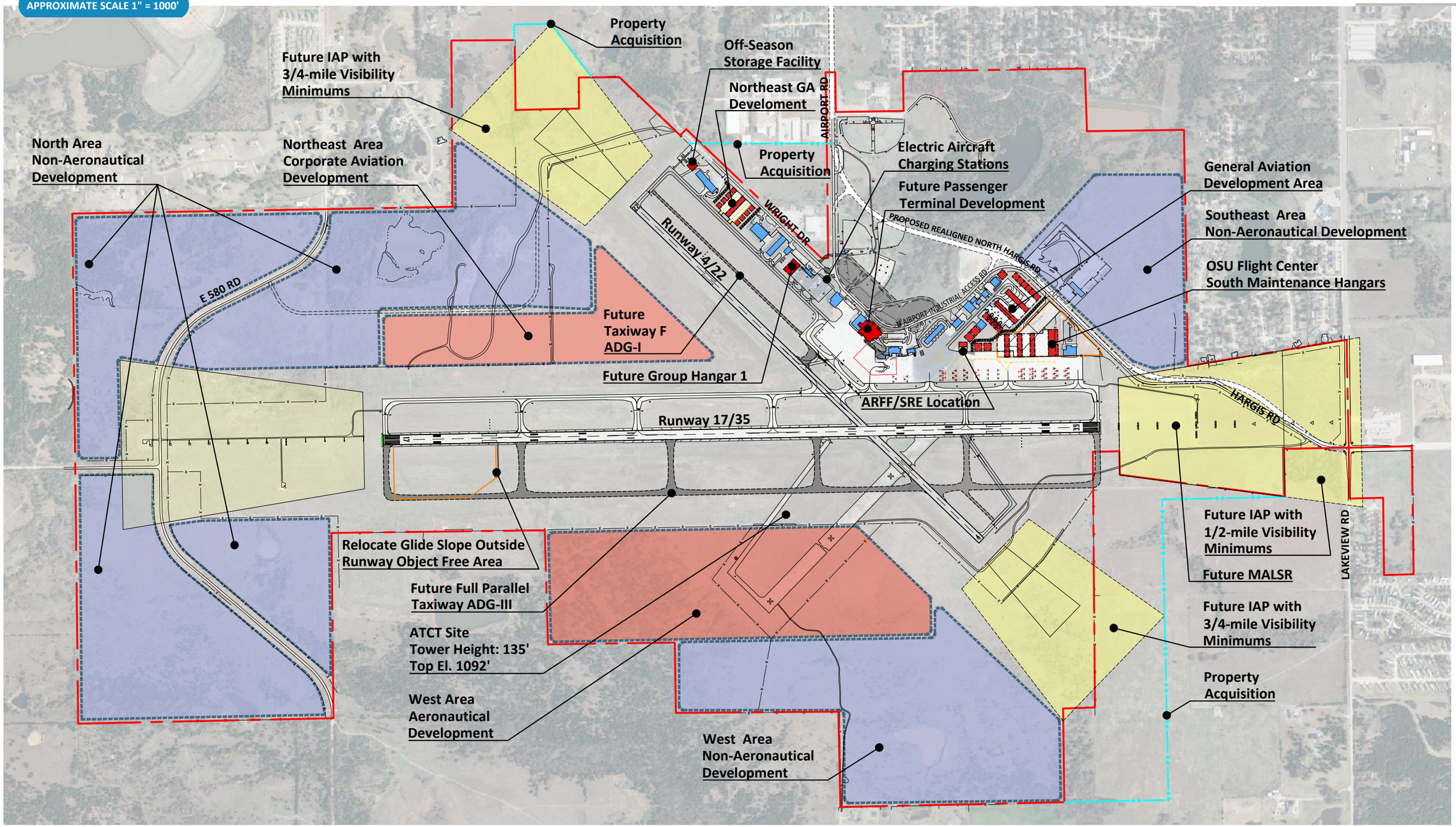


Figure D-24:
Conceptual Development Plan

E. Financial Implementation

INTRODUCTION

This chapter documents the strategy to implement, fund, and finance the recommended 20-year project improvements (i.e., the Capital Improvement Program or CIP), finance operations, and maximize the potential to receive federal and state grant funds at Stillwater Regional Airport (SWO or the Airport). It also establishes a financially prudent plan for improvement funding on a local level. The CIP is planned for implementation through three phases of development including a five-year Phase I period (0 – 5 years - 2023-2027), a five-year Phase II period (6 – 10 years - 2028-2032) and a ten-year Phase III period (11 – 20 years - 2033-2042). The CIP identifies improvement needs and allows budgeting and financial decision to be made with a comprehensive understanding of future financial implications. Although the CIP will be used for preliminary programming by the Federal Aviation Administration (FAA) and the Oklahoma Department of Aerospace and Aeronautics (ODAA), this analysis does not guarantee any financial commitment from federal, state, or local governments to provide funding for the CIP.

CAPITAL IMPROVEMENT APPROACH

The CIP identifies the overall airport development objectives, individual project costs, and anticipated funding. The CIP projects are based on the needs identified in **Chapter C - Facility Requirements**, the most recent approved Airport's CIP (kept on file with the FAA), and planning and pavement maintenance projects. The following considerations influenced the project priority approach:

- Ability to meet user demand
- Ability to enhance efficiency and meet FAA design standards
- Ability to repair and upgrade facilities reaching the end of useful life.

Projects also considered SWO preference and ability to facilitate an orderly sequence of improvements while taking into consideration economic and environmental factors. Projects are sequenced according to strategic vision, forecast demand triggers, and funding considerations. The first phase projects are sequences in year-by-year format, the second and third phase projects are identified in priority order without year distinction. This allows flexibility for changes or adjustments to the timing and priority of projects based on SWO needs as it progresses through the planning periods.

COST ESTIMATES AND PROECT PHASING

Cost Estimates

Cost estimates, based on current construction unit costs, have been prepared so SWO and the FAA can allocate financial resources for the improvement projects that have been identified as potentially being needed during the 20- year planning period. Professional engineers and architects develop cost estimates for

each project based on 2022 dollars. Contingencies are included to account for unknown factors at the planning level of design. The contingency amount varies by project but is generally set between 5 and 15 percent depending on the complexity and overall project cost. Costs for planning, environmental review, design, and construction management are included as appropriate. The cost estimates are intended to be used for planning purposes only and should not be construed as construction cost estimates, which can only be compiled following the preparation of detailed engineering design documents.

Project Phasing

Project phasing prioritizes projects through a priority ranking system based on development needs. The FAA's priorities in administering the CIP gives highest priority to projects that currently do not meet FAA design standards to maintain safety, security, and efficiency. Projects with higher priority are considered to have more urgency and are placed in the beginning phase. Those projects with lower priorities are placed in later phases. Several projects can and will be phased over multiple years. This approach helps distribute capital costs more evenly and allows SWO to implement improvements as demand materializes. Project phasing supports accelerating or delaying project implementation in response to economic conditions and changing airport user needs.

Future demand for airport facilities is difficult to predict accurately, especially during the latter phases of the 20-year planning period. Therefore, emphasis is placed on the initial portion of the planning period. In this phase, projections are more definable, and the magnitude of program accomplishment is more pronounced.

Phase I Projects

Table E-1 provides the sequencing and costs for each project placed in the first phase (i.e., 1-5 years). Phase I major improvement projects are centered around the development of the new passenger terminal, which includes relocation of Group Hangar 1, the relocation of Airport Drive, and constructing vehicular parking facilities. The first phase construction of a new Airport Traffic Control Tower (ATCT) is included in this phase. Other projects identified include hangar construction, equipment purchases, and pavement maintenance.

Table E-1: Phase I (1-5 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Year 1 (2023)		
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225
A.2	Design Terminal Building, Parking, and Utility Relocation	$1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	$100,000
A.4	Prepare ATCT EA	$200,000
A.5	Replace Two Primary Mower Apparatus	$30,000
2022	SRE Equipment – FY 22 Grant Carryover	$280,829
	Year 1 Totals	**$2,563,492**
Year 2 (2024)		
A.6	Construct New Group Hangar	$2,500,000
A.7	Design and Construct Terminal Building (Phase One), Including Demolition of Group Hangar #1	$19,000,000
A.8	Design and Construct Terminal Area Roadways and Parking Lots (Phase One)	$907,000
A.9	Crack Seal, and Re-Mark Taxiway A	$60,000
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	$200,000
	Year 2 Totals	**$22,667,000**
Year 3 (2025)		
A.11	Construct Terminal Building (Phase Two)	$1,500,000
A.12	Construct Terminal Area Roadways and Parking Lots (Phase Two)	$615,000
A.13	Construct One Corporate Hangar with Pavement	$2,213,000
	Year 3 Totals	**$4,328,000**
Year 4 (2026)		
A.14	Construct Terminal Building (Phase Three)	$1,400,000
A.15	Construct Terminal Area Roadways and Parking Lots (Phase Three)	$653,500
A.16	Replace Mower	$80,000
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35	$150,000
A.18	Construct Portions of Perimeter Road (Phase One)	$107,000
	Year4 Totals	**$2,390,500**
Year 5 (2027)		
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase One)	$10,888,889
A.20	Implement Airport Safety Management System (SMS)	$90,000
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	$5,349,000
A.22	Construct One 10-Unit T-hangar	$1,200,000
	Year 5 Totals	**$17,527889**
Subtotal Phase I		**$49,476,881**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Phase II Projects

Table E-2 provides the sequencing and costs for each project contained with the second phase (i.e., 6-10 years). Major projects within this phase include the second phase of ATCT construction, demolition of the existing ATCT, property acquisition for approach protection, new and improved Instrument Approach Procedures (IAPs), relocation of facilities to meet FAA Runway Object Free Area (ROFA) and Runway Obstacle Free Zone (ROFZ) design standards, and terminal building vehicle parking expansion. Other projects include expansion of the fuel farm and various hangar construction.

Table E-2: Phase II (6-10 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 6-10 (2028-2032)		
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up (Phase Two)	$1,000,000
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	$1,920,000
B.3	Demolish Existing ATCT	$40,000
B.4	Install Whole Airport Facility Back-Up Power Generator	$3,000,000
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and One 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	$1,178,000
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	$2,000,000
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	$7,576,000
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	$731,000
B.9	Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	$51,000
B.10	Construct Snow Removal Equipment (SRE) and Airport Maintenance Facility	$2,000,000
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	$1,200,000
B.12	Expand Terminal Parking Lots and Roadways (Phase Two)	$317,000
B.13	Construct South GA Development Access Road	$611,000
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	$7,468,000
B.15	Runway and Taxiway Pavement Maintenance	$2,000,000
B.16	Construct One Corporate Hangar with Pavement	$2,213,000
B.17	Install Two Electric Aircraft Charging Stations	$416,000
B.18	Construct Two Box Hangars	$2,969,000
B.19	Construct Portions of Perimeter Road (Phase Two)	$446,000
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	$280,767
B.21	Rehabilitate Airport Drainage System	$500,000
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	$1,195,425
B.23	Acquire Airfield De-icing Vehicle	$500,000
Subtotal Phase II		**$39,612,192**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Phase III Projects

Phase III projects are difficult to predict accurately, but like all CIP projects, they must be included on the Airport Layout Plan (ALP) to be eligible for FAA funding. Major projects included in this phase are taxiway reconstruction and relocation, terminal building vehicular parking expansion, and airfield pavement maintenance. Other projects include various hangar construction. **Table E-3** provides the sequencing and costs for each project contained with the third phase (i.e., 11-20 years).

Table E-3: Phase III (11-20 Years) Development Plan Project Costs

Project Number	Project Description	Total Cost[1]
Years 11-20 (2033-2042)		
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$800,000
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	$940,000
C.3	Relocate Taxiway F, Including CATEX or EA	$1,292,000
C.4	Expand Terminal Parking Lots and Roadways (Phase Three)	$439,000
C.5	Runway and Taxiway Pavement Maintenance	$1,076,000
C.6	Construct One 10-Unit T-hangar with Pavement	$2,400,000
C.7	Construct Two Box Hangars	$2,969,000
C.8	Construct Two Corporate Hangars with Pavement	$4,406,000
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	$7,711,000
C.10	Construct Taxiway West of Runway 17/35, Including EA	$27,822,853
C.11	Runway and Taxiway Pavement Reconstruction	$20,000,000
C.12	Construct Portions of Perimeter Road (Phase Three)	$680,000
C.13	Update Airport Master Plan	$750,000
C.14	Purchase ARFF Vehicle	$1,000,000
Subtotal Phase III		**$72,285,853**
GRAND TOTAL		**$161,374,926**

Notes: [1] Cost estimates based upon 2022 data, are intended for preliminary planning purpose and do not reflect a detailed engineering evaluation.

Figure E1 graphically illustrates the location of all projects on the airfield and **Figure E2** provides an enlarge drawing of the terminal area projects.

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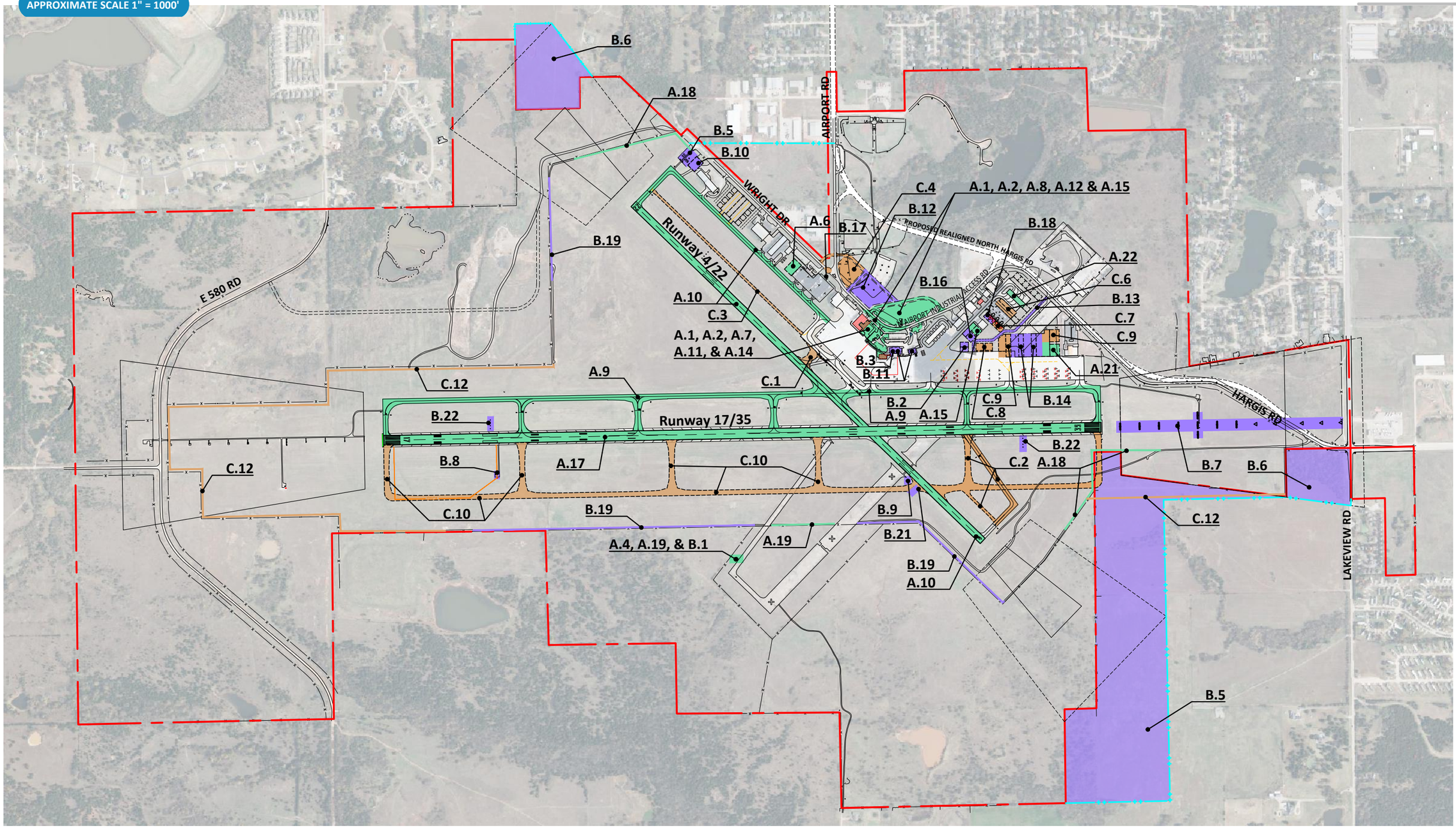
APPROXIMATE SCALE 1" = 1000'



Phase I (0-5 Years)

Phase II (6-10 Years)

Phase III (11-20 Years)

Buildings to be removed

Figure E-1:
Airport-Wide Phasing Plan

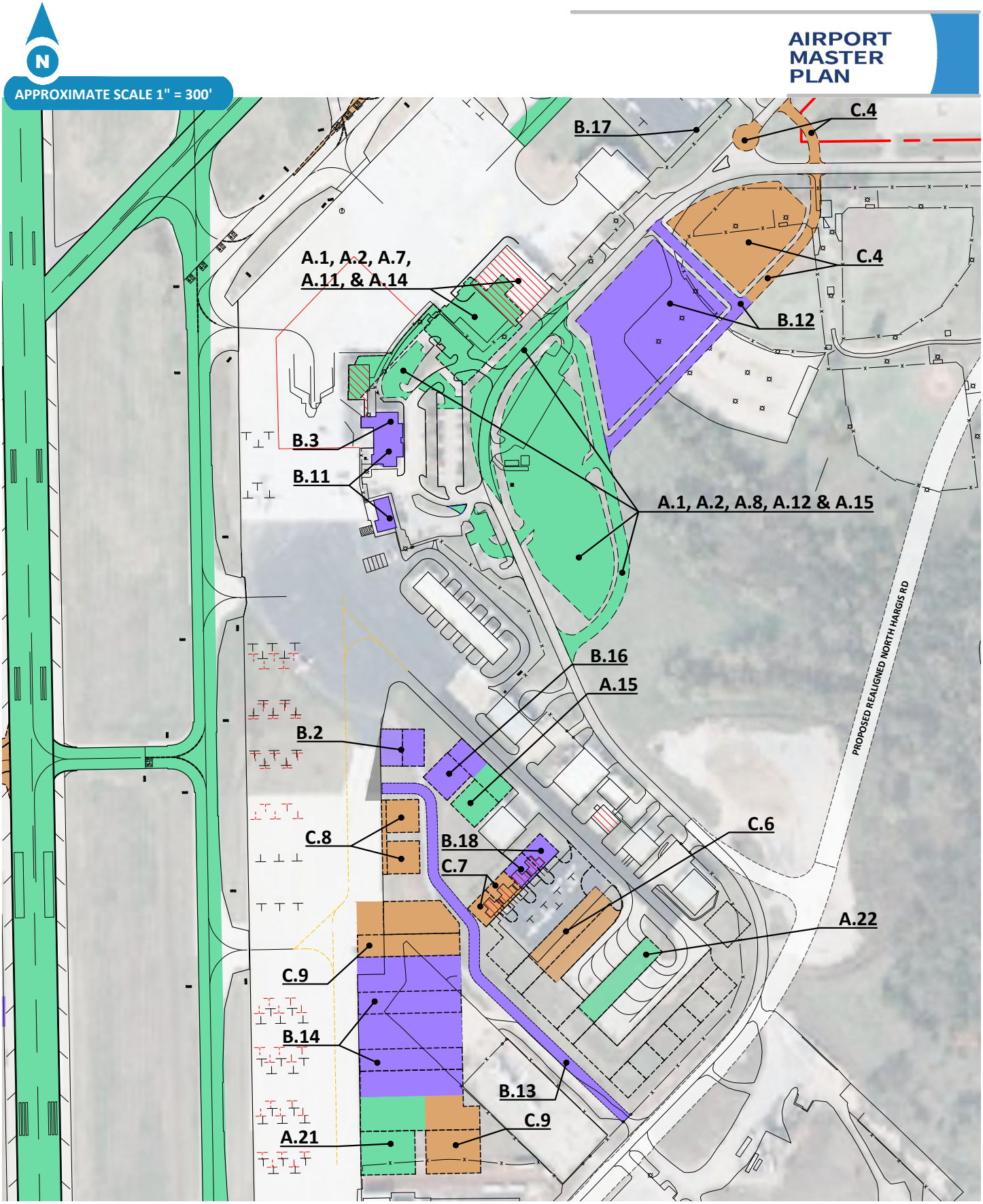


Figure E-2:
Terminal Area Phasing Plan

FINANCIAL IMPLEMENTATION ANALYSIS

Overall Approach

The overall objectives and approach for conducting the financial implementation analysis include presenting detailed results of the analysis and providing practical guidelines for matching an appropriate amount ant time of financial sources with the planned use of funds. The overall approach for conducting the financial implementation analysis included the following steps:

- Gathering and reviewing key SWO historical financial results, capital improvement plans, operating budgets, regulatory requirements, City of Stillwater policies, airline agreements, and other operating agreements with SWO users
- Interviewing key SWO officials to gain an understanding of the existing operating and financial environment, relationships with the airlines, and overall management philosophy
- Reviewing the information resented in **Chapter B - Aviation Activity Forecasts**
- Reviewing the projects list, cost estimates, and development schedules presented previously and projecting the overall financial requirements for the CIP
- Determining and analyzing the sources and timing of capital funds available to meet the financial requirements for operating SWO and financing the CIP
- Analyzing historical operations and maintenance expenses, developing operations and maintenance expense growth assumptions, reviewing assumptions with SWO management, and projecting future operations and maintenance expenses for the planning period
- Analyzing historical revenue sources, developing revenue growth assumptions, reviewing assumptions with SWO management, and projecting future airline and non-airline revenues for the planning period
- Completing results of the review in a Financial Analysis Summary and Implementation Plan that evaluates the financial reasonableness of the CIP.

Organization, Accounting, and Budgeting

Governmental Organization and Administration

SWO is owned and operated by the City of Stillwater, Oklahoma (the City). The Airport Director is responsible for day-to-day operations, supervision of the administrative and maintenance staff, and reporting to the City.

Accounting and Budgeting Practices

The financial transactions of SWO are accounted for in the City's financial statements in an Enterprise Fund. The financial statements are reported using the accrual basis of accounting. Under the accrual basis of accounting, revenues are recognized when earned and expenses are recorded when the liability is incurred or economic asset used.

The annual budget serves as the foundation for SWO's financial planning and control. The budget is prepared on a modified accrual basis where revenues are recognized when measurable and available and expenses are recognized when incurred.

Aviation Forecasts

In **Chapter B - Aviation Activity Forecasts** aviation activity forecasts were developed to estimate potential future activity levels. These forecasts are then used in **Chapter C - Facility Requirements** to determine if existing Airport facilities have the capacity to meet future demand or if facility modifications are needed. These forecasts, which include passenger enplanements, total aircraft operations, and commercial aircraft operations aid in the development and prioritization of the projects included in the CIP. The aviation activity forecasts are used in the projection of many capital funding sources and operating revenues described below.

Capital Funding Sources

Funding sources for the CIP depend on many factors, including the project eligibility, priority rating models for project evaluation, the ultimate type and use of facilities to be developed, SWO's debt capacity, the availability of other financing sources, and the priories for scheduling project completion. For planning purposes, assumptions were made related to the funding source of each capital improvement. The following funding sources provide background and context when reviewing the financial feasibility of proposed improvements.

In recent years, SWO has used a combination of FAA Airport Improvement Program (AIP) entitlement and discretionary grants, Passenger Facility Charges (PFCs), City Transfers and Capital Contributions, and cash reserves/net operating revenues to fund capital improvements. These funding sources, as well as additional sources of capital funding, will continue to be important to finance the Airport's CIP during the twenty-year planning period.

Federal

The FAA provides funding for airport improvements through the Aviation Trust Fund (ATF), which is financed by aviation system user fees and taxes (e.g., airline passenger tax, aircraft parts tax, fuel tax, and aircraft registration fees). The AIP provides the mechanism to reinvest the ATF monies at FAA-eligible airports. The total amount of federal funds available through AIP is governed by congressional appropriations to the AIP. FAA Order 5100.38D, *Airport Improvement Program Handbook* (AIP Handbook), describes AIP funding eligibility.

The FAA's most recent version (2024) of the National Plan of Integrated Airport Systems (NPIAS) classifies SWO as a non-hub commercial service primary airport. A primary airport is defined by statute as a public use airport receiving scheduled air carrier service with 10,000 or more annual enplaned passengers. Primary airports are divided into four categories based on the percentage of total U.S. passenger enplanements, with non-hub airports accounting for less than 0.05 percent of the total. The NPIAS identifies airports eligible for AIP funding and estimates the amount of AIP funds needed to fund the projects that will update airports to

current FAA standards and increase capacity as needed. FAA AIP funds available for commercial service airports are allocated through entitlement grants and discretionary grants.

AIP Passenger Entitlement Grants

AIP entitlement grants are allocated among airports by an enplanements-driven formula. Primary commercial service airports receive a minimum of one million dollars in AIP entitlement funds under the current legislation. Additionally, under current AIP authorization legislation, eligible projects at non-hub airports in Oklahoma are funded on a 90 percent AIP/10 percent local match basis.

Based on the current program, SWO is projected to receive entitlement grants of approximately $1 million per year for the entire 20-year planning period based on its enplanement levels. Non-hub airports (currently, those with annual enplanements between 10,000 and approximately 423,000 passengers) can accumulate and carryover up to three years of unspent entitlement funds plus the current year, before the awards are revoked. At the end of 2022, SWO had $90,000 in entitlements to carryover for use in 2023. The analysis assumes the application of annual AIP passenger entitlement funds will be about $5 million during the Phase I planning period, $5 million during Phase II, and $10 million during Phase III.

AIP Discretionary Grants

Projects eligible for AIP funding may also receive discretionary grants if the total cost exceeds what can be covered by entitlement funds. The approval of discretionary grant funds is established through a project priority ranking methodology used by the FAA to award grants, at their discretion, based upon a project's importance to the National Airport System (NAS). Discretionary funds are generally provided for projects that have placed high in priority towards enhancing safety, security, and capacity and would be difficult to fund otherwise. Dollar amounts vary and can be significant compared to entitlement funds. Discretionary grants are not guaranteed, and the amount dedicated to any one airport is determined by its demonstrated and documented need compared to the needs at other airports within the NAS.

In past years, SWO received discretionary funds to support runway, taxiway, and apron improvement projects. It is reasonable to assume that SWO will receive additional discretionary grants throughout the 20-year planning period for higher priority, eligible projects such as runway and taxiway projects. Like passenger entitlement grants, discretionary grants usually have an FAA funding participation rate of 90 percent and a local match of 10 percent. The analysis assumes that $14.8 million of AIP discretionary funds will be required during Phase I for the new terminal building and ATCT facilities, and about $2.6 million will be required during the five-year Phase II period for ARFF facilities and runway and taxiway improvements. An additional $63.1 million of AIP discretionary funds are assumed for Phase III for significant runway and taxiway improvements. Since the future availability of AIP discretionary grants is not certain until an actual grant is awarded, it should be noted that any CIP projects which have discretionary funds indicated as a funding source in the analysis may need to be delayed until such funds actually become available.

The analysis further assumes that the current AIP program will be extended through 2042 and that future program authorizations will provide substantially similar funding levels as it currently does and as it has historically provided since the program was established in 1982.

Bipartisan Infrastructure Law Grants

With the passage of the Infrastructure Investment and Jobs Act of 2021, known as the Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. The legislation included $25 billion in funding for the FAA to invest in airport terminals, airport infrastructure, and air traffic control facilities over the next five years.

Included in the BIL is the Airport Infrastructure Grant (AIG) program. Like AIP Entitlements, AIG funds are allocated to airports based on passenger enplanements. AIG funds are non-competitive and may be used for projects based on PFC eligibility requirements. SWO's 2023 AIG allocation was $1,019,003. The Financial Implementation Analysis assumes the allocations in 2024 – 2026 will be approximately the same amount. The analysis assumes these AIG funds will be used toward constructing the new terminal building.

Also included in the BIL is the Airport Terminal Program (ATP). This program is a discretionary grant program providing $1 billion per year to replace aging terminals and airport-owned towers, increase terminal energy efficiency and accessibility, and other terminal projects. These grants will be awarded annually through a competitive process based on a Notice of Funding Opportunity (NOFO), and not less than $100 million per year may be allocated to general aviation (GA) and non-hub airports such as SWO. The analysis assumes the Airport will apply for and secure $6.1 million in ATP funding for the new terminal building.

State

The ODAA serves as the lead government agency to support, promote, and advocate for Oklahoma's aviation and aerospace industries. The agency provides funding, planning, programming, and engineering expertise for Oklahoma's airports and administers all state aviation grant programs through the Airport Construction Program (ACP). Grants are approved for projects including those that are AIP eligible. The analysis assumes the ODAA will support SWO with grant funds for two significant projects during Phase I – the new terminal building and the new ATCT in the amount of $1,000,000 for each project.

In addition to ODAA grant funds for certain capital development projects, the ODAA administers a loan program in which an airport can secure a loan for up to 70 percent of construction costs of a new aircraft hangar. The term of the loan is for ten years. The interest rate is determined by the ODAA at the time a loan is issued and is anticipated to be more competitive than what is available in the traditional loan market. It is appropriate to allow the ODAA to recover costs associated with administering the loan. For the analysis, it was assumed that SWO would secure a loan of $1.75 million for a new group hangar during Phase I. The loan rate was assumed to be 1.8 percent and the debt service would be funded through rents from the tenant(s) occupying the new hangar.

Other Federal/State Grants

Certain projects identified in the CIP lend themselves to be funded from other federal or state grant funding sources. Certain lighting and navigational aids programmed in the CIP, including a Global Positioning System (GPS) IAP and the associated Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR), the relocation of the Glideslope Antenna and equipment building, and the installation of Precision Approach Path Indicators (PAPIs) are assumed to be funded with FAA Facilities and Equipment (F&E) funds. Additionally, the CIP includes a project for the acquisition and installation of an airport facility backup power generator, for which SWO intends to pursue funding from Federal Emergency Management Agency (FEMA) grant opportunities.

Passenger Facility Charges

The Aviation Safety and Capacity Expansion Act of 1990 established the authority for commercial service airports to apply to the FAA for imposing and using a PFC of up to $3.00 per eligible enplaned passenger. With the passage of AIR-21 in June 2000, airports could apply for an increase in the PFC collection amount from $3.00 per eligible enplaned passenger to $4.50. The proceeds from PFCs are eligible to be used for AIP eligible projects and for certain additional projects that preserve or enhance capacity, safety or security, mitigate the effects of aircraft noise, or enhance airline competition. PFCs may also be used to pay debt service on bonds (including principal, interest, and issue costs) and other indebtedness incurred to carry out eligible projects. In addition to funding future planned projects, the legislation permits airports to collect PFCs to reimburse the eligible costs of projects that began on or after November 5, 1990.

The Airport currently collects PFC revenues through an approved application at the $4.50 collection level. Current collections at the $4.50 collection level are approximately $94,000 per year. This open application is expected to be fully collected in 2026. Annual PFC collections are anticipated to grow to approximately $116,000 per year by the end of Phase I and $171,000 per year by the end of the 20-year planning period.

The analysis assumes that SWO will submit new PFC applications to fund future projects included in the CIP. The analysis assumes that PFC collections available for use on the projects included in the CIP will be about $350,000 during the Phase I planning period, $848,000 during Phase II, and $1.5 million during Phase III. The analysis assumes that throughout the twenty-year planning period, SWO will use its PFCs to provide some or all the required local match on AIP grants as well as the purchase of an airfield deicing vehicle.

The analysis assumes that SWO will submit PFC applications and amendments, as required, to ensure that the collection of PFC revenues continues uninterrupted beyond the authorized expiration date through the end of the 20-year planning period in 2042.

Local

City Capital Contributions

SWO is a municipally owned facility and as such, the City may provide funding to the Airport for capital projects from its general fund budget, special assessments or as a temporary short-term loan from other City

enterprise funds. The analysis assumes the City will provide approximately $3.1 million of funds during the short-term period to fund a portion of the local funds required for the construction of the new terminal building and associated terminal area roadways and parking lots. Additional City funds are likely to be required to support future capital development projects, but those funds are not committed until approved by the City. Therefore, for the purposes of the analysis, funding deficiencies are programmed with Other Unidentified Funding described below. Local funds can include, but are not limited to, airport revenues from hangar leases, fuel surcharges, landing fees, facility charges and fees, concession revenues, airline operations, and non-aeronautical facility leases. SWO uses local funds to provide the ten percent match on AIP eligible projects and to pay for projects that are not eligible for or do not compete well for AIP funding.

Private Third-Party Funding

Certain on-airport development projects may be funded through private third-party funding. This is frequently the case for GA or private use development where a third-party will assume the capital development costs of a hangar, and in exchange, SWO receives rent through a ground lease. The analysis assumes private third-party funding of approximately $53.4 million during the twenty-year planning period for hangar development projects including maintenance hangars, corporate hangars, box hangars, and T-hangars. If private third-party funding does not materialize in the time frame needed, the associated projects may have to be modified, delayed, or cancelled until such funding is committed.

Cash Reserves/Airport Net Operating Revenue

At the beginning of 2023, SWO had accumulated about $2.3 million in unrestricted cash reserves available for operations and capital project funding. Prior to the COVID-19 pandemic, actual operating expenses at SWO exceeded operating revenues and the operating deficit, along with minor capital outlay and federal grant matches, were generally funded by the City. COVID relief funding alleviated the need for significant City subsidies from 2020 through 2023. Beginning in 2024, however, revenue and expense projections included in the Financial Implementation Analysis indicate that SWO will again be operating at a deficit and will require resumed subsidies from the General Fund to cover operations. The Airport and the City are working to reverse this trend by generating additional revenue from existing operating revenue sources and by identifying new sources of operating revenue. For conservative planning purposes, the Financial Implementation Analysis assumes limited net operating revenue available for capital development.

The analysis assumes that SWO's cash reserves available are used to fund the local funding requirements for the new terminal building.

Other Unidentified Funding

The traditional airport capital funding sources described in the preceding paragraphs are insufficient in amount and timing to finance some capital projects planned for implementation during the planning period. As previously discussed, the required local matches on federal grants received by the Airport have historically been provided through capital contributions from the City. However, as those funds cannot be assured until the City has committed to providing that support, those local matches on future federal grants have been

programmed as other unidentified funding. Additionally, certain projects included in the CIP are not eligible for federal funding, or there are insufficient federal funds available in the time needed to support the projects. Those projects have also been programmed with other unidentified funding and include projects such as pavement maintenance, parking lots, access and perimeter roads, land acquisition, fencing maintenance, drainage rehabilitation, a portion of hangar development, and a portion of the new terminal building. Consequently, non-traditional funding sources will be needed to finance the cost of projects totaling about $3.5 million during Phase I, $8.1 million during the Phase II planning period, and $8.3 million during the Phase III planning period. The source of this non-traditional "other" funding has not yet been determined and represents a shortfall for the capital project implementation plan. This "other" funding may potentially include sources such as City capital contributions (discussed above), state grant funding, federal economic stimulus grants, economic development funding, future private third-party funding, and other possible sources that are not certain at this time. If other funding sources cannot be identified and obtained in the time frames needed, the associated projects will have to be modified, delayed, or cancelled until such funding can be identified. Consequently, this source of capital funding has been referenced in the Financial Implementation Analysis as "Other Unidentified Funding."

FINANCIAL ANALYSIS AND IMPLEMENTATION FOR THE CIP

The analysis, along with the Schedules contained in **Appendix Six**, provides the results of evaluating the financial reasonableness of implementing the CIP during the planning period from 2023 through 2042.

Estimated Project Costs and Development Schedule

The CIP Estimated Project Costs and Development Schedule is derived from previous results of the Master Plan analysis. The CIP for capital expansion and improvement projects is projected on an annual basis for the Phase I planning period from 2023 through 2027, in total for the Phase II planning period from 2028 through 2032 and in total for the Phase III planning period from 2033 through 2042. For each of these planning periods, **Schedule E-1** (provided in **Appendix Six**) presents the CIP including estimated costs and anticipated development schedule for the identified projects.

As presented earlier in **Tables E-1**, **E-2**, and **E-3**, the total estimated cost of projects is $161,374,926 in 2023 dollars. The estimated costs for the projects are adjusted by an assumed three percent rate of annual inflation for the remainder of the twenty-year planning period. The resulting total project costs escalated for inflation are $210,184,145. **Table E-4** presents a summary of the project schedule and provides a comparison of 2023 base year costs with escalated costs adjusted for inflation for each of the planning periods.

Table E-4: Summary of 2023 Base Year and Total Escalated CIP Costs

Planning Period	2023 Base Year Costs	Total Escalated Costs
Phase I (2023-2027)	$49,476,881	$52,842,035
Phase II (2028-2032)	$39,612,192	$48,003,271
Phase III (2033-2042)	$72,285,853	$109,338,839
Total Costs	**$161,374,926**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

This Financial Implementation Analysis commenced in early 2023. However, due to unforeseen circumstances, it was not completed until early 2024. That is why the base year of the analysis is 2023, which includes the CIP and it associated cost estimates.

Sources and Uses of Capital Funding

Funding sources for the CIP depend on many factors, including AIP and PFC project eligibility, the ultimate type and use of facilities to be developed, management's current and desired levels of SWO's airline cost per enplaned passenger, the availability of other financing sources and the priorities for scheduling project completion. For master planning purposes, assumptions were made related to the funding source of each capital improvement.

Schedule E-2 (provided in **Appendix Six**) lists each of the CIP projects, their estimated costs (escalated annually for inflation) and the assumed funding sources and amounts. During the 20-year planning period, it was assumed that AIP entitlement, BIL AIG, AIP discretionary, and BIL ATP grants would fund terminal improvements including roadways and parking, a new ATCT, ARFF facilities, Snow Removal Equipment (SRE) facilities, and runway and taxiway improvements. State funds are assumed for the new terminal building and ATCT, as well as a loan on a new group hangar. Other federal and state grants are assumed for improvements to navigational aids and backup power generators. PFC pay-as-you-go revenues were assumed to fund the local matches of AIP and AIG grants to the extent available and the acquisition of a deicing truck. City contributions and available airport cash reserves are assumed to find the local portions of the new terminal building. Private third-party funds are assumed for hangar and other GA development projects. Projects for which funding has not been identified, reflected as “Other Unidentified Funding” include pavement maintenance, parking lots, access and perimeter roads, land acquisition, fencing maintenance, drainage rehabilitation, a portion of hangar development, and a portion of the new terminal building.

A summary of the sources of capital funding by type and uses of capital funding by planning period for the CIP is presented in **Table E-5**.

Table E-5: Summary of Sources and Uses of Capital Funding for the CIP

Sources of Capital Funding	Phase I	Phase II	Phase III	Totals
AIP Entitlement/BIL AIG	$9,168,052	$5,000,000	$10,000,000	$24,168,052
AIP Discretionary/BIL ATP	$20,936,184	$2,555,883	$63,077,396	$86,569,463
ODAA Grants and Loans	$3,750,000	$0	$0	$3,750,000
Other Federal/State Grants	$0	$14,241,950	$0	$14,241,950
Passenger Facility Charges	$350,000	$848,282	$1,486,075	$2,684,357
City Contributions	$3,052,715	$0	$0	$3,052,715
Private Third-Party Funding	$9,718,729	$17,261,317	$26,449,144	$53,429,190
Other Unidentified Funding	$3,547,885	$8,095,840	$8,326,224	$19,969,949
Cash Reserves/Net Operating Revenue	$2,318,469	$0	$0	$2,318,469
Total Sources of Capital Funding	**$52,842,035**	**$48,003,271**	**$109,338,839**	**$210,184,145**
Uses of Capital Funding	**Phase I**	**Phase II**	**Phase III**	**Totals**
Runway/Taxiway Improvements	$431,709	$2,423,661	$78,550,075	$81,405,445
Terminal Building	$24,643,831	$0	$0	$24,643,831
Terminal Roadway and Parking Improvements	$2,300,761	$384,150	$664,027	$3,348,938
Hangars and GA Infrastructure	$12,293,729	$18,001,745	$26,449,144	$56,744,618
Land Acquisition	$0	$2,423,661	$0	$2,423,661
SRE/Maintenance Facility	$0	$2,423,661	$0	$2,423,661
ARFF Facilities	$0	$2,326,715	$0	$2,326,715
Air Traffic Control Tower and Navigational Aids	$12,555,541	$12,727,161	$0	$25,282,702
Other Improvements	$398,247	$4,241,408	$1,512,590	$6,152,244
Total Uses of Capital Funding	**$52,842,035**	**$48,003,271**	**$109,338,839**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

A summary of the application of the different capital funding source to specific categories of CIP projects is presented in **Table E-6**.

Table E-6: Summary Application of Funding Sources to the CIP

Summary of Projects	AIP Entitlement/ BIL AIG	AIP Discretionary/ BIL ATP	ODAA Grants and Loans	Other Federal/ State Grants	PFCs	City Contri-butions	Private Third-Party	Other Unidentified Funding	Cash Reserves/ Net Revenues	Total
Runway/Taxiway Improvements	$8,979,002	$63,897,360	$0	$0	$1,463,738	$0	$0	$7,065,345	$0	$81,405,445
Terminal Building	$5,754,621	$12,136,184	$1,000,000	$0	$0	$2,794,556	$0	$700,000	$2,258,469	$24,643,831
Terminal Roadway and Parking Improvements	$2,070,685	$0	$0	$0	$0	$230,076	$0	$1,048,177	$0	$3,348,938
Hangars and GA Infrastructure	$0	$0	$1,750,000	$0	$0	$0	$53,429,190	$1,565,429	$0	$56,744,618
Land Acquisition	$0	$0	$0	$0	$0	$0	$0	$2,423,661	$0	$2,423,661
SRE/Maintenance Facility	$1,944,377	$236,918	$0	$0	$0	$0	$0	$242,366	$0	$2,423,661
ARFF Facilities	$956,374	$1,137,669	$0	$0	$0	$0	$0	$232,671	$0	$2,326,715
ATCT and Navigational Aids	$1,998,834	$8,800,000	$1,000,000	$11,515,331	$350,000	$0	$0	$1,588,537	$30,000	$25,282,702
Equipment	$1,252,746	$361,331	$0	$2,726,619	$757,174	$28,083	$0	$996,291	$30,000	$6,152,244
Other Improvements	$1,211,413	$0	$0	$0	$113,444	$0	$0	$4,107,471	$0	$5,432,328
Totals	**$24,168,052**	**$86,569,463**	**$3,750,000**	**$14,241,950**	**$2,684,357**	**$3,052,715**	**$53,429,190**	**$19,969,949**	**$2,318,469**	**$210,184,145**

Source: Leibowitz & Horton AMC analysis, 2024.

Notes: Addition errors are due to rounding of calculated amounts.

Projected Operations and Maintenance Expenses

Operations and maintenance expense projections for the planning periods are based on SWO's 2024 budget, the anticipated impacts of inflation, aviation traffic increases, facility improvements and the recent experience of other airports with similar levels of aviation activity.

Operations and Maintenance Expense Projection Assumptions

Operations and maintenance expense growth assumptions, as reflected in **Schedule E-4** (provided in **Appendix Six**), were developed to project SWO's operating expenses during the planning period. Actual amounts for 2020 through 2022 and budgeted amounts for 2023 and 2024 provide a comparison with expenses that are projected for the period 2025 through 2042.

For all expense categories reflected on Schedule E-4, projections are based on 2024 budgeted amounts with an assumed three percent rate of annual inflation for the remainder of the 20-year planning period.

Projection of Operations and Maintenance Expense and Operating Expenses Per Enplaned Passenger

The projection of operations and maintenance expenses is provided in **Schedule E-4** (provided in **Appendix Six).** As shown in the Schedule, total expenses are expected to grow from $1,613,285 budgeted in 2024 to $1,762,880 projected in 2027 reflecting an overall growth rate of three percent per year and total $8,364,160 during the Phase I planning period. Phase II expenses are projected to total $9,640,151 reflecting a three percent annual growth rate for the five-year period 2028-2032, and Phase III expenses are projected to total $24,131,134 reflecting a three percent annual growth rate for the 10-year period 2033-2042.

Schedule E-4 also provides a comparison of SWO's total operating expenses per enplaned passenger versus non-hub airports with similar levels of aviation activity. SWO's operating expenses per enplaned passenger are projected to increase from $62.42 budgeted for 2024 to an average of $62.47 during the Phase III planning period. Over the same period of time, the overall non-hub industry average drops slightly from $75.60 in 2024 to $74.05 during Phase III[1]. These comparisons show that SWO's budgeted and projected operating expenses are lower than other non-hub airports of similar size during all three phases of the 20-year planning period. This implies that SWO currently manages operations and controls expenses in a manner that is more cost efficient than other comparable non-hub airports.

Projected Operating Revenues

Operating revenue projections for the planning periods are based on SWO's 2024 budget, current rates and charges methodology, current leasing practices, the anticipated impacts of inflation, aviation traffic increases, facility expansions and the recent experience of other airports with similar levels of aviation activity.

[1] Non-hub Airports, FAA Operating and Financial Summary Report #127 and FAA Air Carrier Activity Information System enplanement database.

Operating Revenue Projection Assumptions

Operating revenue growth assumptions, as reflected in **Schedule E-5** (provided **Appendix Six**), were developed to project SWO's operating revenues during the planning period. Actual amounts for 2020 through 2022 and budgeted amounts for 2023 and 2024 provide a comparison with revenues that are projected for the period 2025 through 2042. The analysis organizes revenues into categories for airline revenues, non-airline revenues and non-operating revenues. Annual Inflation was assumed at a three percent rate of annual inflation for the remainder of the 20-year planning period.

Annual revenue growth assumptions for the period 2024 through 2042 are provided in the following sections.

Airline Revenues

- **Landing Fees –** Beginning in 2025, the analysis assumes landing fees will grow based on the annual rate of inflation assumed above plus increases in aircraft landed weight assuming on half the annual growth rate of passenger enplanements forecast.
- **Terminal Rents, Stand-by ARFF Fees, and Security Fee –** Beginning in 2025, the analysis assumes terminal rent and ARFF and security fee increases will be based on the annual rate of inflation assumed above.

Non-Airline Revenues

Concessions projections beginning in 2025 are based on SWO's 2024 budget with growth based on previously described inflation assumptions plus the annual rate of forecast enplanement growth.

Projections for revenue from non-airline landing fees, fuel flowage fees, and fuel sales are based on SWO's 2024 budget with growth based on the assumed annual rate of inflation plus increases in aircraft landed weight assuming one half the annual growth rate of the passenger enplanements forecast.

Non-airline revenue projections for all other revenue categories beginning in 2025 are based on SWO's 2024 budget with growth at the annual inflation rate assumed above for all years thereafter.

Non-Operating Revenues

Non-operating revenues at SWO are limited and generally include interest income, and gains or losses from the sale of capital assets. None of these revenues are typically budgeted. Based on the historically small amount, none of these revenues have been projected for the remainder of the planning period.

Projections of Operating Revenues, Airline Cost Per Enplaned Passenger, and Operating Revenues Per Enplaned Passenger

The projection of operating revenues is provided in Schedule E-5 (provided in **Appendix Six**). As shown in the Schedule, airline revenues are expected to grow from $119,325 budgeted in 2024 to $132,598 projected for 2027 and total $601,720 during the Phase I planning period. During the five-year Phase II period, airline revenues are projected to total $732,659, and during the ten-year Phase III period, revenues are projected to total $1,884,738. The overall annual growth rate for airline revenues is 3.4 percent during the twenty-year

planning period. Non-airline revenues are expected to grow from $431,675 budgeted in 2024 to $478,834 projected for 2027 and total $2,247,122 during the Phase I planning period. During Phase II, non-airline revenues are projected to total $2,642,916, and during Phase III, non-airline revenues are projected to total $6,780,148. The overall annual growth rate for non-airline revenues is 3.4 percent. Total SWO revenues (including non-operating revenues) are expected to grow from $551,000 budgeted in 2024 to $611,431 projected for 2027 and total $3,846,411 during the Phase I planning period. During Phase II, revenues are projected to total $3,375,575 and during Phase III, revenues are projected to total $8,664,886. The overall annual growth rate for total Airport revenues is 3.4 percent.

Schedule E-5 also provides a comparison of SWO's airline cost per enplaned passenger (CPEP) versus non-hub airports with similar levels of aviation activity. The airline CPEP (all airline fees and rentals divided by enplaned passengers) is a measure that airlines use to compare their cost of operations among the airports they serve. SWO's airline CPEP is projected to grow from $4.62 budgeted in 2024 to an average of $4.88 during the Phase III planning period. Over the same period, the overall non-hub industry average drops slightly from $13.07 in 2024 to $12.80 during the Phase III[2].

This comparison indicates that SWO's airline rates and charges are much lower than the industry average and are projected to remain below the industry average throughout the planning period. This indicates that SWO has room to grow airline rates and charges in the future if it is determined that there is a need or justification to do so. SWO should continue to monitor their rates in comparison with the non-hub industry average and other comparable peer airports.

Schedule E-5 also provides a comparison of SWO's total operating revenue per enplaned passenger versus the industry average for other non-hub airports. SWO's total operating revenue per enplaned passenger is projected to grow from $21.32 budgeted for 2024 to an average of $22.43 during the Phase III planning period. Over the same period, the overall non-hub industry average drops slightly from $73.71 in 2024 to $72.20 during the Phase III[3].

SWO has several non-airline revenues including revenue generated from aeronautical and non-aeronautical land rents, building rents, and terminal related concessions. SWO and the City are actively working to generate additional revenues from these existing sources and by identifying new sources of revenue from the Airport operations. Additionally, as existing tenant leases expire, SWO should continue to review those agreements considering current airport operating costs, real estate fair market rental values, and current industry best practices.

SWO's overall policies for setting and negotiating airline and non-airline user fees and rental rates should continue to be reviewed and adjusted over time in order to establish rates that are more comparable with other airports having similar levels of aviation activity.

[2] Ibid.
[3] Ibid.

FINANCIAL ANALYSIS SUMMARY

The Financial Analysis Summary and Implementation Plan presented in Schedule E-6 (in **Appendix Six**) includes a Capital Cash Flow section that presents a summary of projected capital funding (from **Schedule E-2**) and scheduled capital expenditures (from **Schedule E-1**) with the cash flow that results from implementing the CIP. Schedule E-6 also includes an Operating Cash Flow section that summarizes totals for operating revenues (from **Schedule E-5**) and operating expenses (from **Schedule E-4**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities.

In **Schedule E-1**, practical approaches were provided for scheduling capital expenditures to match the availability of capital funding. **Schedule E-2** provided practical approaches for matching specific capital funding sources with each of the identified projects. As shown in **Schedule E-6**, year-end cash reserves are projected to remain extremely low and close to zero throughout the 20-year planning period based on the City practice of supporting the financial operations of SWO to the levels necessary to break even.

Based on the assumptions underlying the Financial Implementation Analysis summarized in the Capital Cash Flow section of **Schedule E-6**, implementation of projects in the CIP that are scheduled throughout the 20-year planning period are projected to be financially possible subject to substantial FAA discretionary support, identification of approximately $53.4 million in funding for projects with Other Unidentified Funding, and significant ongoing City financial support. If funding sources are not available in the timeframes needed for these projects and other alternative sources cannot be identified, then development of these projects will not be feasible during the period that is currently planned.

Implementation of other capital projects during the 2023-2042 planning period that have AIP discretionary grants indicated as a funding source are subject to the availability of those grants which are provided at the sole discretion of the FAA. If the identified portion of discretionary funding is not awarded by the FAA, then these projects will need to be delayed until funding is available.

Similarly, it should be noted that implementation of projects programmed for private third-party funding depends on favorable market demand conditions. If these favorable conditions do not occur, then the investment necessary for implementation of the associated projects may not be available in the time frames that are planned.

Additionally, as previously discussed, SWO is currently operating at a deficit and requires a subsidy from the City to cover operating expenses and minor capital outlays. The Financial Implementation Analysis assumes that the use of SWO's CARES Act grant funding is completely applied to capital and operating expenses by 2023. After 2023, it is assumed that City funding transfers will resume to support SWO operating expenses.

Finally, the Financial Implementation Analysis relies on achievement of the aviation activity and passenger enplanement forecast. Actual aviation traffic may temporarily vary from the projected levels of activity without a significant adverse impact on the capital program. If decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted, however,

that if the forecast activity levels are not met, then many of the planned capital improvements may not be necessary.

F. Recycling and Solid Waste Plan

SUMMARY

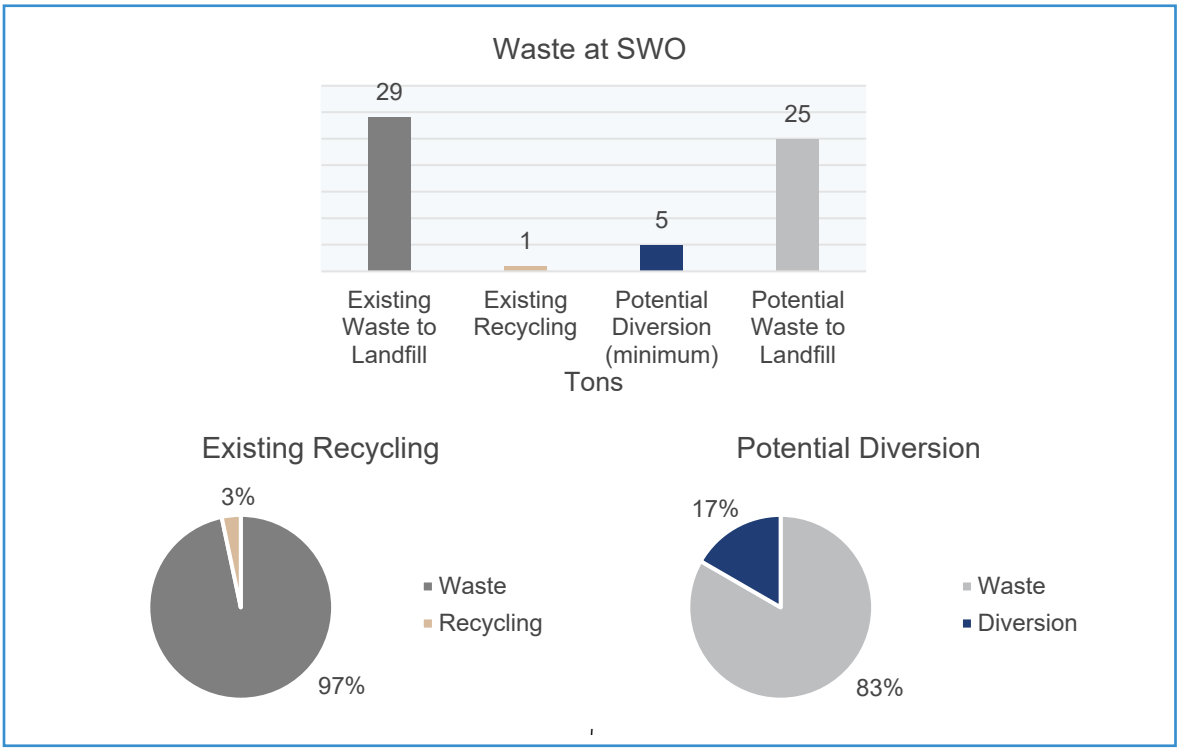
Planning for solid waste and recycling under the on-going master plan fulfills Stillwater Regional Airport (SWO)'s federal obligation under the Federal Aviation Administration (FAA) Modernization and Reauthorization Act of 2012, FAA Reauthorization Act of 2018, and associated guidance.#

SWO can reduce waste generation and increase landfill diversion by:

- Integrating waste diversion practices into airport operations.
- Improving purchasing practices, reducing disposable items, and reusing supplies.
- Enhancing the existing recycling program.
- Tracking and voluntarily reporting waste metrics and diversion progress.

It is estimated that SWO generates approximately 29 tons of landfill-bound waste annually, as well as an additional ton of comingled recycling. The recommended strategies contained in this chapter have the potential to divert at least five tons of general materials from the landfill a year. Reducing waste generation and increasing landfill diversion align with SWO's efforts to operate in an environmentally responsible manner.

Figure F-1: Potential Improvements to SWO Waste Stream



RECOMMENDATIONS

The following recommendations to improve waste management at SWO include waste reduction, reuse, and recycling strategies. Evaluation of each recommendation considers the estimated relative cost and diversion potential; the suggested implementation time frame; and noted alignment with best practices or standard programs. **Table F-1** shows the key for quick comparison of the impact of each recommendation on diversion.

Table F-1: Recommendation Key

Item	Icons	Significance
Relative Cost	$ $ $	Low cost
	$ $ $	Medium cost
	$ $ $	High cost
Estimated Diversion Potential		Low diversion potential
		Medium diversion potential
		High diversion potential
Benefits		Reduced Environmental Impact(s) *(For example, Reduced Resource Consumption, Emissions, and/or Pollution)*
		Cost Savings
		Support Community / Build Relationships
Alignment	BMP	Best Management Practice
	TRUE	BMP and Total Resource Use and Efficiency (TRUE) Certification program element

Recommendation 1: Integrate Waste Diversion in Airport Operations

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			BMP

Description

Waste diversion is the concept of avoiding and/or managing waste to avoid landfill disposal. Waste diversion strategies include practices such as reduction, reuse, donation, sustainable procurement, recycling, and composting. These strategies offer various levels of fiscal, environmental, and social benefits.

Action

It is recommended that SWO continue to integrate waste diversion concepts and practices into existing policies and operations, for example, in maintenance operations, purchasing practices, and tenant requirements.

Justification

Most of the municipal solid waste generated at SWO is collected for landfill disposal (see **Current Waste Management Program**). Waste diversion would reduce the volume of waste sent to the landfill as well as reduce the financial and social impacts of waste.

Information Needed

- Communication tools to reach SWO staff and tenants.
- Waste diversion information.

Action Plan

- Emphasize importance of waste diversion to SWO staff and tenants.
- Adopt additional waste diversion policy or integrate in existing guidance documents, including tenant lease language or contractor guidance.
- Identify sources of waste and promote strategies to avoid, reduce, or divert these materials.
- Continue existing practices such as double-sided printing, digital documentation, and water bottle filling stations.

Recommendation 2: Improve Purchasing Practices, Reduce, & Reuse

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			BMP

Description

To reduce the facility's volume of waste sent to the landfill, SWO should reduce waste generation and reuse materials where possible. SWO staff's existing purchasing practices may generate waste in the form of single-use and/or disposable items and supplies and tracking of these items could reveal opportunities for reduction and reuse.

Action

It is recommended SWO adopt a purchasing policy prioritizing durable (versus disposable) items and supplies that are reusable, recyclable, compostable, and/or made from recycled content. It is also recommended that SWO identify supplies and materials which can be avoided, reused on site, or donated to a third party.

Justification

Waste reduction is the most environmentally preferred waste management strategy as determined by the Environmental Protection Agency (EPA). Reduction and reuse simultaneously lower waste program costs by producing a smaller material stream.

Information Needed

- Purchasing records.
- Waste stream information.

Action Plan

- Adjust practices that generate waste (e.g., printing/physical media, housekeeping).
- Substitute durable alternatives for single use or disposable items in areas such as the administration office and staff areas.
- Reuse items and materials where possible and encourage reuse by passengers, tenants, and contractors.

Recommendation 3: Enhance Existing Recycling Program

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			TRUE

Description

To reduce the facility's volume of waste sent to the landfill, SWO should continue to recycle materials that cannot be diverted, reduced, or reused.

Action

It is recommended SWO maintain its existing recycling program and supplement current practices with additional receptacles, signage, and an education campaign. It is also recommended SWO expand its recycling program to include all materials accepted by the City of Stillwater.

Justification

Convenient receptacles, effective signage, and educational campaigns have been shown to increase participation and improve compliance with a recycling program. Recycling bins should be readily visible and instructional recycling signage would greatly increase the effectivity of designated recycling bins. An awareness campaign for employees, tenants, or visitors further compounds the program's effectiveness.

Information Needed

- Inventory of related signage and areas of significant waste generation.
- Protocol for communicating program to employees, tenants, and visitors.
- Input from janitorial staff and contractors regarding current practices and program effectivity.

Action Plan

- Introduce glass to recycling program.
- Convert surplus garbage bins into recycling bins with labeling.
- Collocate all recycling and garbage bins into pairs throughout facility.
- Right-size and standardize bins and bin liners to match capacity needs.
- Install color-coded, graphic instructional signage in public areas, such as Recycle Across America standardized recycling labels.
- Introduce restrictive bin covers to prevent waste contamination in recycling bins.
- Develop a promotional campaign to communicate information about recycling program to staff, tenants, and passengers.
- Monitor and adjust recycling program using feedback from Stillwater Waste Management Department.

Recommendation 4: Tracking and Reporting

Relative Cost	Estimated Diversion	Benefits	Alignment
$ $ $			TRUE

Description

Monitoring waste metrics provides feedback on the efficiency of diversion efforts. Sharing this information with stakeholders has been shown to increase participation in diversion practices.

Action

It is recommended that SWO begin to regularly estimate and track the volume of waste sent to the landfill and diverted through reduction, reuse, donation, recycling, or other strategies. Sharing the total costs and cost savings associated with these services is also recommended. Additionally, SWO should discuss these trends with the waste hauler and share this information with program stakeholders (SWO staff and tenants).

Justification

SWO does not currently track metrics associated with its waste or recycling. Trends associated with SWO's waste generation, landfill, diversion, and associated costs could indicate opportunities for improvement.

Information Needed

- Waste generation, disposal, and cost estimates.
- Simple tracking tool (spreadsheet).
- Estimates for volume of waste diverted by various strategies and avoided costs.
- Mechanism for communicating progress to stakeholders.

Action Plan

- Collaborate with Stillwater Waste Management Department to measure or estimate waste disposal.
- Obtain estimate of associated costs from City of Stillwater.
- Enter estimates into tracking tool.
- As strategies are implemented, update tracking tool to reflect waste avoided or diverted, and their associated costs.
- Evaluate data for additional opportunities to set and pursue waste diversion goals.
- Share and celebrate progress with stakeholders.

WASTE PLAN GUIDING ELEMENTS

Additional Recommendations for Consideration

In addition to the primary recommendations stated previously, it is suggested that other items could be implemented at SWO, which are presented in **Table F-2**.

Table F-2: Additional Recommendations for SWO Waste Recycling Plan

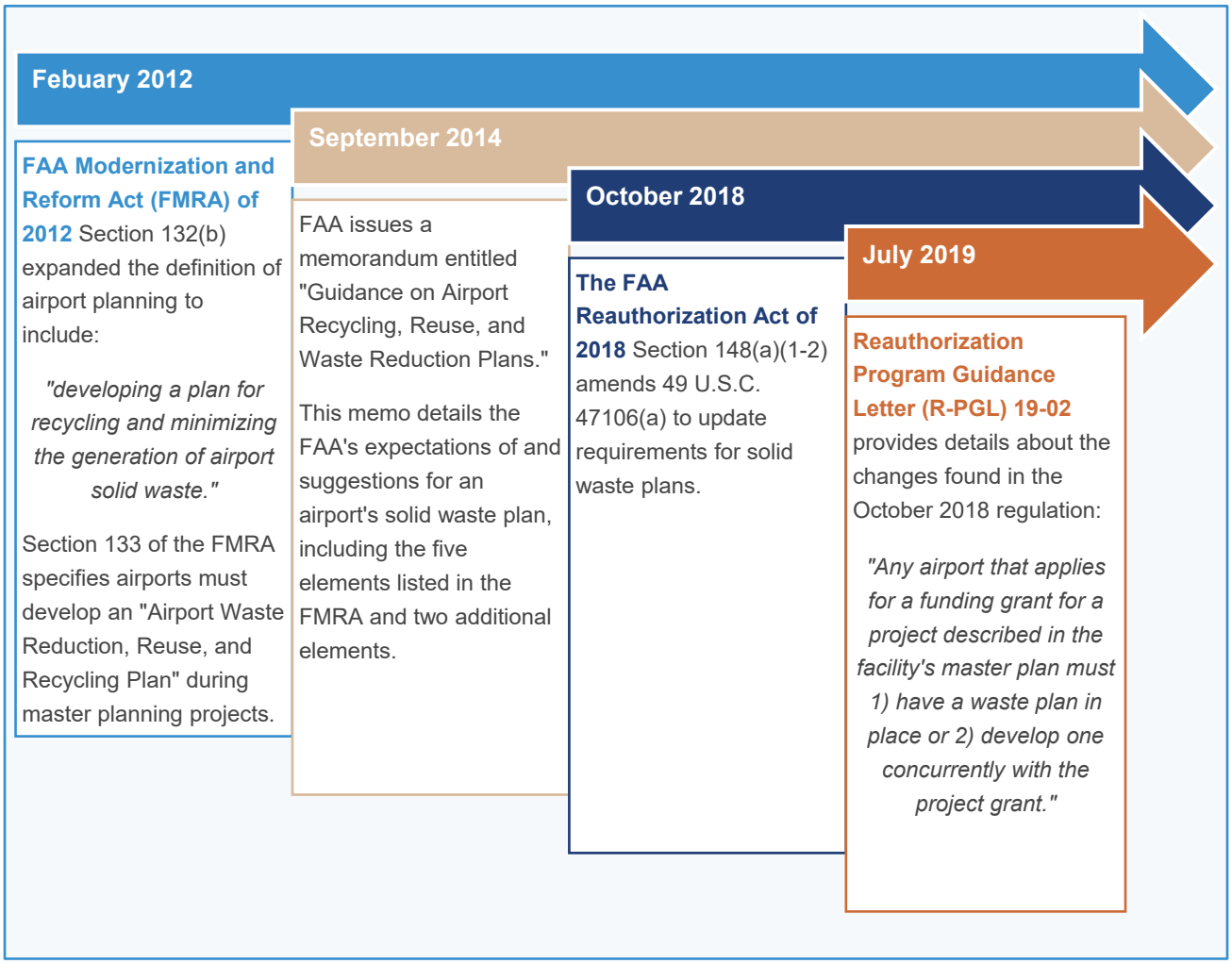
Recommendations Summary
Objectives and Targets Set specific, measurable, achievable, realistic, and time-bound (SMART) goals for SWO's waste program.
Tenant Requirements Revise rules and regulations and/or minimum standards to encourage or require waste diversion among tenants, including recycling.
Additional Facilities and New Development Consider waste diversion and management in the design and construction process of future airport projects.
Continuous Improvement Maintain and improve the recycling and waste program per the Plan Do Check Act cycle.

Source: Mead & Hunt.

Regulatory Background

Figure F-2 outlines the introduction timeline and specifics of FAA's waste planning requirement. The FAA provides content guidance for airport waste plans in the September 2014 memo on the topic (available on the FAA's website).

Figure F-2: FAA Solid Waste Recycling Planning Requirement Timeline and Details



Source: Federal Aviation Administration.

Figure F-3 details the elements which are required for a solid waste recycling plan per the FMRA (marked with an asterisk, *) or suggested for inclusion in a plan in the FAA Memo (marked with two asterisks, **). **Figure F-4** lists the factors influencing the scope and nature of an airport's waste program, as described in the FAA memo.

Figure F-3: Elements of Airport Solid Waste Management

Source: Federal Aviation Administration.

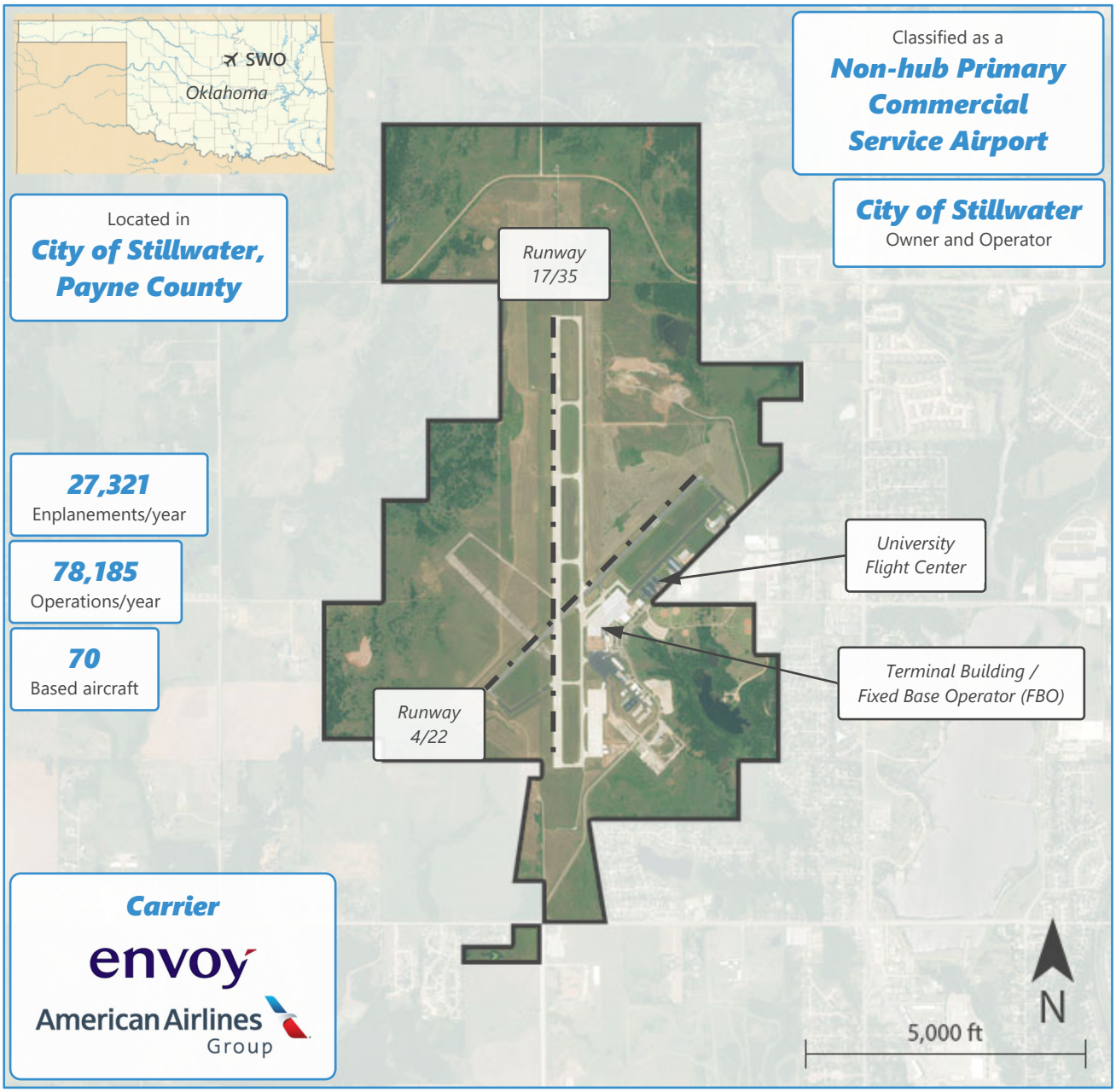
Figure F-4: Factors Influencing Airport Solid Waste Management Programs

Source: Federal Aviation Administration.

Airport Information

Figure F-5 shows a summary of background information about SWO, including its location, operations, air carrier, layout, classification, and governance.

Figure F-5: SWO Background Information



Sources: Stillwater Regional Airport; Google Earth; Alexrk – "USA Oklahoma location map".

Plan Scope

Municipal Solid Waste (MSW) consists of everyday items that are used and then discarded. This plan focuses on the management of MSW and other materials that may be recycled or disposed of in a municipal solid waste landfill. There are five primary types of MSW generated at airports:

- General MSW
- Food waste
- Green waste (yard waste)
- Deplaned waste
- Construction and demolition (C&D) waste.

This plan does not address the management of other waste types regulated by federal, state, or local laws, specifically: hazardous, universal, or industrial waste; waste from international flights, or C&D waste that is subject to special requirements/handling.

Facilities at SWO include buildings and areas over which SWO has a varying degree of control or influence over waste management practices. Some areas fall under direct control of SWO and its staff, while in other areas SWO has influence over but not direct control. According to FAA guidance, areas over which SWO has direct control or influence should be included in the Recycling, Reuse, and Waste Reduction Plan; areas outside SWO's direct control or influence may be excluded.

Table F-3 lists a breakdown of the areas SWO controls, influences, and neither controls nor influences.

Table F-3: Waste Management Areas at SWO

Management Level	Description
Areas under direct control	Public terminal areas • Parking and curbside • Ticketing / baggage claim area, restrooms, security queue, hold room
	Aircraft Rescue and Fire Fighting (ARFF) Station
	Airport Administration Areas • Office spaces • Conference rooms • Maintenance Facilities/SRE
Areas under influence	Terminal Tenants • TSA offices • Baggage screening • Envoy Airlines ticketing counter • Air Traffic Control Tower (ATCT)
	General Aviation (GA) facilities • Fixed Base Operator (FBO) Stillwater Flight Center • Private / leased hangars
	Oklahoma State University (OSU) Flight Center
Areas not under control or influence	TSA Security Checkpoint

Source: Stillwater Regional Airport.

Current Waste Management Program

The waste program at SWO is maintained by airport staff, and the City of Stillwater Waste Management Department directly manages waste collection. City garbage trucks collect waste and recyclable materials from SWO's dumpsters. Dumpsters are provided by the Waste Management Department for use by SWO. Recycling collection occurs only in the airport administration areas and in the Stillwater Flight Center FBO.

Figure F-6 shows the materials collected by the Stillwater Waste Management Department in SWO's existing recycling program.

Figure F-6: Items Currently Collected for Comingled Recycling at SWO

Source: Stillwater Regional Airport.

SWO's janitorial staff are managed by airport administration and are responsible for custodial activities in buildings and areas directly managed by the Airport, such as the public terminal and administration areas. Janitorial staff collect waste and recyclables from bins and transfer these materials to the appropriate dumpsters.

SWO's tenants (Envoy Airlines, OSU Flight Center, GA hangars, etc.) are responsible for custodial activities in their areas, including transferring waste to the appropriate dumpsters. Terminal tenants are responsible for housekeeping in their leased areas and use SWO's dumpsters. The OSU Flight Center, hangar tenants, and other aviation-related businesses at SWO are responsible for individual housekeeping and contracting for their own waste dumpsters and recycling services.

Infrastructure

Figure F-7 and **Figure F-8** detail the existing waste infrastructure in place at SWO.

Figure F-7: Existing Receptacles Collected by Waste Hauler

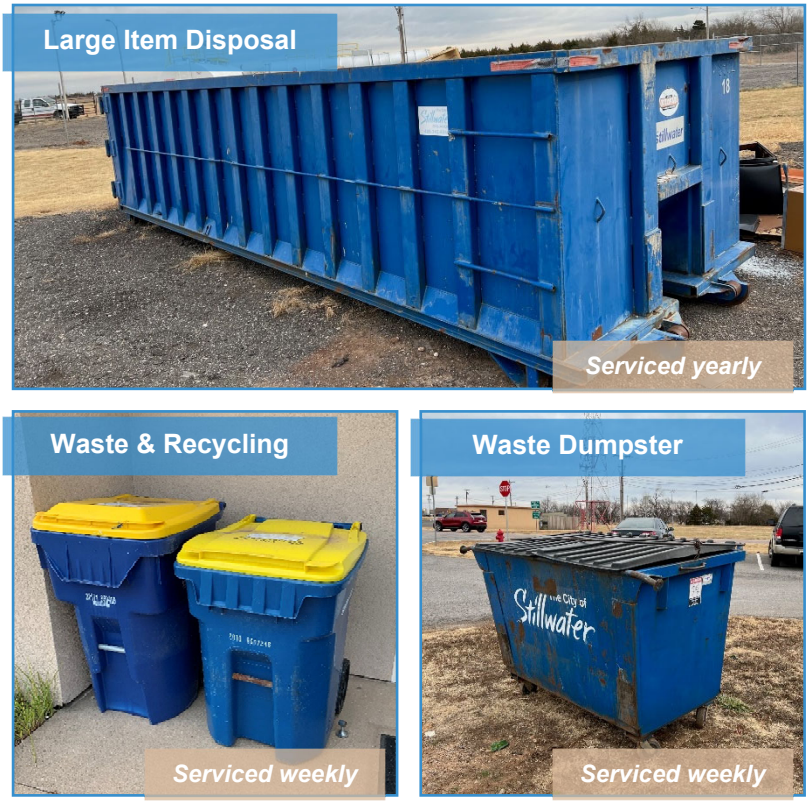


Figure F-8: Existing Terminal Building Infrastructure

Waste Audit

An evaluation of SWO's information and records, as well as aviation industry waste and recycling trends, supported efforts to identify the source, composition, and quantity of waste generated at SWO, including areas under SWO's direct control or influence. This information then served as a foundation to identify opportunities to improve and monitor program effectiveness.

Quantity

29
Annual tons of MSW

1
Annual ton of Recycling

These volumes are based upon the capacity and frequency of collection service for each of the facility's receptacles and the EPA's volume-to-weight conversion factors for MSW.

Purchases

SWO staff do not currently track the quantity and type of disposable items and supplies purchased for the facility. This information could provide insight on some of the materials coming into airport facilities that will go back out as waste (other materials are brought on-site by visitors, employees, and vendors). Identifying and tracking the type and quantity of all disposable items purchased will allow SWO to identify opportunities to reduce outgoing waste, including:

- Some items that could be eliminated
- Items that have reusable or recyclable alternatives.

Sources and Composition

Based on the activities taking place at SWO, a varied waste stream can be expected. **Table F-4** lists each area included in the scope of this plan and the type(s) of waste likely generated there. A waste sort could also be used to identify opportunities to improve the composition of the waste stream (by item substitution and by improving recycling to reduce the volume of waste, among others).

A physical waste material sort could provide more detailed information about the specific composition of waste at SWO. This information may include:

- Types of items included in each general category
- Contamination rate of the recycling stream
  (items that are not recyclable in the recycling bins)
- Recovery rate for recycling
  (the proportion of recyclable items that are segregated properly).

Table F-4: SWO Waste by Area and Material

Area | Material	Office Paper	Newspapers	Magazines	Plastic	Aluminum	Cardboard	Glass	Food Waste	Paper Products	Liquids	Toiletries	Deplaned Waste	Packaging	Styrofoam	Metals	Green Waste	C & D Waste	Other Waste
Terminal Building																		
Public areas		x	x	x	x		x	x	x	x			x					x
Airline areas	x	x	x	x	x	x	x	x	x	x		x	x					x
Tenant areas	x	x	x	x	x	x	x	x	x	x			x					x
Airport administration offices	x	x	x	x	x	x	x	x	x				x					x
TSA security queue		x	x	x	x		x	x		x	x		x					
Airport Support Buildings																		
Maintenance building	x	x	x	x	x	x	x	x	x	x			x	x				x
Airport maintenance facilities			x	x	x	x				x			x		x	x	x	x
GA facilities	x		x	x	x	x	x							x				
Other Airport Buildings																		
GA and commercial hangars				x	x	x	x	x		x			x					
Cargo tenant facilities	x			x	x	x	x	x					x	x				

Source: Stillwater Regional Airport.

Review of Recycling Feasibility

There are several factors that influence the feasibility of recycling and other waste diversion strategies at an airport. The project team assessed these factors for influence at SWO.

Guidelines and Policies

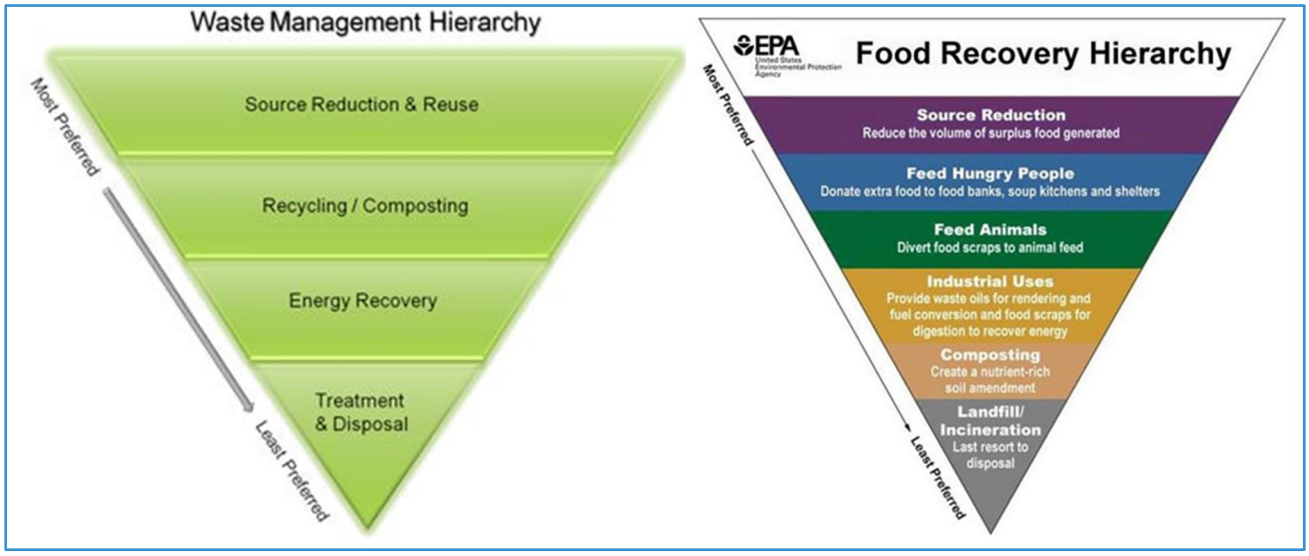
To evaluate SWO's existing diversion plan in the context of local, state, and national requirements, the project team reviewed federal, Oklahoma state, and local-level waste and recycling regulations, policies, and factors.

Federal

As described in **Regulatory Background**, the FAA's definition of airport planning includes planning for recycling and waste minimization. The EPA is responsible for developing a solid waste management program under the Resource Conservation and Recovery Act (RCRA) and related policies and guidance. RCRA provides the framework for management of hazardous and non-hazardous waste. All generators of hazardous waste, including airports, are required to comply with RCRA and all other federal waste laws and regulations.

Figure F-9 shows a hierarchy of waste management strategies developed by the EPA. This hierarchy on the left ranks these strategies from most- to least-environmentally preferred and places emphasis on reducing, reusing, and recycling. In addition to the general waste management hierarchy, the EPA has also developed a preference ranking of management strategies for food waste, as shown in the figure at the right.

Figure F-9: Waste Management and Food Recovery Hierarchies



Source: Environmental Protection Agency.

State

The Oklahoma Department of Environmental Quality (DEQ) oversees the state's waste management program. Oklahoma statute 252:515 states, "solid waste collection and transportation services shall be provided by all incorporated generators of solid waste located within the corporate city or town limits." While municipalities are not required to recycle under the statute, governmental entities may seek reimbursement for recycling programs under the Oklahoma Recycling Initiative.

Local

Payne County does not currently have a county-wide waste management program. All waste and recycling in the City of Stillwater is managed by the Stillwater Waste Management Department, which offers residential and commercial trash and recycling services for all city residents. The Oklahoma DEQ oversees the City's waste program, and accepts all recyclable materials listed in **Table F-5**.

Table F-5: Accepted Recyclable Items in the City of Stillwater

Disposal Area	Accepted Recyclable Items				
Curbside	• All paper	• Aluminum/tin cans	• Cardboard	• Plastics 1,2, & 5	• Glass
Drop-Off	• All paper • Plant material • Textiles/clothing	• Aluminum/tin cans • Antifreeze • Car batteries	• Cardboard • Appliances • Scrap metal	• Plastics 1,2, & 5 • Tires • Motor oil	• Glass • Rechargeable batteries

Source: Oklahoma Department of Environmental Quality.

Drivers and Constraints

Many factors affect recycling feasibility at SWO. Such factors include both opportunities for growth, such as local commitments, and challenges to the implementation of a recycling plan, such as the availability of region-wide recycling infrastructure.

Airport Policy, Commitment, and Support

The willingness of SWO staff, contractors, and tenants to support the existing recycling plan are critical to the program's success. Without committing resources such as funding, labor and time, space, and access to secure areas, a waste management program could struggle.

SWO's staff remain committed to the existing recycling program and wish to oversee its expansion into additional areas. They assert recycling and waste reduction represent opportunities for energy and cost savings, as well as providing a genuine service to the community.

Local Dedications

Based on the resources allocated to local recycling programs, the City of Stillwater appears to generally support waste diversion, responsible waste management, and sustainable operations. Based on the availability of residential and commercial recycling, this plan assumes the residents of the communities surrounding SWO, and therefore its employees and visitors, have been exposed to recycling, receive on-going messaging about its importance, and are generally supportive of recycling efforts.

Local Markets, Logistics, and Infrastructure

Markets for recycled materials fluctuate based on many factors and interactions. Local waste haulers typically accept materials that can be recycled cost-effectively in the area. Manufacturers purchasing recycled material need a predictable and ready for use product; therefore, recycling facilities are discriminatory about what materials they accept. They almost unilaterally prefer materials that are of high value, clean, and easy to separate.

The drop-off location for MSW in the City of Stillwater is the Republic Services Stillwater Landfill operated by Republic Services. The landfill facility is located approximately five miles northeast of SWO. Recycling is dropped off at the Payne County Recycling Center and it located approximately 10 miles south of SWO. Both facilities have adequate capacity to serve SWO and the local area for the foreseeable future.

Partnerships

American Airlines, Envoy Airlines' parent company, has established a sustainability program that includes elements of waste diversion and recycling for both passengers and internal operations. American Airlines has had an aluminum can recycling program since 1989, and internal operations reflect waste reduction and diversion through minimizing paper use and recycling electronic waste.

Aligning the SWO program with air carrier practices, like those of American's, provides opportunities for mutually beneficial agreements. SWO can reduce its environmental impact and, by helping the air carriers reduce their impact, generate goodwill with the local community.

Costs

Airport staff strive to operate SWO to be as self-sustaining as is feasible; therefore, it is imperative that programs implemented and maintained at SWO, including recycling and other waste diversion strategies, are as cost-effective as possible. See **Financial Analysis** for more information.

Review of Waste Management Contracts and Tenant Leases

The FAA memorandum titled "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans" explains that the purpose of reviewing waste management contracts is to "identify opportunities for improving (waste) program scope and efficiency, as well as identify constraints." By reviewing contracts and tenant leases for language pertaining to waste management practices, the waste plan may appropriately identify opportunities to encourage responsible waste management for all levels of airport activity.

The Consultant reviewed tenant leases for provisions related to waste management. The contracts detail general housekeeping requirements and related expectations for managing trash, but they provide no information about or requirement to reduce waste or recycle. The contracts do not necessarily impede recycling or other waste management strategies, but neither do they explicitly require conformance with or support of any future Airport-related waste efforts.

Financial Analysis

According to the FAA memo "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans," an analysis of the financial aspects of waste management assists airport sponsors in determining the cost versus benefit of all existing and proposed enhancements to an airport's practices and should include capital costs, physical infrastructure, transport, and labor.

A financial analysis of the cost for waste management at SWO was not conducted for this plan because the City of Stillwater serves as the waste service provider for all City facilities, including SWO. As a result, SWO does not receive invoices for waste collection services. It is anticipated that reducing and diverting waste generated at SWO would reduce costs through adjustments to the waste collection schedule and size of waste dumpsters required at the facility.

WASTE GLOSSARY

(Sorted by chronology)

FAA Modernization and Reform Act of 2012 (FMRA) – legislation that seeks to improve aviation safety and capacity of the national airspace system and provide a stable funding system.

FAA Reauthorization Act of 2018 – reauthorization of FMRA 2012 to extend funding and administrative authority to the FAA.

Total Resource Use and Efficiency (TRUE) – Zero waste certification program administered by the Green Business Certification Inc. (GBCI).

Environmental Protection Agency (EPA) – independent agency of the US government that establishes policies that protect the natural environment.

Reauthorization Program Guidance Letter (R-PGL) 19-02 – implements provisions to FAA Reauthorization Act of 2018 that changed project eligibility, scope, or funding under 49 U.S.C., Chapter 471.

Municipal Solid Waste (MSW) – everyday items that are used and then discarded. There are five primary types of MSW generated at airports:

- **General MSW** – common inorganic waste, such as product packaging, disposable utensils, plates and cups, bottles, and newspaper. Less common items, such as furniture and clothing, are also considered general MSW.
- **Food waste** – either food that is not consumed or the waste generated and discarded during food preparation. Food waste and green waste make up a waste stream known as compostable waste.
- **Green waste (yard waste)** – tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities. Food waste and green waste make up a waste stream known as compostable waste.
- **Deplaned waste** – waste removed from passenger aircraft. These materials include bottles and cans, newspaper and mixed paper, plastic cups, service ware, food waste, food-soiled paper, and paper towels.
- **Construction and demolition (C&D) waste** – any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipes, land clearing debris, cardboard, and salvaged building components.

Resource Conservation and Recovery Act (RCRA) – federal law of the US governing the disposal of solid or hazardous waste.

Oklahoma Department of Environmental Quality (DEQ) – Oklahoma state body dedicated “to protect and improve public health and our environment.”

APPENDIX ONE. SWOT Analysis

STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT) ANALYSIS

Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a strategic evaluation tool frequently used to identify existing influences, either positive or negative, in any number of situations. The SWOT analysis is employed early in the planning process, and it closely examines the four primary aspects in how they may influence the outcome of a project:

- **Strengths –** Internal characteristics that provide an advantage over others.
- **Weaknesses –** Internal characteristics that create a disadvantage compared to others.
- **Opportunities –** External elements that can be capitalized upon.
- **Threats –** External elements risks that can be detrimental.

These four components of the acronym can also be shown visually through the matrix shown below.

	Helps Progress	Harms Progress
Within Airport Influence	**Strengths**	**Weaknesses**
Outside Airport Influence	**Opportunities**	**Threats**

Stillwater Regional Airport (SWO or the Airport) is an important city economic asset with ample available land providing valuable properties for aviation development, therefore this method was used to aid in the development of goals, objectives, and visions for the Airport.

The following SWOT factors were identified by the Committee during the initial kick-off meeting and will be addressed throughout the Study:

Strengths

- Centrally located in the US
- Oklahoma State University (OSU) Flight Center
- Regularly scheduled commercial service operations
- Good pavement condition
- Contract Air Traffic Control Tower (ATCT)
- Community support
- 1,000 acres directly owned by the Airport, not including OSU or other surrounding properties
- Runway length can accommodate all types of aircraft operations

- Annual fuel sales exceeding half a million dollars
- Many services offered on the airfield
- Strong GA community
- Few to no noise complaints
- Research and Development (R&D) opportunities for Unmanned Aerial Systems (UAS)

Weaknesses

- No dedicated funding source for development activity
- Older and outdated facilities
- Lack of automation in the tower
- No facilities to house R&D airfield facilities
- No utilities supporting development of property on SWO's western side
- SWO not financially self-sufficient
- No specialty services incentivizing users to base their aircraft at SWO
- High turnover rate for ATCT personnel and TSA agents
- Difficult rightsizing commercial service aircraft to best fit the area

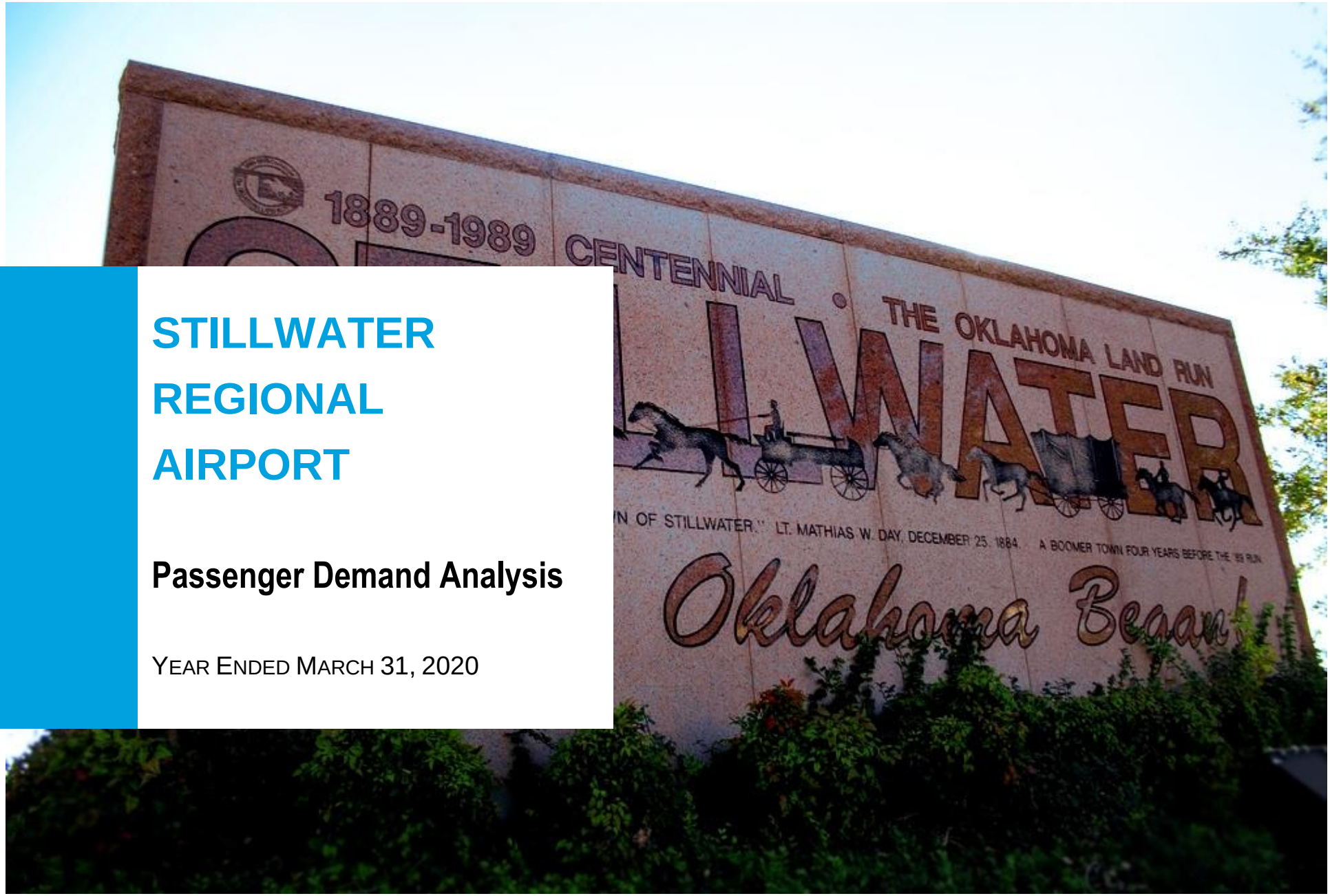
Opportunities

- Room for expansion of crosswind RWY (4/22)
- Room and demand for aircraft hangar construction
- OSU Flight School program growth
- University research group with UAS
- State and Department of Commerce pushing aerospace development
- Expansion of commercial service market
- Diversifying aircraft fuels and electronic aircraft

Threats

- COVID and its variants
- Uncertainty of commercial service market
- Declining funding for education
- Low-cost carriers at Oklahoma City and Tulsa
- No clear package drop-off locations result in unattended packages in the terminal building
- Pending economical concerns
- Change in airline business models
- Laws impacting funding and subsidies for airports

APPENDIX TWO. Passenger Demand Analysis



STILLWATER REGIONAL AIRPORT

Passenger Demand Analysis

YEAR ENDED MARCH 31, 2020

Mead & Hunt

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INTRODUCTION & METHODOLOGIES

INTRODUCTION

Achieving air service success requires thoroughly understanding the market and the needs of local stakeholders, airlines, and trends impacting the aviation industry. Air service development efforts are most effective when they follow a plan consistent with industry trends, the air service needs of the community and specific strategies of target airlines for additional air service. Stillwater Regional Airport (SWO) is subject to several trends that impact air service efforts, including:

- The years prior to the Coronavirus Disease 2019 (COVID-19) pandemic included major airline consolidation, fleet renewal with larger aircraft and rapid growth by ultra-low-cost carriers.
- The pandemic had an unprecedented worldwide impact on the airline industry. Airlines significantly reduced capacity as passenger demand dropped 90 percent in April 2020.
- Demand has slowly increased, but, in June 2021, capacity from the U.S. to Europe and Asia was still down more than 70 percent, and U.S. domestic capacity was down 14 percent. Even with the capacity reductions, March 2021 airline load factors were 21 points lower than the prior year.
- Prior to the pandemic, the industry was enjoying record profits due to lower fuel prices and less competition. Due to the pandemic, airlines have required financial aid and subsidies, but most have restructured debt and reduced costs to reduce cash burn and position for a return to profitability as demand returns.
- At the end of 2020, one-fourth of the U.S. passenger airline fleet was inactive, but airlines are seeing stronger demand in 2021 as the rate of vaccinations accelerate and the economy improves.
- Incentives for new service continue to be important to airline decision-making.
- Low-cost carriers and ultra-low-cost carriers, as a group, are growing faster than the majors as domestic leisure demand returns faster than business traffic during the pandemic.

With these trends in mind, the responsibility is on airports to monitor their market and be proactive with their air service development efforts, especially when performance issues are noted. When service improvements or new service is

sought, it is important that airports and communities know and understand their market, and the *Passenger Demand Analysis* is a critical tool in helping communities do so.

The ultimate impact on the airline industry from the pandemic is yet to be determined. There will be a long recovery period before the U.S. demand for air travel returns to normal conditions. This study reviews historical trends and demand as it existed through the first quarter of 2020. Assumptions about the pandemic-affected air travel environment have not been incorporated because there is not currently a clear view to where this evolving situation will lead. However, as with every other challenge to industry demand, the industry will rebound and air travel will continue to be a vital and growing element for economic development throughout the U.S. While the evolving environment will create temporary setbacks, the observations and recommendations of this study are still valid and important for long-term air service development.

OBJECTIVES

The objective of the *Passenger Demand Analysis* is to develop information on the travel patterns of airline passengers who reside in the SWO catchment area. The report provides an understanding of the SWO situation and formulates strategies for improvement. This analysis includes an estimate of total airline passengers in the catchment area and related destinations as well as an assessment of the air service situation at SWO.

METHODOLOGY

The *Passenger Demand Analysis* combines Airline Reporting Corporation (ARC) ticketed data and U.S. Department of Transportation (DOT) airline data to provide a comprehensive overview of the air travel market. For the purposes of this study, ARC data includes tickets purchased through travel agencies in the SWO catchment area (**Exhibit 3.1**, page 5) as well as tickets purchased via online travel agencies by passengers in the SWO catchment area. It does not capture tickets issued directly by airline web sites (e.g., www.aa.com, www.united.com) or directly through airline reservation offices. The data used include tickets for the zip codes in the catchment area, NOT all tickets. As a result, ARC data represents a sample to measure the air travel habits of catchment area air travelers. Data for travel agencies located within the catchment area is reported by the zip code of the travel agency. Online travel agency data (e.g. Expedia, Orbitz, and Travelocity) is reported by the customer zip code used to purchase the ticket. Although limitations exist, ARC data accurately portrays the airline ticket purchasing habits of a large cross-section of catchment area travelers. A total of 7,272 ARC tickets for the year ended March 31, 2020, were used in this analysis. Adjustments were made for Allegiant Air, Frontier Airlines and Southwest Airlines since they have limited ARC representation.

EXECUTIVE SUMMARY

DATA SOURCE/ CATCHMENT AREA

The *Passenger Demand Analysis* includes 7,272 ARC tickets from the SWO catchment area for the year ended March 31, 2020. The catchment area has an estimated population of 250,782 in 2020 and 60 zip codes. In addition to ARC data, Diio Mi origin and destination data and schedule data is used throughout the report.

DEPARTURES AND AVAILABLE SEATS

For the year ended March 31, 2020, SWO had service by one airline, American Airlines, to one hub/destination, Dallas-Fort Worth International Airport (DFW). SWO had 875 scheduled departures and 39,550 seats for the year ended March 31, 2020, with the peak month for seats in May.

AIRPORT USE

Fifteen percent of catchment area travelers used SWO, while 54 percent diverted to Oklahoma City's Will Rogers World Airport (OKC), 19 percent to Tulsa International Airport (TUL), 6 percent to DFW and 6 percent to Wichita Dwight D. Eisenhower National Airport (ICT).

In a comparison of domestic versus international itineraries, 15 percent of domestic travelers and 14 percent of international travelers used SWO. OKC served 55 percent of domestic and 47 percent of international travelers, while TUL served 19 percent of domestic and 14 percent of international travelers. DFW served 5 percent of domestic and 21 percent of international catchment area travelers. ICT served 6 percent of domestic and 4 percent of international travelers. Compared to the study completed for the year ended December 31, 2018, SWO's retention improved 1 percent overall, as the domestic retention increased slightly and the international retention decreased slightly.

TRUE MARKET

SWO's total air service market, called the true market, is estimated at 351,291 annual origin and destination passengers. Domestic travelers accounted for 318,455 of the total true market (91 percent). International travelers made up the remaining 32,836 passengers (9 percent). Compared to the study completed for the year ended December 31, 2018, the total true market increased 3 percent, with the domestic true market increasing 2 percent and the international true market increasing 12 percent.

DESTINATIONS

Forty-eight percent of travelers were destined to or from one of the top 25 markets. Denver was the number one destination with 4 percent of passengers. SWO retained only 5 percent of passengers to/from Denver. The next largest markets were Orlando-International, Atlanta, New York-LaGuardia and Seattle, with retention of 15, 10, 15 and 9 percent, respectively. Four of the top 25 markets had retention rates greater than 20 percent. Two markets had retention rates lower than 10 percent.

REGIONAL DISTRIBUTION

Twenty-five percent of travelers were destined to the Southeast region, followed by 14 percent to the West region. Travel to the Southwest region was the third highest. SWO's highest retention occurred in the Southwest region at 25 percent and the West region at 17 percent. The lowest retention occurred to the Northwest region (9 percent) and Alaska (5 percent). Of the international travelers, the top three international regions were Mexico and Central America, Europe, and Asia with the highest SWO retention to Asia (20 percent) and the lowest retention to Mexico and Central America, South America, and the Caribbean, each with retention of 11 percent.

AIRLINES USED

As the only service provider at SWO, American had the largest share of flown passengers based on U.S. DOT data at SWO. Airline share of diverting passengers were estimated using an approximation of carrier share with ARC data. An adjustment was made for Allegiant Air, Frontier Airlines and Southwest Airlines. Carrier shares of diverting SWO catchment area passengers were American with 37 percent, United Airlines with 24 percent, Southwest with 17 percent and Delta Air Lines with 16 percent. Alaska Airlines, Frontier Airlines and Allegiant each had a share of 2 percent or less while other various airlines served 2 percent.

PASSENGER ACTIVITY

Beginning with the initiation of service in the year ended March 31, 2017, SWO's passengers have increased each year since the first year, increasing 4.8 percent from 2019 to 2020. OKC and TUL had declining passengers while DFW and ICT passengers increased by less than 1 percent over the same period.

DOMESTIC AIRFARES

SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW. In individual markets, SWO had a higher fare than the highest fare at all of the competing airports in 14 of the top 25 markets. The highest fare difference compared to the highest fare at competing airports (greater than $50) was in the Denver, Phoenix-Sky Harbor and Portland markets.

AVERAGE FARE TREND

Overall from the year ended March 31, 2017 to 2020, average domestic fares increased at a CAGR of 3.3 percent at SWO, below the increase for DFW of 4.4 percent and above the increase for ICT of 0.7 percent. OKC's and TUL's fares decreased at CAGRs of 1.7 and 1.2 percent, respectively. In the latest year-ended period, SWO's fare differential compared to each of the competing airports decreased. The fare differential decreased by $5 compared to OKC, $6 compared to TUL, $3 compared to ICT and $8 compared to DFW.

NONSTOP SERVICE

For the year ended March 31, 2020, SWO had nonstop service to one of the top 25 catchment area destinations with an average of 17 weekly departures and one destination overall, DFW. OKC had service to 18 of the top 25 markets with an average of 412 weekly roundtrips, while TUL had service to 12 of the top 25 destinations with 295 weekly frequencies. DFW had service to 24 of the top 25 destinations and 259 total destinations. ICT had service to nine top 25 destinations with 215 weekly frequencies on average.

AIR SERVICE OPPORTUNITIES

SWO is one of the few communities in the U.S. that had no commercial service since deregulation and was able to successfully recruit traditional, legacy service. SWO needs to continue to concentrate on improving passenger levels on its flights, with load factors approximating 71 percent for the 12-months ended March 31, 2020. While this is above many peer markets at DFW, it is substantially below the industry and American averages. The revenue per available seat mile (RASM) for SWO also tends to be below many of its peer markets due to lower average fares. SWO should work with American to achieve average fares that are a consistent $30 to $40 one-way premium over what the fares for American are at OKC and TUL.

As SWO continues to recover post-pandemic, additional flights or capacity through use of larger aircraft are potential opportunities. In the near term, it is unlikely that SWO will be able to add service to a new hub either on American or a different airline until SWO is able to consistently have a RASM that is on par or above peer markets. Once RASM improves, new service to a new hub such as Chicago O'Hare International Airport on American or new service on United Airlines to Denver is possible.

AIRPORT USE

To understand airport use, it is important to understand the relative size of the catchment area, current air service and passenger activity. SWO's use was determined using year ended March 31, 2020, ARC data for the zip codes from the catchment area.

AIRPORT CATCHMENT AREA

An airport catchment area, or service area, is a geographic area surrounding an airport where it can reasonably expect to draw passenger traffic and is representative of the local market. The catchment area contains the population of travelers who should use SWO considering the drive time from the catchment area to competing airports. This population of travelers is SWO's focus market for air service improvements and represents the majority of travelers using the local airport. **Exhibit 3.1** identifies the SWO catchment area. It is comprised of 60 zip codes within the U.S. with a population of approximately 250,782 in 2020[1].

EXHIBIT 3.1 SWO CATCHMENT AREA

[1] *Source: U.S. Census Bureau, Woods & Poole Economics, Inc.*

AIR SERVICE

Table 3.1 provides SWO's departures and seats by month for the year ended March 31, 2020. One airline, American Airlines, served SWO to one destination, DFW. There were 875 scheduled departures for the 12-month period with two to three daily departures and 39,550 annual seats, with the peak month for seats in May.

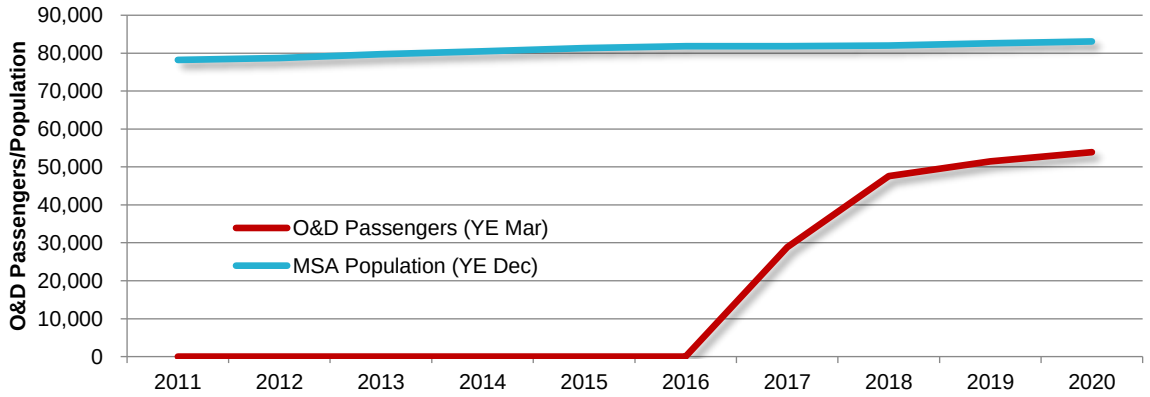
TABLE 3.1 DEPARTURES AND SEATS BY AIRLINE AND DESTINATION

DESTINATION	MARKETING CARRIER	CY 2019									CY 2020		
		APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Dallas, TX (DFW)	American	60	87	86	86	85	79	78	69	68	59	56	62
Total Departures		**60**	**87**	**86**	**86**	**85**	**79**	**78**	**69**	**68**	**59**	**56**	**62**
Total Seats		**2,640**	**3,828**	**3,784**	**3,790**	**3,740**	**3,632**	**3,618**	**3,264**	**3,232**	**2,764**	**2,530**	**2,728**

PASSENGER AND POPULATION TRENDS

Exhibit 3.2[2] plots passenger and population trends from 2011 to 2020. The Stillwater, Oklahoma, Micropolitan Statistical Area (Micro) was used for the growth trend of the SWO catchment area population. Since the initiation of commercial air service in the year ended March 31, 2017, passengers have grown each year, with a 4.8 percent growth rate for the year ended March 31, 2019, to the year ended March 31, 2020, while the population grew only 0.6 percent from calendar year 2019 to 2020.

EXHIBIT 3.2 PASSENGERS AND POPULATION TRENDS



[2] *Source: Diio Mi; Woods & Poole Economics, Inc.*

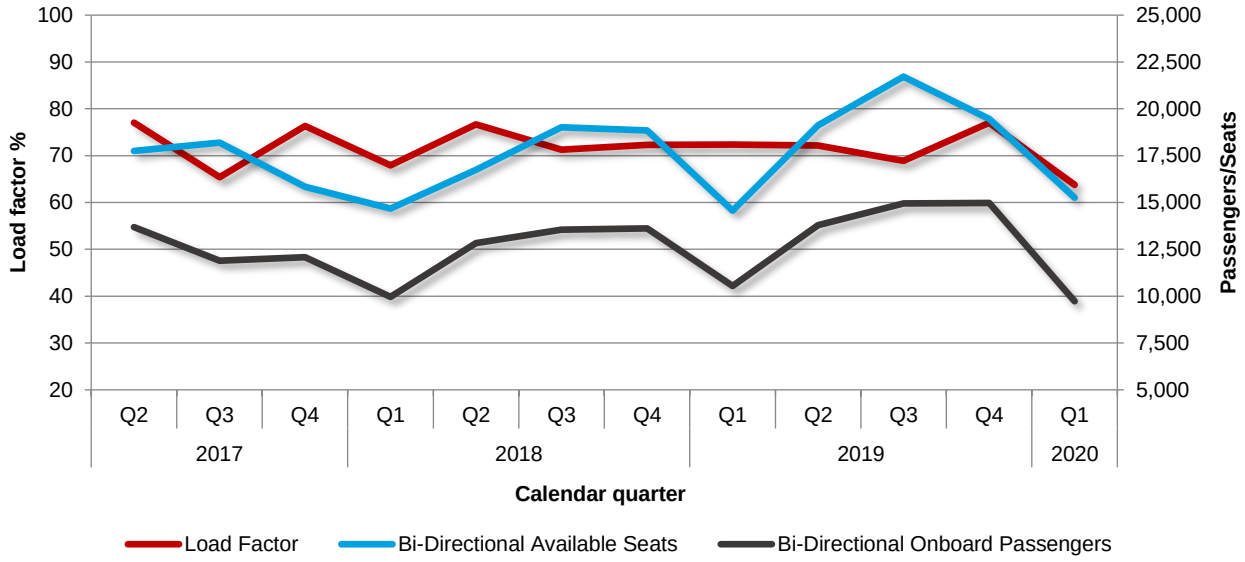
The average load factor decreased in three of the last four quarters year-over-year with an increase in seats in each of the last four quarters.

LOAD FACTOR, AVAILABLE SEATS AND PASSENGERS

Exhibit 3.3 shows SWO's bi-directional available seats, bi-directional onboard passengers and load factors for arrivals and departures by quarter from the second quarter 2017 through the first quarter 2020. The average load factor decreased in three of the last four quarters year-over-year with an increase in seats in each of the last four quarters. The lowest load factor during the 12-quarter period was in the first quarter of 2020 at 64 percent with part of March impacted by the pandemic. The high was in the second quarter of 2017 at 77 percent.

Over the three-year period, available seats were lowest in the first quarter of 2019 at 14,564. The highest number of seats was in the third quarter of 2019 at 21,714. The low for onboard passengers at SWO through the three-year span was in the first quarter of 2020, and the high for onboard passengers was in the fourth quarter of 2019. Onboard passengers increased in three of the last four quarters compared to the previous year.

EXHIBIT 3.3 LOAD FACTOR, AVAILABLE SEATS AND ONBOARD PASSENGERS



SWO retained 15 percent of its catchment area passengers, with OKC being the largest diversionary airport at 54 percent followed by TUL at 19 percent, DFW at 6 percent and ICT at 6 percent.

AIRPORT USE

Exhibit 3.4 shows the airports used by SWO catchment area travelers. An estimated 15 percent of the catchment area's air travelers used SWO for their trips; 54 percent diverted to OKC, 19 percent to TUL, 6 percent to DFW and 6 percent to ICT.

Table 3.2 shows passengers by domestic and international itineraries. Fifteen percent, or 49,398 domestic travelers, and 14 percent, or 4,499 international travelers, used SWO. OKC is the top diversionary airport for domestic passengers, serving 55 percent of domestic travelers, and the highest diversionary airport for international travelers serving 47 percent. TUL served the second highest share of diverting domestic passengers with 19 percent of domestic travelers versus serving 14 percent of international travelers. DFW served 5 percent of domestic and 21 percent of international travelers, while ICT served 6 percent of domestic and 4 percent of international travelers. Compared to the study completed for the year ended December 31, 2018, the total true market increased 3 percent, with the domestic true market increasing 2 percent and the international true market increasing 12 percent. SWO's retention improved 1 percent overall, as the domestic retention increased slightly and the international retention decreased slightly.

EXHIBIT 3.4 AIRPORT USE

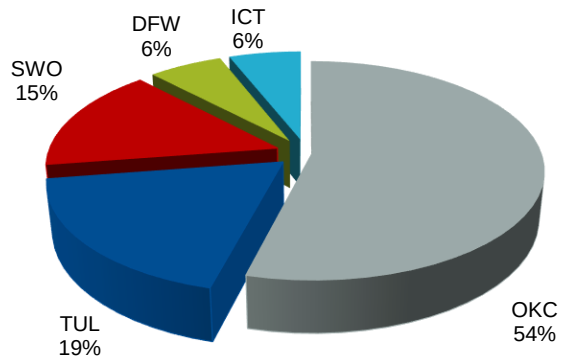


TABLE 3.2 AIRPORT USE - DOMESTIC & INTERNATIONAL COMPARISON

RANK	ORIGINATING AIRPORT	AIRPORT USE	
		PAX	%
Domestic			
1	OKC	174,351	55
2	TUL	60,643	19
3	SWO	49,398	15
4	ICT	19,602	6
5	DFW	14,461	5
Subtotal		**318,455**	**100**
International			
1	OKC	15,307	47
2	DFW	7,049	21
3	TUL	4,631	14
4	SWO	4,499	14
5	ICT	1,350	4
Subtotal		**32,836**	**100**
Domestic and International			
1	OKC	189,658	54
2	TUL	65,274	19
3	SWO	53,897	15
4	DFW	21,510	6
5	ICT	20,952	6
Total		**351,291**	**100**

AIRPORT USE BY COMMUNITY

Airport retention rates by community are an important aspect to understanding the overall SWO catchment area. ARC tickets include local travel agency data which is reported by the agency zip code and online travel agency data which is reported by the passenger zip code. **Table 3.3** shows how retention varies among the local communities within it.

Overall, the Stillwater community generated the highest number of true market passengers, with 131,923 annual passengers, 38 percent of the total. The Enid community generated more than 92,000 passengers while the Ponca City community generated more than 35,000 annual passengers. Communities that generally do not use SWO (0 percent retention) included the Hennessey, Pawhuska, Crescent, Waukomis, Newkirk and Pond Creek communities. The highest retention (greater than 20 percent) was in the Stillwater, Perry, Glencoe and Orlando communities.

TABLE 3.3 AIRPORT USE BY COMMUNITY

COMMUNITY	% AIRPORT USE					TRUE MARKET PASSENGERS
	OKC	TUL	SWO	DFW	ICT	
Stillwater	43	18	31	7	1	131,923
Enid	78	10	3	6	4	92,399
Ponca City	40	25	8	4	22	35,166
Perkins	63	11	17	6	2	9,737
Cushing	43	43	5	8	2	8,992
Perry	53	20	24	4	0	7,356
Blackwell	30	6	10	5	49	4,817
Hennessey	100	0	0	0	0	5,064
Pawhuska	5	91	0	2	1	4,982
Crescent	92	3	0	5	0	3,960
Pawnee	14	43	7	33	3	3,693
Tonkawa	53	12	1	9	24	3,552
Glencoe	38	32	26	5	0	3,438
Waukomis	92	4	0	3	2	2,711
Newkirk	34	11	0	5	50	2,450
Morrison	65	11	7	14	2	2,001
Pond Creek	67	7	0	5	22	1,979
Orlando	73	0	27	0	0	1,728
Other	49	30	5	5	10	25,342
Total	**54**	**19**	**15**	**6**	**6**	**351,291**

TRUE MARKET

The true market portion of the *Passenger Demand Analysis* provides the total number of passengers in the catchment area; specifically, it analyzes the portion of passengers diverting from the SWO catchment area. This section investigates destinations associated with travel to and from the catchment area. In addition, destinations are grouped into geographic regions to further understand the regional flows of catchment area air travelers.

TRUE MARKET ESTIMATE

The airport catchment area (**Exhibit 3.1**, page 5) represents the geographic area from which the airport primarily attracts air travelers. Domestic airlines report origin and destination traffic statistics to the U.S. DOT on a quarterly basis. Used by itself, these traffic statistics do not quantify the total size of an air service market. By combining ARC tickets with passenger data contained in the U.S. DOT airline reports, an estimate of the total air travel market by destination was calculated. The total air travel market is also referred to as the “true market”. Passengers were estimated for domestic and international markets on a destination basis. Adjustments were made to account for Allegiant Air, Frontier Airlines and Southwest Airlines, which are under-represented in ARC data.

The ARC data used in this report includes information on initiated passengers ticketed by local or online travel agencies. This enables the identification of passenger retention and diversion. According to U.S. DOT airline reports for the year ended March 31, 2020, 66 percent of SWO origin and destination passengers initiated air travel from SWO, and the other 34 percent began their trip from another city (e.g. New York, Dallas and Phoenix). For the purposes of this analysis, it is assumed that travel patterns for SWO visitors mirror catchment area passengers.

TOP 25 TRUE MARKET DESTINATIONS

The top 25 destinations for SWO (shown in **Table 4.1**) accounted for 48 percent of the travel to/from the SWO catchment area. Denver was the largest market with 14,798 annual passengers (20.3 passengers daily each way [PDEW]) and accounted for 4 percent of all catchment area travel. Orlando-International, Atlanta, New York-LaGuardia and Seattle made up the remaining top five markets. SWO had nonstop service to one of the top 10 markets, DFW.

TABLE 4.1 TRUE MARKET ESTIMATE - TOP 25 DESTINATIONS

RANK	DESTINATION	SWO REPORTED PAX	DIVERTED PAX	TRUE MARKET	PDEW
1	Denver, CO	810	13,989	14,798	20.3
2	Orlando, FL (MCO)	2,182	11,946	14,128	19.4
3	Atlanta, GA	1,006	8,603	9,608	13.2
4	New York, NY (LGA)	1,408	7,992	9,400	12.9
5	Seattle, WA	801	8,236	9,037	12.4
6	Chicago, IL (ORD)	1,074	7,946	9,020	12.4
7	Dallas, TX (DFW)	4,769	3,624	8,393	11.5
8	Los Angeles, CA	883	7,099	7,982	10.9
9	Houston, TX (IAH)	945	6,750	7,694	10.5
10	Tampa, FL	970	6,037	7,007	9.6
11	Nashville, TN	1,140	5,545	6,685	9.2
12	Washington, DC (DCA)	978	5,473	6,450	8.8
13	New Orleans, LA	684	5,221	5,905	8.1
14	Boston, MA	956	4,726	5,682	7.8
15	Phoenix, AZ (PHX)	624	4,909	5,534	7.6
16	Portland, OR	581	4,711	5,292	7.2
17	Philadelphia, PA	657	4,214	4,871	6.7
18	Las Vegas, NV	737	4,121	4,858	6.7
19	Fort Lauderdale, FL	518	3,982	4,500	6.2
20	Newark, NJ	641	3,660	4,302	5.9
21	San Francisco, CA	933	3,192	4,125	5.7
22	Salt Lake City, UT	510	3,237	3,747	5.1
23	Cancun, Mexico	338	3,334	3,671	5.0
24	San Diego, CA	1,062	2,576	3,638	5.0
25	Minneapolis, MN	702	2,694	3,397	4.7
Top 25 destinations		**25,909**	**143,816**	**169,725**	**232.5**
Total domestic		**49,398**	**269,057**	**318,455**	**436.2**
Total international		**4,499**	**28,337**	**32,836**	**45.0**
All markets		**53,897**	**297,394**	**351,291**	**481.2**

Four markets had retention greater than 20 percent, including DFW, San Francisco, San Diego and Minneapolis, while two markets had retention of less than 10 percent, Denver and Seattle.

TOP 25 DOMESTIC DESTINATIONS

Table 4.2 shows the percentage of passengers by market and originating airport for the top 25 domestic destinations. Fifteen percent of passengers used SWO for travel to the top 25 domestic markets. Overall, the highest retention rates by market (greater than 20 percent) included DFW, San Francisco, San Diego and Minneapolis. The lowest retention rates (less than 10 percent) included Denver and Seattle.

TABLE 4.2 TOP 25 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

RANK	DESTINATION	ORIGIN AIRPORT %					TOTAL PAX
		OKC	TUL	SWO	ICT	DFW	
1	Denver, CO	55	30	5	6	4	14,798
2	Orlando, FL (MCO)	54	25	15	4	1	14,128
3	Atlanta, GA	49	19	10	16	5	9,608
4	New York, NY (LGA)	52	20	15	4	10	9,400
5	Seattle, WA	67	10	9	12	2	9,037
6	Chicago, IL (ORD)	57	21	12	5	5	9,020
7	Dallas, TX (DFW)	28	13	57	3	0	8,393
8	Los Angeles, CA	57	23	11	2	7	7,982
9	Houston, TX (IAH)	58	23	12	4	3	7,694
10	Tampa, FL	57	20	14	3	6	7,007
11	Nashville, TN	56	23	17	1	3	6,685
12	Washington, DC (DCA)	76	5	15	2	1	6,450
13	New Orleans, LA	72	2	12	13	2	5,905
14	Boston, MA	47	16	17	2	18	5,682
15	Phoenix, AZ (PHX)	62	18	11	8	1	5,534
16	Portland, OR	55	28	11	5	1	5,292
17	Philadelphia, PA	40	37	13	1	8	4,871
18	Las Vegas, NV	57	20	15	3	4	4,858
19	Fort Lauderdale, FL	55	33	12	1	1	4,500
20	Newark, NJ	62	16	15	1	5	4,302
21	San Francisco, CA	38	10	23	12	18	4,125
22	Salt Lake City, UT	51	25	14	3	7	3,747
23	San Diego, CA	47	9	29	10	5	3,671
24	Minneapolis, MN	31	24	21	21	4	3,638
25	Charlotte-Douglas, NC	56	22	15	7	0	3,397
Top 25 Domestic		**54**	**20**	**15**	**6**	**5**	**169,725**
Total Domestic		**55**	**19**	**15**	**6**	**5**	**318,455**

Top markets for diverting airports were mixed, largely dependent on the type and frequency of available service.

TOP 10 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

Table 4.3 shows the top 10 markets when passengers exclusively fly out of SWO as well as the top 10 markets when passengers fly exclusively from the alternate airports. Top markets for each of the diverting airports were mixed, largely dependent on the type of nonstop service available and frequency of service. Only Atlanta appeared in each of the diverting airports top 10 markets.

TABLE 4.3 TOP 10 DOMESTIC DESTINATIONS BY ORIGINATING AIRPORT

RANK	OKC		TUL		SWO	
	DESTINATION	PAX	DESTINATION	PAX	DESTINATION	PAX
1	Denver, CO	8,084	Denver, CO	4,420	Dallas, TX (DFW)	4,769
2	Orlando, FL (MCO)	7,695	Orlando, FL (MCO)	3,494	Orlando, FL (MCO)	2,182
3	Seattle, WA	6,089	Chicago, IL (ORD)	1,933	New York, NY (LGA)	1,408
4	Chicago, IL (ORD)	5,101	New York, NY (LGA)	1,902	Nashville, TN	1,140
5	Washington, DC (DCA)	4,928	Atlanta, GA	1,873	Chicago, IL (ORD)	1,074
6	New York, NY (LGA)	4,853	Los Angeles, CA	1,823	San Diego, CA	1,062
7	Atlanta, GA	4,718	Philadelphia, PA	1,799	Atlanta, GA	1,006
8	Los Angeles, CA	4,589	Houston, TX (IAH)	1,755	Washington, DC (DCA)	978
9	Houston, TX (IAH)	4,455	Nashville, TN	1,555	Tampa, FL	970
10	New Orleans, LA	4,226	Fort Lauderdale, FL	1,463	Austin, TX	965

RANK	ICT		DFW	
	DESTINATION	PAX	DESTINATION	PAX
1	Atlanta, GA	1,542	Boston, MA	1,047
2	Seattle, WA	1,045	New York, NY (LGA)	896
3	Denver, CO	877	San Francisco, CA	760
4	New Orleans, LA	746	Denver, CO	607
5	Minneapolis, MN	702	Los Angeles, CA	556
6	Orlando, FL (MCO)	623	Chicago, IL (ORD)	483
7	Fresno, CA	576	Atlanta, GA	469
8	San Francisco, CA	484	Tampa, FL	431
9	Norfolk, VA	482	Philadelphia, PA	394
10	Phoenix, AZ (PHX)	437	Jacksonville, FL	341

TOP 15 INTERNATIONAL DESTINATIONS

Table 4.4 shows the percentage of passengers for the top 15 international destinations by originating airport. Only the top 15 international destinations are shown due to the smaller market sizes involved with international itineraries and limited available data. SWO retained 13 percent of the catchment area passengers destined for the top 15 international markets.

Cancun, Mexico; London-Heathrow, United Kingdom; and Mexico City, Mexico were the top three international markets. San Jose del Cabo, Mexico and Vancouver, Canada made up the remainder of the top five markets. The highest retention (15 percent or greater) was to Shanghai, China; Beijing, China; Toronto, Canada; Amsterdam, Netherlands; and Mazatlan, Mexico. The lowest retention at less than 10 percent was to Cancun, Mexico; Vancouver, Canada; Dublin, Ireland; Lima, Peru; and Rome, Italy.

TABLE 4.4 TOP 15 INTERNATIONAL DESTINATIONS BY ORIGINATING AIRPORT

RANK	DESTINATION	ORIGIN AIRPORT %					PASSENGERS	
		OKC	DFW	TUL	SWO	ICT	TOTAL	PDEW
1	Cancun, Mexico	35	39	17	9	0	3,671	5.0
2	London, UK (LHR)	54	25	8	13	0	2,041	2.8
3	Mexico City, Mexico	22	59	7	12	0	1,964	2.7
4	San Jose del Cabo, Mexico	51	6	29	11	3	1,908	2.6
5	Vancouver, Canada	46	4	23	8	19	1,166	1.6
6	Shanghai, China	48	19	13	15	4	1,141	1.6
7	Dublin, Ireland	69	9	9	9	4	1,007	1.4
8	Beijing, China	48	13	0	40	0	981	1.3
9	Toronto, Canada	39	3	12	21	24	902	1.2
10	Amsterdam, Netherlands	48	19	13	15	4	884	1.2
11	Ho Chi Minh City, Vietnam	79	0	0	13	8	842	1.2
12	Calgary, Canada	39	19	19	13	10	830	1.1
13	Lima, Peru	28	24	40	5	4	769	1.1
14	Mazatlan, Mexico	48	19	13	15	4	567	0.8
15	Rome-Da Vinci, Italy	64	0	27	9	0	563	0.8
Top 15 International		**45**	**23**	**15**	**13**	**4**	**19,238**	**26.4**
Total International		**47**	**21**	**14**	**14**	**4**	**32,836**	**45.0**

Most airline hubs are directional and flow passenger traffic to and from geographic regions, not just destinations within the region.

FEDERAL AVIATION ADMINISTRATION (FAA) GEOGRAPHIC REGIONS

It is important to identify and quantify air travel markets, but it is also important to measure air travel by specific geographic regions. Generally, airlines operate route systems that serve geographic areas. Additionally, most airline hubs are directional and flow passenger traffic to and from geographic regions, not just destinations within the region. Therefore, air service analysis exercises consider the regional flow of passenger traffic as well as passenger traffic to a specific city. Accordingly, this section analyzes the regional distribution of air travelers from the airport catchment area. For this exercise, the FAA geographic breakdown of the U.S. is used (**Exhibit 4.1**).

EXHIBIT 4.1 FAA GEOGRAPHIC REGIONS

The Southeast region was the largest traveled region, with 25 percent of passengers, followed by the West region.

REGIONAL DISTRIBUTION OF TRAVELERS

Table 4.5 divides catchment area travel into the FAA's nine geographic regions and one catch-all international region. The Southeast region was the largest traveled region, with 25 percent of passengers. The West region was the second largest with 14 percent of passengers, followed by the Southwest, Northwest and East regions.

SWO's retention rates were highest to the Southwest region (25 percent) and West region (17 percent) while its lowest retention rates were to the Northwest region (9 percent) and Alaska (5 percent).

TABLE 4.5 REGIONAL DISTRIBUTION OF TRAVEL BY AIRPORT

AIRPORT		REGION										
		SE	W	SW	NW	E	GL	INTL	NE	C	AK	TOTAL
OKC	Pax	46,030	27,420	23,844	25,300	23,350	19,468	15,307	4,990	2,928	1,022	189,658
	%	24	14	13	13	12	10	8	3	2	1	100
TUL	Pax	18,926	7,034	7,091	9,578	8,711	6,425	4,631	1,179	1,002	697	65,274
	%	29	11	11	15	13	10	7	2	2	1	100
SWO	Pax	12,675	8,184	11,341	3,794	5,931	5,148	4,499	1,298	909	117	53,897
	%	24	15	21	7	11	10	8	2	2	0	100
DFW	Pax	3,749	3,039	1,366	1,392	2,087	1,388	7,049	1,063	285	93	21,510
	%	17	14	6	6	10	6	33	5	1	0	100
ICT	Pax	5,340	3,229	2,567	3,165	1,861	2,285	1,350	328	409	418	20,952
	%	25	15	12	15	9	11	6	2	2	2	100
Total	**Pax**	**86,720**	**48,906**	**46,208**	**43,230**	**41,940**	**34,714**	**32,836**	**8,857**	**5,532**	**2,347**	**351,291**
	%	**25**	**14**	**13**	**12**	**12**	**10**	**9**	**3**	**2**	**1**	**100**
SWO Retention %		**15**	**17**	**25**	**9**	**14**	**15**	**14**	**15**	**16**	**5**	**54**

Mexico and Central America was the largest international region, with 33 percent of SWO catchment area international passengers. SWO retained 11 percent of travelers to Mexico and Central America.

DISTRIBUTION OF INTERNATIONAL TRAVEL

Table 4.6 shows international travelers by airport and region. Nine percent of catchment area travelers had international itineraries. Mexico and Central America was the most frequented international region with 33 percent, or 10,725 of the total 32,836 catchment area international travelers, followed by Europe with 26 percent and Asia with 18 percent of the total. Canada was the fourth largest region with 9 percent of international travel. The remaining top international regions were, in order of greatest to least: South America, the Caribbean, the Middle East, Australia and Oceania, and Africa.

SWO's retention averaged 14 percent for international destinations. SWO's retention was highest (20 percent or greater) to Asia (20 percent). SWO's lowest retention (11 percent) was to Mexico and Central America, South America and the Caribbean.

TABLE 4.6 REGIONAL DISTRIBUTION OF INTERNATIONAL PASSENGERS

REGION	ORIGINATING AIRPORT					TRUE MARKET	% OF COLUMN	SWO RETENTION %
	OKC	DFW	TUL	SWO	ICT			
Mexico & Central America	4,245	3,463	1,679	1,167	171	10,725	33	11
Europe	4,542	1,545	1,043	1,189	254	8,573	26	14
Asia	3,151	961	493	1,181	232	6,018	18	20
Canada	1,280	258	557	408	529	3,032	9	13
South America	693	370	435	188	73	1,758	5	11
Caribbean	631	153	216	127	22	1,149	4	11
Middle East	367	143	100	115	33	758	2	15
Australia & Oceania	311	121	85	97	28	642	2	15
Africa	87	34	24	27	8	180	1	15
Total passengers	**15,307**	**7,049**	**4,631**	**4,499**	**1,350**	**32,836**	**100**	**14**
% of row	**47**	**21**	**14**	**14**	**4**	**100**	**-**	**-**

AIRLINES

Information in this section identifies airline use by catchment area air travelers. The information is airport and airline specific. The intent is to determine which airlines are used to travel to specific destinations. The airline market share at SWO is based on U.S. DOT airline reported data. Airline market share at diverting airports is based on ARC data and is an estimation of the carrier's share of diverted passengers.

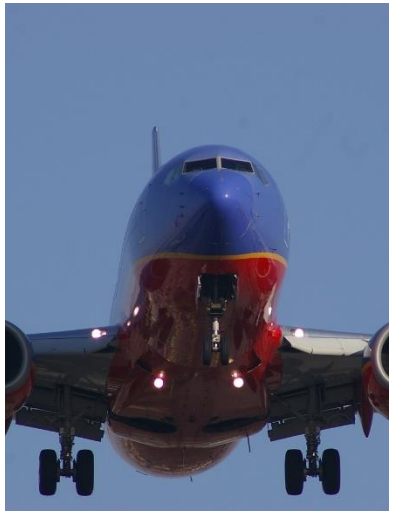
AIRLINES USED AT SWO

Table 5.1[3] provides the airline share for the top 25 SWO true markets and total share by airline at SWO. American Airlines carried the highest share as the only airline to provide nonstop service at SWO. All other carriers, through codeshare and interline connections, served 1 percent of passengers.

TABLE 5.1 AIRLINES USED AT SWO

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %		TOTAL PAX
		AA	OTHER	
1	Dallas, TX (DFW)	100	0	4,769
2	Orlando, FL (MCO)	100	0	2,182
3	New York, NY (LGA)	100	0	1,408
4	Nashville, TN	100	0	1,140
5	Chicago, IL (ORD)	100	0	1,074
6	San Diego, CA	100	0	1,062
7	Atlanta, GA	100	0	1,006
8	Washington, DC (DCA)	100	0	978
9	Tampa, FL	100	0	970
10	Austin, TX	100	0	965
11	San Antonio, TX	100	0	964
12	Boston, MA	100	0	956
13	Houston, TX (IAH)	100	0	945
14	San Francisco, CA	100	0	933
15	Los Angeles, CA	100	0	883
16	Miami, FL	100	0	812
17	Denver, CO	100	0	810
18	Seattle, WA	100	0	801
19	Las Vegas, NV	100	0	737
20	Houston, TX (HOU)	100	0	729
21	Minneapolis, MN	100	0	702
22	New Orleans, LA	100	0	684
23	Sacramento, CA	100	0	683
24	Philadelphia, PA	100	0	657
25	Newark, NJ	100	0	641
Total Top 25		**100**	**0**	**27,491**
Total All Markets		**99**	**1**	**53,897**

[3] *Source: Diio Mi; Year Ended March 31, 2020*



AIRLINES USED AT OKC

Table 5.2 shows the airlines used and top destinations when travelers from the catchment area used OKC. American had the highest estimated share of catchment area passengers at OKC, carrying 37 percent of diverting passengers. United Airlines had the second highest share at 24 percent, followed by Southwest Airlines, Delta Air Lines, Alaska Airlines and Frontier Airlines. All other carriers combined for the remaining 2 percent of passengers.

TABLE 5.2 AIRLINES USED AT OKC

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %							TOTAL OKC PAX
		AA	UA	WN	DL	AS	F9	OTHER	
1	Denver, CO	14	63	12	0	0	12	0	8,084
2	Orlando, FL (MCO)	22	19	18	24	0	18	0	7,695
3	Seattle, WA	15	42	1	5	36	1	2	6,089
4	Chicago, IL (ORD)	57	43	0	0	0	0	0	5,101
5	Washington, DC (DCA)	48	1	52	0	0	0	0	4,928
6	New York, NY (LGA)	45	16	33	6	0	0	0	4,853
7	Atlanta, GA	6	10	0	84	0	0	0	4,718
8	Los Angeles, CA	81	11	1	1	3	1	1	4,589
9	Houston, TX (IAH)	5	95	0	0	0	0	0	4,455
10	New Orleans, LA	32	17	52	0	0	0	0	4,226
11	Tampa, FL	35	8	42	15	0	0	0	4,003
12	Nashville, TN	26	17	50	7	0	0	0	3,731
13	Phoenix, AZ (PHX)	95	2	1	2	0	1	0	3,411
14	Portland, OR	29	38	2	25	5	2	0	2,927
15	Chicago, IL (MDW)	0	0	90	10	0	0	0	2,806
16	Las Vegas, NV	67	18	0	14	0	0	0	2,784
17	Newark, NJ	14	59	11	16	0	0	0	2,669
18	Boston, MA	46	3	30	21	0	0	0	2,660
19	Fort Lauderdale, FL	23	9	46	21	0	0	0	2,465
20	Dallas, TX (DFW)	100	0	0	0	0	0	0	2,337
21	Sacramento, CA	42	31	1	26	0	1	0	2,193
22	Fort Myers, FL	34	22	16	28	0	0	0	1,995
23	Norfolk, VA	55	6	20	18	0	0	0	1,958
24	Philadelphia, PA	84	10	1	3	0	1	0	1,955
25	Salt Lake City, UT	12	8	2	74	0	2	0	1,900
Total Top 25		**36**	**25**	**19**	**14**	**3**	**3**	**0**	**94,531**
Total All Markets		**37**	**24**	**18**	**16**	**2**	**1**	**2**	**189,658**

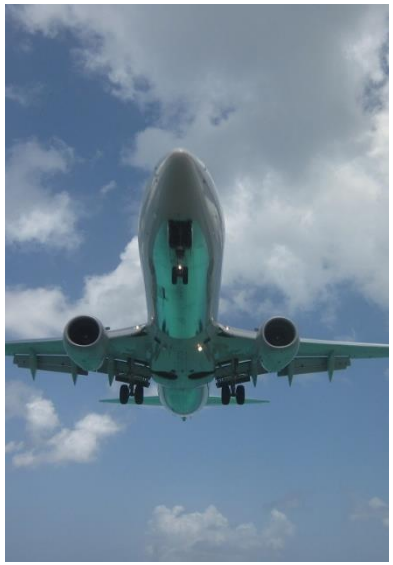
American Airlines had the highest share of catchment area passengers at TUL, carrying 33 percent of diverting passengers, followed by United Airlines at 26 percent.

AIRLINES USED AT TUL

Table 5.3 shows the airlines used and top destinations when travelers from the catchment area used TUL. American had the highest share of catchment area passengers at TUL, carrying 33 percent of diverting passengers, followed by United with 26 percent of passengers. Southwest had the third highest share at 21 percent, while Delta had the fourth highest share at 16 percent. Other carriers combined for the remaining 4 percent of passengers.

TABLE 5.3 AIRLINES USED AT TUL

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL TUL PAX
		AA	UA	WN	DL	OTHER	
1	Denver, CO	3	75	11	0	11	4,420
2	Orlando, FL (MCO)	32	27	9	24	9	3,494
3	Chicago, IL (ORD)	53	47	0	0	0	1,933
4	New York, NY (LGA)	49	11	34	5	0	1,902
5	Atlanta, GA	0	7	14	79	0	1,873
6	Los Angeles, CA	47	4	23	0	27	1,823
7	Philadelphia, PA	40	11	34	15	0	1,799
8	Houston, TX (IAH)	0	100	0	0	0	1,755
9	Nashville, TN	27	10	50	13	0	1,555
10	Fort Lauderdale, FL	11	30	40	19	0	1,463
11	Portland, OR	4	35	43	4	13	1,461
12	Tampa, FL	35	27	38	0	0	1,388
13	Pittsburgh, PA	60	21	19	0	0	1,206
14	Dallas, TX (DFW)	100	0	0	0	0	1,049
15	Phoenix, AZ (PHX)	31	13	50	6	0	999
16	Las Vegas, NV	12	44	19	7	19	992
17	Salt Lake City, UT	17	8	17	58	0	944
18	Boston, MA	25	39	26	10	0	927
19	Seattle, WA	16	16	34	12	23	892
20	Richmond, VA	69	13	0	19	0	881
21	West Palm Beach, FL	83	17	0	0	0	862
22	Savannah, GA	26	0	0	74	0	805
23	Minneapolis, MN	0	0	12	88	0	801
24	Pensacola, FL	25	25	25	25	0	765
25	Dallas, TX (DAL)	0	0	100	0	0	754
Total Top 25		**28**	**29**	**22**	**16**	**5**	**36,743**
Total All Markets		**33**	**26**	**21**	**16**	**4**	**65,274**



AIRLINES USED AT DFW

Table 5.4 shows the airlines used and top destinations when travelers from the catchment area used DFW. American had the highest share of catchment area passengers at DFW, carrying 65 percent of diverting passengers. Delta had the second highest share at 9 percent, followed by Interjet, a Mexico low-cost carrier headquartered in Mexico City, with an 8 percent share. United had the fourth highest share at 8 percent. All other carriers combined for the remaining 10 percent of passengers.

TABLE 5.4 AIRLINES USED AT DFW

RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL DFW PAX
		AA	DL	4O	UA	OTHER	
1	Boston, MA	83	0	0	17	0	1,047
2	New York, NY (LGA)	84	16	0	0	0	896
3	San Francisco, CA	82	0	0	18	0	760
4	Denver, CO	78	0	0	22	0	607
5	Los Angeles, CA	18	82	0	0	0	556
6	Chicago, IL (ORD)	78	0	0	22	0	483
7	Atlanta, GA	43	57	0	0	0	469
8	Tampa, FL	63	0	0	38	0	431
9	Philadelphia, PA	100	0	0	0	0	394
10	Jacksonville, FL	100	0	0	0	0	341
11	Pensacola, FL	100	0	0	0	0	333
12	Charleston, SC	100	0	0	0	0	324
13	Austin, TX	100	0	0	0	0	322
14	West Palm Beach, FL	100	0	0	0	0	287
15	Lihue, HI	33	67	0	0	0	284
16	Salt Lake City, UT	57	29	0	14	0	275
17	Newark, NJ	100	0	0	0	0	233
18	Miami, FL	100	0	0	0	0	224
19	Seattle, WA	33	0	0	0	67	209
20	Nashville, TN	100	0	0	0	0	207
21	Houston, TX (IAH)	100	0	0	0	0	202
22	San Diego, CA	100	0	0	0	0	193
23	New York, NY (JFK)	100	0	0	0	0	186
24	Las Vegas, NV	50	0	0	0	50	184
25	Minneapolis, MN	0	100	0	0	0	140
Total Top 25		**76**	**13**	**0**	**8**	**3**	**9,590**
Total All Markets		**65**	**9**	**8**	**8**	**10**	**21,510**

United Airlines had the highest share of catchment area passengers at ICT, carrying 33 percent of diverting passengers, followed by closely by American Airlines also with a 33 percent share of passengers.

AIRLINES USED AT ICT

Table 5.5 shows the airlines used and top destinations when travelers from the catchment area used ICT. United had the highest share of catchment area passengers at ICT, carrying 33 percent of diverting passengers, followed closely by American, also with a 33 percent share of passengers. Delta had the third highest share at 27 percent, while Alaska carried the fourth highest share at 6 percent. Other carriers combined for the remaining 1 percent of passengers.

TABLE 5.5 AIRLINES USED AT ICT

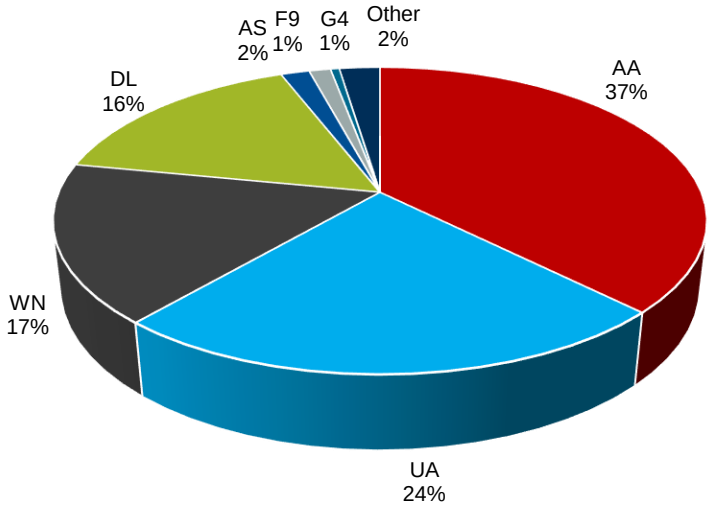
RANK	TOP 25 DOMESTIC TRUE MARKETS	AIRLINE %					TOTAL ICT PAX
		UA	AA	DL	AS	OTHER	
1	Atlanta, GA	0	4	96	0	0	1,542
2	Seattle, WA	13	7	0	80	0	1,045
3	Denver, CO	85	15	0	0	0	877
4	New Orleans, LA	8	92	0	0	0	746
5	Minneapolis, MN	0	0	100	0	0	702
6	Orlando, FL (MCO)	14	43	43	0	0	623
7	Fresno, CA	83	17	0	0	0	576
8	San Francisco, CA	50	50	0	0	0	484
9	Norfolk, VA	0	75	25	0	0	482
10	Phoenix, AZ (PHX)	29	71	0	0	0	437
11	Chicago, IL (ORD)	75	25	0	0	0	430
12	Anchorage, AK	56	0	22	22	0	418
13	San Diego, CA	73	27	0	0	0	354
14	New York, NY (LGA)	13	0	88	0	0	341
15	Jacksonville, FL	0	0	100	0	0	341
16	Houston, TX (IAH)	100	0	0	0	0	337
17	Pensacola, FL	0	33	67	0	0	285
18	Raleigh/Durham, NC	0	100	0	0	0	284
19	Portland, OR	75	0	0	25	0	258
20	Bozeman, MT	100	0	0	0	0	241
21	Dallas, TX (DFW)	0	100	0	0	0	238
22	Charlotte-Douglas, NC	25	0	75	0	0	233
23	Buffalo, NY	67	33	0	0	0	218
24	Tampa, FL	0	75	25	0	0	216
25	Ontario, CA	57	43	0	0	0	205
Total Top 25		**32**	**29**	**31**	**8**	**0**	**11,914**
Total All Markets		**33**	**33**	**27**	**6**	**1**	**20,952**

When SWO catchment area travelers divert to alternate airports, the largest percentage used American Airlines, followed by United Airlines, Southwest Airlines and Delta Air Lines.

DIVERTING PASSENGER AIRLINE USE

Exhibit 5.1 shows the airlines used when travelers from the catchment area originated from any other airport besides SWO. Overall, American carried the highest number of diverting passengers, with 37 percent, followed by United with 24 percent, Southwest with 17 percent, Delta with 16 percent, Alaska with 2 percent, Frontier with 1 percent and Allegiant with 1 percent. Other airlines accounted for 2 percent of passengers.

EXHIBIT 5.1 DIVERTING PASSENGER AIRLINE USE



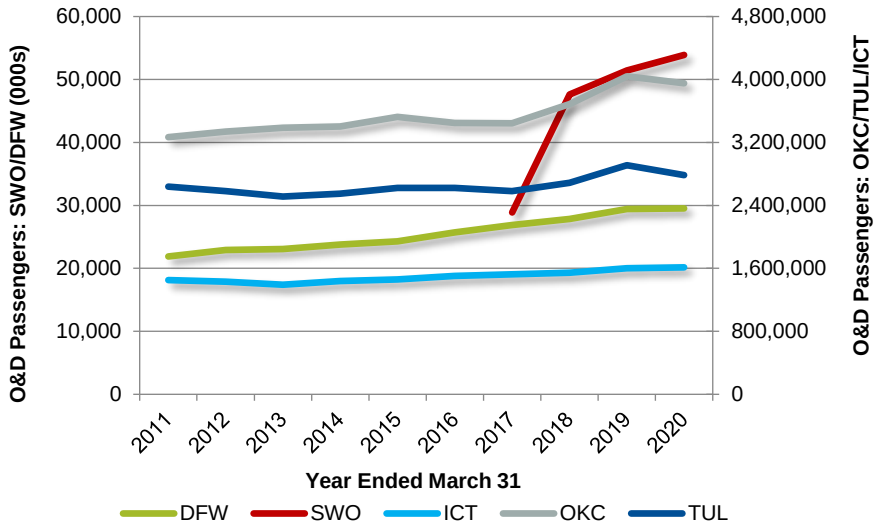
FACTORS AFFECTING AIR SERVICE DEMAND AND RETENTION

This section examines several factors that have affected and will continue to affect air service demand in the Stillwater area and SWO's ability to retain passengers. The factors affecting SWO's ability to retain passengers included in this section are airfares, nonstop service availability, and the quality and capacity of air service offered at SWO, OKC, TUL, ICT and DFW.

PASSENGER ACTIVITY COMPARISON

To better understand the changes in passenger volumes at SWO and the diverting airports, **Exhibit 6.1** provides a depiction of origin and destination passengers over the last 10 years by year ended March 31 passenger totals as reported to the U.S. DOT. During this period:

EXHIBIT 6.1 PASSENGER TRENDS



- Beginning with the initiation of service in the year ended March 31, 2017, SWO's passengers have increased each year since the first year, increasing 4.8 percent from 2019 to 2020.
- Each of the alternate airports had increasing growth rates over the 10-year period, with TUL having the lowest CAGR at 0.6 percent and DFW having the highest CAGR at 3.4 percent. From 2019 to 2020, however, OKC and TUL had declining passengers while DFW and ICT passengers increased by less than 1 percent.

SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW.

AIRFARES

When a traveler decides which airport to access for travel, airfares play a large role. Airfares affect air service demand and an airport's ability to retain passengers. One-way airfares (excluding taxes and Passenger Facility Charges [PFC]) paid by travelers are used to measure the relative fare competitiveness between SWO and the alternate airports. Fares listed for the alternate airports are for all air travelers using the airport and are not reflective of the average fare paid only by catchment area travelers diverting to these airports.

TABLE 6.1 U.S. DOT AVERAGE DOMESTIC ONE-WAY FARES

RANK	DESTINATION	AVERAGE ONE-WAY FARE					MIN DIFF.
		OKC	TUL	SWO	ICT	DFW	
1	Denver, CO	$111	$116	$192	$121	$118	$71
2	Orlando, FL (MCO)	$123	$148	$147	$180	$146	($33)
3	Atlanta, GA	$196	$200	$194	$199	$150	($6)
4	New York, NY (LGA)	$201	$215	$232	$221	$194	$11
5	Seattle, WA	$171	$197	$227	$188	$175	$30
6	Chicago, IL (ORD)	$183	$202	$225	$220	$150	$5
7	Dallas, TX (DFW)	$175	$150	$155	$194	-	($39)
8	Los Angeles, CA	$189	$156	$209	$181	$141	$20
9	Houston, TX (IAH)	$199	$199	$181	$217	$182	($36)
10	Tampa, FL	$162	$158	$204	$170	$160	$35
11	Nashville, TN	$142	$183	$166	$179	$189	($23)
12	Washington, DC (DCA)	$153	$216	$242	$211	$250	($8)
13	New Orleans, LA	$170	$178	$175	$172	$141	($3)
14	Boston, MA	$233	$229	$256	$234	$194	$22
15	Phoenix, AZ (PHX)	$172	$184	$270	$151	$180	$87
16	Portland, OR	$199	$214	$273	$217	$206	$56
17	Philadelphia, PA	$215	$219	$221	$235	$198	($14)
18	Las Vegas, NV	$147	$140	$185	$124	$128	$39
19	Fort Lauderdale, FL	$163	$161	$173	$188	$131	($15)
20	Newark, NJ	$229	$241	$200	$252	$236	($53)
21	San Francisco, CA	$214	$215	$231	$223	$200	$8
22	Salt Lake City, UT	$195	$186	$249	$214	$187	$36
23	San Diego, CA	$185	$199	$208	$201	$184	$7
24	Minneapolis, MN	$209	$203	$184	$217	$145	($34)
25	Charlotte-Douglas, NC	$235	$237	$267	$219	$245	$22
Average Domestic Fare		**$184**	**$186**	**$209**	**$195**	**$190**	**$15**

Table 6.1[4] shows one-way average airfares for the top 25 catchment area domestic destinations. Average airfares are a result of many factors including length of haul, availability of seats, business versus leisure fares and airline competition. SWO's overall average domestic fare for the year ended March 31, 2020, was $209, $25 higher than OKC, $23 higher than TUL, $15 higher than ICT and $19 higher than DFW.

In individual markets, SWO had a higher fare than the highest fare at all of the competing airports in 14 of the top 25 markets. The highest fare difference compared to the highest fare at competing airports (greater than $50) was in the Denver, Phoenix-Sky Harbor and Portland markets.

[4] *Source: Diio Mi; Note: Year Ended March 31, 2020; Fares do not include taxes or Passenger Facility Charges*

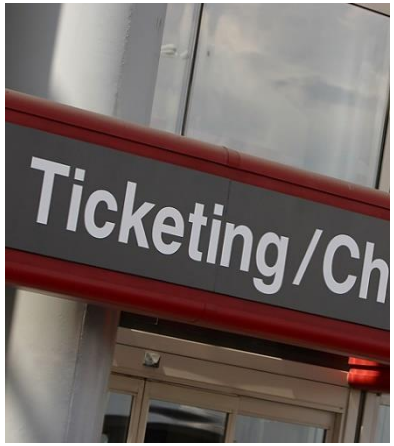
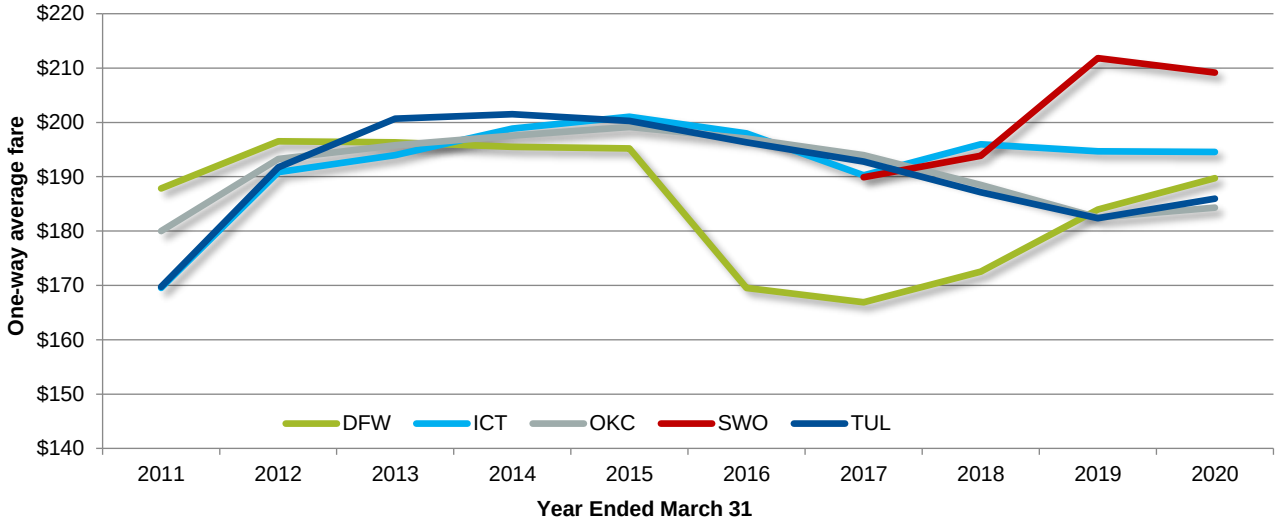


Exhibit 6.2 tracks the average fares at SWO and the competing airports from the year ended March 31, 2011, through the year ended March 31, 2020. Based on U.S. DOT airline data, average fares at SWO since initiation of service in the year ended March 31, 2017, ranged from $190 (2017) to $212 (2019). Over the same time period, the average fare at OKC ranged from $182 (2019) to $194 (2017), while the average fare at TUL ranged from $182 (2019) to $193 (2017), ICT's ranged from $190 (2017) to $196 (2018) and DFW's fares ranged from $167 (2017) to $190 (2020). Overall from 2017 to 2020, average domestic fares increased at a CAGR of 3.3 percent at SWO, below the increase for DFW of 4.4 percent and above the increase for ICT of 0.7 percent. OKC's and TUL's fares decreased at CAGRs of 1.7 and 1.2 percent, respectively.

In the latest year-ended period, SWO's fare differential compared to each of the competing airports decreased. The fare differential decreased by $5 compared to OKC, $6 compared to TUL, $3 compared to ICT and $8 compared to DFW.

EXHIBIT 6.2 10-YEAR AVERAGE DOMESTIC ONE-WAY FARE TREND



DFW offered the highest service levels to the top 25 catchment area destinations followed by OKC, TUL, ICT and SWO.

NONSTOP SERVICE AVAILABILITY

Travelers drive to competing airports to access air service for many reasons, one of which is nonstop service availability. **Table 6.2**[5] compares the level of air service offered at SWO with that offered at the competing airports. For the year ended March 31, 2020, SWO had nonstop service to one of the top 25 catchment area destinations with an average of 17 weekly departures and one destination overall, DFW. OKC had service to 18 of the top 25 markets with an average of 412 weekly roundtrips, while TUL had service to 12 of the top 25 destinations with 295 weekly frequencies. DFW had service to 24 of the top 25 destinations and 259 total destinations. ICT had service to nine top 25 destinations with 215 weekly frequencies on average.

TABLE 6.2 NONSTOP SERVICE COMPARISON

RANK	DESTINATION	AVG WEEKLY DEPARTURES				
		OKC	TUL	SWO	DFW	ICT
1	Denver, CO	60	43	0	117	32
2	Orlando, FL (MCO)	2	1	0	87	0
3	Atlanta, GA	38	31	0	129	20
4	New York, NY (LGA)	0	0	0	127	0
5	Seattle, WA	7	0	0	79	7
6	Chicago, IL (ORD)	46	46	0	149	48
7	Dallas, TX (DFW)	61	61	17	0	45
8	Los Angeles, CA	15	9	0	143	0
9	Houston, TX (IAH)	55	49	0	118	27
10	Tampa, FL	0	0	0	53	0
11	Nashville, TN	3	0	0	52	0
12	Washington, DC (DCA)	14	0	0	65	0
13	New Orleans, LA	0	0	0	56	0
14	Boston, MA	0	0	0	59	0
15	Phoenix, AZ (PHX)	27	10	0	91	9
16	Portland, OR	0	0	0	34	0
17	Philadelphia, PA	8	0	0	69	0
18	Las Vegas, NV	16	10	0	106	9
19	Fort Lauderdale, FL	0	0	0	61	0
20	Newark, NJ	5	0	0	64	0
21	San Francisco, CA	7	0	0	90	0
22	Salt Lake City, UT	15	10	0	74	0
23	San Diego, CA	0	0	0	63	0
24	Minneapolis, MN	14	10	0	82	19
25	Charlotte-Douglas, NC	19	14	0	70	0
Total Top 25 Frequencies		**412**	**295**	**17**	**2,037**	**215**
Total All Markets		**503**	**354**	**17**	**6,725**	**231**
Number of Top 25 Served		**18**	**12**	**1**	**24**	**9**
Total Destinations Served		**29**	**19**	**1**	**259**	**14**

[5] *Source: Diio Mi; Year Ended March 31, 2020*

SWO offered a total of 875 departures and 39,550 seats. SWO's departures were provided on regional jet aircraft; more than 50 percent of the service at OKC and ICT and nearly 50 percent of the service at TUL were provided on regional jets.

QUALITY OF AIR SERVICE AT COMPETING AIRPORTS

The quality of air service offered by an airport is a factor in a traveler's decision when selecting which airport to originate travel from. In general, passengers prefer larger over smaller aircraft and jet over turboprops.

Table 6.3[6] provides SWO's and the competing airports total departures by aircraft type for the year ended March 31, 2020. SWO had 875 departures and 39,550 seats, all on regional jet aircraft. Comparatively, OKC offered 26,157 departures and more than 2.7 million seats on a mix of regional jet and narrow-body aircraft. TUL had 18,425 departures and nearly 2.0 million seats, with 49 percent of the departures on regional jet aircraft, while ICT had 12,027 departures and nearly 1.1 million seats, 64 percent of which were on regional jets. DFW had the highest level of service with nearly 350,000 departures and nearly 44.3 million seats on a wide range of aircraft types.

TABLE 6.3 DEPARTURES BY AIRCRAFT TYPE BY ORIGIN

AIRCRAFT TYPE	SEAT RANGE	TOTAL DEPARTURES				
		OKC	TUL	SWO	DFW	ICT
Turboprop	9-30	-	-	-	4,837	-
Regional jet	30-50	2,029	3,799	875	36,432	4,957
	51-70	3,605	634	-	15,369	441
	71-100	8,575	4,542	-	84,114	2,301
Narrow body jet	70-125	862	247	-	6,828	130
	126-160	9,487	8,329	-	123,130	3,600
	>160	1,599	874	-	65,273	598
Wide body jet	160-240	-	-	-	3,372	-
	241-300	-	-	-	7,789	-
	>300	-	-	-	2,571	-
Total Departures		**26,157**	**18,425**	**875**	**349,715**	**12,027**
% Turboprop Departures		**0%**	**0%**	**0%**	**1%**	**0%**
% Regional Jet Departures		**54%**	**49%**	**100%**	**39%**	**64%**
Total Seats		**2,740,941**	**1,966,567**	**39,550**	**44,250,928**	**1,083,133**

[6] *Source: Diio Mi; Year Ended March 31, 2020*

An increase in retention of 10 percentage points would create an estimated additional 35,129 annual passengers (48.1 PDEW) for SWO.

RETENTION RATE SENSITIVITY

Considering the previous factors of airfares, nonstop service and quality of service, a retention rate sensitivity follows in **Table 6.4**. The purpose is to show how small changes in passenger retention can affect passenger volume. Passengers in total and for each of the top 25 markets are calculated using varying degrees of retention. An increase in retention of 10 percentage points would create an estimated additional 35,129 annual passengers (48.1 PDEW) for SWO.

TABLE 6.4 RETENTION RATE SENSITIVITY

RANK	DESTINATION	REPORTED PAX	RETENTION %	RETENTION IMPROVEMENT		
				5%	10%	15%
1	Denver, CO	810	5	1,550	2,290	3,029
2	Orlando, FL (MCO)	2,182	15	2,888	3,594	4,301
3	Atlanta, GA	1,006	10	1,486	1,967	2,447
4	New York, NY (LGA)	1,408	15	1,878	2,348	2,818
5	Seattle, WA	801	9	1,253	1,705	2,157
6	Chicago, IL (ORD)	1,074	12	1,525	1,976	2,427
7	Dallas, TX (DFW)	4,769	57	5,188	5,608	6,028
8	Los Angeles, CA	883	11	1,282	1,681	2,081
9	Houston, TX (IAH)	945	12	1,330	1,714	2,099
10	Tampa, FL	970	14	1,320	1,671	2,021
11	Nashville, TN	1,140	17	1,474	1,809	2,143
12	Washington, DC (DCA)	978	15	1,300	1,623	1,945
13	New Orleans, LA	684	12	979	1,274	1,569
14	Boston, MA	956	17	1,240	1,525	1,809
15	Phoenix, AZ (PHX)	624	11	901	1,178	1,454
16	Portland, OR	581	11	846	1,110	1,375
17	Philadelphia, PA	657	13	901	1,144	1,388
18	Las Vegas, NV	737	15	979	1,222	1,465
19	Fort Lauderdale, FL	518	12	743	968	1,193
20	Newark, NJ	641	15	856	1,071	1,286
21	San Francisco, CA	933	23	1,139	1,346	1,552
22	Salt Lake City, UT	510	14	698	885	1,073
23	Cancun, Mexico	338	9	521	705	888
24	San Diego, CA	1,062	29	1,244	1,426	1,608
25	Minneapolis, MN	702	21	872	1,042	1,212
Total Top 25		**25,909**	**15**	**34,395**	**42,882**	**51,368**
Total Domestic		**49,398**	**16**	**65,320**	**81,243**	**97,166**
Total International		**4,499**	**14**	**6,141**	**7,783**	**9,424**
Total of All Markets		**53,897**	**15**	**71,461**	**89,026**	**106,590**

SITUATION ANALYSIS

Stillwater is located approximately 70 miles, or an approximate 90-minute drive, from both TUL and OKC, creating challenges in retaining passengers flying out of SWO. For the 12-months ended March 31, 2020, SWO retained approximately 15 percent of catchment area passengers, which was 1 percentage point higher than the previous true market estimate.

SWO is one of the few communities in the U.S. that had no commercial service since deregulation and was able to successfully recruit traditional, legacy service. In August 2016, American Airlines commenced service to DFW with small regional jet aircraft. While the pandemic threatened service at SWO, American remained in the market during the entire pandemic and has since returned SWO to its pre-pandemic, twice daily service.

SWO needs to continue to concentrate on improving passenger levels, with load factors approximating 71 percent for the 12-months ended March 31, 2020. While this is above many peer markets at DFW, it is substantially below the industry and American averages. The RASM for SWO also tends to be below many of its peer markets due to lower average fares. SWO should work with American to achieve average fares at a consistent $30 to $40 one-way premium over what the fares for American are at OKC and TUL.

As SWO continues to recover post-pandemic, additional flights or capacity through use of larger aircraft are potential opportunities. In the near term, it is unlikely that SWO will be able to add service to a new hub either on American or a different airline until SWO is able to consistently have a RASM that is on par or above peer markets. Once RASM improves, new service to a new hub such as Chicago O'Hare International Airport on American or new service on United Airlines to Denver is possible.

TOP 50 TRUE MARKETS

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	SWO REPORTED PAX	RETENTION %	TRUE MARKET	PDEW	DIVERTING PASSENGERS			
						OKC	TUL	DFW	ICT
1	Denver, CO	810	5	14,798	20.3	8,084	4,420	607	877
2	Orlando, FL (MCO)	2,182	15	14,128	19.4	7,695	3,494	134	623
3	Atlanta, GA	1,006	10	9,608	13.2	4,718	1,873	469	1,542
4	New York, NY (LGA)	1,408	15	9,400	12.9	4,853	1,902	896	341
5	Seattle, WA	801	9	9,037	12.4	6,089	892	209	1,045
6	Chicago, IL (ORD)	1,074	12	9,020	12.4	5,101	1,933	483	430
7	Dallas, TX (DFW)	4,769	57	8,393	11.5	2,337	1,049	0	238
8	Los Angeles, CA	883	11	7,982	10.9	4,589	1,823	556	131
9	Houston, TX (IAH)	945	12	7,694	10.5	4,455	1,755	202	337
10	Tampa, FL	970	14	7,007	9.6	4,003	1,388	431	216
11	Nashville, TN	1,140	17	6,685	9.2	3,731	1,555	207	52
12	Washington, DC (DCA)	978	15	6,450	8.8	4,928	349	78	117
13	New Orleans, LA	684	12	5,905	8.1	4,226	124	124	746
14	Boston, MA	956	17	5,682	7.8	2,660	927	1,047	91
15	Phoenix, AZ (PHX)	624	11	5,534	7.6	3,411	999	62	437
16	Portland, OR	581	11	5,292	7.2	2,927	1,461	65	258
17	Philadelphia, PA	657	13	4,871	6.7	1,955	1,799	394	66
18	Las Vegas, NV	737	15	4,858	6.7	2,784	992	184	161
19	Fort Lauderdale, FL	518	12	4,500	6.2	2,465	1,463	27	27
20	Newark, NJ	641	15	4,302	5.9	2,669	700	233	58
21	San Francisco, CA	933	23	4,125	5.7	1,554	393	760	484
22	Salt Lake City, UT	510	14	3,747	5.1	1,900	944	275	118
23	Cancun, Mexico	338	9	3,671	5.0	1,287	612	1,435	0
24	San Diego, CA	1,062	29	3,638	5.0	1,708	322	193	354
25	Minneapolis, MN	702	21	3,397	4.7	1,050	801	140	702
26	Charlotte-Douglas, NC	524	15	3,389	4.6	1,893	740	0	233
27	Sacramento, CA	683	21	3,331	4.6	2,193	228	114	114
28	Chicago, IL (MDW)	0	0	3,238	4.4	2,806	369	0	64
29	West Palm Beach, FL	287	9	3,091	4.2	1,511	862	287	144
30	Austin, TX	965	32	3,056	4.2	1,448	161	322	161
31	Norfolk, VA	241	8	3,043	4.2	1,958	362	0	482
32	Miami, FL	812	27	2,996	4.1	1,400	448	224	112
33	Pittsburgh, PA	564	19	2,971	4.1	1,098	1,206	0	103
34	Houston, TX (HOU)	729	25	2,917	4.0	1,459	729	0	0
35	Boise, ID	157	5	2,858	3.9	1,865	640	0	196

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	SWO REPORTED PAX	RETENTION %	TRUE MARKET	PDEW	DIVERTING PASSENGERS			
						OKC	TUL	DFW	ICT
36	Richmond, VA	136	5	2,725	3.7	1,597	881	55	55
37	Pensacola, FL	381	14	2,702	3.7	938	765	333	285
38	Reno, NV	271	10	2,669	3.7	1,538	724	45	90
39	Fort Myers, FL	318	12	2,663	3.6	1,995	271	0	80
40	San Antonio, TX	964	37	2,609	3.6	1,588	0	0	57
41	Madison, WI	420	16	2,556	3.5	1,353	463	132	189
42	Anchorage, AK	117	5	2,347	3.2	1,022	697	93	418
43	Savannah, GA	127	6	2,289	3.1	1,229	805	42	85
44	Jacksonville, FL	341	15	2,272	3.1	754	496	341	341
45	Raleigh/Durham, NC	568	26	2,222	3.0	1,036	335	0	284
46	Knoxville, TN	317	14	2,220	3.0	1,374	423	106	0
47	St. Louis, MO	352	16	2,144	2.9	1,135	388	111	158
48	Milwaukee, WI	180	8	2,122	2.9	1,413	529	0	0
49	Fresno, CA	384	18	2,112	2.9	1,056	0	96	576
50	Honolulu, HI	139	7	2,091	2.9	1,533	279	105	35
Top 50 Destinations		**35,888**	**15**	**236,360**	**323.8**	**128,369**	**46,770**	**11,620**	**13,713**
Total Domestic		**49,398**	**16**	**318,455**	**436.2**	**174,351**	**60,643**	**14,461**	**19,602**
Total International		**4,499**	**14**	**32,836**	**45.0**	**15,307**	**4,631**	**7,049**	**1,350**
Total All Markets		**53,897**	**15**	**351,291**	**481.2**	**189,658**	**65,274**	**21,510**	**20,952**

GLOSSARY

AIRLINE CODES

4O	Interjet
AA	American Airlines
AS	Alaska Airlines
DL	Delta Air Lines
F9	Frontier Airlines
G4	Allegiant Air
UA	United Airlines
WN	Southwest Airlines

AIRPORT CATCHMENT AREA (ACA)

The geographic area surrounding an airport from which that airport can reasonably expect to draw passenger traffic. The airport catchment area is sometimes called the service area.

AIRPORT CODES

DAL	Dallas-Love Field, TX
DCA	Washington-National, DC
DFW	Dallas-Fort Worth, TX
HOU	Houston-Hobby, TX
IAH	Houston-Intercontinental, TX
ICT	Wichita, KS
JFK	New York-Kennedy, NY
LGA	New York-LaGuardia
LHR	London-Heathrow, UK
MCO	Orlando-International, FL
OKC	Oklahoma City, OK
ORD	Chicago-O'Hare, IL

AIRPORT CODES (CONTINUED)

PHX	Phoenix-Sky Harbor, AZ
SWO	Stillwater, OK
TUL	Tulsa, OK

ARC

Acronym for Airline Reporting Corporation.

AVERAGE AIRFARE

The average of the airfares reported by the airlines to the U.S. DOT. The average airfare does not include taxes or passenger facility charges and represents one-half of a roundtrip ticket.

CAGR

Abbreviation for compounded annual growth rate, or the average rate of growth per year over a given time period.

DESTINATION AIRPORT

Any airport where the air traveler spends four hours or more. This is the Federal Aviation Administration definition.

DIVERSION

Passengers who do not use the local airport for air travel, but instead use a competing airport to originate the air portion of their trip.

FAA

Acronym for the Federal Aviation Administration.

HUB

An airport used by an airline as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destination. Also an airport classification system used by the FAA (e.g., non-hub, small hub, medium hub, and large hub.

INITIATED (ORIGIN) PASSENGERS

Origin and destination passengers who began their trip from within the catchment area.

LOAD FACTOR

The percentage of airplane capacity that is used by passengers.

LOCAL MARKET

The number of air travelers who travel between two points via nonstop air service.

MICRO
Acronym for Micropolitan Statistical Area. Micros have at least one urban cluster with a population ranging from 10,000 to 50,000 that has a high degree of social and economic integration with the core as measured by commuting ties.

NARROW-BODY JET
A jet aircraft with a single aisle designed for seating over 100 passengers.

NONSTOP FLIGHT
Air travel between two points without stopping at an intermediate airport.

ONBOARD PASSENGERS
The number of passengers transported on one flight segment.

ORIGIN AND DESTINATION (O&D) PASSENGERS
Includes all originating and destination passengers. In the context of this report, it describes the passengers arriving and departing an airport.

ORIGINATING AIRPORT
The airport used by an air traveler for the first enplanement of a commercial air flight.

PASSENGER FACILITY CHARGE
Fee imposed by airports of $1 to $4.50 on enplaning passengers. The fees are used by airports to fund FAA approved airport improvement projects.

PAX
Abbreviation for passengers.

PDEW
Abbreviation for passengers daily each way.

POINT-TO-POINT
Nonstop service that does not stop at an airline's hub and whose primary purpose is to carry local traffic rather than connecting traffic.

REFERRED PASSENGERS
Origin and destination passengers who began their trip from outside the catchment area.

REGIONAL JET
A jet aircraft with a single aisle designed for seating fewer than 100 passengers.

RETAINED PASSENGERS
Passengers who use the local airport for air travel instead of using a competing airport to originate the air portion of their trip.

TRUE MARKET
Total number of air travelers, including those who are using a competing airport, in the geographic area served by SWO. The true market estimate includes the size of the total market and for specific destinations.

TURBOPROP AIRCRAFT
A type of engine that uses a jet engine to turn a propeller. Turboprops are often used on regional and business aircraft because of their relative efficiency at speeds slower than, and altitudes lower than, those of a typical jet.

U.S. DOT
Acronym for U.S. Department of Transportation.

WIDE-BODY JET
A jet aircraft with two aisles designed for seating greater than 175 passengers.

FOR MORE INFORMATION, PLEASE CONTACT
JEFFREY HARTZ | 959 REDCEDAR WAY | COPPELL, TX 75019
360-600-6112 | JEFFREY.HARTZ@MEADHUNT.COM | WWW.MEADHUNT.COM

Mead & Hunt

APPENDIX THREE. FAA TAF Comparison Tables

AIRPORT NAME: STILLWATER REGIONAL AIRPORT

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2020	17,410	17,410	0%
Base yr. + 5yrs.	2025	28,000	28,964	-3%
Base yr. + 10yrs.	2030	31,830	28,964	10%
Base yr. + 15yrs.	2035	36,150	28,964	25%
Commercial Operations				
Base yr.	2020	1,920	1,920	0%
Base yr. + 5yrs.	2025	2,284	2,517	-9%
Base yr. + 10yrs.	2030	2,284	2,645	-14%
Base yr. + 15yrs.	2035	2,180	2,776	-21%
Total Operations				
Base yr.	2020	62,643	62,643	0%
Base yr. + 5yrs.	2025	77,354	80,967	-4%
Base yr. + 10yrs.	2030	85,234	84,121	1%
Base yr. + 15yrs.	2035	91,200	87,423	4%

NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).

Template for Summarizing and Documenting Airport Planning Forecasts

A. Forecast Levels and Growth Rates

AIRPORT NAME: STILLWATER REGIONAL AIRPORT **Specify base year:** 2020

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Average Annual Compound Growth Rates: Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15
Passenger Enplanements									
Air Carrier	1,308	1,600	1,600	1,600	1,600	22.3%	4.1%	2.0%	1.4%
Commuter	16,102	13,900	26,400	30,230	34,550	-13.7%	10.4%	6.5%	5.2%
TOTAL	17,410	15,500	28,000	31,830	36,150	-11.0%	10.0%	6.2%	5.0%
Operations									
Itinerant									
Air carrier	30	94	348	1,180	1,388	212.0%	63.3%	44.4%	29.1%
Commuter/air taxi	1,890	1,899	1,936	1,104	792	0.5%	0.5%	-5.2%	-5.6%
Total Commercial Operations	1,920	1,993	2,284	2,284	2,180	3.8%	3.5%	1.8%	0.9%
General aviation	25,654	27,980	31,260	34,760	38,640	9.1%	4.0%	3.1%	2.8%
Military	1,314	1,310	1,310	1,310	1,310	-0.3%	-0.1%	0.0%	0.0%
Local									
General aviation	31,858	34,500	40,610	44,990	47,180	8.3%	5.0%	3.5%	2.7%
Military	1,897	1,890	1,890	1,890	1,890	-0.4%	-0.1%	0.0%	0.0%
TOTAL OPERATIONS	62,643	67,673	77,354	85,234	91,200	8.0%	4.3%	3.1%	2.5%
Instrument Operations	4,737	5,034	5,643	5,983	6,255	6.3%	3.6%	2.4%	1.9%
Peak Hour Operations	30	31	37	41	43	4.7%	4.5%	3.2%	2.6%
Cargo/mail (enplaned+deplaned tons)	42	43	46	51	51	2.0%	2.0%	2.0%	1.3%
Based Aircraft									
Single Engine (Nonjet)	72	73	76	80	84	1.2%	1.0%	1.0%	1.1%
Multi Engine (Nonjet)	6	8	8	7	6	33.3%	5.9%	1.6%	0.2%
Jet Engine	2	2	2	2	3	0.7%	1.0%	0.9%	2.7%
Helicopter	0	0	0	1	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Other	0	0	1	1	1	0.0%	0.0%	0.0%	0.0%
TOTAL	80	83	87	91	96	3.6%	1.7%	1.3%	1.2%

B. Operational Factors

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.
Average aircraft size (seats)					
Air carrier	164	150	85	79	78
Commuter	46	46	50	48	45
Average enplaning load factor					
Air carrier	74%	70%	55%	69%	67%
Commuter	58%	60%	65%	59%	67%
GA operations per based aircraft	719	754	825	872	895

U.S. Department of Transportation
Federal Aviation Administration

Federal Aviation Administration
Southwest Region, Airports Division
AR/OK Airports Development Office

FAA-ASW-630
10101 Hillwood Pkwy.
Fort Worth, Texas 76177

March 17, 2022

Paul Priegel
Airport Director
Stillwater Regional Airport
723 South Lewis
Stillwater, OK 74074-4652

Federal Aviation Administration (FAA)
Stillwater Regional Airport (SWO) Aviation Activity Forecast Approval
Airport Improvement Program Grant Number 3-40-0090-033-2021

The FAA Airports District Office has reviewed the aviation forecast for the Stillwater Regional Airport (SWO) Airport Master Plan dated December 3, 2021. The FAA approves these forecasts for airport planning purposes, including the existing and future critical aircraft.

Our approval is based on the following:

- The forecast is supported by reasonable planning assumptions and current data
- The forecast appears to be developed using acceptable forecasting methodologies
- The difference between the FAA Terminal Area Forecast (TAF) and the Airport's forecast for total operations is within the 10 percent and 15 percent allowance for the 5 and 10 year planning horizons.

Approval of this forecast does not automatically justify any of the capital improvements shown on the ALP or recommended in the master plan. All future projects will need to be justified by current activity levels at the time of proposed implementation. Lastly, the approved forecasts may be subject to additional analysis, or the FAA may request a sensitivity analysis if this data is to be used for environmental or Part 150 noise planning purposes.

This forecast was prepared at the same time as the evolving impacts of the COVID-19 public health emergency. Forecast approval is based on the methodology, data, and conclusions at the time the document was prepared. However, consideration of the impacts of the COVID-19 public health emergency on aviation activity is warranted to acknowledge the reduced confidence in growth projections using currently-available data.

Accordingly, FAA approval of this forecast does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is

requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify AIP funding for eligible projects.

If you have any questions about this forecast approval, please call me at (817) 222-5641.

Sincerely,

Phuong Tran

Arkansas/Oklahoma
Airports District Office
Southwest Region

Enclosures: TAF Summary Report for Stillwater Regional Airport
Forecast of Aviation Activities and Critical Aircraft Designations

cc: Kelly Maddoux, AICP, Mead & Hunt
Tim House, FAA Program Manager

APPENDIX FOUR. Runway Length Analysis

The runway length analysis recommends the length necessary to meet existing and future aircraft demands. The determination of runway recommendation for airport planning purposes uses the methodology found in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. This AC states the design objective for primary runways is to provide a runway length for all aircraft that will regularly use the runway without causing operational weight restrictions. AC 150/5000-17, *Critical Aircraft and Regular Use Determination* defines regular use as 500 annual operations, excluding touch-and-go local operations.

RUNWAY LENGTH METHODOLOGY

FAA AC 150/5325-4B describes five steps to determine recommended runway lengths. The information from these steps is to be used for airport design and not for flight operations. The five steps are:

1. Identify potential design aircraft
2. Identify the most demand aircraft
3. Determine appropriate methodology
4. Determine the recommended runway length
5. Apply necessary adjustments as needed.

Design Aircraft and Most Demanding Aircraft

The existing design aircraft (and most demanding aircraft) for Runway 17/35 has been determined to be the Embraer ERJ 145. The future design aircraft (and most demanding aircraft) is the Embraer ERJ 175.

The existing and future design aircraft (and most demanding aircraft) for Runway 4/22 has been determined to be the family grouping of small aircraft (i.e., aircraft with maximum takeoff weight equal to or less than 12,500 pounds) that have approach speeds greater than 50 knots but have less than 10 passenger seats excluding crew (i.e., pilot and copilot) as defined by AC 150/5325-4B. This family grouping of small aircraft is further divided into two categories according to percentage of fleet: 95 percent and 100 percent. The differences between the two percentage categories are based on the airport's location and amount of existing or planned aviation activities.

The 95 percent of the fleet category is intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. It also includes those airports that are primarily intended to service low-activity locations, small population communities, and remote recreational areas. The 100 percent of the fleet category is intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. Stillwater and aircraft activity at SWO are best represented by the 95 percent category.

Determine Appropriate Methodology

Following guidance provided in AC 150/5325-4B, individual Airport Planning Manuals (APMs) produced and published by aircraft manufacturers should be used for regional jets or aircraft with Maximum Takeoff Weight (MTOW) greater than 60,000 pounds. Therefore, the APMs for the ERJ 145 and ERJ 175 will be used to determine a recommended length for Runway 17/35; the family grouping of small aircraft will be used to determine a recommended length for Runway 4/22.

The performance requirements of the design aircraft determine recommended runway length. Factors that affect aircraft performance capabilities include the airport elevation, air temperature, aircraft payload, fuel load, and wind conditions. These factors are explained below.

Elevation

Aircraft performance declines at higher altitudes because the air is less dense. Higher elevations negatively impact thrust produced by the aircraft on takeoff and the aerodynamic performance of the aircraft. An elevation of 1,000 feet above mean sea level (AMSL) is used for this analysis.

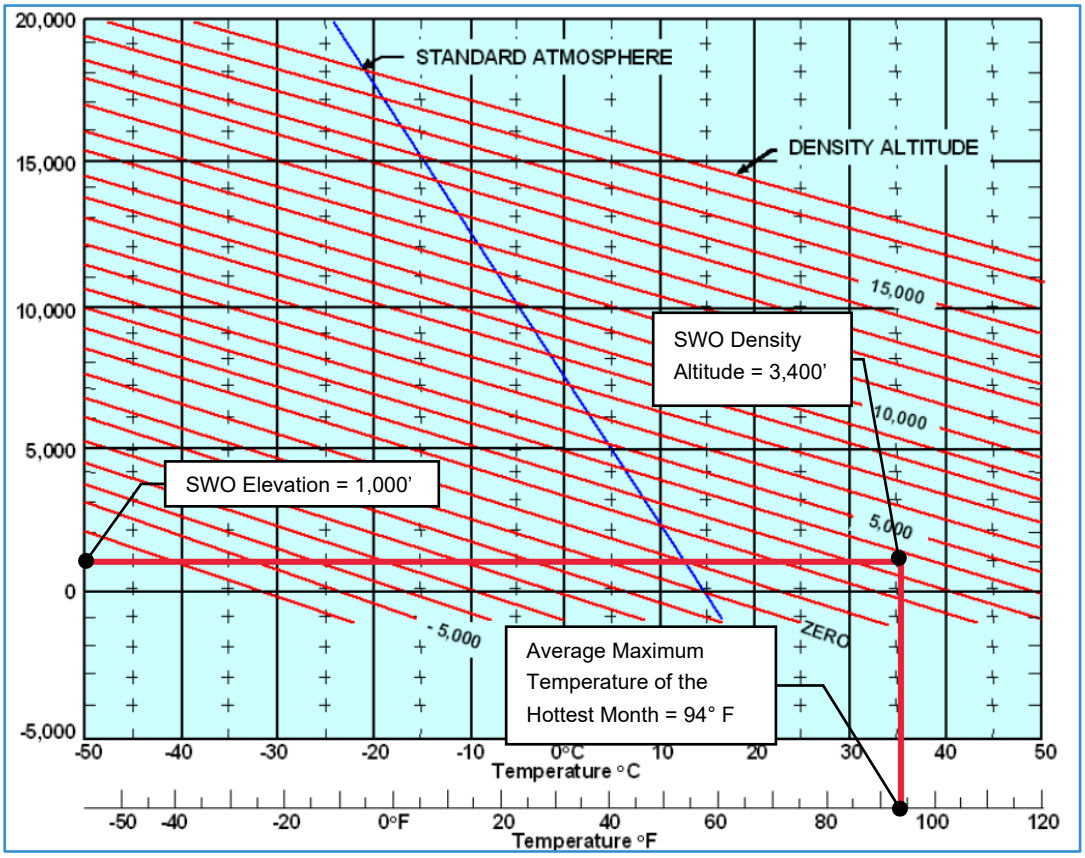
International Standard Atmosphere (ISA)

International Standard Atmosphere (ISA) is a mathematical model that describes how the earth's atmosphere, or air pressure and density, changes relative to altitude. The atmosphere is less dense at higher elevations. ISA is frequently used in aircraft performance calculations because conditions that deviate from ISA will affect aircraft performance. ISA at sea level occurs when the temperature is 59 degrees Fahrenheit. According to the 1976 Standard Atmosphere Calculator, the ISA at SWO's 1,000 feet AMSL occurs when the temperature is 55 degrees Fahrenheit.

Density Altitude (DA)

Density Altitude (DA) compares air density to ISA at a point in time and specific location and is also a critical component of aircraft performance calculations. DA is used to describe how aircraft performance differs from the performance that would be expected under ISA. DA is primarily influenced by elevation and air temperature. **Figure 4-1** illustrates how DA is impacted when factoring in the average maximum temperature of the hottest month. The SWO DA during the hottest month, when the ambient air temperature is 94 degrees Fahrenheit, is 3,400 feet AMSL. As a measure of high temperature impacts on aircraft performance, this DA is used in aircraft performance assessment.

Figure 4-1: Density Altitude for SWO



Takeoff Weight and Destination

Aircraft takeoff weight is directly related to the distance of the flight and the load that the aircraft is carrying. For shorter distances, aircraft may depart with a full passenger load and less than full fuel tanks. In those instances, the aircraft will typically be departing below MTOW and will not require as long of a runway. Aircraft require more fuel for longer trips, and the longest trips may require payload restrictions on the passengers, baggage, and cargo that can be carried. An aircraft with full passenger load and fuel will be near its MTOW.

Currently, Envoy Airlines provides twice daily non-stop service to Dallas Fort Worth International Airport (DFW), which is approximately 200 nautical miles (NM) from Stillwater. Additional long-term potential destinations that could be served by commercial air carriers include Denver International Airport (DEN) and Chicago O'Hare International Airport (ORD), which are located approximately 225 NM and 550 NM from Stillwater, respectively.

Recommended Runway Length Determination

Runway 17/35

The runway 17/35 length analysis is based on the payload and range table and the takeoff performance charts in the APMs for the existing and future design aircraft. AC 150/5325-4B allows for runway length determination to be based on MTOW. As seen in **Figure 4-2**, the runway length for the E-145 at 48,502 pounds MTOW and at SWO's DA of 3,400 feet AMSL is approximately 8,200 feet (represented by the red dashed line). However, using SWO's existing runway length of 7,401 feet, the operational takeoff weight is approximately 46,200 pounds (represented by the solid red line), about 2,500 pounds less than its MTOW. It is understood that the ERJ 145s departing SWO currently fly to DFW, do not need full fuel capacity, and are not routinely carrying full passenger loads. In other words, the ERJ 145s are not required to takeoff at MTOW.

Figure 4-2: E-145 Takeoff Runway Length Requirements

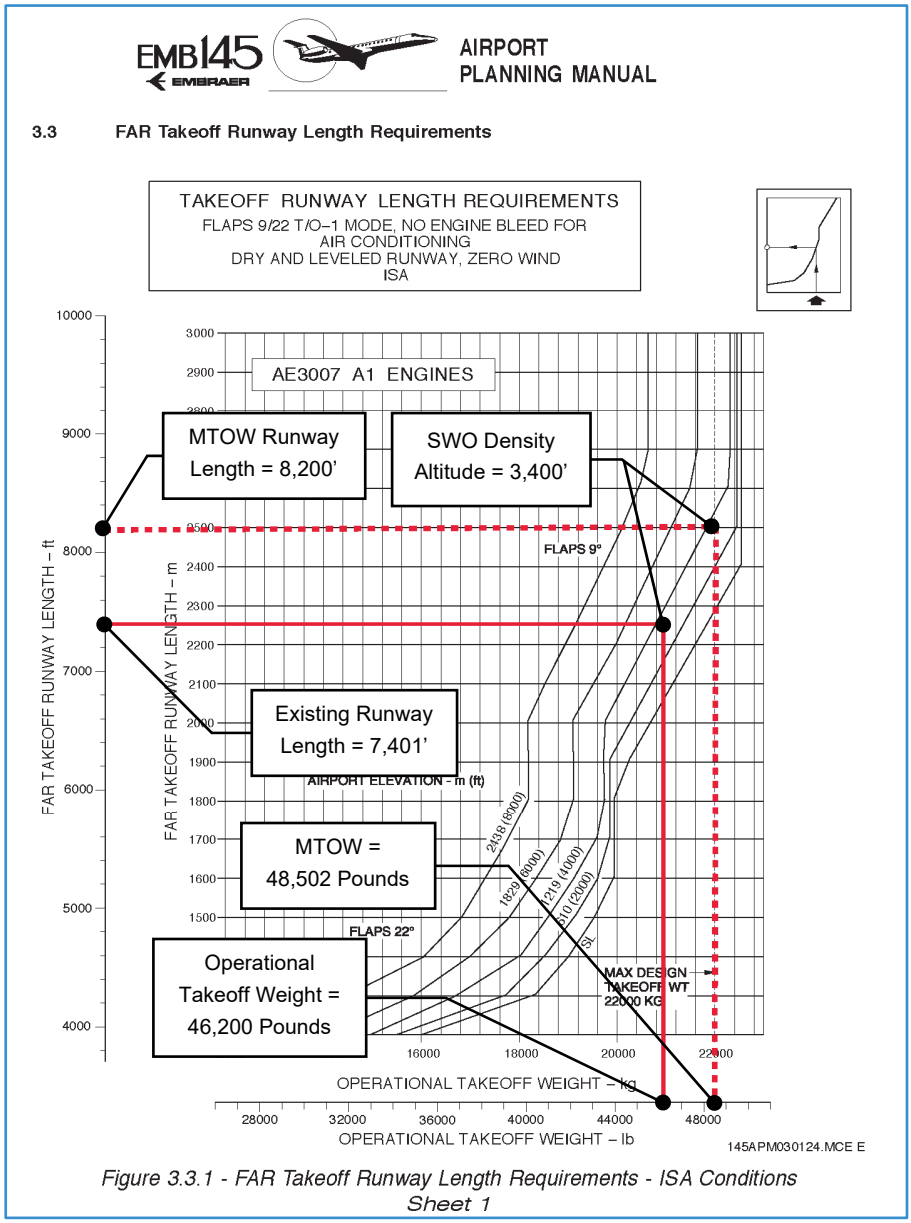


Figure 3.3.1 - FAR Takeoff Runway Length Requirements - ISA Conditions
Sheet 1

Source: Mead & Hunt analysis using Embraer E 145 Airport Planning Manual.

When using the payload versus range chart (see **Figure 4-3**), it is only when an approximate 650-NM range is required does the ERJ 145 begin to experience maximum payload restrictions. Since payload is a measure of passengers, baggage, and cargo (i.e., not including fuel), the MTOW reductions do not affect the future destinations most likely to be served by air carriers from SWO because the reduced weight can be met with less fuel and not fewer passengers. As detailed above, the most likely future destinations to be served from SWO are DEN and ORD, which are within the range of the maximum payload allowed.

Figure 4-3: E-145 Payload Versus Range

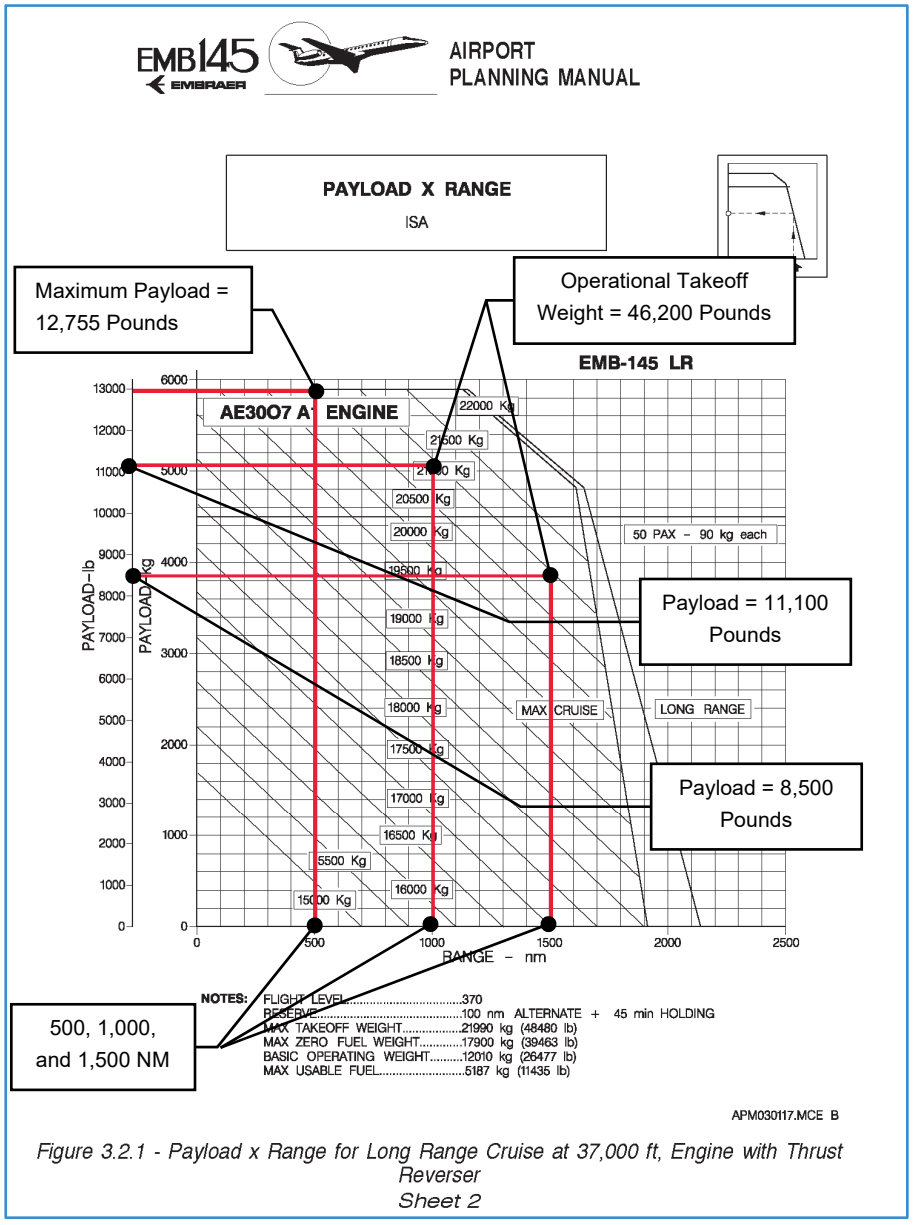


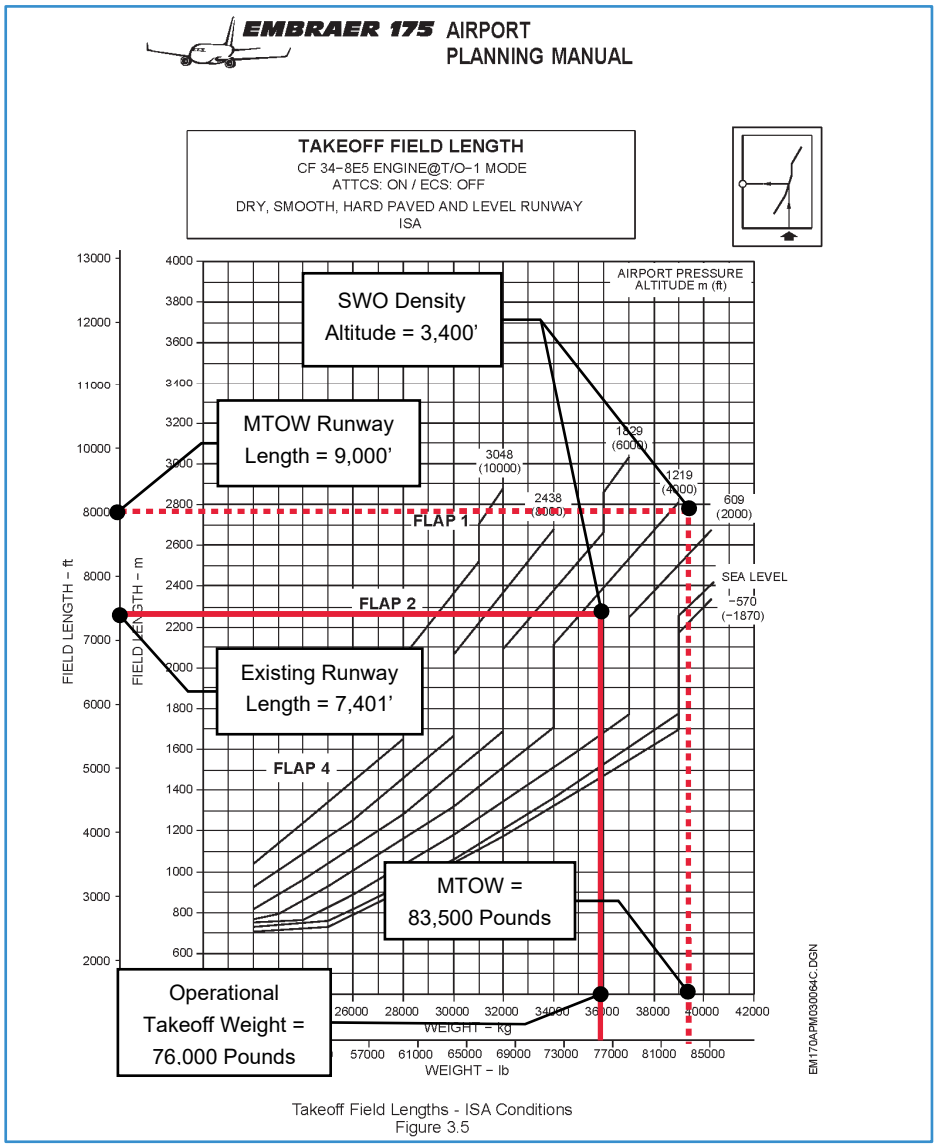
Figure 3.2.1 - Payload x Range for Long Range Cruise at 37,000 ft, Engine with Thrust Reverser
Sheet 2

Source: Mead & Hunt analysis using Embraer E 145 Airport Planning Manual.

Figure 4-4 presents the runway length requirements of the ERJ 175. The runway length required at the 83,500 MTOW and DA of 3,400 feet AMSL is approximately 9,000 feet. Using SWO's existing runway length of 7,401 feet indicates the operational takeoff weight is approximately 76,000 pounds, about 7,500 pounds less than MTOW. However, as with the ERJ 145s, it is not expected that ERJ 175s departing SWO will be required to operate at MTOW. This is verified by **Figure 4-5**, which indicates that not until an approximate

1,300-NM range is required does the E-175 experience maximum payload restrictions. The reduced MTOW can be met with less fuel and not fewer passengers.

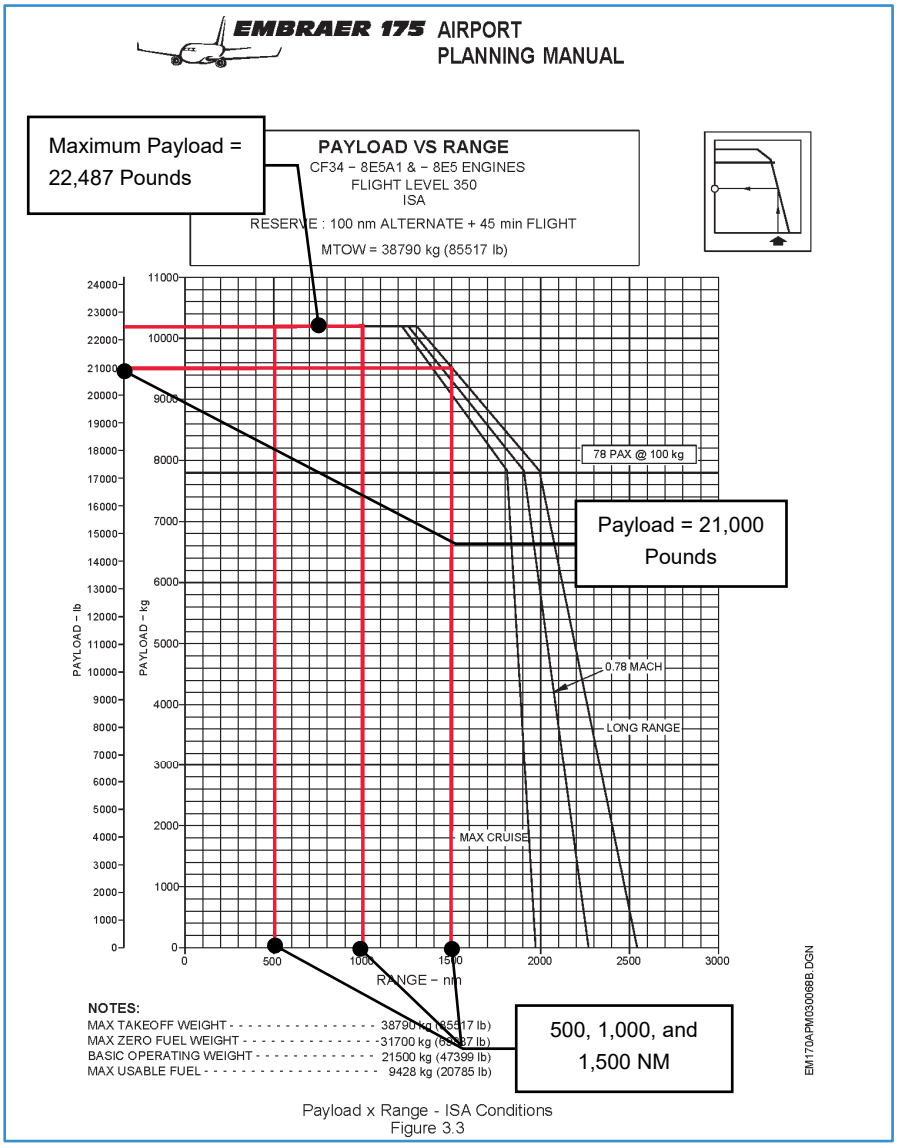
Figure 4-4: E-175 Takeoff Runway Length Requirements



Source: Mead & Hunt analysis Embraer E 175 Airport Planning Manual.

Note: There is a typo of 8,000 feet in field length rather than 9,000 feet.

Figure 4-5: E-175 Payload Versus Range

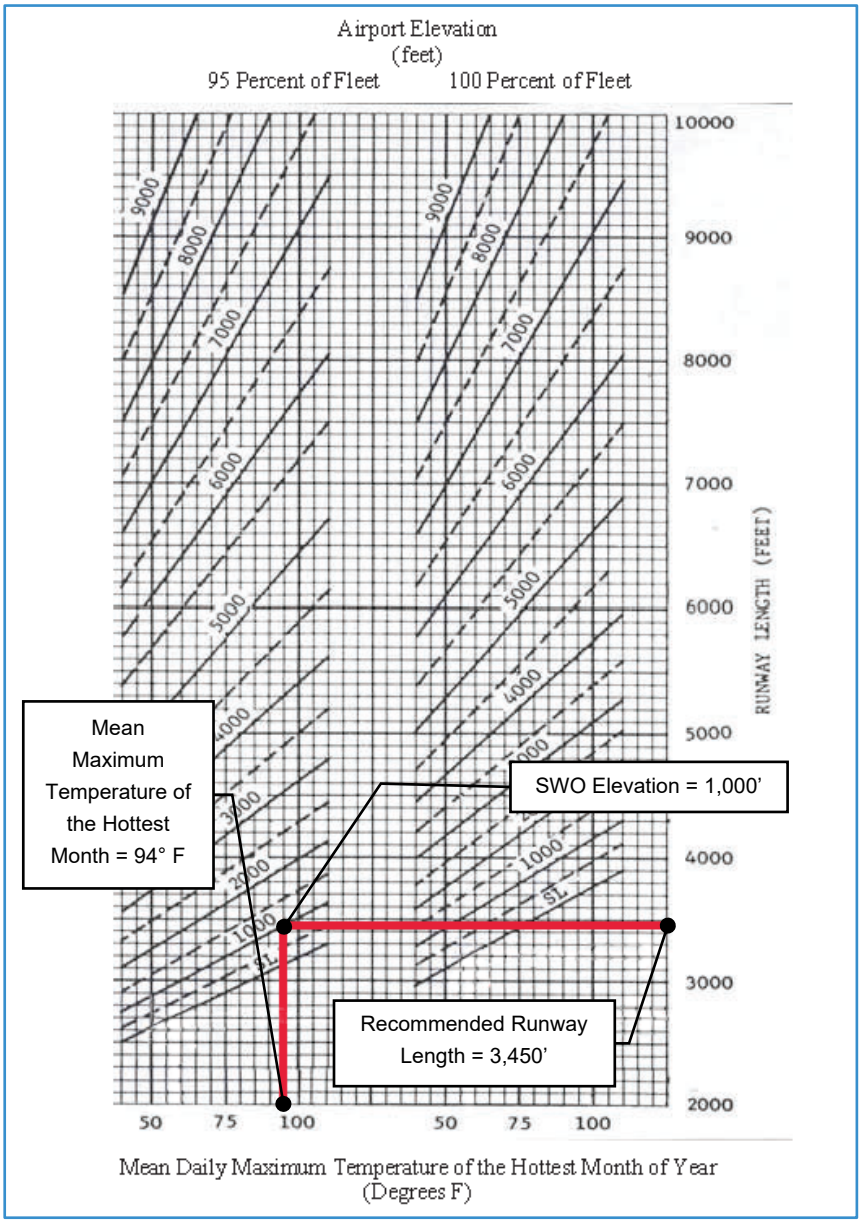


Source: Mead & Hunt analysis using Embraer E 175 Airport Planning Manual.

Runway 4/22

Figure 4-6 uses the 95 percent of the small aircraft fleet with approach speeds greater than 50 knots and less than 10 passenger seats. Using SWO's elevation of 1,000 feet (not the DA of 3,400 feet) and the mean maximum temperature of the hottest month (94 degrees Fahrenheit), a runway length of approximately 3,450 feet is recommended as shown in the chart.

Figure 4-6: Small Aircraft with Less Than 10 Passenger Seats Takeoff Runway Length Requirements



Source: Mead & Hunt analysis using FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Apply Necessary Adjustments

AC 150/5325-4B allows for the adjustment of runway lengths for non-zero effective runway gradients (i.e., runways having a difference in centerline elevation that is not equal to zero). The adjustment increases the takeoff length thy 10 feet for every 1-foot of maximum elevation difference of the runway centerline. For Runway 17/35 an adjustment of 430 feet is provided since the maximum centerline elevation difference is 43

feet. For Runway 4/22 an adjustment of 280 feet is afforded since the maximum centerline elevation difference is 28 feet.

Table 4-1 provides the recommended runway lengths after applying the adjustments.

Table 4-1: Runway Length Recommendations with Adjustments

Runway	Recommended Runway Length	Maximum Centerline Elevation Difference	Adjustment	Final Recommended Runway Length
17/35				7,401
Existing Design Aircraft (E-145)	8,200' (MTOW)	43'	430'	8,630'
Future Design Aircraft (E-175)	9,000' (MTOW)	43'	430'	9,430'
4/22				5,002
Existing and Future Design Aircraft (C 172)	3,450'	28'	280'	3,730'

Source: Mead & Hunt using airport planning manuals and FAA AC 150/5325-4B methodology.

RUNWAY LENGTH CONCLUSION

The runway length analysis suggests that Runway 17/35, with an existing length of 7,401 feet is slightly deficient to accommodate both the existing and future design aircraft when operating at MTOW. However, since the existing destination for Envoy Airlines aircraft is DFW and the most likely destinations for air carriers to provide long-term future service from SWO is DEN and ORD, which are within the ranges of both the ERJ 145 and 175 aircraft without requiring payload restrictions, this indicates that the Runway 17/35 length is sufficient, and no additional runway length is recommended. This is supported by the fact that no airport users have indicated runway length is insufficient for their operations and have not requested a runway extension.

APPENDIX FIVE. ATO and Ground Operations Analysis

Table 5-1 shows a detailed breakdown of the proposed Airline Ticket Offices (ATO) and ground operations areas.

Table 5-1: Airline Ticketing and Operations Office Space Program

Location	Quantity	Calculation	Notes
Airline Ticket Office			
Ticket Counters	3		Additional Counter
Counter Length w/ Bagwell	12’		
Counter Depth to Back Wall	12.5’		
Total Ticketing Area (sq ft)	150		
Station Manager (sq ft)	108		Enclosed Office
Supervisor's Office (sq ft)	90		
Agent Check-In/Cash-Out Workstations (sq ft)	70	2 x 35	Counters
Break & Conference Room (sq ft)	150		Kitchen Setup
Sub-Total ATO Space (sq ft)	568		
Airline Ground Operations Space (sq ft)			
Workstation Load & Balance	108		
MOD Desk	108		
Equipment Shelves – Radios/Chargers, Manuals	50	5 x 10	
Tow Bars	90	15 x 6	
Aircraft Maintenance Stores	100	10 x 10	
Lockers & Heavy Weather Gear Storage	100		Full Height Lockers
Sub-Total Operations Space	556		
Sub-Total ATO & Operations Space	1,124		
Circulation (10%)	112		Back of House
Total ATO & Ground Operations Space (sq ft)	**1,236**		
GSE Equipment Storage (sq ft)	**800**		**1 Tug and 1 Cart**
Grand Total ATO and Ground Operations Space (sq ft)	**2,036**		

Source: Mead & Hunt analysis.

APPENDIX SIX. Financial Implementation Analysis Schedules

The Schedules used in the Financial Implementation Analysis are presented on the following pages and described below.

- **Schedule E-1 – Estimated Project Costs and Development Schedule:** This schedule presents the CIP including estimated costs and anticipated development schedule for individual projects in the program. The schedule provides practical approaches for matching capital expenditure amounts with capital funding availability in the Phase I, Phase II, and Phase III planning periods. This schedule also applies inflation adjustments to provide escalated development costs for projects implemented throughout the entire 20-year planning period.
- **Schedule E-2 – Projected Capital Funding Sources:** This schedule lists each of the CIP projects, their estimated costs (escalated for inflation) and the assumed funding sources and amounts. The schedule applies specific capital funding sources to each individual project in the capital program.
- **Schedule E-3 – Statewide Hangar Loan Program Funded Debt:** This schedule provides the details of the debt issue through the State Hangar Loan Program, which may be required in 2024 to partially fund the construction of a new Group Hangar. The schedule includes the anticipated terms of the loan and the resulting annual debt service requirements including associated interest costs. Debt service is planned to be funded with additional revenues from the tenant(s) of the hangar.
- **Schedule E-4 – Actual, Budgeted, and Projected Operations & Maintenance Expenses:** This schedule reflects the past three years of actual operations and maintenance expenses, budgeted 2023 and 2024 operations and maintenance expenses, and projections of these expenses through the Phase I, Phase II, and Phase III planning periods. This schedule also provides a comparison of SWO's annual expenses per enplaned passenger with the industry average of other non-hub airports.
- **Schedule E-5 – Actual, Budgeted, and Projected Operating Revenues:** This schedule reflects the past three years of actual operating revenues, budgeted 2023 and 2024 operating revenues, and projections of these revenues through the Phase I, Phase II, and Phase III planning periods. These revenues are organized into categories for airline revenues, non-airline revenues and non-operating revenues, and provides statistical comparisons of SWO's airline cost per enplaned passenger and operating revenues per enplaned passenger with other non-hub airport industry averages.
- **Schedule E-6 – Financial Analysis Summary and Implementation Plan – Budgeted and Projected Net Revenues, Capital Funding, and Capital Expenditures:** This schedule includes a Capital Cash Flow section that presents a summary of projected capital funding (from **Schedule E-2**) and scheduled capital expenditures (from **Schedule E-1**) with the cash flow that results from implementing the CIP. It also includes an Operating Cash Flow section that summarizes totals for operating revenues (from **Schedule E-5**) and operating expenses (from **Schedule E-4**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities.

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

13-Feb-24

Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Short Term Projects (2023-2027)										
Capital Projects 2023										
A.1 Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225	$78,225					$78,225			$78,225
A.2 Design Terminal Building	1,874,438	1,874,438					1,874,438			1,874,438
A.3 Prepare Airport Traffic Control Tower (ATCT) Siting Study	100,000	100,000					100,000			100,000
A.4 Prepare Airport Traffic Control Tower (ATCT) EA	200,000	200,000					200,000			200,000
A.5 Replace Two Primary Mower Apparatus	30,000	30,000					30,000			30,000
2022 SRE Equipment - FY22 Grant Carryover	280,829	280,829					280,829			280,829
Total Capital Projects 2023	$2,563,492	$2,563,492	$0	$0	$0	$0	$2,563,492	$0	$0	$2,563,492
Capital Projects 2024										
A.6 Construct New Group Hangar	$2,500,000		$2,575,000				$2,575,000			$2,575,000
A.7 Design and Construct Terminal Building including Demolition of Group Hangar #1, Phase 1	19,000,000		19,570,000				19,570,000			19,570,000
A.8 Design and Construct Terminal Area Roadways and Parking Lots, Phase 1	907,000		934,210				934,210			934,210
A.9 Crack Seal, and Re-Mark Taxiway A	60,000		61,800				61,800			61,800
A.10 Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	200,000		206,000				206,000			206,000
Total Capital Projects 2024	$22,667,000	$0	$23,347,010	$0	$0	$0	$23,347,010	$0	$0	$23,347,010

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Capital Projects 2025										
A.11 Construct Terminal Building, Phase 2	$1,500,000			$1,591,350			$1,591,350			$1,591,350
A.12 Construct Terminal Area Roadways and Parking Lots, Phase 2	615,000			652,454			652,454			652,454
A.13 Construct One Corporate Hangar with Pavement	2,213,000			2,347,772			2,347,772			2,347,772
Total Capital Projects 2025	$4,328,000	$0	$0	$4,591,575	$0	$0	$4,591,575	$0	$0	$4,591,575
Capital Projects 2026										
A.14 Construct Terminal Building, Phase 3	$1,400,000				$1,529,818		$1,529,818			$1,529,818
A.15 Construct Terminal Area Roadways and Parking Lots, Phase 3	653,500				714,097		714,097			714,097
A.16 Replace Mower	80,000				87,418		87,418			87,418
A.17 Remove Rubber, Crack Seal, and Re-Mark Runway 17/35 and Taxiway A	150,000				163,909		163,909			163,909
A.18 Construct Portions of Perimeter Road, Phase 1	107,000				116,922		116,922			116,922
Total Capital Projects 2026	$2,390,500	$0	$0	$0	$2,612,164	$0	$2,612,164	$0	$0	$2,612,164
Capital Projects 2027										
A.19 Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 1	$10,888,889					$12,255,541	$12,255,541			$12,255,541
A.4 Reimburse Airport Traffic Control Tower (ATCT) EA	0					0	0			0
A.20 Implement Airport Safety Management System (SMS)	90,000					101,296	101,296			101,296

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

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Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
A.21 Construct One OSU Flight School Maintenance Hangar, Including Pavement	5,349,000					6,020,347	6,020,347			6,020,347
A.22 Construct One 10-Unit T-hangar	1,200,000					1,350,611	1,350,611			1,350,611
Total Capital Projects 2027	$17,527,889	$0	$0	$0	$0	$19,727,793	$19,727,793	$0	$0	$19,727,793
Total Short Term Project Costs	$49,476,881	$2,563,492	$23,347,010	$4,591,575	$2,612,164	$19,727,793	$52,842,035	$0	$0	$52,842,035

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule: Phase I (0 - 5 Years) 2023	2024	2025	2026	2027	Total	Phase II (6 - 10 Years) 2028-2032	Phase III (11 - 20 Years) 2033-2042	Total Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule: Phase I (0 - 5 Years) 2023	2024	2025	2026	2027	Total	Phase II (6 - 10 Years) 2028-2032	Phase III (11 - 20 Years) 2033-2042	Total Escalated Costs
Mid Term Projects (2028-2032)										
B.1 Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 2	$1,000,000						$0	$1,211,831		$1,211,831
B.2 Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	1,920,000						0	2,326,715		2,326,715
B.3 Demolish Existing ATCT	40,000						0	48,473		48,473
B.4 Install Whole Airport Facility Back-Up Power Generator	3,000,000						0	3,635,492		3,635,492
B.5 Expand Fuel Farm: One 12,000-gallon Jet A Tank and one 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	1,178,000						0	1,427,537		1,427,537
B.6 Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	2,000,000						0	2,423,661		2,423,661
B.7 Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	7,576,000						0	9,180,830		9,180,830
B.8 Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	731,000						0	885,848		885,848
B.9 Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	51,000						0	61,803		61,803
B.10 Construct SRE/Maintenance Facility	2,000,000						0	2,423,661		2,423,661

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
B.11 Remodel Existing Terminal and Demolish Existing ARFF Facility	1,200,000						0	1,454,197		1,454,197
B.12 Expand Terminal Parking Lots, Phase 4	317,000						0	384,150		384,150
B.13 Construct South GA Development Access Road	611,000						0	740,429		740,429
B.14 Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	7,468,000						0	9,049,952		9,049,952
B.15 Runway and Taxiway Pavement Maintenance	2,000,000						0	2,423,661		2,423,661
B.16 Construct One Corporate Hangar with Pavement	2,213,000						0	2,681,781		2,681,781
B.17 Install Two Electric Aircraft Charging Stations	416,000						0	504,122		504,122
B.18 Construct Two Box Hangars	2,969,000						0	3,597,925		3,597,925
B.19 Construct Portions of Perimeter Road, Phase 2	446,000						0	540,477		540,477
B.20 Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	280,767						0	340,242		340,242
B.21 Rehabilitate Airport Drainage System	500,000						0	605,915		605,915
B.22 Rehabilitate PAPIs for Runways 17, 35, and 4	1,195,425						0	1,448,653		1,448,653
B.23 Acquire Airfield De-icing Vehicle	500,000						0	605,915		605,915
Total Mid Term Project Costs	$39,612,192	$0	$0	$0	$0	$0	$0	$48,003,271	$0	$48,003,271

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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Capital Improvement Program	Funding Schedule								
	Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	Funding
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000	$20,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0	4,078,052
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0	90,000
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Grants (ATCT)	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396	86,569,463
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0	2,000,000
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0	14,241,950
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199	2,692,297
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)	446
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0	1,750,000
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)	(1,927,884)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577	1,927,884
City Contribution	228,083	2,576,280	224,121	224,232	(200,000)	3,052,715	0	0	3,052,715
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144	53,429,190
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224	19,969,949
Net Operating Cash Flow	0	0	0	0	0	0	0	0	0
Funds Available Current Year	2,047,619	21,564,414	4,591,575	2,612,164	19,707,793	50,523,565	48,003,271	109,338,838	207,865,675
Beginning Cash Balance/Funds Carried Over from Prior Year	2,319,155	1,803,282	20,686	20,686	20,686	2,319,155	686	686	2,319,155
Funds Used Current Year	(2,563,492)	(23,347,010)	(4,591,575)	(2,612,164)	(19,727,793)	(52,842,035)	(48,003,271)	(109,338,839)	(210,184,145)
Funds Carried Over to Next Year	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685	$685
Estimated Days Unrestricted Cash on Hand >>	408	5	5	4	0		0	0	

Capital Project Description	2023 Base Year Costs	Estimated Project Costs and Development Schedule								
		Phase I (0 - 5 Years)						Phase II (6 - 10 Years)	Phase III (11 - 20 Years)	Total Escalated Costs
		2023	2024	2025	2026	2027	Total	2028-2032	2033-2042	
Long Term Projects (2033-2042)										
C.1 Reconstruct and Realign Taxiway F1, Including CATEX	$800,000						$0		$1,210,072	1,210,072
C.2 Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	940,000						0		1,421,834	1,421,834
C.3 Relocate Taxiway F, Including CATEX or EA	1,292,000						0		1,954,266	1,954,266
C.4 Expand Terminal Parking Lots, Phase 5	439,000						0		664,027	664,027
C.5 Runway and Taxiway Pavement Maintenance	1,076,000						0		1,627,547	1,627,547
C.6 Construct One 10-Unit T-hangar with Pavement	2,400,000						0		3,630,215	3,630,215
C.7 Construct Two Box Hangars	2,969,000						0		4,490,879	4,490,879
C.8 Construct Two Corporate Hangars with Pavement	4,406,000						0		6,664,470	6,664,470
C.9 Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	7,711,000						0		11,663,579	11,663,579
C.10 Construct Taxiway West of Runway 17/35, Including EA	27,822,853						0		42,084,562	42,084,562
C.11 Runway and Taxiway Pavement Reconstruction	20,000,000						0		30,251,794	30,251,794
C.12 Construct Portions of Perimeter Road, Phase 3	680,000						0		1,028,561	1,028,561
C.13 Update Airport Master Plan	750,000						0		1,134,442	1,134,442
C.14 e Purchase ARFF Vehicle	1,000,000						0		1,512,590	1,512,590
Total Long Term Project Costs	$72,285,853	$0	$0	$0	$0	$0	$0	$0	$109,338,839	$109,338,839
Total Project Costs	$161,374,926	$2,563,492	$23,347,010	$4,591,575	$2,612,164	$19,727,793	$52,842,035	$48,003,271	$109,338,839	$210,184,145

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

13-Feb-24

	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement and BIL-AIG Funding	AIP Discretionary/ BIL-ATP-ATCT Funding	Total Federal Funding	Oklahoma Aeronautics Commission Grants	Other Federal/ State Grants (FEMA/BRIC, FAA F&E)	Passenger Facility Charges (PAYG)	City Contribution	Private 3rd Party Funding (Inc. OSU)	Debt Proceeds	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Short Term Projects (2023-2027)														
Capital Projects 2023														
A.1	Prepare Re-evaluation of Terminal Building Environmental Assessment (EA)	$78,225	$70,403		$70,403								$7,823	$78,225
A.2	Design Terminal Building	1,874,438	1,406,388		1,406,388				Assumes Local Match + 15% ineligible >>>>				468,051	1,874,438
A.3	Prepare Airport Traffic Control Tower (ATCT) Siting Study	100,000	90,000		90,000								10,000	100,000
A.4	Prepare Airport Traffic Control Tower (ATCT) EA	200,000			0			Reimb in 2027>>>	200,000				0	200,000
A.5	Replace Two Primary Mower Apparatus	30,000			0								30,000	30,000
2,022	SRE Equipment - FY22 Grant Carryover	280,829	252,746		252,746				28,083				0	280,829
	Total Capital Projects 2023	$2,563,492	$1,819,536	$0	$1,819,536	$0	$0	$0	$228,083	$0	$0	$0	$515,873	$2,563,492
Capital Projects 2024														
A.6	Construct New Group Hangar	$2,575,000			$0						$1,750,000	$825,000	$0	$2,575,000
A.7	Design and Construct Terminal Building including Demolition of Group Hangar #1, Phase 1	19,570,000	1,468,361	12,136,184	13,604,545	1,000,000			$2,482,859			700,000	1,782,596	19,570,000
A.8	Design and Construct Terminal Area Roadways and Parking Lots, Phase 1	934,210	840,789		840,789				93,421				0	934,210
A.9	Crack Seal, and Re-Mark Taxiway A	61,800			0							61,800	0	61,800
A.10	Crack Seal, Seal Coat, and Re-Mark Runway 4/22 and Taxiway F	206,000			0							206,000	0	206,000
	Total Capital Projects 2024	$23,347,010	$2,309,150	$12,136,184	$14,445,334	$1,000,000	$0	$0	$2,576,280	$0	$1,750,000	$1,792,800	$1,782,596	$23,347,010
Capital Projects 2025														
A.11	Construct Terminal Building, Phase 2	$1,591,350	$1,432,475		$1,432,475				$158,875				$0	$1,591,350
A.12	Construct Terminal Area Roadways and Parking Lots, Phase 2	652,454	587,208		587,208				65,245				0	652,454
A.13	Construct One Corporate Hangar with Pavement	2,347,772			0					2,347,772			0	2,347,772
	Total Capital Projects 2025	$4,591,575	$2,019,683	$0	$2,019,683	$0	$0	$0	$224,121	$2,347,772	$0	$0	$0	$4,591,575
Capital Projects 2026														
A.14	Construct Terminal Building, Phase 3	$1,529,818	$1,376,996		$1,376,996				$152,822				$0	$1,529,818
A.15	Construct Terminal Area Roadways and Parking Lots, Phase 3	714,097	642,687		642,687				71,410				0	714,097
A.16	Replace Mower	87,418			0							87,418	0	87,418
A.17	Remove Rubber, Crack Seal, and Re-Mark Runway 17/35 and Taxiway A	163,909			0							163,909	0	163,909
A.18	Construct Portions of Perimeter Road, Phase 1	116,922			0							116,922	0	116,922
	Total Capital Projects 2026	$2,612,164	$2,019,683	$0	$2,019,683	$0	$0	$0	$224,232	$0	$0	$368,249	$0	$2,612,164
Capital Projects 2027														
A.19	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 1	$12,255,541	$728,834	$8,800,000	$9,528,834	$1,000,000		$350,000				$1,376,707	$0	$12,255,541
A.4	Reimburse Airport Traffic Control Tower (ATCT) EA	0	180,000		180,000				-200,000				20,000	0
A.20	Implement Airport Safety Management System (SMS)	101,296	91,166		91,166							10,130	0	101,296
A.21	Construct One OSU Flight School Maintenance Hangar, Including Pavement	6,020,347			0					6,020,347			0	6,020,347
A.22	Construct One 10-Unit T-hangar	1,350,611			0					1,350,611			0	1,350,611
	Total Capital Projects 2027	$19,727,793	$1,000,000	$8,800,000	$9,800,000	$1,000,000	$0	$350,000	-$200,000	$7,370,957	$0	$1,386,836	$20,000	$19,727,793
	Total Short Term Project Funding	$52,842,035	$9,168,052	$20,936,184	$30,104,236	$2,000,000	$0	$350,000	$3,052,715	$9,718,729	$1,750,000	$3,547,885	$2,318,469	$52,842,035

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

13-Feb-24

	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement and BIL-AIG Funding	AIP Discretionary/ BIL-ATP-ATCT Funding	Total Federal Funding	Oklahoma Aeronautics Commission Grants	Other Federal/ State Grants (FEMA/BRIC, FAA F&E)	Passenger Facility Charges (PAYG)	City Contribution	Private 3rd Party Funding (Inc. OSU)	Debt Proceeds	Other Unidentified Funding	Cash Reserves/ Net Revs	Total Funding
Mid Term Projects (2028-2032)														
B.1	Construct ATCT, with Access Road, Utilities, and ASOS Back-Up, Phase 2	$1,211,831	$1,000,000		$1,000,000							$211,831	$0	$1,211,831
B.2	Construct Aircraft Rescue and Fire Fighting (ARFF) Facility, Including EA or CATEX	2,326,715	956,374	1,137,669	2,094,043							232,671	0	2,326,715
B.3	Demolish Existing ATCT	48,473	43,626		43,626							4,847	0	48,473
B.4	Install Whole Airport Facility Back-Up Power Generator	3,635,492			0		2,726,619					908,873	0	3,635,492
B.5	Expand Fuel Farm: One 12,000-gallon Jet A Tank and one 6,000-gallon Unleaded AVGAS Tank, Including EA or CATEX	1,427,537			0					1,427,537			0	1,427,537
B.6	Purchase Property for Instrument Approach Procedures (IAP) Implementation and Expanded RPZs, Including EA or CATEX	2,423,661			0							2,423,661	0	2,423,661
B.7	Implement GPS IAPs to Runway 35, 4, and 22, Including Installation of MALSR to Runway 35 and EA or CATEX	9,180,830			0		9,180,830						0	9,180,830
B.8	Relocate Glideslope Antenna and Equipment Building Near Runway 17 Outside of ROFA	885,848			0		885,848						0	885,848
B.9	Relocate Utility Box Near Runway 4/22 Outside of ROFA and ROFZ	61,803	55,623		55,623							6,180	0	61,803
B.10	Construct SRE/Maintenance Facility	2,423,661	1,944,377	236,918	2,181,295							242,366	0	2,423,661
B.11	Remodel Existing Terminal and Demolish Existing ARFF Facility	1,454,197			0							1,454,197	0	1,454,197
B.12	Expand Terminal Parking Lots, Phase 4	384,150			0							384,150	0	384,150
B.13	Construct South GA Development Access Road	740,429			0							740,429	0	740,429
B.14	Construct Two OSU Flight Center 10-Unit T-hangars with Pavement	9,049,952			0					9,049,952			0	9,049,952
B.15	Runway and Taxiway Pavement Maintenance	2,423,661	1,000,000	1,181,295	2,181,295			242,366					0	2,423,661
B.16	Construct One Corporate Hangar with Pavement	2,681,781			0					2,681,781			0	2,681,781
B.17	Install Two Electric Aircraft Charging Stations	504,122			0					504,122			0	504,122
B.18	Construct Two Box Hangars	3,597,925			0					3,597,925			0	3,597,925
B.19	Construct Portions of Perimeter Road, Phase 2	540,477			0							540,477	0	540,477
B.20	Construct Concrete Mow Strip/Wildlife Barrier to Entire Perimeter Fence	340,242			0							340,242	0	340,242
B.21	Rehabilitate Airport Drainage System	605,915			0							605,915	0	605,915
B.22	Rehabilitate PAPIs for Runways 17, 35, and 4	1,448,653			0		1,448,653						0	1,448,653
B.23	Acquire Airfield De-icing Vehicle	605,915			0			605,915					0	605,915
	Total Mid Term Project Funding	$48,003,271	$5,000,000	$2,555,883	$7,555,883	$0	$14,241,950	$848,282	$0	$17,261,317	$0	$8,095,840	$0	$48,003,271
Long Term Projects (2033-2042)														
C.1	Reconstruct and Realign Taxiway F1, Including CATEX	$1,210,072	1,089,065		$1,089,065			$121,007					$0	$1,210,072
C.2	Reconstruct and Realign Taxiway B, Including Demolition of Existing Pavement and CATEX	1,421,834	1,279,651		1,279,651			142,183					0	1,421,834
C.3	Relocate Taxiway F, Including CATEX or EA	1,954,266	1,145,495	613,344	1,758,839			195,427					0	1,954,266
C.4	Expand Terminal Parking Lots, Phase 5	664,027			0							664,027	0	664,027
C.5	Runway and Taxiway Pavement Maintenance	1,627,547	1,464,792		1,464,792			162,755					0	1,627,547
C.6	Construct One 10-Unit T-hangar with Pavement	3,630,215			0					3,630,215			0	3,630,215
C.7	Construct Two Box Hangars	4,490,879			0					4,490,879			0	4,490,879
C.8	Construct Two Corporate Hangars with Pavement	6,664,470			0					6,664,470			0	6,664,470
C.9	Construct One OSU Flight Center Maintenance Hangar and One 10-Unit T-hangar, with Pavement	11,663,579			0					11,663,579			0	11,663,579
C.10	Construct Taxiway West of Runway 17/35, Including EA	42,084,562	2,000,000	35,876,105	37,876,105			300,000				3,908,456	0	42,084,562
C.11	Runway and Taxiway Pavement Reconstruction	30,251,794	1,000,000	26,226,615	27,226,615			300,000				2,725,179	0	30,251,794
C.12	Construct Portions of Perimeter Road, Phase 3	1,028,561			0							1,028,561	0	1,028,561
C.13	Update Airport Master Plan	1,134,442	1,020,998		1,020,998			113,444					0	1,134,442
C.14	Purchase ARFF Vehicle	1,512,590	1,000,000	361,331	1,361,331			151,259					0	1,512,590
	Total Long Term Project Funding	$109,338,839	$10,000,000	$63,077,396	$73,077,396	$0	$0	$1,486,075	$0	$26,449,144	$0	$8,326,224	$0	$109,338,839
Total Project Funding		$210,184,145	$24,168,052	$86,569,463	$110,737,515	$2,000,000	$14,241,950	$2,684,357	$3,052,715	$53,429,190	$1,750,000	$19,969,949	$2,318,469	$210,184,145

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-3

Master Plan - Financial Implementation Analysis
Statewide Hangar Loan Program Funded Debt

13-Feb-24

Debt Issue Structure

Issue Date:	01-Jan-24
Interest:	1.8%
Term:	10 Years
Project Funding Requirement:	$1,750,000
Debt Service Reserve Fund Requirement (MADS):	0
Capitalized Debt Issue Costs (0%):	0
Total Debt Requirement:	$1,750,000

Debt Service Schedule

Payment Number	Year	Beginning Principal	Annual Debt Service	Interest Payment	Principal Payment	Ending Principal
1	2024	$1,750,000	$192,788	$31,500	$161,288	$1,588,712
2	2025	1,588,712	192,788	28,597	164,192	1,424,520
3	2026	1,424,520	192,788	25,641	167,147	1,257,373
4	2027	1,257,373	192,788	22,633	170,156	1,087,217
5	2028	1,087,217	192,788	19,570	173,218	913,999
6	2029	913,999	192,788	16,452	176,336	737,663
7	2030	737,663	192,788	13,278	179,510	558,152
8	2031	558,152	192,788	10,047	182,742	375,411
9	2032	375,411	192,788	6,757	186,031	189,380
10	2033	189,380	192,788	3,409	189,380	0
	Totals		$1,927,884	$177,884	$1,750,000	

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-4

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operations & Maintenance Expenses

13-Feb-24

				Phase I (0 - 5 Years)						Phase II	Phase III
	Actual	Actual	Actual	Budget	Budget	Projected				(6 - 10 Years)	(11 - 20 Years)
Operations & Maintenance Expenses	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**	**2028-2032**	**2033-2042**
Personnel Compensation and Benefits	$931,380	$1,022,892	$1,128,603	$1,083,722	$1,136,965	$1,171,074	$1,206,206	$1,242,392	$5,840,359	$6,793,911	$17,006,452
Travel and Training	10,318	14,914	26,086	33,235	30,000	30,900	31,827	32,782	158,744	179,264	448,733
Insurance	7,851	7,851	26,765	46,960	31,000	31,930	32,888	33,875	176,652	185,240	463,691
Utilities and Telecommunications	7,522	8,840	12,641	26,500	15,000	15,450	15,914	16,391	89,254	89,632	224,366
Dues and Subscriptions	4,928	5,095	5,905	5,000	5,000	5,150	5,305	5,464	25,918	29,877	74,789
Advertising and Promotion	9,523	575	3,824	7,300	3,800	3,914	4,031	4,152	23,198	22,707	56,839
Janitorial Services and Supplies	8,221	28,040	39,410	44,500	44,500	45,835	47,210	48,626	230,671	265,909	665,620
Contract for Services	8,422	52,645	60,555	57,500	60,000	61,800	63,654	65,564	308,518	358,529	897,466
Parts and Supplies	33,774	20,201	33,980	37,500	27,500	28,325	29,175	30,050	152,550	164,326	411,338
Chemicals	22,754	21,387	23,940	25,000	25,000	25,750	26,523	27,318	129,591	149,387	373,944
Clothing and Uniforms	1,857	3,117	3,392	6,000	6,000	6,180	6,365	6,556	31,102	35,853	89,747
Equipment and Other Rentals	6,023	1,905	1,905	2,300	2,300	2,369	2,440	2,513	11,922	13,744	34,403
Repairs and Maintenance	74,549	34,647	79,917	41,146	36,750	37,853	38,988	40,158	194,894	219,599	549,698
Fuel and Oil	42,170	19,444	34,756	26,000	26,000	26,780	27,583	28,411	134,774	155,362	388,902
Supplies, Minor Tools, Safety Equipment	19,580	8,523	9,422	8,300	8,300	8,549	8,805	9,070	43,024	49,596	124,149
Professional Services	64,362	4,405	4,000	54,000	4,000	4,120	4,244	4,371	70,735	23,902	59,831
Software Maintenance	0	4,600	3,600	44,600	3,600	3,708	3,819	3,934	59,661	21,512	53,848
Technology and PC Hardware	1,068	4,439	506	7,200	1,000	1,030	1,061	1,093	11,384	5,975	14,958
Office Supplies and Postage	15	686	1,141	1,250	1,250	1,288	1,326	1,366	6,480	7,469	18,697
Direct Costs	8,272	19,727	19,727	19,727	19,727	20,319	20,928	21,556	102,257	117,878	295,072
Indirect Costs	19,602	23,913	23,913	23,913	23,913	24,630	25,369	26,130	123,956	142,892	357,685
Miscellaneous Expenses	6,033	734	279	1,680	1,680	1,730	1,782	1,836	8,708	10,039	25,129
Contingency	0	350	0	11,444	100,000	103,000	106,090	109,273	429,807	597,548	1,495,776
Total Operations & Maintenance Expenses	$1,288,222	$1,308,929	$1,544,268	$1,614,777	$1,613,285	$1,661,684	$1,711,534	$1,762,880	$8,364,160	$9,640,151	$24,131,134
Annual Growth Rate	-	1.6%	18.0%	4.6%	-0.1%	3.0%	3.0%	3.0%	2.7%	3.0%	3.0%
Operating Expenses Per Enplaned Passenger:											
Stillwater Regional Airport	$104.62	$64.39	$70.12	$67.68	$62.42	$59.35	$59.58	$59.81	$61.54	$60.54	$62.47
Non-Hub Industry Average	$65.89	$75.95	$75.83	$75.71	$75.60	$75.48	$75.37	$75.25	$75.48	$74.90	$74.05

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Schedule E-5

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operating Revenues

13-Feb-24

Revenues	Actual 2020	Actual 2021	Actual 2022	Phase I (0 - 5 Years) Budget 2023	Budget 2024	Projected 2025	2026	2027	Total	Phase II (6 - 10 Years) 2028-2032	Phase III (11 - 20 Years) 2033-2042
						LDW - Landed Weight Growth + Inflation					
						ENP - Enplanement Growth + Inflation					
AIRLINE REVENUES											
Landing Fees	28,758	22,959	36,821	25,325	29,325	$31,463	$32,828	$34,252	$153,194	$194,866	$538,539
Terminal Rent	47,676	51,731	50,889	51,000	51,000	52,530	54,106	55,729	264,365	304,749	762,846
Stand By ARFF Fee	21,310	14,310	23,140	7,000	20,000	20,600	21,218	21,855	90,673	119,510	299,155
Security Fee	18,030	13,565	18,755	14,000	19,000	19,570	20,157	20,762	93,489	113,534	284,197
Total Airline Revenues	$115,774	$102,565	$129,605	$97,325	$119,325	$124,163	$128,309	$132,598	$601,720	$732,659	$1,884,738
Annual Growth Rate	-	-11.4%	26.4%	-24.9%	22.6%	4.1%	3.3%	3.3%	0.5%	3.4%	3.4%
Airline Cost Per Enplaned Passenger:											
Stillwater Regional Airport	$9.40	$5.05	$5.89	$4.08	$4.62	$4.43	$4.47	$4.50	$4.43	$4.60	$4.88
Non-Hub Industry Average	$12.02	$13.13	$13.11	$13.09	$13.07	$13.05	$13.03	$13.01	$13.05	$12.95	$12.80
NON-AIRLINE REVENUES											
Fuel Sales (Profit from Fuel Sales, Net with Purchases)	$16,748	-$5,416	$44,794	$0	$0	$0	$0	$0	$0	$0	$0
Room Rental	54,917	55,579	59,562	59,000	59,000	60,770	62,593	64,471	305,834	352,553	882,508
Pasture Rental	26,725	28,837	34,404	25,000	29,000	29,870	30,766	31,689	146,325	173,289	433,775
Hangar Rental	83,927	87,008	94,771	85,000	88,000	90,640	93,359	96,160	453,159	525,842	1,316,283
Land Rental	38,953	116,059	123,842	120,000	120,000	123,600	127,308	131,127	622,035	717,057	1,794,931
Concessions	1,660	840	1,209	900	1,000	1,116	1,179	1,246	5,441	7,374	22,494
Landing Fee - Non-Airline	750	675	675	675	675	724	756	788	3,618	4,485	12,396
Fuel Flowage Fee	81,782	83,168	108,747	82,000	92,000	98,709	102,990	107,458	483,157	611,344	1,689,534
Parking Fee	15,650	27,478	29,088	21,600	22,000	22,660	23,340	24,040	113,640	131,461	329,071
ID/Access Card Fee	0	0	1,050	0	0	0	0	0	0	0	0
Vendor Sales Sharing	11,962	5,697	8,961	7,400	8,000	8,240	8,487	8,742	40,869	47,804	119,662
Interest on Loan	160	60	0	40	0	0	0	0	40	0	0
Miscellaneous Revenue	4,965	4,488	7,055	18,000	5,000	5,150	5,305	5,464	38,918	29,877	74,789
Ad Sales	0	0	0	4,800	0	0	0	0	4,800	0	0
Workers' Comp Contributions	0	0	0	0	0	0	0	0	0	0	0
Nonaviation Fuel Sales	8,150	5,096	7,459	0	7,000	7,210	7,426	7,649	29,285	41,828	104,704
Total Non-Airline Revenues	$346,349	$409,570	$521,617	$424,415	$431,675	$448,689	$463,509	$478,834	$2,247,122	$2,642,916	$6,780,148
Annual Growth Rate	-	18.3%	27.4%	-18.6%	1.7%	3.9%	3.3%	3.3%	-1.7%	3.3%	3.3%
NON-OPERATING REVENUES											
Interest Income	$0	$7,160	$9,313	$0	$0	$0	$0	$0	$0	$0	$0
Gain on Sale of Assets	0	0	22,680	0	0	0	0	0	0	0	0
COVID Relief Funding	0	0	0	997,569	0	0	0	0	997,569	0	0
Total Non-Operating Revenues	$0	$7,160	$31,993	$997,569	$0	$0	$0	$0	$997,569	$0	$0
Annual Growth Rate	-	-	346.9%	3018.1%	-100.0%	-	-	-	-	-	-
Total Revenues	$462,123	$519,295	$683,215	$1,519,309	$551,000	$572,852	$591,819	$611,431	$3,846,411	$3,375,575	$8,664,886
Annual Growth Rate	-	12.4%	31.6%	122.4%	-63.7%	4.0%	3.3%	3.3%	-2.2%	3.3%	3.3%
Operating Revenues Per Enplaned Passenger:											
Stillwater Regional Airport	$37.53	$25.19	$29.57	$21.87	$21.32	$20.46	$20.60	$20.75	$20.96	$21.20	$22.43
Non-Hub Industry Average	$61.02	$74.06	$73.94	$73.83	$73.71	$73.60	$73.49	$73.38	$73.60	$73.04	$72.20

Schedule E-6

STILLWATER REGIONAL AIRPORT (SWO)
City of Stillwater, Oklahoma

Master Plan - Financial Implementation Analysis
Financial Plan Summary
Budgeted and Projected Net Revenues, Capital Funding and Capital Expenditures

13-Feb-24

Operating/Capital Cash Flow	Phase I (0 - 5 Years)						Phase II	Phase III
	Budget	Budget	Projected				(6 - 10 Years)	(11 - 20 Years)
	2023	2024	2025	2026	2027	Total	2028-2032	2033-2042
Passenger Enplanements	23,858	25,846	28,000	28,727	29,473	135,904	159,236	386,282
Annual Growth Rate	-	8.33%	8.33%	2.60%	2.60%	5.43%	2.59%	2.58%
Operating Cash Flow								
Revenues:								
Airline Revenues	$97,325	$119,325	$124,163	$128,309	$132,598	$601,720	$732,659	$1,884,738
Non-Airline Revenues	424,415	431,675	448,689	463,509	478,834	2,247,122	2,642,916	6,780,148
Non-Operating Revenues	997,569	0	0	0	0	997,569	0	0
Subsidy Required to Fund Operating Deficit	95,468	1,062,285	1,088,831	1,119,716	1,151,449	4,517,749	6,264,576	15,466,248
Total Revenues	$1,614,777	$1,613,285	$1,661,684	$1,711,534	$1,762,880	$8,364,160	$9,640,151	$24,131,134
Operations & Maintenance Expenses	(1,614,777)	(1,613,285)	(1,661,684)	(1,711,534)	(1,762,880)	(8,364,160)	(9,640,151)	(24,131,134)
Total Net Operating Cash Flow Available For Capital Expenditures	$0	$0	$0	$0	$0	$0	$0	$0
Capital Cash Flow								
Beginning Cash Balance	$2,319,155	$1,803,282	$20,686	$20,686	$20,686	$2,319,155	$686	$686
Other Capital Funding Sources:								
AIP Entitlement Grants	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$5,000,000	$5,000,000	$10,000,000
BIL Airport Infrastructure Grants (AIG)	1,019,003	1,019,683	1,019,683	1,019,683	0	4,078,052	0	0
AIP Entitlement & AIG unspent current year + carryover	(289,467)	0	0	0	0	0	0	0
AIP Entitlements & AIG carryover from the prior years	90,000	289,467	0	0	0	90,000	0	0
AIP Discretionary/BIL Airport Terminal Grants (ATP) & Tower Gra	0	12,136,184	0	0	8,800,000	20,936,184	2,555,883	63,077,396
Oklahoma Aeronautics Commission (OAC) Grants	0	1,000,000	0	0	1,000,000	2,000,000	0	0
Other Federal / State Grants	0	0	0	0	0	0	14,241,950	0
Passenger Facility Charges	94,261	102,117	110,628	113,501	116,449	536,957	629,141	1,526,199
PFC beginning year unliquidated balance	446	94,707	196,825	307,453	420,954	446	187,403	(31,737)
PFC unspent current year + carryover	(94,707)	(196,825)	(307,453)	(420,954)	(187,403)	(187,403)	31,737	(8,387)
Debt Proceeds (10 yrs, 1.8%) Thru 2033	0	1,750,000	0	0	0	1,750,000	0	0
Less Debt Service	0	0	(192,788)	(192,788)	(192,788)	(578,365)	(963,942)	(385,577)
Plus Debt Service Reimbursed by Tenant	0	0	192,788	192,788	192,788	578,365	963,942	385,577
City Contribution	228,083	2,576,280	224,121	224,232	-200,000	3,052,715	0	0
Private 3rd Party Funding	0	0	2,347,772	0	7,370,957	9,718,729	17,261,317	26,449,144
Other Unidentified Funding	0	1,792,800	0	368,249	1,386,836	3,547,885	8,095,840	8,326,224
Total Other Capital Funding Sources	$2,047,619	$21,564,414	$4,591,575	$2,612,164	$19,707,793	$50,523,565	$48,003,271	$109,338,838
Total Funds Available for Capital Expenditures	$4,366,774	$23,367,696	$4,612,261	$2,632,849	$19,728,479	$52,842,720	$48,003,957	$109,339,524
Capital Improvement Program Expenditures	2,563,492	23,347,010	4,591,575	2,612,164	19,727,793	52,842,035	48,003,271	109,338,839
Ending Cash Balance	$1,803,282	$20,686	$20,686	$20,686	$686	$686	$686	$685

APPENDIX SEVEN. Airport Obstacle Action Plan

INTRODUCTION

Airports are required to protect approach and departure paths from encroachment by objects to ensure the safety of people on the ground and in aircraft. The City of Stillwater is responsible for maintaining clear approach and departure surfaces at Stillwater Regional Airport (SWO). This responsibility is derived from FAA grant assurances attached to all FAA-administered airport financial assistance programs. Specifically, the following grant assurances apply to maintaining clear airport approaches:

- Grant Assurance 19 states that the airport shall be operated in a safe and serviceable conditions and in accordance with appropriate minimum standards required by applicable agencies.
- Grant Assurance 20 states that an airport sponsor must also take appropriate action to ensure that terminal airspace will be adequately cleared and protected by removing, lowering, lighting, or otherwise mitigating existing airport hazards and by preventing the establishment of future hazards.
- Grant Assurance 21 states that an airport sponsor must take appropriate action, to the extent practicable, including the adoption of zoning laws, to restrict the use of land adjacent to the airport to uses compatible with normal airport operations.
- Grant Assurance 29 says the airport sponsor must keep the Airport Layout Plan (ALP) up to date (obstacles are generally shown on the ALP plan and profile sheets).

The Federal Aviation Administration (FAA) has issued a reminder memo regarding airport sponsors' requirements and the FAA's policies (see Attachment One). The objective of this Obstacle Action Plan (OAP) is to identify existing obstructions, recommend steps for their removal, and provide means and methods for addressing future obstructions based on the ultimate airport configuration.

OBSTRUCTION ANALYSIS

Imaginary Surfaces

The determination of surrounding objects as obstacles is based on a set of imaginary surfaces established to identify and evaluate obstacles. Both existing and future surfaces are utilized. Existing surfaces are designed to identify objects that penetrate or come close to penetrating surfaces of the existing airport configuration. The OAP will identify initial action steps to remove these obstacles. The future surfaces are designed to protect for the long-term airport configuration and address long-term action steps for removing and preventing obstructions.

A variety of imaginary surfaces have been established to aid airport sponsors in evaluating objects in the surrounding airspace and prioritize steps for their removal. The following surfaces are used in the OAP, which were detailed and evaluated in the Master Plan.

- Threshold Siting Surface (TSS).
- Straight-In Visual Portion of the Final Approach Segment Surface (20:1 TERPS Surface)
- Vertical Guidance Surface (VGS).
- Precision Approach Path Indicator (PAPI) Obstacle Clearance Surface.
- Inner Approach Obstacle Free Zone (IAOFZ).
- Federal Aviation Regulations (FAR) Part 77.

Because the 20:1 TERPS Surface is virtually identical to the TSS (only slightly narrower at the outer edge), it is considered in the TSS analysis that follows.

Obstacle Identification

Since trees are the primary tall objects surrounding SWO and not manmade objects, this OAP will focus on tree analysis. To determine existing tree obstacles, data provided in the Airport Geographical Information System (AGIS) is used for object identification, height, and location. Some trees that are very close together and of similar height may not be collected as individual points by the AGIS data. Depending on the density and height of trees, there may be more than one tree at a particular AGIS identified location.

RECOMMENDATIONS

Based on the data and analysis Runway Ends 4, 22, and 35 have obstacles that penetrate the FAR Part 77 imaginary surfaces, as identified in **Table 7-1**.

Recommendation 1

Remove obstacles that penetrate the FAR Part 77 Surfaces.

Action

It is recommended that SWO negotiate with property owners and remove off-airport trees that penetrate the FAR Part 77 surfaces identified in **Table 7-1**. Removal of trees is preferred since Airport Improvement Program (AIP) grant funds may not be used to address the same obstacle more than once. SWO should remove on airport trees and bushes as soon as possible to maintain clear approaches to the runways. Grading of ground on SWO property should commence with the next major projects near Runway Ends 4 and 35.

Justification

Obstacles to these surfaces have a negative effect on the ability to retain existing nighttime approaches or approaches with vertical guidance.

Table 7-1: Existing FAR Part 77 Surface Obstacles, By Runway End

Runway End/ Obstacle No.	Description	Latitude	Longitude	Top Elevation	Proposed Mitigation
Runway 4					
24026	Tree	W 97° 05' 32.193"	N 36° 09' 13.766"	977.9'	Remove
33875	Tree	W 97° 05' 29.953"	N 36° 09' 11.370"	980.4'	Remove
GROUND	Terrain	Varies	Varies	965.0'	Grade
Runway 22					
25775	Tree	W 97° 04' 42.641"	N 36° 10' 00.075"	1001.9'	Remove
25816	Tree	W 97° 04' 27.013"	N 36° 09' 59.711"	1033.1'	Remove
33899	Bush	W 97° 04' 42.548"	N 36° 09' 59.852"	996.6'	Remove
33907	Bush	W 97° 04' 42.125"	N 36° 09' 59.833"	996.4'	Remove
33915	Bush	W 97° 04' 42.317"	N 36° 10' 00.734"	997.7'	Remove
33923	Bush	W 97° 04' 42.685"	N 36° 10' 00.585"	998.2'	Remove
33931	Bush	W 97° 04' 42.199"	N 36° 10' 00.072"	996.6'	Remove
Runway 35					
19625	Ground	W 97° 05' 17.924"	N 36° 09' 05.161"	966.5'	Grade
35263	Tree	W 97° 05' 04.771"	N 36° 08' 57.231"	982.7'	Remove
35271	Tree	W 97° 05' 04.881"	N 36° 08' 57.108"	982.1'	Remove
35279	Tree	W 97° 05' 04.696"	N 36° 08' 55.970"	986.6'	Remove
35287	Tree	W 97° 05' 04.670"	N 36° 08' 55.612"	988.6'	Remove
35311	Tree	W 97° 05' 03.665"	N 36° 08' 54.056"	990.9'	Remove
35303	Tree	W 97° 05' 04.658"	N 36° 08' 54.982"	987.0'	Remove

Source: Mead & Hunt analysis.

Information Needed

- Property owner's names.
- Property deeds.

Action Steps

- Review deeds and property information to verify any existing easements.
- Perform site visits to confirm location and number of individual trees at each location.
- Meet with property owners, verify owner information is correct, and discuss proposed mitigation measures (removal of trees).
- Remove trees within five years.

APPENDIX EIGHT. Airport Layout Plan

Mead & Hunt

Stillwater REGIONAL AIRPORT

SWO

ORDINANCE NO. 3571

AN ORDINANCE REZONING A TRACT OF LAND LOCATED AT 1002 S. HUSBAND STREET FROM TWO-FAMILY RESIDENTIAL (RT) TO COMMERCIAL BUSINESS (CB).

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF STILLWATER, OKLAHOMA:

Parcel located at 1002 S. Husband Street:

Lots 1 & 2 of Block 48, Original Town Stillwater, County of Payne, State of Oklahoma

be and the same is hereby rezoned from RT (Two-Family Residential) to CB (Commercial Business).

PASSED, APPROVED, AND ADOPTED THIS ___ DAY OF _____, 2025.

_____
WILLIAM H. JOYCE, MAYOR

(SEAL)
ATTEST:

_____
TERESA KADAVY, CITY CLERK

APPROVED AS TO FORM AND LEGALITY THIS ____ DAY OF _____, 2025.

_____
TAMMY EWING, ASSISTANT CITY ATTORNEY

First Reading: 06/02/2025
Second Reading:

ORDINANCE NO. 3570

AN ORDINANCE REZONING A TRACT OF LAND LOCATED AT 1017 AND 1023 SOUTH HUSBAND STREET FROM TWO-FAMILY RESIDENTIAL (RT) TO COMMERCIAL BUSINESS (CB).

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF STILLWATER, OKLAHOMA:

Parcels located at 1017 and 1023 South Husband Street:

Lots Thirteen (13) through Eighteen (18), in Block Forty-Seven (47), in the Original Town Stillwater, now the City of Stillwater, Payne County, State of Oklahoma, according to the recorded plat thereof.

be and the same is hereby rezoned from RT (TWO-FAMILY RESIDENTIAL) to CB (COMMERCIAL BUSINESS).

PASSED, APPROVED, AND ADOPTED THIS 2ND DAY OF JUNE, 2025.

_____
WILLIAM H. JOYCE, MAYOR

(SEAL)
ATTEST:

_____
TERESA KADAVY, CITY CLERK

APPROVED AS TO FORM AND LEGALITY THIS 2ND DAY OF JUNE, 2025.

_____
TAMMY EWING, ASSISTANT CITY ATTORNEY

First Reading: 05/19/2025
Second Reading: 06/02/2025