Chapter One

Airport Inventory

1.1 Master Plan Introduction

An Airport Master Plan is a planning document that assists the airport, the community, and the surrounding region in providing guidelines and direction over a 20-year period. Its long-term development concepts encompass the present and future aviation needs. The most recent Master Plan for Springfield-Branson National Airport (SGF or Airport) was developed in 2012 and an Airport Layout Plan (ALP) was completed in 2013. The 2012 Master Plan has largely been built-out and needs to be updated to reflect current conditions of the Airport, current projections of airport activity, and new environmental considerations. Furthermore, it will consider other regulatory factors, while planning for future land uses, facility development, and changes in the aviation environment.

The Federal Aviation Administration (FAA) provides documented guidance for Airport Master Plans[1]. Additionally, the FAA Central Region and the Missouri Department of Transportation (MoDOT) require ALP updates to include aeronautical survey and aerial imagery acquisition in order to meet standards set forth in Advisory Circulars (ACs)[2]. These are significant items both in terms of effort and cost. They are necessary to obtain enhanced instrument approach capabilities and provide an Airports Geographic Information System (AGIS) compatible dataset, in order to aid in decision making and future airport design projects. The resulting ALP will go on file with the FAA to maintain airspace protection and permit the City of Springfield to receive federal funding associated with proposed improvements at the Airport.

The following chapters will make up the SGF Airport Master Plan Report, as specified by the FAA AC:

- Chapter One – Airport Inventory
- Chapter Two – Terminal Area Inventory
- Chapter Three – Demand Projections
- Chapter Four – Airport Facility Requirements
- Chapter Five – Terminal Facility Requirements
- Chapter Six – Airport Alternatives
- Chapter Seven – Terminal Alternatives
- Chapter Eight – Land Use Compatibility Plan
- Chapter Nine – Implementation Plan/CIP

[1] FAA Advisory Circulars (ACs), specifically AC 150/5070-6B, Change 2, "Airport Master Plans" https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5070-6B-Change-2-Consolidated.pdf
[2] FAA Advisory Circulars (AC) 150/5300 -16A, -17C and -18B

Due to the extensive use of acronyms in airport master plans, Appendix 1 provides a comprehensive list of these acronyms. This list aims to offer guidance on the most common acronyms used in the aviation industry and throughout this master plan. Readers are encouraged to refer to this appendix for clarification and to ensure a better understanding of the terminology used.

1.1.1 Background

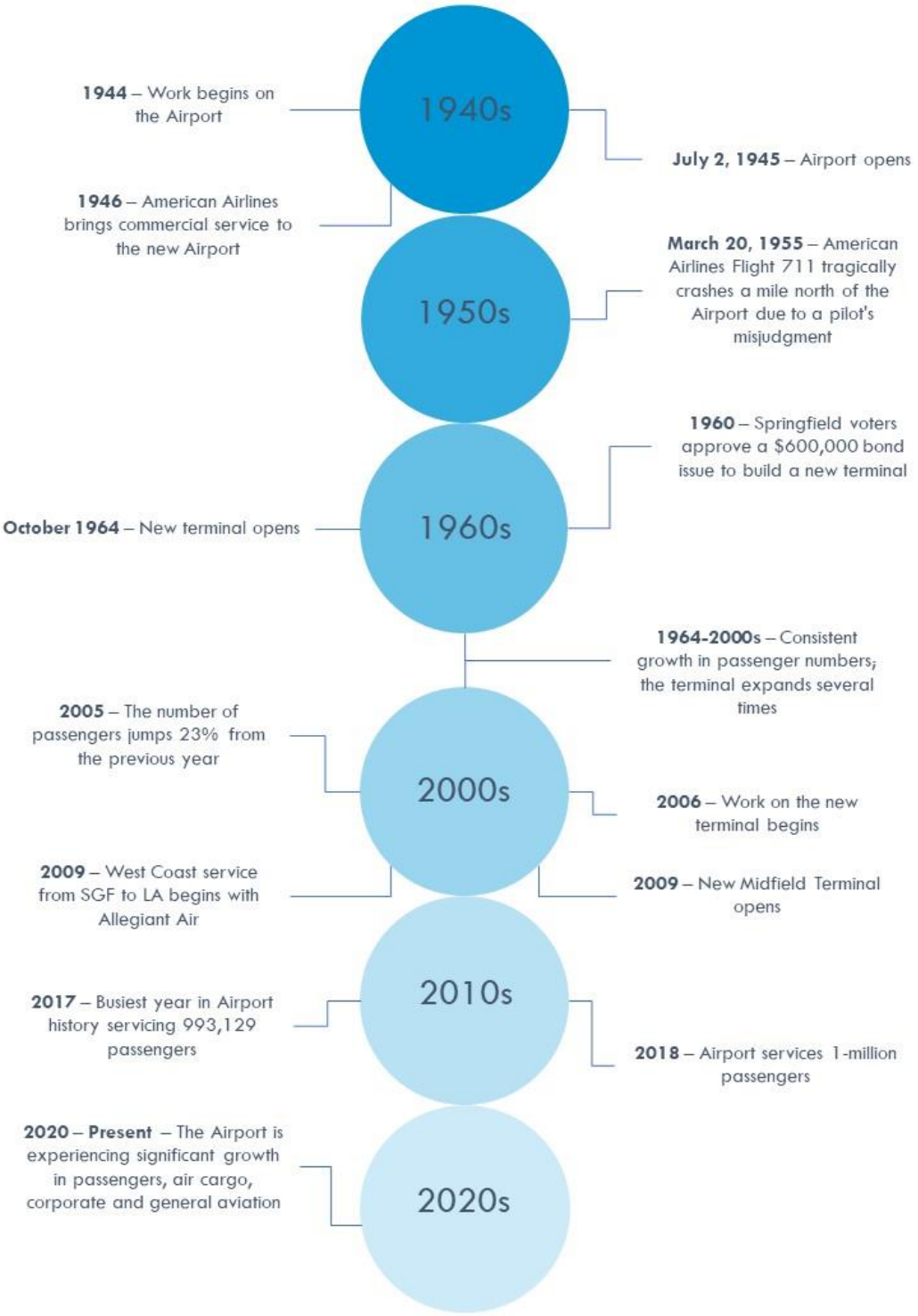
AIRPORT HISTORY

As an influx of wounded military personnel came back from World War II to receive treatment at O'Reilly General Army Hospital in Springfield, Missouri, the unpaved McClure Flying Field was inundated with large military planes leading the community to vote to build a new airport. The doors of Springfield Municipal Airport opened in July 1945 where the new amenities were quickly realized by commercial services and has been a growing asset ever since.

Almost two decades later a new terminal opened at the Airport in October 1964. The terminal was expanded several times to accommodate changes that occurred over the last quarter of the 20th century. Due to the booming tourism industry in neighboring Branson, MO, the Airport changed its name to Springfield-Branson Regional Airport in 1992.

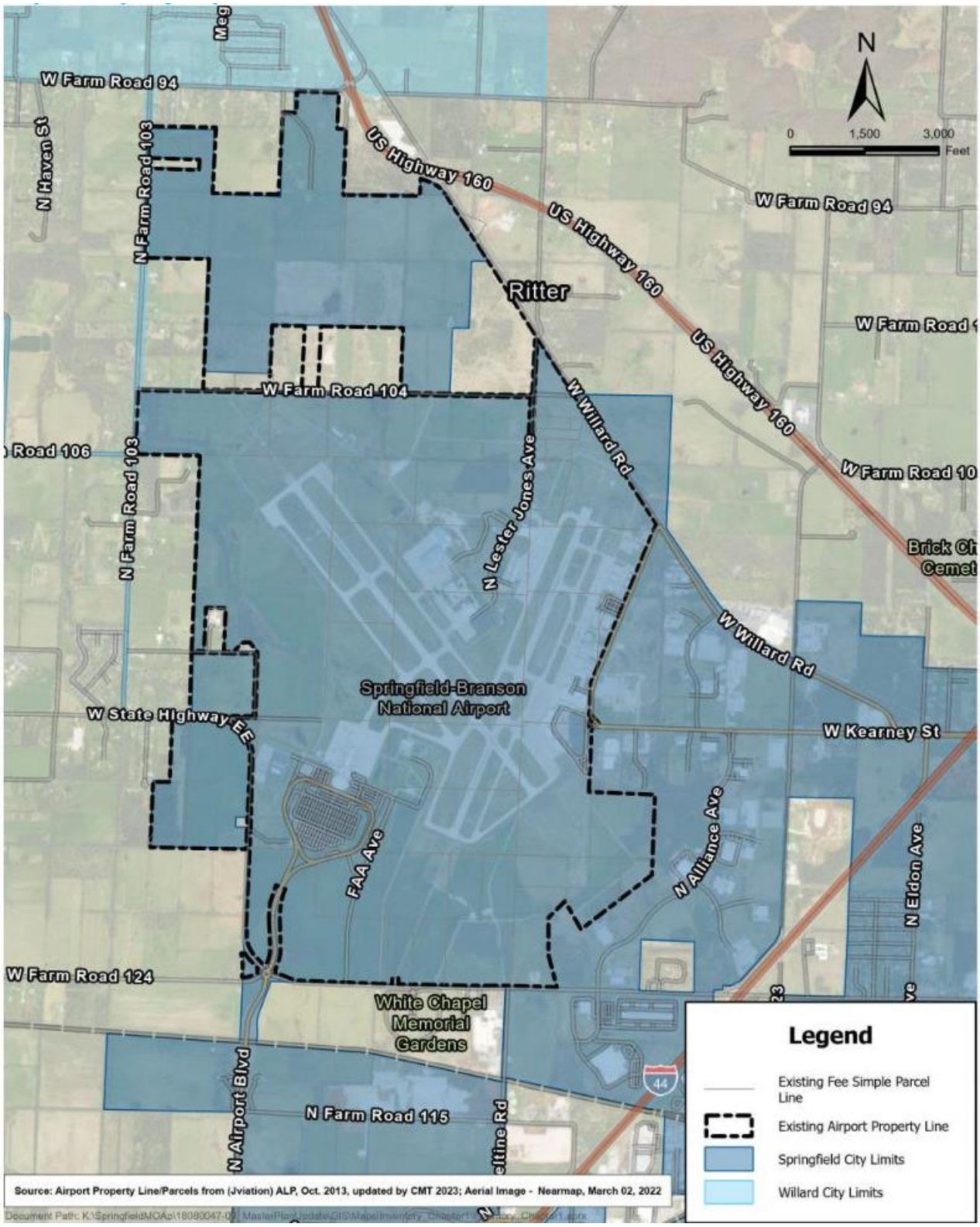
In 2006 the Airport broke ground on what is the current commercial terminal; the terminal opened in 2009. Shortly thereafter, the Airport changed its name to Springfield-Branson National Airport. In 2018, the Airport moved 1 million passengers, the most people in its history. Exhibit 1.1-1 illustrates the timeline of SGF, with further historical information presented in Appendix 2. Exhibit 1.1-2 shows the current footprint of SGF.

Exhibit 1.1-1: Timeline of Springfield-Branson National Airport



Source: https://www.flyspringfield.com

Exhibit 1.1-2: Airport Property



Source: CMT (2022); www.greenecountyassessor.org

1.1.2 Role in the National Aviation System

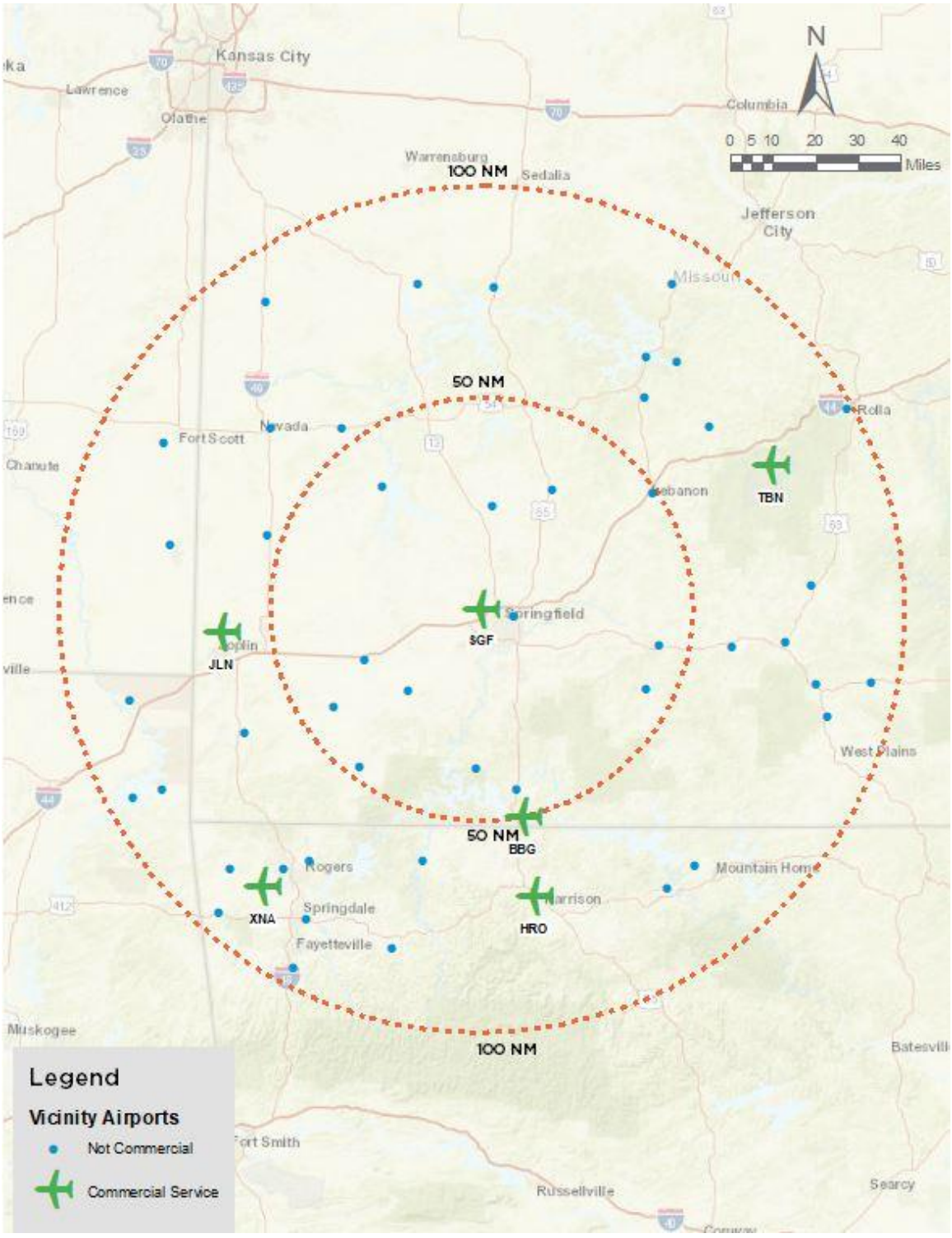
Springfield-Branson National Airport is a public-use airport in Greene County, Missouri owned by the City of Springfield and is managed by an 11-member administrative board. Public airports in the United States that are eligible for Federal Airport Improvement Program (AIP) funding are those included in the National Plan of Integrated Airport Systems (NPIAS). Airports in Missouri are also required to be included in the Missouri State Airport System Plan (MoSASP). SGF is included in both the Federal and State plans.

The FAA further classifies airports through passenger enplanements by total number and by percentage of annual passenger boardings on the national level. Airports are classified as Primary Airports if they have more than 10,000 annual passenger enplanements (boardings); SGF is classified as a Primary Airport.

The FAA further defines airports as "hub" types by the airport's percentage of annual passenger enplanement of the United States' passenger total. For example, an airport that boards more than 10,000 passengers, but between 0.05% to 0.25% of the annual U.S. commercial enplanements, is considered a Small Hub Primary Airport; SGF is classified as a Small Hub Primary Airport and is currently served by four airlines.

There are 13 public-use airports within a 50 nautical mile (NM) radius of SGF, with SGF being the only commercial service airport. Within a 100 NM radius of SGF there are a total of 53 public-use airports, 4 of which offer scheduled airline service (excluding SGF). Of these airports, SGF has the longest runway. **Exhibit 1.1-3** shows the public-use airports within 50 NM and 100 NM of SGF. **Table 1.1-1** lists the public-use airports within 50 NM and the commercial service airports within 100 NM of SGF.

Exhibit 1.1-3: Airports within 50 NM and 100 NM of SGF



Source: CMT (2021)

Table 1.1-1: Regional Airports

AIRPORT	ID	LOCATION	LONGEST RUNWAY LENGTH	DISTANCE (NM)	DIRECTION
General Aviation Airports within 50 NM of SGF					
Ava Bill Martin Memorial	AOV	Ava, MO	3,634'	38	SE
Bentonville Municipal	VBT	Bentonville, AR	4,426'	67	SW
Bolivar Municipal	M17	Bolivar, MO	4,000'	21	N
Branson West Municipal	FWB	Branson West, MO	5,002'	33	S
Buffalo Municipal	H17	Buffalo, MO	3,220'	28	NE
Cassville Municipal	94K	Cassville	3,599'	41	SW
Downtown	3DW	Springfield, MO	4,037'	7	E
Floyd W Jones Lebanon	LBO	Lebanon, MO	5,000'	43	NE
Jerry Sumners Sr Aurora Municipal	2H2	Aurora, MO	3,001'	23	SW
M Graham Clark Downtown	PLK	Branson, MO	3,738'	38	SE
Mansfield Municipal	03B	Mansfield, MO	3,000'	38	E
Monett Regional	HFJ	Monett, MO	5,000'	36	SW
Mount Vernon Municipal	2MO	Mount Vernon, MO	3,195'	26	SW
Stockton Municipal	MO3	Stockton, MO	3,060'	32	NW
Commercial Service Airports within 100 NM of SGF					
Boone County	HRO	Harrison, AR	6,161'	60	S
Branson	BBG	Branson, MO	7,140'	44	S
Joplin Regional	JLN	Joplin, MO	6,501'	54	SW
Springfield-Branson National Airport	SGF	Springfield, MO	8,000'	-	-
Northwest Arkansas National Airport	XNA	Bentonville, MO	8,801'	73	SW
Waynesville-St Robert Regional	TBN	Fort Leonard Wood, MO	6,037'	67	NE

Source: CMT (2022)

1.1.3 Site Location

SGF is located within Greene County, MO in northwest Springfield, MO and is part of the Springfield, MO Metropolitan Statistical Area (MSA). Springfield is the premier location for visitors and residence as a place where the unique natural beauty and urban spaces meet. As a gateway to the Ozarks, Springfield and SGF are situated to attract visitors from other parts of Missouri, northern Arkansas, northeast Oklahoma, and southeastern Kansas. About 45 minutes south by car, is Branson, MO which is one of the nation's most popular entertainment towns. The city is also surrounded by several large reservoirs, state, and national parks which are valued by locals and visitors alike.

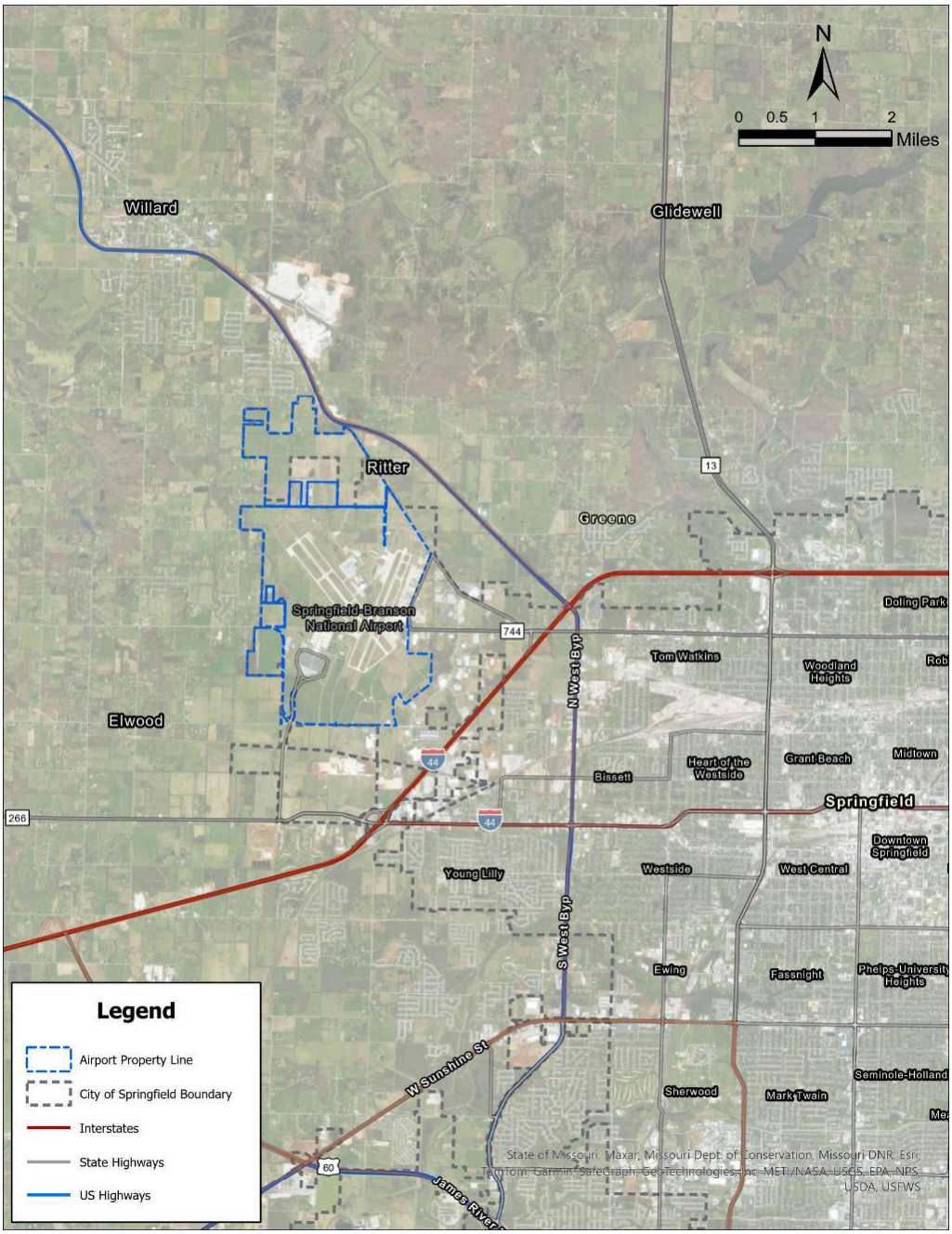
Exhibit 1.1-4 shows SGF's location within Greene County.

Exhibit 1.1-4: Airport Vicinity Map

Source: CMT (2022)

Springfield is a transportation hub for not only air traffic but vehicular traffic as well, as a connector of Interstate 44, U.S. 65, and MO 13 Highways. **Exhibit 1.1-5** shows the roadway network surrounding SGF. The airport is located on the western front of the city of Springfield with several of the largest automotive connectors servicing the site. Being of industrious use and requiring protection zones, the airfield is removed from many of the residential and commercial services of the city but is still accessible being only 15 minutes away by car to the city's downtown.

Exhibit 1.1-5: Roadways Connecting to SGF



Source: CMT (2021)

1.1.4 Socioeconomic Profile

Referencing socioeconomic trends of the environs of an airfield may reveal key indicators of future aviation demand. Economic growth can be measured by several different indicators. Those indicators can often be associated with total employment and personal income to which the state of Missouri, the Springfield, MO MSA, and Greene County, MO have been experiencing a general positive trend in both categories since the late 1960s.

Correlations can be drawn from economic activity to aviation activity and can suggest a future direction for an airport.

WOODS & POOLE ECONOMICS, INC.

The database consulted for this socioeconomic assessment is from Woods & Poole Economics. Woods & Poole Economics is a small, independent corporation that specializes in long-term county economic and demographic projections.

The Woods & Poole Economics database contains more than 900 economic and demographic variables for every county in the United States for every year from 1969 to 2050. This comprehensive database includes detailed population data by age, sex, and race; employment and earnings by major industry; personal income by source of income; retail sales by kind of business; and data on the number of households, their size, and their income. The specialized and reliable data provided by Woods & Poole was utilized to perform much of the socioeconomic assessment of the area surrounding SGF.

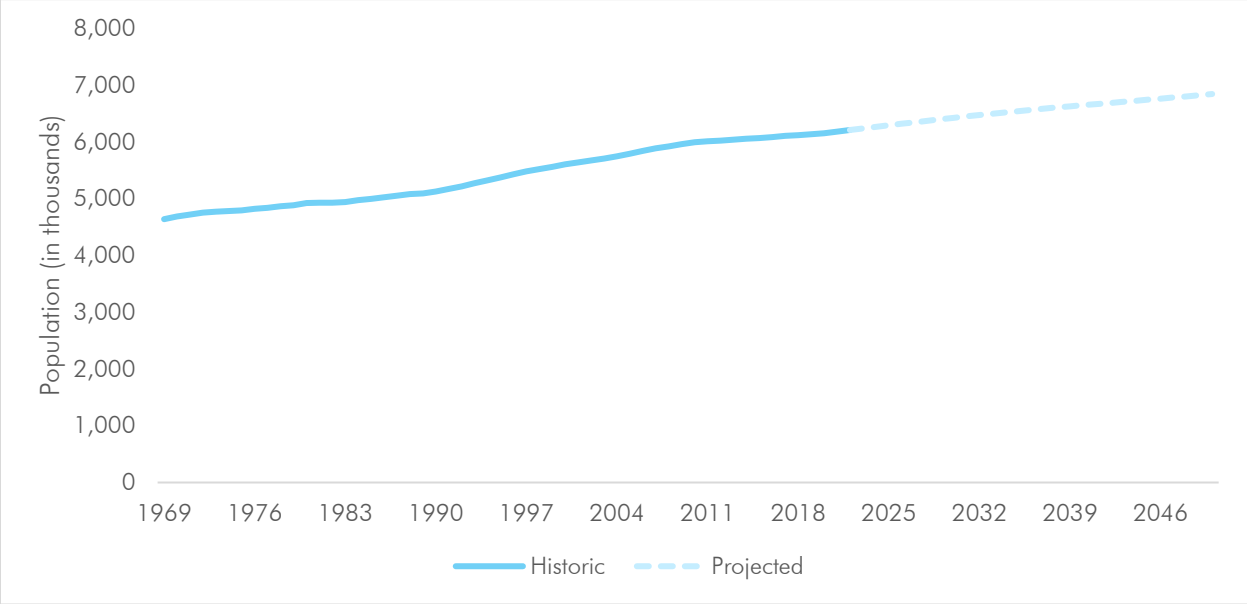
POPULATION

Since 1969 Missouri, the Springfield, MO MSA, and Greene County, MO have experienced growing trends in population. Missouri has a compound annual growth rate (CAGR) of 0.55% and Greene County sports a healthy 1.29% CAGR.

The general population in Missouri has grown by a little over 1.5 million people since 1969 and Greene County accounts for approximately 9% of the total population growth in the state.

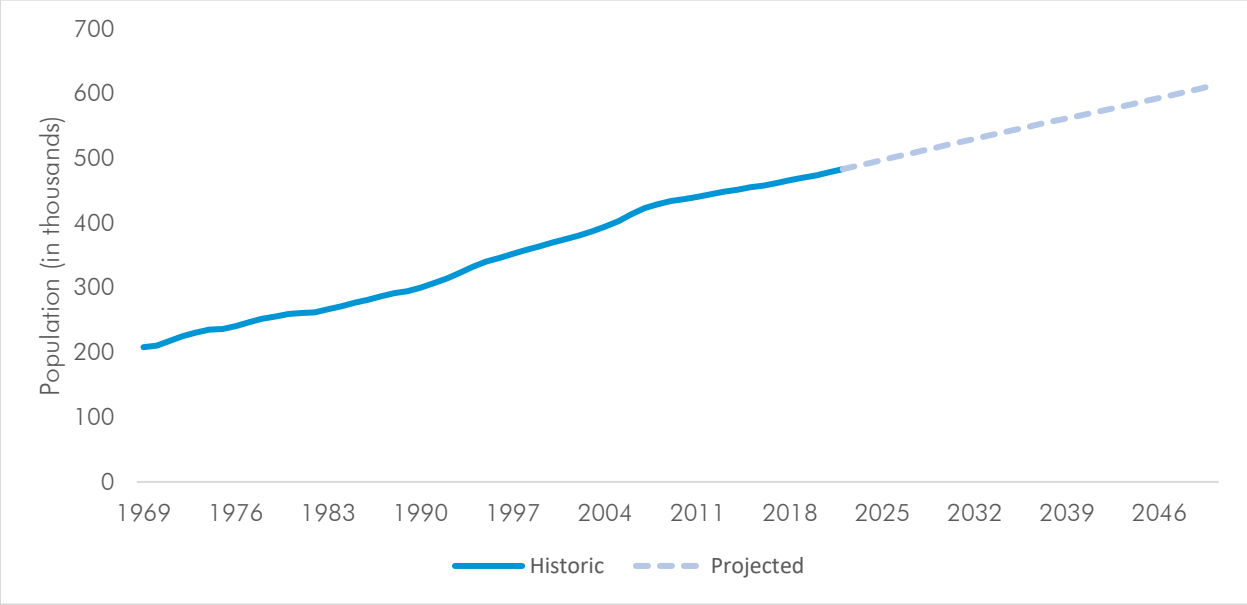
Exhibits Exhibit 1.1-6, Exhibit 1.1-7, and Exhibit 1.1-8 illustrate the growth in population in Missouri, the local MSA, and Greene County, MO, respectively.

Exhibit 1.1-6: Total Population (in thousands) - Missouri



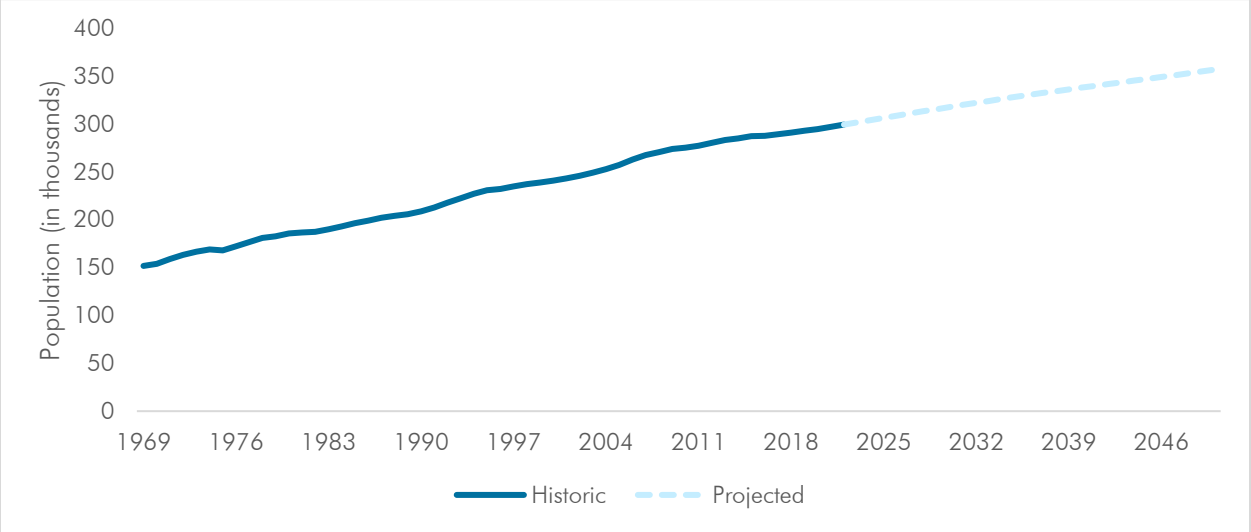
Source: Woods & Poole Economics (2021), CMT

Exhibit 1.1-7: Total Population (in thousands) - Springfield, MO MSA



Source: Woods & Poole Economics (2021), CMT

Exhibit 1.1-8: Population (in thousands) - Greene County, MO



Source: Woods & Poole Economics, CMT

Table 1.1-2 summarizes the growth in population in Missouri, the local MSA, and Greene County, MO, respectively, from 2011 to 2021.

Table 1.1-2: Population Growth Summary – 10 Years

YEAR	MISSOURI		SPRINGFIELD, MO MSA		GREENE COUNTY, MO	
	POPULATION	% CHANGE	POPULATION	% CHANGE	POPULATION	% CHANGE
2011	6,010,275	-	440,432	-	277,446	-
2012	6,024,367	+0.23%	444,432	+0.90%	280,447	+1.07%
2013	6,040,715	+0.27%	448,427	+0.89%	283,605	+1.11%
2014	6,056,202	+0.26%	451,556	+0.69%	285,241	+0.57%
2015	6,071,732	+0.26%	455,593	+0.89%	287,312	+0.72%
2016	6,087,135	+0.25%	457,917	+0.51%	287,818	+0.18%
2017	6,106,670	+0.32%	462,090	+0.90%	289,512	+0.59%
2018	6,121,623	+0.24%	466,273	+0.90%	291,054	+0.53%
2019	6,137,428	+0.26%	470,300	+0.86%	293,086	+0.69%
2020	6,154,407	+0.28%	473,960	+0.77%	294,813	+0.59%
2021	6,182,426	+0.45%	478,611	+0.97%	297,165	+0.79%
CAGR (2011-2021)	+0.28%		**+0.83%**		+0.69%	

Source: Woods & Poole Economics 2021; Bureau of Labor Statistics; CMT

INCOME

On average, both Missouri and Greene County have observed over a 5% CAGR in personal income per capita since 1969. Greene County leads the state and MSA with a CAGR of 5.33% versus the state's and MSA's CAGRs of 5.22% and 5.29%, respectively. This steady increase is a fundamental indicator of consistent growth with potential airport demand.

Table 1.1-3 displays the personal income per capita CAGR per geography from 1969-2021.

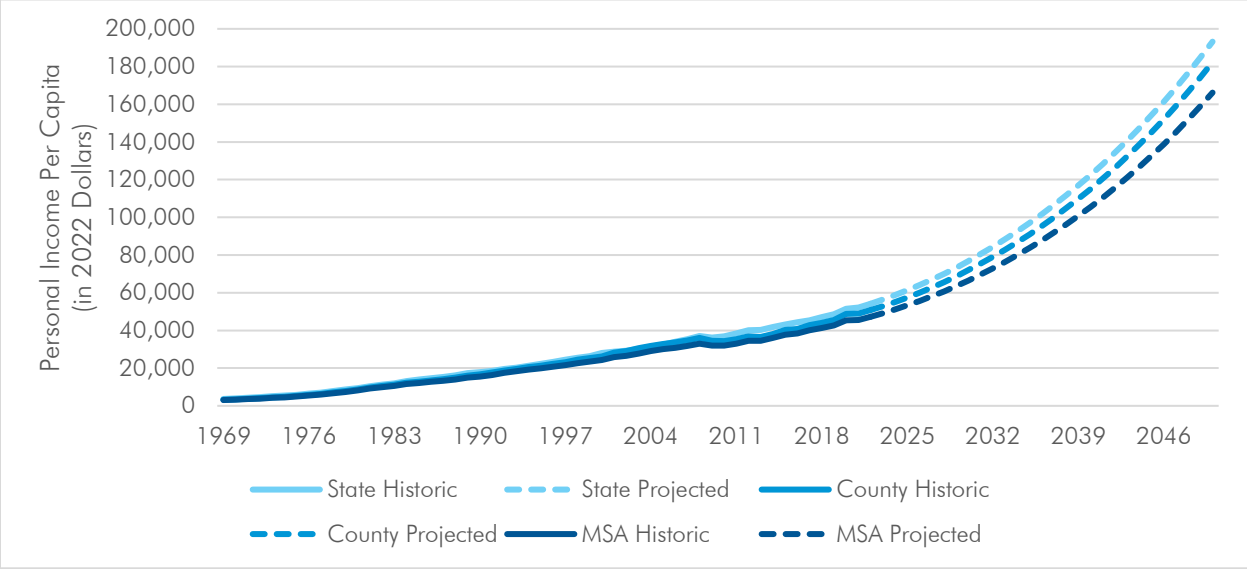
Table 1.1-3: Personal Income Per Capita CAGR (1969-2021)

GEOGRAPHY	CAGR
State	5.22%
MSA	5.29%
Greene County	5.33%

Source: Woods & Poole Economics 2021; Bureau of Labor Statistics; CMT

Exhibit 1.1-9 illustrates the historic and projected total personal income per capita in the state of Missouri, Springfield MSA, and Greene County.

Exhibit 1.1-9: Personal Income Per Capita (in 2022 Dollars) - MO, Greene Co, & Springfield MSA



Source: Woods & Poole Economics, CMT

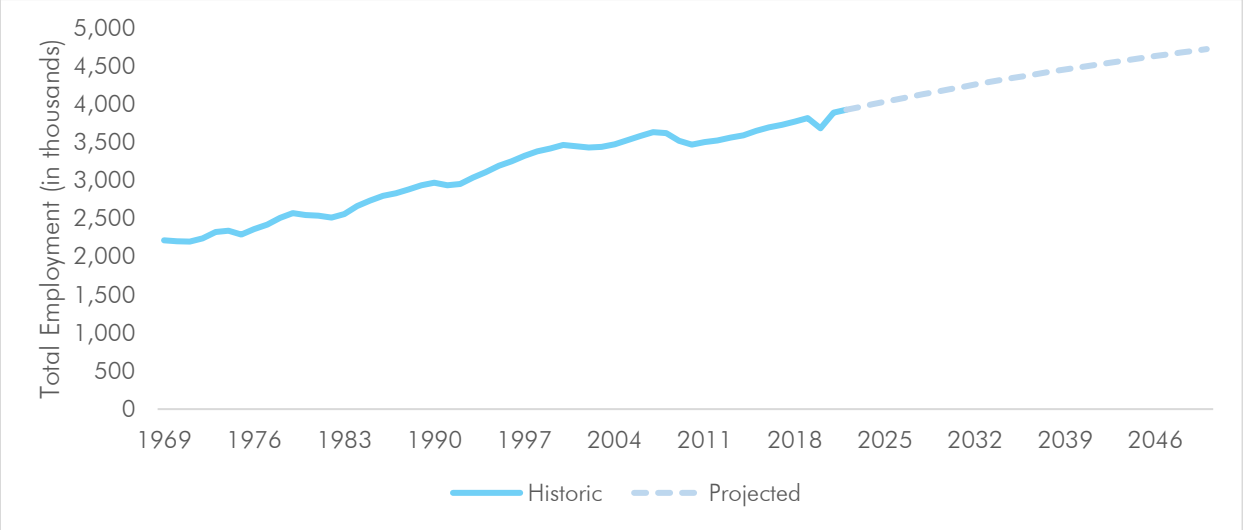
EMPLOYMENT

The total employment of the state and Springfield area have been regularly growing in the last 54 years. Like population and income, employment in the Springfield, MO MSA and Greene County are growing marginally faster than the state with respective CAGRs of 2.24% and 2.17% over the state's 1.09%.

Each year over the last decade all three geographies experienced growth in employment, in terms of number of jobs, except for 2020. In March 2020 the COVID-19 pandemic was declared a national emergency and in the following months had a significant impact on the Springfield area and nationwide. 2021 employment figures indicate the number of jobs has rebounded and exceeded pre-pandemic levels.

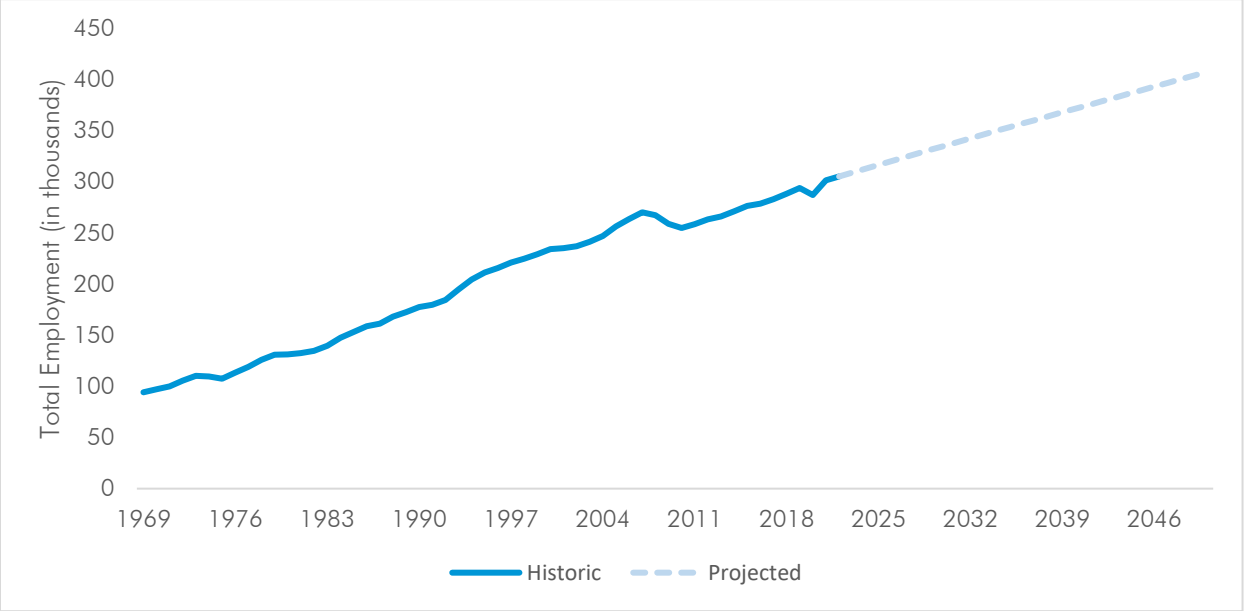
Exhibits Exhibit 1.1-10**, Exhibit** 1.1-11**, and Exhibit** 1.1-12 illustrate the total employment figures for Missouri, the Springfield, MO MSA, and Greene County, MO, respectively. **Table 1.1-4** provides a comparison of the figures.

Exhibit 1.1-10: Total Employment (in thousands) – Missouri



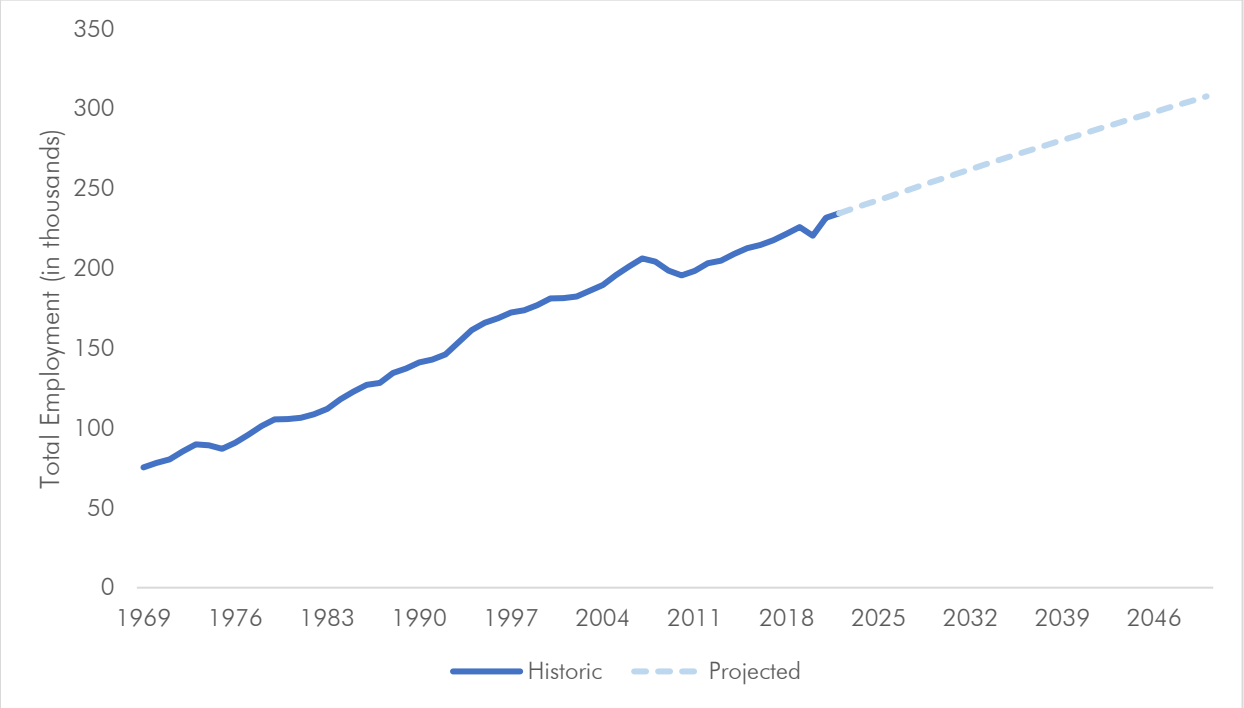
Source: Woods & Poole Economic, CMT

Exhibit 1.1-11: Total Employment (in thousands) – Springfield, MO MSA



Source: Woods & Poole Economic, CMT

Exhibit 1.1-12: Total Employment (in thousands) – Greene County, MO



Source: Woods & Poole Economic, CMT

Table 1.1-4: Employment Growth Summary – 10 Years

YEAR	MISSOURI		SPRINGFIELD, MO MSA		GREENE COUNTY, MO	
	JOBS	% CHANGE	JOBS	% CHANGE	JOBS	% CHANGE
2011	3,506,571	-	258,568	-	198,500	-
2012	3,528,130	+0.61%	263,486	+1.90%	203,287	+2.41%
2013	3,565,929	+1.07%	266,174	+1.02%	204,946	+0.82%
2014	3,596,750	+0.86%	271,201	+1.89%	208,965	+1.96%
2015	3,655,817	+1.64%	276,355	+1.90%	212,736	+1.80%
2016	3,700,664	+1.23%	278,711	+0.85%	214,762	+0.95%
2017	3,735,894	+0.95%	282,941	+1.52%	217,746	+1.39%
2018	3,776,354	+1.08%	288,308	+1.90%	221,717	+1.82%
2019	3,821,912	+1.21%	293,979	+1.97%	225,975	+1.92%
2020	3,687,551	-3.52%	287,191	-2.31%	220,432	-2.45%
2021	3,895,864	+5.65%	301,497	+4.98%	231,625	+5.08%
CAGR (2011-2021)	+1.06%		**+1.55%**		+1.56%	

Source: Woods & Poole Economics 2021; Bureau of Labor Statistics; CMT

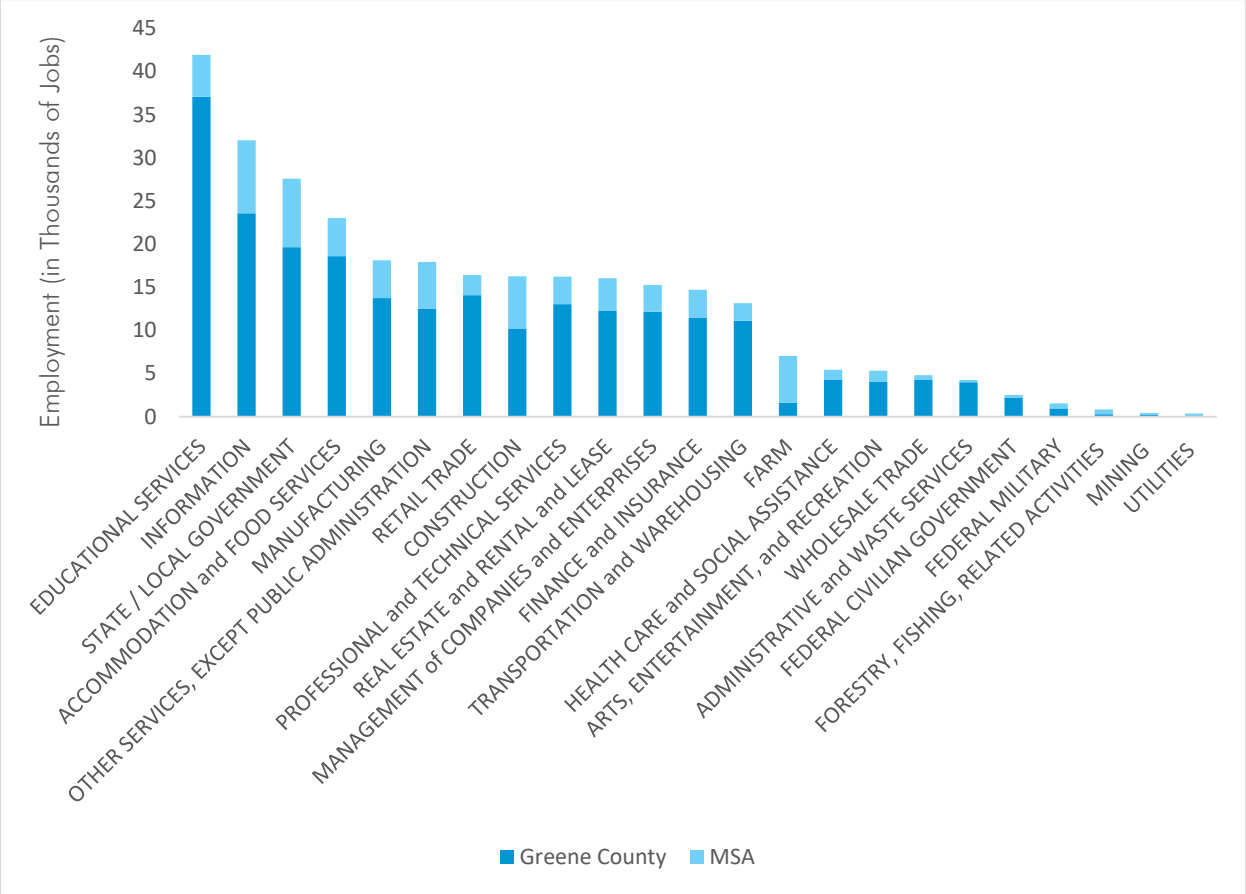
INDUSTRY

In terms of employment in number of jobs within the Springfield MSA, educational services is the largest industry comprising 14% of the job market. Geographically magnified in Greene County, educational services is a slightly larger industry with 16% of the job market, which may be attributed to the 11 higher education and training facilities as well as the large public school district located in Springfield. As Greene County is the nexus of the MSA, the industrial trends mimic one another, and no significant outliers are generated from the data produced.

Exhibit 1.1-13 is a graphic representation of what industries are driving the economy in the Springfield, MO MSA and Greene County, MO in 2021 in terms of number of jobs. The data from the county is overlaying the MSA data in the exhibit, illustrating the total number of jobs in the industry as well as the synergistic relationship between the two data sources.

Table 1.1-5 lists the top 10 employers in Springfield, MO, and their respective industries.

Exhibit 1.1-13: Springfield MSA and Greene County Employment Sectors in 2021



Source: Woods & Poole Economic, CMT (2022)

Table 1.1-5: Major Employers in Springfield, MO

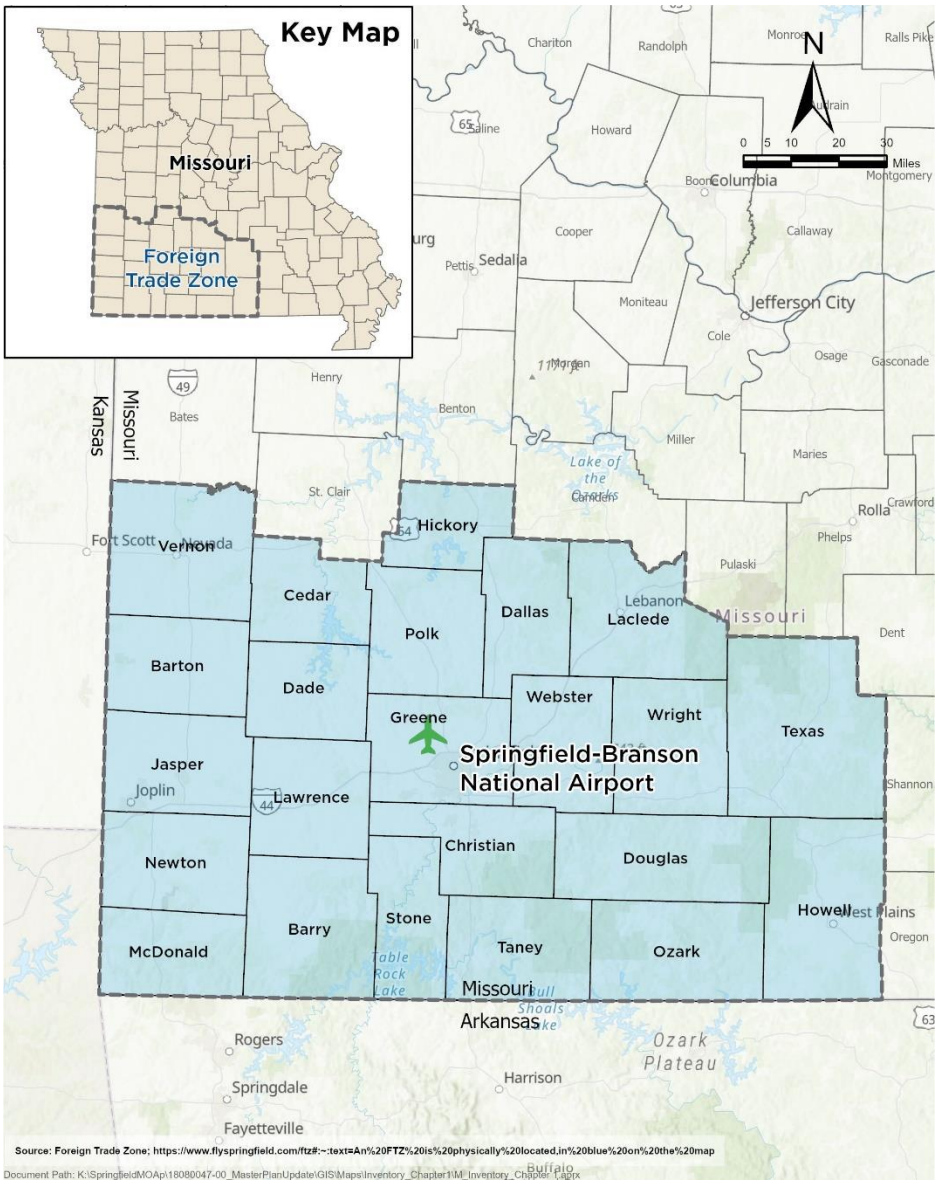
RANK	# OF JOBS	EMPLOYER	INDUSTRY TYPE
1	12,164	CoxHealth	Healthcare
2	8,202	Mercy Hospital Springfield	Healthcare
3	5,381	Walmart Inc.	Retail
4	3,694	Springfield Public Schools	Education
5	3,127	Bass Pro Shops | White River Marine Group	Retail/Manufacturing
6	3,018	State of Missouri	Government
7	2,919	United States Government	Government
8	2,760	Missouri State University	Education
9	2,307	O'Reilly Auto Parts (HQ)	Retail/Manufacturing
10	2,028	City of Springfield	Government

Source: https://www.springfieldregion.com/data/major-employers/

FOREIGN TRADE ZONE

SGF is the hub for the Southwest Missouri Foreign Trade Zone. As a federal economic incentive program, foreign trade zones (FTZ) enhance the capabilities of local businesses competition on the global trading market. The Southwest Missouri Foreign Trade Zone is unique as it not only includes businesses within the airport, but also extends the customs easing benefits to businesses with fixed sites within the 23 counties surrounding the airfield. The FTZ is a regional economic booster and attractant. An FTZ can reduce operating costs, improve supply chain pace, and defer, delay, or eliminate duties and taxes on goods manufactured or processed within the FTZ. **Exhibit 1.1-14** illustrates the Southwest Missouri FTZ boundary.

Exhibit 1.1-14: SGF Foreign Trade Zone



Source: SGF & CMT (2022)

1.2 Airfield and Airspace

1.2.1 Runways

SGF is configured with two intersecting runways: Runway 14-32 and Runway 02-20. Runway 14-32 exists as the primary runway. Table 1.2-1 details an overview of the components of each runway.

Table 1.2-1: SGF Runway Characteristics

RUNWAY FEATURE	RUNWAY 14-32		RUNWAY 02-20	
	14	32	02	20
Length	8,000'		7,003'	
Width	150'		150'	
Pavement Type	Grooved Concrete		Grooved Concrete	
Pavement Classification Number (PCN)	60/R/C/W/T		60/R/C/W/T	
Runway End Elevation	1,260.2'	1,268.2'	1,263.9'	1,261.9'
Runway Edge Lighting	HIRL		HIRL	
Runway Markings/Condition	PIR/good	NPI/good	PIR/good	
Displaced Threshold	No		No	

Note: HIRL – High Intensity Runway Lights; PIR – Precision Instrument; NPI – Non-Precision Instrument
Source: FAA ADIP; CMT (2022)

1.2.2 Airport Reference Code (ARC) and Runway Design Code (RDC)

The FAA uses two designations to design airports and runways. They are the Airport Reference Code (ARC) and the Runway Design Code (RDC). The ARC refers to the operational and physical characteristics of the type of aircraft operating at the airport. Additionally, the ARC also signifies an airport's most demanding RDC excluding the visibility component. Each runway at SGF has an Airport Reference Code (ARC) of D-IV.

The RDC signifies design standards used to build a runway. Both codes are used for planning and to determine design standards. The three elements of RDC are: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and visibility minimums. The AAC is represented by a letter from A-E and reflects aircraft approach speeds. ADG is represented by a roman numeral from I-VI and reflects tail height and wingspan in feet. Finally, runway visibility minimums are a measurement of the instrument approach visibility minimum recorded, in feet, as the Runway Visual Range (RVR). A breakdown of the AAC, ADG and Visibility Minimums is shown in Tables Table 1.2-2, Table 1.2-3, and Table 1.2-4, respectively.

Table 1.2-2: Aircraft Approach Category (AAC)

CATEGORY	APPROACH SPEED V_{REF} (KNOTS)
A	< 91
B	91 ≤ and < 121
C	121 ≤ and < 141
D	141 ≤ and < 166
E	166 ≤

Source: FAA Advisory Circular 150/5300-13B

Table 1.2-3: Airplane Design Group (ADG)

CATEGORY	TAIL HEIGHT (FT.)	WINGSPAN (FT.)
I	< 20	< 49
II	20 ≤ 30	49 ≤ 79
III	30 ≤ 45	79 ≤ 118
IV	45 ≤ 60	118 ≤ 171
V	60 ≤ 66	171 ≤ 214
VI	66 ≤ 80	214 ≤ 262

Source: FAA Advisory Circular 150/5300-13B

Table 1.2-4: Visibility Minimums

RVR (FT)	INSTRUMENT FLIGHT VISIBILITY CATEGORY (STATUTE MILE)
5,000	Not lower than 1
4,000	Lower than 1 but not lower than ¾
2,400	Lower than ¾ but not lower than ½
1,600	Lower than ½ but not lower than ¼
1,200	Lower than ¼

Source: FAA Advisory Circular 150/5300-13B

RUNWAY SAFETY AREAS

According to the FAA, runways must have a Runway Safety Area (RSA). The RSA is a measurable rectangular area around a runway that reduces the risk of aircraft damage should an aircraft overshoot, undershoot, or travel off the runway. AC 150/5300-13B determines the dimensions of the RSA, which is based on the Runway Design Code (RDC). An RSA must not have any objects within its boundaries, except for items necessary for safe operations such as navigational aids (NAVAIDS).

RUNWAY OBJECT FREE AREAS

The FAA requires a Runway Object Free Area (ROFA). The ROFA encompasses a large rectangular shape centered around the runway that provides a buffer from objects and operating aircraft. Objects required for aircraft navigation and ground maneuvering are allowed to be located within the ROFA. AC 150/5300-13B also dictates dimensions for the ROFA.

RUNWAY PROTECTION ZONES

The Runway Protection Zone (RPZ) in established to protect people and property on the ground. Runways require an approach and departure RPZ. The RPZ has a trapezoidal shape and is located beyond each end of a runway. An RPZ's dimensions are established in AC 150/5300-13B, which considers AAC for each runway end with visibility minimums being a factor for the approach RPZ, and departure procedures being a factor for the departure RPZ. Table 1.2-5 lists the RSA/ROFA/RPZ dimensions for both runways at SGF.

Table 1.2-5: SGF RSA/ROFA/RPZ Dimensions

SAFETY AREA	RUNWAY 14-32		RUNWAY 02-20	
	14	32	02	20
RSA (Width x length)	500' x 1,000'		500' x 1,000'	
ROFA (Width x length)	800 x 1,000'		800 x 1,000'	
Approach RPZ (Inner width x outer width x length)	1,000' x 1,510' x 1,700'	500' x 1,010' x 1,700'	1,000' x 1,750' x 2,500'	1,000' x 1,510' x 1,700'
Departure RPZ (Inner width x outer width x length)	500' x 1,010' x 1,700'		500' x 1,010' x 1,700'	

Source: FAA AC 150/5300-13B, CMT (2021)

1.2.3 Taxiways

Each runway at SGF has two parallel taxiways, creating an efficient and comprehensive taxiway system. Several other taxiways run perpendicular to the runways, providing access to different areas of the airfield. All taxiways at SGF are 75 feet wide and are designed for ADG-IV aircraft, or aircraft with up to 171-foot wingspans, except the portion of Taxiway N south of Runway 14-32, which is 60 feet wide. This portion of Taxiway N can accommodate most ADG-IV aircraft, except those in which the cockpit to main gear (CMG) dimension and width of the main gear (MGW) exceed the values prescribed in AC 150/5300-13B, such as the Boeing 767. Table 1.2-6 provides a description of each taxiway.

Table 1.2-6: Taxiway Description and Pavement Condition Index (PCI)

TAXIWAY	DESCRIPTION	AVERAGE PCI
A	Taxiway connector from the GA Apron to Runway 02-20. Located southeast of the Runway 20 threshold	73
B	Taxiway connector from the GA Apron to Runway 02-20. Located southeast of the Runway 20 threshold	53
C	Located at the midpoint of Runway 02-20 and connects the runway to Taxiway U to the west and the West Kearney Complex Apron to the east	73
D	Full length parallel taxiway for Runway 14-32 on the northeast side of the runway	72
E	Connects the Commercial Apron at main terminal to Taxiway U	79
F	Connects Runway 14-32 to the Commercial Apron on the southwest and Taxiway D on the northeast	80
G	Connects the MO National Guard Apron to Taxiway D	79
H	Connects Runway 14-32 to Taxiway D	83
J	Connects the MO National Guard Apron to Taxiway D	77
N	Full length parallel taxiway on the southeast side of Runway 02-20	69
P	Connects Taxiway N to the fuel farm and t-hangars on the north end of the GA Apron	71
R	Connects the GA Apron to Taxiway N	72
S	Connects the threshold of Runway 32 to Taxiway N	68
T	Connects the GA Apron to Taxiway N	79
U	Full length parallel taxiway located on the northwest side of Runway 02-20. Provides access to Cargo Apron.	80
W	Parallel taxiway located on the southwest side of Runway 14-32	89

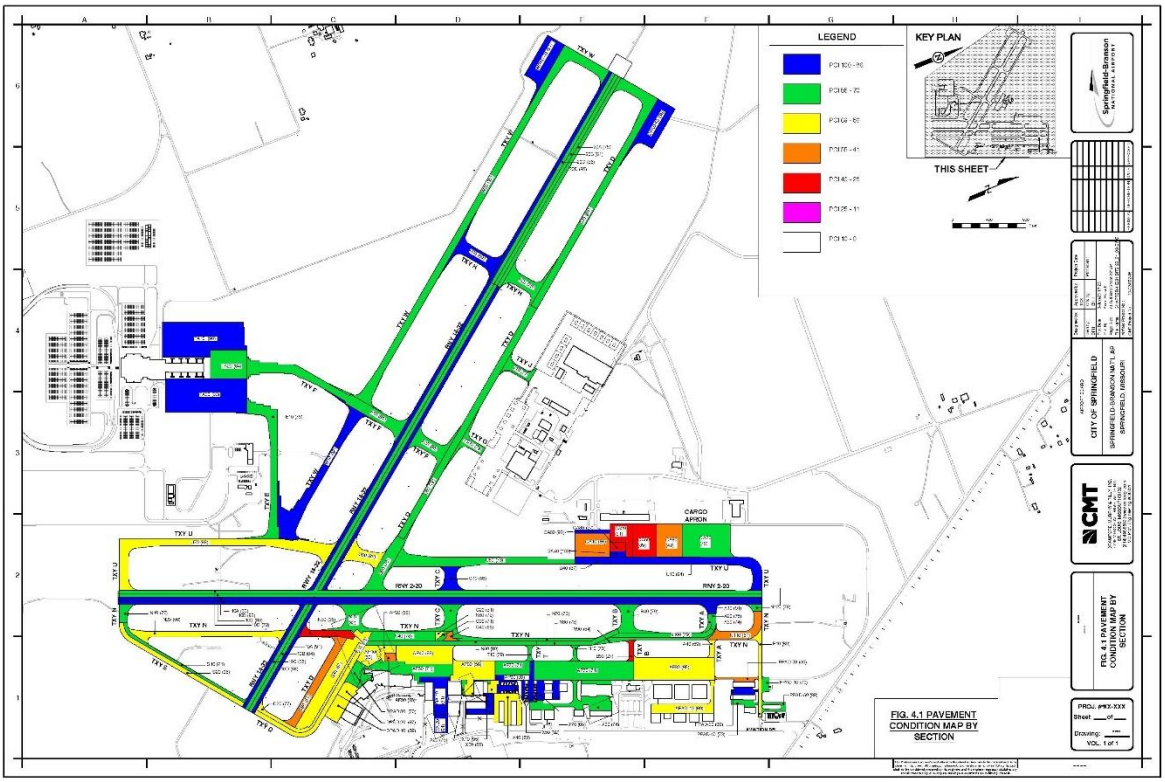
Source: CMT (2022-23)

1.2.4 Pavement Condition Index (PCI)

As per the requirements of FAR Part 139 (Airport Certification), all civilian pavements at SGF are inspected each morning by Airport staff. Pavements are inspected for safety concerns, to ensure no foreign object debris (FOD) is present, as well as inspecting for pavement distresses. These inspections may lead to pavement repair, such as crack and spall repair on concrete pavement and patching on bituminous pavement.

In addition to daily inspections, a Pavement Management Plan (PMP) update was conducted in 2022 to assess the condition of and better manage airfield pavements and identify rehabilitation projects within the CIP. **Exhibit 1.2-1** shows the current PCI map. The full PMP report is provided in **Appendix 3**.

Exhibit 1.2-1: Pavement Condition Index Map



Source: CMT (2022-23)

1.2.5 Airspace, Instrument Approaches, and Navigational Aids

Weather in aviation is defined in two conditions: Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). Aircraft, as defined by the FAA, can fly under either Visual Flight Rules or Instrument Flight Rules. Visual flight is conducted on a see and be seen method and weather conditions includes cloud heights greater than 1,000 feet above the surface and more than three miles visibility. These conditions, paired with the airspace in which they exist, dictate the use of instrument approaches and navigational aids at any given time.

INSTRUMENT APPROACHES

There are several published Standard Instrument Approach Procedures (SIAP) that serve SGF.

Table 1.2-7 summarizes the existing instrument approach procedures available at SGF.

Table 1.2-7: Instrument Approach Summary

APPROACH TYPE	RUNWAY END	CEILING (FEET/AGL) AND VISIBILITY MINIMUMS (MILE)*
ILS or LOC	RWY 02	200 - 1/2
ILS or LOC	RWY 14	300 - 3/4
RNAV	RWY 02	400 - 3/4
RNAV	RWY 14	3/4
RNAV	RWY 20	3/4
RNAV	RWY 32	1
VOR/DME or TACAN	RWY 02	3/4
VOR or TACAN	RWY 20	3/4

Source: FAA Digital Approach Plates, July 2021.
**Lowest minimums are shown. Actual minimums are based on aircraft category type (A, B, C or D).*

NAVIGATIONAL AIDS

Instrument Landing System (ILS)

An ILS is a type of ground-based navigational aid that provides precision vertical and horizontal guidance to aircraft. The ILS consists of several components but most notably a localizer (LOC), glide slope antennae, and distance measuring equipment (DME).

- Localizer (LOC): Generates and radiates signals to provide final approach azimuth navigation information to landing aircraft. The antenna sends a VHF carrier signal with 90-Hz and 150-Hz sideband signals that the aircraft instruments determine as left and right of the centerline. The aircraft interprets the signal and displays them on the cockpit indicator guiding the pilot until the runway is in sight.

- Glide Slope: In a similar manner as the LOC signal (just turned 90 degrees on axis), the Glide Slope sends a UHF carrier signal with the same two 90-Hz and 150-Hz sideband frequencies that aircraft instruments determine as above or below the desired glide path. This is approximately 3 degrees to the horizon which gives the aircraft a descent rate of approximately 500 feet per minute.

- Distance Measuring Equipment (DME): A radio navigation aid used by pilots to determine the aircraft's slant range from the DME ground station location. The DME avionics in aircraft send a pulse signal to the ground based DME, which responds with an answer pulse signal. The receiver in the aircraft measures the time delay between the sent and received pulses and calculates the slant range distance. There is no azimuth information, only distance.[3]

Airport Surveillance Radar

Airport Surveillance Radar is an integrated primary and secondary radar system that has been deployed at terminal air traffic control sites. It interfaces with both legacy and digital automation systems and provides six-level national weather service calibrated weather capability that provides enhanced situational awareness for both controllers and pilots.[4]

Rotating Beacon

The Airport's rotating beacon is used to identify the location of the Airport by projecting beams of light which alternate white and green flashes. The beacon is especially useful to guide pilots in nighttime and inclement weather conditions.

Airfield Lighting and Approach Lighting Aids

Airfield lighting consists of taxiway and runway edge lighting, and approach lighting systems (ALS). The runway edge lights at SGF consist of high intensity runway lights (HIRL). Runway 32 is equipped with Runway End Identifier Lights (REILs), which indicate the beginning of the usable runway for approaching aircraft. Medium Intensity Approach Light Systems with Runway Alignment Indicator Lights are installed on Runways 02 and 14. Runway 20 is equipped with a similar system, which is known as a MALS and

[3] https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices
[4] https://www.faa.gov/air_traffic/technology/asr-11/

excludes the 1,000-foot-long Runway Alignment Indicator Lights. All taxiways are equipped with Medium Intensity Taxiway Lighting (MITL).

Visual Approach Aids

The visual glideslope indicators (VGSI) that provide pilots with the location of their aircraft in relation to the glideslope of a runway are a Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI). VASIs and PAPIs consist of four boxes that emit red and white lights to indicate if an aircraft is below, above, or on the glideslope to a runway. A VASI has two boxes in front of two boxes, while the PAPI has four boxes in a row. The colored lights appear in different sequence depending on the aircraft's position relation to the glideslope. Runways 14, 32 and 20 all have PAPI systems. Runway 02 has a VASI system.

Windsocks

A visual aid in the form of a fabric cone that visually provides surface wind direction and approximate speed information to pilots. They are installed near the operational runway.

Weather Reporting

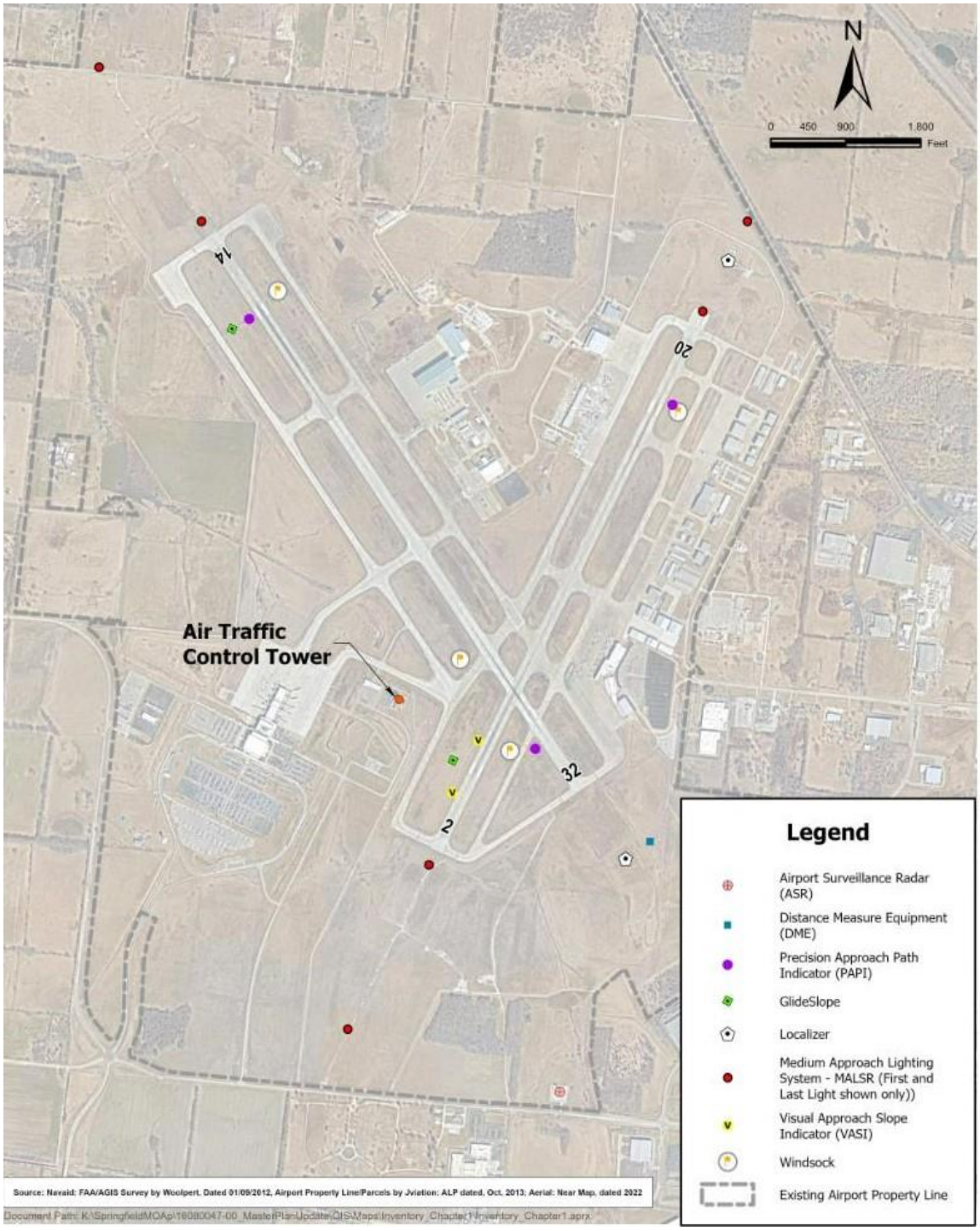
The National Weather Service station of Springfield is located just west of the Airport and provides reliable weather reporting to the airfield and the region with weather surveying equipment such as an Automated Surface Observing System (ASOS) and a WSR-88D(NEXRAD) doppler radar.

AIRPORT TRAFFIC CONTROL

SGF is served by an Airport Traffic Control Tower (ATCT) that controls the Airport's air traffic 24 hours a day. There is also a Terminal Radar Approach Control (TRACON) facility located at the SGF ATCT that offers approach control for the Airport and a large portion of southwest Missouri. The ATCT uses a radar surveillance system that is located on the south side of the airport. The secondary radar is a beacon interrogator which obtains a radio signal from an aircraft with location, altitude, and aircraft-specific identification.

Exhibit 1.2-2 illustrates the location of SGF's navigational aids.

Exhibit 1.2-2: Navigational Aids



Source: FAA/AGIS Survey by Woolpert (2012); CMT

1.2.6 Airspace

Serving as the major airport to the region, the airspace surrounding SGF is not complex. The airport is protected by Class C airspace, which the FAA defines as:

> *"…generally airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area with a five NM radius, an outer circle with a ten NM radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter must maintain those communications while within the airspace."*[5]

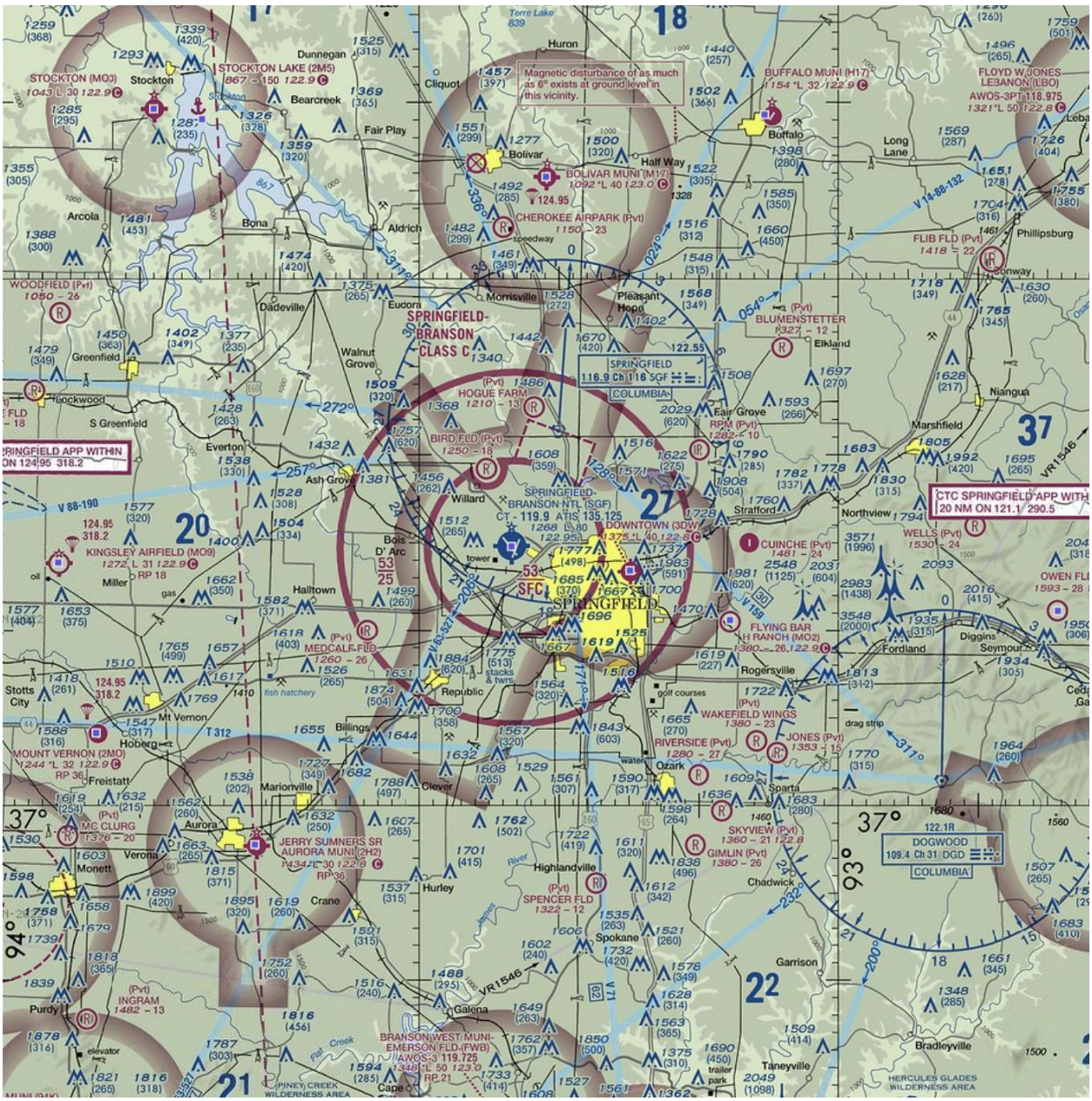
Exhibit 1.2-3 illustrates the FAA Airspace Classifications. Exhibit 1.2-4 depicts the portion of the Sectional Aeronautical Chart that surrounds SGF. The airspace represented by the magenta circles around SGF is the Class C airspace.

Exhibit 1.2-3: FAA Airspace Classifications

Source: https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=42&sID=505&preview=true

[5] Airspace Classification (aspm.faa.gov)

Exhibit 1.2-4: Regional Airspace



Source: VFR Map; CMT (2022)

1.3 Passenger Terminal and Facilities

Located on the southwest side of the airfield, the new passenger terminal broke ground in 2006 and opened in 2009. Less than a decade later, SGF serviced 1 million passengers. An inventory of the commercial terminal and facilities is provided in Chapter Two – Terminal Area Inventory.

1.4 Landside Facilities

1.4.1 Aprons

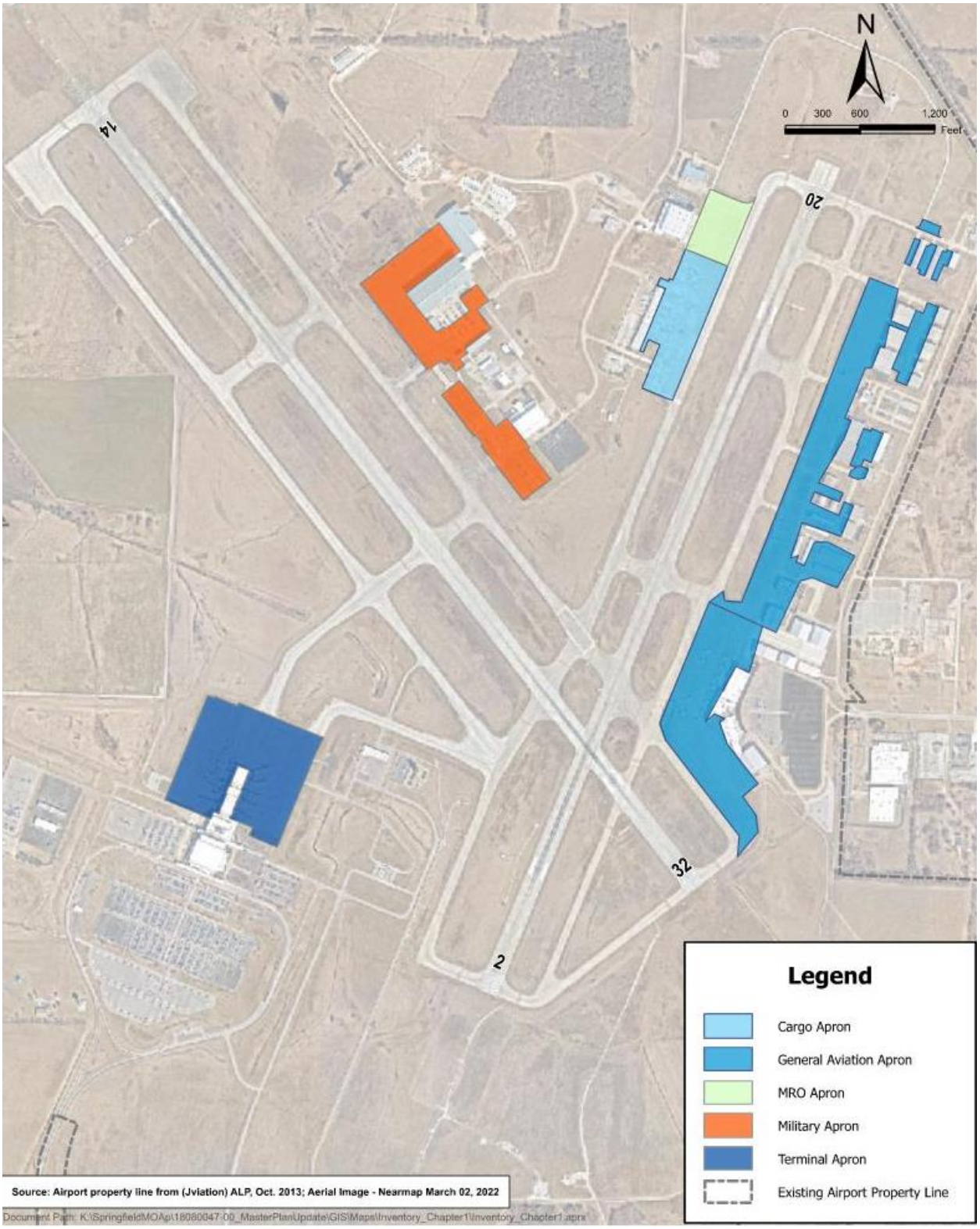
There are different types of aprons at an airport that serve different purposes, such as aircraft parking, fueling, maintenance, loading/unloading of passengers, and special use aprons. **Table 1.4-1** summarizes the size of each main apron area. **Exhibit 1.4-1** identifies the existing apron areas at SGF.

Table 1.4-1: SGF Apron Areas

APRON	AREA (yd^2)	PAVEMENT TYPE	PCI
Terminal	85,000	Concrete	85
Military	121,000	Concrete	66
Air Cargo	65,000	Concrete	61
Maintenance, Repair, & Overhaul (MRO)	19,800	Concrete	69
General Aviation	117,000	Concrete	92

Source: CMT 2022

Exhibit 1.4-1: Apron Areas

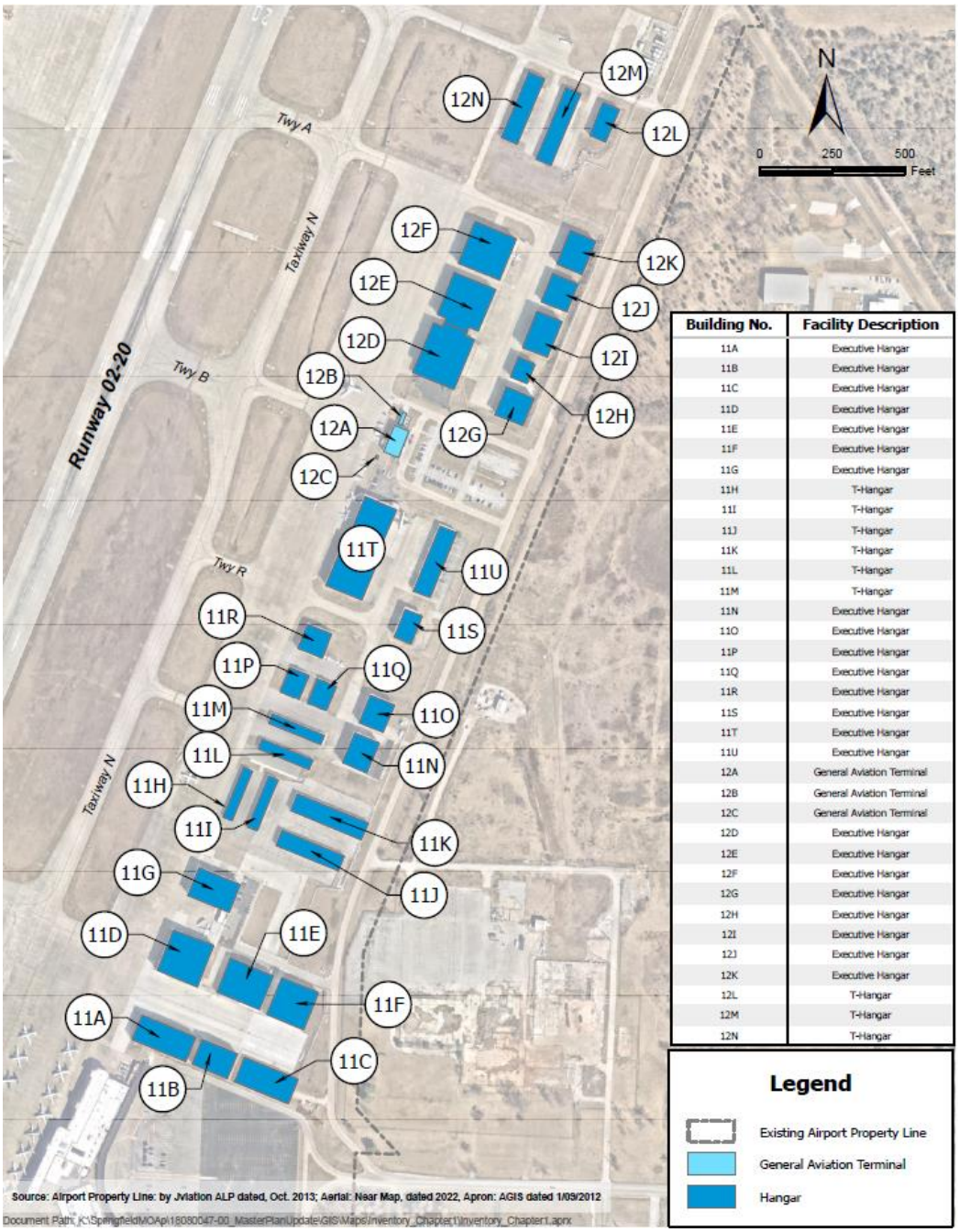


Source: CMT (2022)

1.4.2 Hangars and T-Hangars

The Airport has a total of 32 hangar buildings on the GA apron, with an additional hangar under construction. There are 22 executive (box) hangars and 9 t-hangar buildings. Exhibit 1.4-2 depicts the different hangars on the GA Apron. In 2021 the Airport reported 143 based aircraft. As of June 2022, there are 35 individuals on the hangar wait list.

Exhibit 1.4-2: GA Hangar Area



Building No.	Facility Description
11A	Executive Hangar
11B	Executive Hangar
11C	Executive Hangar
11D	Executive Hangar
11E	Executive Hangar
11F	Executive Hangar
11G	Executive Hangar
11H	T-Hangar
11I	T-Hangar
11J	T-Hangar
11K	T-Hangar
11L	T-Hangar
11M	T-Hangar
11N	Executive Hangar
11O	Executive Hangar
11P	Executive Hangar
11Q	Executive Hangar
11R	Executive Hangar
11S	Executive Hangar
11T	Executive Hangar
11U	Executive Hangar
12A	General Aviation Terminal
12B	General Aviation Terminal
12C	General Aviation Terminal
12D	Executive Hangar
12E	Executive Hangar
12F	Executive Hangar
12G	Executive Hangar
12H	Executive Hangar
12I	Executive Hangar
12J	Executive Hangar
12K	Executive Hangar
12L	T-Hangar
12M	T-Hangar
12N	T-Hangar

Source: SGF; CMT (2022)

1.4.3 Air Cargo Facilities

The Airport's cargo facilities are located to the west of Runway 02-20, and south of the Snow Removal Equipment (SRE) and MRO facilities. Exhibit 1.4-3 depicts the current apron parking positions for cargo planes at SGF. Currently there are four parking positions for cargo aircraft on the apron and is currently utilized by two cargo carriers.

Exhibit 1.4-3: Air Cargo Positions

Source: CMT 2022

1.4.4 Missouri National Guard - Aviation Classification Repair Activity Depot (MO-AVCRAD)

MO-AVCRAD is located north of the midpoint of Runway 14-32 and has been located at SGF for over 50 years. The mission of MO-AVCRAD is to provide general support, backup direct support, and limited depot maintenance for approximately 359 helicopters and other aircraft assigned to 33 National Guard facilities within a 14-state support area in the Central United States and is one of four AVCRADs in the nation.

The facilities underwent a multi-phased expansion plan with the first two phases completed in 2008 and 2012. The final expansion phase finished at the Roy Blunt Aviation Logistics Facility and was completed in 2021. The expansion is expected to result in a 20% to 30% workload increase with an associated increase in personnel.[6]

Exhibit 1.4-4: MO-AVCRAD Roy Blunt Aviation Logistics Facility

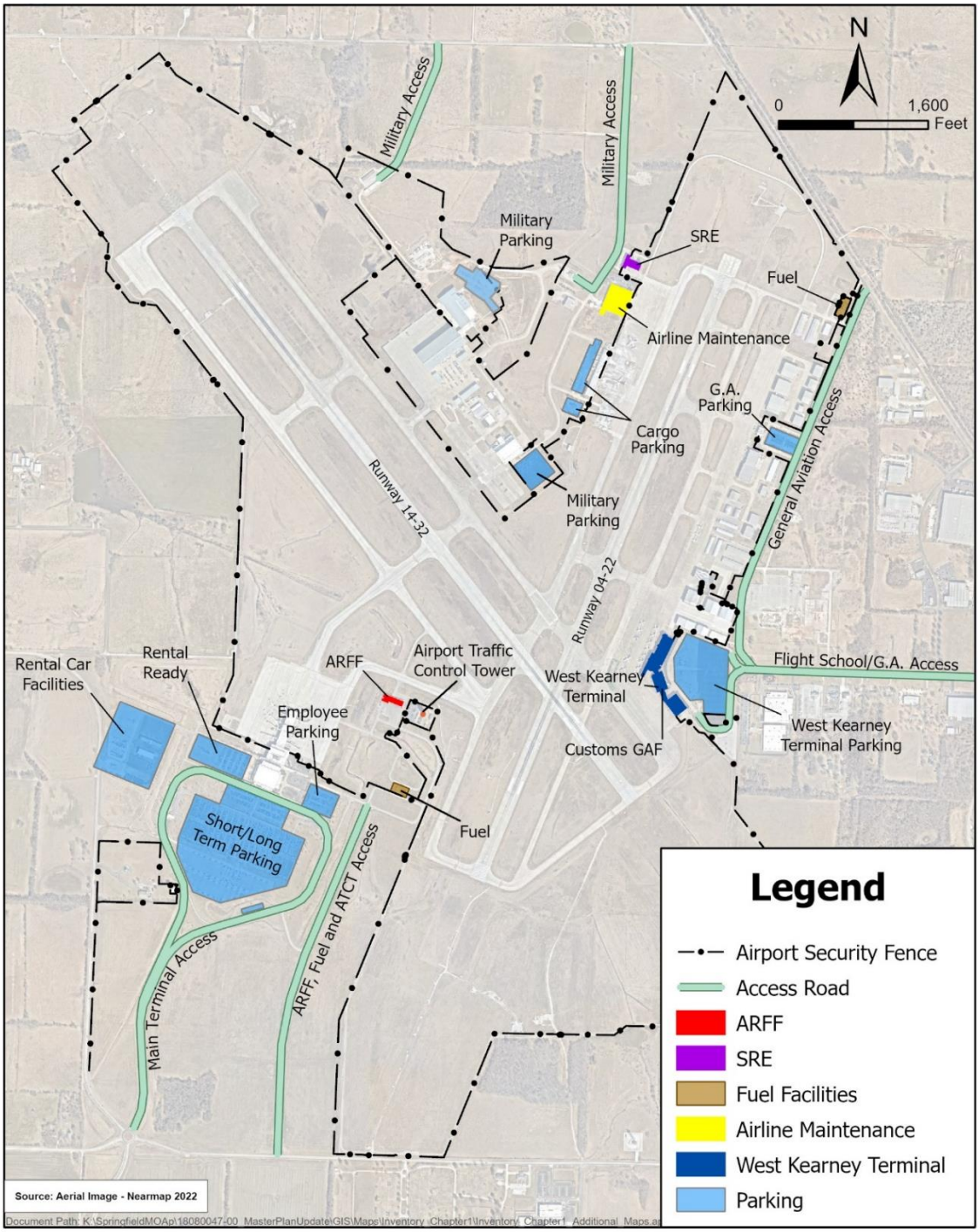
Source: Sapp Design Architects (2022)

[6] Springfield News-Leader: https://www.news-leader.com/story/news/local/ozarks/2021/08/20/national-guard-avcrad-facility-springfield-missouri-named-sen-roy-blunt/8210103002/

1.4.5 Support Facilities

The support facilities are found north of the West Kearney Terminal and South of the GA hangar area. **Exhibit 1.4-5** depicts the location of the Support facilities at SGF.

Exhibit 1.4-5: SGF General Aviation and Support Facilities



Source: CMT (2022)

AIRPORT TRAFFIC CONTROL TOWER (ATCT)

The SGF ATCT is located on the south side of the airfield, just east of the aircraft rescue and firefighting (ARFF) facility. The tower is approximately 93 feet above field elevation.

AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) FACILITIES

SGF maintains an FAA Airport Operating Certificate under 14 CFR Part 139, as it serves scheduled operations of air carrier aircraft seating more than 30 passengers. SGF is identified under the FAA classification system as a Class I airport. The Airport maintains an ARFF Index B and has the capability to become Index C or D upon request between 1100 Zulu (Z) and 0600Z. The Airport's ARFF Index is determined by the length of the air carrier aircraft serving the airport with five or more daily departures. For SGF, Index B was determined by air carrier aircraft service from the following aircraft:

- CRJ Series – 200/700/900
- Embraer Series – 135/145/175
- Airbus 319-320

The SGF ARFF facility is located northeast of the passenger terminal and adjacent to the FAA ATCT. The 17,270 square-foot building was constructed in 2009. **Exhibit 1.4-6** shows the ARFF facility.

Exhibit 1.4-6: SGF ARFF Facility

Source: Mead & Hunt

One bay of the ARFF facility is currently being used to store SRE. Table 1.4-2 provides a detailed list of the ARFF equipment. In addition to performing ARFF tasks and emergency medical services (EMS), ARFF members are responsible for providing fuel services at SGF.

Table 1.4-2: ARFF Equipment

VEHICLE	NAME	YEAR	WATER (gal.)	AFFF (gal.)	DRY CHEMICAL (lbs.)
Oshkosh Striker 3000	EZ-7	2023	3,000	420	500
Oshkosh Striker 3000	EZ-6	2009	3,000	420	500

Source: SGF (2024)

SNOW REMOVAL EQUIPMENT/MAINTENANCE STORAGE FACILITIES

The Snow Removal Equipment (SRE) facility is located on the northwest side of Runway 20. The SRE building is used to house both SRE and other airfield and airport maintenance equipment. Due to limited capacity and nature of use, SRE is stored at various locations across the airfield.

Each piece of equipment is assigned a number, starting with two letters that identify its use and storage location:

- AF – Airfield
- AP – Airport
- GA – General Aviation
- TM – Terminal

Equipment numbers starting with AF and AP are primarily stored in the SRE facility, with limited equipment being stored in a spare bay at the ARFF facility. GA equipment is currently stored outside the GA facility. TM equipment are split between being stored outside, at the terminal loading dock, or in the terminal boiler room. Given the seasonal nature of snow removal, some equipment is converted to SRE with the addition of plows and spreaders every October and then reverted to traditional maintenance equipment every April. Table 1.4-3 provides a list of current SRE.

Table 1.4-3: SRE Equipment Inventory

TYPE	EQUIPMENT #	YEAR	DESCRIPTION
Truck	AF6	2014	Ford F350 4x4 1-ton utility with plow
Truck	AF8	2022	Ford F350 4x4 flatbed with spreader and plow
Blower	AF48	2011	Craftsman 45" snow blower
Truck	AF50	2002	Chevy C7500 dump truck with hydraulic spreader and plow
Spreader	AF54	2015	SaltDogg electric spreader
Truck	AP13	2005	Ford F250 ¾-ton utility with plow
Plow	AP23	2002	Oshkosh P-Series spreader-plow
Plow	AP24	2002	Oshkosh P-Series spreader-plow
Plow	AP25	2018	Oshkosh P-Series 6x6 20' plow
Truck	AP26	2002	4x4 Pick-up with Street Plows
Wheel Loader	AP27	2001	CASE wheel loader
Broom	AP28	2018	Oshkosh snow broom
Broom	AP29	2018	Oshkosh snow broom
Blower	AP30	2018	Oshkosh snow blower
Wheel Loader	AP31	2022	John Deere with 16' box blade
Truck	TM6	2015	Ford F350 4x4 Super Duty
Side-by-Side	TM19	2012	Kawasaki Mule
Sweeper	TM20	2009	Nissan sweeper truck
Tractor	TM30	2013	New Holland tractor 4x4
Truck	TM36	2019	Ford F350 4x4 1-ton
Side-by-Side	TM38	2021	Kawasaki 4x4 Mule
Spreader	TM150	2022	SaltDogg unleaded spreader

Source: SGF; CMT (2024)

WEST KEARNEY TERMINAL

The West Kearney Terminal, located on the east side of the airfield, served as the primary commercial terminal prior to the construction of the Midfield Terminal. The West Kearney Terminal has been reconfigured for corporate office space and is currently leased to a commercial entity, which occupies over 100,000 square feet of the 175,000 square-foot building with almost 1,000 employees. The facility also houses a U.S. Customs Port of Entry.

1.4.6 Fuel Storage

SGF has two primary fuel farms on the airfield. There is a fuel farm located at the commercial terminal that consists of three jet fuel, one gasoline, and one diesel tank. There is also a fuel farm located north of the GA facilities that has three jet fuel, two avgas, one gasoline, and one diesel tank. A full breakdown of the fuel storage is listed in **Table 1.4-4.**

Table 1.4-4: Aircraft and Vehicle Fuel Storage

LOCATION	CONTAINER TYPE/ CAPACITY	FUEL TYPE
General Aviation	(3) 30,000-gallon AST	Jet Fuel
	(2) 15,000 AST	Aviation & Gasoline
	5,000-gallon AST	Diesel
	5,000-gallon AST	Gasoline
Midfield Terminal	(3) 30,000-gallon AST	Jet Fuel
	5,000-gallon AST	Diesel
	5,000-gallon AST	Gasoline
SRE Facility	100-gallon AST	Waste Oil
Airfield Lighting/Electric Vault	660-gallon Emergency Generator Fuel Tank	Diesel
Line Services Vault	300-gallon AST	Diesel
Quick Turnaround Facility	(2) 12,000-gallon AST	Gasoline
	1,000-gallon AST	Gasoline
ARFF Building	300-gallon Tank	Diesel
Airfield Electrical Vault	550-gallon Tank	Diesel
Parking Lot	300-gallon Tank	Diesel

Source: SGF

1.4.7 Fixed Based Operator

SGF has one Fixed Based Operator (FBO), Midwest Premier, located just east of the intersection of Runway 20 and Taxiway B and operates out of the GA terminal. The FBO is owned and operated by the City and provides services to GA operators at the airport. The FBO's services include aircraft line services, apron tie-downs, hangar storage space, catering coordination, and access to weather and flight planning services. Aircraft maintenance and other services are handled by private agencies at the airport.

The GA terminal was built in 1990 and was last updated in 2011; it is in the design process to remodel and expand its current facility. The GA terminal project is anticipated to be completed in 2024. **Exhibit 1.4-7** depicts a rendering of the planned GA terminal expansion.

Exhibit 1.4-7: GA Terminal Rendering

Source: Dake Wells

1.4.8 Rental Car Facilities

Three rental car brand families operate at SGF. The rental car facilities are located just west of the main terminal with a newly paved overflow/holding area that is attached to the quick turnaround service area. The facilities are located strategically on the west side of the terminal to allow users a seamless access point to Airport Boulevard.

1.4.9 Vehicle Parking

SGF has four main parking areas that correspond to the regions of the airfield. To the southwest, the largest parking lot is the terminal parking lot. This lot is primarily for commercial passengers and employees. To the northwest is the military parking lot that is gated and has limited road access. The northern parking area is used for both cargo drop-off and employee parking in the air cargo region of the airfield. To the southeast is the general aviation parking lot. This lot is primarily used by private entities that lease or own space in the hangars in this region of the airfield. Table 1.4-5 provides a summary of the number of parking spaces, including accessible spaces (ADA), in each parking area. Exhibit 1.4-8 illustrates the primary parking areas at SGF. Exhibit 1.4-9 depicts the passenger automotive circulation in relation to the parking areas.

Table 1.4-5: Summary of Landside Auto Parking

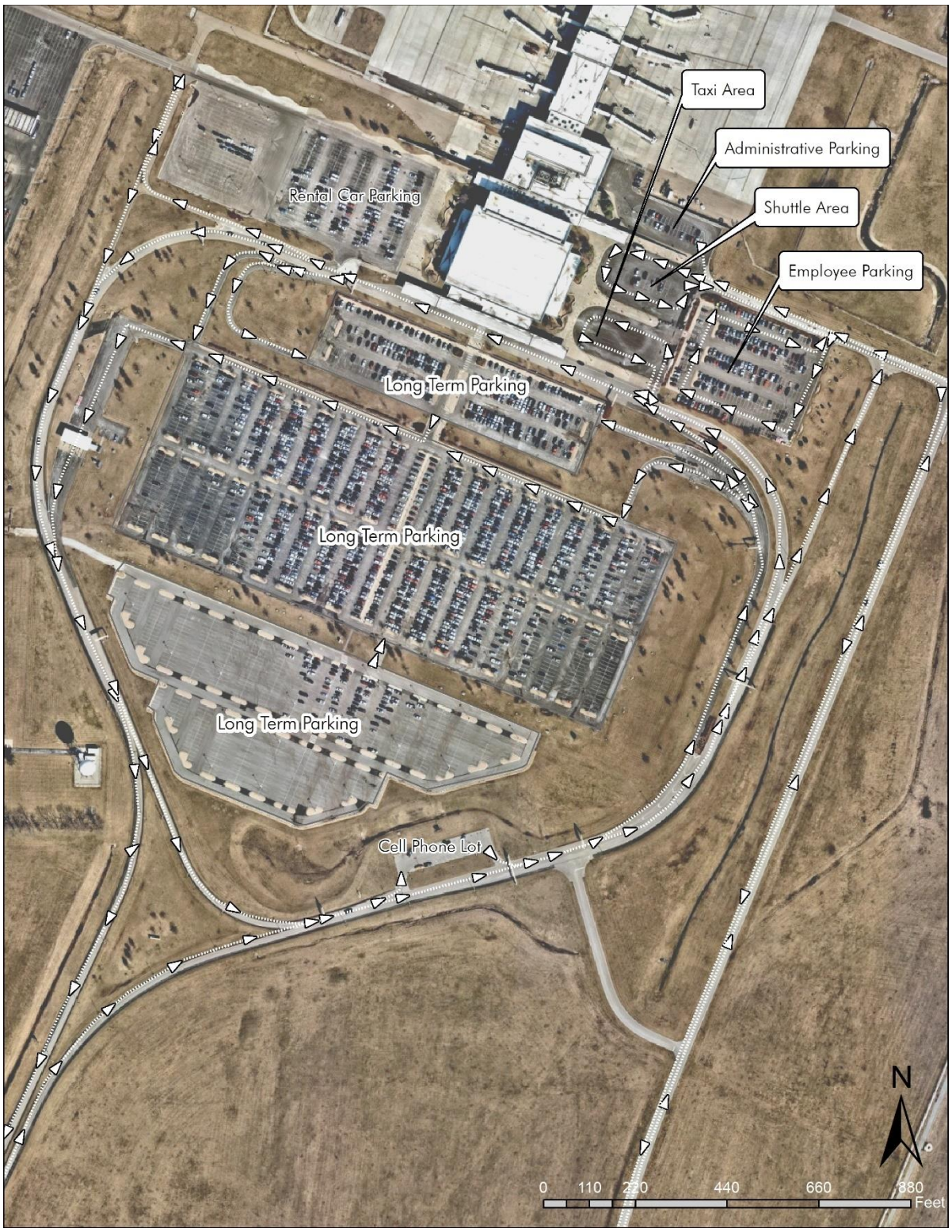
LANDSIDE LOCATION	NUMBER OF PARKING SPACES	
Parking Type	**Regular**	**ADA**
Air Passenger Terminal		
Long Term Parking lot	1,508	30
Long Term Economy	759	
Short Term Parking	278	18
Cell Phone Lot	32	
Pay booth Employee Parking	4	1
TOTAL SPACES	2,630	
Rental Car Facilities		
Pickup and Return Lots	Pick up: 240 Return: 264	
Overflow Parking	492	
Quick Turn Around & Maintenance	South Lot: 140 North Lot: 280	
Rental Car Employee Parking	56	3
TOTAL SPACES	1,475	
Main Terminal & Employee		
Administrative Parking	32	4
Employee Parking	227	8
ARFF Lot	12	2
Air Traffic Control Lot	53	3
SRE Employee Lot	12	2
Airline Maintenance Lot	60	6
TOTAL SPACES	421	
GA Facilities		
West Kearney Parking Lot	986	22
GA Facilities	110	4
TOTAL SPACES	1,222	
Cargo & Military		
Cargo Parking Lot	155	
Military Parking Lot	General Public: 236 Reserved: 28	7
TOTAL SPACES	426	
Total Landside Auto Parking Spaces	6,174	

Source: CMT (2022)

Exhibit 1.4-8: Vehicle Parking

Source: CMT (2022)

Exhibit 1.4-9: Passenger Automotive Circulation



Source: CMT (2022)

1.4.10 Security

The Airport Police Department (APD) headquarters is in the main terminal building and provides the airport with 24/7 police protection. In June 2002 the APD achieved status as a criminal justice agency and is recognized by the Missouri Department of Public Safety as a stand-alone law enforcement agency. The APD has an authorized strength of 13 full-time commissioned officers.

Since SGF serves scheduled passenger operations where the Transportation Security Administration (TSA) conducts passenger screening, it is required to maintain an Airport Security Program (ASP) as described in 49 CFR Part 1542/1540, Airport Security. This program is designed to control access to the Air Operations Area (AOA), control the movement of persons and ground vehicles on the AOA, and to promptly detect and act to control entrance of the AOA by unauthorized individuals. SGF maintains security fencing around the perimeter of the facility.

1.4.11 Global Entry Enrollment Center

In 2021 SGF became home to Missouri's third Global Entry Enrollment Center. Global Entry is a program operated by U.S. Customs and Border Protection (CPB). It allows for faster clearance through customs for pre-approved, low-risk travelers. It is often used by frequent international travelers. The Global Entry Enrollment Center is in SGF's commercial terminal.

1.4.12 Utilities

Electricity

CU provides electricity to SGF. The three main sources of power come from coal, combustion turbines, and long-term purchased power. Additionally, CU has pushed to find renewable electricity sources such as wind and solar energy sources.

Water

Water at the airport is provided by CU. As the main water provider to the City of Springfield, it also has three water treatment facilities, two impoundment areas, and seven sources of water supply. Those sources include Fulbright Spring and Well No.1, McDaniel Lake, Fellows Lake, James River, Stockton Lake, and Distribution Wells. The water is received at SGF through a 12-inch water main from the utility corridor between Kearney Street and Willard Road. The water is then distributed throughout the airport's facilities.

Sanitary Sewer

Springfield's sanitary sewer services are provided by the Environmental Wastewater Management Division of the Department of Environmental Services, which maintains the publicly owned treatment works (POTW). The POTW is made up of a wastewater collection system and two treatment plants and services the city of Springfield and the surrounding communities.

Stormwater

The Rainier Branch of the Clear Creek and the Sac River Basin catch the stormwater runoff from SGF. A series of open channels and pipes direct the flow of water through the airport property to drainage basins to catch and hold water as well as provide best management practices for cleaning the water before releasing it back into the water table.

Exhibit 1.4-10 illustrates the sanitary sewer and stormwater infrastructure near SGF.

Exhibit 1.4-10: Sanitary Sewer and Storm Water Infrastructure near SGF

Source: https://gisdata-cosmo.opendata.arcgis.com/ CMT (2022)

Natural Gas

CU provides natural gas to SGF and the surrounding environs.

Communications

AT&T is the primary telecommunications provider to the Springfield area. The city is also equipped with fiber optic services.

Table 1.4-6 provides a summary of SGF's utility providers.

Table 1.4-6: Summary of Utility Providers

Utility	Company
Electric	City Utilities of Springfield (CU)
Gas	
Water	
Communications	AT&T
Sanitary Sewer	City of Springfield, MO

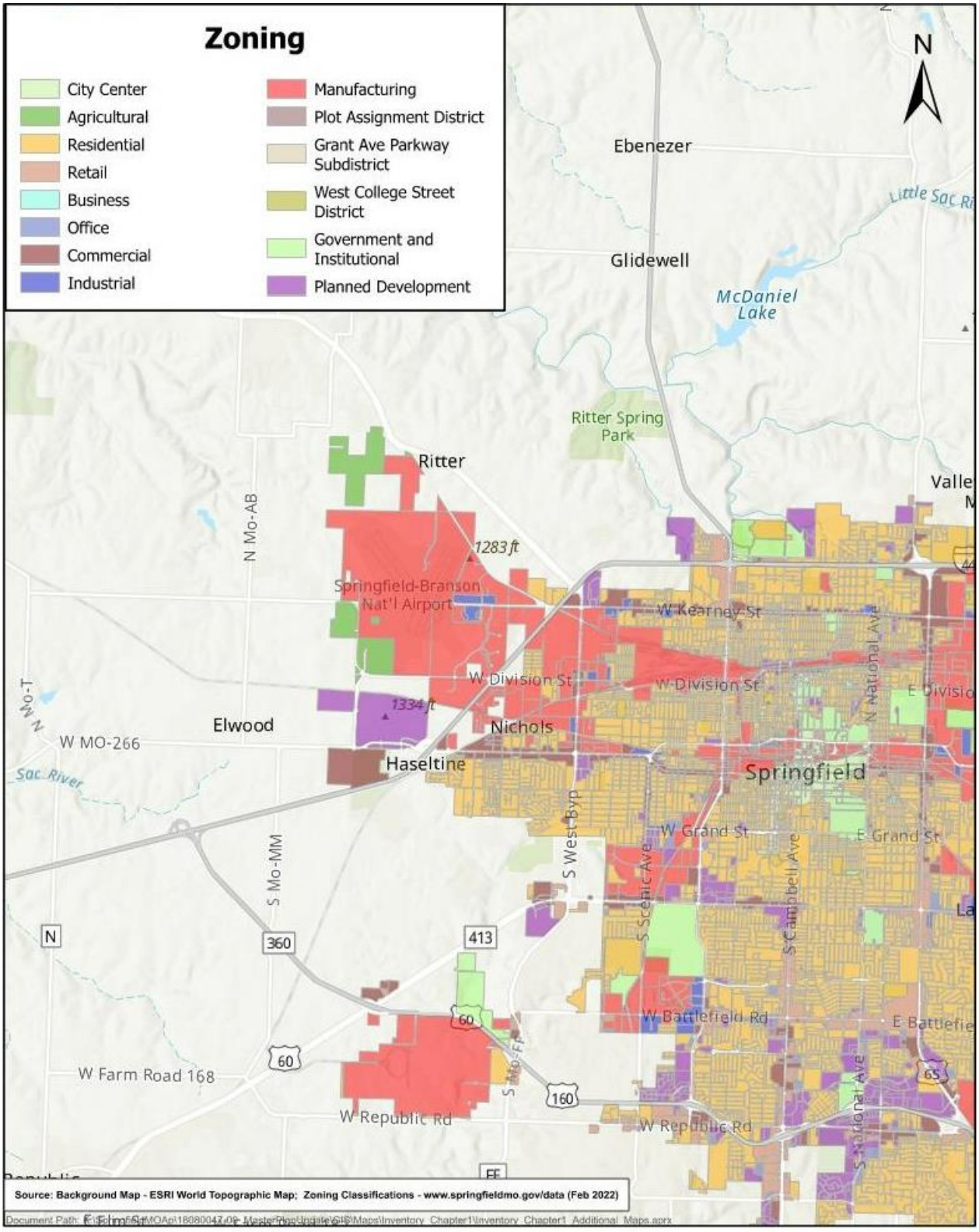
Source: CMT (2022)

1.5 On and Off-Airport Land Uses

1.5.1 Zoning

The Airport lies within the City of Springfield's General Manufacturing (GM) district. The GM district serves as Springfield's basic manufacturing district; airports are a permitted use within the district. The Airport is surrounded with similarly zoned heavy manufacturing and industrial commercial districts as well as county-zoned agricultural districts. **Exhibit 1.5-1** depicts a zoning map of SGF and the city of Springfield.

Exhibit 1.5-1: Springfield Zoning Map



Source: www.springfieldmo.gov/data

Two airport overlay (AO) districts, AO-1 and AO-3, serve as an additional layer to the existing zoning to regulate the development of noise-sensitive land uses, promoting compatibility between the Airport and the surrounding land uses, and to promote the health, safety, and general welfare of property users. users.

The AO-1 district is regulated by the City of Springfield and includes all areas within 2,000 feet of any airport runway centerline extending out 10,000 feet from both ends of any airport runway.

The AO-3 district includes all areas encompassing the airport zones defined in the Airport Zoning Law, Chapter 305 Revised Statutes of Missouri (RSMo), which is specific to Greene County. This law states that the areas encompassing the airport are designed to protect the existing runways and potential runways. **Exhibit 1.5-2** displays the AOs in relation to SGF.

The AO-1 district prohibits residential, public uses, and recreational uses, except as modified by the AO-3 district. While AO-1 prohibits the aforementioned uses, the AO-3 district allows for the construction of single-family dwellings, including manufactured homes, on a lot or parcel of land of 10 acres or more. These uses may be permitted on a lot of less than 10 acres if they lawfully existed at the effective date of the zoning code, provided: an avigation easement is granted to the city, and noise level reduction (NLR) practices are installed during construction.

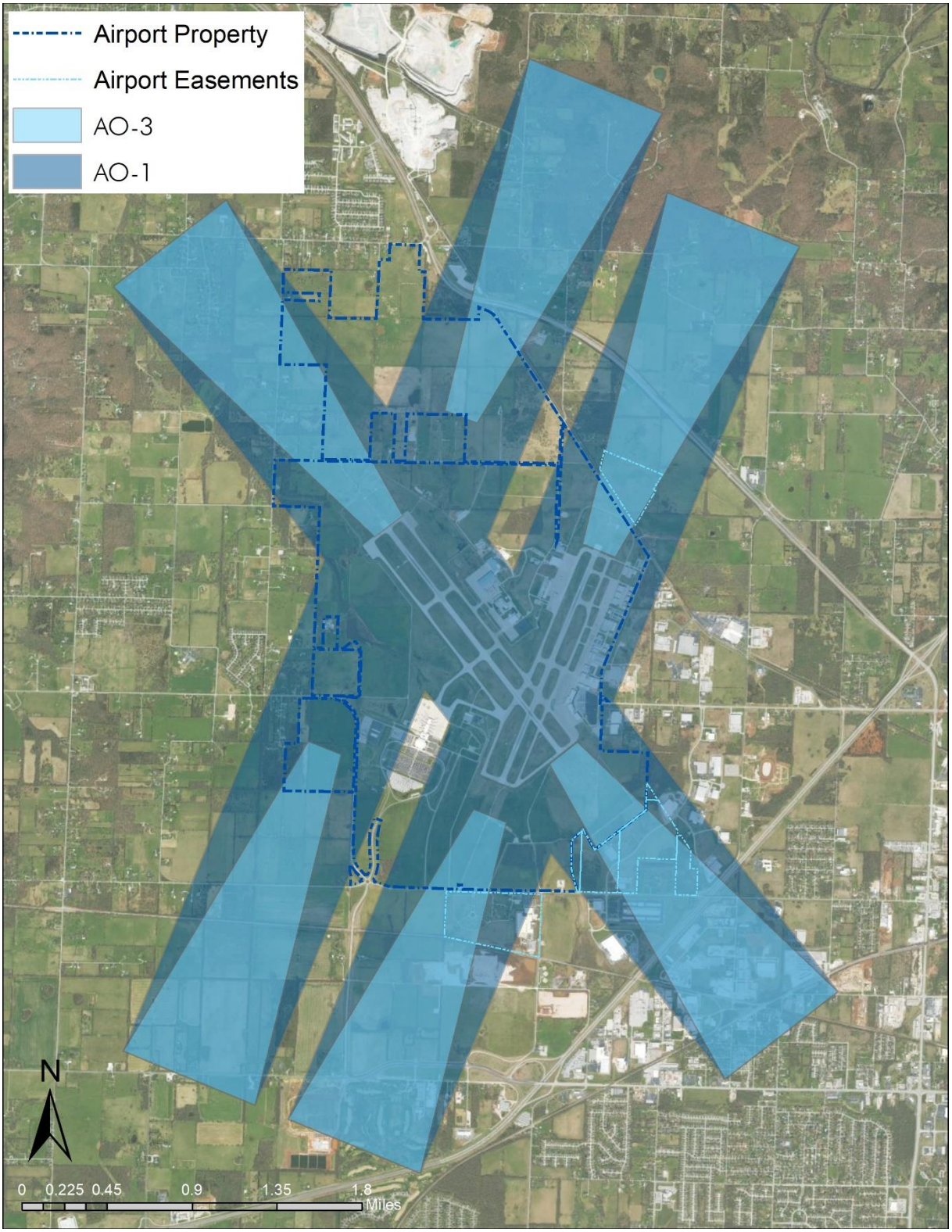
Structures and the accompanying landscaping in the AO districts are required to be not more than 50 feet in height. This height restriction along with the allowable uses steers the area toward an industrial use, with low density and low buildings that are compatible with airport operations.

Any development within 1.5 miles of the ultimate end of any existing or planned runway shown on the most current ALP is required to obtain a Conditional Use Permit. In 2021, playfields were added as only allowable conditional use in the AO districts. The Springfield-Branson National Airport Board shall review any Conditional Use Permit applications in the AO districts for potential impacts to the Airport and make its recommendation to the City's Planning and Zoning Commission. The Planning and Zoning Commission will make its own recommendation on the matter to the City Council for a final action. [7]

The overlay districts protect the planned but unbuilt runway parallel to Runway 02-20 to ensure that further development of the airport is possible without outside influences.

[7] City of Springfield, Missouri zoning regulations

Exhibit 1.5-2: Airport Overlay Map



Source: CMT, SGF ALP 2012

1.5.2 Current Land Uses

SURROUNDING ENVIRONS

With the development conditions set forth by the city code, the predominant land uses surrounding the airport are heavy manufacturing and industrial within the city limits. The leading land uses outside the city boundaries are agricultural and estate-sized single-family dwellings. This type of development surrounding the airfield matches what was envisioned for 2020 in the Northwest Development Study adopted by the Ozarks Transportation Organization in 2005, then again outlined in the Greene County Land Use Plan assembled in 2018.[8]

In spring 2019, the City of Springfield kicked off a new comprehensive plan, *Forward SGF*, and adopted the plan in late 2022. *Forward SGF* identifies future land use through place type instead of traditional future land use maps. This approach means the city's future development is guided by a set of principles that create defined spaces in a place-based approach in a collectively identifiable set of environments through what uses function together. This methodology allows for a more fluid set of uses to mix across very well-place-defined nodes of the city.

Future land uses around the airport must be able to operate within the height restrictions for runway approaches, and support or compliment the airport. Parcels near the airport, not owned by the city, are candidates for light industrial and commercial uses. The large tracts of land west of the airport currently zoned for agricultural use and identified as future urban reserve have the most potential. The city can analyze the current state of infrastructure to determine the relative difficulty of development for marketing purposes. Increased activity from the airport may create the demand for more commercial uses outside of the facility itself. Proximity and access to the airport will determine the cross pollination of nearby commercial uses with the aviation community.

There are two existing land uses in the vicinity of the airport that are compatible with the Airport's surrounding but are not industrial or agricultural: White Chapel Memorial Gardens and Betty & Bobby Allison Sports Town.

White Chapel Memorial Gardens

White Chapel Memorial Gardens is a cemetery that sits just south of the airfield on the south side of W. Division St. where the object free zone for Runway 02-20 spills over onto the cemetery's property. The Airport has established an easement on the property that grants the rights to trimming trees as needed to mitigate obstructions.

Betty & Bobby Allison Sports Town

In 2021 a Conditional Use Permit was approved in the AO districts for the first time to allow for a "playfield" on West State Highway 266. The resulting Betty & Bobby Allison Sports Town opened in 2022 and offers 12 outdoor sports fields and a 94,000-square-foot indoor facility that houses basketball courts, volleyball courts, and indoor soccer fields.

[8] Greene County Land Use Plan April 2018 https://greenecountymo.gov/files/files.php?id=1567

1.6 Environmental Inventory

This environmental inventory aims to provide a general summary of environmental conditions in the vicinity of Springfield-Branson National Airport. This inventory of environmental resources enables the preparation of development alternatives that have the highest possibility for implementation by minimizing potential environmental impacts.

The FAA has issued guidance documents associated with the consideration of environmental impacts of aviation-related actions under the *National Environmental Policy Act (NEPA) of 1969* and implementing regulations. At the master planning level, the FAA Advisory Circular[9] states that environmental considerations should be incorporated into the master planning and alternatives development processes. FAA Order 5050.4B[10], and FAA Order 1050.1F[11], serve as a guide for the discussion below and identify those resources that will require evaluation prior to commencing any project actions.

FAA Order 1050.1F Desk Reference identifies 14 environmental categories that require evaluation. The following pages describe the categories that pertain to the focus of this plan as well as any known resources present within the project area:

- Air Quality
- Biological Resources - Threatened and Endangered Species
- Department of Transportation Act, Section 4(f)
- Farmlands/ Soils
- Noise
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archeological, and Cultural Resources
- Water Resources
- Environmental Justice

1.6.1 Air Quality

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb).

[9] FAA Advisory Circular AC specifically AC 150/5070-6B, Change 2, "Airport Master Plans"
[10] FAA Order 5050.4B: *NEPA Instructions for Airport Actions*
[11] FAA Order 1050.1F: *Environmental Impacts: Policies and Procedures*

Various levels of review apply within both the National Environmental Policy Act (NEPA) and local permitting requirements. Potentially significant air quality impacts, associated with an FAA project or action, would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.

Neither Greene County nor Springfield, MO are listed in the EPA's Green Book which contains nonattainment areas for criteria pollutants.

1.6.2 Threatened and Endangered Species

There are six species identified by the U.S Fish and Wildlife Service to be aware of in the vicinity of SGF. All the mammals listed are bats; the gray bat and Indiana bat, and tricolored bat are endangered species, and the northern long-eared bat is threatened. The habitat for these bats is normally in and among live and dead trees in the summer and in caves for winter hibernation. While these bats may use the skies near SGF to forage for food, there are no active habitable forests or caves on airport property for these mammals to dwell.

There are two fish species in the area listed as threatened: The Ozark Cavefish and the Niangua Darter. The Ozark Cave Fish lives in caves, sinkholes and underground springs that are untouched by light, and while there are no obvious caves on the airport property, some unopened sinkholes on the property could potentially house this creature but it is unlikely as the cavefish is dependent on bat populations as it feeds on their guano. Niangua Darters live in clear Ozark creeks and small rivers draining hilly areas and are normally found in their namesake Niangua River. SGF property does not have the flowing water needed to support this fish, but to support the conservation of this fish and other wildlife the prevention and mitigation of pollutants is crucial.

The monarch butterfly is listed as a candidate, meaning that efforts to conserve the species are encouraged, but not required. Table 1.6-1 summarizes the threatened an endangered species in the vicinity of SGF.

Table 1.6-1 - Federally Protected, Endangered and Threatened Species

Common name	Species	Federal Status	State Status
Gray Bat	Myotis grisescens	Endangered	Endangered
Indiana Bat	Myotis sodalist	Endangered	Endangered
Northern Long-eared Bat	Myotis septentrionalis	Threatened	Threatened
Tricolored Bat	*Perimyotis subflavus*	Endangered	Endangered
Niangua Darter	Etheostoma nianguae	Threatened	Threatened
Ozark Cavefish	Amblyopsis rosae	Threatened	Threatened
Monarch Butterfly	Danaus plexippus	Candidate	Candidate

Source: US Fish and Wildlife Service, Midwest Region Endangered Species, County Distribution of Federally Listed Endangered, Threatened, and Proposed Species; IPaC - Information for Planning and Consultation

1.6.3 Department of Transportation (DOT) Act, Section 4(f)

The U.S. DOT Act of 1966 protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) provides that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land off 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 the using that land and the program or project includes all possible planning to minimize harm resulting from the use.

No publicly owned land from a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance; or any land from a historic site of national, state, or local significance is present within the airport environs. [12]

1.6.4 Farmland and Soils

Farmlands are defined as those agricultural areas considered important and protected by federal, state, and local regulations. Important farmlands include all pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, or of statewide or local importance.

Under the Farmland Protection Policy Act (FPPA), federal agencies are directed to identify and consider the adverse effects of federal actions on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent

[12] Section 4(f) of the U.S. DOT Act of 1966 (now codified at 49 U.S.C. § 303)

practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines developed by the U.S. Department of Agriculture (USDA) apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

According to the USDA Web Soil Survey in the general vicinity of the airport 45.3% of the surveyed area is classified as prime farmland. Further surveying will need to be conducted with specific improvements of undisturbed soils.

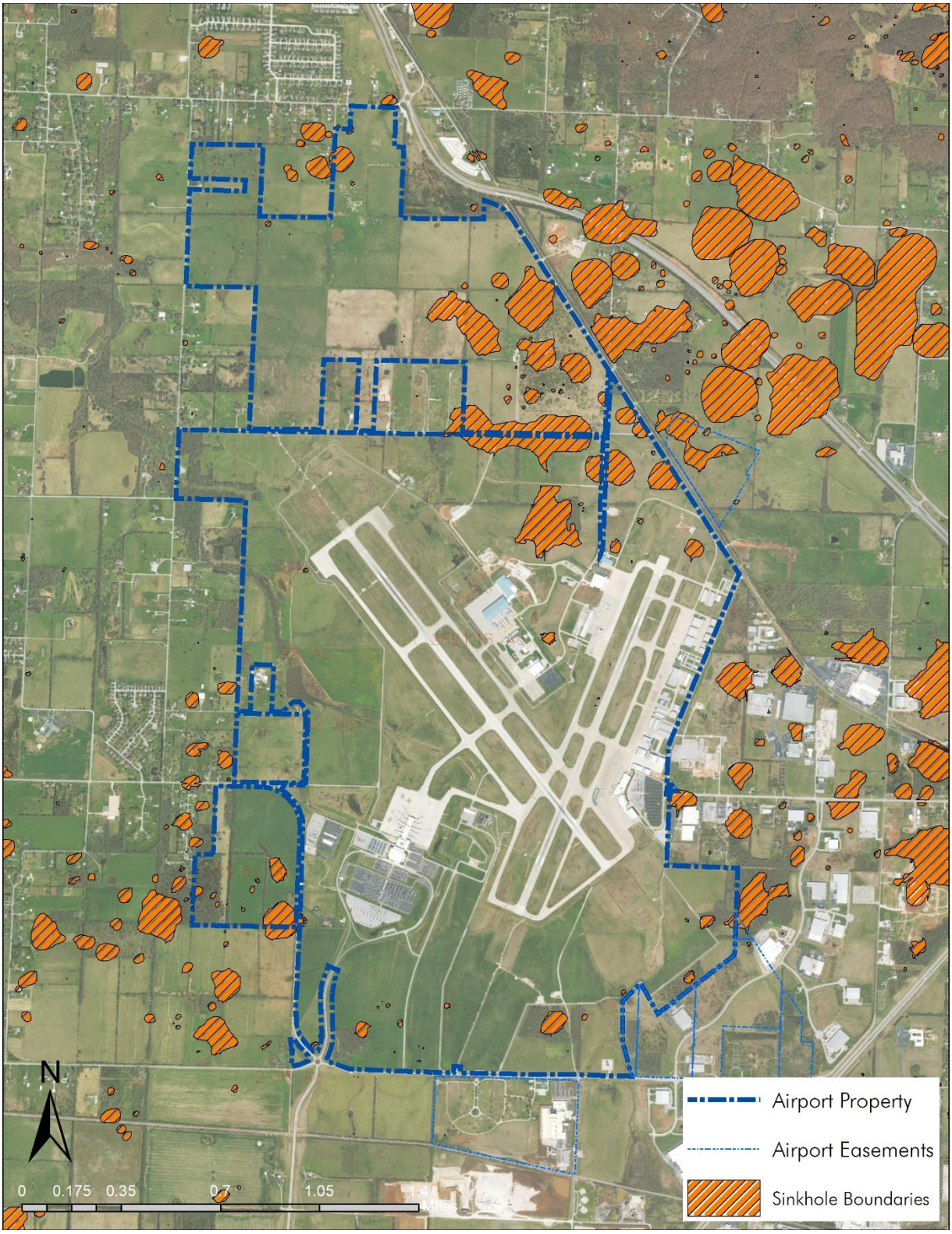
Of the studied area, 52% of the soils are of the karst landscape. Karst is a type of landscape where the dissolving of the bedrock has created sinkholes, sinking streams, caves, springs, and other characteristic features. Karst is associated with soluble rock types such as limestone, marble, and gypsum. In general, a typical karst landscape forms when much of the water falling on the surface interacts with and enters the subsurface through cracks, fractures, and holes that have been dissolved into the bedrock. After traveling underground, sometimes for long distances, this water is then discharged from springs, many of which are cave entrances.

Karst is ideal for storing water as an aquifer and provides vast amounts of clean drinking water to people, plants, and animals. Because of the porous nature of karst, water flows quickly through it and receives little filtration. Therefore, contaminants that enter a karst aquifer are rapidly transported creating water quality problems. About 20% of the United States is underlain by karst landscapes and 40% of groundwater used for drinking comes from karst aquifers. It is imperative for our health and safety to protect karst landscapes.[13]

With karst landscapes, sinkholes are an often a nuisance to development. **Exhibit 1.6-1** shows the known sinkholes in the Airport's vicinity.

[13] https://www.nps.gov/subjects/caves/karst-landscapes.htm

Exhibit 1.6-1 – Known Sinkholes in the SGF Environment



Source: https://www.springfieldmo.gov/ , CMT (2022)

1.6.5 Noise

Aviation noise primarily results from the operation of fixed and rotary wing aircraft, such as departures, arrivals, overflights, taxiing, and engine run-ups. Noise is often the predominant aviation environmental concern of the public. Significant levels of aircraft noise in communities around airports generate the most issues. However, there are increasing concerns in areas of moderate noise exposure, and noise issues are raised by residents in suburban and rural areas where ambient noise is lower than in the more urbanized areas that tend to surround many commercial service airports. Zoning practices have protected SGF from most noise conflicts of the airports neighbors by primarily being surrounded with industrial uses. The residential homes near the airport are the only apparent noise sensitive land use near the airfield but little to no complaints have been recently voiced. No Part 150 studies have been conducted, but further development increasing the density near the airfield could prompt the need for the study.

1.6.6 Hazardous Materials and Solid Waste

There are two sites on Airport property identified by the EPA's Brownfields and Land Revitalization Program. Between 2009 and 2010 the EPA conducted assessments of the former National Airport Terminal, and the former Airport Terminal Parking Lot and deemed that the two sites have soils contaminated with petroleum products and volatile organic compounds (VOCs) and that the terminal location also has lead contamination. For both sites the EPA states that the "Extent of contamination unknown, further detail is needed before developing plans for remediation and redevelopment."[14]

Just east of the general aviation area of the Airport lies the Litton Systems Inc. site at 4811 W. Kearney St. The approximately 70-acre site was once used to manufacture printed circuit boards where heavy metals such as copper and VOCs were used. In 2001, Northrop Grumman Corp. and their subsidiary Guidance Electronics Co., acquired the site and since demolished the building in 2008. The now vacant lot has been the center of a Superfund Cooperative Program cleanup where investigative, cleanup, testing, and community involvement efforts are being seen through by the corporations and the Missouri Department of Natural Resources. [15]

1.6.7 Historical, Architectural, Archaeological, and Cultural Resources

There are no historic sites listed on the National Register of Historic Places near SGF. Additionally, the Airport and surrounding properties are not listed on any state or local registers of historic places.[16]

While the airfield is currently not registered as a historic place, it has been in operation since 1945 and has opportunities to apply and become a designated historic location. With most historic designations comes limitation in development to protect such historic assists. Building 50 years old or older are

[14] https://cimc.epa.gov/ords/cimc/f?p=CIMC:31::::Y,31:P31_ID:118521#media , https://cimc.epa.gov/ords/cimc/f?p=CIMC:31::::Y,31:P31_ID:118681

[15] https://dnr.mo.gov/waste-recycling/sites-regulated-facilities/superfund/interest/litton-systems-inc

[16] National Park Service, National Register of Historic Places. https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466

eligible to be submitted for the register of historic places. Some buildings on airport property could become eligible for submission during this planning period.

1.6.8 Water Resources

Water resources, no matter their size, are an integral asset to society and environments. Water resources come in all different forms, from lakes, ponds, and rivers to underground aquafers and floodplains it is important to think about the entire water system when any development is considered. There are various wetland areas and floodplains existing within and around the SGF property.

Surface Waters - Surface waters include streams, rivers, lakes, ponds, estuaries, and oceans. Lakes and ponds in the vicinity of the airport include McDaniel Lake that sits about five miles northeast of the airfield. Fellows Lake is another lake located approximately ten miles to the northeast of SGF and Lake Springfield is located ten miles southeast. The Rainer Branch Stream flows from the west to the southeast portion of the airport. This small creek is channelized through the property around buildings and culverted under paved areas.

Groundwater - a subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as to wells, springs, and other water sources. Exhibit 4-1 of FAA Order 1050.1F provides the FAA's significance threshold for groundwater. A significant impact exists if:

The action would:

- Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or
- Contaminate an aquifer used for public water supply such that public health may be adversely affected.

Greene County and Springfield are located within the Springfield Plateau Groundwater Province. The province covers approximately 8,900 square miles (12.8% of the state).

Water in the Springfield Province is used for a wide variety of purposes including industry, agriculture, and drinking water. Several cities, such as Joplin and Springfield, heavily rely on surface water for their supply. However, nearly every city pumps groundwater to help meet their water needs.[17]

Floodplains - Executive Order 11988 directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. Floodplains are commonly associated with the annual chance of flood events such as the 100-year (1% chance) or 500-year (.2% chance) floodplains.

[17] https://dnr.mo.gov/document-search/groundwater-provinces-missouri-springfield-plateau-groundwater-province-pub3002/pub3002

According to Federal Emergency Management Agency (FEMA)[18], the Airport has several flood hazard areas that impact the airfield. There are areas of 100-year floodplain that follow the Rainer Branch on the west side of the airport and blotches of floodplain that cover the northwest of Runway 02-20. There are also areas of 500-year floodplain located closer to the airfield at the ends of Runway 02-20. **Exhibit 1.6-2** shows the floodplains that interact with SGF.

Development within floodplains is permissible with permits, but consideration of engineered solutions will mitigate issues caused by flooding and improve insurance and funding rates.

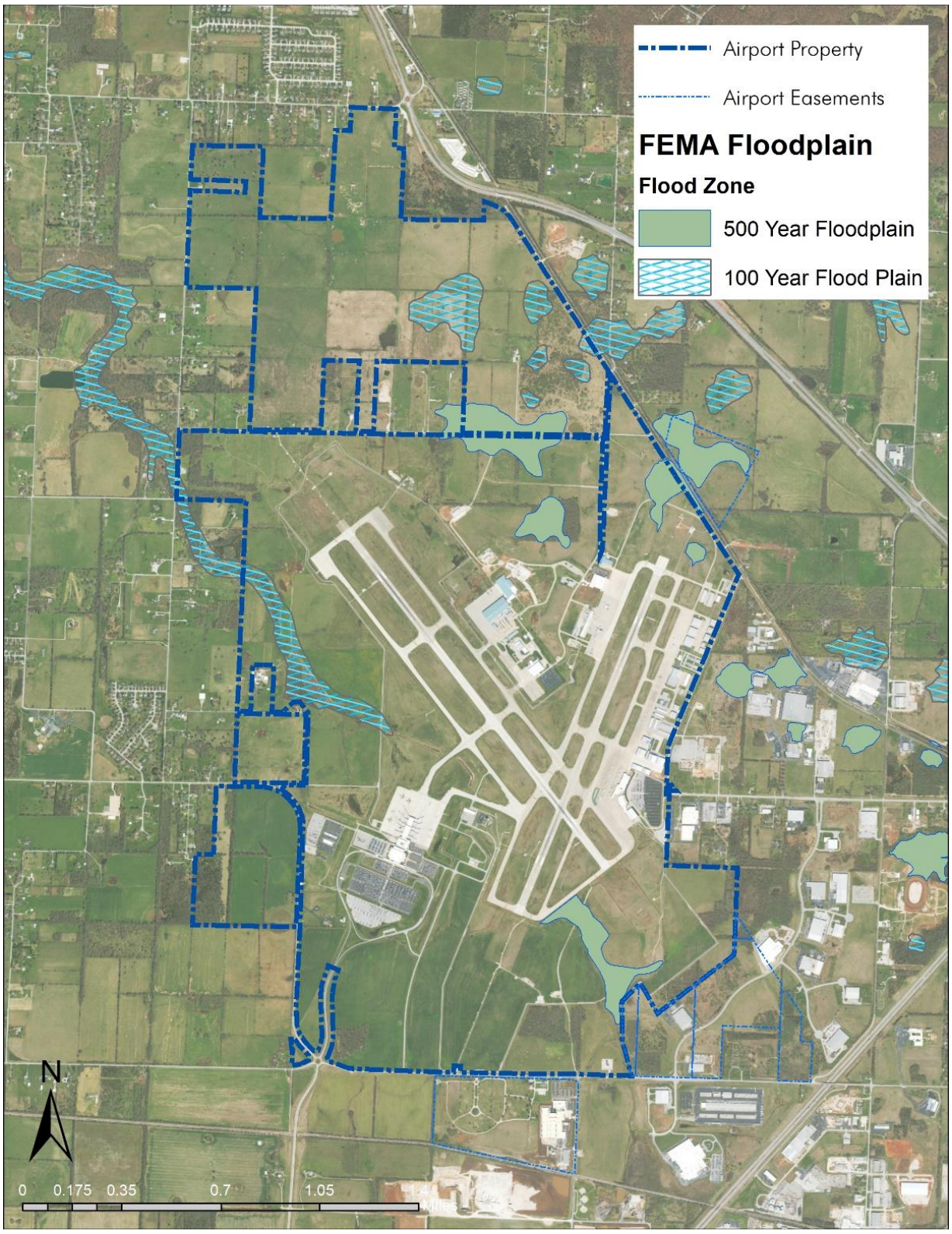
1.6.9 Environmental Justice

With the socioeconomic data shown earlier in the chapter all showing a general growth trend, it is important to consider development conflicts and general health and wellness of residents before developing near an industrialized land use. It is often seen that disadvantaged residents are residing in less desirable areas near point source pollutants such as highways and industrial facilities such as airports.

SGF has worked closely with the City of Springfield as well as Greene County to mitigate these conflicts and injustices near the airport. This has been addressed through active zoning techniques such as enforcing overlay districts which only permit uses that compliment and buffer the airfield's industrial nature and possible health hazards. Continuous implementation of these zoning techniques and regular environmental interventions will ensure that the airport is a key steward of environmental justice within the community.

[18] Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) Panel 307, 194, 326 Greene County, MO established 12/17/2010

Exhibit 1.6-2 – FEMA Floodplains in SGF Vicinity



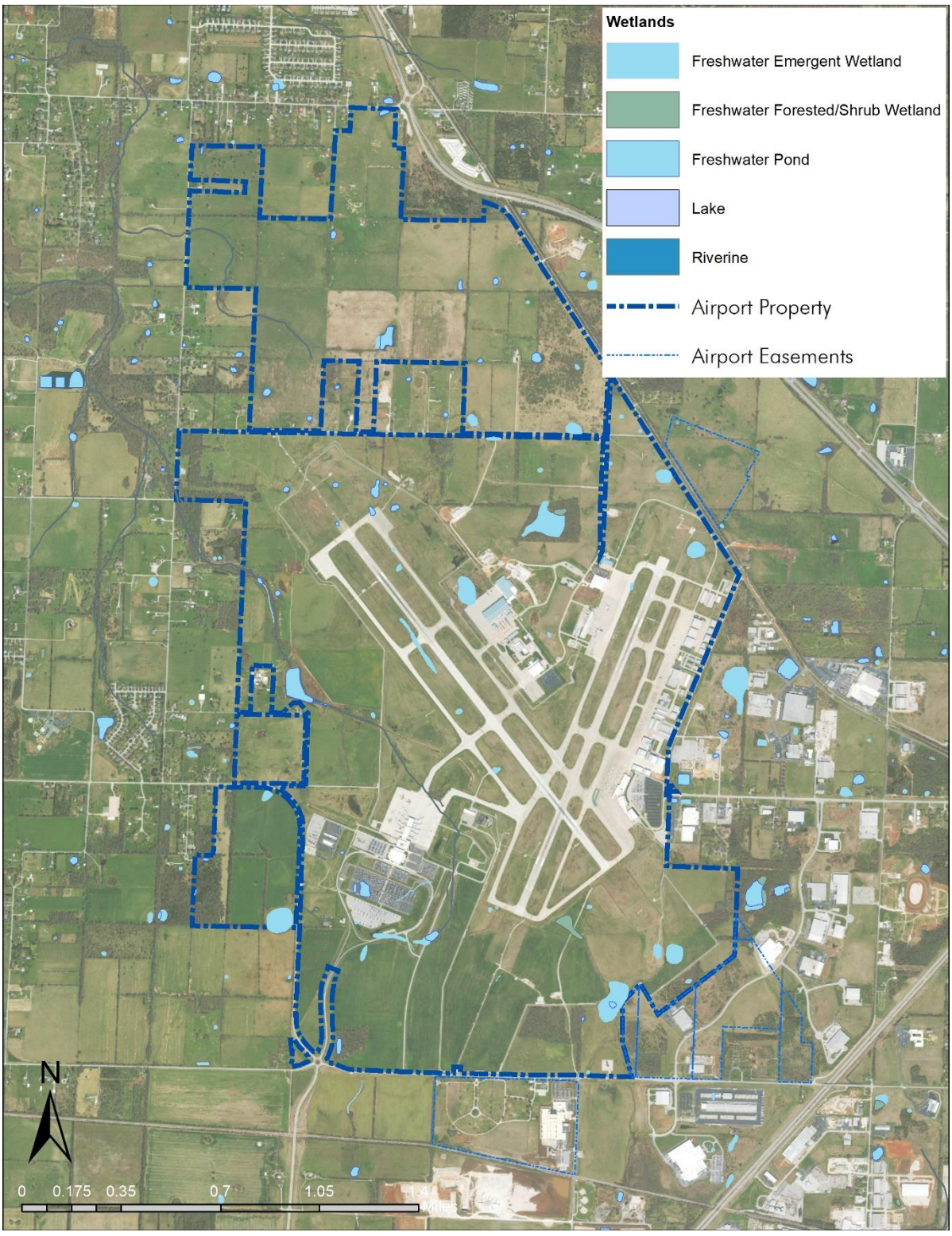
Source: https://gisdata-cosmo.opendata.arcgis.com/ CMT (2022)

Wetlands - According to the Clean Water Act (CWA), waters of the United States (WOTUS) include rivers, streams, tributaries, interstate waters, and wetlands. Such areas are regulated and subject to permitting under the federal CWA by the EPA and the U.S. Army Corps of Engineers (USACE). Wetlands include areas where water either covers the soil or is present at or near the surface of the soil at a frequency and duration to support plants that would grow in saturated soil conditions. Hydrology largely determines how the soil develops and the types of plant and animal communities living in and on the soil, which can support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants, or hydrophytes, and promotes the development of characteristic hydric wetland soils.

A Wetland Delineation report was completed in January 2020 at the site of the now Envoy airplane maintenance and repair operation (MRO) hangar. One isolated wetland was identified in the study area and have been delineated and addressed as part of the project; the project was completed in December 2021.

According to the U.S. Fish and Wildlife Service Wetlands Mapper as seen in **Exhibit 1.6-3**, there are several small wetlands spattered throughout the airport and surroundings.

Exhibit 1.6-3 – Wetlands in SGF Vicinity



Source: United States Fish and Wildlife Services, National Wetlands Inventory https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.

Water Quality - The CWA provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent, or minimize the of wetlands, and regulate other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. The porous Karst soils found on the airport could potentially quickly distribute pollutants into the surrounding environments including the ground water.

Congress has mandated (through the CWA) the National Pollutant Discharge Elimination System (NPDES). This program addresses non-agricultural stormwater discharges. Using NPDES permits, certain procedures are required to prevent contamination of water bodies from stormwater runoff. The EPA can delegate this permit authority to individual states. EPA has delegated authority to the Missouri Department of Natural Resources (MoDNR) to issue all NPDES permits statewide, except those for biosolids processing facilities.

See **Appendix 4** for the detailed reports the were consulted for this environmental inventory.