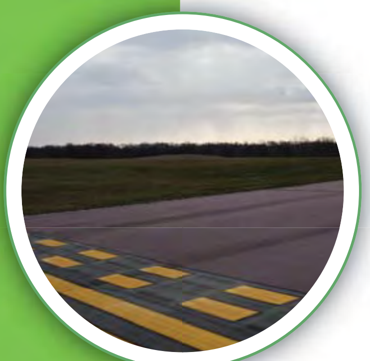
Springfield Municipal Airport

MASTER PLAN
June 2018



Prepared for
Springfield Municipal Airport
Springfield, Minnesota

Prepared by
Mead & Hunt
Engineering
Architecture
Air Service
Planning
Environmental

Springfield Municipal Airport

Master Plan

Prepared for

The City of Springfield, Minnesota

Prepared by

Mead & Hunt

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CHAPTER 1

Inventory of Facilities

1.1 Introduction

The purpose of the Inventory Chapter is to establish the existing conditions of the Springfield Municipal Airport (D42). This provides a baseline for Airport activity, environmental factors, surrounding land use, and local socioeconomic factors. This will be done in the following sections:

- Airport Background
- Federal, State and Local Planning
- Airport Zoning and Land Use
- Airside Facilities
- Landside Facilities
- Airspace
- Local Socioeconomics
- Inventory Summary

1.2 Airport Background

The Springfield Municipal Airport (D42) is located in the western portion of Brown County and approximately one mile west of the Springfield, MN city center, as shown in **Figure 1-1** and **Figure 1-2**. The Airport is owned and operated by the City of Springfield which provides administration and many other services such as Airport Rescue and Firefighting (ARFF) and security. Recent Airport improvements include a new maintenance and SRE building constructed in 2012 and self-serve fuel as of 2013. D42 is situated among several other GA airports in the vicinity, shown in **Table 1-1** and **Figure 1-3**, and is located just over two hours from two commercial airports, the Minneapolis-Saint Paul International Airport (MSP) and the Sioux Fall Regional Airport (FSD). A helicopter pad is attached to the Mayo Clinic Health System facility on the northeast side of town approximately 1.75 miles away, but because it is not oriented on the extended centerline of the runways, it does not directly impact the Airport.

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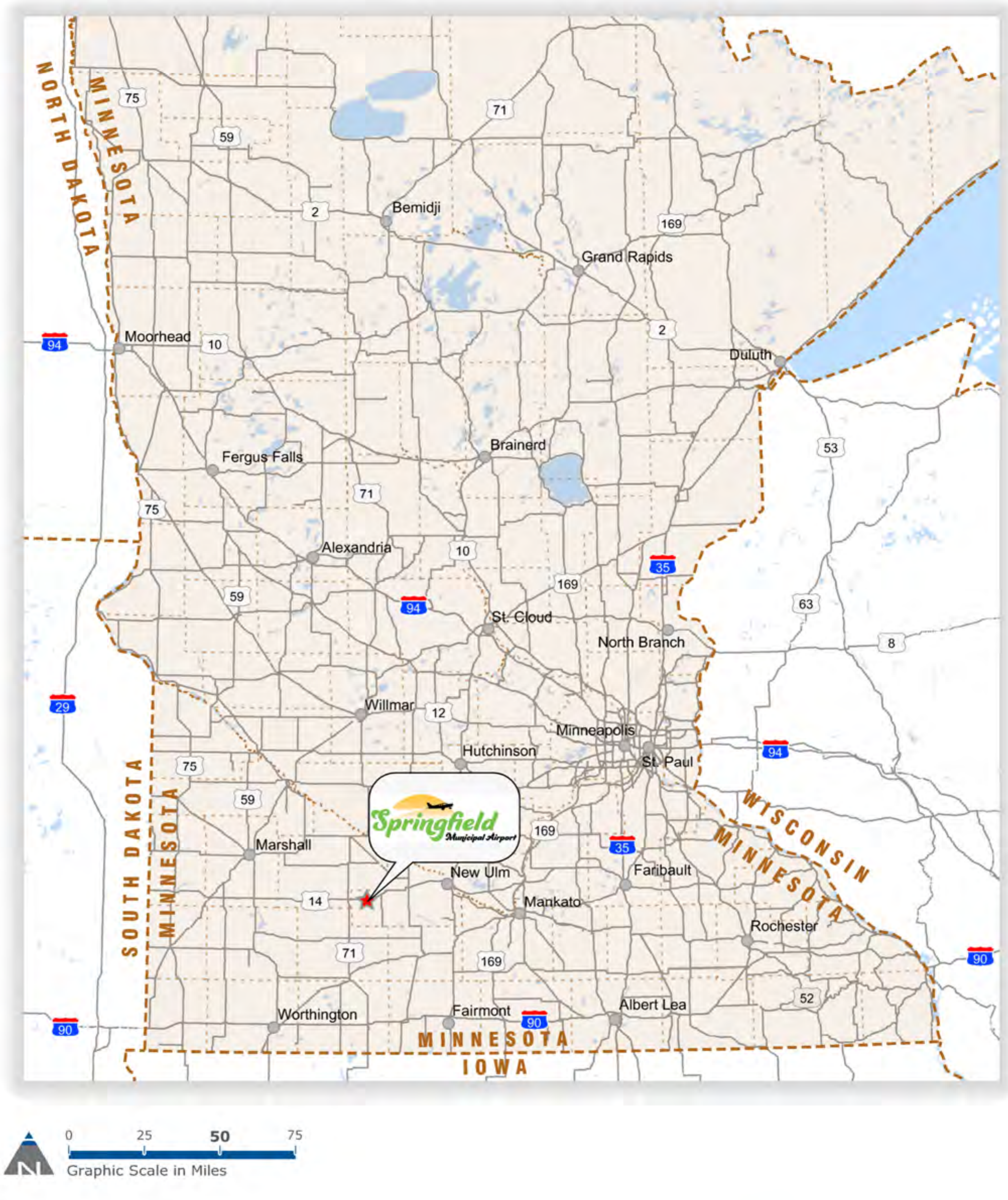
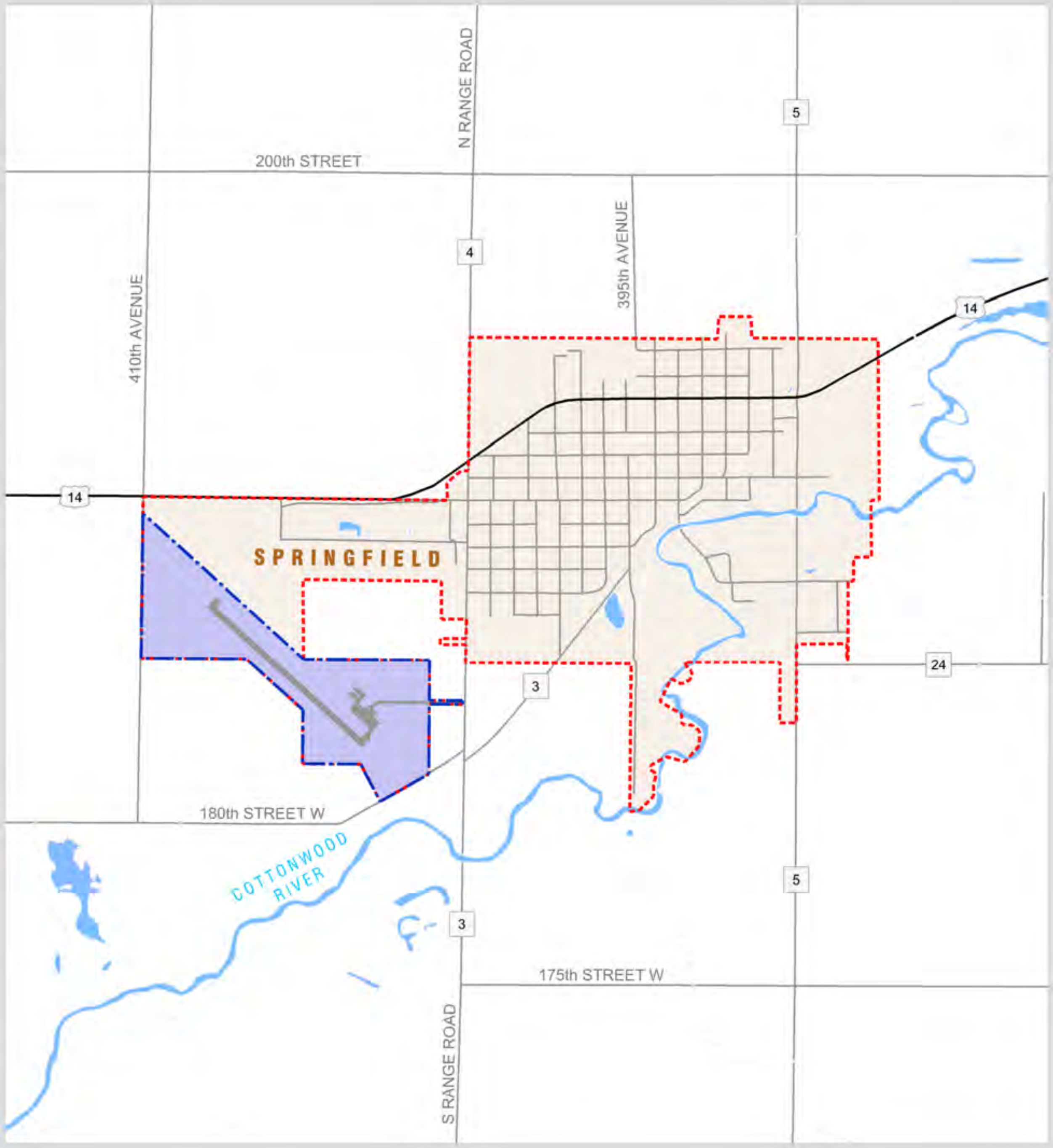


Figure 1-1: **Airport Location Map**

Springfield Municipal Airport

Source: *ArcGIS*



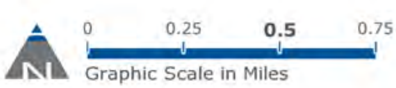


Figure 1-2: **Vicinity Map**

Source: *ArcGIS, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

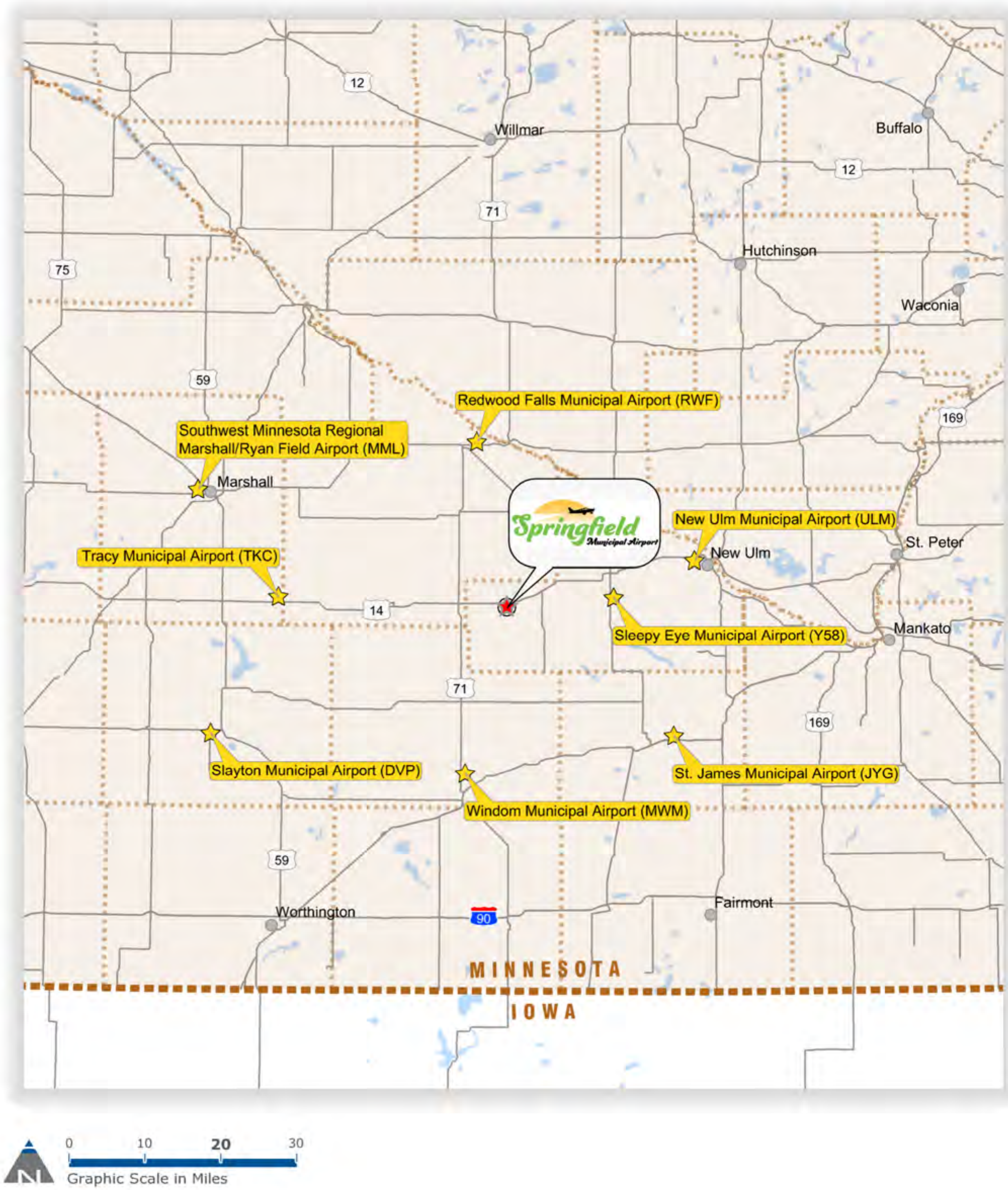


Figure 1-3: **Nearby Airports**

Source: *ArcGIS*

Table 1-1: Airports in the Vicinity

Airport	Flying Distance (Statute Miles)	NPIAS	Runway Type Available	
			Paved	Turf
Redwood Falls Municipal (RWF)	22	x	x	x
Tracy Municipal (TKC)	30	x	x	x
Windom Municipal (MWM)	23	x	x	
St. James Municipal (JYG)	28	x	x	
New Ulm Municipal (ULM)	25	x	x	x
Sleepy Eye Municipal (Y58)	15			x
Slayton Municipal (DVP)	42		x	
Marshall Regional (MML)	44	x	x	

Source: Google Earth

1.3 Federal, State and Local Planning

This section provides a summary of previous planning documents that impact the Airport and provide information for this Master Plan.

1.3.1 NPIAS

The National Plan of Integrated Airport Systems (NPIAS) is a report submitted to Congress by FAA on a bi-annual basis, which identifies airports included in the National Airspace System (NAS), discusses the various roles they serve, and determines development projects eligible for federal funding under the Airport Improvement Program (AIP). The 2017 – 2021 NPIAS identifies 3,340 public use airports (3,332 existing and 8 proposed) that contribute to the national air transportation system, which is about 65% of the 5,136 public use airports and 17% of the 19,536 total U.S. airport facilities.

Airports are grouped into two major categories under the NPIAS: primary and nonprimary. Primary airports have scheduled air carrier service and at least 10,000 annual enplaned passengers. General aviation (GA) aircraft typically use nonprimary airports which are grouped into five categories: national, regional, local, basic, and unclassified. D42 and two other airports in Minnesota are currently considered unclassified. The FAA undertook a review of unclassified airports within the NPIAS in 2010, which is discussed in the next subsection.

The NPIAS estimates five-year costs for airport improvements eligible for Federal development grants under the AIP. The 2017-2021 NPIAS does not list any funds for D42 or the other two unclassified airports within Minnesota.

1.3.2 FAA ASSET Reports

The FAA began a comprehensive review of general aviation (GA) airports nationwide and the role they play in the NAS in 2010. At the time, GA airports had not been studied in detail for more than 40 years and the resulting report, General Aviation Airports: A National Asset (ASSET Report), identified the public aeronautical functions that GA airports serve. The 2012 ASSET report categorized GA airports into four categories based on their activity and function. However, 497 NPIAS airports did not fit into these four categories and were therefore designated as "unclassified". Generally, these facilities have experienced a decline in aviation activity due to socioeconomic shifts and/or changes to the GA industry.

A follow up study was conducted in 2013 to further review the 497 unclassified facilities in coordination with local stakeholders and airport officials. Of the original 497 facilities, 281 airports continue to be unclassified with no clearly defined FAA role. These airports may be re-classified by meeting any of the four NPIAS category requirements (national, regional, local or basic). As D42 is currently unclassified based upon the ASSET Report criteria, and the primary goal of this Master Plan is to provide a path forward, ideally to re-classification under the "basic" category.

Basic category airports are described as linking the community with the NAS and supporting GA activities, and must meet one of the following criteria:

- 10 or more based aircraft
- 4 based helicopters
- 30 miles straight line distance more from the nearest NPIAS airport

Four of the airports listed in **Table 1-1** are NPIAS airports within 30 miles. A survey of basedaircraft.com reveals four single engine aircraft currently based at D42. Therefore, D42 does not currently qualify for the basic category.

1.3.3 2011 Environmental Assessment

In 2011 a Finding of No Significant Impact (FONSI) was issued for an Environmental Assessment (EA) proposing to construct a full parallel taxiway for Runway 13/31. This EA also considered a no-action alternative, a partial parallel taxiway, and two full parallel taxiways (one on each side of the runway). It was determined that placing a full parallel taxiway on the west side of the runway would require aircraft to taxi across the runway before reaching the taxiway, increasing the chance of a runway incursion. In addition, more grading and paving would be required compared to building a taxiway on the east side of the runway. The no-action and partial parallel taxiway alternatives were rejected as they would also require aircraft to taxi on the runway. Therefore, due to operational and cost factors, the EA selected the full parallel taxiway on the east side of the runway as the preferred alternative. Currently, members of the adjacent shooting range notify the Airport of any shooting activities and coordination would continue in the event a parallel taxiway is constructed. Low levels of lead contamination were found in the area, however, as the area immediately around the Airport surfaces are largely unoccupied there would not be any significant impacts associated with construction of the taxiway. Further discussion of the need for a parallel taxiway and the EA will be provided in Chapter 3, *Facility Requirements*.

1.4 Airport Zoning and Land Use

The Airport is located within the jurisdictional boundaries of the City of Springfield. The Airport is therefore subject to zoning ordinances administered by the City of Springfield and the Springfield/Brown County Joint Airport Zoning Board, in addition to state and federal regulations. This section discusses each of these governing bodies and their respective regulation as concerns the Airport.

1.4.1 City of Springfield

The Airport is located on the western edge of Springfield City limits and is zoned as Proposed Special Use District (Zone SU), as shown in **Figure 1-4**. Adjacent to the north and east of the Airport are industrial (Zone I) and agricultural (Zone A) districts. Although the surrounding land to the west, south, and southeast does not fall within City limits, the Airport is otherwise surrounded by agricultural use. Because of the lack of development in the immediate vicinity, there are few land use concerns in the area. Located approximately 600 feet to the north of the Runway 13 threshold is shooting range, while a golf course is located approximately a mile to the southeast along the extended runway centerline.

1.4.2 Springfield/Brown County Joint Airport Zoning Board

MN Statute 360.063, *Airport Zoning; Authority, Procedure*, gives authority to a municipality controlling an airport located within the territorial limits of another county or municipality to join in creating a joint airport zoning board. The Springfield/Brown County Joint Airport Zoning Board (JAZB) has been formed under this statute (in addition to 360.062 – 360.074) and is enabled to adopt, administer, and enforce airport zoning regulations pursuant to these regulations. The JAZB adopted a zoning ordinance in 2004 that closely mirrors the Minnesota Department of Transportation (MnDOT) model zoning regulations for airports. Therefore, both state and local ordinances are discussed in the following section.

1.4.3 MnDOT Aeronautics

MN Administrative Rules 8800.1200, *Criteria for Determining Air Navigation Obstructions*, and 8800.2400, *Airport Zoning Standards*, cover much of the regulation that impacts land use surrounding an airport. Relevant sections of Rule 8800.1200 detail both general obstructions and obstructions to public airports, and generally coincides with local ordinances. As local governing bodies may enact zoning ordinance that is more restrictive than what is required by MN Administrative Rules, the local ordinances take precedent and are shown in **Table 1-2**.

Table 1-2: Airport Zoning Surfaces

Surface	MN Rule	Local Ordinance
MN Administrative Rule 8800.1200		
Primary Surface	200’ beyond runway end x 500’ wide	Same
Horizontal Surface	5,000’ radius from each end	10,000’ radius from each end
Conical Zone	20:1 slope x 4,000’ distance	Same
Approach Zone	20:1 slope x 3,500’ wide x 10,000’ long	40:1 slope x 3,500’ wide x 10,000’ long
Transitional Zone	7:1 slope x 5,000’ distance	Same
MN Administrative Rule 8800.2400		
Safety Zone A*	2,667’ long	2,667’ long
Safety Zone B*	1,333’ long	1,333’ long
Safety Zone C	5,000’ radius from each end	10,000’ radius from each end

Source: MN Statute 8800.1200, 2400, Springfield/Brown County Airport Zoning Ordinance
*Note: *Safety Zones are based on 600’ extension to the current Runway 13 end for a total planned runway length of 4,002’.*

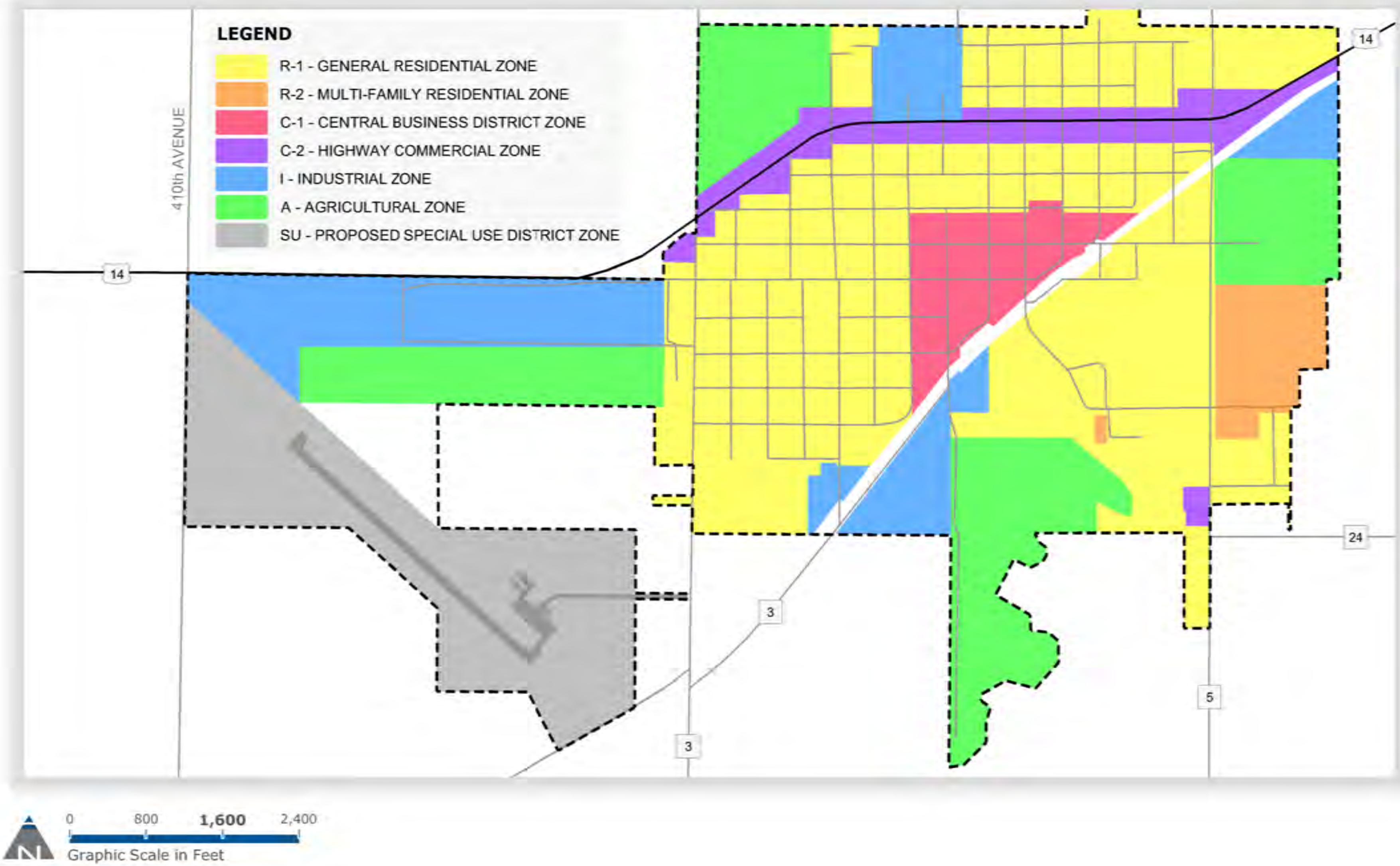


Figure 1-4: **Zoning Map**

Source: *ArcGIS, MnDOT and Minnesota Geospatial Information Office (MnGeo), City of Sprinfield*

Although there are several areas where local zoning is more restrictive than what is required by MN Administrative Rules, this is considered prudent planning based on the ultimate runway plans depicted on the 2004 Airport Layout Plan (ALP). The increased horizontal and approach surface restrictions ensure appropriate zoning is already in place should more restrictive approach visibility minimums be attainable in the future. The evaluation of these zoning surfaces, including potential conflicts and modifications, will be discussed in Chapter 3, *Facility Requirements*.

1.5 Airside Facilities

This section discusses existing airside facilities on the Airport. For orientation, **Figure 1-5** provides a visual reference for major design surfaces and other airside facilities.

1.5.1 Aircraft Categories

As many of the restrictions for airport facilities are based on the characteristics of a specific aircraft, it is necessary to establish how aircraft are categorized. These categories will be used throughout this Master Plan when discussing existing restrictions and determining the future critical aircraft. In order to identify the appropriate design parameters for a runway and associated facilities, aircraft are categorized by dimensions and performance which form part of the Runway Design Code (RDC). In turn, the RDC determines the design standards to which the runway is to be built.

The RDC is broken into three separate parts. The first component is the Aircraft Design Group (ADG) represented by a roman numeral dependent on the aircraft tail height and wingspan. Specific ADG dimensions are shown in **Table 1-3**.The second component is the Aircraft Approach Category (AAC) and is designated by a letter that corresponds to the approach speed of an aircraft. AAC categories are shown by the relevant approach speeds in **Table 1-4**. In the instance there is a conflict between the tail height and the wingspan, the more restrictive or higher group identifier is used. Finally, visibility minimums are expressed as the runway visual range (RVR) in feet approximately equal to quarter mile increments, although this last component of the RDC is not descriptive of aircraft characteristics. Runway 13/31 is classified as B-II on the most recent ALP. The future RDC will be determined as part of the master plan.

Table 1-3: Airplane Design Groups (ADG)

ADG	Tail Height	Wingspan
I	< 20 feet	< 49 feet
II	20 – 29 feet	49 – 78 feet
III	30 – 44 feet	79 – 117 feet
IV	45 – 59 feet	118 – 170 feet
V	60 – 65 feet	171 – 213 feet
VI	66 – 79 feet	214 – 261 feet

Source: FAA Advisory Circular 150/5300-13A, Airport Design

Table 1-4: Aircraft Approach Category (AAC)

AAC	Vref / 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 Advisory Circular 150/5300-13A, Airport Design

In addition to these categories, aircraft can further be separated by weight. The moniker "small" can be added to the A-II, B-II and lesser categories to designate aircraft that have a maximum takeoff weight (MTOW) of 12,500 lbs or less. Runways intended to serve "small" aircraft have specific design standards associated with them and are known as a utility runway.

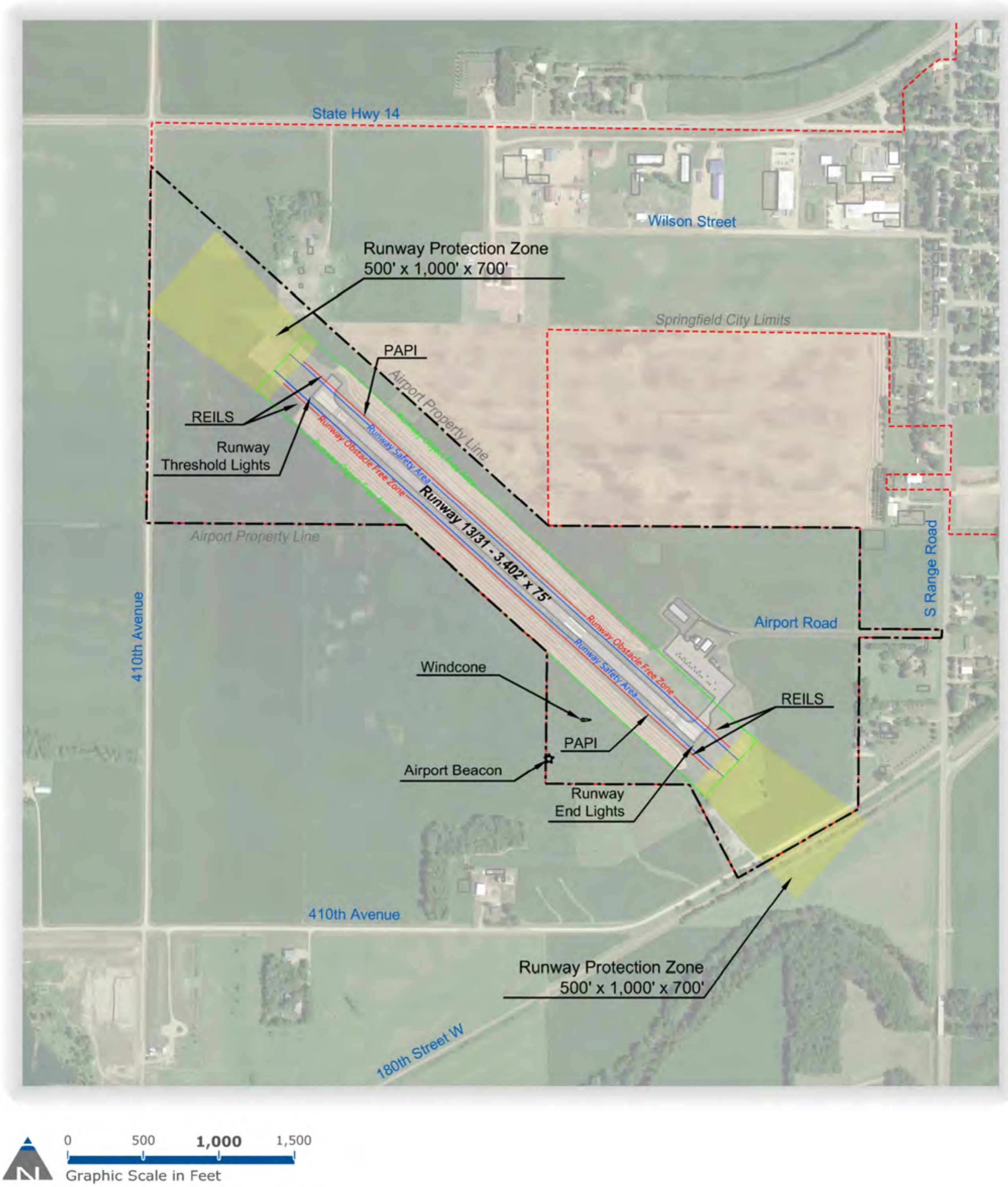


Figure 1-5: **Airport Facilities and Surfaces**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

1.5.2 Runways and Taxiways

D42 has a single runway with a single connector taxiway to the aircraft parking apron on its south end and an aircraft turnaround on its north end. Runway 13/31 is paved, 3,402 feet long, and 75 feet wide. AC 150/5300-13A, *Airport Design*, states that direct access from an apron to a runway is discouraged, as pilots may inadvertently taxi onto the runway while expecting a taxiway. This is particularly a concern for pilots not familiar with the airport or during poor visibility conditions. As there is not a parallel taxiway for Runway 13/31, aircraft landing to the north or taking off to the south must back-taxi on the runway.

1.5.3 Visual Navigational Aids

This section summarizes visual navigational aids (NAVAIDs) and roles that they serve at D42.

Rotating Beacon

The rotating beacon helps pilots locate and identify the Airport during nighttime hours, when visibility is less than 3 miles, and/or when ceilings are less than 1,000 feet. The beacon alternates green and white in 360 degrees, as is standard for civilian airports, and is located approximately 970 feet west of the Runway 31 threshold.

Precision Approach Path Indicator (PAPI)

PAPIs provide a visual indication to pilots of their position relative to the approach glide path. This allows pilots to make appropriate height corrections when approaching a runway to land. The PAPIs at D42 are two-light systems located near the approach ends of Runway 13 and 31. A PAPI is intended to be visible for three to five miles during the day and 20 miles at night while within ten degrees of the extended centerline. It is worth noting that the approach glide paths indicated by the PAPIs are not consistent with the instrument approaches at D42. The glideslope indicated by the PAPIs exhibits a 3.00° angle resulting in a threshold crossing height of 20 feet, while all instrument approaches to both runway ends have threshold crossing heights of 40 feet.

Runway Pavement Markings

Runway pavement markings provide visual indications to pilots for distances on the runway and aids pilot orientation. As Runway 13/31 does not have any precision instrument approaches, the markings are non-precision markings and consist of threshold, aiming point and centerline markings, as well as numeric runway designation markings. Although both non-precision and precision approaches can offer vertical guidance, a runway requires precision markings when visibility limitations are lower than 3/4 of a mile.

Airfield Signage

Airfield signage identifies the locations of runways, taxiways, and aprons, and provides noise abatement instructions and other airfield information to pilots. Airfield signage at the Airport includes directional signs, runway holding signs, and a runway holding position marking.

Runway End Identifier Lights (REIL)

Runway End Identifier Lights consist of a synchronized pair of flashing lights. REILs are particularly helpful when artificial light in the vicinity may confuse the pilot, and during poor visibility conditions. Both Runways 13 and 31 have REILs.

1.5.4 Instrument Approaches

This section will provide a summary of the instrument approach procedures available at D42.

Global Positioning System (GPS)

GPS is system that provides location information using a satellite system. Properly equipped aircraft can determine their location, altitude, direction of travel and speed. Using this system, aircraft can conduct various types of Area Navigation (RNAV) GPS approaches at D42, including Lateral Navigation (LNAV) and Localizer Performance without Vertical Guidance (LP) approaches. LP allows for more sensitive lateral guidance as an aircraft gets closer to the runway, although it requires Wide Area Augmentation System (WAAS) to be equipped on aircraft, which increases GPS accuracy. Neither of these approaches offer vertical navigation, but they do use Minimum Descent Altitudes (MDA) where aircraft may descend to a specified altitude and then establish visual contact with the Airport environment. Additional information about the approaches can be found in **Table 1-5**.

Table 1-5: Instrument Approach Procedures

Approach Type	Minimum Altitude (Feet, AGL)	Visibility Minimum (Statute Miles)	TCH (Feet)	Descent Angle
Runway 13				
LP	427	1	40	3.00°
LNAV	447	1	40	3.00°
Circling	587	1	40	3.00°
Runway 31				
LNAV	427	1	40	3.00°
Circling	587	1	40	3.00°
VOR 13				
S-13	547	1	40	3.01°
Circling	587	1	40	3.01°

Source: FAA Terminal Procedures December 08, 2016 – January 04, 2017
Notes: Alternative minimums may apply under instrument meteorological conditions (IMC).
Minimums listed are for Category A and B aircraft. Minimums and procedures may differ for larger aircraft.
Descent Angle and TCH may differ from visual glideslope indicator.
LP: Localizer Performance without Vertical Guidance
LNAV: Lateral Navigation
RNAV: Area Navigation
TCH: Threshold Crossing Height
AGL: Above Ground Level

Very High Frequency Omni-directional Radio Range (VOR)

VOR is a primary source of navigation used by civil aviation within the NAS. The closest VOR to D42 is the Redwood Falls VOR which is used for navigation and instrument approaches at D42. As part of the FAA's transition to performance based navigation under the NextGen program (proposed under 76 FR 77939), selected VORs are being decommissioned nationwide. Although the Redwood Falls VOR is not scheduled for decommissioning, several surrounding VORs will either be decommissioned or are in the process of being evaluated. The nearest of these VORs is approximately 50 miles away and, collectively, are not expected to have a direct adverse effect on operations at D42. These VORs include:

- Mankato Regional (MKT)
- Fairmont Municipal (FRM)
- Worthington Municipal (OTG)

1.5.5 Runway Lighting

Runway lighting at the Airport provides increased safety and situational awareness for pilots during low light or poor visibility conditions. D42 offers medium intensity runway lights alongside the runway edges at approximately 190 foot intervals. Although normally white, these lights are yellow when either less than 2,000 feet or less than half of the runway remains. Two sets of four threshold indicator lights mark each end of the runway with split red and green lights.

1.6 Landside Facilities

This section provides a summary of the landside facilities at D42. These structures provide support for maintenance, fueling, passenger and pilot transit, and other support activities. Landside facilities are shown in **Figure 1-6** for orientation.

1.6.1 Arrival/Departure Building

The arrival/departure (A/D) building is approximately 1,400 square feet in size and located on the northeast side of the aircraft parking apron next to the vehicle parking lot. The A/D building offers restrooms, a flight planning computer, telephone, and a rest area for pilots, in addition to an office and storage for City and Airport personnel.

1.6.2 Maintenance Facilities

A new maintenance facility was constructed at D42 in 2012. Located on the apron, this three door building houses snow removal equipment and provides an area for maintenance and washing of equipment.

1.6.3 Hangars

Hangars at D42 consist of a single box hangar approximately 4,000 square feet in size and a T-hangar with six units totaling approximately 7,400 feet (including storage end units). Box hangars are generally intended for larger aircraft, or to support operations and maintenance of several aircraft, while T-hangars offer a more economic and spatially efficient option for small piston powered aircraft.

1.6.4 Ground Access and Auto Parking

Airport Road is connected to County Road 4 to the east of the Airport. County Road 4 provides access to US Highway 14 and County Highway 3. These highways flank the City of Springfield to the north and south, respectively. Automobile parking is provided in a lot near the A/D building with room for approximately 15 vehicles.

1.6.5 Fuel Facilities

A 1500 gallon tank of 100LL AvGas with a self-service fueling system was installed in 2013. This tank allows users to pay and pump their own fuel instead of coordinating with City personnel to receive fuel. This facility improvement has resulted in fuel sales increasing dramatically compared to the old system. Refilling the tank is completed a few times a year, as needed. The fueling system is located adjacent to the apron near the vehicle parking lot.

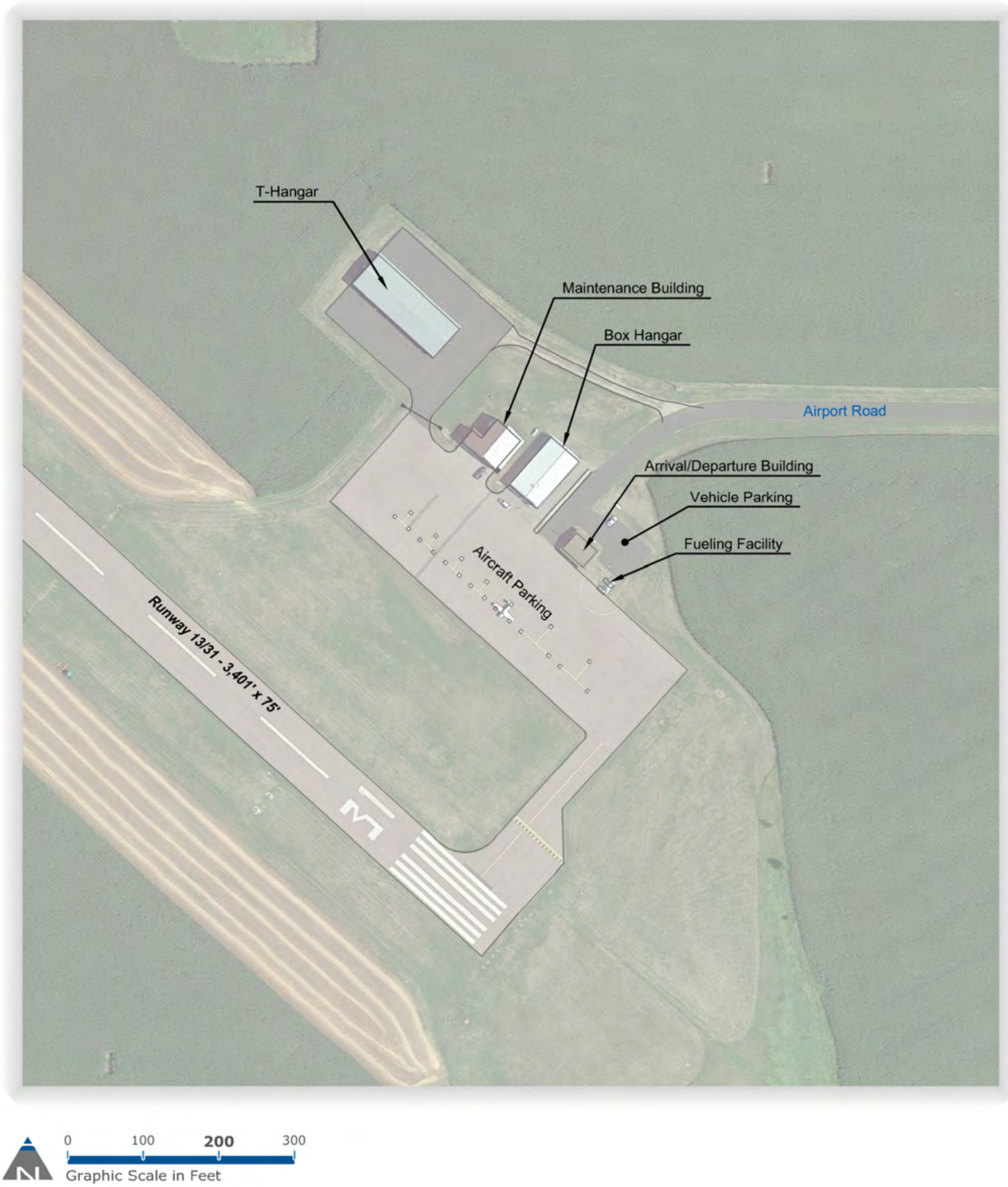


Figure 1-6: **Landside Facilities**

1.6.6 Design Surfaces

Several design standards are relevant when considering surrounding land use and expansion of facilities on the Airport. Some of the most critical design standards are shown below in **Table 1-6**.

Table 1-6: Existing Runway Design Surfaces

Surface	Dimensions	Description
Runway Safety Area	150' wide x 300' beyond runway end	A/B-II(small)-5000
Runway Object Free Area	500' wide x 300' beyond runway end	A/B-II(small)-5000
Obstacle Free Zone	250' wide x 200' beyond runway end	Small aircraft with approach speeds of 50 knots or more
FAR Part 77 Approach Surface	500' inner width x 2,000' outer edge x 5,000' long, 20:1 slope	Utility runway with a non-precision approach (A(NP))
Threshold Siting Surface	800' (inner width) x 10,000' (length) x 3,800' (outer width), 20:1 slope	Instrument night operations serving greater than approach Category B aircraft

Sources: Airport Layout Plan, Advisory Circular 150/5300-13A, FAR Part 77

1.6.7 FAA Runway Protection Zones

A Runway Protection Zone (RPZ) is a trapezoidal area centered about the extended runway centerline starting 200 feet from each runway end. The RPZ serves to protect people and property on the ground, and to this end, Airport ownership of this area is encouraged by the FAA. RPZ dimensions for D42 are shown below in **Table 1-7**. Land uses that require coordination with the FAA when there is an airfield project or change in the RPZ include the following:

- Buildings and structures
- Recreational land use
- Transportation facilities
- Fuel storage facilities
- Hazardous material storage
- Wastewater treatment facilities
- Above ground utility infrastructure

Table 1-7: RPZ Dimensions

Runway	Length	Inner Width	Outer Width
Required			
Runway 13	1,000 feet	250 feet	450 feet
Runway 31	1,000 feet	250 feet	450 feet
Existing			
Runway 13	1,700 feet	1,000 feet	1,510 feet
Runway 31	1,700 feet	1,000 feet	1,510 feet

Source: AC 150/5300-13A, Airport Design, 2004 ALP

To the north, the Runway 13 RPZ overlaps 410 Street. To the south, the Runway 31 RPZ overlaps 180 Street West and a railroad. RPZ dimensions for each runway end are determined based on the aircraft intended to use the runways and the visibility of the associated instrument approach. Although the dimensions for the RPZs required for B-II (small) aircraft are smaller than what is currently depicted on the ALP, the current RPZs protect this area for a the potential of an instrument approach with 3/4 mile visibility minimums.

1.7 Airspace

As surrounding structures or land uses may affect airspace it is important to consider how D42 operations may be impacted. **Figure 1-7** shows the surrounding airspace while the rest of the section discusses each relevant type.

1.7.1 Controlled Airspace

Controlled airspace is a term applied to all airspace in which FAA Air Traffic Control (ATC) service is provided in accordance with the airspace classification. This does not mean that controlled airspace must have a control tower in the immediate vicinity but rather that some type of ATC authority is extended to the airspace.

Class A Airspace

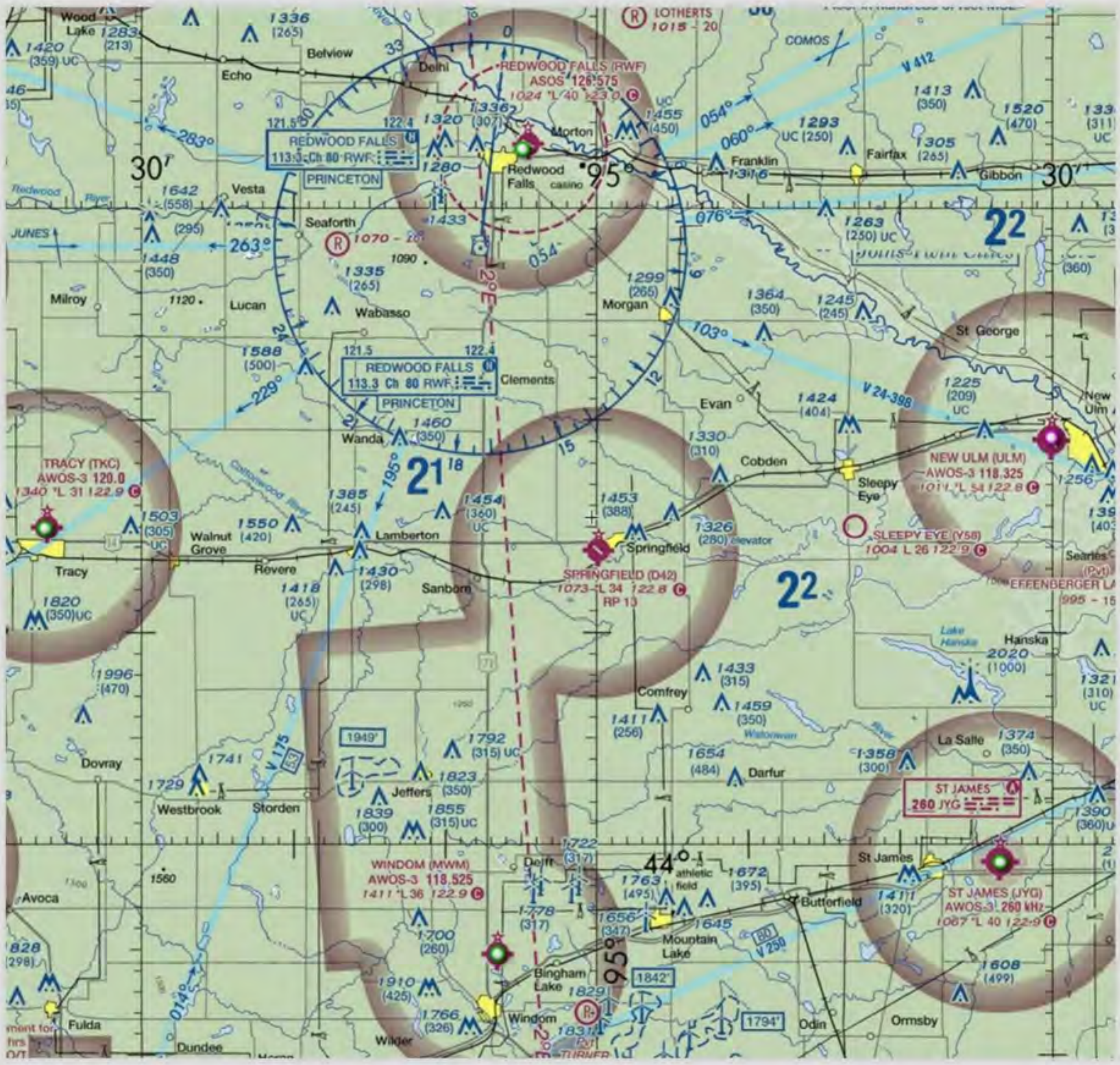
Class A airspace generally begins at 18,000 feet above mean sea level (MSL) up to 60,000 feet MSL throughout the United States and 12 nautical miles off of each coast. This airspace requires an instrument flight rules (IFR) flight plan to enter and ATC approval must be received before entering. Class A airspace does not have a direct effect on D42.

Class B Airspace

Class B airspace often surrounds the nation's busiest airports and extends from the surface to 10,000 feet MSL in multiple tiers of various dimensions. This design is intended to incorporate all instrument approaches into the airport once an aircraft enters the airspace. Class B is one of the most restrictive airspaces requiring additional equipment on the aircraft and express permission from ATC to enter. MSP is the closest Class B airport to D42 at nearly 100 miles away, although its Class B airspace begins approximately 60 miles to the northeast of D42 at 7,000 feet MSL.

Class C Airspace

Class C airspace is utilized for airports that have a control tower and radar approach control but do not require the greater restrictions of Class B. This airspace generally extends from the surface to 4,000 feet above the airport elevation. The dimensions of Class C airspace are tailored for the specific airport but usually consist of an inner five nautical mile radius surrounding the airport with an outer circle that begins at 1,200 feet above the airport and has a total diameter of 20 nautical miles. There are no Class C airports within the state of Minnesota.



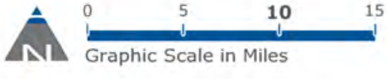


Figure 1-7: **Airspace**

Source: *Sky Vector Aeronautical Charts (https://skyvector.com/)*

Class D Airspace

Class D airspace generally extends to 2,500 feet above the airport elevation and is used for airports that have a control tower but not necessarily radar capacity. Similar to other airspace classes, when an approach is published for an airport surrounded by Class D the airspace is usually tailored to accommodate the approach. Several surrounding airports have Class D airspace, including Redwood Falls Municipal and New Ulm Municipal.

Class E Airspace

Be default, if airspace is controlled but not Class A, B, C, or D, then it is classified as Class E airspace. Class E is unique in that it is a multifaceted airspace that is used in a variety of situations to protect approaches to airports. Class E airspace begins at 1,200 feet above D42 and extends outward to a seven nautical mile radius around the Airport.

1.7.2 Uncontrolled Airspace

Uncontrolled airspace is any airspace that is not Class A, B, C, D, or E, and is known as Class G airspace. Class G airspace is the only uncontrolled airspace in the NAS. ATC does not possess responsibility or authority to control air traffic but there are VFR minimums which apply to pilots operating in this area. Class G is common in relatively unpopulated areas where air traffic is sparse.

1.7.3 Special Use Airspace

Special use airspace designates areas in which certain activities are confined and additional limitations may be imposed on aircraft entering the airspace. While these areas vary according to their use, some areas present hazards and pilots are advised to maintain situational awareness. While there are several types of special use airspace (prohibited, restricted, warning, military operation areas, alert area, and controlled firing areas) none of these are known to exist within a 30 mile radius of D42 and are therefore not relevant to this Master Plan.

1.7.4 Other Airspace

Other airspace is simply a generic term to describe the majority of remaining airspace not covered by the above three sections such as military training routes (MTR) or parachute jump aircraft operations; however, no airspace under this classification exists within 30 miles of D42. Temporary Flight Restrictions are an exception as they may be temporarily enacted to keep traffic out of the area in the event of emergency. However, due to their transient and infrequent nature, a detailed discussion is not necessary here.

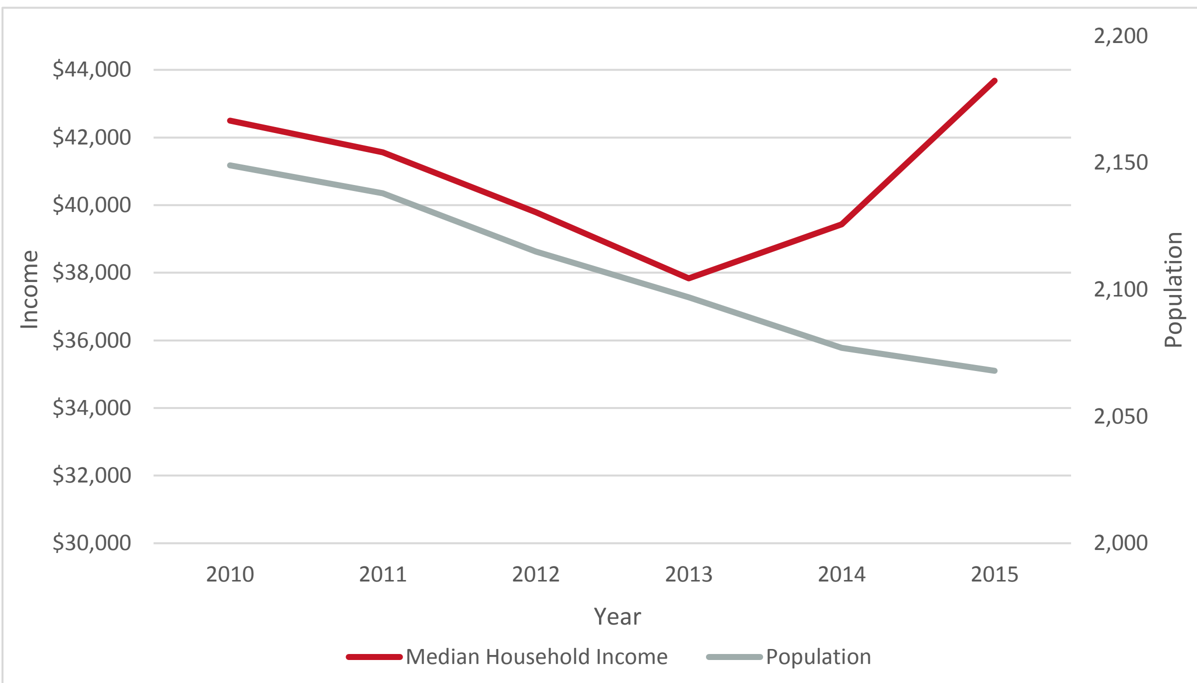
1.8 Local Socioeconomics

The City of Springfield is location in the western half of Brown County, Minnesota. Given the City's location near the border of the County and relatively small size it is not appropriate to consider the County as a whole. Therefore, median household income and population for the city of Springfield since 2010 are shown in **Table 1-8** and **Chart 1-1**. Although population has declined slowly for a compound annual growth rate of -0.77% since 2010 and the median household income has recovered since 2013.

Table 1-8: Springfield Historical Socioeconomics		
Year	**Median Household Income**	**Population**
2015	$43,679	2,068
2014	$39,426	2,077
2013	$37,833	2,097
2012	$39,792	2,115
2011	$41,563	2,138
2010	$42,500	2,149
CAGR	0.55%	-0.77%

Source: American Fact Finder

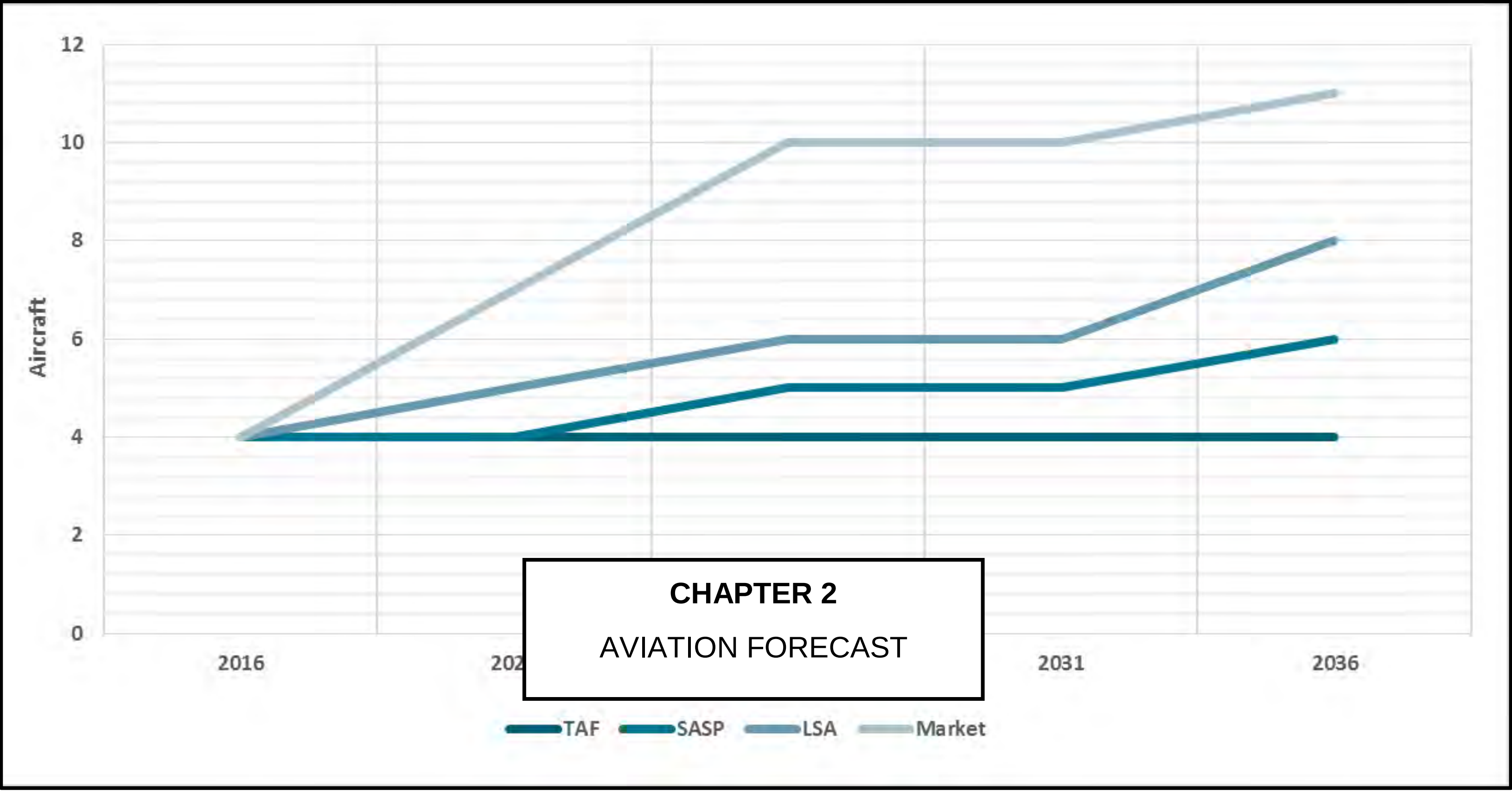
Chart 1-1: Springfield Historical Socioeconomics



Source: American FactFinder

1.9 Inventory Summary

The goal of this chapter is to develop an understanding of existing facilities at the Airport and the local context within which it operates. Information presented in this chapter will be used in subsequent chapters to determine potential changes needed to meet future demand over the next 20 years. This Master Plan will serve as a guide for airside and landside developments to better provide for GA aircraft operators and serve the local community.



CHAPTER 2

AVIATION FORECAST

2.1 Introduction

Aviation forecasts are an important part of the Master Planning process, as the need for Airport facilities is largely based on future activity. Based aircraft, aircraft operations, and peak aircraft activity all have a role in determining the type and number of required facilities. This chapter presents forecasts of aviation activity for the 20-year planning period, with a base year of 2016, in the following sections:

- Airport Activity
- Based Aircraft Forecast
- Aircraft Fleet Mix Forecast
- Operations Forecast
- Local and Itinerant Operations Forecast
- Peak Operations Forecast
- Forecast Summary

2.2 Airport Activity

Determining the level and type of activity at a non-towered airport can be difficult due to the lack of records. In order to address this challenge, this section takes three different approaches to estimating current activity at the Springfield Municipal Airport (D42). First, a survey was sent out to recent Airport users found in the visitor’s logbook. Second, an industry standard formula developed by the FAA to assess traffic at non-towered airports using surrounding socioeconomic conditions was applied to D42. Finally, a general discussion of aviation industry trends, and their relevance to D42, provides insight when evaluating forecasts.

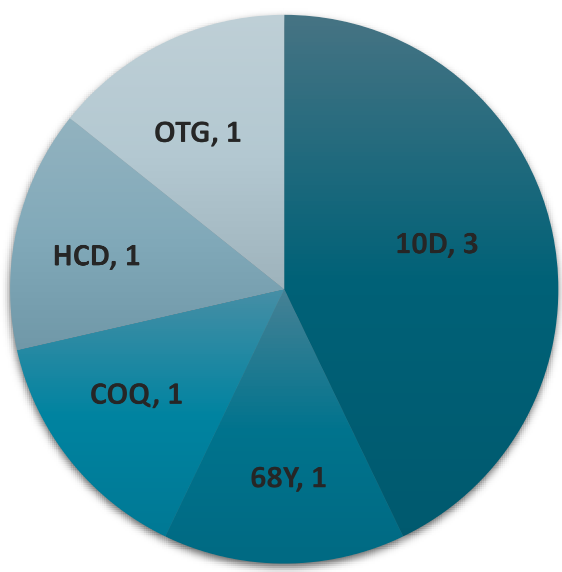
2.2.1 Background

As discussed in greater detail Chapter 1, D42 does not qualify for the basic category of the National Plan of Integrated Airport Systems (NPIAS) and is categorized as unclassified. One of the criteria that would requalify D42 as basic in the NPIAS is to have 10 or more based aircraft. Therefore, the forecasts in this chapter are aggressive in order to allow the Airport to plan for the growth necessary to reclassify in the NPIAS. The trends and activity discussed in this section will be used to consider potential areas of growth for the Airport to meet this goal.

2.2.2 Airport User Survey

In order to establish an estimate of the user base for D42, a user survey inquiring into the type of aircraft and operations at the Airport was conducted. Contact information was derived from the visitor's logbook kept in the arrival/departure building. Given that several of the visitors would visit D42 with a rental aircraft, contacting many of these pilots was not possible. In order to ensure that information was reliable, surveys were only sent to users that had visited the Airport within the past two years. A copy of the distance and local survey can be found in **Appendix A**. Of the sixteen surveys sent out, seven responses were received, a response rate of 44%. Two respondents also replied online. In addition, an interview was conducted with a local aviation agriculture business that uses D42 on a seasonal basis. Respondents were from several surrounding airports, all of which are in southwest Minnesota with the exception of COQ (near Duluth, MN), as shown below in **Chart 2-1**.

Chart 2-1: User Survey Respondent Aircraft Location



Source: Mead & Hunt, Inc.

Pilots were asked to estimate their activity at D42. The majority of respondents from other airports estimated only a few operations a year at D42, although some users indicate more regular operations and the seasonal agricultural operations bolster annual operations. In total, the survey revealed an estimated 460 annual operations by these seven respondents. As these operations are derived from a 44% survey response rate based on the visitor logbook, which does not include all visitors, this is assumed to only represent a portion of total annual operations at D42.

Examining the pilot logbook revealed that approximately one third of entries were rental aircraft from FBOs in the region. Several of these rental FBOs are in the south Twin Cities metro area. Given the distance from the south metro area, it is possible that D42 is often used as a training or recreational destination. The Airport's runway length, surface, condition of the NAVAIDS, lack of conflicting traffic, and pilot facilities make D42 an appealing destination, especially to training pilots. A more in depth analysis of the Airport, including strengths, weaknesses, and facilities needed to meet expected demand, will be provided in the following chapter, *Facility Requirements*.

2.2.3 Current Airport Operations Statistical Estimate

When determining future aviation activity at an airport, local and national socioeconomic trends should be analyzed to determine how they affect aviation activity. Generally, there are various ways of collecting activity information at an airport including control tower data, airport records, air carrier information and more. However, establishing precise levels of operations at untowered GA airports can be challenging given the lack of information. In order to address this challenge, in 2001 a report was prepared for the Statistics and Forecast Branch of the FAA entitled *Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-towered Airport Data*, that examined airport operations in relation to their socioeconomic surroundings.

This report sought to produce models for estimating operations at non-towered airports by evaluating previous models and developing new ones, using additional variables. One of the equations developed for this report, Equation 13, derived the best-fitting equation for a joint set of 232 towered and non-towered GA airports. As information at towered airports is often more available and reliable, this equation utilizes information about small towered GA airports to model small non-towered GA airports. The full equation can be seen below and each variable is explained in greater detail in **Table 2-1**.

$$Operations = -571 + (355 * BA) - (0.46 * BA2) - (40{,}510 * \%in100mi) + (3{,}795\ VITFSnum) + (0.001 * Pop100) - (8{,}587\ WACAORAK) + \left(24{,}102 * \frac{Pop25}{Pop100}\right) + (13{,}674 * TOWDUM)$$

Using Equation 13 results in 2,350 annual operations at D42. This is a 3% difference in Airport operations total from the FAA Terminal Area Forecast (TAF), an annual forecast of airport activity, see Section 2.5.1 for further information. Although this is a useful way to help confirm existing activity at an airport, it is difficult to use this formula to estimate future activity given the uncertainly inherent to of the many variables.

Table 2-1: Equation Thirteen Variables			
Variable	**Explanation**	**Coefficient**	**Value for D42**
BA	Based Aircraft	355	4
BA2	Based Aircraft Squared	-0.46	16
%in100mi	Percentage of based aircraft among based aircraft at GA airports within 100 miles	-40,510	0.022
VITFSnum	Number of FAR141 certificated pilot schools on airport	3,795	0
Pop100	Population within 100 miles	0.001	1,755,323
WACAORAK	1 if state is CA, OR, WA, or AK, 0 otherwise	-8,587	0
Pop25/Pop100	Ratio of Pop25 to Pop100	24,102	0.026
TOWDUM	1 if towered airport, 0 otherwise	13,674	0
Total D42 Operations			**2,350**

Source: GRA 2011

2.2.4 Aviation Industry Trends

General aviation (GA) represents all civil aviation activity not defined as commercial. GA includes a variety of users and activities, including corporate and business operators, recreational users, flight training, agricultural applications, law enforcement and other government uses. GAMA (General Aviation Manufacturers Association) states that nationwide, GA is a $219 billion dollar industry and is responsible for 1.1 million jobs. Minnesota ranks as number nine among the 50 states as measured by total GA economic impact per capita. As the operations at D42 are primarily GA, this section will provide a summary of recent trends in the industry relevant to the Airport.

Recent trends, as indicated by the 2015 General Aviation Manufacturers Association (GAMA) Databook, show that there has been an overall decrease in the national GA fleet from a high of 231,607 aircraft in 2007 to 198,780 aircraft in 2015. Although the fleet as a whole has decreased, this is mainly due to the decrease in popularity of traditional piston driven GA aircraft. The overall trend has been a decline in piston aircraft and a rise in turbine aircraft. As turbine aircraft are considerably more expensive to acquire and maintain, the national GA fleet is anticipated to grow modestly in the future.

Meanwhile, hours flown by the national GA fleet are anticipated to increase from 23.2 million hours in 2015 to 29.2 million hours in 2035. The majority of this increase is expected to consist of turbine aircraft hours. In 2015 turbine aircraft flew an average of 295 hours each, and this is anticipated to increase to 330 hours by 2035. Although piston aircraft are becoming less common, they are expected to spend more time in the air on average, with a slight rise from 86 hours per aircraft in 2015 to 89 hours per aircraft in 2035. It is expected that by 2035, turbine aircraft will be responsible for 36.7% of all GA flight time, compared to 28.0% now. In summary, the GA fleet is beginning to see more business oriented aircraft as the cost to own and operate an aircraft increases, and as recreational flying becomes less common. A survey of the FAA Traffic Flight Management System Counts (TFMSC) database, which logs instrument flight plans, shows 44 instrument operations at D42 in 2016. These mainly consist of single engine piston aircraft operations but shows some turbine aircraft operations, such as the Cessna Citation II and King Air 90.

Although the runway at D42 is sufficient to support several light jets, such as the Embraer Phenom 100, Cessna Mustang and Cirrus Vision, other trends are also relevant to D42. Light Sport Aircraft (LSA) are a relatively new category of aircraft added by the FAA in 2005. In 2012 LSAs were reclassified as experimental aircraft. The difference between LSAs and traditional GA single engine aircraft is mainly one of performance and size. LSAs are limited to a maximum takeoff weight of 1,320 pounds (compared to 2,550 pounds for the Cessna C-172 Skyhawk, a common GA aircraft), maximum stall speed of 45 knots (51 mph), and a maximum of two seats, in addition to other stipulations. Common examples of LSA aircraft include the Cessna Skycatcher, Legend Cub, Van's RV-12, and the Harmony LSA. Wingspans usually fall between 30 feet to 40 feet, with exceptions, and hangar needs are similar to GA single engine piston aircraft. These lowered parameters typically translate to a lower initial purchase price, maintenance costs, and operational expenses. For pilots with a recreational agenda and/or shorter distances to fly, the tradeoff of power and amenities for efficiency and lower costs is a welcome one. In 2015, 60.8% of LSA flight time was for personal use.

The FAA expects LSAs to increase from 2,590 in 2016 to 6,100 aircraft in 2036, a CAGR of 4.38%. Conversely the total amount of active GA and air taxi aircraft are expected to grow at less than 1%. A similar trend can be seen in the active pilot projections within the 2016 FAA Aerospace Forecasts. The total number of pilots, minus air traffic pilots, is expected to decline from 433,985 in 2016 to 428,975 in 2035, a CAGR of -0.06%. However, sport pilot ratings, a common rating for pilots to fly an LSA, is expected to grow 4.63% in this period. Even though the growth of sport pilots and LSAs are expected to be above 4% it should be noted that this is a small group of pilots and aircraft. Therefore, despite strong expected growth, this category of GA is not expected to have a dramatic impact on the nation's airports in the short term.

2.3 Based Aircraft Forecasts

The FAA defines based aircraft as aircraft stored at the Airport the majority of the year. Aircraft based at the Airport have a direct impact on infrastructure needs such as hangars, tie-downs, and fixed based operator (FBO) services. The size of the aircraft also determines the dimensions of the taxiways and taxilanes that support traffic to and from the hangars. According to a survey of basedaircraft.com there are currently four fixed wing aircraft at D42. Although this is a small number, GA activity and based aircraft in the area are relatively limited and GA activity has decreased nationally. However, as discussed in the previous section, LSAs and turbine aircraft are expected to grow in the future.

Each subsection below presents a different methodology to examine potential based aircraft numbers over the course of the planning period. An explanation of methodologies used is provided with a preferred forecast selected at the end of this section.

2.3.1 FAA Terminal Area Forecast (TAF)

The FAA provides based aircraft projections for airports in the NPIAS through its Terminal Area Forecast (TAF). For D42, the TAF projects four single engine based aircraft for the duration of the 20 year planning period.

2.3.2 FAA Aerospace Forecast

The FAA provides an additional forecast for the industry as a whole through its Aerospace Forecast. GA aircraft as a whole are expected to grow slowly throughout the planning period. If the forecasted growth rate of national GA aircraft from 2016 to 2036 is applied to D42, growth is negligible, as seen in **Table 2-2**. This is due to the small amount of existing based aircraft at D42 and the low anticipated CAGR.

Table 2-2: FAA Aerospace Forecast	
Year	**Based Aircraft**
2016	4.00
2021	4.04
2026	4.07
2031	4.11
2036	4.14
CAGR	0.18%

Source: 2016 FAA Aerospace Forecast

2.3.3 MN SASP Forecast

The Minnesota State Aviation System Plan (SASP) provides a description of the current airport system within the state and guidance for future development. Part of planning for future development is developing forecasts for the various types of aircraft within the state. Although the SASP only provides forecast information through the year 2030, this master plan uses the CAGR in the SASP to extrapolate projections to 2036. As LSA are the most likely aircraft to grow organically at D42, but single engine piston aircraft are the most common currently, this forecast combines the two growth rates and applies it to D42. The result can be seen below in **Table 2-3**.

Table 2-3: MN SASP Forecast	
Year	**Based Aircraft**
2016	4
2021	4
2026	5
2031	5
2036	6
CAGR	2.02%

Source: MN SASP, CAGR from the LSA

2.3.4 Light Sports Aircraft Driven Forecast

LSAs are a small but growing part of the aviation community and Minnesota is one of the more active states for GA activity. In 2015, Minnesota ranked 15th in pilots per capita in the contiguous United States. The SASP anticipates an increase from 120 LSAs in 2015 to 190 in 2030. If this growth continues until 2036, this will result in 238 aircraft. Due to the pilot population in MN and the anticipated growth in LSAs within the state, this forecast projects based aircraft growth solely on LSAs, shown in **Table 2-4**.

Table 2-4: LSA Based Forecast	
Year	**Based Aircraft**
2016	4
2021	5
2026	6
2031	6
2036	8
CAGR	3.28%

Source: MN SASP, CAGR from the LSA

2.3.5 Market Share Forecast

While the other forecasts in this section project organic growth only, additional growth is also possible by increasing the market share of existing based aircraft in the area. At the nine airports (including D42) within 30 miles there are a total of 120 based aircraft, 3.3% of which reside at D42. The market is also expected to continue to grow throughout the planning period. Growth for local based aircraft, based on the MN SASP, is compared with the D42 market share in **Table 2-5**. This forecast considers capturing additional aircraft in the area through 2026 before reverting to organic growth as determined by the MN SASP. This would be dependent on additional efforts such as marketing, hosting local events, and other strategies to be identified by this Master Plan.

Table 2-5: Market Share Forecast			
Year	**Regional Based Aircraft**	**D42 Market Share**	**D42 Aircraft**
2016	120	3.3%	4
2021	124	5.6%	7
2026	129	7.8%	10
2031	133	7.8%	10
2036	138	7.8%	11
CAGR	0.69%	N/A	5.19%

Source: basedaircraft.com, 2016 TAF, MN SASP

2.3.6 Preferred Forecast

This section selects a preferred based aircraft forecast from the ones presented above. A comparison of the forecasts can be seen in **Table 2-6** and **Chart 2-2**. A preferred forecast is used for planning purposes to ensure the future needs of the Airport are met. Even though GA aircraft growth is expected to be modest over the planning period, LSAs and turbine aircraft are becoming more popular and existing piston driven aircraft may relocate to D42. Because the TAF and the FAA Aerospace forecasts do not expect growth, they were removed from further consideration.

LSAs are expected to become a more prominent part of the GA community in MN, however, they still represent a small portion of the overall GA fleet and are not numerous enough to have a significant impact at D42. LSAs in the Minnesota are expected to reach 190 by 2030. Given the numerous airports in the state LSA growth is not expected to be concentrated enough to drive D42 based aircraft alone. For this reason the LSA Driven forecast was removed from further consideration.

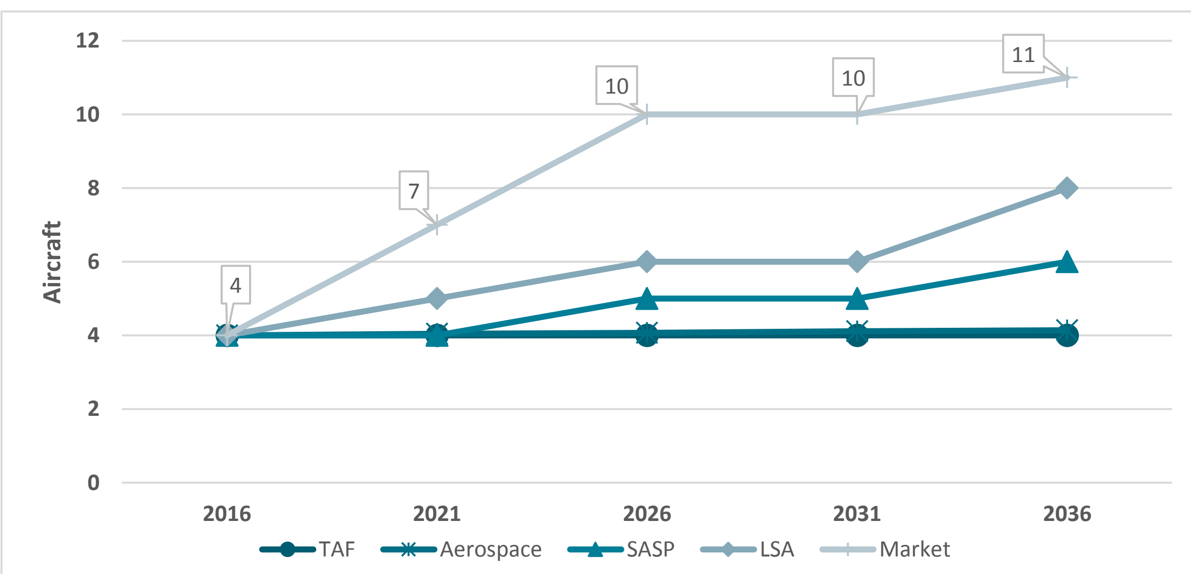
The final two forecasts, the Adjusted SASP and the Market Share forecasts, are considered the most reasonable based aircraft forecasts. The Adjusted SASP focuses on the growth of single engine piston aircraft and LSAs expected within the state, while the Market Share forecast focuses on capturing a greater share of the regional based aircraft market initially, before reverting to organic growth. While the Adjusted SASP is reasonable, it only considers organic growth. D42 offers hangars in good condition at a competitive lease rate, a paved runway, and numerous other desirable facilities. For this reason the Market Share forecast is selected as the preferred forecast for planning purposes.

Table 2-6: Based Aircraft Forecasts Comparison

Year	TAF	Aerospace	SASP	LSA	Market
2016	4	4	4	4	**4**
2021	4	4.04	4	5	**7**
2026	4	4.07	5	6	**10**
2031	4	4.11	5	6	**10**
2036	4	4.14	6	8	**11**
CAGR	0.00%	0.18%	2.02%	3.28%	**5.19%**

Source: Mead & Hunt, Inc.

Chart 2-2: Preferred Forecasts Comparison



Source: Mead & Hunt, Inc.

2.4 Aircraft Fleet Mix Forecast

Based upon the industry trends discussed in **Section 2.2.3**, based aircraft growth is most likely to occur at D42 by increasing its market share of the existing based aircraft in the region while harnessing the natural increase in LSAs and small turbine aircraft. These trends are reflected in the fleet mix forecast shown below in **Table 2-7.**

Table 2-7: Based Aircraft Fleet Mix

Year	Single	Jet	Total
2016	4	0	4
2021	7	0	7
2026	9	1	10
2031	9	1	10
2036	10	1	11

2.5 Aircraft Operations Forecasts

Operations drive several aspects of the airport, such as the number of tie downs and apron sizes needed. An operation is considered one takeoff or landing, so an aircraft arriving and later departing from the Airport would count as two operations. Similar to based aircraft, aircraft operations determine facility types and requirements such as tie down numbers and apron space needed. This section will apply similar methodologies as based aircraft to forecast the number of operations over the planning period.

Operations have also been broken into local and iterant operations. Local operations are conducted by aircraft that originate and terminate their flight at the same location, while itinerant operations are conducted by aircraft that fly from one location to another. It is important to consider the percentage of these operations as the needs of these aircraft differ. For instance, aircraft conducting local operations will often desire hangars while aircraft conducting itinerant operations will drive tie down demand. The 2016 TAF shows 17% of operations as itinerant and the remaining 83% as local. However, as most local operations are conducted by based aircraft (in the case of D42 the agricultural aviation seasonal activity are also local) and itinerant operations are provided by all other aircraft, itinerant operations are usually a majority at airports. The 2016 FAA Aerospace Forecast estimates that of all national GA operations in 2016 54.1% are itinerant and 45.9% are local, with local operations increasing slightly to 46.4% by 2036. Local and itinerant operations are shown separately for each forecast and these percentages are applied when applicable.

2.5.1 FAA Terminal Area Forecast (TAF)

The TAF separates operations into local and itinerant. For the duration of the planning period the TAF projects operations to consist of 400 itinerant GA operations and 2,020 local GA operations, for a total of 2,420 operations per year.

2.5.2 MN SASP

As with based aircraft, the SASP projections for GA operations within MN were extrapolated to 2036. This CAGR was then applied to the existing operations at D42. As shown in **Table 2-8**, operations are projected to grow to 3,256 by 2036 using this methodology.

Table 2-8: Operations – MN SASP Forecast

Year	Local	Itinerant	Operations
2016	1,272	1,078	2,350
2021	1,377	1,173	2,550
2026	1,490	1,276	2,766
2031	1,612	1,389	3,001
2036	1,744	1,511	3,256
CAGR	1.59%	1.71%	1.64%

Source: MN SASP

2.5.3 FAA Aerospace Forecast

For this forecast, the CAGR for national local and itinerant GA operations as projected by the FAA Aerospace Forecast was applied to D42 operations. Given the industry trends discussed in previous sections, modest growth is expected for GA operations on the national level. This methodology projects 2,518 operations by 2036, as shown in **Table 2-9**.

Table 2-9: Operations – FAA Aerospace Forecast

Year	Itinerant	Local	Total
2016	1,272	1,078	2,350
2021	1,291	1,100	2,391
2026	1,310	1,122	2,432
2031	1,329	1,145	2,475
2036	1,349	1,169	2,518
CAGR	0.29%	0.11%	0.35%

Source: 2016 FAA Aerospace Forecast

2.5.4 Operations per Based Aircraft

The number of GA operations at an airport is influenced by the number of based aircraft. FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, states that “a general guideline is 250 operations per based aircraft for rural GA airports, 350 operations per based aircraft for busier GA airports, and 450 operations per based aircraft for busy reliever airports.” However, given the small number of aircraft currently at D42 this is not an accurate way to predict aircraft operations. The current ratio of OPBA is 588, which is likely inflated. As more aircraft come to D42 this ratio will decrease to meet more normal levels for an airport of this size. Therefore, the initial ratio of 588 is combined with the preferred forecast initially and then lowered as the based aircraft market share increases. Using this methodology 4,950 operations are projected by 2036, as shown in **Table 2-10**.

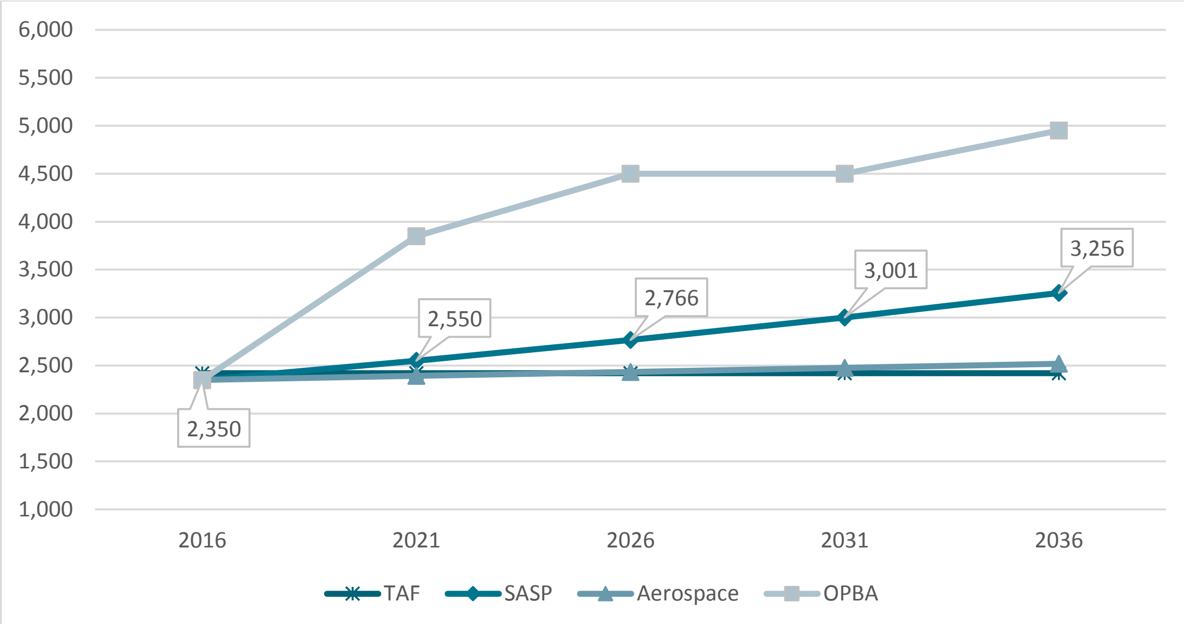
Table 2-10: Operations – OPBA Forecast			
Year	**Based Aircraft**	**OPBA**	**Operations**
2016	4	588	2,350
2021	7	588	4,116
2026	10	450	4,500
2031	10	450	4,500
2036	11	450	4,950
CAGR	5.19%	N/A	3.80%

2.5.5 Preferred Forecast

This section compares the various operations forecasts for D42 and selects a preferred methodology. A comparison of the operations forecasts can be seen in **Table 2-11** and **Chart 2-3**. The FAA TAF predicts stagnant operations through the duration of the planning period. This does not align with regional trends as per the MN SASP which anticipates modest GA growth. Although the Aerospace forecast shows modest growth, this is only an increase of less than 50 operations per year, which does not align with expected trends. For these reasons this forecast was removed from further consideration. The based aircraft forecast projects 11 aircraft by the end of the planning period and though it is reasonable to assume that more based aircraft will have an impact on the total number of airport operations, the number of aircraft is too low to sufficiently support a OPBA ratio that can be used to project future operations. For this reason this forecast was dismissed from further consideration. Finally, the SASP focuses on MN based activity and the trends it represents are more relevant to D42 than national trends. The growth represented in the SASP based forecast also aligns with anticipated increase in small piston and turbine aircraft. For these reasons this was selected as the preferred forecast.

Table 2-11: Aircraft Operations Forecast Comparison				
Year	**TAF**	**SASP**	**Aerospace**	**OPBA**
2016	2,420	**2,350**	2,350	2,350
2021	2,420	**2,550**	2,391	3,850
2026	2,420	**2,766**	2,432	4,500
2031	2,420	**3,001**	2,475	4,500
2036	2,420	**3,256**	2,518	4,950
CAGR	0.00%	**1.64%**	0.35%	3.80%

Chart 2-3: Operations Forecasts Comparison



Source: Mead & Hunt, Inc.

2.6 Peak Operations Forecast

Forecasting peak activity forecast is important for any airport. Annual measurements are only useful when activity tends to be evenly distributed over the entire year. However, seasons and events often create periods of fluctuating demand. As a result, it is important to identify and forecast peak period activity levels.

As D42 is an untowered airport, information on the peak periods of operations are limited. Based on a survey of the TFMSC database from 2011 through 2016, June appears to be the peak month at approximately 15% of annual operations. This aligns with expectations for a GA airport, as summer months are often busier. Peak month operations are estimated by applying this percentage to the preferred forecast in **Table 2-12**.

Table 2-12: Peak Month Operations

Year	Annual Operations	Peak Month Operations
2016	2,350	353
2021	2,550	382
2026	2,766	415
2031	3,001	450
2036	3,256	488

Peak month operations can further be refined into peak hour operations. Monthly operations are divided by 30, for the number of days in June. The number of average daily operations during the peak month is then multiplied by 50% to determine peak hour operations, as shown in **Table 2-13.** These numbers will be used in the following chapter.

Table 2-13: Peak Hour Operations

Year	Peak Month Operations	Average Day Operations	Peak Hour Operations
2016	353	12	6
2021	382	13	6
2026	415	14	7
2031	450	15	8
2036	488	16	8

2.7 Forecast Summary

The forecasts of based aircraft and operations are important as they drive the need for improvements on the Airport. The forecasts presented in this chapter will provide planning considerations for the duration of the twenty year period in the following chapter. The FAA templates for summarizing and documenting airport planning forecasts, and for comparing forecasts with the FAA TAF, are presented in **Table 2-14** and **Table 2-15**.

A summary of the Preferred Forecasts is as follows:

- The based aircraft preferred forecast projects growth to 11 aircraft by 2036, a CAGR of 5.19%
- The fleet mix forecast anticipate 10 single engine aircraft, including LSAs, and a single jet aircraft by 2036.
- Aircraft operations are anticipated to grow consistent with state trends and as the number of based aircraft at D42 increases. A total of 3,256 operations are expected by the end of the twenty year planning period.
- Itinerant operations are expected to make up slightly more than 50% of D42 operations.

Table 2-14: Template for Comparing Airport Planning and TAF Forecast

Activity	Year	Master Plan Forecast	TAF	MPF/TAF (% Difference)
Total Operations				
Base yr.	2016	2,350	2,420	-2.89%
Base yr. + 5yrs.	2021	2,550	2,420	5.35%
Base yr. + 10yrs.	2026	2,766	2,420	14.30%
Base yr. + 15yrs.	2031	3,001	2,420	24.01%
Base yr. + 20yrs.	2036	3,256	2,420	34.54%

Table 2-15: Template for Summarizing and Documenting Airport Planning Forecasts

	2016	2021	2026	2031	2036	Base Yr. to +5	Base Yr. to +10	Base Yr. to +15	Base Yr. to +20
Passenger Enplanements									
TOTAL	N/A	N/A	N/A	N/A	N/A	-	-	-	-
Operations									
Itinerant									
Air carrier	0	0	0	0	0	-	-	-	-
Commuter/air taxi	0	0	0	0	0	-	-	-	-
Total Commercial	0	0	0	0	0	-	-	-	-
General aviation	1,078	1,173	1,276	1,389	1,511	8.81%	18.37%	28.85%	40.17%
Military						-	-	-	-
Local									
General aviation	1,272	1,377	1,490	1,612	1,744	8.25%	17.14%	26.73%	37.11%
Military	0	0	0	0	0	-	-	-	-
TOTAL OPERATIONS	2,350	2,550	2,766	3,001	3,256	8.51%	17.70%	27.70%	38.55%
Peak Hour Operations	6	6	7	8	8	0.00%	16.67%	33.33%	33.33%
Based Aircraft									
Single Engine (Nonjet)	4	7	9	9	10	75.00%	125.00%	125.00%	150.00%
Multi Engine (Nonjet)	0	0	0	0	0	-	-	-	-
Jet Engine	0	0	1	1	1	N/A	N/A	N/A	N/A
Helicopter	0	0	0	0	0	-	-	-	-
Other	0	0	0	0	0	-	-	-	-
TOTAL	4	7	10	10	11	75.00%	150.00%	150.00%	175.00%
B. Operational Factors									
Average aircraft size (seats)	N/A	N/A	N/A	N/A	N/A				
Average enplaning load factor	N/A	N/A	N/A	N/A	N/A				
GA operations per based aircraft	588	550	450	450	450				

CHAPTER 3

FACILITY REQUIREMENTS

3.1 Introduction

This chapter examines how the forecasted aviation demand for Springfield Municipal Airport (D42) in Chapter 2**,** compares to the inventory of existing facilities in Chapter 1. The disparities between the needed facilities, determined by the forecasted demand, and the assessment of existing conditions included in this chapter are the basis for the recommended alternatives in Chapter 4. In this chapter, the analysis is split into specific facilities where concerns will be addressed individually.

- Critical Aircraft
- Runway
- Taxiways
- Design Surfaces
- Instrument Approaches
- Landside Facilities
- Aircraft Parking
- Aircraft Aprons
- User Survey
- Hangars
- Maintenance/SRE Facility
- Arrival/Departure Building
- Fixed Based Operator
- Fueling Facilities
- Airport Access and Vehicles Parking
- Airport Assessment

3.2 Critical Aircraft

Many aspects of the Airport environment are designed to accommodate the most demanding aircraft expected to use the facilities. Therefore, the first step in determining the Airport's needs is to establish the critical aircraft. The Federal Aviation Administration (FAA) considers the critical aircraft to be the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is considered 500 annual operations, excluding touch-and-go operations. An operation is either a takeoff or landing. As discussed in Chapter 1, the Runway Design Code (RDC) is based on the approach speed and dimension of the aircraft expected to use a runway and the approaches associated with the runway. The current RDC at D42 is A/B-II (small)-5000. The "small" designation means that the runway is intended for aircraft with a maximum certificated takeoff weight (MTOW) of 12,500 or less.

A survey of the Traffic Flow Management System Counts (TFMSC) shows that some of the most demanding aircraft that operate at D42 are the Cessna Citation II and King Air 90. These aircraft, and other common aircraft that can operate at D42, are shown below in **Table 3-1**.

Table 3-1: Runway 13/31 Critical Aircraft

Aircraft	Runway Design Code	Approach Speed (knots)	Wingspan (feet)	Tail Height (feet)
Cessna Citation II	B-II	106	52	15
Citation Excel	B-II	106	56	17
King Air 90	B-II	105	55	15
Piper Seminole	A-I	74	39	9
Diamond DA42	A-I	84	44	8
Beech Bonanza 36	A-I	80	34	9
Cirrus SR22	A-I	80	38	9
Piper Arrow	A-I	75	35	7

Source: Mead & Hunt; FAA Pilot Operating Handbook; FAA AC 150/5300-13A, Airport Design

Although some aircraft with an MTOW over 12,500 pounds use the Airport, the majority of aircraft fit the small designation. For instance, the Citation II has an MTOW of 13,300 pounds, but these exceptions are not common as the runway length limits the type of aircraft able to operate at the Airport. In addition to planning based on the current aircraft, planning should account for future aircraft when determining Airport needs. The Mayo Clinic has a Springfield location less than two miles to the northeast of the Airport. The medical center currently has an attached helicopter base that provides medical air evacuation and transportation in the area. The center has recently been considering expanding the air fleet to include fixed wing aircraft such as the King Air 350, King Air 200, or the Pilatus PC12. A King Air 350 is currently used at the Rochester Mayo Clinic for service in the 48 contiguous United States. In addition to ensuring that runway and taxiway dimensions are met, as normally determined by a critical aircraft, this specific type of operations will require additional supporting facilities to be discussed in their respective sections of this chapter.

3.3 Runway

This section provides an analysis of the runway dimensions and their ability to meet the Airport's existing and future needs.

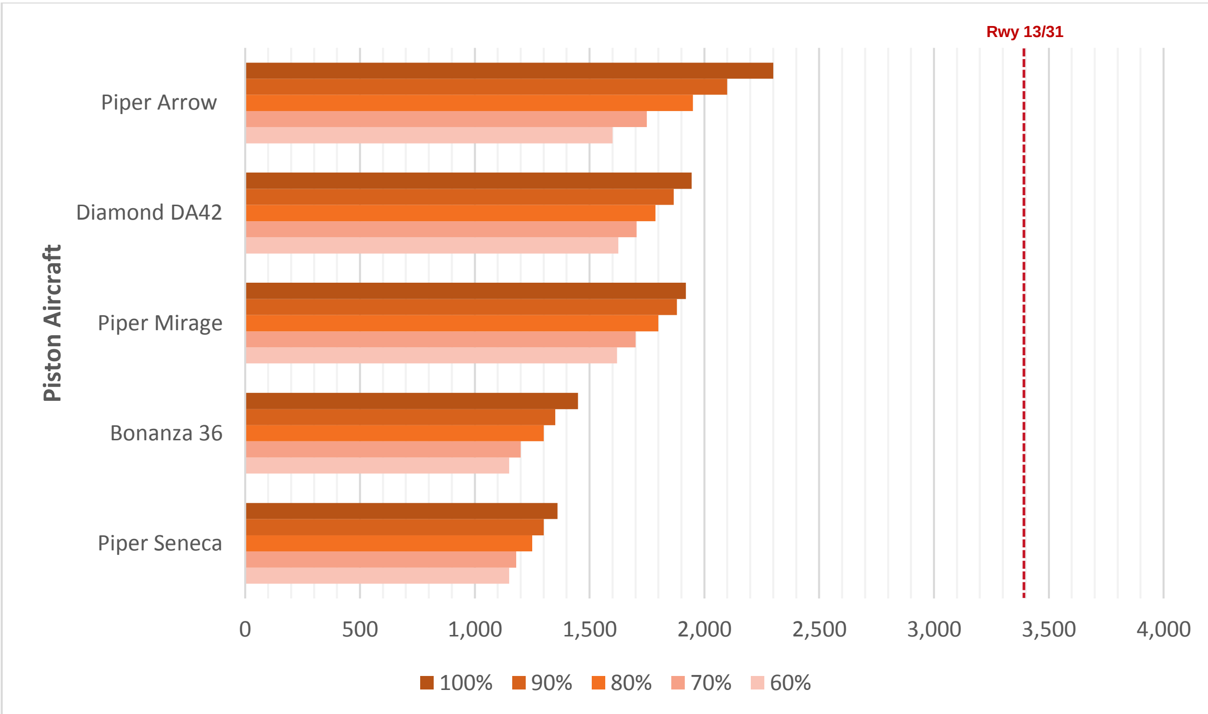
Runway Length

Runway length is based on the specific performance of the aircraft intended to use the airport. Determining variables for runway length include temperature and the airport elevation. Both of these parameters influence air density. Air density directly impacts aircraft performance in two ways. First, the thrust generated by propeller or jet engines will be less effective at higher temperatures and elevations, as the thinner air will not produce as much forward momentum in the aircraft. Second, the air moving over the wing will not generate as much lift and greater speeds are required to generate the same amount of lift as lower temperatures and elevations. These two factors combine to exponentially increase an aircraft's takeoff distance as temperature and elevation increase.

According to FAA Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*, the airport temperature parameter should be set equal to the mean daily maximum temperature of the hottest month at the airport. As there isn't an automated weather reporting station at D42, information from Redwood Falls Municipal Airport was used. According to the National Oceanic and Atmospheric Administration (NOAA), the mean daily maximum temperature of the hottest month from 2011 to 2016 at D42 was 85.1°F (July). The Airport elevation is 1,073 feet above sea level according to the FAA Airport/Facility Directory valid June 21, 2017.

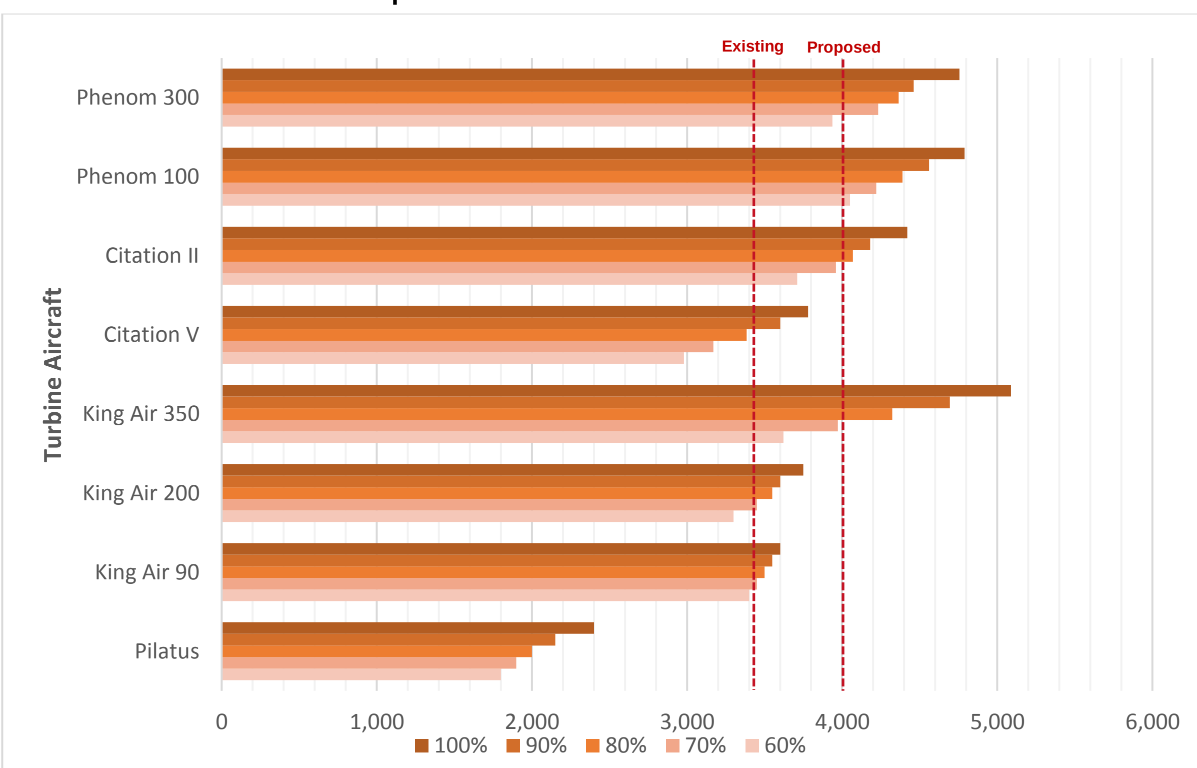
This information can be used to determine the runway length required for various aircraft that operate at the Airport. **Chart 3-1** shows the required length for a variety of single- and multi-engine piston aircraft. As can be seen, the current runway length is sufficient for piston driven aircraft, which are generally much lighter and less demanding than turbine aircraft. Therefore, the runway length is sufficient for piston driven general aviation (GA) aircraft. Although piston aircraft are capable of operating at D42 without limitations, the runway length is not sufficient for many turbine aircraft, as shown in **Chart 3-2**. This includes aircraft the Mayo Clinic may use in the future for medical operations. Some turbine aircraft are able to operate at D42 by reducing their load, such as the Citation II, while the runway length is prohibitive to others. Based on a conversations with personnel at the local Mayo Clinic, a runway distance of 5,000 feet is desirable for operations, as required by the King Air 350, although this length is impractical due to site restraints. The 2004 Airport Layout Plan (ALP) shows a 600-foot extension to Runway 13. Although this would not be sufficient for all turbine aircraft, it would increase the functionality of the runway for others. For instance, it would allow the King Air 90, King Air 200, and Citation V to operate without limitations and allow other aircraft to conduct limited operations. An extension of this length would cause the relocated RPZ to overlap 410th Avenue to the northwest although the RPZ and runway would remain on existing Airport property. The timing of this extension will be discussed in greater detail in the following chapter.

Chart 3-1: Takeoff Distance Required – Piston Aircraft



Source: Mead & Hunt, Inc.

Chart 3-2: Takeoff Distance Required



Source: Mead & Hunt, Inc.

Crosswind Coverage

Winds are a major consideration at any airport. Wind can not only directly impact aircraft performance but can affect the ability of aircraft to safely operate. Slow and small aircraft are generally more susceptible to crosswinds although all aircraft have a limit to how much of a crosswind they can tolerate. The FAA has assigned a crosswind tolerance for each category of aircraft based upon its speed and size, as seen below in **Table 3-2**. FAA guidance states these crosswind limitations should be met 95 percent of the time given the runway's alignment. If this benchmark is not met, then a crosswind runway should be considered. The crosswind coverage for the existing conditions at D42 are shown below in **Table 3-3**, as it does not meet the 95 percent threshold a crosswind runway will be considered in the following chapter. However, it should be noted that as there is not a weather reporting station at D42, actual crosswind coverage may vary slightly. Therefore it is recommended a weather reporting system be established at the Airport and the crosswind coverage be reexamined in the future.

Table 3-2: Crosswind Limitations per RDC

Category	Allowable Crosswind Component
A-I and B-I	10.5 knots
A-II and B-II	13 knots
A-III, B-III, C/D-I through C/D-III	16 knots
A-IV and B-IV C/D-IV through C/D-VI E-I through E-VI	20 knots

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

Table 3-3: Runway Crosswind Coverage

Weather	10.5 knots	13 knots	16 knots	20 knots
Runway 13				
All Wx	46.98%	49.06%	50.55%	51.10%
VFR	45.60%	47.78%	49.42%	50.05%
IFR	52.73%	54.34%	55.23%	55.42%
Runway 31				
All Wx	53.38%	54.59%	55.37%	55.61%
VFR	54.42%	55.59%	56.36%	56.61%
IFR	49.03%	50.37%	51.22%	51.38%
Both Runways				
All Wx	93.40%	96.68%	98.97%	99.75%
VFR	93.07%	96.43%	98.83%	99.72%
IFR	94.87%	97.83%	99.57%	99.92%

Source: FAA Wind Analysis Tool

Runway Width

Based on guidance in FAA AC 150/5300-13A, *Airport Design*, a runway intended for B-II (small) aircraft should be 75 feet wide. As the runway at D42 is this width, no changes are anticipated over the 20-year planning period.

3.4 Taxiways

The current taxiway system consists of a single 40-foot-wide connection from the apron to the runway. In 2011 an Environmental Assessment (EA) was completed that examined existing issues and their potential solutions. Although the alternatives proposed in that document will be summarized in Chapter 4, this section will draw on the conclusions from that EA to discuss existing issues and needs at D42. There are several issues with the existing layout. As aircraft are required to taxi on the runway, this not only reduces the utility of the runway due to the additional time aircraft must spend on it, but it also poses a risk of runway incursion due to the lack of separation from taxiing and takeoff/landing operations. A runway incursion is described by the FAA as “Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft.”

The direct connection of the apron to the runway via the existing taxiway is also in conflict with FAA guidance. As stated in Chapter 1, guidance in FAA AC 150/5300-13A, *Airport Design*, states that direct access from the apron to the runway is discouraged as pilots may inadvertently taxi onto the runway while expecting a taxiway. This taxiway connection should be modified so that pilots make an additional turn before entering the runway, such as onto a parallel taxiway, as this is common at most airports and expected by pilots. This AC also provides taxiway guidance for runways with a precision instrument approach. A runway with visibility minimums less than 1 mile requires a full-length parallel taxiway though is recommended for all other conditions. Although the existing approaches at D42 offer visibility minimums of 1 mile, the existing runway protection zones (RPZs) are intended to allow for a decrease in visibility minimums to 3/4 mile. Taxiway and taxilanes are based on the size of the aircraft intended to use them. Standard taxiway and taxilane dimensions are shown in **Table 3-4**.

It can be seen that the 40 foot taxiways at D42 exceed the TDG 2 standards in the table above. Typically the FAA will only provide funding for the width of taxiways shown in the standards. However, snow removal equipment is increasing in size and may have difficulty maneuvering on taxiways less than 40 feet. This may aid justification for additional funding for the extra taxiway width when reconstruction is required.

Table 3-4: Taxiway Design Group for Future Critical Aircraft			
Criteria	**Category**		
Taxiway Design Group Criteria	***TDG 1***	***TDG 2***	***TDG 3***
Taxiway Width	25 feet	35 feet	50 feet
Taxiway Edge Safety Margin	5 feet	7.5 feet	10 feet
Taxiway Shoulder Width	10 feet	15 feet	20 feet
Airplane Design Group Criteria	***ADG I***	***ADG II***	***ADG III***
Taxiway Safety Area Width	49 feet	79 feet	118 feet
Taxiway Object Free Area Width	89 feet	131 feet	186 feet
Taxilane Object Free Area Width	79 feet	115 feet	162 feet

Sources: Planning Manuals, FAA AC 150/5300-13A, Airport Design

3.5 Pavement Condition

According to AC 150/5380-7A, *Airport Pavement Management Program,* maintaining a pavement in good condition over its life cycle is four to five time less expensive than periodically rehabilitating a pavement in poor condition. Based upon a visual inspection by experienced engineers, a pavement condition index (PCI) rating is assigned to a particular piece of pavement but does not necessarily reflect its structural integrity. The PCI rating is scored on a scale of 1-100. A score of 100 indicates the pavement is in perfect condition while a score of 60 or less indicates that rehabilitation is needed.

A 2016 Pavement Condition Report indicates that the entire Airport pavement was in satisfactory condition at the time of the 2015 survey, with a PCI of 79. However, pavement conditions tend to deteriorate over time due to use and weather. Based on the deterioration rates recorded during the 2015 survey the 2018 PCIs are estimated below in **Table 3-5** and are generally fair. The runway was originally constructed in the 1980s and received an overlay in 1994. Overlays are often used as a temporary measure to repair the top layer of pavement and can slow the rate of deterioration but is not a long term solution. As the lower layers of the runway are aging the deterioration will increase as the overlay and lower layers of the runway continue to age. Reconstruction of the runway will eventually be necessary, likely within approximately ten years.

Table 3-5: PCI Section Summary				
Description	**2012 PCI**	**2015 PCI**	**Drop**	**2018**
Apron	85	79	3.5	68
Taxiway	86	79	3.5	68
Hangar Taxiways	68	79	1.0	76
Runway	86	79	3.5	68

3.6 Design Surfaces

Runway Safety Areas (RSA)

The RSA is intended to protect the safety of the aircraft in the event of a runway excursion. The dimensions of the RSA have been designed to incorporate 90 percent of runway overruns based on the size of the aircraft using the runway. The RSA for an A/B-II (small)-5000 runway is 300 feet beyond the runway end x 150 feet wide. This must be kept clear of all objects, except those fixed by function, and capable of supporting aircraft, maintenance, and rescue vehicles.

Runway Object Free Areas (ROFA)

Similar to the RSA, the ROFA provides an additional clearance around runways free of objects that are not fixed by function. Although larger than the RSA it is not intended to support aircraft or vehicles.

Runway Protection Zones

As discussed in Chapter 1, the RPZs for the Airport are currently sized for approaches with a visibility minimum of 3/4 mile although the existing approaches are not less than 1 mile. Each RPZ currently overlaps a nearby road. Runway 13 RPZ overlaps 410 Street and Runway 31 RPZ overlaps 180 Street West and a railroad.

3.7 Instrument Approaches

Each end of the runway at D42 has a Global Positioning System (GPS) area navigation (RNAV) approach without vertical guidance and Runway 13 offers a VHF Omni-directional Range (VOR)/distance measuring equipment (DME) approach. Each of these approaches have visibility minimums of 1 mile and can be used to perform a circling approach to the airport. A circling approach is where an aircraft will conduct an approach to a runway and, once visual contact is established, will circle around to land at a different runway. Each end of the runway offers a minimal altitude of 427 feet above ground level (AGL). The proposed parallel taxiway and existing RPZs are suited for a decrease to visibility minimums of 3/4 mile. Providing lower minimums would be increasingly important for medical flights. Normal GA operations may have the flexibility to cancel operations during inclement weather, but medical flights are often time-critical operations that have less flexibility. Other noteworthy items either required or recommended by an instrument approach with a 3/4-mile visibility include an ALP (which will be completed as part of this master plan) and approach lighting system (ALS). Although an ALS is only a recommendation, Chapter 4 will consider the possibility of an ALS. **Table 3-6** shows some of the selected changes to reduce the visibility minimums from 1 mile to 3/4 mile. Currently, each runway end has a precisions approach path indicator (PAPI) and runway end identifier lights (REIL). Both of these navigational aids (NAVAIDS) assist pilots in identifying the runway environment and the PAPIs also aid in establishing a smooth approach path.

Table 3-6: Standards for Instrument Approach Procedures		
Visibility Minimums	**3/4 to < 1 statute mile (SM)**	**≥ 1 SM straight-in**
Height Above Airport for circling	≥ 250 feet	≥ 250 feet
ALP*	Required	Required
Minimum Runway Length	3,200 feet	3,200 feet
Runway Markings	Non-precision	Non-precision
Position Signs & Markings	Non-precision	Non-precision
Runway Edge Lights	HIRL* / MIRL*	MIRL* / LIRL*
Parallel Taxiway	Required	Recommended
Approach Lights	Recommended	Recommended
Applicable Runway Design Standards, e.g. OFZ	≥ ¾ SM* approach visibility minimums	≥ ¾ SM* approach visibility minimums
Threshold Siting Criteria	TSS* 6	TSS* 1-5

**SM: statute mile; ALP: Airport Layout Plan; TSS: Threshold Siting Criteria; H/M/LIRL: High-/Medium-/Low-Intensity Runway Lighting*

3.7.1 Weather Reporting Station

Instrument approaches depend on pilots knowing the weather conditions at an airport when selecting an approach or determining a go/no-go decision. This dependency makes it crucial for pilots to have real time weather information based on local conditions. Therefore, the recommendation is to add a weather reporting system on the Airport to provide current, local information. Currently, instrument approaches are conducted using the Redwood Falls weather reporting and altimeter settings. Based on Paragraph 5-4-5, a.4, *Instrument Approach Procedure (IAP) Charts*, in the *Aeronautical Information Manual* (AIM), pilots may not fly some of the more stringent approaches offering vertical guidance unless altimeter settings are reported from the local airport. Although the current approaches at D42 do not offer vertical guidance, the presence of on-site weather reporting would be beneficial for medical operations. As medical operations will often occur during inclement weather, real-time local weather is crucial to the safety of the operation. Real-time weather reporting informs pilots if the minimums of an airport's instrument approaches have been exceeded. Without this information pilots would be forced to conduct the approach and physically meet minimums before knowing if an approach was possible, an undesirable position.

There are several types of weather reporting systems including the Automated Weather Reporting System (AWOS) and Automated Surface Observation System (ASOS). Each of these systems offer a variety of weather reporting technologies such as precipitation differentiation, visibility sensors, thunderstorm detection, and many others. An ASOS offers more information to pilots than most AWOS variants and so is the recommended weather reporting station for D42. When determining a location for the ASOS FAA Order 6560.20B, *Siting Criteria for Automated Weather Observing Systems,* provides guidance on the location of automated weather stations. For airports such as D42, the preferred location of the station is within 1,000 feet adjacent to the primary runway and 3,000 feet from the runway thresholds. In addition, the station should not interfere with runway surfaces, such as the object free area. This standards will be adhered to when determining location for the weather reporting system in the following chapter.

3.8 Aircraft Parking

Although local aircraft will often prefer hangars, itinerant aircraft will utilize tie downs for temporary parking on the apron. D42 has a total of seven tie downs: five for small, single-engine aircraft, and two for larger aircraft such as multi-engine aircraft and small turbine aircraft. As locally based aircraft will often be hangared, itinerant aircraft drive tie down demand. Itinerant aircraft may originate from anywhere which makes it difficult to predict the type of aircraft. Although single-engine piston aircraft are believed to be the most common aircraft at D42, a survey of the 2016 TFMSC reveals some turbine aircraft activity such as the Cessna Citation II and King Air 90. Therefore, an average of 2,000 square feet per aircraft is used as an average value to determine apron demand. This is enough room to allow an aircraft to park with an additional safety buffer around the aircraft.

Parking demand at the Airport is determined by combining this square footage with the project peak hourly operations above in **Table 3-7**. Peak monthly itinerant operations are determined to be 15 percent of annual operations. This number is then divided by 30, for the number of days in the peak month of June. An additional 3,110 square feet, or nearly two tie down spaces, will be needed by 2036.

Table 3-7: Aircraft Parking Demand

Criteria	2016	2021	2026	2031	2036
Operations					
Annual Itinerant GA Operations	1,078	1,173	1,276	1,389	1,511
Peak Month Operations	162	176	191	208	227
Peak Month Average Day	5	6	6	7	8
Parking Demand					
Total GA Apron Demand	10,780	11,730	12,760	13,890	15,110
Available Parking Space	12,000	12,000	12,000	12,000	12,000
Difference	***1,220***	***270***	***-760***	***-1,890***	***-3,110***

3.9 Aircraft Aprons

Aircraft aprons provide an area for aircraft to maneuver, park and have limited service such as fueling. FAA AC 150/5300-13A, *Airport Design,* states that the total amount of GA apron area required is based on local conditions and will vary from airport to airport. The total size of the apron at D42 is approximately 76,000 square feet. Aprons often support facilities such as hangars, fueling, and parking by providing access, areas for aircraft to maneuver and be serviced. Therefore, apron size should not be examined in isolation but in conjunction with the facilities it supports. One of the unique aspects of D42 is that it seasonally supports agricultural aviation. Chemical will be stored on the apron to allow aircraft to fill up before departing the Airport and flying to the site of treatment before returning to repeat the process. Chemicals used during this process can be hazardous in high doses or concentrations, and spills may be harmful to the surrounding environment. Infrastructure could be built to better support these operations.

Minnesota Administrative Rule 1505.3070, *Loading Areas*, provides guidance on loading areas of liquid bulk pesticide and specifies that the perimeter of the loading area be curbed at least three inches and able to contain a minimum of 1,000 gallons. An area matching these specifications provides a place where loading can be conducted, and if a spill occurs, the described area is able to contain the materials and mitigate exposure to the environment. For instance, the Cottonwood River, an impaired river, is located approximately 1/4 mile away at a lower elevation and is susceptible to further contamination. By creating a designated area on the southern portion of the apron, overall circulation would improve and any drainage from the area would be captured. The following chapter will provide alternatives to address these needs.

3.10 User Survey

As part of the user survey discussed in Chapter 2, survey respondents also recommended other facility improvements and services at the Airport. Survey responses show that top considerations when visiting D42 include self-service fuel, Airport location, and runway surface. The runway length, surface, and other Airport facilities were also named factors. In general, when selecting where to base their aircraft, pilots typically desire to have their aircraft close to where they live. As a result, survey responses identified Airport location as the number one consideration for basing aircraft, followed by hangar type, condition, and cost.

When asked “Are there any improvements you would like to see at the Airport?” four of the respondents said that a courtesy car at the Airport would be desirable. The Airport is approximately a 1.5-mile walk to the city center where there are restaurants and businesses. As South Range Road and County Highway 3 do not have sidewalks, this distance is not easily walkable, especially during the winter. Likewise, there is not a shuttle or taxi service available to pilots, so arriving pilots must either make private arrangements for transportation or stay on the Airport when visiting.

Housing a courtesy car at the Airport would require the City to provide maintenance and the car would need to be accessible for visiting pilots. As D42 is typically unoccupied by City personnel, a secure key could be accessed by a lockbox on site. This would allow pilots to access the car during all hours and provide a method of transportation into the City of Springfield.

3.11 Hangars

Hangars provide a space for aircraft to shelter from the elements and for maintenance to be performed. Given the harsh winter climate in Minnesota, it is assumed that all based aircraft will desire hangars. The preferred based aircraft forecast is shown below in **Table 3-8**. The number of hangars can be projected based on the number of aircraft expected to be at the Airport over the 20-year planning period. Typically, T-hangars are used for single-engine aircraft while box hangars are used for multi-engine or turbine aircraft. The space required for each type of aircraft, including a safety zone around each aircraft, is shown below in **Table 3-9**. There are currently four single-engine aircraft at D42. A single building with six T-hangar units and a single box hangar offers hangar space at the Airport. Projections through the planning period for demands for total hangar space were calculated based on the projected based aircraft number in **Table 3-8** and the space requirements from **Table 3-9**.

Table 3-8: Based Aircraft Fleet Mix

Year	Single	Jet	Total
2016	4	0	4
2021	7	0	7
2026	9	1	10
2031	9	1	10
2036	10	1	11

Source: Mead & Hunt, Inc.

Table 3-9: Parking Area Sizes for Aircraft Fleet Mix		
Aircraft Type	**Examples**	**Approximate Square Feet**
Single-engine	Cessna 172, Cirrus SR-22	1,400 square feet
Multi-engine	Piper Seneca, Beechcraft King Air	2,500 square feet
Small- & Mid-sized Jets	Cessna Citation, Learjet	4,000 square feet
Large Business Jets	Gulfstream G550, Global Express	10,000 square feet
Helicopter	Sikorsky S-76, Bell 206	1,400 square feet

Source: Mead & Hunt, Inc.

As can be seen in **Table 3-10**, the immediate hangar demand is met with the existing conditions. However, as additional aircraft are based at the Airport hangar, demand will increase. Because single-engine piston aircraft are expected to be a significant part of total aircraft increase, T-hangars will be the most efficient method of meeting demand for these aircraft. Although no jet aircraft are currently registered at the Airport, an existing 4,000-square-foot box hangar is accounted for in existing demand and a new based turbine aircraft would require an additional box hangar. Chapter 4 will discuss the best way to meet both types of hangar demand. The existing T-hangars are located to the northwest of the Arrival/Departure (A/D) building and connected to the apron via a single taxilane connector, which creates a bottleneck for aircraft based at the T-hangar. As traffic and based aircraft at the Airport increase, congestion at this point is likely to obstruct aircraft circulation and alternate layouts will be considered in Chapter 4.

Table 3-10: Hangar Demand					
Aircraft Type	**2016**	**2021**	**2026**	**2031**	**2036**
Single-Engine					
Projected Based Aircraft	4	7	9	9	10
Total Hangar Demand (sq. ft.)	5,600	9,800	12,600	12,600	14,000
Jet Aircraft					
Projected Based Aircraft	-	-	1	1	1
Total Hangar Demand (sq. ft.)	0	0	4,000	4,000	4,000
T-Hangars					
Total T-Hangar Available	6,800	6,800	6,800	6,800	6,800
T-Hangar Demand	5,600	9,800	12,600	12,600	14,000
T-Hangar Difference	1,200	-3,000	-5,800	-5,800	-7,200
Box Hangars					
Box Hangar Available	4,000	4,000	4,000	4,000	4,000
Box Hangar Demand	0	0	4,000	4,000	4,000
Box Hangar Difference	4,000	4,000	0	0	0
Total Difference	**5,200**	**1,000**	**-5,800**	**-5,800**	**-7,200**

Source: Mead & Hunt, Inc.

3.12 Maintenance/Snow Removal Equipment (SRE) Facility

Maintenance and SRE is stored on the Airport in a 2,500-square-foot facility. This facility was constructed in 2012 for storage and maintenance of equipment. Recent construction means that the age of the building is not a concern and it is currently meeting Airport needs. Therefore, no changes are suggested for the SRE facility for the duration of the planning period. However, while the facility is meeting the needs of the Airport the equipment is aging. Both the snow plow and the utility truck are fourteen years old are will need to be replaced to continue serving the Airport. In 2024 each of these vehicles will be twenty years old and should be considered for replacement at that time.

3.13 Arrival/Departure Building

A 1,400-square-foot A/D building is located adjacent to the apron. As the Airport is not occupied by City personnel, pilots and passengers must have independent access to amenities. This facility currently provides pilots and personnel access and use to a rest area and flight planning area, as well as office space, restrooms, and some storage space.

3.14 Fixed Based Operator

A Fixed Based Operator (FBO) conducts business from the airport at which it is based and provides services to aircraft and pilots. These services include fueling, hangar access, maintenance, flight instruction, and facilities for pilots to rest and prepare for their flights. An FBO has direct and indirect effects on airport activity. Often and FBO increases activity directly by driving operations through flight instruction and aircraft rental, and indirectly by attracting pilots for aircraft inspection and maintenance services. Bringing an FBO to the Airport would likely increase the based aircraft and aircraft operations at D42 as these activities are conducted. Although the final design of an FBO facility would depend on the specific FBO, the facility requirement for an FBO is similar to the A/D building. A front area allows pilots and passengers to interact with FBO staff and request services. Other areas often include a crew rest area, flight planning computer and telephone, offices, and storage. A connected or nearby hangar could provide an area for aircraft maintenance and storage.

3.15 Fueling Facilities

A self-fueling station with space for aircraft to maneuver and refuel is located on the south side of the apron. As the fuel tank is currently refilled several times a year, capacity is not an issue and the current location is not conflicting with other facilities. As growth at the Airport continues, and a more diverse user base exists, the need for expanding the fueling area to provide Jet A may be beneficial. Several small turbine aircraft are already capable of using the runway at D42 and future operations, such as agricultural turbine-power helicopters or medical air transport aircraft, may benefit from the addition of Jet A fueling.

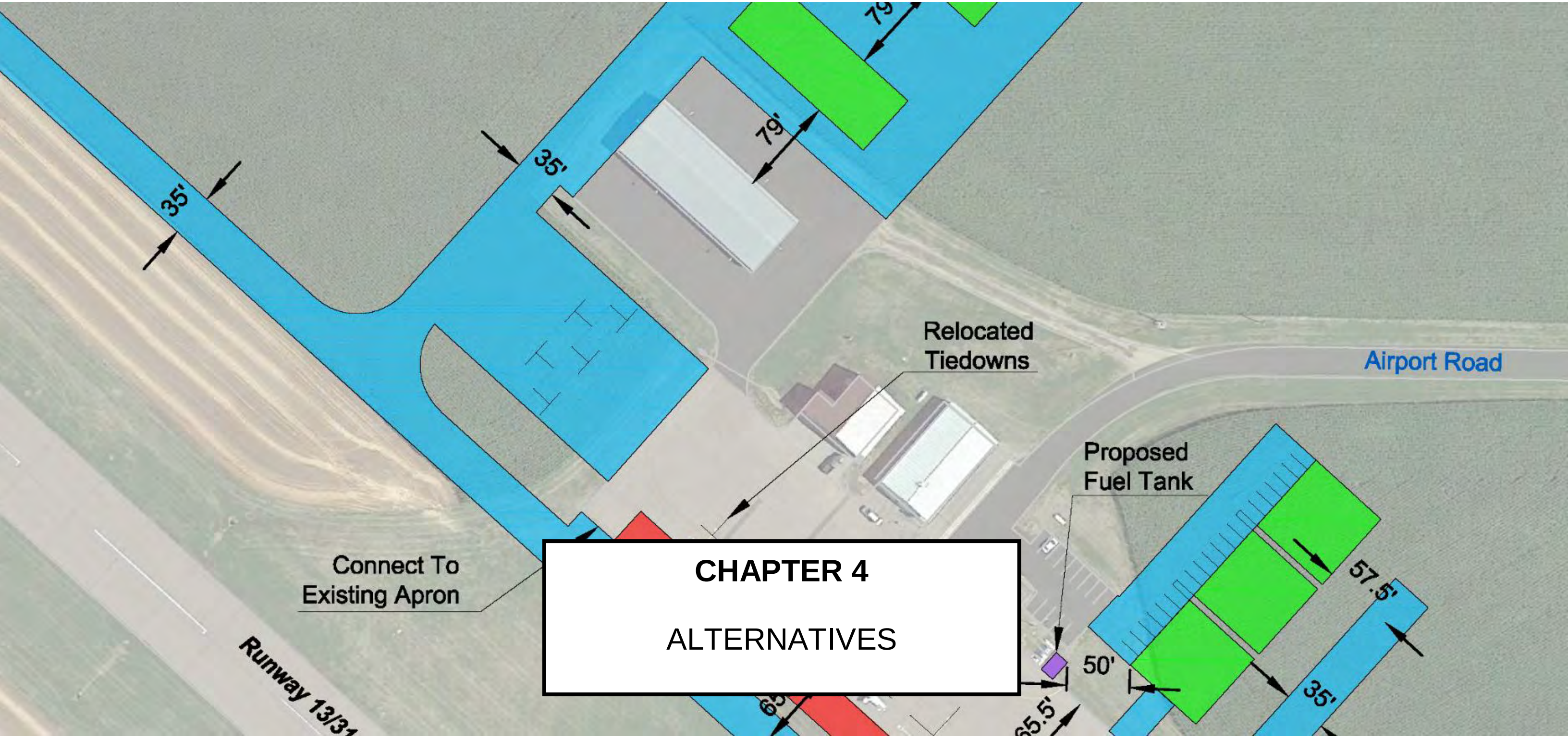
3.16 Airport Access and Vehicle Parking

Airport Road, which connects to South Range Road, is the only road that provides access to the Airport. Airport vehicle parking is available near the A/D building. Due to a small hill between the Airport and South Range Road, the Airport is not easily visible from the road and a sign is located at the entrance to Airport Road to direct traffic.

3.17 Airport Assessment

This final summary provides an analysis of the Airports assets and its ability to meet local aviation needs and how that may impact its National Plan of Integrated Airport Systems (NPIAS) classification, as discussed in Chapter 2. The Springfield Municipal Airport offers many amenities uncommon at small airports, such as a paved runway with various approaches and NAVAIDs. The Airport is in a strong position to increase its itinerant operations. The existing runway length and surface, NAVAIDs and lack of an operating tower, are all appealing to many GA students and pilots.

The Springfield Municipal Airport offers many strengths and is in a good location to attract aircraft for training and recreational flights. How to meet the anticipated facility requirements in this chapter and increase aviation activity on the Airport will be discussed in the Chapter 4. However, even if the NPIAS basic category of ten aircraft is not met, there are alternative options for the Airport to remain unclassified while also continuing to grow. These options will be further discussed in Chapter 5.



CHAPTER 4

ALTERNATIVES

4.1 Introduction

This chapter will discuss various ways of meeting the facility requirements addressed in the last chapter. These alternatives will consider how to best meet the immediate needs of the Airport while also planning for long term development. Development and alternatives will be discussed in the following sections:

- Runway
- Taxiway
- Apron
- Hangars
- Vehicle Parking Area
- Fixed Based Operator
- Maintenance/SRE Facility
- Fuel Facilities
- Navigational Aids

4.1.1 Runway 13/31

This section will address the ability of the runway to meet the demand over the 20-year planning period. Although the width of the runway is sufficient, the previous chapter has shown that an increase in the runway length would allow additional small turbine aircraft to operate at the Airport. Alternatives below discuss the extension of the runway.

Runway Alternative 1: No-Action

This alternative would keep the existing runway configuration. The majority of piston-powered aircraft are able to operate at the Airport without restrictions. However, some turbine aircraft are limited to restricted operations while others are prohibited entirely from D42 due to insufficient runway length. Based on Traffic Flow Management System Counts (TFMSC) data, there are currently few turbine aircraft operating at the Airport. The Federal Aviation Administration (FAA) projects that turbine aircraft will become more popular over the next 20 years. Given the cost associated with turbine aircraft, typically businesses will be the sole owner and operator of these aircraft. Therefore, local business will often drive this type of aviation activity and an extension to the runway would likely be necessary only in conjunction with local business expansion.

Runway Alternative 2: 600 Foot Extension

This alternative would place a 600-foot extension on the north side of Runway 13/31 as shown on the 2004 Airport Layout Plan (ALP) and in **Figure 4-1**. This additional length would allow for additional turbine operations. The review of TFMSC shows only a few turbine operations per year, which is not considered justification for immediate extension. However, this extension would benefit the air medical operations that take place at the local Mayo Clinic for several reasons. Like any operation, a longer runway would enable increased payload and extended range but as air medical operations are often time sensitive, high stress operations that can take place during inclement weather, a longer runway would provide a greater safety margin for these operations.

In addition, as turbine aircraft continue to become more popular and the City of Springfield develops, local businesses may generate sufficient traffic to justify this extension in the future. In the event that the runway is extended in the future several other changes will be necessary to the Airport environment. 410th Avenue will likely need to be closed due its proximity near the relocated runway threshold and position in the relocated RPZ, although the RPZ would remain within Airport property. A runway extension would benefit medical operations and support future growth as turbine aircraft become more common. Therefore, it should be kept on the ALP and land to the northwest of the runway should be retained to protect for a future runway extension when necessary.

4.1.2 Crosswind Runway

The previous chapter determined that crosswind coverage may be less than 95 percent for small aircraft with a 10.5 knot crosswind limitation. Although it is recommended that a local weather reporting station first be installed on the Airport, small aircraft represent the majority of operations at D42 and it is important to consider possibilities that will increase the crosswind coverage of this group. Constructing a crosswind runway within existing Airport property would not be possible, as it closely mimics the current Airport footprint, and the crosswind runway would extend beyond existing property boundaries. Although the Airport is not significantly constrained by adjacent land uses several design surfaces, such as the runway protection zones (RPZs) and MnDOT Safety Zones discussed in Chapter 1, will extend well beyond the runway surface.

A turf runway at an alignment of 04/22 has been previously considered. Although an alignment of 04/22 would provide the best overall wind coverage this orientation would cause Safety Zone A and the RPZ to overlap several businesses and/or residences to the northeast along US Highway 14. This area has seen commercial growth over the past decade and its location on US Highway 14 makes it a prime area for future development. Therefore, purchasing land in this area would not only increase the price of a crosswind runway substantially and impact local businesses and/or residents but could impede future city growth. Due to these restrictions a runway orientation of 09/27 is proposed and the 04/22 alternative has been modified. Although land would still need to be acquired, these alternatives align the runway with less populated areas to limit land use conflicts but would increase the crosswind coverage over the 95 percent threshold, as shown in **Table 4-1**.

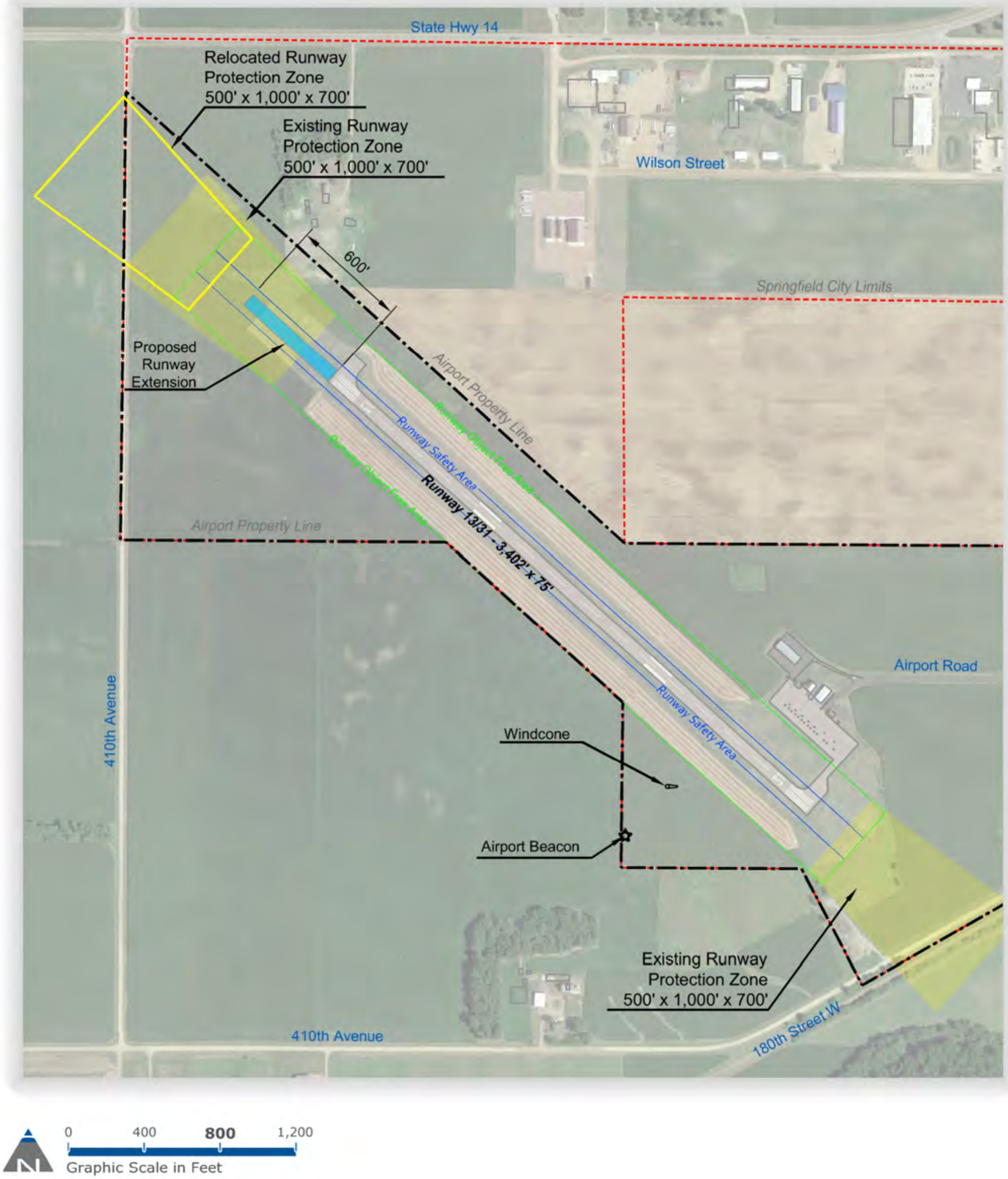


Figure 4-1: **Runway Alternative 2: 600 Foot Extension**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

Table 4-1: A/B-I Crosswind Coverage			
Weather	**Existing**	**With Additional Runway**	
		04/22	**09/27**
All Weather	93.40%	98.04%	95.62%
VFR	93.07%	97.92%	95.28%
IFR	94.87%	98.58%	97.21%

Source: FAA Wind Analysis Tool

As both of the alternatives are developed along the same orientation due to surrounding land uses, the wind coverage will be the same for each alternative and concerns similar for both alternatives. Each alternative will be evaluated on the following criteria:

Airport Utility – This section will consider how much utility would be added to the Airport. In addition to providing the required wind coverage, the type of aircraft intended to use the proposed runway will be discussed as well as any other factors that may impact the overall utility of the Airport.

Instrument Approach – Each alternative will consider a future instrument approach attached to the proposed runway and the type of aircraft it may be able to serve.

Land Use – This section will examine the surrounding land use conflicts due to MnDOT Safety Zones and RPZs, as mentioned in Chapter 1. Minnesota Statute 8800.2400, *Airport Zoning Standards*, prevents several types of land uses that may interfere with airport operations for each Safety Zone. Safety Zone A restrictions prohibit any building, temporary structures or any use that will result in the assembly of persons. The majority of the land around the Airport is currently dedicated as agricultural land, which is a permitted use, although development in the area is planned. Safety Zone B restrictions are intended to limit population density as shown below in **Table 4-2**. As the area within Safety Zone B to the east is greater than 20 acres for all alternatives, up to five acres (218,000 square feet) could be developed into clustered building plots with a maximum population of 300 people.

Table 4-2: Safety Zone B Development Restrictions			
Site Area (Acres)	**Ratio of Site Area to Building Plot Area**	**Maximum Building Plot Area (Square Feet)**	**Maximum Population**
3 – 4	12:1	10,900	45
4 – 6	10:1	17,400	60
6 – 10	8:1	32,600	90
10 – 20	6:1	72,500	150
> 20	4:1	218,000	300

Source: MN Statute 8800.2400, Airport Zoning Standards

Development would either be clustered or positioned on larger plots to allow for residential development in this area. Prohibited uses in Safety Zone B include churches, hospitals, schools, theaters, stadiums, hotels and motels, trailer courts, camp grounds, and other places of public or semipublic assembly.

Feasibility – This section will discuss the feasibility of the alternative. This will include impacted roads or lands and any other challenges that may arise with implementing the proposed alternative.

Crosswind Runway Alternative 1: Turf 4,020' Runway

This alternative proposes a 4,020-foot turf runway in a 09/27 orientation, shown in **Figure 4-2**. Turf runways require additional length due to the resistance of the grass when aircraft are taking off. Based on the elevation, temperature and surface of the runway this is the minimal length for a turf runway at D42. As the majority of aircraft that require crosswind coverage are small single and twin piston engine aircraft a turf runway would provide another option at a reduced cost. The existing runway satisfies the crosswind requirements for larger aircraft and so this alternative would be intended for smaller aircraft.

Airport Utility – This option would not only provide the required crosswind coverage but would provide an alternative runway surface for pilots. Some small aircraft, particularly tail wheel aircraft, benefit from a turf runway. The softer surface is able to absorb impacts from hard landings and prevent or mitigate potentially dangerous bouncing and oscillations. Given the high amount of single engine piston aircraft in the region this would be an attractive option for aircraft and may make the Airport more appealing for small aircraft seeking a base. Arguably, the main drawback of this alternative is that turf runways are often unusable during heavy rain and the peak of winter as they are usually not plowed.

Instrument Approach – Instrument approaches attached to turf runways are uncommon and this alternative would not propose one dedicated to the proposed turf runway. However, approaches would be able to be conducted on the proposed runway using the existing instrument approaches for Runway 13/31 and then performing a circling approach to the proposed turf runway. This is particularly important as the current IFR crosswind coverage is below 95 percent.

Land Use – Due to the turf's runway greater length the Safety Zones would be extended. The proposed runway would be positioned so that the RPZ and Safety Zone A terminates on agricultural land use on either side of the runway. Zone B beyond the proposed Runway 27 end would overlap some areas of private property although neither area is densely populated. While there would not be any immediate land use conflicts associated with this alternative it may restrict further residential development in this area.

Feasibility – Both alternatives would require the partial closure of 410th Avenue for the crosswind runway construction. This road provides a connection between US Highway 14 and 180th Street West. However, as there are no private entrances located along this road, and other roads in the vicinity provide passage between the highway and 180th Street West, no significant impacts are considered to be associated with this road closure.

Crosswind Runway Alternative 2: Paved 3,350' Runway

This alternative would construct a paved runway 3,350 feet long with the potential for a non-precision approach with one mile visibility limitations, as shown in **Figure 4-3**. The paved surface would allow for a shorter runway length which would minimize safety area conflicts while allowing larger aircraft to operate.

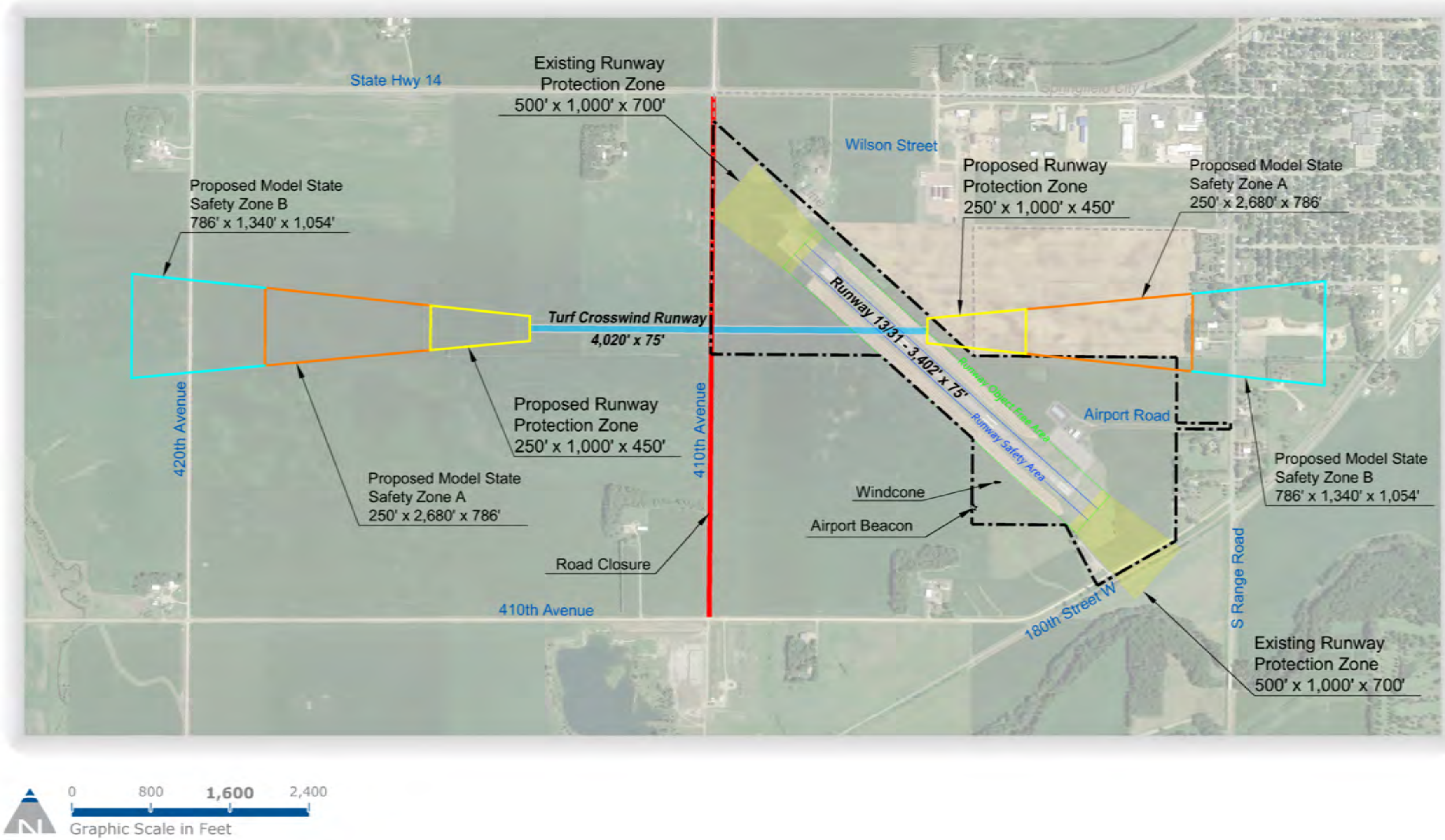


Figure 4-2: **Crosswind Runway Alternative 1: Turf 4,020' Runway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

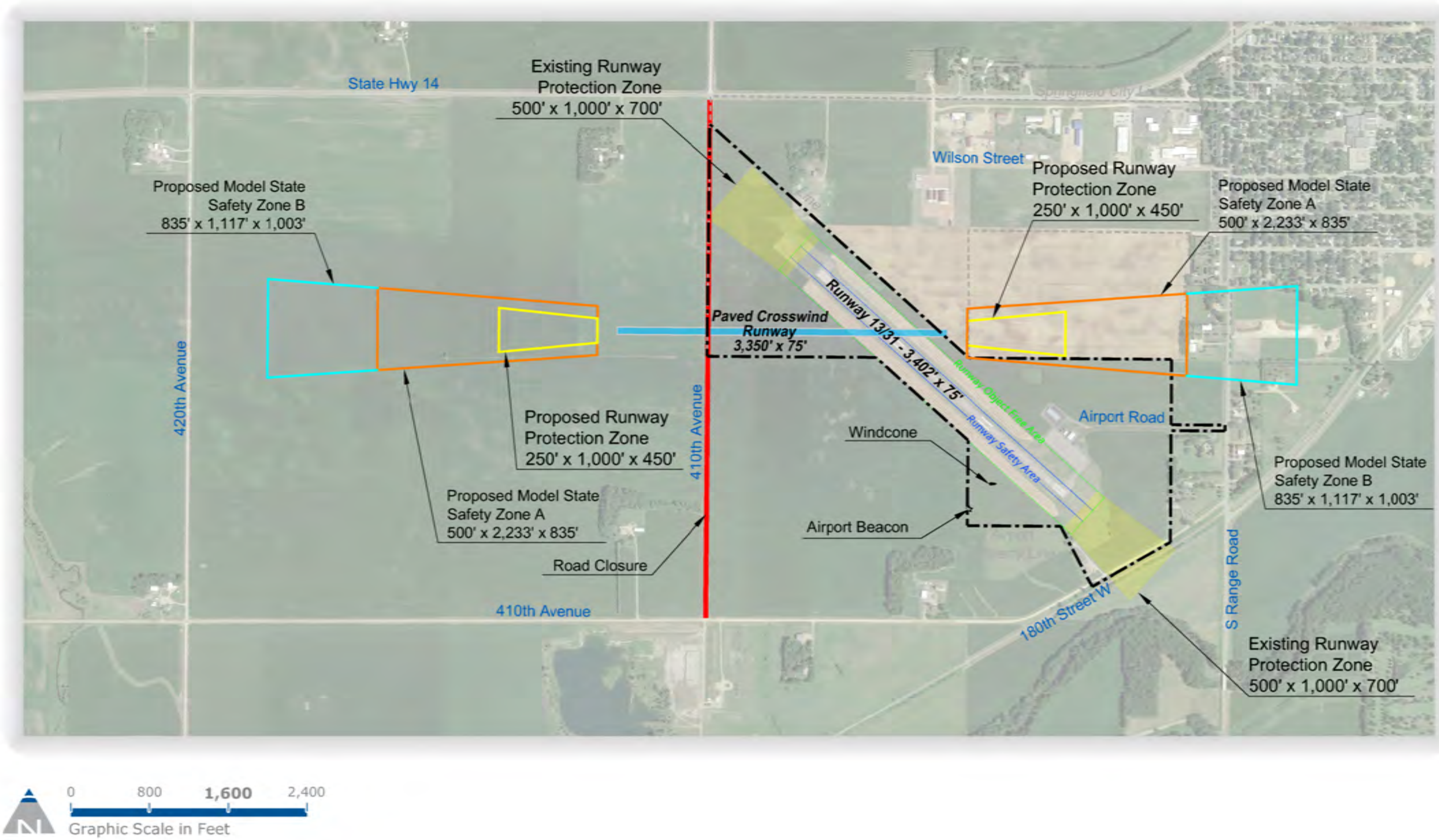


Figure 4-3: **Crosswind Runway Alternative 2: Paved 3,350' Runway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

Airport Utility – Although shorter than Alternative 1, the hard surface would allow heavier aircraft to operate on the runway. This length would be sufficient for the vast majority of piston powered aircraft with limited utility for turbine aircraft. Most turbojet aircraft would not be able to operate at this length although there would be some limited use for turboprops. However, as the crosswind coverage is met for most turbine aircraft it is unlikely they would utilize this runway, as Runway 13/31 offers additional length. Therefore the overall Airport utility would have a marginal increase compared to Alternative 1 as heavier piston aircraft, such as twin engine aircraft, would be able to use this runway but it is unlikely that turbine aircraft would use the runway often.

Instrument Approach – A non-precision approach with one mile visibility limitations could be added to this runway without an increase in the safety zones around the runway. The approach attached directly to this runway would provide aircraft with increased access to the Airport as the circling approach described in Alternative 1 often require higher ceilings to be safety conducted. However, given the amount of instrument operations at D42 over the past several years it is not suspected that this would greatly increase the Airport activity during IFR conditions.

Land Use – Land use impacts for this alternative would be similar to Alternative 1 except the Safety Zones would be slightly smaller. Safety Zone B off the proposed Runway 27 end would be positioned over the same sparsely populated area as Alternative 1 but would terminate earlier.

Feasibility – Similar to Alternative 1 part of 410th Avenue would have to be closed.

Crosswind Runway Alternative 3: Turf 1,850' Runway

This alternative consists of a turf crosswind runway 1,850 feet long perpendicular to the existing runway. Although this orientation was previously considered and rejected due to a variety of conflicts with surrounding development, this alternative shortens the runway so that the associated zoning would not present land use conflicts, as shown in **Figure 4-4**.

Airport Utility – This alternative is considerably shorter than the previous two alternatives as it is intended to serve small aircraft that often prefer turf runways, such as tailwheel aircraft, while also offering a crosswind alternative. Site constraints limit the length of the proposed runway. Although other turf runways in the vicinity are 2,000 feet or longer, the proposed length would be able to serve many of the local small aircraft. The turf runway would also provide an alternative to the current paved runway so that aircraft would be able to choose the type of surface best suited to their needs. Currently, the Tracy Municipal, Redwoods Falls Municipal, and New Ulm Municipal Airports all have both a paved and turf runway option. Finally, this orientation also provides superior wind coverage compared to a 9/27 orientation, as shown in **Table 4-1**.

Instrument Approach – Similar to Alternative 1, there would not be an instrument approach attached to this runway, although a circling approach would be possible.

Land Use – Due to the reduced runway size of this alternative, the safety zones would be limited to agricultural areas. This would allow residential and business development to continue without conflicting with the proposed runway.

Feasibility – Due to the orientation of this runway surrounding roads would not be impacted.

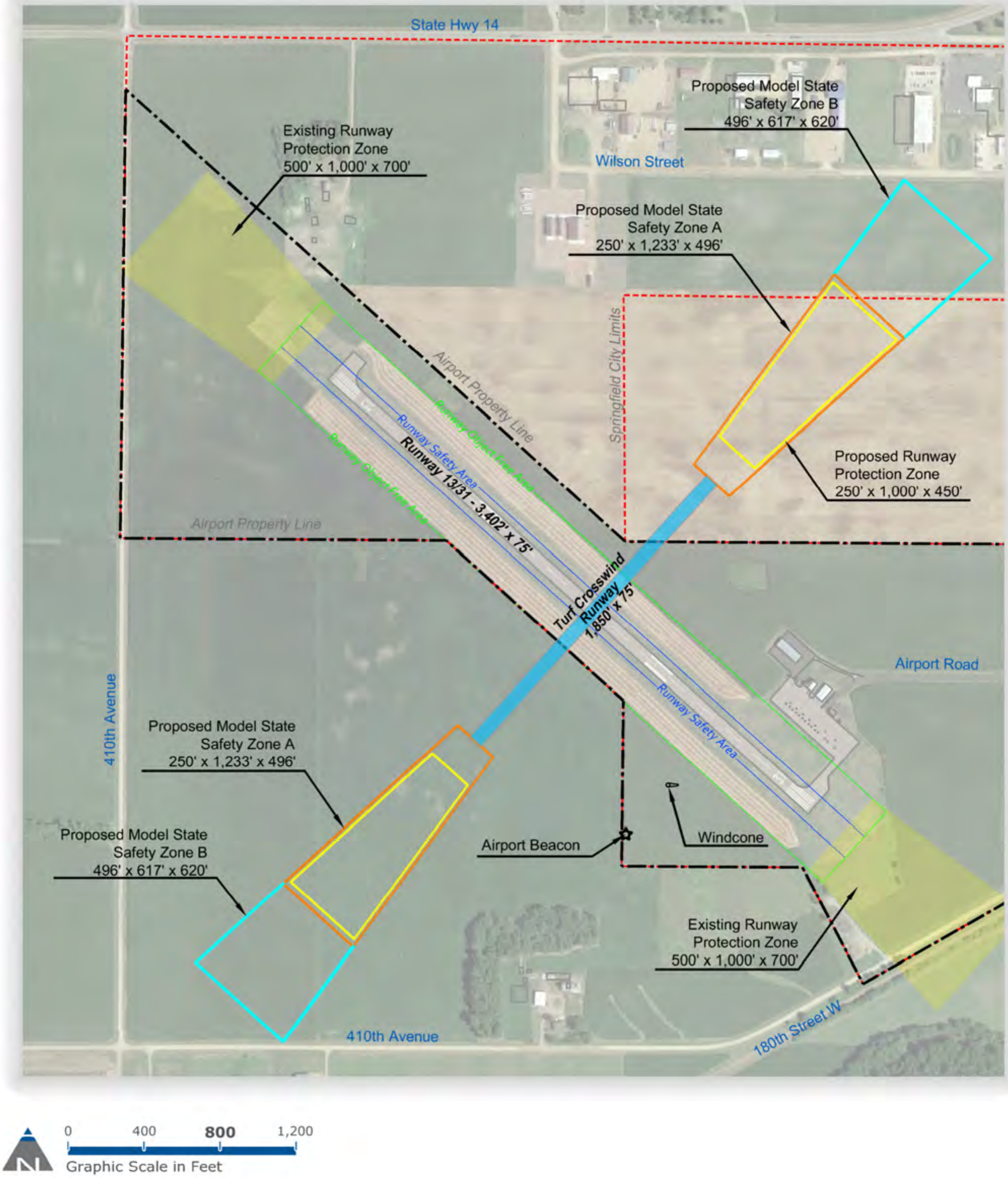


Figure 4-4: **Crosswind Runway Alternative 3: Turf Runway 04/22**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

4.2 Taxiway

As stated in Chapter 3, a 2011 Environmental Assessment (EA) was conducted to develop a preferred alternative to meet the needs of D42. As the shortcoming of the current layout and anticipated needs have been discussed in previous chapters, this section will discuss the alternatives presented in the EA, identify a new alternative, and reevaluate each alternative. The following five alternatives address taxiway circulation at the Airport.

Taxiway Alternative 1: No-Action Alternative

This alternative would keep the existing conditions at the Airport. Traffic would continue to back taxi on the runway and a single access point to the runway would remain. As this does not meet the purpose and need described in the EA or in Chapter 3 of this master plan, this alternative was no longer considered.

Taxiway Alternative 2: Partial Parallel Taxiway

A partial length taxiway, shown in **Figure 4-5**, would allow two points of access to the runway and improve aircraft circulation for arriving and departing aircraft. However, as this taxiway would not match the full width of Runway 13/31, any aircraft arriving from or departing to the south may still have to back taxi to reach the partial parallel taxiway. As taxiing on the runway would still exist under this alternative, it was dismissed from further consideration.

Taxiway Alternative 3: Full Parallel Taxiway on West Side of Runway 13/31

This alternative would construct a full parallel taxiway on the west side of Runway 13/31 as shown in **Figure 4-6**. As the hangars and other Airport facilities are on the east side of the runway, this would require aircraft to cross the runway to reach the taxiway. Additional runway crossings from aircraft and vehicles would increase the likelihood of a runway incursion. In addition, as the apron is located on the east side of the runway, a taxiway on the west side would require a larger amount of pavement. Finally, this alternative would require the acquisition of 3.3 acres of land west of the Airport due to a drainage ditch that runs parallel to the west side of Runway 13/31. Due to the increased costs and safety concerns, this alternative was dismissed from further consideration.

Taxiway Alternative 4: Full Parallel Taxiway on the East Side of Runway 13/31

Under this alternative, a full parallel taxiway would be constructed on the east side of the runway as shown in **Figure 4-7**. The taxiway would connect to the north side of the existing apron and extend to the remaining length of the runway. As the Airport's existing facilities are based around the apron, this would allow aircraft quick access to the taxiway while improving circulation. Compared to Alternative 3, less pavement would have to be constructed, a runway crossing would not be required to access the taxiway, and land acquisition would not be required. However, connecting the taxiway to the apron would mean that aircraft landing and taxiing back to take off again would be required to transit across the apron. As this is where aircraft will be parking, maneuvering, and fueling, this would interfere with these activities.

Taxiway Alternative 5: Modified Full Parallel Taxiway

This alternative modifies Alternative 4 to locate the taxiway to the west of the existing apron as shown in **Figure 4-8**. FAA Advisory Circular (AC) 150/5300-13A, *Airport Design,* requires 240 feet between the centerline of the runway and taxiway.

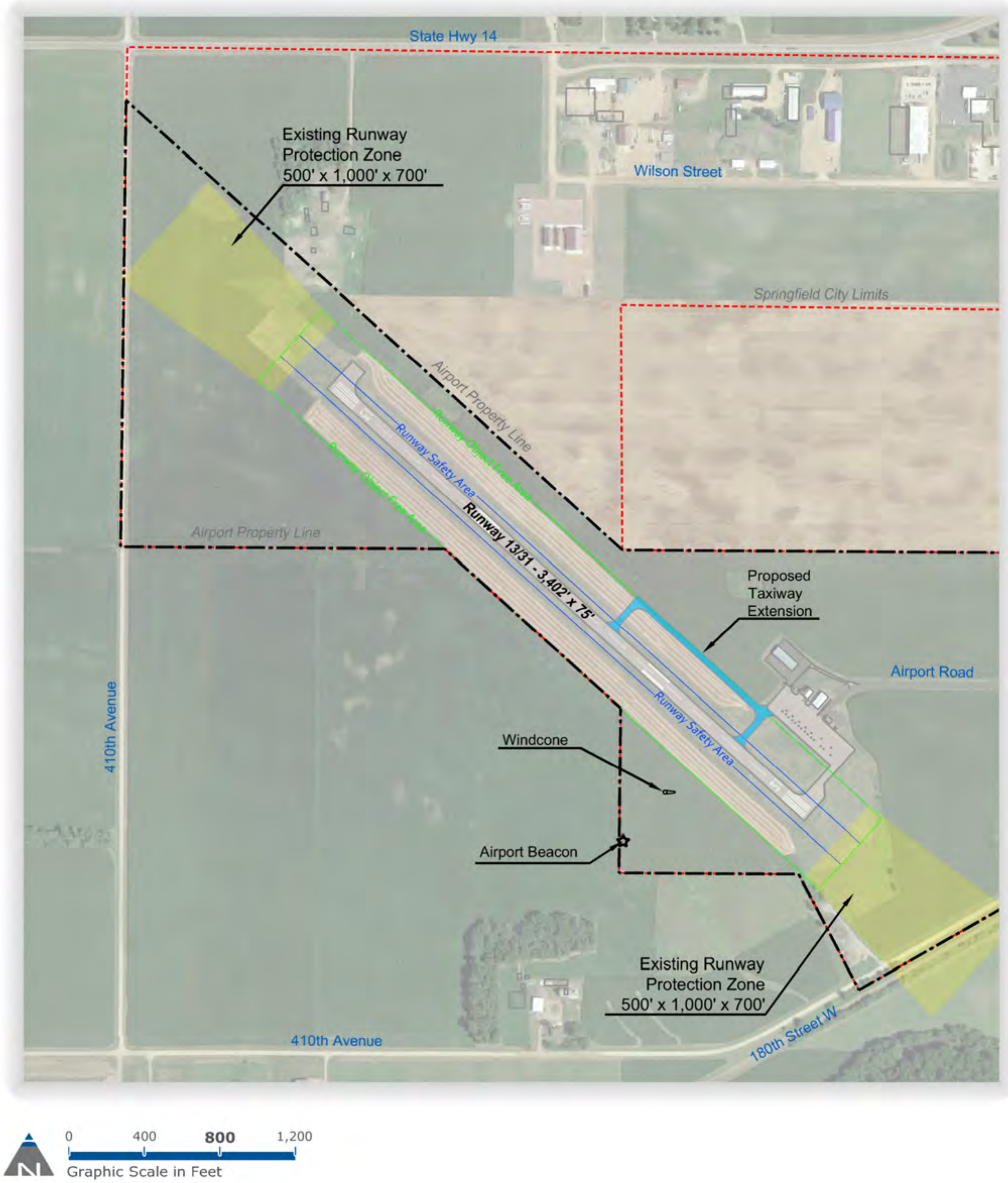


Figure 4-5: **Taxiway Alternative 2: Partial Parallel Taxiway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

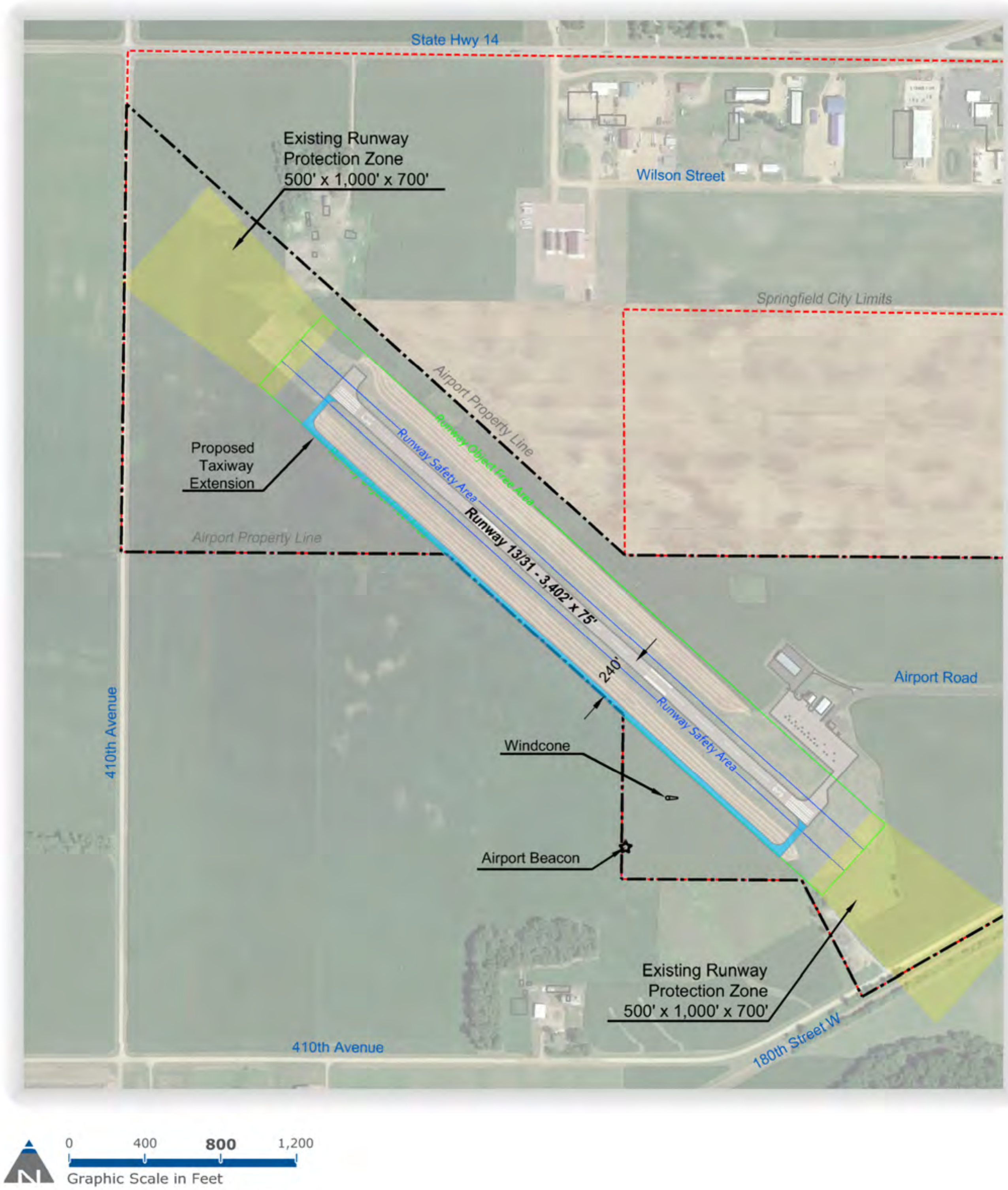
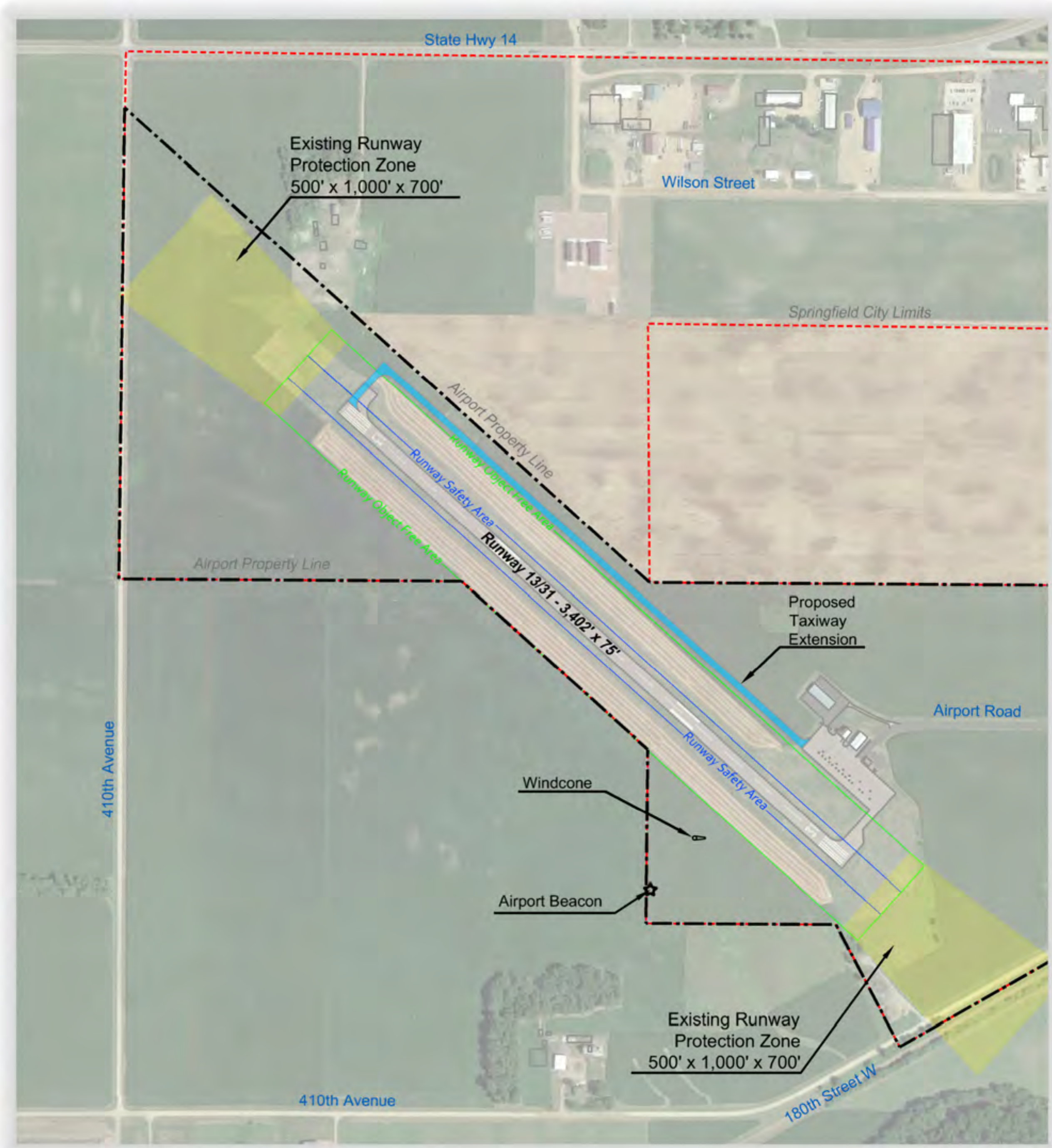


Figure 4-6: **Taxiway Alternative 3: West Full Parallel Taxiway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*



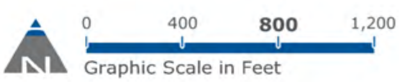


Figure 4-7: **Taxiway Alternative 4: East Parallel Taxiway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

Figure 4-8: **Taxiway Alternative 5: Modified Parallel Taxiway**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

This alternative would place the taxiway at that separation, allowing a small gap between the apron and taxiway to improve circulation. The existing connection to the apron from the runway would be removed to prevent a direct connection to the apron. A connection from the apron to the proposed taxiway would be placed on the north side of apron. This would allow aircraft to be able to easily access the taxiway system from the hangars without interfering with the activity on the apron. This layout would allow improved aircraft circulation as transiting aircraft, or aircraft conducting repeated landing and takeoff operations, would not be required to enter the apron. The same FAA AC requires that 65.5 feet is located between the centerline of the taxiway and a fixed or movable object, such as aircraft parking. Therefore, a small section of the apron would have to be removed and aircraft tie downs moved slightly. As this alternative proposes more pavement than Alternative 4 it would increase the comparative cost. In the event that this is cost prohibitive a turf taxiway in this configuration could be considered.

4.3 Apron

Based on the aircraft parking demand in Chapter 3, an additional two tie downs will be required over the 20-year planning period. As the existing apron would be reduced and parking slightly relocated under Taxiway Alternative 5, it is recommended that the apron be expanded to the northwest. This would allow additional aircraft tie downs that would not inhibit traffic on the existing apron, and additional aircraft tie downs could be added as required. Currently, agricultural aviation operations take place on the southern portion of the apron and constructing a designated loading area would mitigate the risk of environmental impacts. Designating a loading area in the existing location would interfere with aircraft taxing across the apron to access the runway. As stated in Chapter 3, Minnesota Administrative Rule 1505.3070, *Loading Areas*, requires a three-inch high perimeter around loading areas providing 1,000 gallons of retention. Therefore, the apron could be expanded to the south to meet the required retaining capacity. This designated area would also prevent loading aircraft from blocking aircraft transiting across the apron or self-fueling area. A loading area of approximately 6,000 square feet is shown in **Figure 4-9** and would provide room for aircraft to maneuver in addition to meeting the retention requirements.

4.4 Hangars

The preferred based aircraft forecast indicates there will be a need for 7,200 square feet of hangar space. As the majority of aircraft are single-engine aircraft, T-hangars are considered the most economical way to meet this demand. The 2004 ALP shows T-hangars constructed to the northwest of the existing T-hangar, as depicted in **Figure 4-9**. One additional T-hangar would nearly meet the projected need although additional hangars could be built along this axis based on future demand. Although this would satisfy the projected need for the number of aircraft consideration should be given to future turbine or large twin engine piston aircraft.

It is often prudent to separate piston and turbine power aircraft due to their difference in sizes to promote safety. A series of box hangars could be constructed on the southeast portion of the ramp. This would leave room for an additional taxilane to allow aircraft access while parking for these hangars would fit on the northwest. This configuration would allow an initial hangar to be constructed with direct access to the apron, for use by either a private tenant or FBO based on demand, and future tenants could be situated along the same axis.

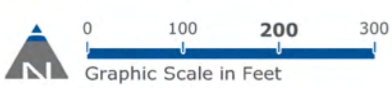


Figure 4-9: **Landside Facilities**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

4.5 Vehicle Parking Area

Vehicle parking is located adjacent to the A/D building with space for approximately ten vehicles. As aircraft owners will often drive to their hangars and not park next to the A/D building, this lot usually serves visitors and city personnel. Therefore, vehicle parking is considered sufficient for the duration of the planning period.

4.6 Fixed Based Operator (FBO)

In the instance that a FBO decides to develop at the Airport, potential locations should be considered for development. The south side of the current apron is vacant and would provide a relatively isolated area from other activities for pilots and passengers to enplane/deplane and service aircraft. This area would provide enough space for an FBO and separate vehicle parking area to be constructed, as shown previously in **Figure 4-9**. Based aircraft are often a function of the surrounding flying population, as pilots would prefer to hangar their aircraft relatively near where they live. Therefore, the possibility of increasing the based aircraft by attracting surrounding aircraft is usually limited to nearby airports. The presence of flight training, often associated with an FBO, on the Airport would increase based aircraft.

4.7 Maintenance/Snow Removal Equipment (SRE) Facility

A maintenance and SRE building was recently constructed in 2012. This building is approximately 2,600 square feet with three main bay doors to allow equipment to easily park. This building is in good condition, was recently constructed, and appears to be meeting storage and maintenance needs. Therefore, no changes are recommended for this facility for the duration of the planning period.

4.8 Fuel Facilities

The new self-service fuel pump has been operational since 2013, holds 1,500 gallons of 100LL fuel, and is refilled several times a year. The space surrounding the pump allows aircraft to taxi up to the pump without interfering with surrounding traffic. As the location, capacity, and functionality, of the pump appear to be meeting the demands of the Airport, no changes are recommended for the duration of the planning period for 100LL fuel. However, as turbine aircraft are becoming more popular there may be a need for Jet A fuel to be available at the Airport. In addition to normal turbine-powered business aircraft, medical operations and turbine-powered helicopters, often used for agricultural aviation, would benefit from Jet A fuel on-site.

The existing runway protection zones (RPZs) and proposed parallel taxiway meet the requirements for reducing the approach visibility minimums to 3/4 mile visibility. Reducing the visibility minimums would allow for additional operations at the Airport during inclement weather and aid future medical operations on the Airport. This would benefit from the support of various NAVAIDs discussed in this section.

4.8.1 Approach Lighting System

As mentioned in Chapter 3, an Approach Lighting System (ALS) is recommended for instrument approaches with visibility minimums of 3/4 of a mile. There are a variety of ALS systems, each designed to provide a varying degree of guidance to pilots. The most complex systems are often 2,400 feet long and consist of sequenced flashing lights to guide pilots to the runway. However, these systems are expensive and their length can create a challenge installing them when the site is restricted, such as at D42 due to nearby roads. FAA AC 150/5300-13A, *Airport Design* (Table 3-2), lists several acceptable ALS systems. The two most applicable for consideration at D42, based on local conditions such as activity and instrument approaches, are the Medium Intensity Approach Lighting System (MALS) and Omnidirectional Approach Lighting System (ODALS). FAA AC 150/5340-30H, *Design and Installation Details for Airport Visual Aids*, provides guidance on selecting an ALS based on local conditions.

4.9 NAVAIDs

A MALS provides early runway lineup and identification. The advantage of a MALS is that it assists pilots with altitude awareness in areas that lack visual cues for pilots. Areas without a significant amount of terrain or lighting in the vicinity are subject to a phenomenon known as a featureless terrain illusion or black hole approach. This illusion makes it appear to pilots that they are at a higher altitude than they actually are due to the absence of surrounding features. As a result, a pilot may fly their approach at a dangerously low altitude. Although the precision approach path indicator (PAPI) at the end of each runway can aid in maintaining a safe approach path, a MALS would provide an additional aid for situational awareness.

An ODALS provides omnidirectional lighting to aid pilots in lining up with the runway. Two lights on either side of the runway threshold serve as runway end identifier lights (REILs). The advantage of an ODALS as compared to a MALS is that the omnidirectional nature of the lights provide additional aid to pilots conducting a circling approach to the runway. ODALS extend to a length of 1,500 feet compared to the 1,400 feet of a MALS. **Figure 4-10** and **Figure 4-11** show each of these systems, respectively. As the area surrounding D42 is sparsely inhabited and surface lighting is limited, it is recommended that a MALS be selected as the future ALS. Although ODLAS provides the advantage of being more compatible with circling approaches, installing a MALS on either end of the runway would reduce the need for a circling approach. Additionally, ODALS are becoming less common and the layout of the MALS helps to orient pilots and prevent illusions that may lead to pilots flying a low approach.

Figure 4-10: Omnidirectional Airport Lighting System

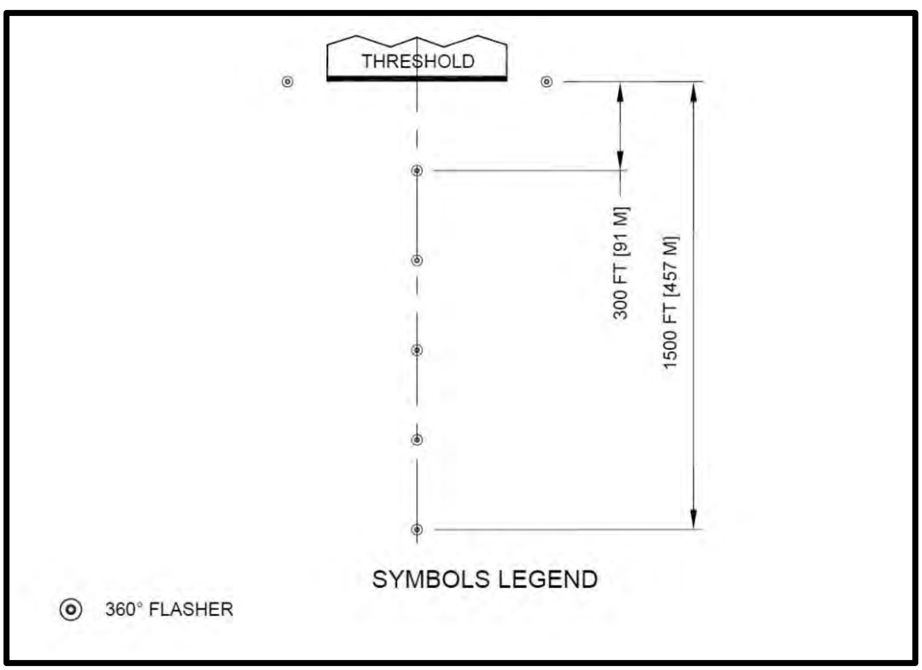
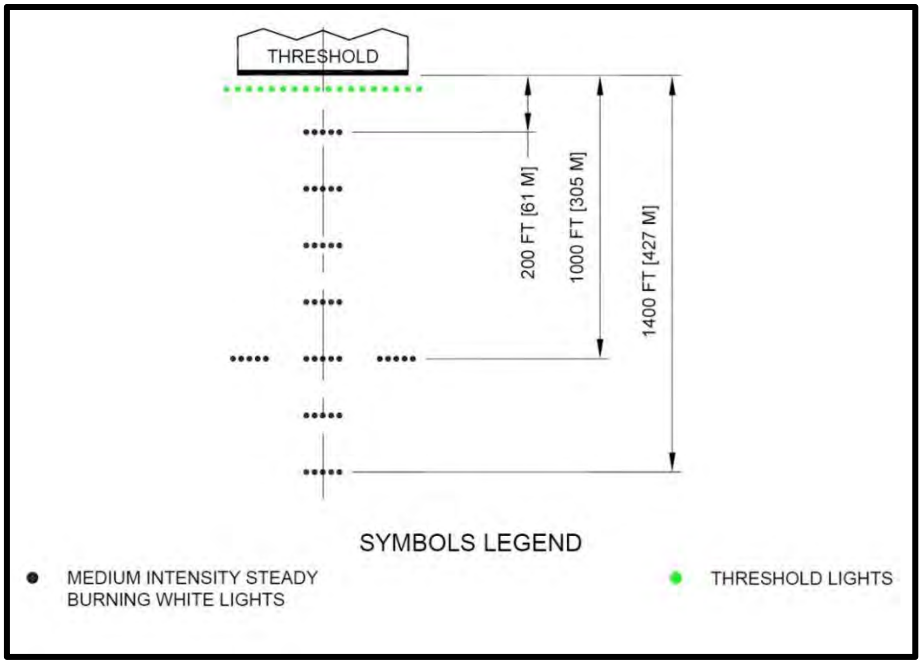


Figure 4-11: Medium Intensity Approach Lighting System



4.9.1 Weather Reporting System

A weather reporting system, such as an Automated Surface Observing System (ASOS), would be beneficial at the Airport as it would allow real-time weather reporting. This would be particularly important during medical operations which are often time sensitive operations conducted in inclement weather. As mentioned in the previous chapter, the location of the ASOS should be 1,000 feet from the primary runway and 3,000 feet from the runway thresholds. This section will provide alternatives for the location of an AWOS while adhering to sitting requirements and considering future Airport development. All alternatives can be seen in **Figure 4-12**.

Weather Station Alternative 1: West of Runway 31 Threshold

This alternative would place the station near the Runway 31 threshold 500 feet from the runway and within 3,000 feet of the Runway 13 threshold. This would allow it to meet siting requirements, and this area is currently occupied by agricultural land on Airport property. This location provides several benefits including proximity to the terminal area and other NAVAIDs, which help to minimize the footprint of the Airport. This location is easier to connect to electrical and is beyond all required safety areas of the runway. However, consideration should also be given to the future layout of the Airport. Given the turf runway alternatives discussed in Section 4.1.2 would not have an instrument approach attached to them, the station would not need to remain within 3,000 feet of their proposed thresholds. However, in the event Runway 13 is extended by 600 feet or Crosswind Alternative 2 is selected, the 3,000 foot limitation would be exceeded for the extended Runway 13 threshold and proposed Runway 09 threshold. In summary, this alternative would meet existing but not future needs.

Figure 4-12: **Proposed Weather Stations**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

Weather Station Alternative 2: Near Terminal Area

This alternative would place the station 600 feet from the centerline of Runway 13/31 near the terminal area. This would provide easier access for maintenance as a runway crossing would not be required, and the station would be positioned close to the terminal area to allow for an easier electric connection. In addition to these benefits, this location works for siting on existing Airport property. Although this location would not remain within 3,000 feet of the Crosswind Alternative 2, it would remain within 3,000 feet of the Runway 13 threshold even if the runway is extended by 600 feet. Therefore this alternative would meet existing needs while allowing an extension of the current runway.

Weather Station Alternative 3: Midfield

This alternative would place the station 500 feet from the runway centerline near the Runway 13 threshold. The main benefit of this alternative is that it would remain within 3,000 feet for all existing and proposed runway thresholds, including the Runway 13 extension and proposed paved crosswind runway. This location is not currently Airport property but would be acquired if a west-east oriented crosswind was constructed. Therefore this alternative is a potential long-term location for a weather station and should only be considered in conjunction with a future crosswind runway.

CHAPTER 5

IMPLEMENTATION PLAN

5.1 Introduction and Goals

The Springfield Municipal Airport (D42) connects the local community to the national airspace system, helps local businesses, and supports local activities such as agricultural aviation and recreational flight. However, construction projects and regular maintenance can be expensive and the City may be unable to support the Airport without external funding and careful planning. The Airport's current position as "unclassified" on the FAA's National Plan of Integrated Airport System (NPIAS) means funding for the Airport is not expected to increase and if the Airport is removed from the NPIAS then it will no longer be eligible for funding under the Airport Improvement Program (AIP). As the continued operation of the Airport is important to its users and allows the City of Springfield greater connectivity to the surrounding region, the long-term viability of the Airport is essential for the community. This chapter present objectives for strengthening the long-term viability of the Airport, potential strategies for pursuing these objectives, and project phasing recommendations for promoting and managing future activity growth, with the overarching goal of enabling the Springfield Municipal Airport (D42) to continue serving the community long-term. As a whole, this chapter provides direction to pursue two goals for maintaining long-term viability:

1. Improve the Airport's FAA classification to "basic", which will make the Airport eligible for federal AIP entitlement funding to support future projects and maintenance. As discussed in previous chapters, the most likely way to achieve basic airport classification status is to establish a minimum of ten based aircraft at the Airport.
2. Improve or create revenue streams at the Airport by identifying, building, and capitalizing on development to support future projects and maintenance.

These two goals are not mutually exclusive, and the pursuit of either will generally complement the other. Therefore, this chapter seeks to pursue each of these goals through a variety of objectives and supporting strategies. Each objective is listed below:

- Increase Based Aircraft
- Diversify Financial Resources
- Prioritize New Infrastructure and Services
- Garner Community Support

5.2 Objectives for Viability

This section presents the four overarching objectives for pursuing the joint goals of classification as a basic airport in the NPIAS and establishing viable revenue streams and future funding. Each objective presented in this section is supported by a number of strategies.

5.2.1 Increase Based Aircraft

This first objective is to grow the number of based aircraft at the Airport, which can be pursued using various strategies. As ten based aircraft would reclassify the Airport in the NPIAS and increase its eligibility for federal funding, increasing the number of based aircraft should be the first priority of the Airport.

Organic Growth and Market Share

Although there are many factors pilots consider when selecting an airfield for their aircraft, such as hangar costs and runway characteristics, the primary factor is often the proximity to their home which allows easier access to their aircraft. This limits the number of potential aircraft likely to be based at D42 to aircraft currently in the vicinity and any pilots that may move into the area. Several unique strengths make D42 a favorable choice compared to other airports in the area. Hangar conditions and costs at D42 are competitive with other airports and its amenities are similar, if not superior. Therefore, it is likely that, aside from organic growth of the Airport related to growth in the City of Springfield, any increase of any based aircraft in the short term will likely come from other nearby airports.

Offering initial promotions to promote interest at D42 may be beneficial. Nearby airports such as Tracy Municipal (TCY), Redwood Falls Municipal (RWF), New Ulm Municipal (ULM) and Sleepy Eye Municipal (Y58) all offer turf runways. Although some aircraft owners prefer turf runways they have inherent limitations. While some turf runways are plowed during the winter this is not common and can only take place once the ground is frozen. Therefore, the seasonal transition during late fall and early spring often render turf runways unusable. Extending initially discounted hangar promotions for new tenants during a seasonal transition period may emphasize the advantages that D42 has to offer. A paved runway with instrument approaches like Runway 13/31 allows tenants more operational days during the year, particularly during inclement weather and transitional months.

Reliever and Overflow Role

Surrounding airports are planning construction projects and their based aircraft may need either permanent or temporary hangar space. In order to effectively serve in a reliever and overflow role, D42 should have the infrastructure necessary to support a variety of aircraft. Business aircraft are often unable to wait for a hangar in their preferred location, as recreational pilots will sometimes do, but operate on more restrictive timelines. Therefore it is important to have available box hangars to support turbine and multiengine aircraft as the demand arises. Additional information on hangar development is discussed in Section 5.2.2 – *Aeronautical Development*.

Conclusion

Although increasing the number of aircraft at the Airport would likely be the most expedient method of securing federal funding and long-term viability for the Airport, the local market is limited and organic national growth of the general aviation (GA) fleet is expected to be modest. Therefore, additional strategies for increasing Airport viability should be considered.

5.2.2 Diversify Financial Resources

In addition to the prudent expenditure of capital on key projects, the City should also consider developing and promoting alternate revenue streams over the long term. Additional revenue will ease the fiscal burden of future large infrastructure projects. For instance, the existing runway pavement is generally in good condition and will continue to serve the Airport with only routine maintenance for many years. However, eventual reconstruction is inevitable with any paved surface and early planning can help ease the strain of reconstruction cost. Mead & Hunt projects that runway reconstruction will be required by 2030 and will cost approximately $4.5 million, according to the Airport's 2017 Capital Improvement Plan (CIP). Runway reconstruction will be essential but local funding alone will likely be insufficient. A copy of the CIP is available in **Appendix B**.

Although there are not any essential major projects expected to be needed at the Airport within the next decade, the future expense of a runway reconstruction project makes it prudent to take steps now to plan for this eventuality. State and local investments in the more immediate future may create new revenue streams that can reduce the overall financial support needed over the long-term. Federally supported public use airports typically receive annual Airport Improvement Program (AIP) entitlement funding for eligible capital projects, but the current FAA classification of D42 limits the possibility that such funding will be available to the Airport in the future. Although discretionary AIP funding may be available, these funds are usually reserved for safety-critical projects. This will require FAA to determine that the completion of a specific project is critical to their mission of supporting the national airport system. As major airport projects can be expensive, it makes fiscal sense for local, state, and federal entities to make incremental investments in the Airport that will promote and create revenue streams that will have a long-term impact on financial growth at the Airport. In summary, a relatively small investment in the short term may have a compounded effect over the long term and make future larger investments more feasible. The strategies in this section explore methods for promoting independent revenue streams.

Non-Aeronautical Development

When considering methods to create revenue streams, all of the Airport's resources should be taken into account. Although fuel sales and hangar rentals are a more traditional method of creating revenue, other avenues can be viable. For instance, the Airport currently collects revenue for land leased for agricultural use. This same practice could be expanded to other land uses. Airport land includes sections that are in close proximity to residential, agricultural and industrial land uses. Although residential land use is generally in conflict with airport activities, some commercial and industrial uses could be seamlessly integrated onto Airport property. The limited noise and activity of industrial or commercial uses are often similar to preexisting activities on the Airport. Manufacturing is a major business within the City of Springfield and the expansion of existing businesses onto Airport property may be mutually beneficial while raising revenue for the Airport.

Airport property currently includes undeveloped land near each end of the runway, while the central portion of the property closely parallels the runway and taxiway. Although some of this land is used to protect various design surfaces, specific areas could be used for non-aeronautical development, as shown in **Figure 5-1**. Airport land to the southeast, near South Range Road, is near future residential development and non-aeronautical development in this area would be limited to business use. This location has several advantages for businesses. Airport Road and South Range Road provide easy access and offer a location convenient to residents. This could be an ideal location for a small grocery store, café or other business with a small footprint that benefits from having a location near residential areas. This location also has easy access to the Airport terminal area if aviation activity is desired.

The land to the northwest of the Airport is bordered by 410th Avenue near the Runway 13 threshold. This area is more isolated and it is not immediately visible from any of the major roads or residential areas. This would be a prime area for industrial development as it would not interfere with Airport activities or surrounding residents. This is an important consideration as development on Airport land will reflect on the Airport's role as a good neighbor in the community. When handled well, Airport development, both aeronautical and non-aeronautical, can be a job creation opportunity and foster interest and support towards the Airport, while also creating additional revenue.

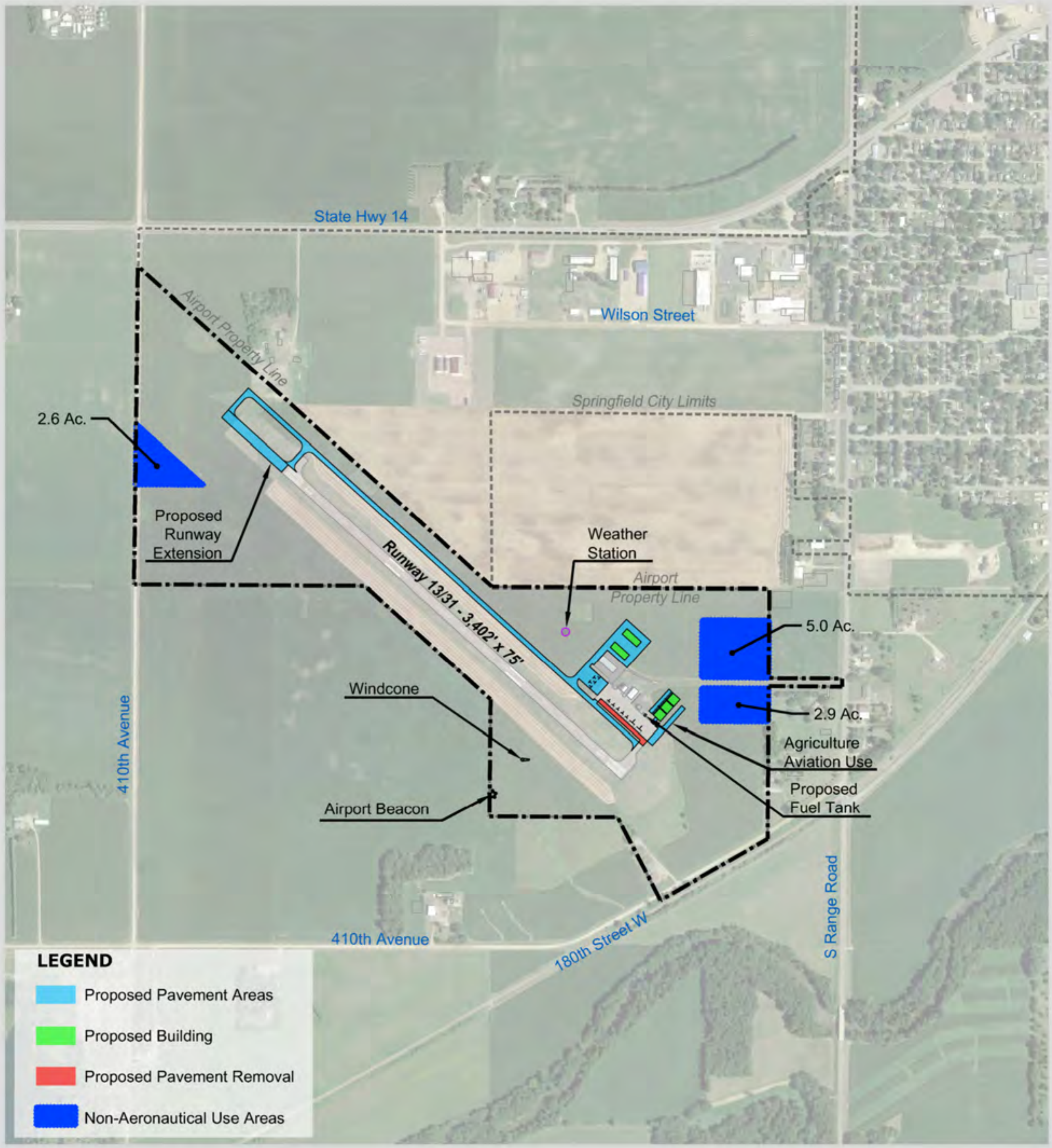
Aeronautical Development

As there are already sufficient T-hangars at D42, box hangars capable of supporting turbine powered aircraft should be considered to meet demand as it occurs. Available hangars of the proper size are crucial in supporting the Airport in the reliever and overflow roles described in Section 5.2.1. Business users that may move to D42 from other airports are unlikely to wait for available space. Although hangars may be costly to construct, the Minnesota Department of Transportation (MnDOT) offers a "Hangar Loan" program to assist airports construct needed development. The program provides an 80 percent and interest-free loan to state system airports for constructing new hangars that are paid back in installments over 20 years. This program can be used to fund both site prep for new hangars as well as the hangar building itself. However, in order to be eligible the hangar project must be shown as a proposed project in the Airport's CIP during the appropriate year of construction.

Additional aeronautical development should be considered to attract a Fixed Based Operator (FBO). An FBO would not only provide hangar rent to the Airport but may attract additional based aircraft. FBOs usually provide services such as maintenance and inspections that draw aircraft from the surrounding area and will often provide flight instruction. This could attract additional operations, fuel sales and pilots which may result in additional revenue for the Airport. Additional interest could be generated by creating incentives for FBOs to do business at D42, such as providing the existing box hangar as space, attractive fuel flow rates, or Tax Increment Financing (TIF) incentives. To gauge interest a request for information (RFI) could be issued by the City for potential tenants.

Land Use Planning

In addition to successfully attracting additional tenants and businesses to the Airport, there must be appropriate planning to ensure tenants have an efficient space and the Airport is viewed as a good neighbor by the community. The western portion of Airport owned land is dedicated to agricultural use. This area is isolated from City limits and other probable future development. It may be beneficial to explore permitting industrial development in this location, as it would benefit from the isolated area.



0 600 1,200 1,800
Graphic Scale in Feet

Figure 5-1: **Non-Aeronautical Development**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

However, the Airport and City should weigh the benefits of industrial development against current agricultural use. Areas to the east are close to the City of Springfield and development on and around Airport property should be carefully considered in order to provide complementary land use. Focusing aeronautical development near the existing apron will provide a dedicated area of aeronautical land use, while non-aeronautical development can occur in other areas as described above. The MnDOT Office of Aeronautics is currently updating its airport zoning standards to increase clarity and allow for site specific zoning practices. As these changes are ongoing, it is recommended to consider a local zoning update once the new standards are finalized.

5.2.3 Prioritize New Infrastructure and Services

New facilities and services will be required to support Airport growth and surpass the NPIAS based aircraft threshold. New infrastructure and services that will attract additional aircraft, operations, and revenue to the Airport may be prudent long term investments, as this new activity may lead to funding opportunities. Several potential changes to the Airport were identified in Chapter 4. This section prioritizes and summarizes how those alternatives may interact based on Airport conditions and preferred alternatives from Chapter 4 are shown in **Figure 5-2**.

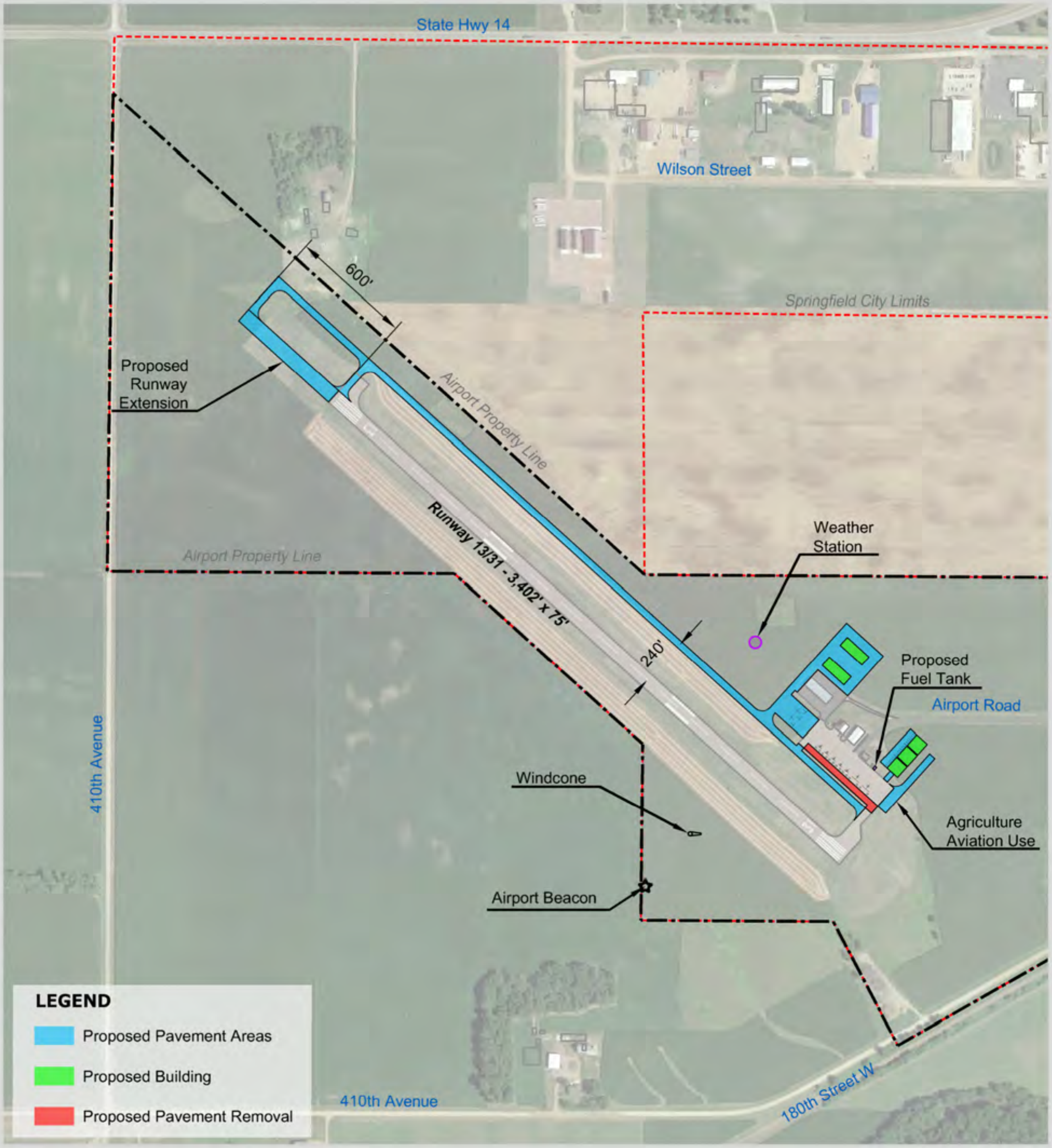
Airfield Improvements

A Runway 13/31 extension, parallel taxiway and improved instrument approaches would allow a greater range of aircraft to operate at D42. In addition, an automated weather reporting system would not only be crucial for potential air medical operations but benefit all users by providing real-time, site-specific conditions. In addition to improving airfield circulation and runway utility, the proposed parallel taxiway will be required to lower visibility requirements to ¾ mile for Runway 13/31.

Landside Facilities and Amenities

There are existing hangar vacancies on the Airport. This will allow for some flexibility when additional aircraft owners choose the airport as their base. However, site preparations for new hangars should be conducted prior to the existing hangars becoming full. This will allow for a smooth transition for aircraft owners interested in relocating to D42. The existing box hangar near the SRE building is partially unoccupied and could serve a turbine aircraft. Businesses often seek hangars that are already available or sites that are shovel ready, as they may not have the flexibility of recreational pilots. Therefore, it is important to retain some existing vacancy as demand grows.

The aforementioned “Hangar Loan” program could be used to help construct hangars as needed. As the Airport’s user base grows, additional space will need to be provided for pilots and passengers to operate. Although the arrival/departure (A/D) building is adequate, it is outdated and provides few amenities. Updating and expanding this facility will be necessary if additional hangars are constructed and occupied or as operations increase. Fuel improvements, such as adding Jet A fuel or increasing avgas capacity, may also be needed if turbine or piston aircraft increase operations.



0 400 800 1,200
Graphic Scale in Feet

Figure 5-2: **Preferred Alternatives**

Source: *Google Earth, MnDOT and Minnesota Geospatial Information Office (MnGeo)*

Agricultural User Improvements

As stated in Chapters 3 and 4, several hundred agricultural aircraft operations take place on a seasonal basis at the Airport. Currently, these aircraft and their support equipment operate on the southern edge of the apron. Extending the apron would provide a dedicated area for agricultural operations and would fill an existing need. Trucks would be able to dispense their product directly to aircraft while any spills would drain to and be captured at the center of the dedicated apron. This would have the dual benefit of providing users with support facilities while guarding against environmental contamination.

Ground Transportation Services

Finally, the importance of Airport activity will more readily be acknowledged by the community if there are visible economic impacts. Most operation types at the Airport are related to local business, agricultural applications, recreation, or flight training. If transportation to and from the Airport is not convenient, operations will likely be limited to the Airport and have only limited economic benefits to the community. Providing ground transportation to and from the Airport will allow the local community to feel the positive impacts of Airport growth.

5.2.4 Garner Community Support

For the Airport to achieve independent revenue streams, there must be interest in and commitment to the Airport from the local community, the larger flying community, and political representatives. Interest generated at a local level will help to create a sense of shared ownership in the Airport and the desire to maintain it as a community asset. This can be generated through local use, including special events and normal aviation use, and by increasing awareness of the economic and social benefits of the Airport. The Airport supports multiple types of uses and offers excellent facilities for business, medical, agricultural, personal, and recreational users. A review of the visiting pilot's sign-in book indicates the Airport may also be used for regional flight training. Increasing the flying community's knowledge of D42 will likely increase operations at the Airport and overall interest in continued operation of the Airport.

Creating and promoting awareness of the Airport is the first step in establishing a long-term community interest. Local GA airports often stage events such as fly-ins, pancake breakfasts, or other events. These measures, paired with a sustained presence in the region, can create a mixture of local and regional interest. If the Airport is acknowledged as benefiting the economy and supporting essential community services, this will assist in creating local support of the Airport from the wider community. Once the Airport is understood as an essential community asset it will reflect in the priorities of political representatives with the ability to secure public financial support.

There are many methods of creating interaction between the community and the Airport. Airport open houses, newsletters, air shows, and aviation education courses are all common ways the Airport create local interest. However, each of these methods have various costs and resources attached to them. Therefore, it is important to determine the most effective use of resources when establishing which promotional strategies to pursue with the local community and greater general aviation community. This section provides a discussion of various strategies, as researched by ACRP Report 28, *Marketing Guidebook for Small Airports*, which could be employed at D42.

It is important to note that it is unlikely that there is a single magic bullet answer to develop local interest, but instead a combination of strategies will likely be necessary to provide continued long-term exposure for the Airport. These suggestions focus on low cost options that are sustainable while having the benefit of repeated exposure and serve as a bank of ideas that the Airport can draw from when appropriate.

Each of the strategies discussed in this section could be further supported by finding parties interested in reaching out to the local community. Two of the most applicable aviation focused groups include the Aircraft Owners and Pilots Association (AOPA) and the Civil Air Patrol (CAP). AOPA often hosts classes and events for local pilots and serves as a conduit for advertising events at local airports. The CAP, an auxiliary of the United States Air Force, often provides flight training, and search and support during disasters. Aviation education courses through these agencies would bolster the regional recognition of the Airport while also serving the community. Other mutually beneficial partnerships could include other social groups such as the Chamber of Commerce, Boy Scouts, and Lions Club. Potential partnerships have been included below, but additional opportunities should be taken advantage of as they become available.

Economic Impact Studies

These studies demonstrate the economic impact of the Airport to the local community. This is a useful tool that can be targeted to public officials, businesses, news media, and interested residents. It can vary in length and complexity and can be funded by state or local entities. Information on how the Airport is supporting local businesses and buoying the finances of the City can encourage buy in from the local community and establish the Airport as a community asset that contributes more than an aviation playground for hobbyist. For D42, available information on the economic impact to the local community could be placed on a brochure and made available to the public. This could be a simple tool that could be distributed to business leaders, the chamber of commerce, local politicians and other interested parties to support knowledge of the positive impact that the Airport has on the community.

Airport Website

An airport website can be an effective way of quickly disseminating information, keeping tenants and the community informed, and providing a single point of contact to refer reporters and other inquiries. Identified as an essential tool for airports by the ACRP report, an airport website can also be used as a landing page for advertising. Important information is often available on the website such as hangar availability, cost, and fuel prices and can present a consistent branding for the Airport, which will aid recognition.

There is an existing need for a one stop shop for Airport information. Although the tab on the City website provides information, it is limited and does not showcase everything the Airport has to offer. Websites for small GA airports are generally fairly simple and a mutually beneficial partnership with the local high school may be possible. The high school has classes for web design, marketing and other relevant classes. A contest for the local high school students to design an airport website could provide an affordable avenue for fielding website ideas while giving high school students the opportunity for real experience. The more technical aspects of website building, such as security and coding, could be provided by using the City's existing site or a third party host. This option could even be followed up with a limited part-time internship to keep the website up to date at little cost while maintaining the community connection. Engaging the local high school would have the dual purpose of creating a new website for the Airport while also generating interest in the Airport within the local community. The Airport could play a role in fostering community growth and high school education while increasing its own visibility.

Airport Newsletter

A newsletter, often done on a quarterly basis, provides a method of keeping interested parties up-to-date with the Airport. Distribution of the newsletter can be done through the airport website or an email subscription list. Building a list of email subscribers provides a method of tracking interest as subscriptions change in number and could be a useful way of establishing a connection to interested parties. As other engagement strategies are enacted a newsletter could later be added. For instance, a list of interested parties could sign up for the newsletter at an Airport event or aviation education course, and/or at the Airport website. The downside of newsletters is that they are usually most effective at communicating with previously interested parties instead of reaching new groups. However, they are an excellent way to remain prominent in the local community and track interest.

Public Speaking

Public speaking is an effective way of gaining exposure for the Airport at a very low cost. Various opportunities can present themselves in the community such as aviation education, local political committees, or ceremonies. As the situation and event can vary so can the effectiveness, based on the type of event. For D42 this could apply to various audiences, such as the chamber of commerce, economic development authority or local ceremonies.

Press Coverage

Press coverage can come in many forms but the two most immediately relevant are press releases and earned press. Press releases are pieces of information about airport initiatives, opportunities or interesting stories that are sent to the media for publication. Earned press is when the press takes the first step to provide coverage of events or initiatives. Press releases can serve as a low cost method of gaining traction with the local community. Although it is up to the specific media outlet to determine if they want to release the information, an on-going relationship will help foster an understanding of the role the Airport serves in the community and media willingness to provide coverage. This can lead to opportunities for earned press as the Airport takes on initiatives. Airport events or mutually beneficial engagements in the community are often of particular interest. Communicating with the press should be an aspect of all initiatives, as press coverage can compound the level of interest generated by any initiative.

Airport Event

Airport events represent an umbrella category for many types of activities that can take place on an airport. One of the most well-known airport events are air shows, although open houses and aviation education programs are also common airport events. Air shows are usually costly events but can attract people from a wide region while displaying local and notable aircraft in flight and for static displays. While this may be an appealing option it is also high risk. A successful airshow may create a spike in sudden interest in the Airport, but it may not be as effective at generating long-term interest and reinforcing ties to the community. With the limited resources of the City an airshow is a risky option that is not likely to create sustained long term interest. Open houses are like airshows in that they often have exhibitors and booths, static aircraft, and food and beverage services, while providing the public a more in depth look at the Airport. Complex airports often benefit from open houses as a chance to demonstrate the less common aspects of the Airport, such as ARFF response and large SRE equipment. D42 is already very accessible to the community and gathering additional exhibits and static aircraft displays may be prohibitively expensive. As interest in the

Airport grows, an open house may draw a crowd together that local businesses would be interested in supporting the effort.

However, there are many other appealing events feasible for the Airport. Aviation education programs could be done in partnership with local schools or scouts to introduce citizens to aviation and the purpose of the Airport. GA airports generally find these classes to be more tailored to their resources and abilities. More site-specific events include jet pulls, runway runs or other active events. For instance, the local Anytime Fitness gym could partner with the Airport for a runway run. A three kilometer runway run is a chance for the local community to see the Airport in a new and interesting way by spending time on the runway, an area usually strictly prohibited for pedestrians. The event could be advertised at local gyms, the chamber of commerce, and other prominent areas. A three kilometer race could be conducted entirely on Airport surfaces while a five kilometer race could start downtown and end at the Airport. Interest could be sustained by creating an annual event with a partnership between the Airport and local gym, and businesses could offer food and drink at the end of the race on Airport grounds.

Phasing

The various strategies presented in this section will be most effective when conducted in a complementary manner. The first step is to raise the visibility of the Airport while not stretching available resources. Items like an economic impact brochure and public speaking appearances require little financial investment, but help foster a positive impression of the Airport from the local community. Sustained engagements will ensure the community is aware of the Airport and the role it plays in supporting the community.

After this initial interest is created, it should be leveraged to create mutually beneficial partnerships within the community. Prime examples would be hosting a competition at the local high school (which offers web design, marketing and other business oriented classes) to create a new Airport website and hosting a runway run in partnership with the local gym. These events should not be seen as isolated events but as continuing relationships with these partners. For instance, the winner of the website design competition could play a role in maintaining and improving the website while the runway race could be an annual event. As these mutually beneficial arrangements grow they would offer visible benefits for the community while continually raising the profile of the Airport.

Increasing the prominence of the Airport and local interest will create windows of opportunity for further development. An Airport event would create a place for local businesses to showcase their food and goods during an event, such as spot landing competition. Such events could also be used to gather additional email addresses for the newsletter and perpetuate interest from the local community and potential businesses. Press releases should be conducted for each event in order to capitalize visibility and earned media. In summary, each of the strategies should not be thought of a single effort but a bank of complementary strategies used in conjunction with one another while benefitting the community. Establishing the Airport as an inseparable part of the community will create the political interest necessary to help perpetuate the growth of the Airport during its continued efforts to attract additional aircraft, increase revenue streams, and foster development.

5.3 Future Funding Plans

In addition to taking steps to secure sustainable revenue streams it is prudent to maximize the chances of securing funding from a state and federal level. This section will provide relevant strategies for each of these objectives.

5.3.1 State Funding

An essential part of any future planning efforts are keeping an up to date Airport Layout Plan (ALP). In the event that funding is sought from the State it will be important to have an updated ALP that depicts planned future development. Although this is not an immediate need, an ALP update should occur before additional hangars or airfield improvements are needed and should take place within the next five years. MnDOT has expressed support for upcoming projects at D42 as it is a State system airport. However, many airports within the State need funding and spontaneous projects will likely be denied funding. For these reasons it is important to plan for future projects and reflect them on the CIP and ALP. When federal funding is not available the State may fund justified projects according to the type of project. **Table 5-1** shows current MnDOT funding levels for both NPIAS and non-NPIAS airports.

Table 5-1: Fiscal Year 2018-2019 MnDOT Funding Participation

Project Type	NPIAS	Non-NPIAS
Air Service Marketing	70%	70%
M&O	75%	75%
Fuel Systems and Fuel Trucks	70%	70%
Equipment	75%	90%
Construction	75%	95%*
Navigational Systems	75%	90%
AWOS	100%	100%

*Note: *95% will be limited to the first $150,000 in each year or $600,000 in four years to imitate the FAA AIP program, thereafter the rate will revert to 90%.*

5.3.2 Federal Funding

As discussed previously, discretionary federal funding is possible based on need. If the Airport pursues federal funding for projects at a future date, steps will need to be taken to be eligible for funding. One of the strategies for raising future sustainable capital is to explore non-aeronautical development on existing Airport property. Therefore, it will be important to consider surrounding property boundaries, ownership and intended uses to ensure future development is purposeful and neighborly. An Exhibit 'A' Property Map depicts an inventory of parcels that make up dedicated airport property, and catalogues pertinent details regarding how the land was acquired and the nature of the Airport's interest in each parcel. To secure federal approval of non-aeronautical development on Airport property, the Airport's Exhibit 'A' Property Map would need to be updated to conform to the new FAA requirements identified in its Standard Operating Procedure (SOP) 3.00, *Standard Operating Procedure for FAA Review of Exhibit 'A' Airport Property Inventory Maps*. This effort will also likely include a geographic information systems (GIS) update data collection.

Although this Master Plan has proposed several alternative projects, they are generally like those shown on the current ALP. The environmental assessment (EA) completed in 2011 for the proposed parallel taxiway is also like the one proposed by this Master Plan. Given the time since this EA and the modifications to the proposed taxiway presented in Chapter 4, it will need to be re-evaluated. However, changes in the affected environment and proposed project since 2011 are not substantial enough to warrant a brand-new EA for the project, and an addendum to the 2011 EA would likely be sufficient to secure environmental approval for the project.

5.4 Next Steps

Although various strategies have been discussed throughout this report, the bullet points below summarize the most salient steps that should be pursued within the next five years. These steps will provide the foundation for future partnerships and potential revenue streams while ensuring the Airport is in the best possible position to secure future funding, should it be available. The Springfield Municipal Airport offers many strengths and unique advantages for an Airport of its size, and a visible presence in the community and region will be mutually beneficial to the flying population and the local community.

Planning Efforts

- Airport Layout Plan
- Exhibit ‘A’ Airport Property Map
- Land Use Zoning after MnDOT update
- Environmental Assessment Addendum
- Issue RFI to gauge FBO interest

Outreach

- Initiate Airport promotion campaign
- Explore potential partnerships

Development

- Agricultural Aviation Operations Pad
- Automated Weather Reporting Station
- Begin planning for hangar development
- Extend Runway 13/31
- Full parallel taxiway

Funding

- Develop Airport projects funding plan
- Start saving for larger project needs

Appendix A

Springfield Municipal Airport Master Plan

User Survey

1. What make/model aircraft do you operate at D42?

2. Where are these aircraft based?

3. How many operations do you conduct at D42 per year? (An operation is one takeoff or one landing; therefore, one trip to and from the airport would count for two operations)

4. What makes you choose to operate at D42 compared to other airports? Check all that apply.

- [ ] Runway Length
- [ ] Runway Surface (paved)
- [ ] Navaids (lighting, PAPIs, REILs, etc.)
- [ ] Instrument Approaches
- [ ] Location
- [ ] Self-serve fuel
- [ ] Other Facilities (pilot rest area, flight computer, etc.)

5. Please list any other reasons you choose to operate at D42.

6. When deciding where to base your aircraft, what are important considerations? (Please rank in order of importance, 1 being the most important)

- Runway Length
- Runway Surface
- Navaids (lighting, REILs, PAPIs, etc.)
- Hangars Type and Condition
- Hangar Cost
- Airport Location
- Other Facilities (arrival/departure building, pavilion, etc.)

7. Does your company and/or insurance policy require a minimum runway length to operate your aircraft? If so, what?

8. Are there any improvements you would like to see at the Airport?

9. Please provide your name and preferred contact information.

D42 User Survey - Distance

1. What make/model aircraft do you operate at D42?

2. Where are these aircraft based?

3. What caused you to select D42 as your destination?

4. How many operations do you conduct at D42 per year? (An operation is one takeoff or one landing; therefore, one trip to and from the airport would count for two operations)

5. What makes you choose to operate at D42 compared to other airports? Check all that apply.

- [ ] Runway Length
- [ ] Runway Surface (paved)
- [ ] Navaids (lighting, PAPIs, REILs, etc.)
- [ ] Instrument Approaches
- [ ] Location
- [ ] Self-serve fuel
- [ ] Other Facilities (pilot rest area, flight computer, etc.)

6. Please list any other reasons you choose to operate at D42.

7. Does your company and/or insurance policy require a minimum runway length to operate your aircraft? If so, what?

8. How did you hear about D42?

9. Please provide your name and preferred contact information.

Appendix B

Springfield Municipal Airport Master Plan

Capital Improvement Plan

Capital Improvement Program Report

Minnesota Department of Transportation - Aviation Division
Springfield Municipal Airport
Report Filter - Types: All, Statuses: All

All Projects

Year	Project Name	Status		FAA	State	Local	Total
2017							
	AIRPORT MASTER PLAN & SWPPP (STATE ONLY)	CIP		0.00	83,646.00	20,912.00	$104,558.00
			SubTotal:	**$0.00**	**$83,646.00**	**$20,912.00**	**$104,558.00**
2019							
	AIRPORT LAYOUT PLAN (ALP) UPDATE	CIP		0.00	36,000.00	9,000.00	$45,000.00
	CROP SPRAY STAGING/TRANSFER PAD	CIP		0.00	135,000.00	15,000.00	$150,000.00
	INSTALL NEW AWOS	CIP		0.00	450,000.00	0.00	$450,000.00
			SubTotal:	**$0.00**	**$621,000.00**	**$24,000.00**	**$645,000.00**
2020							
	AIRPORT SECURITY FENCE	CIP		0.00	45,000.00	5,000.00	$50,000.00
	HANGAR REHABILITATION	CIP		0.00	120,000.00	30,000.00	$150,000.00
	OBSTRUCTION REMOVAL	CIP		0.00	45,000.00	5,000.00	$50,000.00
	PAVEMENT MANAGEMENT	CIP		0.00	126,000.00	14,000.00	$140,000.00
			SubTotal:	**$0.00**	**$336,000.00**	**$54,000.00**	**$390,000.00**
2021							
	HANGAR SITE DEVELOPMENT	CIP		0.00	81,000.00	9,000.00	$90,000.00
			SubTotal:	**$0.00**	**$81,000.00**	**$9,000.00**	**$90,000.00**
2022							
	MULTI-UNIT T-HANGAR	CIP		0.00	585,000.00	65,000.00	$650,000.00
			SubTotal:	**$0.00**	**$585,000.00**	**$65,000.00**	**$650,000.00**
2023							
	RUNWAY EXTENSION 600 FT X 75 FT NORTH END	CIP		0.00	440,000.00	110,000.00	$550,000.00
			SubTotal:	**$0.00**	**$440,000.00**	**$110,000.00**	**$550,000.00**
2024							
	NEW SNOW REMOVAL EQUIPMENT (SRE) TRUCK & PLOW & BLOWER	CIP		0.00	382,500.00	42,500.00	$425,000.00
			SubTotal:	**$0.00**	**$382,500.00**	**$42,500.00**	**$425,000.00**

Year	Project Name	Status	FAA	State	Local	Total
2025						
	PAVEMENT MANAGEMENT	CIP	0.00	225,000.00	25,000.00	$250,000.00
		SubTotal:	**$0.00**	**$225,000.00**	**$25,000.00**	**$250,000.00**
2029						
	PAVEMENT MANAGEMENT	CIP	0.00	135,000.00	15,000.00	$150,000.00
		SubTotal:	**$0.00**	**$135,000.00**	**$15,000.00**	**$150,000.00**
2030						
	RUNWAY 13/13 RECONSTRUCTION	CIP	0.00	4,275,000.00	475,000.00	$4,750,000.00
		SubTotal:	**$0.00**	**$4,275,000.00**	**$475,000.00**	**$4,750,000.00**
2031						
	CROSSWIND RUNWAY DEVELOPMENT	CIP	0.00	450,000.00	50,000.00	$500,000.00
	DESIGN TAXIWAY (STATE ONLY)	CIP	0.00	135,000.00	15,000.00	$150,000.00
	REPLACE BRUSHHOG MOWER	CIP	0.00	117,000.00	13,000.00	$130,000.00
	REPLACE JOHN DEERE 5085 TRACTOR	CIP	0.00	40,500.00	4,500.00	$45,000.00
		SubTotal:	**$0.00**	**$742,500.00**	**$82,500.00**	**$825,000.00**
2032						
	TAXIWAY CONSTRUCTION PHASE I (STATE ONLY)	CIP	0.00	477,000.00	53,000.00	$530,000.00
		SubTotal:	**$0.00**	**$477,000.00**	**$53,000.00**	**$530,000.00**
2033						
	RECONSTRUCT TERMINAL APRON & PARKING	CIP	0.00	652,500.00	72,500.00	$725,000.00
	REPLACE PAYLOADER	CIP	0.00	135,000.00	15,000.00	$150,000.00
	TAXIWAY CONSTRUCTION PHASE II (STATE ONLY)	CIP	0.00	675,000.00	75,000.00	$750,000.00
		SubTotal:	**$0.00**	**$1,462,500.00**	**$162,500.00**	**$1,625,000.00**
2034						
	TAXIWAY CONSTRUCTION PHASE III ELEC. (STATE ONLY)	CIP	0.00	148,500.00	16,500.00	$165,000.00
		SubTotal:	**$0.00**	**$148,500.00**	**$16,500.00**	**$165,000.00**
2035						
	PAVEMENT MANAGEMENT	CIP	0.00	90,000.00	10,000.00	$100,000.00
		SubTotal:	**$0.00**	**$90,000.00**	**$10,000.00**	**$100,000.00**

Year	Project Name	Status	FAA	State	Local	Total
All Projects			$0.00	$10,084,646.00	$1,164,912.00	$11,249,558.00

Mead & Hunt

Engineering
Architecture
Air Service
Planning
Environmental