Chapter 2: Existing Conditions

The Existing Conditions chapter of the Airport Master Plan for Sioux Falls Regional Airport provides the baseline framework to evaluate the airport facility. This review will be used to compare the existing facilities to the airport needs determined in future sections of the plan. This will lead to a plan developed for the future of the airport. Background information and data is gathered from various sources and compiled into this chapter. Please refer to the various appendices referenced within this narrative for more detailed information.

Background

General

Sioux Falls Regional Airport – Joe Foss Field (FAA ID: FSD), South Dakota's busiest airport is located in Minnehaha County in southeastern South Dakota. The airport is a commercial service airport providing scheduled passenger service, overnight cargo, complete general aviation services and U.S. Customs services. The airport served 66,589 operations, enplaned 474,118 passengers and served nearly 35 million pounds of landed freight and mail in Federal fiscal year 2013.

Location

The City of Sioux Falls is located in southeastern South Dakota, the county seat of Minnehaha County. Sioux Falls is located approximately 88 driving miles north of Sioux City, IA; 186 driving miles north of Omaha, Nebraska; 237 miles southwest of Minneapolis, Minnesota; and 245 miles south of Fargo, North Dakota. The City is at the junction of Interstates 90 and 29, major national east-west and north-south interstate highways, respectively. City limits encompass land in both Minnehaha and Lincoln counties.

The airport is located three miles northwest of the Sioux Falls central business district in South Dakota's largest city. Minnesota Avenue provides access to the airport. This north-south thoroughfare provides direct access to downtown Sioux Falls. **Figure 1-1: Airport Location Map** located in Chapter 1 depicted the airport's location locally and regionally.

Setting

Sioux Falls Regional Airport is located adjacent to urban development areas to the south and east and near urban expansion areas to the north and west. The airport is sited on a plateau between the Big Sioux River and the diversion channel. The airport is located above the Big Sioux Aquifer, which provides the majority of water for the City of Sioux Falls. Numerous water wells are located within the airport environs that date back to before the site was developed as an airport. Terrain rises to the north and west of the airport. The natural environment can be described as rolling hills and prairie. **Figure 2-1: Surrounding Land Use** and **Figure 2-2: Airport Setting** depict to the airport's local environment.

Climate

Local weather conditions are a significant factor in the design of airport facilities. Temperature affects runway length, wind direction and speed affect runway orientation, and visibility and cloud ceiling conditions affect the need for runway navigational aids and lighting. Over the last 10 years the average maximum temperature in the hottest month (July) has been 85.7 degrees Fahrenheit.

Prevailing winds are from the northwest aligned with the airport's runway configuration. Crosswind or tailwind conditions can be hazardous to aircraft operations if they exceed the operational capabilities of the airplane or flight crew. The current all-weather combined wind coverage of all runways exceeds FAA minimum recommendations of 95 percent.

Exhibit 2-1 – Wind Analysis

All-Weather Wind Coverage				
Runway	**Crosswind Component (Wind Speed)**			
	10.5 knots	**13.0 knots**	**16.0 knots**	**20.0 knots**
Runway 3/21	80.40%	87.96%	94.80%	98.19%
Runway 15/33	92.86%	96.58%	98.96%	99.74%
Runway 9/27	82.08%	89.38%	-	-
Combined*	99.74%	99.97%	99.99%	100.00%

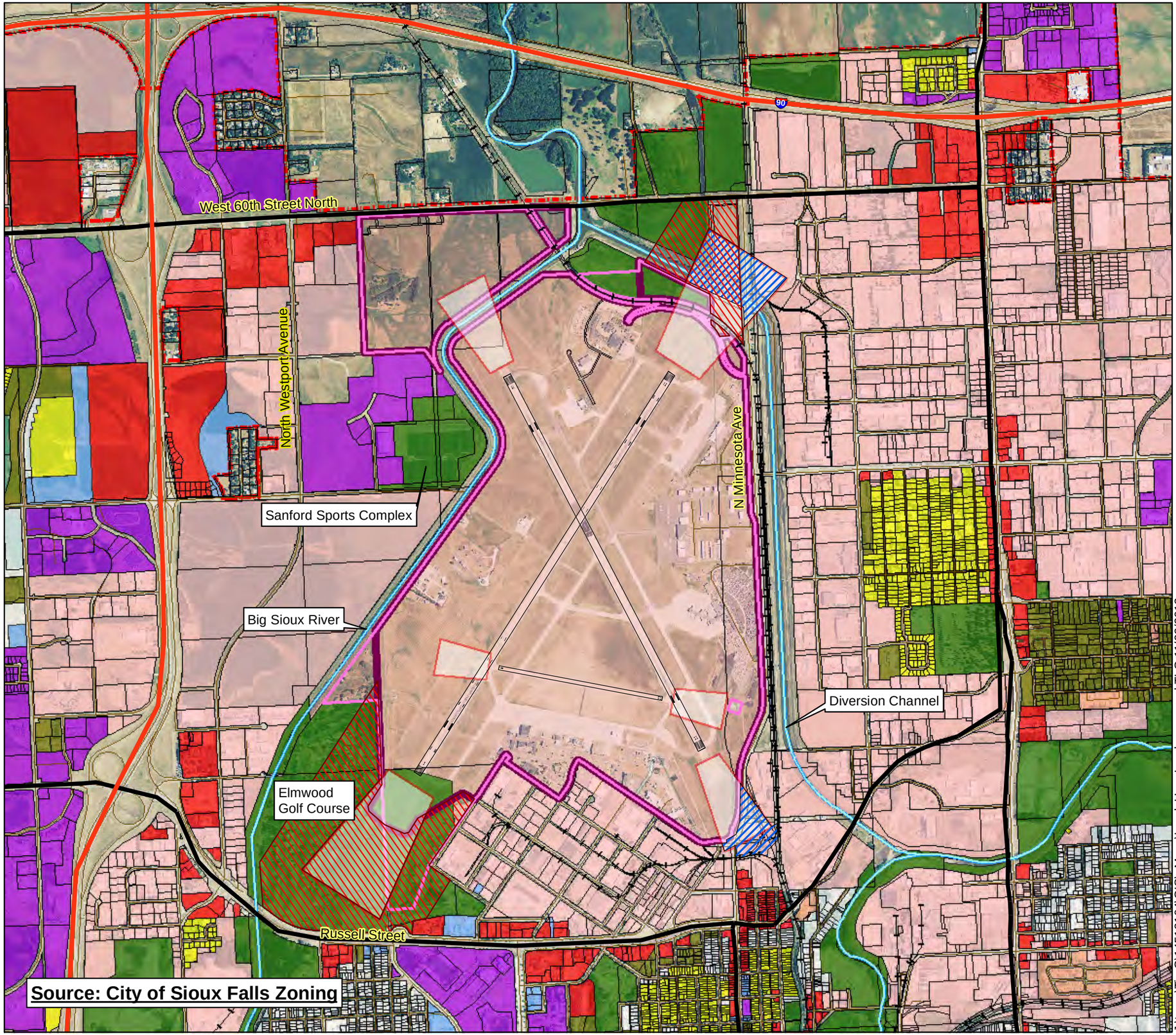
**Combined assumes up to maximum design aircraft crosswind component for each runway*
Source: National Climatic Data Center data from Sioux Falls Regional Airport ASOS (2003-2012)

According to runway visibility weather data, the airport experiences conditions 9.31 percent of the time requiring pilots to reference flight instruments known as Instrument Flight Rules and 0.92 percent of the time in conditions that are below current legal IFR Category I landing weather minimums based on current airport infrastructure and obstructions.

Exhibit 2-2 – Meteorological Analysis

Meteorological Analysis	
Weather Condition	**Observation Percentage**
Visual Flight Rules (VFR)	90.69%
Instrument Flight Rules (IFR) Category I	8.39%
Instrument Flight Rules IFR Category II	0.76%
IFR Category III & Below	0.16%
TOTAL	**100.00%**

Source: National Climatic Data Center data from Sioux Falls Regional Airport ASOS (2003-2012)



Legend

- Apartment Residential
- Commercial
- Manufactured Housing
- Office
- Planned Development
- Recreation/Conservation
- Rural/Suburban Residential
- Single/Multi-Family Residential
- Industrial

Legend

- Interstate
- Existing Airport Easement
- Future Airport Land Exchange Easements
- FAA Runway Protection Zone
- Big Sioux River & Diversion
- Railroad
- Existing Airport Property
- Future Airport Property
- Roadway
- City Limits

N

0 1,250 2,500 5,000 Feet

*Intended for Planning Purposes Only

PRELIMINARY

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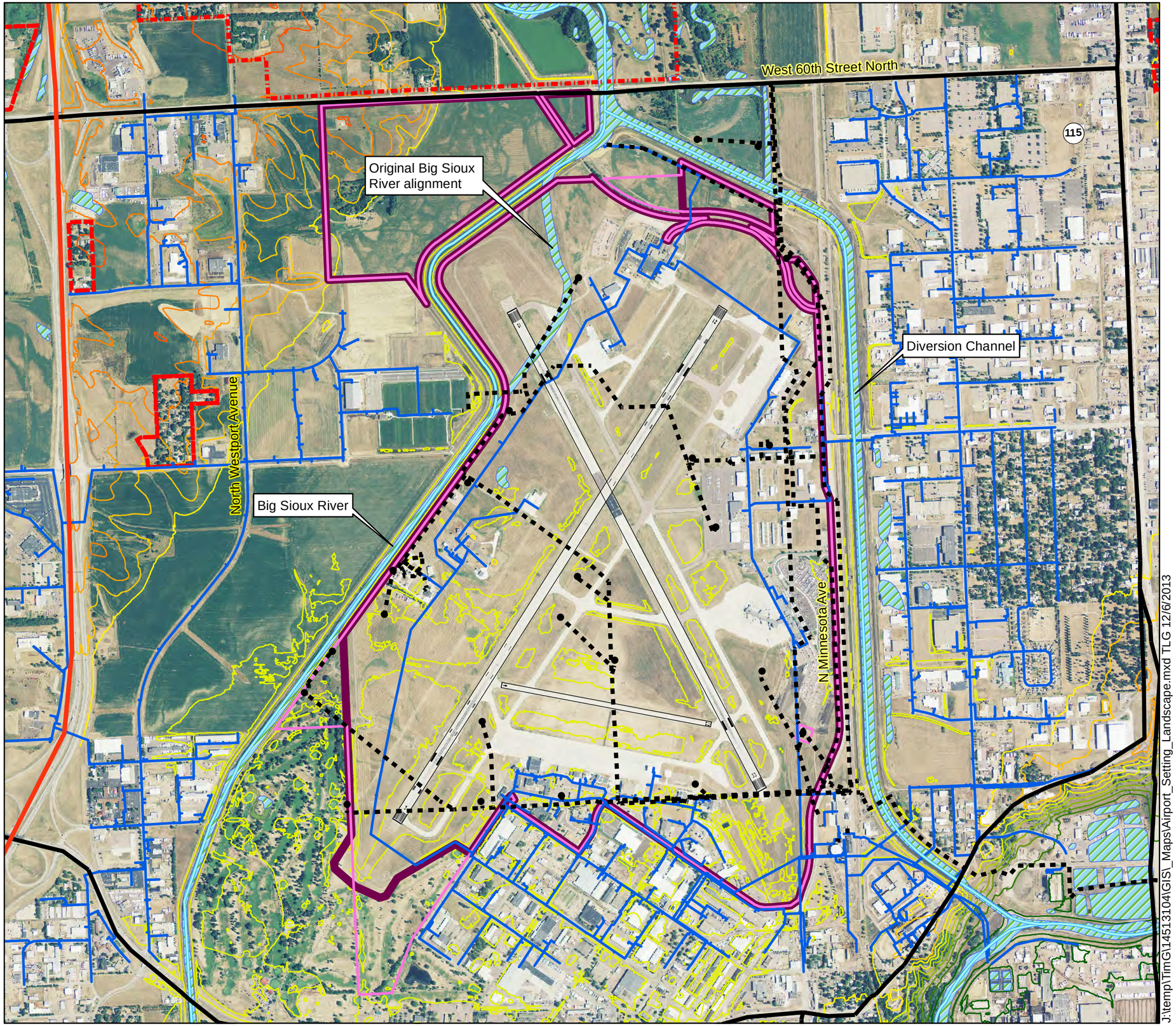
KLJ

Sioux Falls Regional Airport
Joe Foss Field
Land Use Map
Figure 2-1



Ground contours

Elevation (ft)

- 1300 - 1320
- 1321 - 1340
- 1341 - 1360
- 1361 - 1380
- 1381 - 1400
- 1401 - 1420
- 1421 - 1440
- 1441 - 1460
- 1461 - 1480
- 1481 - 1500
- 1501 - 1520
- 1521 - 1540

Legend

- Water Well
- Water Well Main
- Interstate
- Roadway
- Big Sioux River & Diversion
- Water Main
- Existing Airport Property
- Future Airport Property
- City Limits
- National Wetland Inventory

N

0 1,000 2,000 4,000 Feet

*Intended for Planning Purposes Only

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KLJ

Sioux Falls Regional Airport
Joe Foss Field
Airport Setting Map
Figure 2-2

Demographics

The City of Sioux Falls has an estimated population of 159,908 as of July 1, 2012[1]. Population within the Metropolitan Statistical Area (MSA) which includes a four county area surrounding Sioux Falls is 237,251. The Sioux Falls region is steadily growing; population in the MSA has increased at an average annual growth rate of 2.00 percent since 2000. This compares to a South Dakota statewide population growth rate of 0.8 percent.

Exhibit 2-3 – Population Summary

Population Summary				
Year	**Sioux Falls**	**Sioux Falls MSA***	**South Dakota**	**United States**
2000	124,158	187,093	754,884	281,421,906
2010	153,888	227,732	814,180	309,326,225
2012 (est.)	159,908	237,251	833,354	313,914,040
Annual Growth Rate	*2.13%*	*2.00%*	*0.83%*	*0.91%*

**Includes Minnehaha, Lincoln, Turner and McCook counties as defined by U.S. Census Bureau*
Source: U.S. Census Bureau

Unemployment rate within the Sioux Falls MSA as of July 2012 was 4.0 percent as compared to the South Dakota statewide rate of 4.5 percent and the United States rate of 8.2 percent. Unemployment rate in Sioux Falls has historically been lower than the statewide and national figures. Health care, retail and financial trade sectors make up the majority of employers in the Sioux Falls area. These industries, along with higher capture rates, have contributed to increased airport passenger activity.

Exhibit 2-4 – Sioux Falls Major Employers

City of Sioux Falls Major Employers (2012)		
Employer Name	**Industry**	**Number of Employees**
Sanford Health	Hospital/Health Care	7,703
Avera Health	Hospital/Health Care	5,921
John Morrell & Co.	Food Processing	3,300
Sioux Falls School District	Education	3,000
Citibank South Dakota NA	Banking/Financial	2,900
Wells Fargo & Co.	Banking/Financial	2,832
Hy-Vee Food Stores	Grocery	2,733
The Evangelical Lutheran Good Samaritan Society	Hospital/Health Care	1,426
City of Sioux Falls	Government	1,133
Wal-Mart/Sam's Club	Retail	1,056
Department of Veterans Affairs Medical Center	Government/Health Care	1,036
First Premier Bank/Premier Bankcard	Banking/Financial	1,025
Raven Industries/Aerostar International	Manufacturing	943

Source: Sioux Falls Development Foundation (2012)

[1] American Fact Finder, U.S. Census Bureau (2013)

Exhibit 2-5 – Sioux Falls Area Employment

Employment by Industry - Sioux Falls MSA (2011)	
Industries	**Percent of Total**
Health Care and Social Assistance	20.79%
Retail Trade	13.58%
Finance and Insurance	11.03%
Manufacturing	10.67%
Accommodation and Food Services	8.99%
Wholesale Trade	4.84%
Construction	4.60%
Transportation and Warehousing	3.68%
Other services (except Public Administration)	3.63%
Administrative, Support, Waste Management	3.61%
Professional, Scientific and Technical Services	3.45%
Management of Companies and Enterprises	2.67%
Educational Services	2.58%
Information	2.41%
Arts, Entertainment and Recreation	2.08%
Real Estate, Rental and Leasing	1.10%
Utilities	0.20%
Mining, Quarrying, and Oil and Gas Extraction	0.05%
Agriculture, Forestry, Fishing and Hunting	0.02%
All Industries	**100% (122,295)**

Source: U.S. Census Bureau

Per Capita Personal Income (PCPI) in 2012 for the Sioux Falls MSA is $45,087 which is about equal to the statewide average and higher than the United States average.

Exhibit 2-6 – Demographic Summary

Demographic Summary (2012)				
Demographic	**Sioux Falls**	**Sioux Falls MSA**	**South Dakota**	**United States**
Unemployment Rate	4.2%	4.0%	4.5%	8.2%
Per Capital Personal Income	-	$45,087	$45,381	$43,735

Source: South Dakota Department of Labor and Regulation, Bureau of Economic Analysis, Bureau of Labor Statistics

Appendix X - Aviation Forecasts contains demographic and socioeconomic data, estimates, and forecasts.

Airport History

The airport was first established in 1937 for civil public use. The U.S. Government leased the airport from 1942 to 1947 to establish the Sioux Falls Army Base during World War II. At this time three runways were constructed in same orientation as they exist today. The airport was then returned to the city after World War II with the facilities on the south side of the airport leased to South Dakota Air National Guard (SDANG). The airport is named after Brig. General Joseph J. Foss, a Marine aviator Captain in WWII born in Sioux Falls. Foss became lieutenant

colonel in the U.S. Air Force Reserve, founded the SDANG and was a two term Governor of South Dakota.

In the last 10 years the airport has made a commitment to improving the airport facility through completing capital projects. After the last airport master plan was completed the airport completed a terminal building remodeling, entrance road reconfiguration, parking lot expansion, Taxiway M construction, and adopted an airport land use overlay zoning district. A complete list of major airport development projects from FAA and the State can be found in **Appendix X – Airport History.**

Airport Management

The Sioux Falls Regional Airport Authority, an independent governing body created in 1986, is responsible for the overall administrative, development and operations of Joe Foss Field. The authority is made up of five members appointed by the mayor of Sioux Falls. The Authority is self-funded and does not rely on tax dollars from the community. Airport Authority staff members include the Executive Director, Deputy Director, and various maintenance and operations personnel.

Airport Role & Design

Joe Foss Field provides scheduled passenger service, overnight cargo, complete general aviation services and a U.S. Customs Port of Entry. The airport serves southeast South Dakota, northwest Iowa and southwest Minnesota. The airport commonly draws commercial passengers from a catchment area within 75 miles. Competing commercial service airports include Minneapolis-St. Paul International Airport and Omaha Eppley Airfield.

The airport is part of the National Plan of Integrated Airport Systems (NPIAS) as classified by the Federal Aviation Administration (FAA). NPIAS airports are vital to the national air transportation system. According to FAA standards, the airport is classified as a small-hub primary commercial airport enplaning more than 0.05 percent of national total. **Appendix X - Airport Classification** contains more information on this topic with **Appendix X – Airport Funding** providing additional information about the Federal funding programs available to airports. The airport is certificated under FAR Part 139 guidelines as a Class I airport certificated to serve scheduled operations of large air carrier aircraft.

Airports are designed to regularly accommodate aircraft up to certain wingspan, tail height, and approach speed parameters. The last Airport Master Plan prepared for Sioux Falls Regional Airport in 2006 has a FAA Airport Reference Code (ARC) of D-IV for an Airbus A-300F-600 cargo aircraft. The current design aircraft continues to be D-IV for a Boeing 767-300ER freighter aircraft (ARC D-IV) operated by UPS. Fully loaded, the Airbus A-300F-600 has an Aircraft Classification Number (ACN) of 59.8 and the Boeing 767-300ER has an ACN of 57.4 given local soil conditions. The taxiway design group (TDG) for these aircraft is TDG-5. See **Appendix X – Design Classifications** for more details on FAA design classifications.

Airport Operators

Scheduled Passenger Airlines

Sioux Falls Regional Airport is served by five commercial air carriers and/or their regional subsidiaries; Allegiant, American, Delta, Frontier and United. Scheduled direct flights are currently available to eleven cities including hub airports where connections may be made to hundreds of destinations worldwide. Scheduled airlines currently serve Joe Foss Field with all jet aircraft as large as 161 seats (Allegiant MD-83) and 150 seats (Airbus A320). The airport served 474,118 passengers in Federal fiscal year 2013, a 37.4 percent increase in the last three years. A complete flight schedule and aircraft fleet mix from March, July and December 2013 can be found in **Appendix X - Flight Schedules.** See **Chapter 3 - Forecasts** for more detailed information on existing and projected scheduled air service activity. The schedule below details the peak month activity (July 2013).

Exhibit 2-7 - Scheduled Airline Departures

Sioux Falls Regional Airport - July 2013 Scheduled Airline Service

Airline	Destination	Frequency	Aircraft Type (Frequency, Seats)
Allegiant (G4)	Las Vegas-McCarran (LAS)	4/week	MD-83 (166)
Allegiant (G4)	Orlando-Sanford (SFB)	2/week	MD-83 (166)
Allegiant (G4)	Los Angeles (LAX)	2/week	MD-83 (166)
Allegiant (G4)	Phoenix-Mesa (AZA)	4/week	MD-83 (166)
American (AA)	Dallas-Ft. Worth (DFW)	2/day	E145 (50)
American (AA)	Chicago O'Hare (ORD)	3/day	E145 (50)
Delta (DL)	Minneapolis-St. Paul (MSP)	8/day**	CRJ-200 (6x, 50) E170 (1x, 69) E175 (1x, 76)
Delta (DL)	Detroit Metro (DTW)*	1/day	CRJ-200 (50)
Frontier (F9)	Denver Int'l (DEN)	1/day	A319 (138)
United (UA)	Chicago O'Hare (ORD)	5/day**	CRJ-700 (1x, 70) E145 (4x, 50)
United (UA)	Denver Int'l (DEN)	5/day**	CRJ-200 (1x, 50) CRJ-700 (1x, 70) A319 (1x, 128) E145 (2x, 50)

**Indicates seasonal destination, **Frequency changes on weekends*
Source: Sioux Falls Regional Airport, July 2013

Significant flight schedule changes in 2013 include Delta Air Lines beginning a once daily direct flight to Atlanta, GA (ATL) on 65-seat CRJ-700 aircraft, and new twice-weekly service on Allegiant Airlines to Tampa-St. Petersburg, FL (PIE) on 166 seat MD-83 aircraft. Allegiant Airlines features increased flight frequency to destinations except Los Angeles during the winter months.

Scheduled Cargo Carriers

Three cargo carriers have facilities at the Sioux Falls Regional Airport; FedEx, UPS and Encore Air Cargo. Other operators include Bemidji Airlines, CSA Air, Empire Airways, Martinaire and

others. Aircraft types that serve the airport include the Boeing 757-200F operated by FedEx to and from Memphis, TN twice daily, Boeing 767-300F or Airbus A300F-600 operated by UPS to and from Louisville, KY and Calgary, AB Canada daily, and smaller turboprop or piston-engine aircraft on feeder routes throughout South and North Dakota. FedEx feeder aircraft include Cessna 208B Caravan and ATR-42/72 aircraft. UPS feeder aircraft include Fairchild Metroliner III, Beechcraft 1900, Beechcraft 99, Beechcraft King Air series, and Cessna 404/402 twin engine aircraft. The airport served over 144 million pounds of cargo in 2012, a decrease of 57 percent from 2011. The decrease can be attributed to DHL ceasing operations in Sioux Falls and many part of the United States.

Air National Guard

South Dakota Air National Guard (SDANG) operates a facility located on the south side of the airport. The 114th Fighter Wing is based at Sioux Falls Regional Airport with over 1,100 members. The current mission operates Block 40 F-16 military aircraft. There are 18 military aircraft based at Sioux Falls Regional Airport.

General Aviation

General aviation makes up the remaining activity at Sioux Falls Regional Airport which accounts for about 40 percent of aircraft operations according to local Air Traffic Control Tower counts. Flights are for various purposes including medical, business, training and recreational. Aircraft range in size from small single-engine aircraft to large corporate business jets. The airport is home to two Fixed-Base Operators (FBO), Landmark Aviation and Maverick Air Center providing aviation services to the public including fueling, ground handling, aircraft storage, pilot lounge, conference room and passenger lobby. Landmark Aviation also performs aircraft maintenance. Maverick Air Center began operations at Sioux Falls in 2012 from the west general aviation area.

According to the local Sioux Falls Air Traffic Control Tower (ATCT) staff, general aviation airport operations are increasing with the majority of growth in turboprop and turbojet corporate aircraft. The airport has a small flight school, Sioux Falls Flight School, which operates a Cessna 172; however operations of smaller single engine and multi-engine piston aircraft have been decreasing over the past several years.

Existing Facilities

An inventory of Sioux Falls Regional Airport facilities was performed to establish a baseline for determining required future improvements. As discussed in the following sections, airport facilities are grouped into three categories: airside facilities, airspace and navigation aids (NAVAIDs) and landside facilities.

Land

As of the end of 2013, the Sioux Falls Airport Authority owns approximately 1,570 acres of property fee simple and controls another 111 acres in aviation easement for land use and/or airspace control. Airport property was platted in 1997. A land exchange was scheduled to be completed in 2013 for the airport to control additional property interests for public safety

near Runway 3/21. Airport property owned by the Airport Authority is designated as aeronautical or non-aeronautical, and can be leased to private entities for approved uses.

Airside Facilities

Airside facilities are those that are necessary for aircraft surface movement, such as runways, taxiways, aprons and associated lighting, marking and signage systems. A map depicting existing airport airside components is included in **Figure 2-3: Airside Facilities Map**. Information on design codes is contained in **Appendix X – Design Classifications**.

Runway 3/21

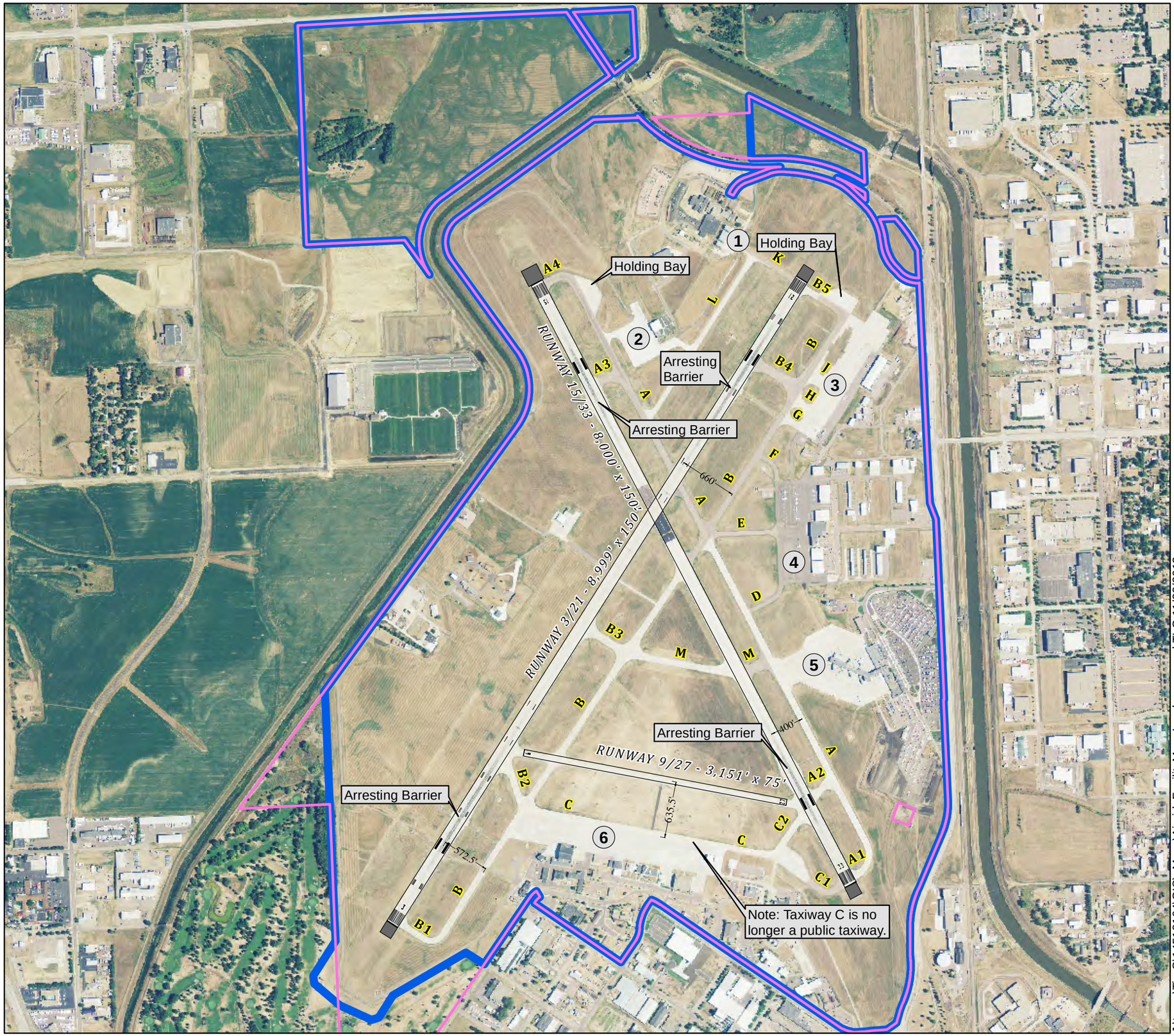
Runway 3/21, the longest and primary air carrier and general aviation runway at Sioux Falls Regional Airport, is 8,999 feet long and 150 feet wide. The runway is designed to meet FAA Runway Design Code (RDC) D-IV design standards. The runway safety (overrun) area will be improved in 2014 to meet all applicable design standards near the Runway 3 end. The runway pavement surface is concrete wire combed to increase surface friction, and the approach ends are grooved to improve water runoff. The pavement is designed to accommodate regular use of up to 200,000 pound aircraft in a single wheel main landing gear configuration, 200,000 pound aircraft in a double-wheel main landing gear configuration and 444,000 pound aircraft in a double tandem main landing gear wheel and strut configuration. The runway's Pavement Classification Number is 60/R/B/W/T. A 150 foot long blast pad is located beyond each runway end for jet blast erosion protection. Runway arresting barriers are installed on each end for military emergency landings in F-16 fighter jets. Both runway ends are designed to accommodate precision instrument approaches.

Runway 15/33

Runway 15/33, the secondary air carrier and general aviation runway, is 8,000 feet long and 150 feet wide. The runway is designed to meet FAA Runway Design Code (RDC) D-IV design standards. The runway pavement surface is concrete and grooved to promote drainage. The pavement is designed to accommodate up to 100,000 pound aircraft in a single wheel configuration, 180,000 pound aircraft in a double-wheel configuration and 400,000 pound aircraft in a double tandem wheel configuration. The runway's Pavement Classification Number is 70/R/B/W/T. A 150 foot long blast pad is located beyond Runway 15 and a 200 foot long blast pad is beyond the Runway 33 end for jet blast erosion protection. Runway arresting barriers are installed on each end. Both runway ends are designed to accommodate non-precision instrument approaches.

Runway 9/27

Runway 9/27 is the general aviation runway with dimensions of 3,151 feet long and 75 feet wide. The runway is designed to meet FAA Runway Design Code (RDC) B-II design standards. The runway pavement surface is concrete and wire combed to increase surface friction. The pavement designed to accommodate up to 30,000 pound aircraft in a single wheel configuration. Both runway ends are designed to accommodate non-precision instrument approaches.



Legend

- Existing Airport Property
- Future Airport Property
- Blast Pad

Joe Foss Field Aprons

1. West Cargo
2. West General Avation
3. East Cargo
4. East General Aviation
5. Air Carrier
6. South Dakota Air National Guard (SDANG)

N

0 750 1,500 3,000 Feet

*Intended for Planning Purposes Only

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Sioux Falls Regional Airport
Joe Foss Field
Airside Facility Map
Figure 2-3

Exhibit 2-8 – Runway Facility Summary

Runway Facility Summary			
Component	**Runway 3/21**	**Runway 15/33**	**Runway 9/27**
Runway Length (feet)	8,999	8,000	3,152
Runway Width (feet)	150	150	75
Runway Surface Material	Concrete	Concrete	Concrete
Runway Surface Treatment	Wire Combed	Grooved	Wire Combed
Runway Pavement Strength (lbs.)			
Single Wheel	200,000	100,000	30,000
Double Wheel	200,000	180,000	-
Double Tandem Wheel	444,000	400,000	-
Pavement Classification Number (PCN)	60/R/B/W/T	70/R/B/W/T	N/A

R = Rigid Concrete Pavement, B = Subgrade Category (Medium Strength), W = Unrestricted Tire Pressure, T = Technical Analysis
Source: Airnav.com, FAA Airport Master Record Form 5010 Report, Airport Management records

Helipad H1

Helipad H1 serves based and transient helicopters. The helipad is located near the general aviation apron and is 50 feet square in size. Helipad H1 has pavement markings, Touchdown and Lift-Off Area (TLOF) perimeter lighting, and Final Approach and Takeoff Area (FATO) markings. Approach and departure paths are oriented north and south.

Taxiways

Sioux Falls Regional Airport is served by a system of taxiways to facilitate the movement of aircraft from the runway environment to other airport facilities including hangars, parking aprons and hangars. Locations are identified in **Figure 2-3**. Primary taxiways are labeled A through M with connecting taxiways adding a numeric character (i.e. A1, A2, etc.).

- Taxiway A is a 75-foot wide full length parallel taxiway serving Runway 15/33. This taxiway centerline is located 400 feet from the adjacent runway centerline. There are four connecting taxiways designated A1 through A4 providing entry and exit from the runway. Taxiway A provides access to the air carrier apron.
- Taxiway B is a 75-foot wide full length parallel taxiway serving Runway 3/21. This taxiway centerline is located 660 feet from the adjacent runway centerline on the north end, and 560 feet from the adjacent runway centerline of the south end. There are five connecting taxiways designated B1 through B5 providing entry and exit from the runway. Taxiway B provides access to the east cargo ramp.
- Taxiway C was a 70-foot wide parallel taxiway for Runway 9/27 and has been transferred for military only use to access the SDANG apron. Two connecting taxiways provide access to Runway 15/33 and Taxiway A.
- Taxiway D, E and F are each 50 feet wide and provide access from Taxiway A or B to the east general aviation apron.

- Taxiway G, H and J are short access taxiways connecting Taxiway B with the east cargo ramp ranging in width from 80 to 140 feet.
- Taxiway K is 50-feet wide and provides access to the west cargo and general aviation ramps connecting with Taxiway L.
- Taxiway L was constructed in 2009, is 50-feet wide and connects Taxiway K with Taxiway A providing access to the west cargo and general aviation ramps.
- Taxiway M, constructed in 2009, is 75-feet wide and connects Taxiway B with the air carrier apron.

Runway 15 and 21 departure ends are served by aircraft holding bays that provide aircraft the ability hold for air traffic control clearances away from the taxiway traffic flow. Runway 33 is served by an arm/de-arm pad owned by SDANG but used for joint civil and military use. These should be redesigned to accommodate the design aircraft. A complex taxiway intersection east of Runway 15/33 and 3/21 intersection is identified as a "hot spot" by FAA with a potential risk of collisions and should be redesigned.

Aprons and Taxilanes

Six apron areas serve users to Joe Foss Field. Locations are identified in **Figure 2-2**. Apron areas serve the loading, unloading and parking needs for commercial airlines, air cargo, general aviation and military operators.

The air carrier apron serves commercial aircraft around the terminal building located east of Runway 15/33 along Taxiway A. There is a single entrance taxiway serving all seven gates at the terminal concourse and a total of 11 aircraft parking stand positions. The apron is approximately 74,800 square yards in size with a concrete surface with the pavement strength the same as the runways. Area is available for ground support vehicles to serve parked aircraft. There is limited parking designated for U.S. customs, aircraft de-icing and irregular operations.

The east cargo apron serves air cargo operators with space for aircraft parking, loading and unloading, mobile sorting operations, ground handling vehicles and cargo equipment storage. The apron is located east of Runway 3/21 along Taxiway B, north of the General Aviation apron accessed by Taxiway G, H and J. The area is approximately 66,000 square yards in size primarily consisting of a concrete surface and a pavement strength the same as the runways. A paved asphalt surface 105 feet wide on the southeast edge of the apron area is intended to serve cargo ground operations and is also used for aircraft parking when all UPS aircraft are present. This pavement area has reduced pavement strength. The cargo apron is used for the loading, unloading and parking of aircraft a large as Design Group IV.

The west cargo apron was once used for air cargo operations and is now used for aircraft parking near aircraft storage hangars and aviation businesses. This apron is approximately 5,100 square yards in size with a concrete surface. The apron is located at the end of Taxiway K.

The east general aviation apron serves multiple aviation operators including Landmark Aviation, a fixed-base operator. The apron is located east of the Runway 15/33 and 3/21 intersection accessed Taxiway by Taxiway D, E and F. The apron is approximately 68,000 square yards in size made of an asphalt surface with a pavement strength of 60,000 pounds. There are 79 designated aircraft tie-down parking spaces for transient aircraft marked for small aircraft. Frequently larger and heavier aircraft utilize this pavement than its intended design leading to deteriorating pavement condition and limited aircraft maneuverability. The north-south taxilane is only designed for Group I aircraft when Group II aircraft regularly utilize the apron. This apron also features an on-airport well located in the middle of the south portion of the apron which limits maneuverability.

The west general aviation apron was constructed in 2010 and is located at the intersection of Taxiway A and L. This apron primarily serves a second fixed-base operator, Maverick Air Center. This apron is also used by other Specialized Aviation Service Operators (SASOs) such as Satnan Avionics and Sioux Falls Flight School. The apron is approximately 22,900 square yards in size made of concrete surface with a maximum load capacity of 171,500 pounds to accommodate up to a Boeing 737 business jet. There are eight aircraft tie-down parking spaces available for transient aircraft.

The SDANG apron is exclusively used for military purposes in support of the Air Guard mission. It is a concrete surface approximately 88,200 square yards located south of Runway 9/27 between Runway 15/33 and 3/21. There are 28 parking positions for military aircraft.

Exhibit 2-9 – Apron Area Summary

Apron Areas	
Identifier	**Area (Square Yards)**
Air Carrier	74,800
East Cargo	66,000
West Cargo	5,100
East General Aviation	68,000
West General Aviation	22,900
SDANG	88,200
TOTAL	**325,000**

Note: All areas are approximate.
Source: Sioux Falls Regional Airport CAD drawings, KLJ Analysis

Various low-speed taxilanes provide access from the aprons to individual general aviation hangar areas. Taxilanes are also designated within apron areas to separate aircraft parking from access areas. Some taxilanes such as those through the east general aviation apron do not provide adequate wingtip separation for the design aircraft.

Pavement Condition

Airport pavements are basic infrastructure components at airports. Airfield pavements should be maintained in a safe and operable condition for aircraft operations. Pavement condition is comprehensively evaluated by the State every three years and measured on a 0 to 100 scale known as the Pavement Condition Index rating. Pavement evaluation includes runway,

taxiway, and apron pavement. A summary of the current PCI rating for the runway and selected other airfield pavements is below. A copy of the latest pavement evaluation map is contained in **Appendix X – Airfield Pavement Condition.**

Exhibit 2-10 – Pavement Condition Summary

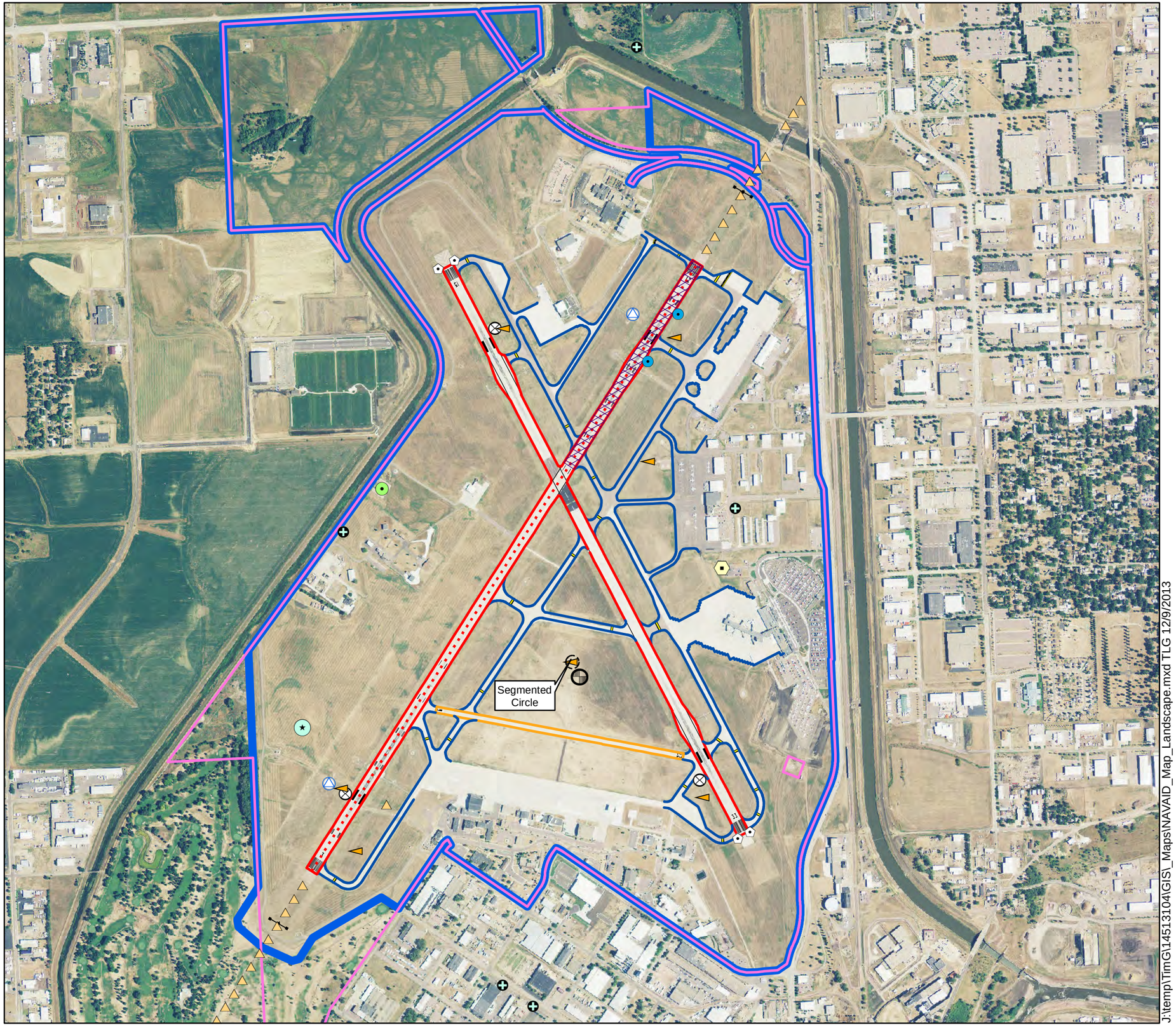
Airside Pavement Condition Summary (2012)		
Component	**Lowest Avg. PCI**	**Highest Avg. PCI**
Runway 3/21	54	90
Runway 15/33	96	98
Runway 9/27	83	97
Taxiway A, A1-A4	41	98
Taxiway B, B1-B5	27	91
Taxiway C, C2	77	90
Taxiway D	81	
Taxiway E	83	
Taxiway F	79	
Taxiway G	100	
Taxiway H	95	
Taxiway J	100	
Taxiway K	74	
Taxiway L	100*	
Taxiway M	99	99
Air Carrier	53	95
East Cargo	91	96
West Cargo	44	
East General Aviation	20	68
West General Aviation	100**	
SDANG	N/A	
East GA Taxilanes	18	100

PCI = Pavement Condition Index rating. Taxiway designation includes connecting taxiways
Color code represents overall pavement condition
**From 2009 PCI Report, **Estimated (new construction)*
Source: Pavement Condition Technical Evaluation (2012)

Overall, Runway 3/21 has portions of the pavement in good condition near the north and south ends that are in fair or good condition, respectively. A portion of Taxiway B near the south end is in poor condition. The east general aviation apron pavement is in fair to very to very poor condition. The taxilane to the north of the Landmark Aviation hangars is in very poor condition.

Navigation Aids & Airspace

Navigational aids (NAVAIDs) provide visual and electronic guidance to pilots enabling the airport to safely, efficiently and effectively accommodate arriving and departing flights. Airspace is a resource that is necessary to allow flights to safely operate and maneuver in the airport environment. **Figure 2-3: Navigational Aids Map** identifies visual and electronic navigational aids and weather facilities graphically.



Legend

- Airport Beacon
- Airport Surveillance Radar
- Air Traffic Control Tower
- Approach Lighting System
- Automated Surface Observing System
- Glideslope
- Localizer
- Low Level Windshear Alert System
- Precision Approach Path Indicator
- Runway End Identifier Lights
- Visual Approach Slope Indicator
- Windcone
- High Intensity Runway Lighting
- Hold Line
- ILS Hold Line
- Medium Intensity Runway Lighting
- Medium Intensity Taxiway Lighting
- Runway Centerline Lighting
- Existing Airport Property
- Future Airport Property
- Touchdown Zone Lighting

N

0 750 1,500 3,000 Feet

*Intended for Planning Purposes Only

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Sioux Falls Regional Airport
Joe Foss Field
Navigational Aids Map
Figure 2-4

Visual Navigation Aids

Visual aids are installed to provide airport usability during periods of darkness and/or low visibility. Pavement markings and lighting systems available at Sioux Falls Regional Airport are summarized in the following sections.

Identification Lighting

A white-green rotating beacon is a two-sided light used to assist pilots in the visual identification of a civilian airport. The rotating airport beacon for Sioux Falls Regional Airport is located near the center of the airfield, each of Runway 3/21 and south of Taxiway M.

Pavement Edge Lighting

Pavement edge lighting fixtures are installed off the edges of runway and taxiway pavement to help pilots identify the edge and ends pavement to facilitate safe operations in darkness and/or low visibility environments. Runway edge lights are white, except for the final 3,000 feet of runway where the lights change color to yellow then red to warn pilots of the end of the runway. The runway end threshold lights are green viewing down the runway and red viewing at the end of the runway. Taxiway edge lights are blue. Runway 3/21 and Runway 15/33 are equipped with High Intensity Runway Lighting (HIRL) while Runway 9/27 is equipped with Medium Intensity Runway Lighting (MIRL). The taxiways are equipped with Medium Intensity Taxiway Lighting (MITL).

In-Pavement Runway Lighting

A flush mounted in-pavement runway lighting provides enhanced lighting of critical runway areas during very low visibility conditions. Two flush-mounted systems are installed at Sioux Falls Regional Airport, Touchdown Zone Lighting (TDZL) and Centerline Lighting (CL). TDZL are white lights identifying the runway threshold landing zone for the first 3,000 feet. CL are white lights identifying the runway centerline at 50 foot intervals. Runway 21 is equipped with TDZL and Runway 3/21 is equipped with CL.

Visual Approach Lighting

Visual approach lighting provides vertical descent guidance to pilots for a runway end. This navigational aid is used by the pilot to acquire and maintain the correct glide path for landing. The red and white lights emitted are interpreted by the pilot to indicate whether they are too high, too low, or on glidepath. Precision Approach Path Indicator Lights (PAPI) are the current standard equipment installed for this purpose. Runway 21 is equipped with a four-box Visual Approach Slope Indicator (VASI-4L) system installed on the left side of the runway. Runway 3, 15 and 33 are equipped with a four-box Precision Approach Path Indicator (PAPI-4L) lights installed on the left side of the runway.

Approach Lighting System

An approach lighting system provides extended runway centerline alignment information near the runway's end for pilots to transition from instrument flight to visual flight for landing in low visibility conditions. There are several types of systems with varying configurations. Runway 3 and 21 ends are equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). A MALSR system consists of green threshold lamps, a set of high-intensity white and red steady-burning lights located up to 1,400 feet

from the runway end, plus a single row of sequenced flashing lights located another 1,000 feet out.

Runway End Identification Lighting

Runway End Identifier Lights (REILs) are a set of synchronized flashing white strobe lights installed on each side of the runway to provide rapid and positive identification of the approach end of a runway without complex visual approach lighting. The system can be unidirectional toward the runway approach or omnidirectional. REILs are installed on both ends of Runway 15/33.

Pilot-Controlled Lighting

Airfield lighting systems allow for pilots to control the complexity and intensity of lights. Runway 3/21 and 15/33 are equipped with a pilot-controlled lighting system (PCL) which is available when the control tower is closed. Lights are able to be activated using aircraft radio.

Pavement Markings

Pavement markings provide visual guidance to aircraft to critical areas on the runway and taxiway surface. Runway markings vary in complexity depending on the type of approach. Runway 3/21 is equipped with precision runway markings identifying the runway designation, threshold, centerline, side stripes, aiming point and touchdown zone. Runway 15/33 is equipped with non-precision runway markings identifying the runway designation, threshold, centerline and aiming point. Runway 9/27 is equipped with basic runway markings identifying the runway designation and centerline.

Taxiway markings include centerline striping to provide proper clearance from pavement edges and fixed objects. Enhanced markings with additional visual cues are now in place near intersections with runways. Runway hold position markings identify the safety setback from active runways in association with airfield guidance signs and Runway Guard Lights (RGL). Other markings include pavement edge and object free area striping.

Airfield Guidance Signs

Guidance signs provide location, direction, and guidance information to pilots on the ground to enhance awareness. Lighted signs are placed around the airfield to identify runway and taxiway intersections, runway hold positions, and other guidance. Mandatory signs are red and identify an intersection with a runway or critical safety zone. Location signs identify the taxiway or runway the aircraft is located. Direction signs provide guidance to other taxiways from an intersection. Destination signs point to the path of important airport facilities. Distance remaining signs are located on the runway and provide the pilot with information about runway length remaining in intervals of 1,000 feet. Runway Guard Lights (RGL) are alternating yellow lights that designate the taxiway holding position near runway intersections. An entire array of airfield guidance signs are installed at Sioux Falls. Runway distance remaining signs are installed on Runway 3/21 and Runway 15/33.

Electronic Navigation Aids

Electronic navigational aids are installed to provide critical guidance information when operating in the airport environment. These navigational aids often provide horizontal and/or vertical guidance in conjunction with published navigation procedures. Electronic navigation aids available at Sioux Falls Regional Airport are summarized below:

Very High Frequency Omni-Directional Range Tactical Air Navigation (VORTAC)

This ground-based navigational aid projects an omni-directional signal that allows equipped aircraft to navigate to and from the station. The Sioux Falls (FSD) VORTAC station is located four miles to the northwest and provides navigation to the airport and runways. This VORTAC station is equipped with Distance Measuring Equipment (DME) providing slant distance information to pilots.

Instrument Landing System (ILS)

An Instrument Landing System is installed for a runway end to allow pilots to capture a horizontal and vertical radio beam to the runway threshold to assist in landing. Components of an ILS include the glideslope antenna, localizer antenna, approach lighting system, and marker beacons. The glideslope antenna is located alongside the runway providing vertical guidance, the localizer antenna is installed beyond the opposite runway end providing horizontal guidance, the approach lighting system provides visual guidance to the runway end, and the marker beacons provide aural cues for pilots flying the approach. Runway 3 and 21 ends at Joe Foss Field have an ILS installed.

Global Positioning System (GPS)

GPS is a satellite-based navigation system that allows location to be triangulated from space-based satellites. Equipped aircraft can navigate between user-defined or FAA waypoints with lateral and vertical guidance. With ground-based transmitters known as Wide Area Augmentation System (WAAS) the system can provide accuracy down to a few feet. GPS is widely becoming the preferred aircraft navigation system and FAA is establishing en-route and approach procedures using this satellite-based technology. GPS is used at Sioux Falls Regional Airport in the establishment of instrument approach procedures to each of the six runway ends.

Meteorological Facilities

Metrological facilities provide users with up-to-date weather information at the airport to aid in pilot decision making for safe flight operations.

Wind direction indicators provide immediate visual indication of the wind direction and velocity. A segmented circle provides a visual indication of the wind cone area together with runway alignment and/or traffic pattern information. A lighted windcone with a segmented circle providing runway centerline reference information is installed in the center of the airfield, south of Taxiway M and east of Runway 3/21. Various supplemental wind cones are located throughout the airport near the landing thresholds to Runway 15/33 and Runway 3/21.

An Automated Surface Observation System (ASOS) is installed at Sioux Falls Regional Airport providing continuous weather observations every minute. Observations include cloud ceiling, visibility, barometric pressure, precipitation, temperature and dew point. The ASOS is located west of the Runway 3 landing threshold. Data from the ASOS is relayed to the National Weather Service and Air Traffic Controllers.

Sioux Falls Regional Airport has a Low Level Windshear Alert System (LLWAS) installed. There are eight wind sensors installed throughout the airport environment transmitting information to air traffic controllers about local differences in wind conditions which may be hazardous to aircraft.

Runway Visual Range (RVR) equipment reports visibility conditions at the runway touchdown zone providing more accurate readings during low visibility landing conditions when precision landing and takeoff operations are in effect. RVR sensors are installed at the touchdown zone for Runway 3 and 21.

Communication Facilities

Communication facilities allow aircraft to transmit and receive clearances to air traffic control to safely and effectively navigate the national airspace system.

Sioux Falls Regional Airport is equipped with an FAA Air Traffic Control Tower (ATCT) providing aircraft clearances via radio communications on tower frequency 118.30 MHz and ground control on 121.90 MHz. Tower controllers issue instructions and clearances to manage runway and air traffic, and ground controllers issue instructions and clearances to manage ground traffic. ATCT is responsible for providing clearances to aircraft on the movement areas of the airport and airspace within five miles. The ATCT is located on the east side of the airport just north of the passenger terminal complex. ATCT personnel have limited visibility to Taxiway H, G and J between Taxiway B and the east cargo apron. ATCT is open from 5 a.m. to Midnight every day.

Terminal Radar Approach Control (TRACON) provides aircraft navigational guidance and separation within 40 nautical miles of the facility. The Airport Surveillance Radar (ASR) that identifies aircraft in the local area is located on the far west side of the airport near the perimeter road. The radar was relocated to this location in 2009.

A recording of weather observations and other pertinant airport information is available on the Automatic Terminal Information Service (ATIS) frequency of 126.60 MHz. Communication link to the local Huron Flight Service Station for flight plan and weather information is available through local ground controllers or through through a navigational aid located four miles northwest of the airport.

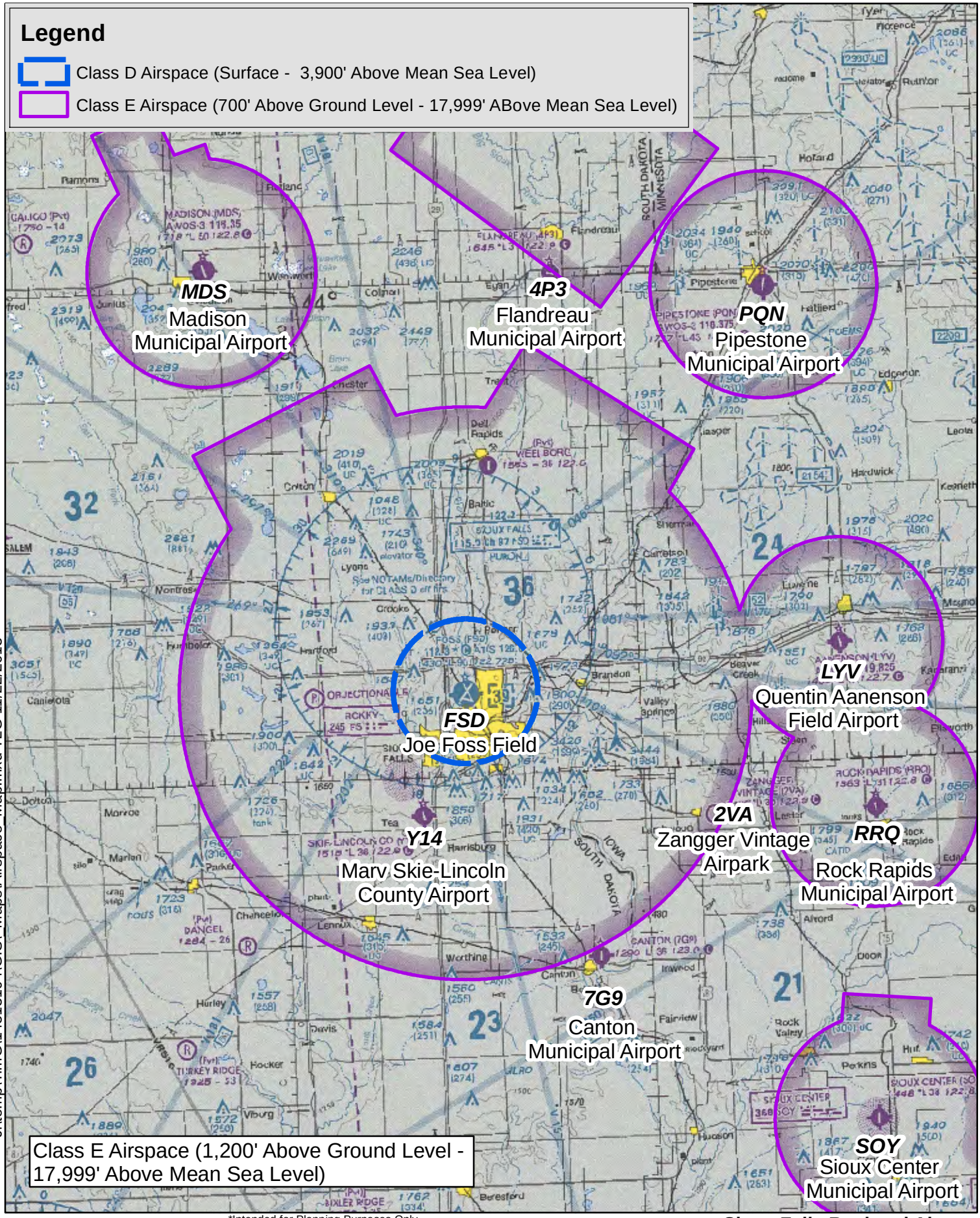
Exhibit 2-11 – Navigational Aid Summary

Navigational Aid Summary Table			
Component	**Runway 3/21**	**Runway 15/33**	**Runway 9/27**
Runway Length (feet)	*8,999*	*8,000*	*3,152*
Runway Width (feet)	*150*	*150*	*75*
Pavement Markings	Precision	Non-Precision	Basic
Runway Lighting	HIRL CL TDZL (21)	HIRL	MIRL
Taxiway Lighting	MITL		
Approach Lighting	MALSR (3, 21) PAPI-4L (3) VASI-4L (21)	PAPI-4L (15, 33) REIL (15, 33)	None
Instrument Approach Procedures	ILS (3, 21) RNAV (GPS) (3, 21) GPS/LPV (3, 21)	RNAV (GPS) (15,33) VOR (15, 33)	RNAV (GPS) (9,27)
Navigational Aids	Air Traffic Control Tower (ATCT) Airport Surveillance Radar (ASR)		
Meteorological Facilities	Automated Surface Observation System (ASOS) Runway Visual Range (RVR) Low Level Windshear Alert System (LLWAS) Lighted Wind Cone with Segmented Circle		

Source: Airnav.com, FAA Airport Master Record Form 5010 Report

Airspace

Airspace is segregated into controlled, uncontrolled, special use or other airspace. Currently, air traffic at Sioux Falls Regional Airport is classified as Class D controlled airspace starting at the surface through 2,500 feet above ground level and extending five statute miles from the airport. Class D airspace is directly controlled by the ATCT at Joe Foss Field. Class E controlled airspace surrounds the Class D airspace beginning 700 feet above the ground. Air traffic control services are available to aircraft within the surrounding Class E airspace as well. Airspace and surrounding airport features are depicted on **Figure 2-5: Airspace & Surrounding Airports Map**.



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*Intended for Planning Purposes Only

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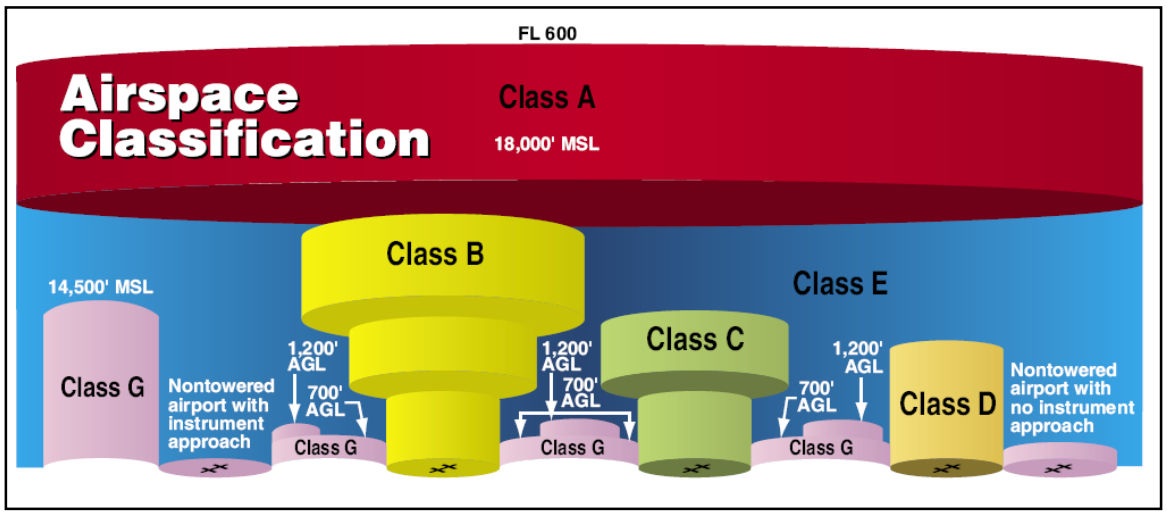
Sioux Falls Regional Airport
Joe Foss Field
Airspace & Surrounding Airports Map
Figure 2-5

Exhibit 2-12 – FAA Airspace Classifications



Source: Federal Aviation Administration (FAA) Pilot's Handbook of Aeronautical Knowledge (2007)

Instrument Approach Procedures

Aircraft operate under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). Pilots approaching under IFR to land at Sioux Falls Regional Airport must navigate aircraft according to published Instrument Approach Procedures (IAP). Multiple IAPs are available for the runways with different navigational aids, including a Category I precision instrument approach to Runways 3 and 21. Instrument approach weather minimums are a result of the approach type, airport infrastructure and prevailing airspace obstructions.

Exhibit 2-13 – Instrument Approach Procedures

FAA Published Instrument Approach Procedures			
Approach Procedure	**Approach Type**	**Lowest Cloud Ceiling Minimum (HAT)**	**Lowest Visibility Minimum RVR, n.m.**
HI-ILS OR LOC RWY 3	ILS	1674' (250')	2400' RVR, ½ mile
ILS OR LOC RWY 3	ILS	1674' (250')	2400' RVR, ½ mile
ILS OR LOC RWY 21	ILS	1630' (200')	1800' RVR, ½ mile
HI-ILS RWY 21	ILS	1630' (200')	1800' RVR, ½ mile
RNAV (GPS) RWY 03	LPV	1674' (250')	2400' RVR, ½ mile
RNAV (GPS) RWY 09	LNAV	1880' (457')	1 mile
RNAV (GPS) RWY 15	LNAV/VNAV	1896' (467')	1 ¾ miles
RNAV (GPS) RWY 21	LPV	1630' (200')	2400' RVR, ½ mile
RNAV (GPS) RWY 27	LNAV	1960' (537')	1 mile
RNAV (GPS) RWY 33	LNAV/VNAV	1970' (548')	2 ¼ miles
VOR/DME OR TACAN RWY 33	VOR	1940' (517')	1 mile
VOR OR TACAN RWY 15	VOR	1920' (492')	1 mile
HI-TACAN RWY 15	VOR	1920 (491')	1 3/8 miles

Note: HAT = Height Above Touchdown, RVR = Runway Visual Range, n.m. = nautical miles (reported), ILS = Instrument Landing System, LPV = Localizer Performance with Vertical Guidance, LNAV = Lateral Navigation, VNAV = Vertical Navigation, VOR = Very High Frequency Omni-Directional Range
Source: Airnav.com

Instrument approach weather minimums are a result of the approach type, airport infrastructure and prevailing airspace obstructions. Lower instrument approach minimums may be possible by constructing additional infrastructure and establishing clear airspace to FAA standards. Typical straight-in instrument approach minimums for runways that meet all requirements are as follows:

Exhibit 2-14 – Typical Instrument Approach Minimums

Typical Instrument Approach Minimums			
Approach Procedure	**Approach Type**	**Typical Lowest Cloud Ceiling Minimum (HAT)**	**Typical Lowest Visibility Minimum RVR, n.m.**
ILS - Category III	Precision	≤ 100 feet	≤ 1200' RVR
ILS - Category II	Precision	200 feet	1200' RVR
ILS – Category I	Precision	200 feet	2400'/1800' RVR
LPV	Approach with Vertical Guidance	200 feet	1 mile
LNAV/VNAV	Non-Precision	400 feet	1 mile
LNAV	Non-Precision	400 feet	1 mile
VOR	Non-Precision	400 feet	1 mile
None	Visual	1,000 feet	3 miles

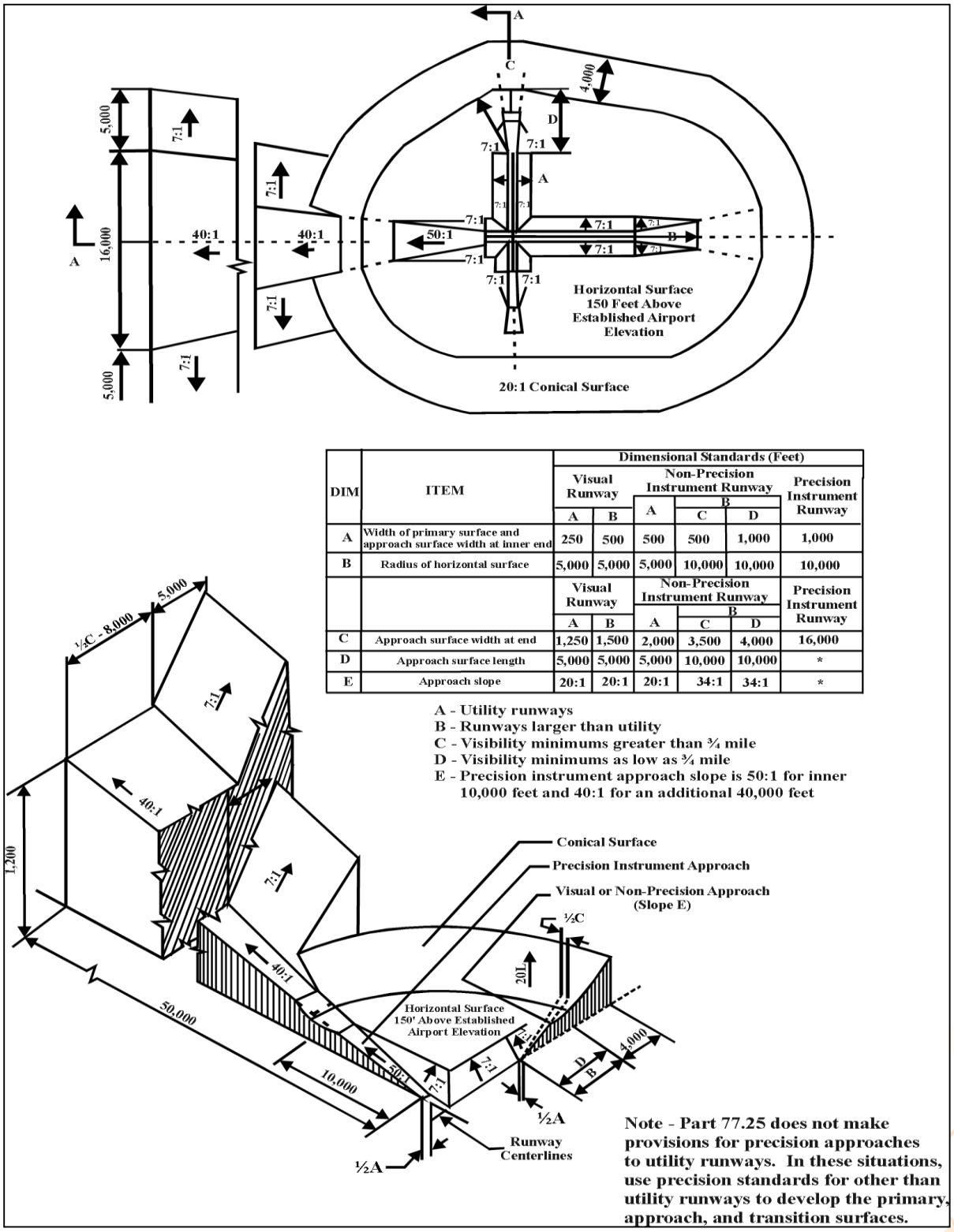
Note: HAT = Height Above Touchdown, RVR = Runway Visual Range, n.m. = nautical miles (reported), ILS = Instrument Landing System, LPV = Localizer Performance with Vertical Guidance, LNAV = Lateral Navigation, VNAV = Vertical Navigation, VOR = Very High Frequency Omni-Directional Range
Source: FAA Advisory Circular AC 150/5300-13A

The instrument approach minimums for Runway 15 and 33 are higher than typical due to prevailing obstructions. No approach with vertical guidance is published for either runway end. See **Appendix X - Instrument Approach Charts** to view the charted instrument approach procedures for Sioux Falls regional Airport.

Airspace Obstructions

Airspace is an important resource around airports that is very important for safe flight operations. There are established standards to identify airspace obstructions around airports. 14 CFR (Code of Federal Regulations) Part 77 *Safe, Efficient Use, and Preservation of the Navigable Airspace* establishes various airspace surfaces in the vicinity of airports. Part 77 used to determine and analyze obstruction data by evaluating objects that penetrate these "imaginary" three-dimensional surfaces. Surfaces include the primary, approach, transitional, horizontal and conical surfaces each with different standards. When evaluating objects, the FAA determines whether or not a penetrating object is a hazard to air navigation, and whether or not corrective action is recommended based on more in-depth minimum airspace standards (i.e. FAA Approach/Departure Surface). Examples of corrective action include removing, lowering, or obstruction lighting an object. A general diagram of the Part 77 surfaces is shown in the following exhibit:

Exhibit 2-15 –FAR Part 77 Airspace



DIM	ITEM	Dimensional Standards (Feet)					
		Visual Runway		Non-Precision Instrument Runway			Precision Instrument Runway
		A	B	A	B C	B D	
A	Width of primary surface and approach surface width at inner end	250	500	500	500	1,000	1,000
B	Radius of horizontal surface	5,000	5,000	5,000	10,000	10,000	10,000
		Visual Runway		Non-Precision Instrument Runway			Precision Instrument Runway
		A	B	A	B C	B D	
C	Approach surface width at end	1,250	1,500	2,000	3,500	4,000	16,000
D	Approach surface length	5,000	5,000	5,000	10,000	10,000	*
E	Approach slope	20:1	20:1	20:1	34:1	34:1	*

A - Utility runways
B - Runways larger than utility
C - Visibility minimums greater than ¾ mile
D - Visibility minimums as low as ¾ mile
E - Precision instrument approach slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet

Note - Part 77.25 does not make provisions for precision approaches to utility runways. In these situations, use precision standards for other than utility runways to develop the primary, approach, and transition surfaces.

Source: Federal Aviation Administration (FAA)

Clear airspace is necessary for the safe and efficient use of aircraft arriving and departing an airport. Part 77 airspace standards are defined by the most demanding approach to a runway. There are three main approach types:

- Precision - a runway having an existing instrument approach procedure utilizing an existing or planned Instrument Landing System (ILS) with horizontal and vertical guidance. Visibility minimums are less than ¾ mile.
- Non-Precision - a runway having an existing instrument approach procedure utilizing air navigation facilities with horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved or planned. Approaches with vertical guidance are considered non-precision. Visibility minimums are typically 1 mile but as low as ¾ mile.
- Visual - a runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure published or planned.

There are two runway classifications:

- Utility - a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.
- Other-Than-Utility - a runway that is constructed for and intended to be used by aircraft greater than 12,500 pounds maximum gross weight.

The combination of the approach type and the runway classification defines the dimensional criteria for each approach. The Part 77 airspace dimensional criteria for Sioux Falls Regional Airport are identified in the table below.

Exhibit 2-16 – Existing Part 77 Approach Airspace Standards

FAR Part 77 Approach Standards						
Runway End	**Approach Standards**	**Part 77 Code**	**Inner Width***	**Outer Width**	**Length**	**Slope**
3	Precision	PIR	1,000’	16,000’	50,000’	50:1/40:1
21	Precision	PIR	1,000’	16,000’	50,000’	50:1/40:1
15	Non-Precision Other-Than-Utility Greater than ¾ mile	C	500’	3,500’	10,000’	34:1
33	Non-Precision Other-Than-Utility Greater than ¾ mile	C	500’	3,500’	10,000’	34:1
9	Non-Precision Utility	A(NP)	500’	2,000’	5,000’	20:1
27	Non-Precision Utility	A(NP)	500’	2,000’	5,000’	20:1

**Inner width is also the Primary Surface width driven by the most demanding approach to a runway.*
Source: 14 CFR Part 77, FAA Form 5010-1 Airport Master Record

Below is a list of the most critical airspace obstructions for each existing runway end as evaluated by FAA. A detailed obstruction identification and mitigation disposition is identified

in the Airport Layout Plan developed at the end of this planning study located in **Appendix X - Airport Layout Plan.**

Exhibit 2-17 – Critical Part 77 Airspace Obstructions

FAA Form 5010 Airspace Obstructions						
Runway End	**Surface**	**Object Type**	**Distance from End**	**Location from Centerline**	**Penetration**	**Slope to Clear (Required)**
3	Approach	Tree	935'	575' Left	**16'**	**23:1** (50:1)
21	Approach	Railroad	1,170'	645' Right	**5'**	**38:1** (50:1)
15	Approach	Tower*	3,650'	930' Right	**51'**	**22:1** (34:1)
33	Approach	Tree	1,455'	328' Right	**9'**	**27:1** (34:1)
9	Approach	-	-	-	-	50:1 (20:1)
27	Approach	Poles	1,256'	23' Right	-9'	24:1 (20:1)

*Notes: Penetration value estimated based. **RED** indicates does not meet current standards.*
**Runway 15 FAA Remote Communication Outlet towers removed in 2012 since FAA inspection was last completed.*
Source: FAA Airport Master Record Form 5010 Report, Sioux Falls Regional Airport.

Airspace obstructions to the Runway 3 end will be mitigated to meet current standards in 2014. A comprehensive FAA survey to more precisely identify airspace obstructions will be completed as part of this Master Plan Update and Airport Layout Plan project.

Surrounding Airports

Public use airports within 30 nautical miles of Sioux Falls Regional Airport were reviewed to provide background into the other area airports. **Figure 2-5** has been prepared to provide a visual indication of these airports.

Exhibit 2-18 – Surrounding Public Airports

Surrounding Airports					
Airport Name	**FAA ID**	**Location from FSD**	**Based Aircraft**	**Instrument Approach**	**Longest Runway Dimensions**
Sioux Falls Regional	***FSD***	**-**	***111***	**Yes/ILS**	***8,999' x 150'***
Marv Skie - Lincoln County	Y14	8 nm S	84	No	3,650' x 60'
Canton Municipal	7G9	18 nm SE	11	Yes/GPS	3,600' x 60'
Quentin Aanenson Field	LYV	23 nm E	16	Yes/GPS	4,200' x 75'
Flandreau Municipal	4P3	26 nm N	11	No	3,100' x 60'
Rock Rapids Municipal	RRQ	26 nm E	16	Yes/GPS	3,097' x 50'
Madison Municipal	MDS	30 nm NW	54	Yes/GPS	5,000' x 75'

Source: Airnav.com, FAA Airport Master Record Form 5010 Report. Note: nm = nautical miles

The Lincoln County Airport in Tea is located only 8 miles southwest of Sioux Falls Regional Airport and only 2 miles east of the Runway 3 approach. This can be a safety hazard with high concentration of small and large aircraft in the same vicinity. Local air traffic controllers are working to establish a Class C airspace "shelf" to better control traffic in this area at particular altitudes.

Smaller general aviation aircraft typically seek "reliever" airports due the increased traffic, security, procedures and delay at primary airports. In and around Sioux Falls there are few options for general aviation aircraft other than the Regional Airport. The Lincoln County Airport accommodates some based aircraft but is constrained, does not have an instrument approach procedure and has limited hangar and runway growth opportunities. A new airport site selection study was completed but not approved for further action by the Lincoln County Board of Commissioners.

Landside Facilities

Landside facilities consist of areas of the Sioux Falls Regional Airport necessary for the movement of passengers and automobiles, and parking and storage of aircraft. Examples of these facilities include the passenger terminal building, public parking lots, access roads, hangars and airport support facilities. A map depicting components of the landside facilities is shown on **Figure 2-6: Landside Facilities Map**.

Passenger Terminal Complex

The passenger terminal complex is accessed by Jaycee Lane which intersects with Minnesota Avenue on the southeast quadrant of the airfield. It is located east of Runway 15/33 along Taxiway A at the intersection with Taxiway M.

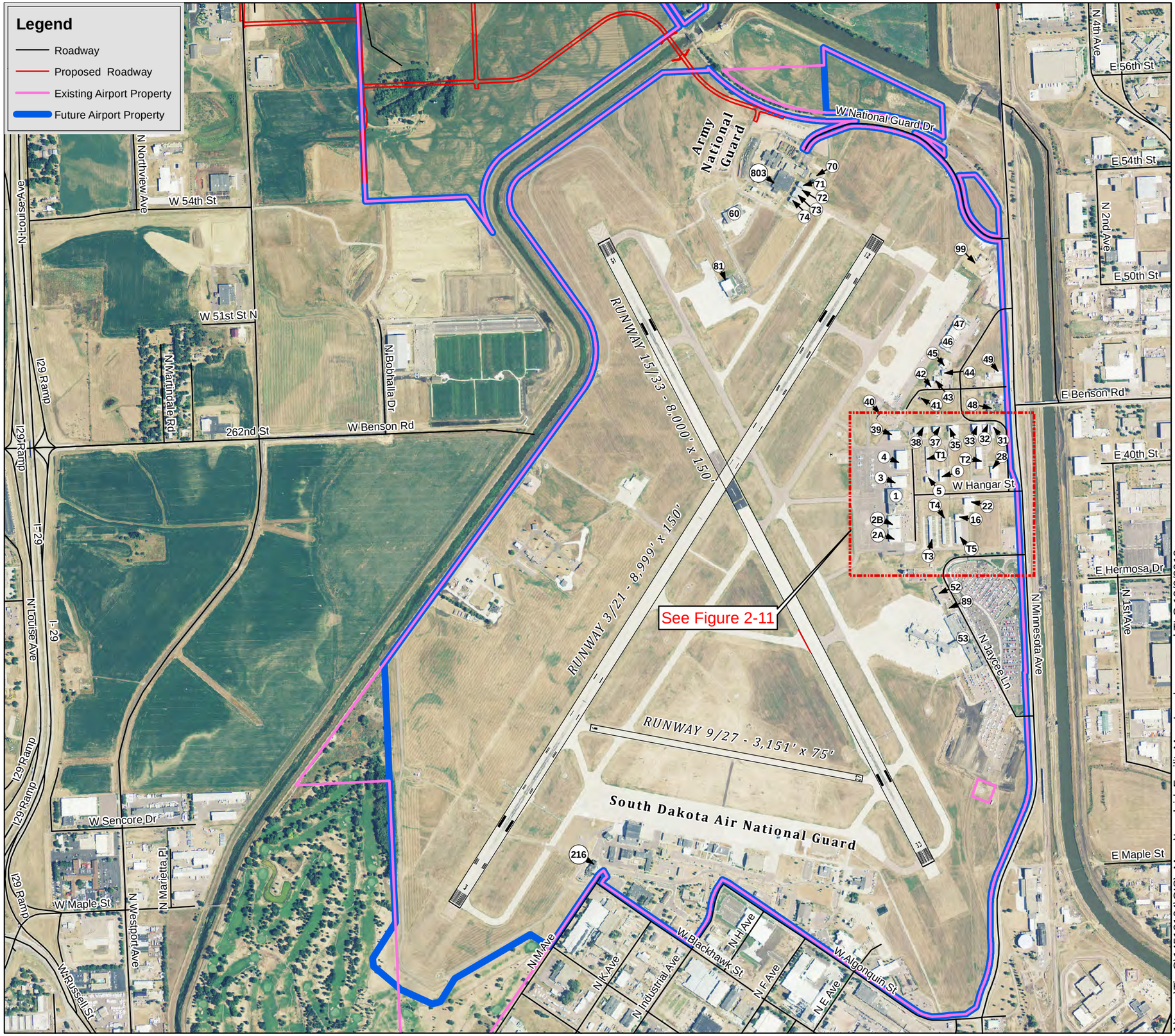
Terminal Building

The terminal building serves multiple functions including general circulation, ticketing, passenger security screening, baggage screening, baggage claim, airport administration, concessions and restrooms. The terminal serves airlines and their affiliates; Allegiant Air, American Eagle, Delta Air Lines, Delta Connection (Compass Airlines, Endeavor Air, ExpressJet, SkyWest Airlines), Frontier Airlines, United Airlines, and United Express (ExpressJet and SkyWest Airlines).

The passenger terminal consists of a terminal building and one concourse that is approximately 140,000 square feet in size with two levels. There are currently seven aircraft gates each with a passenger loading bridge.

The passenger terminal building and concourse was constructed in 1970. It features an open entrance lobby and sloped moving walkway to the security checkpoint and terminal concourse. The complex has been remodeled several times since its original construction. Below is a list of major improvements completed in the terminal building to meet the needs of the travelling public, including several projects completed and planned since the last Master Plan:

- 1970: Original terminal building opens to the public.
- 1990: Terminal is renovated to improve the building aesthetics, add a gift shop, snack and lounge area, conference room, and utility improvements.



Existing Buildings/Facilities

1. Landmark Aviation Hangar/Offices
2A. Landmark Aviation Facilities
2B. Landmark Aviation Facilities
3. Landmark Aviation Facilities
4. Landmark Aviation Facilities
5. Hangar
6. Hangar
7. Hangar
16. Hangar
22. Hangar
28. Office/Hangar
31. Hangar
32. Hangar
33. Hangar
35. Hangar
37. Hangar
38. UPS Facility
39. Sanford Health Hangar
40. U.S. Customs and Border Patrol
41. Airport Storage
42. Airport Maintenance Building
43. Airport Maintenance Building
44. Airport Maintenance Building
45. Airport Maintenance Building
46. Air Cargo Sorting Facility
47. FedEx Facility
48. National Weather Service (NOAA)
49. Landmark Aviation Fuel Storage Facility
52. Air Freight Building (To Be Removed), Future Hotel
53. Terminal Building
60. Airport Snow Removal Equipment and Maintenance Facility
70. Hangar/Satnan Avionics
71. Hangar/Sioux Falls Flight School
72. Hangar
73. Hangar
74. Hangar
81. Maverick Air Center
89. Future Hotel
99. Maverick Air Fuel Storage Facility
216. Aircraft Rescue and Fire Fighting (ARFF) Facility
803. Army National Guard Facilities
T1. T-Hangar
T2. T-Hangar
T3. T-Hangar
T4. T-Hangar
T5. T-Hangar

0 625 1,250 2,500 Feet

N

PRELIMINARY

*Intended for Planning Purposes Only

KLJ

Sioux Falls Regional Airport
Joe Foss Field
Landside Facility Map
Figure 2-6

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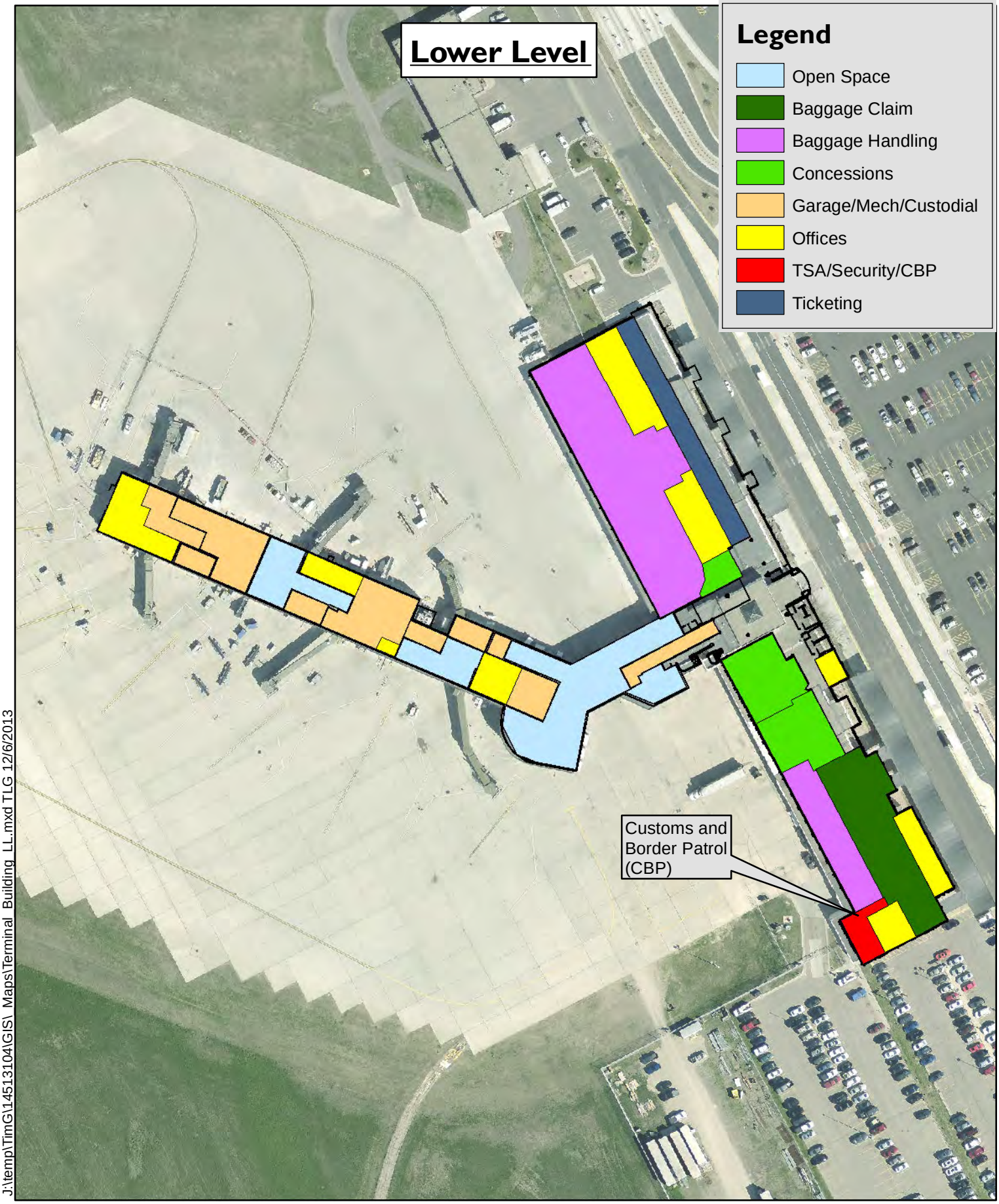
- 2001: Terminal building is expanded by 9,200 square feet to add new baggage claim, expanded rental car offices, and Federal Inspection Services (FIS) clearing area and offices for the United States Customs and Border Protection (CBP) and other Federal agencies.
- 2004: Terminal is remodeled to accommodate additional office and screening space for Transportation Security Administration (TSA). Improvements include widening the checkpoint area and adding a "meet and greet" area upstairs, restroom remodels, additional airport administration rooms, and adding additional seating in the lower level.
- 2009: Terminal building is expanded to accommodate in-line passenger baggage screening, relocated and expanded ticket counters, and improve passenger circulation.
- 2012: Terminal concourse expansion and renovation completed. Improvements include expanded hold rooms, new passenger loading bridges for Gates 1, 2 and 8 (now Gate 7), and constructing departure area restrooms and restaurant. Restaurant/bar and gift shop in non-secure area is remodeled. Parking lot and curbside improvements completed.
- 2016 (projected): Planned near-term improvements within the next three years include an expansion of the security checkpoint to alleviate screening delays. The project will construct space for multiple lanes, new entrance escalator/elevator and new airport administration offices.

The terminal building lower level provides airline ticket counters, passenger check-in, airline office space, passenger baggage claim, baggage handling, car rental counters and offices, airport security, airport conference room, gift shop and restaurant concessions. The upper level consists of airport administration office, passenger screening checkpoints, security office space, and the terminal concourse area consisting of seven aircraft gates and hold rooms, restaurant and gift shop concessions. The following exhibit breaks down the terminal space and **Figure 2-7: Passenger Terminal Building Map (Lower Level)** and **Figure 2-8: Passenger Terminal Building Map (Upper Level)** identify these spaces graphically.

Exhibit 2-19 – Passenger Terminal Space Breakdown

Passenger Terminal Space (Square Feet)			
Space Category	**Lower Level**	**Upper Level**	**Total**
Airline Offices	2,171	-	2,171
Airport Administration	-	2,440	2,440
Baggage Claim	9,010	-	9,010
Baggage Handling	19,760	-	19,760
Concessions	11,450	5,714	17,164
Customs & Immigration	2,775	-	2,775
Garage, Mech., Custodial	20,515	520	21,035
Passenger Ticketing & Waiting	11,114	-	11,114
Public Space & Gates	15,609	30,262	45,871
Security Screening & TSA	3,806	2,570	6,376
TOTAL	**102,753**	**41,506**	**144,259**

Source: Sioux Falls Regional Airport



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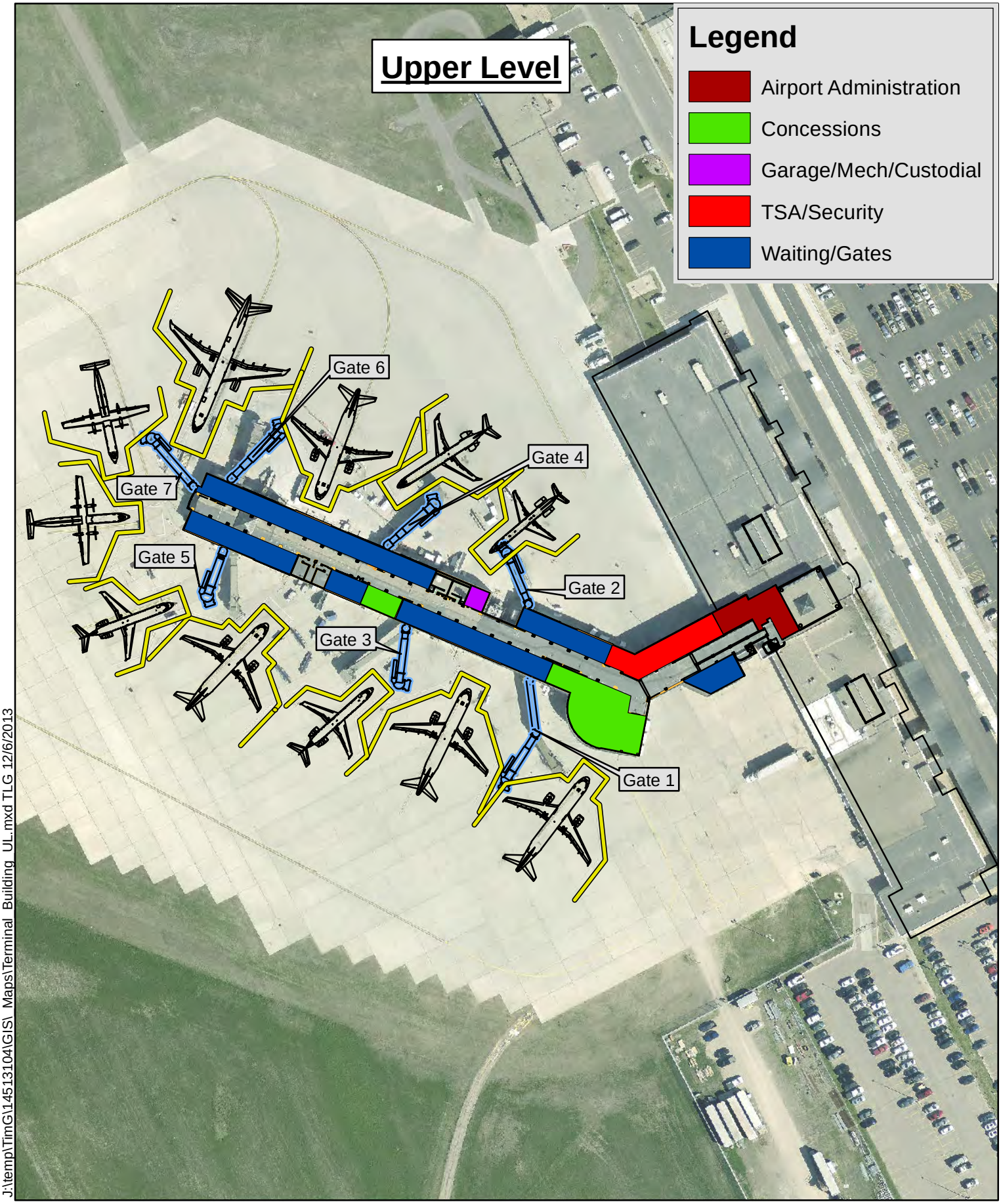
*Intended for Planning Purposes Only

PRELIMINARY

N

0 100 200 400 Feet

Sioux Falls Regional Airport
Joe Foss Field
Passenger Terminal
Building Map
Figure 2-7



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*Intended for Planning Purposes Only

PRELIMINARY

N

0 100 200 400 Feet

Sioux Falls Regional Airport
Joe Foss Field
Passenger Terminal
Building Map
Figure 2-8

There are a total of three baggage carousel located in the baggage claim area on the south portion of the terminal building on the lower level. Currently two are in use by the airlines and the third is reserved for Federal Inspection Services. There are no baggage resolution offices. Inbound baggage make-up facilities consisting of baggage transferred from carts onto the conveyor belts are located behind the baggage claim area. Outbound baggage facilities consist of an in-line baggage handling system located behind the airline ticketing and offices. Baggage is screened by TSA and sorted to carousels to be transported by baggage cart to aircraft. This area was expanded in 2010 to accommodate security personnel and equipment. Larger bags are screened by hand in the ticket lobby.

The ticketing lobby is located in the north portion of the terminal building on the lower level. There are 38 ticket positions over 19 ticket counters and additional space for electronic check-in kiosks. Airline offices are located behind the ticketing area. This area was also expanded in 2010.

There is one passenger security screening checkpoint located on the second level beyond the sloped moving walkway. There is currently one checkpoint lane. Equipment includes a metal detector, two x-ray screeners and TSA full-body scanner. The checkpoint's single security line causes passenger screening delays during peak times. Contributing factors include more passengers carrying on luggage onto aircraft.

The passenger concourse provides seven gates available for loading and unloading of passengers, baggage and cargo. The concourse extends from one spoke of a planned "Y" shape. The concourse had staggered gates and holding areas on each side of the building. The lower level houses airline space, airport utility rooms, and non-enclosed open space below the second level for ground vehicle traffic maneuvering. The upper level contains the passenger gates, restaurant and gift shop concessions, restrooms and a business area.

Two of the seven aircraft gates are for exclusive use. Gate 4 is designated for Delta and Gate 6 for United. Each gate station has kiosks that allow for multiple airline use. Gate 2 is designed for smaller regional jets and is used infrequently because of space constraints with Gate 4 and the terminal building expansion. A recent terminal concourse enhancement project was completed to add gate seating, food and beverage concessions along with business and casino space. This area, located where the leg of the "Y" meet, features an all-glass wall with a view of the airfield.

The Airport's Federal Inspection Services (FIS) facility is located in the southernmost corner of the terminal building connecting into the air carrier apron. There is dedicated and shared space for FIS use. This area becomes secure through retractable partitions near the rental car counters. FIS provides immigration processing for passengers arriving from abroad, baggage claim, baggage screening, and office space for U.S. Customs and Border Patrol. CBP currently does not accept international airline or large charter flights.

Rental car concessionaires are located on the lower level adjacent to the baggage claim area. There are four rental car counters and offices serving Avis, Enterprise, National and Hertz. The space is located adjacent to the south terminal building exit and ready/return rental car parking. All rental car concessionaires are located at the airport.

The aircraft parking apron is configured to accommodate aircraft from small regional jets (CRJ-200) to mid-size mainline jets (Airbus A320, Boeing 757).

Exhibit 2-20 – Passenger Gates

Passenger Gate Summary			
Gate	**Airline**	**Gate Type**	**Largest Aircraft**
1	Multiple	Loading Bridge	Airbus A320
2	Multiple	Loading Bridge	ERJ-145
3	Multiple	Loading Bridge	Airbus A320
4	Delta Air Lines	Loading Bridge	Airbus A320
5	Multiple	Loading Bridge	Boeing 757
6	United Airlines	Loading Bridge	Airbus A320
7	Multiple	Loading Bridge	Airbus A320

Source: KLJ, Sioux Falls Regional Airport Authority

All passenger gates are accessed from Taxiway A and M. Taxilane centerlines guide aircraft to each gate position for the critical aircraft. There are no designated service roadways for ground transport. There is a lower level bypass to avoid driving vehicles around the terminal concourse.

A new four-story, 74-room efficiency hotel is planned just north of the terminal building in the approximate location of the air freight building and employee parking lot. The development will be completed in early 2015.

Circulation & Parking

The passenger terminal complex is accessed from the signalized intersection of Jaycee Lane from Minnesota Avenue. Inbound Jaycee lane is a two-lane roadway providing access to the passenger terminal curbside facilities, rental car and parking entrance plaza. A recirculation road around the parking lots returning to the terminal is also available. The airport exit is south of the terminal with Jaycee Lane merging with Minnesota Avenue. A passenger pickup waiting lot is also available north of the entrance. **Figure 2-9: Passenger Terminal Access & Parking Map** depicts these facilities.

Legend

- Roadway Access Direction
- Existing Airport Property
- Railroad
- Roadway

Total Parking Spaces Available:
Public - 2,563
Employee - 206
Rental Car - 725

1. Passenger Pickup Waiting Parking, Terminal Cab Queuing (93 spaces)
2. Main Long-Term Parking (1,405 Spaces)
3. North Employee Parking (23 spaces)
4. Passenger Pickup/Waiting Lane (1,110 Linear Feet)
5. Short-Term Parking (300 Spaces)
6. Rental Car Ready/Return Parking (167 spaces)
7. South Employee Parking (183 spaces)
8. Rental Car Storage Parking (558 spaces)
9. South Long-Term Parking (765 Spaces)

N

0 125 250 500
Feet

*Intended for Planning Purposes Only

PRELIMINARY

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KLJ

Sioux Falls Regional Airport
Joe Foss Field
Passenger Terminal Access and Parking Map
Figure 2-9

The terminal curbside roadway consists of an inner and outer roadway for the pick-up and drop-off of passengers. The two-lane inner roadway is used by provides approximately 580 linear feet of curbside and includes one 10-foot wide parking lane, a 12-foot wide maneuvering lane and a 12-foot wide through lane. The two-lane outer roadway, used by commercial vehicles, shuttles and taxicabs, provides approximately 530 linear feet of curbside with one ten foot wide parking lane and one 12 foot wide through lane. There are three designated spaces for taxicabs. Five 10-foot wide pedestrian crosswalks provide access across the inner and outer roadways connecting the parking lots with the terminal building.

Parking facilities include public, employee, and rental car parking lots. All parking facilities are located on-airport. Short-term parking is available in a 300 space lot adjacent to the terminal building. Long-term parking is available in a 1,405 space lot centrally located near the terminal building, and in a newly constructed 765 space south lot.

Exhibit 2-21 – Parking Facilities

Parking Lot Facilities		
Group	**Parking Lot**	**Spaces**
Public	Short-Term	300
Public	Main Long-Term	1,405
Public	South Long-Term	765
Public	Passenger Pickup Waiting	93
Total Public		**2,563**
Employee	South Employee Parking	183
Employee	North Employee Parking	23
Total Employee		**206**
Rental Car	Ready/Return	167
Rental Car	Storage	558
Total Rental Car		**725**
Grand Total		**3,494**

Source: KLJ, Sioux Falls Regional Airport Authority

The main public parking lot and entrance road was reconstructed and reconfigured in 2011. In 2012, the south terminal parking lot, rental car parking expansion and employee parking expansion was completed. In all the improvements added approximately 750 new parking spaces to meet existing and projected demand. The Airport Authority operates a shuttle bus to and from the new south terminal parking lot during the colder months.

Sioux Falls Regional Airport Authority charges for short-term and long-term parking. Short-term parking rates are $1.00 per hour or up to $9.00 per day. Long-term parking rates are $1.00 per hour or up to $7.00 per day, and $35.00 per week.

Rental car facilities consist of a north building owned by Hertz and has a maintenance bay and a car wash. The second building is jointly owned by Enterprise, Avis and National and consists of three service bays and a car wash. Both buildings are located at the northwest corner of the rental car storage lot. Fuel pumps are also present near the maintenance facilities.

Air Cargo

Current major air cargo operations at the airport include UPS and FedEx. Each of these companies have local facilities within the City. Multiple feeder carriers serve UPS to operate from including Encore Air Cargo based at Sioux Falls Regional Airport. See **Figure 2-10: Air Cargo Facilities Map** for more detail.

Cargo sorting activities are performed on the east and northeast quadrants of the airport. UPS has sorting facilities located in a 9,300 square foot building near the east general aviation ramp, accessed by West Weather Lane from Minnesota Avenue. Much of the cargo sorting takes place on the east air cargo apron located along Taxiway B. Ground vehicle and pedestrian operations must travel between the general aviation and east cargo aprons which leads to lost time and safety concerns within the air operations area.

FedEx and Same Day Express (ground transport) conduct their sorting activities out of the 40,000 square foot sort building located on the east cargo apron located along North John Orr Drive with access from Minnesota Avenue.

General Aviation

There are two distinct general aviation areas at Sioux Falls Regional Airport – east and west. **Figure 2-11: General Aviation Facilities Map** depicts these area graphically.

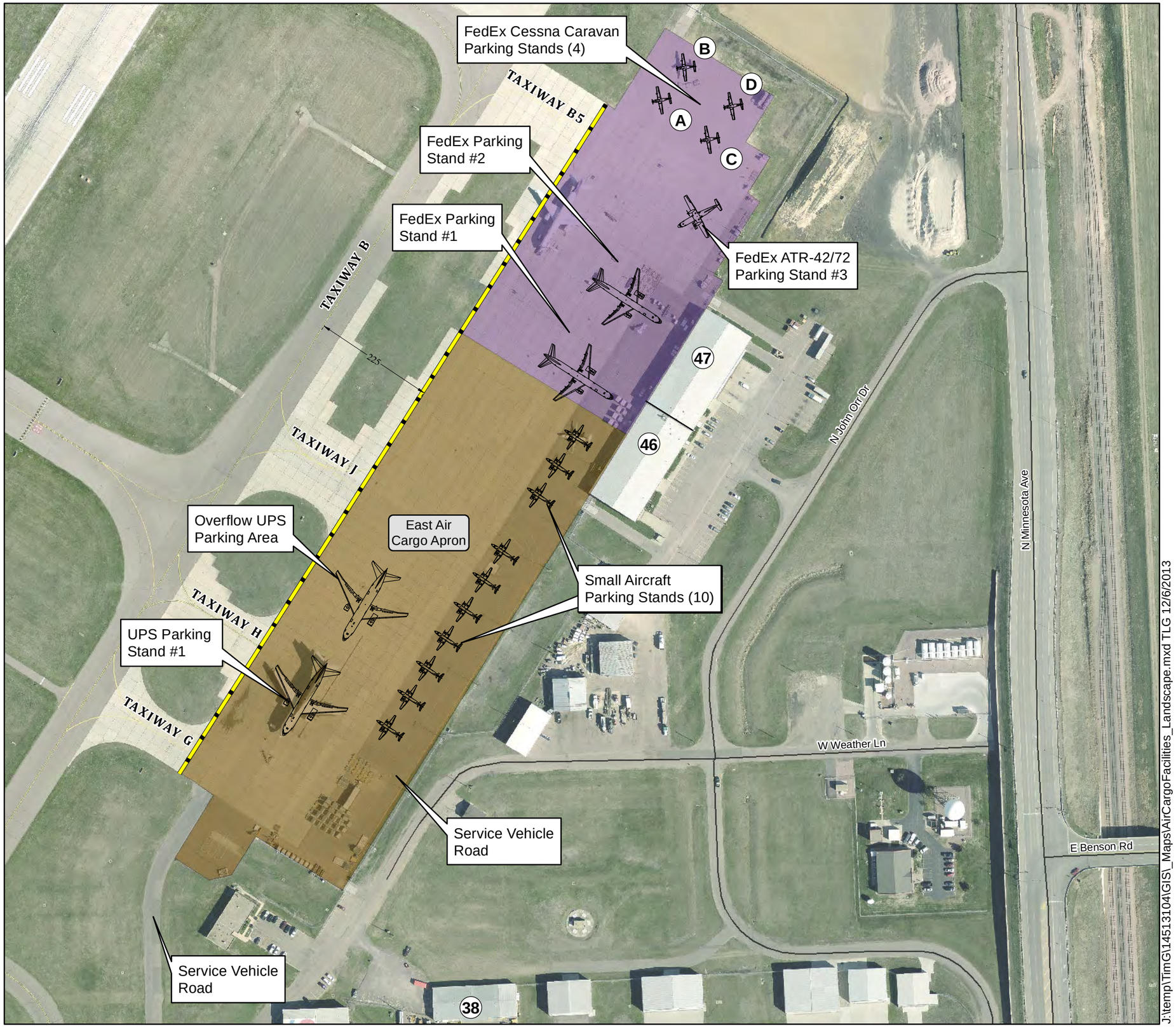
The east general aviation area is located directly east of Runway 15/33 and 3/21 intersection and north of the commercial passenger terminal. Facilities include Landmark Aviation Fixed-Base Operator (FBO), general aviation parking apron and multiple aircraft storage and maintenance hangars. FBO and general aviation ramp facilities are accessed through Aviation Avenue which intersects with Hangar Street. Aircraft storage facilities are accessed through Hangar Street which intersects with Minnesota Avenue.

The west general aviation area includes Maverick Air Center FBO, general aviation parking apron and future hangar development space. This area was constructed in 2010 and is located east of Runway 15/33 at the intersection of Taxiway A and L. Ground access is provided from Minnesota Avenue along West National Guard Drive, Lien Place and Maverick Place (private roads) to the west side of the airfield. There is no access from the west to the west side of the airport.

Fixed-Base Operators

There are two separate Fixed-Base Operators (FBOs) that provide aeronautical services to the public at Sioux Falls, Landmark Aviation (formerly Business Aviation) and Maverick Air Center. FBOs are a commercial business providing aviation services to the public, primarily for general aviation.

Landmark Aviation operates from several buildings, hangars, and office space in the east general aviation area. The Airport owns Hangar #1 and leases it to Landmark Aviation for use. Landmark provides full FBO services including fuel sales (100LL and Jet-A) with mobile fueling, aircraft parking, aircraft handling, de-icing, passenger lobby, pilot lounge,



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Legend

- Non-Movement Area Boundary
- Fed Ex
- UPS

Existing Buildings/Facilities

38. UPS Facility
46. Same Day Express
47. FedEx

N

0 100 200 400 Feet

*Intended for Planning Purposes Only

PRELIMINARY

KLJ

Sioux Falls Regional Airport
Joe Foss Field
Air Cargo Facilities Map
Figure 2-10

East General Aviation Area

E Benson Rd

N John Orr Dr

N Aviation Ave

W Hangar St

79 Aircraft Tiedowns

Aircraft Storage Hangars

Landmark Aviation Terminal

City of Sioux Falls Water Well

East General Aviation Apron

West General Aviation Area

Maverick Air Center Terminal

West General Aviation Apron

8 Aircraft Tiedowns

TAXIWAY A

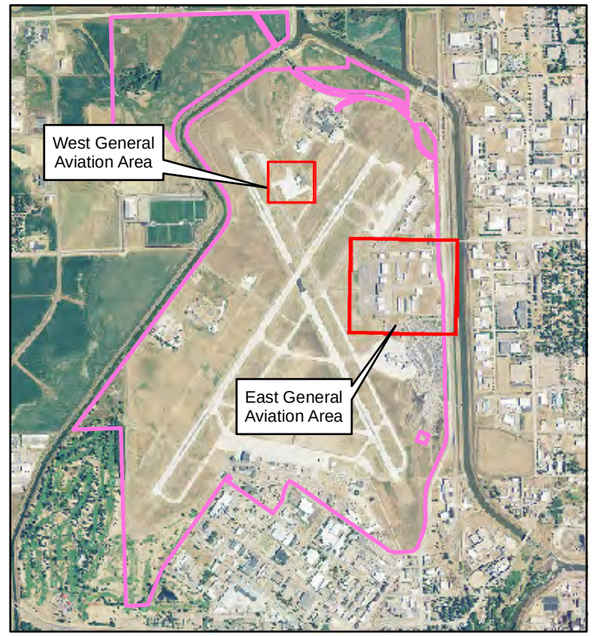
TAXIWAY L

N

0 100 200 400 Feet

Existing Buildings/Facilities

1. Landmark Aviation Hangar/Office
2A. Landmark Aviation Facilities
2B. Landmark Aviation Facilities
3. Landmark Aviation Facilities
4. Landmark Aviation Facilities
5. Hangar
6. Hangar
7. Hangar
16. Hangar
22. Hangar
28. Office/Hangar
31. Hangar
32. Hangar
33. Hangar
35. Hangar
37. Hangar
38. UPS Facility
39. Sanford Health Hangar
40.U.S Customs and Border Patrol
50. Vault
51. Air Traffic Control Tower
81. Maverick Air Center
T1. T-Hangar
T2. T-Hangar
T3. T-Hangar
T4. T-Hangar
T5. T-Hangar



PRELIMINARY

*Intended for Planning Purposes Only

Sioux Falls Regional Airport
Joe Foss Field
General Aviation Facilities Map
Figure 2-11

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aircraft charter, aircraft sales, avionics, aircraft maintenance, and ground transportation services. Landmark Aviation operates Encore Air Cargo which operates and maintains a fleet of aircraft including Fairchild Metroliner III, Cessna 404 and Cessna 402. Landmark Aviation provides approximately a 10,000 square foot terminal and office facility providing passenger and crew amenities. They have a total of 107 stalls for their automobile parking lots and also park on Aviation Avenue and Hangar Street to serve employees and customers.

Maverick Air Center, who started operations in 2010, operates from a 16,500 square foot hangar, office and terminal facility in the west general aviation area. They lease Hangar #81 from the Airport. Maverick provides full FBO services including fuel sales (100LL and Jet-A) with mobile fueling, aircraft parking, aircraft handling, de-icing, passenger lobby, pilot lounge, and ground transportation services. Maverick Air Center provides a 4,500 square foot terminal facility providing passenger and crew amenities. They have a 30 stall automobile parking lot to serve employees and customers.

Other services available at the Sioux Falls Regional Airport include: major airframe service repairs, major engine power plant (engine) repairs, high pressure bottled and bulk oxygen, transient hangar and tie-down aircraft storage, and other services including aircraft maintenance, air ambulance, avionics repair, charter, flight instruction, aircraft rental, aircraft sales, and aerial surveying.

South Dakota National Guard

South Dakota Air National Guard (SDANG) is home to the 114th Fighter Group supporting state and Federal missions operating F-16 aircraft. SDANG was founded in 1946. SDANG occupies approximately 102 acres of Airport Authority land on the south quadrant of the airport and 59 acres of land west of Runway 3/21 and 15/33. Facilities on the south side of the airport include the operational complex which includes aircraft storage hangars, offices, and the Aircraft Rescue and Fire Fighting (ARFF) facility. SDANG operates the ARFF facility for the airport. Other facilities to the west of Runway 3/21 include a hush house for engine repair and tests, and a munitions storage area. SDANG retains planning authority for their facilities. They completed their own facilities master plan in early 2014.

South Dakota Army National Guard (SDARNG) operates a complex located in the northwest quadrant of the airfield west of Runway 3/21. This area is accessed through West National Guard Drive. SDARNG leases land from the Airport Authority. Facilities include armory facility, a regional training institute, outdoor storage, and a baffled shooting range. SDARNG operates under a facilities master plan last updated in 2011. The shooting range is scheduled to close by 2016. SDARNG retains planning authority for their facilities in cooperation with the airport.

Customs and Immigration

Sioux Falls Regional Airport is a Port of Entry for South Dakota were international arrivals are cleared by customs. The 4,500 square foot U.S. Customs and Border Protection office is located at the Airport between the east general aviation and east air cargo aprons. CBP staff clear international air arrivals and ground cargo. FIS facilities are located in the passenger terminal building.

Aircraft Storage

Sioux Falls Regional Airport has 93 reported civil aircraft based at the airport. Aircraft storage facilities consists of large conventional hangars (greater than 10,000 square feet), smaller corporate hangars (10,000 square feet or less), and T-hangars. The primary aircraft storage area is the east general aviation area, however growth is occurring in the new west general aviation area. Aircraft storage facilities are depicted in **Exhibit 2-10**.

The east general aviation area consists of five large conventional hangars along the apron owned by Landmark Aviation. These five conventional hangars provide approximately 77,700 square feet of open aircraft storage space and 14,500 square feet of and terminal office space. There are 11 corporate hangars located in this area totaling approximately 66,900 square feet of aircraft storage space which includes Sanford Health hangars. Five T-Hangars total approximately 61,800 square feet of aircraft storage space. The west general aviation area consists of one large conventional hangar approximately 12,000 square feet of aircraft storage. The west cargo area consists of four corporate “alert” hangars purchased from the South Dakota Air National Guard providing approximately 18,000 square feet of aircraft storage space. A total of 36,200 square feet of new aircraft storage space have been constructed since 2006, an increase of 16 percent.

Exhibit 2-22 – Aircraft Storage Hangars Breakdown

Aircraft Storage Hangars (Square Feet)			
Facility Number	**Area**	**Facility Type**	**Area (SF)**
1	East General Aviation	Conventional Hangar	29,100
2A	East General Aviation	Conventional Hangar	14,500
2B	East General Aviation	Conventional Hangar	17,200
3	East General Aviation	Conventional Hangar	19,500
4	East General Aviation	Conventional Hangar	24,400
5	East General Aviation	Corporate Hangar	4,700
6	East General Aviation	Corporate Hangar	6,800
16	East General Aviation	Corporate Hangar	4,200
22	East General Aviation	Corporate Hangar	7,700
28	East General Aviation	Corporate Hangar	5,800
31	East General Aviation	Corporate Hangar	3,900
32	East General Aviation	Corporate Hangar	4,200
33	East General Aviation	Corporate Hangar	4,200
35	East General Aviation	Corporate Hangar	7,100
37	East General Aviation	Corporate Hangar	5,000
39	East General Aviation	Conventional Hangar	13,300
71	West Cargo	Corporate Hangar	4,200
72	West Cargo	Corporate Hangar	4,800
73	West Cargo	Corporate Hangar	4,800
74	West Cargo	Corporate Hangar	4,200
81	West General Aviation	Conventional Hangar	12,000
T-2	East General Aviation	T-Hangar (10 units)	15,300
T-1	East General Aviation	T-Hangar (10 units)	10,000
T-3	East General Aviation	T-Hangar (10 units)	11,700
T-4	East General Aviation	T-Hangar (10 units)	10,000
T-5	East General Aviation	T-Hangar (10 units)	14,800
TOTAL		**Conventional Hangars**	**130,000**
		Corporate Hangars	**71,600**
		T-Hangars (50 units)	**61,800**
		Grand Total	**263,400**

Source: Sioux Falls Regional Airport CAD drawings, Bing Maps (2013)
NOTE: Areas estimated by KLJ based on imagery to include Aircraft Storage areas only.
GREEN indicates new hangar since 2006.

Fuel Facilities

There are two aviation fuel farms located on the airport for aircraft fuel storage. The facility owned and operated by Landmark Aviation is located on the north side of Weather Lane near the intersection of Minnesota Avenue. The facility owned and operated by Maverick Air Center is located along West National Guard Drive near the intersection with Minnesota Avenue.

The Landmark fuel facility stores 240,000 gallons of Jet-A fuel and 34,000 gallons of 100LL fuel. Landmark provides fuel for air cargo and airline operations. The Maverick Air Center fuel facility stores 40,000 gallons of Jet-A fuel and 12,000 gallons of 100LL fuel. All fuel stored is distributed through fuel trucks owned and operated by the FBO's.

De-Icing Facilities

Aircraft operators typically de-ice aircraft when conditions warrant. De-icing fluid is stored in an underground holding tank north of the terminal building. De-icing fluids are applied by operators using a boom truck. Used de-icing fluid cannot be introduced into stormwater runoff. To accomplish this, the inlets in the air carrier apron can direct local runoff to the local sanitary sewer system versus the storm sewer. There is no other designated de-icing pad on the airfield or in the general aviation areas.

Airport Maintenance & Fire Fighting

Sioux Falls Regional Airport's maintenance facilities are located in the northwest quadrant of the airport, north of the west general aviation area and south of the SDARNG facilities. The primary facility, constructed in 2007, provides 27,500 square feet of space for airport maintenance and snow removal equipment vehicle and equipment storage, repair, and maintenance along with office and circulation space. The airport plans to add a SDANG building with approximately 10,700 square feet of storage space.

SDANG owns and operates the aircraft rescue and firefighting (ARFF) equipment and building. The facility is located east of Runway 3/21 in the southwest corner of the SDANG complex. The building is approximately 12,700 square feet in size and was constructed in year 2000. The facilities and equipment meets the current standards for a Federal Aviation Regulation (FAR) Part 139 ARFF Index B, which applies to airports regularly serving aircraft less than 126 feet long. The airport has a five-bay facility to house ARFF trucks and sufficient space for offices, living quarters and parking.

Sioux Falls Regional Airport owns one airport vehicle, six pickup trucks, two trucks, one grader, two sweepers, three snow blowers, four plow and/or sander trucks, two loaders, one tractor, one skidsteer, one snowplow truck, five mowers, and a crash fire rescue truck. A complete vehicles inventory list is included in **Appendix X – Airport Equipment**.

Ground Access, Parking & Circulation

All public airport access roads connect with Minnesota Avenue on the east side of the airfield. There is direct no access from areas west of the Airport. Numerous airfield access points exist for authorized personnel to enter the airport operations area. All on-airport roadways are private roads maintained by the Airport Authority.

An on-airport perimeter road outside of the aircraft movement area exists to serve authorized airport ground vehicles. There is no perimeter road around Runway 21 and 33 ends. The perimeter road around Runway 3 is currently being relocated to meet airport safety requirements.

Fencing & Security

The air operations area at Joe Foss Field is encompassed by a security fence to prevent unauthorized access to the active airport environment. The fence is six feet high with wire barbed security top. The fence is currently being upgraded to a wildlife fence to additionally prevent fauna from accessing the airfield creating a safety hazard to aircraft and the public.

Land Use Compatibility

Compatible land uses are defined as those uses that can coexist with a nearby airport without either constraining the safe and efficient operation of the airport or exposing people working or living nearby to unacceptable levels of noise or safety hazards. Incompatible land use is a large issue facing airports today, often resulting in conflicts between airports and communities. Typical airport land use compatibility elements include:

- FAA land use compatibility within designated day-night average sound level (DNL) noise exposure contours to avoid significant impacts to activities on the ground.
- FAA airspace standards for airport safety and operational capability.
- FAA land use compatibility near runway ends associated with the Runway Protection Zone (RPZ) for the safety of people and property on the ground.
- State or local airport land use standards, if applicable.
- FAA wildlife hazard mitigation plans for aircraft operational safety.

Airports have a responsibility to constantly work together with local governments to identify, control and prevent the creation of potential incompatibilities. This section is an introduction to this topic; a more comprehensive evaluation in relation to existing and planned airport development is prepared in Chapter 8.

Jurisdictions

The surrounding airport environment is primarily located within the City of Sioux Falls, but also fall into areas of Minnehaha and Lincoln Counties. The South Eastern Council of Governments is the designated Metropolitan Planning Organization (MPO) for the Sioux Falls area. The local MPO provides planning and development staff support to local governmental entities.

Existing Land Uses

Within Sioux Falls city limits, areas south of the airport consist of multiple land uses including public service, commercial, industrial and single family residential land uses. Elmwood Golf Course is located immediately southwest of the airport, with a portion of the golf course within airport property. Portions east of the airport area surrounded by industrial and office land uses. Areas north of the airport are generally undeveloped with conservation/green space and agricultural/transition land uses with the Sioux Falls city limits.

Within the last five years, land immediately west of the airport has been developed into what is known as the Sanford Sports Complex. This area includes a City park, Pentagon sports arena, indoor sports facilities, restaurants and hotels. This area is generally classified as general institutional and recreational/conservation land uses. Other areas west of the airport are identified as agricultural/transition land uses with commercial land uses further northwest within Sioux Falls.

Land uses within Minnehaha County are located north of the airport. Land in these areas are now generally used for rural residential and agricultural land uses.

The existing land uses within the airport environs is depicted on a map in **Figure 2-1.**

Airport Zoning

The City of Sioux Falls adopted an airport zoning district in 2007 to help ensure airspace and land uses around the airport meet safety requirements for airport operations. The Sioux Falls Regional Airport Authority has the power to adopt and enforce the airport zoning regulations. Land use within airport property is classified as Airport and is limited to certain compatible land uses controlled by the Airport Authority. An airport influence overlay district was established to include land uses within the lateral limits of the approach, transitional, horizontal, and conical airspace surfaces of the airport. The district also includes all parcels within the aircraft noise influence zone, identified by the 65 DNL noise contour representing yearly day-night average sound level. In addition, the ordinance enables the Sioux Falls Regional Airport Authority to establish an aviation easement on newly developed land within the airport influence zone. Joint jurisdiction between Sioux Falls and Minnehaha County exists within approximately two miles north of the airport. A copy of this ordinance is contained in **Appendix X – Airport Overlay Ordinance.**

Environmental Overview

The purpose of this section is to provide a general overview of environmental features which should be considered in the alternatives analysis. The intent is not to perform detailed analysis, but rather to assemble readily available information in a systematic manner. A review of National Environmental Policy Act (NEPA) criteria relative to development alternatives considered and the NEPA approval process is discussed in Chapter 6 of this Master Plan.

Conclusion

The information collected and documented in this Existing Conditions chapter provides a baseline foundation to update the Sioux Falls Regional Airport long range plan. This information will feed into future sections including developing aviation activity forecasts and determining how facilities will meet the projected airport needs.