Airport Master Plan

Hot Springs Municipal Airport

Hot Springs, SD

SEH No. HOTSP 129766 4.00

March 4, 2016

Executive Summary

The Hot Springs Municipal Airport (HSR) in Hot Springs, SD, serves the general aviation air transportation needs of southwest South Dakota. HSR is home to 27 single engine aircraft, one helicopter, and three gliders. The airport is served by two runways: Runway 1/19, the primary runway, is 4,506 feet long and 100 feet wide, and is paved and lighted; and Runway 6/24, the crosswind runway is 3,926 feet long and 235 feet wide, and is constructed of turf. There are four privately owned box hangars, three City owned hangars, and one privately owned t-hangar building with six units on the airfield.

The purpose of this Master Plan was to determine the facilities needed to meet the projected aviation demand in the 20-year planning period (2015-2035). As part of this study, aviation activity forecasts were prepared based on responses to user surveys, the airport's service area, and on analysis of local and national general aviation trends and socioeconomic data. The number of based aircraft at HSR is forecasted to increase from 29 in 2015 to 44 by 2035. Aircraft operations are expected to increase at an annual average growth rate of 0.56%, from 6,877 in 2015 to 7,696 in 2035.

The following are future development recommendation outlined in the Master Plan:

- Runway 1/19
  - Update Runway 1/19's designation to Runway 2/20 (Section 4.2.2.1).
  - Show an ultimate length of 4,900 feet for Runway 1/19 on the ALP (Section 4.2.4).
  - Develop a non-precision LPV approach for Runway 1 (Section 4.2.6.1).
  - Install Runway End Identifier Lights (REILs) on both ends of Runway 1/19 (Section 4.2.10).

- Runway 6/24
  - Update Runway 6/24's designation to Runway 7/25 (Section 4.2.2.1).
  - Show Runway 6/24 to be ultimately paved at 60-width with 1-mile non-precision approaches to both runway ends on the ALP for longer-term planning (Sections 4.2.4.3, 4.2.5, and 4.2.6.2).

- Taxiway System
  - Construct parallel taxiway to Runway 1/19 (Section 4.2.9).
  - Redesign the connector taxiway to mitigate direct access from the apron to the Runway 1/19, and incorporate into the partial-parallel taxiway design (Sections 4.2.9 and 5.2).
  - Reconstruct taxiways to 35 feet to meet Group II standards as part of future improvements (Section 4.2.9).
  - Update taxiways system to TDG 2 design and marking standards as part of future improvements (Section 4.2.9).
  - Install edge lighting on all taxiways (Section 4.2.10).

- Miscellaneous
  - Install FAA certified AWOS (Section 4.2.12).
  - Plan for short-term, mid-term, and long-term hangar development, and construct when demand warrants (Sections 4.3.1.1 and 5.1.4).
  - Install two additional tiedown spaces (total of 11) by 2035 (Section 4.3.1.2).
  - Pursue an agreement with a local rental car company (Section 4.3.2).
  - Seek out opportunities for an aircraft mechanic with businesses or individuals that may be interested in relocating to HSR or offering aircraft maintenance services at HSR on an on-call basis (Section 4.3.3).
  - Develop an SPCC Plan as soon as possible (Sections 1.17.7 and 4.3.4)

  - Monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (Section 4.3.4).
  - Add an additional 19 parking spaces (total of 27) available by 2035 (Section 4.3.5.1).
  - Acquire a snow plow, as well as a hopper spreader attachment to aid in snow removal operations (Section 4.3.6).
  - Mitigate Part 77 obstructions (Section 4.6.1).
  - Mitigate wildlife attractants and hazards (Section 4.8).
  - Purchase 19.7 acres of property for ultimate Runway 1/19 extension (Section and 4.2.4.2 and 4.5).
  - Remedy possible encroachments to Airport Property (Sections 1.16 and 4.5)

- Planning Documentation
  - Develop and enact comprehensive and land use plans (Section 4.7.2)
  - Develop and enact Height Zoning (Section 4.7.3).
  - Prepare an Emergency Response Plan for the Airport (Section 4.7.4)
  - Prepare a Security Plan for the Airport (Section 4.7.5).
  - Develop Minimum FBO Standards for commercial operators (Section 4.7.6).

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Hot Springs Municipal Airport

Prepared for City of Hot Springs

1.0 Inventory

1.1 Introduction

Effective airport planning ensures that an airport is developed in a logical manner that coincides with the demand for facilities. Typically, planning efforts are performed approximately every five to ten years. An Airport Master Plan study has never been completed for Hot Springs Municipal Airport (the Airport or HSR). This Master Plan effort has been undertaken to ensure that the planning recommendations and alternatives are consistent with the current and future needs of the Airport and community. The previous Airport Layout Plan was conditionally approved in 2003.

The Master Plan projects the needed facilities within the planning horizon, which is 20 years, or in this case, 2015 through the year 2035. However, when dealing with the development of facilities such as airports, an even longer-term view is often required in order to evaluate the needs of the ultimate layout of the facility. Encroachment of residences and businesses usually occurs at an airport site and can make expansion in the future difficult if actions are not taken far in advance of development to preserve land for aeronautical uses either through land purchase, easement, or land use protection.

1.2 Project Goals

This planning study is a cooperative effort between HSR, the Federal Aviation Administration, the South Dakota Department of Transportation (SDDOT) Aeronautics Commission, and the consultant. Several project goals were identified during the scoping process. These goals include:

- Construction of full parallel taxiway for Runway 1/19;
- Installation of runway lighting for crosswind runway (Runway 6/24);
- Explore ways to accommodate local glider club needs;
- Identify land required for future airport development needs;
- Develop a plan for future hangar expansion;
- Explore compatible land use regarding mining on and near the Airport property.

1.3 Existing Airport Inventory

The intent of Chapter 1.0, *Airport Inventory,* is to outline existing conditions of all of the facilities at HSR. In later chapters of this report, the ability of the Airport to meet anticipated demand and user needs will be analyzed, and any required improvements will be identified.

1.4 Airport Information

1.4.1 City and Location

The City of Hot Springs is located in Fall River County close to the southwestern edge of South Dakota, approximately 50 miles southwest of Rapid City, South Dakota as shown in **Figure 1-1**. Hot Springs is located at the intersection of U.S. Highway 18/385 and State Highway 71, as shown in **Figure 1-2**. HSR is a city owned, public-use airport located five miles southeast of the Hot Springs downtown district.

1.4.2 Airport Ownership, Governance and Management

The Airport is owned and operated by the City of Hot Springs. The Hot Springs Airport Advisory Committee is comprised of five members, all of which are appointed by the City. The Airport Advisory Committee provides the City Council with recommendations regarding long-range planning, land-use, and necessary improvements for HSR. Day-to-day operations of the Airport are managed by Ed Jensen, Airport Manager.

1.4.3 Airport Use

The Airport is utilized primarily by recreational users, mostly small single-engine aircraft as well as gliders. The Black Hills Soaring Club, a glider club, is the largest operator at HSR and have five aircraft based at the Airport. Life Flight, Air National Guard, and South Dakota Veterans Home also regularly use HSR. Additionally, a Single Engine Air Tanker (SEAT)/Fire Plane is based at HSR in the summer months to help combat forest fires.

1.5 Socioeconomic Information

1.5.1 Population

According to the United States Census, the City of Hot Springs had a population of 3,711 in 2010. The total population of Fall River County was 7,094 in 2010. The City of Hot Springs is the county seat of Fall River County.

1.5.2 Employment and Income

According the United States Census, in 2010 the median household income for Fall River County was $33,703 and the State of South Dakota was $49,091.

1.5.3 Local Economy

The local Hot Springs economy is influenced largely by tourism, agriculture, and government activity. The Veterans Affairs (VA) Medical Center is the largest employer in Hot Springs, with 381 employees. **Table 1-1** shows the top employers in Hot Springs, SD.

Table 1-1
Top 10 Employers

Company	Product/Service	Number of Employees
VA Medical Center	Medical	381
Hot Springs School District	Education	125
Fall River Health Services	Medical	119
Wind Cave National Park	Recreation	95
State Veterans Home	Retirement	83
Fall River County	Government	83
City of Hot Springs	Government	80
Castle Manor Nursing Home	Healthcare	60
Lynn's Dakotamart	Groceries	48
The Mammoth Site	Education	44

Source: Southern Hills Economic Development Corporation

1.6 Airport Role and Classification

1.6.1 FAA National Plan of Integrated Airport Systems

HSR is included in the FAA's 2015-2019 *National Plan of Integrated Airport Systems* (NPIAS), which classifies the Airport as a General Aviation (GA) Airport[1]. General Aviation Airports are civilian airports open to the public that do not have scheduled passenger service, and usually serve private aircraft and small aircraft charter operations. FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, states that to be included in the NPIAS, an airport must have at least 10 based aircraft and serve a community located 30 minutes or more average ground travel time from the nearest existing or proposed NPIAS airport. Inclusion in the NPIAS is a requirement to receive federal grants for airport improvement projects.

1.6.1.1 FAA Asset Study

In May 2012, the FAA released a study[2] of the nearly 3,000 GA airports in the federal system. The goal of this study was to more accurately define the roles of the airports in the GA service level and develop a new way to categorize the GA airports within the national system. The following service level categories of general airports were developed.

National – National airports support the national and state system by providing communities with access to national and international markets in multiple states and throughout the United States. These airports are located in metropolitan areas near major business centers and support flying throughout the nation and the world. Currently, 84 airports are categorized as national airports and account for 13 percent of the total flying studied in the study as well as 35 percent of flight plans filed to studied airports.

Regional – Regional airports support regional economies by connecting communities to statewide and interstate markets. These airports are located in metropolitan areas, serve relatively large populations, and support interstate and some cross country flying. Regional airports account for 37 percent of the total flying at the studied airports and 42 percent of the total flight plans filed to studied airports.

[1] 2015-2019 National Plan of Integrated Airport Systems, submitted to Congress on September 30, 2014.
[2] General Aviation Airports: A National Asset. May 2012. U.S. Department of Transportation Federal Aviation Administration.

Local – Local airports supplement local communities by providing access primarily to intrastate and some interstate markets. These airports are also defined as the backbone of the GA system and are typically located near larger population centers. Most users of these airports are piston aircraft supporting business and personal needs. Flights to and from local airports are typically intrastate or regional.

Basic – Basic airports support GA activities such as emergency service, charter or critical passenger service, cargo operations, flight training, and personal flying. These airports provide a community airport that allows for private GA flying and links the community to the national airport system.

There are 497 airports in the NPIAS that were not classified into one of the above classifications. The FAA will continue to assess and potentially classify these airports.

Hot Springs is classified as a Local Airport in the Asset Study.

1.6.2 South Dakota State Aviation System Plan 2010-2030

To better manage the overall system of airports in South Dakota, the SDDOT Office Aeronautics produced the State Aviation System Plan (SDSASP). The SDSASP provides a description and assessment of the performance of the current aviation system, which consists of the 72 public use airports, as well as guidance for the future development of aviation in South Dakota.

The SDSASP classifies the airports in South Dakota into five classifications: Commercial Service, Large General Aviation, Medium General Aviation, Small General Aviation, and Basic Service Airports. For this Plan, HSR is classified as a Medium General Aviation Airport. A Medium General Aviation Airport is defined as an airport that supports most twin and single engine aircraft and may have the ability to accommodate the occasional business jets, which supports the regional transportation needs. Medium General Aviation Airports typically have a runway length of at least 4,200 feet, with non-precision or GPS approaches, weather reporting equipment, on-call repair service, 100LL fuel available, and a Runway Design Code (RDC) of B-II (see **Section 1.8** for definition of RDC). The ability of HSR to meet the SDSASP's recommendations as a Medium General Aviation Airport will be evaluated in **Chapter 4**, *Facility Recommendations*.

The SDSASP also assessed the economic contribution of airports and the aviation industry to both the State and local economies to determine total economic impact. According to the SDSASP, HSR contributes to approximately 15 jobs and $908,000 in economic activity to the State.[3]

1.7 Based Aircraft and Aircraft Operations

According to the FAA Airport Master Record (Form 5010 dated 3/5/2015) there are 27 single-engine aircraft, one helicopter, and three gliders based at the Airport. According to SDDOT Aeronautics Division records (dated 3/5/2015) there are 27 single-engine aircraft, one helicopter, and three gliders based at HSR. The FAA's National Based Aircraft Inventory Program (BasedAicraft.com) indicates there are 29 aircraft based at HSR, 28 single-engine and one helicopter. FAA's National Based Aircraft Inventory Program also shows five gliders at HSR, however since gliders do not have engines they are not included under the "Validated" based aircraft count.

[3] South Dakota State Aviation System Plan 2010-2030. Report in 2010 dollars.

The 5010 Form also reports 6,820 annual aircraft operations at HSR, of which 5,500 by local general aviation (GA), 1,200 by itinerant GA, and 120 by military. The FAA's Terminal Area Forecasts (TAF) also estimates 6,820 annual aircraft operations at HSR, of which 5,500 by local general aviation (GA), 1,200 by itinerant GA, and 120 by military. The South Dakota SDSASP estimated by 2015 HSR would have 8,688 annual operations.

The various sources of based aircraft and operations data are summarized in **Table 1-2**.

Table 1-2
Summary of Based Aircraft and Operations

Source	Based Aircraft	Aircraft Operations
Form 5010	31 (27 single-engine, 1 helicopter, 3 gliders)	6,820
Terminal Area Forecasts	19	6,820
South Dakota State Airport System Plan (2015)	17	8,688
BasedAircraft.com (Validated Aircraft)	34 (28 single-engine, 1 helicopter)	N/A
Airport Management	35 (29 single-engine, 1 helicopter, 5 gliders)	N/A

Notes: Airport management does not track or maintain historic records of aircraft operations.

Source: FAA Form 5010 (March 2015), TAF (2014), SDSASP (2015), BasedAircraft.com (03/05/2015), and Airport Management.

1.8 Runway Design Code

The FAA classifies airports by the type of aircraft traffic they experience, this classification is known as the Runway Design Code (RDC). This classification is based on two components: approach speed and wingspan or tail height of the aircraft. The Aircraft Approach Category, representing the approach speed, is an alphabetical classification denoted with letters A through E (A being the slowest and E being the fastest), as shown in **Table 1-3**. The Airport Design Group (ADG), representing the wingspan or tail height, is a numerical classification denoted with roman numerals I though VI (I being the smallest and VI being the largest), as shown in **Table 1-4**. The RDC classification of a specific airport and its facilities are based on the RDC of its Critical Aircraft. Critical Aircraft is defined as the most demanding airplane, or family of airplanes, that have a minimum of 500 annual operations using an airport, or forecasted to use an airport within 5 years.

Table 1-3
Aircraft Approach Category

Aircraft Approach Category	Approach Speed
A	Approach speed < 91 knots
B	Approach speed ≥ 91 knots < 121 knots
C	Approach speed ≥ 121 knots < 141 knots
D	Approach speed ≥ 141 knots <166 knots
E	Approach speed ≥ 166 knots

Source: FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*

Table 1-4 Airplane Design Group (ADG)		
Group Number	**Description**	
	Wing Span (feet)	**Tail Height (feet)**
I	< 49’	< 20’
II	≥ 49’ < 79’	≥ 20’ < 30’
III	≥ 79’ < 118’	≥ 30’ < 45’
IV	≥118’ < 171’	≥ 45’ < 60’
V	≥ 171’ < 214’	≥ 60’ < 66’
VI	≥ 214’ < 262’	≥ 66’ < 80’

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

According to the approved 2003 ALP, the primary runway, Runway 1/19, has an RDC of B-II, and the crosswind runway, Runway 6/24, has an RDC of A-I.

For comparison purposes, the following depicts examples of the various RDC categories for general aviation and commercial service aircraft:

1.9 Airfield Facilities

The geographic location of HSR, known as the Airport Reference Point (ARP), is at latitude of 43°22'05.90" north and a longitude of 103°23'17.80" west at an elevation of 3,150.3 feet above Mean Sea Level (MSL).

1.9.1 Runways

HSR's existing airfield has two active runways, Runway 1/19 and Runway 6/24, as shown in **Figure 1-3.**

1.9.1.1 Primary Runway 1/19

Runway 1/19 is the primary runway at HSR, designed to RDC B-II standards. The runway is 4,506 feet long by 100 feet wide, and is constructed of asphalt pavement. According to HSR's Airport Master Record (Form 5010, dated March 5, 2015) Runway 1/19 has a weight bearing capacity of 12,500 pounds for Single Wheel Gear (SWG) equipped aircraft. Runway 1 and 19 are non-precision instrument runways with non-precision markings, which consist of centerline, threshold, and aiming point markings. Runway 1 has an effective gradient of 0.18% and Runway 19 has an effective gradient of 0.21%[4], which meets the FAA's 2.0% longitudinal gradient standards.

1.9.1.2 Crosswind Runway 6/24

The crosswind runway at HSR is Runway 6/24, designed to RDC A-I standards. Runway 6/24 is 3,926 feet long by 235 feet wide, and is constructed of turf. Runway 6/24 is a visual runway and, since it is constructed of turf, is marked with black and white cones. Runway 6/24 has an effective gradient of 0.1%, which meets the FAA's 2.0% longitudinal gradient standards. Runway 6/24 is closed during the winter months.

1.9.2 Lighting and Approach Aids

Runway 1/19 is a non-precision runway and is equipped with Medium Intensity Runway Lights (MIRLs). The existing MIRL lighting system is close to 30 years old, consisting of direct bury cable, and is starting to require significant maintenance. The Airport is planning to upgrade Runway 1/19's lighting system by installing all the cable into conduit and more energy efficient fixtures. Additionally, both ends of Runway 1/19 are also equipped with 2-Light Precision Approach Path Indicators (PAPIs)[5]. The PAPIs are owned and maintained by the Sponsor.

Runway 6/24 is a visual runway equipped with runway edge markers (black and white cones). There are not any lights along the turf runway. This runway is used during daylight hours only.

HSR also has a Super Automated Weather Observation System (Super AWOS) located on the airfield. The Super AWOS provides up to date weather observations and generates routine aviation weather reports to pilots. The Super AWOS is discussed further in Section **1.9.7.3**.

Additional pilot aids on the airfield include a rotating airport beacon located west of the Arrival/Departure (A/D Building), one lighted wind cone, and a segmented circle as shown in **Figures 1-3 and 1-4.**

[4] Effective gradient is the difference in elevations of the two runway ends divided by the length of the runway.
5 PAPIs provide color-coded descent guidance to a runway.

1.9.3 Instrument Approach Procedures

In order for an aircraft to land in inclement weather conditions, the FAA publishes instrument approach procedures to provide directional and/or vertical guidance to pilots. By allowing landings during inclement weather conditions, either obscured cloud ceiling and/or forward-looking visibility, instrument approach procedures increase operational reliability to an airport. A non-precision approach only provides horizontal guidance, while a precision approach provides horizontal and vertical guidance.

HSR is currently served by two non-precision approaches (RNAV/GPS), one to Runway 1 and one to Runway 19. The existing approaches and their associated visibility and ceiling minimums at HSR are summarized in **Table 1-5**. The controlling obstruction for Runway 1's approach are trees within the approach path and for Runway 19 is the fence located on north edge of airport property.

Table 1-5
Instrument Approach Procedures

Runway	Approach	Visibility Minimums	Ceiling Minimums (Above Ground Level – AGL)
1	RNAV(GPS)	1 Mile	690' (700')
19	RNAV(GPS)	1 Mile	698' (700')

Note: All approaches have a circling option
Source: U.S. Terminal Procedures, October 16, 2014

1.9.4 Communications

HSR has a Common Traffic Advisory Frequency (CTAF) of 122.8 MHz for radio communication between aircraft while transitioning into and out of HSR's airspace. The runway's Pilot Controlled Lighting (PCL) can also be activated by keying the aircraft's radio on the CTAF frequency.

HSR has a Ground Communications Outlet (GCO). A GCO allows pilots to relay ground to air and air to ground transmissions between pilots, Denver Center, and Flight Service. Also, allowing pilots to more easily open and close flight plans on the ground. The GCO for HSR is located on the airfield.

1.9.5 Taxiways and Apron System

The existing taxiway and apron system is shown in **Figure 1-3**. The Airport has one connector taxiway, connecting Runway 1/19 to the apron area, as shown in **Figure 1-3**. The connector taxiway is 50 feet wide. The connector taxiway has reflective markers along the edge. The apron area is approximately 14,000 square yards with nine aircraft tiedown positions.

HSR is currently in the design process to build a partial-length parallel taxiway for Runway 1/19, from the main apron to the Runway 19 end. This taxiway is anticipated to be built in 2016.

1.9.6 Airspace

HSR is in Class E Airspace, which is the least restrictive classification of controlled airspace.[6] The airspace for HSR is circle shaped, beginning at 700 feet above the surface extending upward to 18,000 feet above mean sea level. Pilots communicate in HSR airspace on a CTAF of 122.8 MHz.

[6] Controlled airspace is a portion of airspace that may be subject to air traffic control when operating under Instrument Flight Rules (IFR). There are no communication requirements to operate within Class E Airspace, but a pilot can request traffic advisory services from Air Traffic Control (ATC).

Air traffic control services, including instrument approaches, are handled by Denver Center Air Route Traffic Control Center (ARTCC) located in Denver, Colorado.

1.9.7 Weather Reporting and Meteorological Data

1.9.7.1 Temperature

Hot Springs, South Dakota has a typical continental climate with hot summer and cold, often frigid, winters. The mean maximum temperature for the Hot Springs area is 89.2° Fahrenheit normally occurring in July, while the mean minimum temperature is 11.4° Fahrenheit normally occurring in January, shown in **Table 1-6**.

Table 1-6
Temperature Summary

Temp.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Av. Max. °F	37.9	41.8	50.1	61.1	70.6	80.8	89.2	88.0	78.5	65.5	49.7	39.8
Av. Min. °F	11.4	14.5	21.7	31.6	41.7	50.9	57.2	55.0	44.8	33.8	22.6	14.1

Source: High Plains Regional Climate Center, Hot Springs, SD, Period of Record 2/1/1894 to 3/31/2013 http://www.hprcc.unl.edu/data/historical/

1.9.7.2 Precipitation

The maximum average precipitation for the Hot Springs area occurs in the month of June, with an average of 2.96 inches of rainfall. The average annual snowfall is 34.7 inches, with the most snowfall occurring in January and March, shown in **Table 1-7**.

Table 1-7
Precipitation Summary

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Ann
Av. Rain (in.)	0.46	0.46	0.94	1.85	2.95	2.96	2.39	1.68	1.34	1.12	0.48	0.42	17.06
Av. Snow (in.)	6.1	5.8	7.6	3.8	0.3	0.0	0.0	0.0	0.2	1.6	3.7	5.6	34.7

Source: High Plains Regional Climate Center, Hot Springs, SD, Period of Record 2/1/1894 to 3/31/2013 http://www.hprcc.unl.edu/data/historical/

1.9.7.3 Wind Data Analysis

Prevailing wind is a major factor influencing runway orientation. Wind conditions affect all aircraft to some degree. Generally, the smaller the aircraft, the more it is affected by wind. Therefore, orienting the runway such that it is aligned with the prevailing wind the greatest percentage of time will add substantially to the safety and usefulness of an airport.

The crosswind component of wind direction and velocity is defined as the resultant vector that acts at a right angle to the runway centerline, and is equal to the wind velocity multiplied by the sine of the angle between the wind direction and the runway direction. Wind coverage is defined as the percentage of time that crosswind components are below an acceptable velocity. The most desirable runway orientation based on wind is one that has the greatest percentage of wind coverage. The minimum recommended wind coverage for an airport is 95 percent. The 95 percent coverage is computed on the basis of the crosswind not exceeding **10.5 knots for A-I and B-I**, **13 knots for A-II and B-II**, 16 knots for A-III, B-III, and C-I through D-III, and 20 knots for A-IV through D-VI.

HSR has a ~~Super Automated Weather Observation System (~~Super AWOS~~)~~ located at the Airport. The Super AWOS was purchased by the State, and is maintained jointly by the Airport and the State. The Super AWOS is located adjacent to the Segmented Circle (shown in **Figure 1-3**). The Super AWOS located at HSR is not certified by the FAA and, as a result, can only be used as an “advisory” for pilots using the Airport. The Super AWOS provides up-

to-date weather observations and generates routine aviation weather reports. Information typically provided by an AWOS includes wind direction and speed, sky condition visibility, temperature, and dew point. The Super AWOS data is transmitted on the CTAF 122.8 (see **Section 1.9.4**), and can also be accessed via telephone.

Since HSR's Super AWOS is not connected to the National Oceanic and Atmospheric Administration (NOAA)'s Climate Data network[7]. Wind data collected through the NOAA is the best source of certified information. However, the closest FAA certified AWOS are at Custer County Airport (CUS), Rapid City Regional Airport (RAP), and Chadron Municipal Airport (CDR). CUS is located approximately 30 miles north-north west of HSR, within the Black Hills; RAP is located approximately 50 miles north-north east of HSR, on the eastern edge of the Back Hills; and CDR is approximately 40 miles southeast of HSR. Both of these airports are considerably distant from HSR and are surrounded by substantially different terrain. Wind data collected from these FAA AWOS's would be significantly different from the wind that actually occurs at HSR. To utilize the most accurate information, data was obtained from HSR's Super AWOS for this wind analysis. The FAA recommends wind data analysis to be completed with at least 10 years of consecutive data from the Airport site or the closest available site. However, the Super AWOS was installed in fall of ~~2011~~2009, only six years of data was available. Wind data analysis was completed using data from HSR Super AWOS for the period of November 11, 2009 to June 9, 2015.[8] **Table 1-8** shows the wind coverage.

Table 1-8
Wind Coverage – Runways 1/19 & 6/24

	Crosswind Component		
	10.5 knots	**13 knots**	**16 knots**
Runway 1/19	93.62%	96.06%	98.42%
Runway 6/24	95.19%	97.82%	99.49%
Combined	98.84%	99.15%	99.88%

Source: Hot Springs Municipal Airport Super AWOS. 11/11/2009 to 6/9/2015. Obtained from Potomac Aviation. https://potomacaviation.com/weather_index.asp?airportid=KHSR

Since HSR is designed as a B-II airport, the crosswind component should not exceed 13 knots. Primary Runway 1/19 exceeds the recommended 95% coverage for 13 knots (96.06%; B-II aircraft). Additionally, when both the primary and crosswind runways are included in the wind coverage analysis, the combined runways provide 98.84% wind coverage for 10.5 knots (A/B-I) and 99.15% for 13 knots (B-II).

1.9.8 Airside Facilities Condition Index

Each existing airport facility has been assigned a general rating of "Excellent", "Very Good", "Good", "Fair", "Poor", "Very Poor", or "Failed". A facility rated as "Excellent", "Very Good", or "Good" may be assumed to be substantially adequate throughout the 20-year planning period, with normal maintenance. A rating of "Fair" means that the item will probably require major upgrades or replacement at some time during the planning period. A rating of "Poor", "Very Poor", or "Failed" indicates that the item is not adequate for its intended use at the present time. **Table 1-9** depicts the existing airport facilities and the associated condition rating.

The 2010 South Dakota Aviation System Plan (SDSASP) rated the pavements of all the primary runways for all public airports in South Dakota. Each airport's primary runway was rated using a pavement condition index (PCI). A PCI is an indicator of the pavement condition on a scale of 0 to 100, where 100 is the best condition and 0 is the worst. A PCI rating of 100 is considered optimal,

[7] NOAA Climate Data Online. http://www.ncdc.noaa.gov/cdo-web/
[8] Potomac Aviation. HSR Super AWOS. https://potomacaviation.com/weather_index.asp?airportid=KHSR

where a PCI of 70 or greater is considered acceptable, and less than 70 is considered for maintenance such as rehabilitation or reconstruction. Per the 2010 SDSASP, Runway 1/19 at HSR has a pavement condition index (PCI) of 93.

Facility ratings shown in **Table 1-9** were determined through discussions with the Airport Sponsor and consultant experience.

Table 1-9
Airside Facilities Condition Index

Facility	Condition
Runway 1/19	
Pavement	Very Good (PCI 93)
Edge Lighting (MIRL)	Poor
PAPIs	Good
Pavement Markings	Good
Runway 6/24	
Turf	Good
Edge Markers (Black and White Cones)	Good
Taxilane	
Pavement	Very Good
Reflective Markers	Good
Guidance Signs	Very Good
Apron	
Pavement	Excellent
Tiedowns	Very Good
Mics.	
Lighted Wind Cones	Good
Segmented Circle	Good
Beacon	Good
Super AWOS	Good

1.10 Landside Facilities

1.10.1 Aircraft Storage

The Building Area consists of four privately owned box hangars, three City owned hangars, and one t-hangar building with six units (privately owned) (see **Figure 1-4**). Additionally, there are nine tiedowns available on the apron for short-term and long-term aircraft parking. There is limited overnight transient aircraft hangar storage available at HSR.

1.10.2 Arrival/Departure (A/D) Building

The existing A/D building, built in 1951, is approximately 2,304 square feet, and is located west of the apron **Figure 1-4.** The A/D building offers restroom facilities, vending machines, and a pilot lounge area. A courtesy car is available for airport users. The A/D Building is in good condition. The A/D Building had new carpet and an HVAC system installed in fall of 2014. The A/D Building is in need of new windows.

1.10.3 Fixed Base Operator (FBO)

A fixed based operator (FBO) is a provider of services to airport users. HSR does not have an FBO on the airfield, nor does the Airport provide any aircraft maintenance type services. The closest airports that have an FBO that provides aircraft maintenance are Rapid City Regional Airport (RAP) and Chadron Municipal Airport (CDR) in Nebraska. Additionally, there

are Airframe and Power Plant (A&P) mechanics at Black Hills Airport (SPF) in Spearfish, SD, Sturgis Municipal Airport (49B), SD, and Belle Fourche Municipal Airport (EFC), SD.

1.10.4 Black Hills Soaring Club

The Black Hills Soaring Club, a private glider club, is the largest operator at HSR. The Club bases a Piper Pawnee, as well as four sailplanes (gliders) at HSR. Also, several Club members base their own glider aircraft at HSR. In 2014, the Airport built a hangar southwest of the existing apron area to lease to the Club (shown in **Figure 1-4**). The Club is interested in constructing another hangar or expanding their existing hangar. Additionally, the Airport installed in a culvert and ditch crossing to provide easier access to the crosswind runway.

1.10.5 Fueling

HSR has a self-service fuel system located west of the apron, as shown in **Figure 1-4**. The fueling system consists of one 10,000 gallon aboveground tank, containing Aviation Gas (AvGas, 100LL). The fuel tank was registered with the South Dakota Department of Environmental and Natural Resources in 1999. Automated Fuel Systems Inc. owns the fuel tank, and the fueling operations are managed by HSR Fueling. HSR Fueling is a group of local pilots at HSR. Neither HSR Fueling nor the Airport own a fuel truck.

1.10.6 SRE & Maintenance Equipment

The Airport owns and operates one piece of large equipment for airfield maintenance and snow removal, a 2003 CASE International MXM 120 Tractor, and it is in good condition. The Airport also has a sweeper, a snow blower, and a 10-foot plow attachments for the tractor.

1.10.6.1 SRE Building

The equipment is stored in the 25-foot by 40-foot SRE building located southwest of the apron area, as shown on **Figure 1-4**.

1.10.7 Fencing

HSR has eight-foot wildlife fencing around the full perimeter of the Airport.

1.10.8 Landside Facilities Conditions

As with airside facilities, each existing landside airport facility has been assigned with a general rating of “Excellent”, “Very Good”, “Good”, “Fair”, “Poor”, “Very Poor” or “Failed”. **Table 1-10** depicts the existing airport facilities and the associated condition rating. Facility ratings were determined by discussions with airport users, the Airport Sponsor, and consultant experience.

Table 1-10
Landside Facilities Condition Index

Facility	Condition
Fueling System (100LL)	Good
Auto Parking Facilities	
Pavement	Fair
Lighting	Fair
Buildings	
A/D Building	Good
SRE Building	Good
Hangars	Good - Excellent
Security	
Fencing (Full Perimeter)	Very Good

1.11 Airport User Survey

To better define the volume and character of the users of HSR, two Airport User Surveys were developed. Airport management distributed the Pilot User Survey to based aircraft pilots at HSR, and surveys were mailed to pilots that were registered within the 90-minute drive time service area of the Airport. The second survey, Business User Survey, was Airport management distributed to businesses that already use or might use the Airport in the future. Surveys were distributed in November 2014. A copy of the Pilot User Survey and the Business User Survey are included in **Appendix A**.

The Pilot User Survey asked recipients about the type of aircraft they use, the number and type of operations they fly annually, facility and service needs, current and planned aircraft ownership, subjective facility ratings of HSR, and preferences for future development. The Business Aviation User Survey asked recipients if their business has a need for air travel, the number and type of business operations they fly annually, subjective facility ratings of HSR, and preferences for future development.

Of the 144 Pilot User Surveys sent, 24 responded (16.7% response rate): nine from based aircraft owners and 15 from pilots registered within the 90-minute drive time of HSR. The typical survey response rate results for airports of similar size to HSR are between 10% and 20%. Four responded to the Business User Surveys (unknown amount distributed).

1.11.1 Pilot User Survey

1.11.1.1 Reported Based Aircraft Activity

Survey results were tabulated to help determine the number of based aircraft operations at HSR. Of the 24 current based aircraft owners, nine responded to the survey. Only surveys that had complete numerical operations information and/or registration numbers were included in the analysis as shown in **Table 1-11**. The total estimated annual operations at HSR by the eight based aircraft owners that reported operations data are 962 (one did not report operations data). This represents approximately 120 annual operations per based aircraft for that sample (962 divided by 8). **Table 1-11** provides a summary of the reported based aircraft operations activity.

Table 1-11
Survey Summary of Based Aircraft Annual Operations

Aircraft Model (RDC)	Annual Operations						Total
	Pleasure	Business	Medical	Agricultural	Training	Other	
Beech Bonanza (B-I)	100						**100**
Glider (A-II)	20						**20**
Bellanca Viking (A-I)		60					**60**
Cessna 172 (A-I)	No Data Provided						
Beech Bonanza (B-I)	72						**72**
Flight Design (A-I)	320						**320**
Cessna 172 (A-I)	60				40		**100**
Bellanca Citabria (A-I)	90						**90**
Rans S-7 (A-I)	200						**200**
Total	**862**	**60**	**0**	**0**	**40**	**0**	**962**

1.11.1.2 Reported Transient Aircraft Activity

Survey results were also tabulated to help determine the number of transient operations at HSR. Of the 112 Pilot User Surveys mailed to pilots within the 90-minutes of HSR, 15

transient aircraft owners responded to the survey. Again, only surveys that had complete numerical operations information and/or registration numbers were included in the analysis. The total estimated annual operations at HSR by 10 transient aircraft owners reported a total of 270 operations (five did not report operations data). This represents approximately 27 annual operations per transient aircraft for this data sample. **Table 1-12** provides a summary of the reported transient aircraft activity.

Table 1-12
Survey Summary of Transient Annual Operations

Aircraft Model (RDC)	Annual Operations						Total
	Pleasure	Business	Medical	Agricultural	Training	Other	
Aircraft* (Unknown)	40						**40**
Cessna 175 (A-I)	30	5					**35**
Vans RV-7A (A-I)	20				20		**40**
Aircraft* (Unknown)	No Data Provided						
Cessna 172S (A-I)	No Data Provided						
Aircraft* (Unknown)	No Data Provided						
Aircraft* (Unknown)	4				4		**8**
Piper Super Cub (A-I)		60					**60**
Cessna 150 (A-I)	No Data Provided						
Piper Cherokee (A-I)	25				3		**28**
Cessna 182 (B-I)	No Data Provided						
Aircraft* (Unknown)	6						**6**
Cessna 180 (B-I)	10				20		**30**
Cirrus SR-22 (A-I)	6	2			12		**20**
Piper Super Cub (A-I)	3						**3**
Total	**144**	**67**	**0**	**0**	**59**	**0**	**270**

*Aircraft type not provided.

1.11.1.3 Subjective Facility Ratings

As a part of the Pilot User Survey, all respondents were asked to provide a rating of 13 basic facilities at HSR. The respondents were asked to rate each facility on a scale of zero through ten, with ten representing “adequate”, five representing “marginal”, and zero indicating “inadequate”. As a means to facilitate comparison of the subjective ratings, a comparison index, or perceived average rating, was derived by computing an average and mode[9] of all ratings for each facility. The perceived averages and mode include only actual scores given; it does not average in non-responses. The results of the facilities ratings are listed in **Table 1-13**.

[9] Mode is the value that appears most often in a data set.

Table 1-13
Summary of Existing Airport Facilities Ratings

Facility	Perceived Average	Mode
Runway 1/19	9.0	10
Runway 6/24	7.6	10
Runway Lighting	8.6	10
Approach Procedures	7.5	10
Tiedown Availability	8.3	10
Based Aircraft Hangar Availability	**4.9**	**10**
Transient Aircraft Hangar Availability	**5.8**	**5**
Arrival/Departure (A/D) Building	**6.5**	**8**
Pilot Services/Assistance	7.1	10
Fuel Service/Availability	8.6	10
Ground Transportation	**6.8**	**5**
Automobile Parking	8.8	10
Airport Ground Access	8.7	10

Based on consultant experience, a perceived average rating of less than 7.0 requires some type of improvement to the facility. Examination of the responses and the comparison totals presented in the table above indicate that users of the Airport perceive four of the facilities to be rated below 7.0: Based and Transient Hangar Availability, A/D Building, and Ground Transportation, as highlighted in **Table 1-13**. The remaining facilities are perceived to be satisfactory by the current airport users. Airport facilities are examined further in **Chapter 4.0**.

1.11.1.4 Additional Pilot Survey Questions

Several questions on the Pilot User Survey addressed specific issues at the airport. The questions and responses are summarized in **Table 1-14**.

Table 1-14
Additional Pilot User Survey Questions

Question	Airport Users	
	Yes	No
If you are not currently based at HSR, would you consider basing at HSR if facilities were improved?	4	9
Do you purchase fuel at HSR?	19	4
Do you use the existing instrument approaches?	7	15
Does your company, business or clientele use HSR?	5	10

Additional targeted questions were also asked on the survey. Users were asked the most common reason they are unable to use HSR. The responses are summarized in **Table 1-15**.

Table 1-15
Most Common Reason Users Report Being Unable to Use HSR

Reason	Number of Responses
Longer Runway 1/19	0
Improved Runway Lighting	0
Lower Approach Minimums	0
Based Aircraft Storage	4
Transient Aircraft Storage	1
Other: Aircraft Maintenance on Field	3

Users were asked to indicate the runway length necessary for their operation at HSR, 20 users responded to this question. The minimum runway length requirements ranged from 900 to 5,000 feet, with the response averaged to 2,415 feet and the most common response (mode) was 2,500 feet. Users were also asked if they intended to purchase or utilize a new or different aircraft in the future. Five responded indicating they might change aircraft. Those users were also asked the runway length required for their new aircraft, only two responded. The two users indicated they would like a minimum runway length of 1,000 feet and 5,000 feet for their future aircraft.

1.11.1.5 Additional Comments

Users were also given additional space for comments on previously asked questions or topics not previously discussed. From the returned surveys, the respondents overwhelmingly indicated the desire for additional hangar space. Respondent also indicated the need for updates to the A/D Building and the need for an additional courtesy car. The list below summarizes the additional comments received.

- "HSR could certainly use more t-hangars."
- "Hot Springs is a growing Airport. There would be more activity if there were more hangars available."
- "Need more hangars."
- "Would be better if AWOS was FAA certified so it could be used for flight planning. Also need an accurate altimeter."
- "Extend overruns on grass runway for glider ground launch."
- "Need jet fuel for future airport growth."
- Three responses indicated need for aircraft maintenance on the airfield.

1.11.2 Business User Survey

According to the Airport Manager, HSR also serves business aircraft traffic in the area. For the Airport to accommodate this type of air travel, it needs to understand the needs of these users now and in the future.

Businesses in the Hot Springs area were surveyed to determine the number of operations they conduct at HSR, the type of services they would like to see, and a subjective rating of the existing facilities. Four responses were received, and the answers received are summarized in the sections that follow.

1.11.2.1 Company Flight Activity

Businesses were asked if their business used air travel. Of the four responses, three indicated their business travels by air to conduct business in Hot Springs, SD. Those using

HSR were asked to indicate the average number of passengers on each flight. Of the responses to this question, the response was an average of three passengers per flight. Those using HSR report traveling approximately 300 miles to and from HSR. The most frequent destinations to and from HSR were: Rapid City, SD (RAP); Sioux Falls, SD (FSD); Pierre, SD (PIR); Kearney, NE (EAR); North Platte, NE (LBF); Denver, CO (DEN); and Steamboat Springs, CO (SBS).

Respondents were asked to indicate the type of work related to their air travel to or from HSR. The responses are summarized in **Table 1-16**.

Table 1-16
Type of Work Related to Air Travel to/from HSR

Reason	Number of Responses
Manufacturing	0
Wholesale/Distribution	0
Retail	0
Services/Tourism	1
Construction	1
Real Estate/Finance	1
Government	1
Energy/Utilities	0
Other	0

In addition, businesses were asked to indicate the purpose of flights to and from HSR. The most common purpose of travel to/from HSR reported was executive visits and meetings. The responses are shown in **Table 1-17**.

Table 1-17
Purpose of Work Related to Air Travel to/from HSR

Reason	Number of Responses
Executive Visits/Meeting	2
Technical/Inventory Visits	1
Business Start-Up	0
Conferences/Seminars	0
Customer Contact	0
Client/Marketing	0
Part/Supplies/Shipments	0
Recreation	1
Other	0

1.11.2.2 Reported Business Aircraft Activity

Three businesses responded to this section of the survey. Of the three that stated they conduct air travel to and from HSR, only two responded with information about their operations activity. One indicated they travel on average ten times a year (20 annual operations) in a Piper Malibu (B-I, single-engine aircraft), and the other indicated they travel on average 20 times a year (40 annual operations), in a King Air (B-II, multi-engine turbo-prop aircraft). One business indicated they plan on purchasing a different aircraft in the future, a Citation 510 (B-II, twin-engine jet). They also indicated the Citation 510 would

require a minimum runway length of 4,000 feet. Runway 1/19's is 4,506 feet long, which will accommodate the Citation 510's length requirements.

Businesses were asked to indicate if they expected their use of HSR to increase, decrease or remain the same. Of the three responses, one indicated increase use and the remaining two indicated their activity would stay the same. The business that indicated increase in activity was a result of Hot Springs, SD being a tourist destination.

1.11.2.3 Subjective Facility Ratings

Similar to the pilot survey, business survey respondents were asked to provide a rating of 12 basic facilities at the Airport. The respondents were asked to rate each facility on a scale of zero through ten, with ten representing "adequate", five representing "marginal", and zero indicating "inadequate". As a means to facilitate comparison of the subjective ratings, a comparison index, or perceived average rating, was again derived by computing an average of all ratings for each facility. The perceived average includes only actual scores given; it does not average in non-responses. The results of the facilities' ratings are listed in **Table 1-18**. Only two responded to this section of the survey.

Table 1-18
Business Survey - Summary of Existing Airport Facilities Ratings

Facility	Response 1	Response 2	Perceived Average
Runway 1/19	6	10	8
Runway 6/24	1	8	4.5
Runway Lighting	5	8	6.5
Approach Procedures	4	8	6
Tiedown Availability	7	8	7.5
Based Aircraft Hangar Availability	2	N/A	2
Transient Aircraft Hangar Availability	1	8	4.5
Arrival/Departure (A/D) Building	3	8	5.5
Pilot Services/Assistance	5	9	7
Fuel Service/Availability	1	3	2
Ground Transportation	3	8	5.5
Automobile Parking	3	8	5.5
Airport Ground Access	3	8	5.5

Based on consultant experience, a rating of less than 7.0 requires some type of improvement to the facility. However, since only two businesses responded to this section of the survey and had a large disparity in responses (as shown in **Table 1-18**), the perceived average does not accurately reflect the overall adequacy of the Airport's facilities for business users. However, it is important to note that both businesses gave a low rating for Fuel Service/Availability. The adequacy of the Airport facilities will be further examined in **Chapter 4**.

1.11.2.4 Additional Business Survey Questions

Similar to the Pilot Survey, businesses were asked the most common reason they are unable to use HSR. The responses are summarized in **Table 1-19**. The survey also asked what airport was used as an alternate when they are unable to use HSR. All three responses to this question indicated Rapid City, SD (RAP) as the preferred alternate airport.

Table 1-19
Most Common Reason Users Report Being Unable to Use HSR

Reason	Number of Responses
Runway length due to aircraft performance	1
Approach minimums not met	1
Runway length due to surface contamination	0
Other	0

Several questions on the Business User Survey addressed specific issues at the Airport. The questions and responses are summarized in **Table 1-20**. The business that indicated that a longer runway would increase their ability to use HSR, requested a runway length of 5,000 feet.

Table 1-20
Additional Pilot User Survey Questions

Question	Airport Users	
	Yes	No
Overall, are pilot services adequate at HSR?	1	1
Overall, are passenger services adequate at HSR?	1	1
Does your business use the instrument approach procedures at HSR?	2	0
Would lower landing minimums increase your ability to use HSR?	1	1
Would a longer Runway 1/19 increase your ability to use HSR?	1	1
Is locating/expanding your business at HSR a future option?	2	1

1.11.2.1 Additional Comments

Businesses were also given space to comment on previous questions or topics not covered in the survey. Only one comment was given in this section, it indicated the need for jet fuel at HSR.

1.12 Transportation

1.12.1 Automobile Parking

HSR has a gravel parking lot with approximately eight automobile parking spaces available (though no spaces are marked), located west of the A/D building. The parking lot is in fair condition and has lighting.

1.12.2 Airport Access & Ground Transportation

The Airport is located five miles southeast of Hot Springs's downtown district. HSR is surrounded by roads in four directions: to the north is Crosswinds Road; to the east is Angostura Road; to the south is West Oral Road, and to the west is U.S. Highway 385. The primary access to the Airport is via an access road from U.S. Highway 385, on the west side of the airfield.

1.13 Utilities

Electricity and Gas is provided by the City of Hot Springs.

Water is provided by the Fall River County Water User District. Sewer is provided by on-site septic.

Telephone and internet services are provided by the City of Hot Springs.

1.14 Police and Emergency Services

The Fall River County provides police, fire, and emergency services for the Airport.

1.15 Land Use

1.15.1 Local Comprehensive Planning

The City of Hot Springs does not have a Comprehensive Plan. However, Fall River County does have a Comprehensive Land Use Plan. This plan describes the County's community goals and aspirations.

1.15.2 Local Land Use and Zoning

The City of Hot Springs does not have any land use or zoning ordinance(s) in place.

Currently, the Airport is surrounded mostly by agricultural land, as shown in **Figure 1-8**. However, there is a mining operation northeast of HSR and a commercial operation (feedlot) southeast of the Airport. Additionally, there is a shooting range in the northwestern corner of airport property.

1.15.3 Fire House - Hot Springs Rural Fire District

The Rural Fire District is planning to build a new fire house on the existing airport property, north of the airport entrance road, as shown in **Figure 1-9**. Several locations were considered, and the location on the Airport property was ultimately chosen because of its central location, as well as the fact that the Airport is municipally owned land. The addition of the fire house also creates future growth possibilities for the Airport, such as enabling larger aircraft to use HSR. The new fire house is planned to be 60-feet wide and 40-feet deep, will house two trucks, a grass fire truck, and a compressed air foam truck (CAFS). On call fire fighters will not be housed in the building, but it would be capable of doing so in the future. ~~HSR~~ The City of Hot Springs and the Rural Fire District are currently working with the FAA for a concurrent~~ly~~ lease agreement for the future Rural Fire District fire house building. A concurrent use agreement requires FAA approval, but no formal release of land is necessary. Any funds received by the airport (e.g. rent) for a concurrent use should be based on fair market rent and are considered airport revenue (Grant Assurance 25). See **Section 4.5.2** for details for writing and submitting a concurrent use agreement to the FAA.

1.16 Airport Property

To verify the Airport's existing property boundary and easements, an Exhibit 'A' Property Map was completed as part of this Master Plan and conforms to the requirements stated in FAA SOP 3.00 FAA Review of Exhibit 'A' Airport Property Inventory Maps. Historical property records will be researched to verify existing parcel information and how each parcel was purchased. An owners and encumbrances report is included, and encumbrances and all other pertinent information obtained from the report will be noted on the Exhibit 'A'. An airport boundary survey was not included as a part of this task.

The sections below summarize each tract of land owned by the Airport, and includes possible encroachments as well as recommendations to remedy the encroachments. Also **Figure 1-10**, shows each tract of land, right-of-way, utility and avigation easement, and possible encroachments to Airport property. Per the owners and encumbrances report, the Airport currently owns 511.2 acres in fee, and an additional 13.5 acres of Clear Zone (avigation) easements. For more detailed information, see property descriptions in **Appendix D** or the Exhibit 'A' Property Map of the Airport Layout Plan located in **Appendix C**.

1.16.1 Tract A, P.I.D. 21-000-00806-101-30, 21-000-00806-101-20, 21-000-00806-113-00

Existing Legal Description

The E ½ of the SW ¼, the SE ¼ of the NW ¼, S ½ of the NE ¼, SE ¼ of Section 10; The W ½ of the SW ¼, the SW ¼ of the NW ¼ of Section 11, all in Township 8 South, Range 6 East of the Black Hills Meridian, Containing 480 acres more or less; less 6.00 acres deeded to the State of South Dakota for highway purposes. Total area of Tract A is 474.0 acres.

Property Summary

This parcel makes up the majority of the Hot Spring's Airport property. This parcel was obtained from the United States Department of Agriculture in fee title by quit-claim deed on October 31, 1946 (Bk. 62 deeds, Pg. 79). A 22.9 acre portion of the parcel in the West ½ of Section 10 is operated by the Hot Springs Gun Club (see **Section 1.16.28**). A separate County tax parcel exists for said parcel, however, no legal description was provided from the Fall River County Register of Deeds. The legal description is however, memorialized within a Lease document, between the City of Hot Springs, and the Hot Springs Gun Club, Inc. The Lease document is dated May 01, 1950.

Federal/State Participation

Tract A was purchased with grant Federal Aviation Grant C.A.A. 9-39-009-701, dated May 23, 1950. Tract A was identified as Area A in C.A.A. 9-39-009-701 grant agreement. There are several encumbrance on Tract A that do not comply with FAA Airport Sponsor Grant Assurances, and are discussed in **Section 1.16.29**. Additionally, recommendation to resolve noncompliance with Grant Assurances are also discussed in **Section 4.5.**

Recorded Easements over Tract A

Power and Telephone Easement A-1: (Book 20 Misc. Page 334) recorded October 08, 1941. See **Section 1.16.7** for more details. (Not shown on Exhibit A property map)

Power and Telephone Easement A-2: (Book 20 Misc. Page335) recorded October 08, 1941. See **Section 1.16.8** for more details. (Not shown on Exhibit A property map)

County Road Right of Way A-3: (Book 28 Misc. Page 441) recorded January 02, 1952. See **Section 1.16.9** for more details.

Vacation of Road Right of Way A-4: (Book 28 Misc. Page 443-444) recorded January 03, 1952. See **Section 1.16.10** for more details.

Water Line Easement A-5: (Book 128 Misc. Page 129-132) recorded August 08, 1991. See **Section 1.16.11** for more details.

Angostura Irrigation Canal A-6 (Plat Book XVI, Page 17 through 17-B): plat recorded May 05, 1992. See **Section 1.16.12**for details.

U.S. Drain 1.0 A-7 (Plat Book XVI, Page 17 through 17-B) plat recorded May 05, 1992. See **Section 1.16.13** for details.

Drainage Lateral 3.3 A-8: 2 (Plat Book XVI, Page 17 through 17-B) plat recorded May 05, 1992. See **Section 1.16.14** for more details.

County Road Right of Way A-9: (Plat Book XVI, Page 17 through 17-B) plat recorded May 05, 1992. See **Section 1.16.15** for more details.

Road Right of Way A-10: (Plat Book XVI, Page 17 through 17-B) plat recorded May 05, 1992. See **Section 1.16.16** for more details.

Telecom Easement A-11: (Book 174 Misc. Page 81) recorded November 16, 2007. See **Section 1.16.17** for more details.

Drainage Lateral 2.6 A-12: (Book 176 Misc. Page 247-253) plat recorded October 22, 2008. See **Section 1.16.18** for more details.

Additional County Road Right of Way for Highway 18 & 385 A-13: (Book 177 Misc., Page 127-128) recorded February 05, 2009. See **Section 1.16.19** for more details.

Temporary Easement for Highway Construction A-14: (Book 177 Misc. Page129-132) recorded February 05, 2009. Not shown on Exhibit A property map due to lack of legal description. See **Section 1.16.20** for more details.

Power Easement A-15: (Book 179 Misc. Page 245-246) recorded October 14, 2009. See **Section 1.16.21** for more details.

Power Easement A-16: (Book 182 Misc. Page 953-955) recorded February 07, 2014. See **Section 1.16.22** for more details.

Order Establishing Angostura Irrigation District: (Book 28 Misc. Page40-42) recorded August 10, 1950. *The document specifically names Hot Springs Airport to be excluded from the district and, therefore, is not shown on Exhibit A property map and* ***Figure 1-10***. See **Section 1.16.26** for more details.

Vested Drainage Right Form: (Book 131 Misc. Pages 19-34) recorded June 24, 1992. These rights are asserted by the U.S. Bureau of Reclamation, are blanket in nature and therefore not shown on Exhibit A property map *and* ***Figure 1-10***. See **Section 1.16.27** for more details.

Pipeline Easement: (Book 84 Misc. Page 269) recorded December 06, 1978. The document does not provide an adequate legal description and, as a result, is not shown on Exhibit A property map and **Figure 1-10**. See **Section 1.16.29** for more details.

1.16.2 Tract B, P.I.D. 21-000-00806-101-20 & 21-000-00806-034-30

Existing Legal Description

Beginning at a point 1970 feet east of the southeast corner of the NW ¼ of the NW ¼ of Section 10, Township 8 South, Rage 6 East; thence running North 22 degrees East 1440 feet to the line between Sections 10 and 3; thence running easterly along said section line120 feet more or less to the southeast corner of the SW ¼ of the SE ¼ of Section 3; thence running northerly 290 feet along the east boundary of the SW ¼ of the SE ¼ of Section 3; thence running North 22 degrees East 220 feet in the SE ¼ of the SE ¼ of Section 3; thence running South 68 degrees East 920 feet in the SE ¼ of the SE ¼ of Section 3; thence running South 22 degrees West 165 feet to the line between Sections 10 and 3; thence running South 22 degrees West 1415 feet in the NE ¼ of the NE ¼ of Section 10 to the south boundary of the Northeast ¼ of the Northeast ¼ of Section 10; thence running West 1032 feet to the point of

beginning, all in Township 8 South of Range 6 East, B.H.M., and containing 37.2 acres. Total area of Tract B is 37.2 acres.

Property Summary
This parcel makes up the most northerly peninsula of the Hot Spring's Airport property. This parcel was obtained from Alfonso Billups, Mary Billups, and Fall River County in fee title by condemnation order of the 7th Judicial Court on April 07, 1950 (Bk. 27 misc, Pg. 603-604).

Federal/State Participation
Tract B was purchased with grant Federal Aviation Grant C.A.A. 9-39-009-701, dated May 23, 1950. Tract B was identified as Area B in C.A.A. 9-39-009-701 grant agreement. There are several encroachments on Tract B that do not comply with FAA Airport Sponsor Grant Assurances, and are discussed in **Section 1.16.29**. Additionally, recommendation to resolve noncompliance with Grant Assurances are discussed in **Section 4.5.**

Recorded Easements
Right of Way Easement B-1: Right of Way Easement to Fall River County dated January 16th, 1951 (Book 62 deeds, Page 416). See **Section 1.16.23** for more details.

Vacation of Road Right of Way B-2: A portion of the road right of way common to Section 3 and 10 was vacated by resolution. (Book 28 Misc., Page 196-197). See **Section 1.16.24** for more details.

Road Right of Way B-3: Statutory Right of Way pursuant to South Dakota Codified Laws (SD-CL) 31-18. See **Section 1.16.25** for more details.

1.16.3 Clear Zone Avigation Easement A, Hot Springs Airport. (Book 53 Misc. Page 579-581)

Clear Zone Avigation Easement benefiting the Hot Springs Airport is located at the west end of the East-West runway. The easement calls for the air space above the Approach Surface to remain free and clear of any structure, tree or other object which could be a hazard to the flight of aircraft. The Approach Surface is defined by a 20:1 inclined plane, beginning near the west end of the East-West runway, having an elevation of 3,144.7 feet above mean sea level, and extending westerly 1,000 feet, where the elevation of the Approach Surface shall be 3,194.70 feet above mean sea level.

1.16.4 Clear Zone Avigation Easement C, Hot Springs Airport. (Book 53 Misc. Page 582-584)

Clear Zone Avigation Easement benefiting the Hot Springs Airport is located at the north end of the North-South runway. The easement calls for the air space above the Approach Surface to remain free and clear of any structure, tree or other object which could be a hazard to the flight of aircraft. The Approach Surface is defined by a 20:1 inclined plane, beginning near the north end of the North-South runway, having an elevation of 3,139.93 feet above mean sea level, and extending northerly 1000 feet, where the elevation of the Approach Surface shall be 3,189.93 feet above mean sea level.

1.16.5 Clear Zone Avigation Easement E, Hot Springs Airport. (Book 53 Misc. Page 644-646)

Clear Zone Avigation Easement benefiting the Hot Springs Airport is located at the east end of the East-West runway. The easement calls for the air space above the Approach Surface to remain free and clear of any structure, tree or other object which could be a hazard to the flight of aircraft. The Approach Surface is defined by a 20:1 inclined plane, beginning near the east end of the East-West runway, having an elevation of 3,141.0 feet above mean sea level,

and extending northerly 1,000 feet, where the elevation of the Approach Surface shall be 3,191.0 feet above mean sea level.

1.16.6 Clear Zone Avigation Easement H, Hot Springs Airport. (Book 53 Misc. Page 585-587)

Clear Zone Avigation Easement benefiting the Hot Springs Airport is located at the south end of the North-South runway. The easement calls for the air space above the Approach Surface to remain free and clear of any structure, tree or other object which could be a hazard to the flight of aircraft. The Approach Surface is defined by a 20:1 inclined plane, beginning near the south end of the North-South runway, having an elevation of 3,148.33 feet above mean sea level, and extending southerly 1,000 feet, where the elevation of the Approach Surface shall be 3,198.33 feet above mean sea level.

1.16.7 Electric and Telephone Easement A-1, Central Electric & Telephone Company (Book 20 Misc. Page 334)

Electric and Telephone Easement in favor of the Central Electric & Telephone Company is recorded October 8, 1941. The easement is unconfined and covers the S ½ of the NW ¼ of Section 10. The necessary easement was related to the CCC camp erected to house workers for the Angostura Dam Project. The easement grants to the beneficiary, the right to erect, maintain, and repair a line of electric or telephone poles, as well as any necessary fixtures related thereto. The easement also provides tree trimming rights within a distance of 20 feet of the utility line, and provides for its termination in the event of non-use and removal of pertinent fixtures.

1.16.8 Electric and Telephone Easement A-2, Central Electric & Telephone Company (Book 20 Misc. Page 335)

Electric and Telephone Easement in favor of the Central Electric & Telephone Company is recorded October 08, 1941. The easement is unconfined and covers the SW ¼ of Section 10. The necessary easement was related to the CCC camp erected to house workers for the Angostura Dam Project. The easement grants to the beneficiary, the right to erect, maintain, and repair a line of electric or telephone poles, as well as any necessary fixtures related thereto. The easement also provides tree trimming rights within a distance of 20 feet of the utility line, and provides for its termination in the event of non-use and removal of pertinent fixtures

1.16.9 Dedication of Right of Way A-3, Dedication to the Public for Highway purposes (Book 28 Misc. Page 441)

Right of Way dedication in favor of the Public is recorded January 02, 1952. The document provides for a 66-foot wide right of way corridor within the SW ¼ of the NW ¼ and the NW ¼ of the SW ¼, all in Section 11. This right of way corridor is currently not improved with any type of roadway, nor does it appear to connect to any existing public right of way. ***Therefore, it is recommended that this right of way be vacated. SEH notes that the parcel(s) that would be served by this right of way is (are) already currently served with an improved roadway known as Crosswinds Drive located across the northerly peninsula of the Airport***.

1.16.10 Vacation of Right of Way A-4, Fall River County (Book 28 Misc. Page 443-444)

Right of Way vacation by the Fall River County Board is recorded January 03, 1952. The document provides for the vacation of a 66 foot wide right of way corridor along portions of the Section line between Sections 10 and 11.

1.16.11 Water Line Easement A-5, Fall River Feed Lots (Book 128 Misc. Page 129-132)

Water Line Easement in favor of Fall River Feed Lots was executed May 30, 1978, and recorded August 08, 1991. The document grants a 30 foot wide easement to Fall River Feed Lots to construct, install, maintain, operate, repair and remove a water supply line. The easement also provides for ingress and egress rights. In addition, it provides for the Airport to construct certain facilities, including roads and runways, within the easement so long as the purpose of the easement is maintained.

1.16.12 Angostura Irrigation Canal A-6, United States (Plat Book XVI, Page 17 through 17-B)

A canal corridor in favor of the United States is shown on Exhibit A according to the Hot Springs Municipal Airport plat dated May 05, 1992. Additional documentation is available from the United States Bureau of Reclamation Office, Newell, South Dakota.

1.16.13 U.S. Drain 1.0 A-7, United States (Plat Book XVI, Page 17 through 17-B)

A drainage way in favor of the United States is shown on Exhibit A according to the Hot Springs Municipal Airport plat dated May, 05, 1992. Additional documentation is available from the United States Bureau of Reclamation Office, Newell, South Dakota.

1.16.14 Drainage Lateral 3.3 A-8, United States (Plat Book XVI, Page 17 through 17-B)

A Drainage Lateral in favor of the United States is shown on Exhibit A according to the Hot Springs Municipal Airport plat dated May, 05, 1992. Additional documentation is available from the United States Bureau of Reclamation Office, Newell, South Dakota.

1.16.15 County Road Easement A-9, Fall River County (Plat Book XVI, Page 17 through 17-B)

Right of Way dedication is shown according to the Hot Springs Municipal Airport plat from the City of Hot Springs to Fall River County recorded May 05, 1992. The public right of way encumbers portions of the West ½ of the SW ¼ of Sec. 11. The most southerly portion of this right of way between the Angostura main canal and Oral Road is not constructed.

1.16.16 Existing Highway Right of Way A-10, Fall River County (Plat Book XVI, Page 17 through 17-B)

Right of Way indicated on the Hot Springs Municipal Airport plat, recorded May 05, 1992. This right of way appears to fall adjacent to the southerly and westerly limits of the Airport, but wholly outside of the Airport property. SEH believes this right of way to be the 6.00 acres of right of way excepted from the original deed for the 480 acre airport property.

1.16.17 Telecommunication Easement A-11, Golden West Telecommunications Coop Inc. (Book 174 Misc. Page 81)

Telecommunication Easement in favor of Golden West Telecommunications Coop, Inc. is recorded November 16, 2007. The document provides rights for the construction, operation, maintenance and removal of telecommunication facilities, as well as any necessary fixtures related thereto, as well as ingress/egress rights.

1.16.18 Drainage Lateral 2.6 A-12, United States (Book 176 Misc. Page 247-253)

Drainage Lateral Easement in favor of the United States is recorded October 22, 2008. The document provides for a 30 foot wide easement with rights for the construction, operation, maintenance and removal for laterals, drainage ditches, and any necessary appurtenant

structures or facilities, including ingress and egress rights. The easement is generally located along the westerly limits if the Airport property, along U.S. Highway 18/385, and traverses through the area used by the Hot Springs Gun Club.

1.16.19 Permanent Right of Way Easement A-13, South Dakota Department of Transportation (Book 177 Misc. Page 127-128)

Permanent Right of Way Easement in favor of South Dakota Department of Transportation is recorded February 05, 2009. The easement adjoins the existing right of way for U.S. Highway 18/385 along the westerly boundary of the Airport property, and encumbers approximately 5.95 acres.

1.16.20 Temporary Easement A-14, South Dakota Department of Transportation (Book 177 Misc. Page 129-1322

Temporary Easement in favor of South Dakota Department of Transportation is recorded February 05, 2009. The easement lies within the E ½ of the SW ¼ of Section 10, and within the SE ¼ of the NW ¼ of Section 10. The document does not provide any further legal description for the temporary easement, other than to limit the area to 1.8 acres. Rights obtained by the State of South Dakota shall terminate one year after construction of the highway is completed.

1.16.21 Right of Way Easement A-15, Black Hills Power Inc. (Book 179 Misc. Page 245-246)

Right of Way Easement in favor of Black Hills Power Inc. is recorded October 14, 2009. The document provides for a minimum 20 foot width and rights for the construction, operation, maintenance, upgrade and removal of an electrical power system, as well as ingress/egress rights. The easement is generally located along the westerly limits if the Airport property along U.S. Highway 18/385 and traverses through the area used by the Hot Springs Gun Club. The legal description in said document is vague and states the property encumbered to be the NE ¼ of the SW ¼ of Section 10. However, a sketch included as part of the document indicates the easement to run from the current airport driveway, then northerly between the gun club and the U.S. Highway 18 right of way. This would also encumber the SE ¼ of the NW ¼ of Section 10.

1.16.22 Right of Way Easement A-16, Black Hills Power Inc. (Book 182 Misc. Page 953-955)

Right of Way Easement in favor of Black Hills Power Inc. is recorded February 07, 2014. The document provides for a minimum 20 foot width and rights for the construction, operation, maintenance, upgrade and removal of an electrical power system, as well as ingress/egress rights. The easement is generally located along the westerly side of the existing airport buildings as shown in **Figure 1-10** within said document. The legal description in said document is vague and states the center line of the powerline as constructed shall be the center line of the easement.

1.16.23 Dedication of Right of Way B-1, Dedication to Fall River County for Highway purposes (Book 62 Deeds, Page 416)

Right of Way dedication in favor of Fall River County is recorded January 16, 1951. The document provides for a 66 foot wide right of way corridor within the SE ¼ of the SE ¼ of Section 3, and adjacent land in Section 10. The document is explicit in the intended use as a County Highway and provides that if the land described should cease to be a County Highway, title to the property shall revert to the Grantor, currently the City of Hot Springs.

1.16.24 Vacation of Right of Way B-2, Vacation of Right of Way (Book 28 Misc. Page 196-197)

Right of Way vacation in favor of the City of Hot Springs is recorded March 26, 1951, and vacates a portion of the road common to Sections 3 and 10 which lies within Tract B.

1.16.25 Statutory Dedication of Right of Way B-3, (No Recording Data)

Title documents for Tract B indicate the dedication of the public right of way common to Section 3 and 10 are dedicated via Statutory clause of South Dakota Codified Laws (SDCL) 31-18.

1.16.26 Order Establishing Angostura Irrigation District, U.S. Bureau of Reclamation. (Book 28 Misc. Page 40-42)

An Order establishing an Irrigation District is recorded August 10, 1950 that lists tracts of land to be included in the district. All airport property within Tract A is included in the list. However, Hot Springs Municipal Airport is specifically named as being excluded from the district and therefore is not shown on Exhibit A and **Figure 1-10**.

1.16.27 Vested Drainage Right Form, U.S. Bureau of Reclamation. (Book 131 Misc. Page 19-34)

This claim of vested drainage rights is recorded June 24, 1992. The document lists tracts of land from which water is drained, and also asserts claimed drainage rights across airport property through prescriptive rights. The document specifically names U.S. Drain 1.0 shown on Exhibit A property map and **Figure 1-10** as Easement A-7. It names the SW ¼ of Section 10 from which water is drained and also claims prescriptive easement rights extending northeasterly, across airport property, to the Cheyenne River. The document asserts that these drainage rights have existed since October 25, 1950. The legal description is non-specific and, therefore, is not shown on Exhibit A and **Figure 1-10**.

1.16.28 Unrecorded Leases

Unrecorded Lease between the City of Hot Springs, and the Hot Springs Gun Club Inc., dated May 01, 1950. This document includes a legal description for the 22.9 acre tract in the northwest corner of the Airport property and provides for the use of the property as a Gun Club, so long as it does not create a hazard for any airplanes or persons using the Hot Springs Airport.

Unrecorded Lease between the City of Hot Springs and S.E. Wilke, dated July 23, 1956, and subsequent Assignment of Lease to Calvin C. Benne, Jr., dated July 01, 1959. This document provides the Lessee the benefit of using the Hot Springs Municipal Airport grounds for agricultural use only. Specifically excluded from the lease are the runways, buildings, and gun club property. The document highlights that the operation of the farm unit is secondary to the operation as an airport, and that improvements to the Airport may be made without interference from and without liability to the Lessee.

Unrecorded Lease between the City of Hot Springs and Frontier Airlines, Inc., dated March 31, 1959. The terms of the lease appear to be for a 3-year period, beginning April 01, 1959 and ending April 01, 1962.

1.16.29 Possible Encroachments

Angostura Irrigation District, U.S. Bureau of Reclamation
Subject to possible rights and easements in favor of the United States pursuant to the Angostura Irrigation District and related infrastructure. All of Tract A of the Airport property is

recited in the document creating said Angostura Irrigation District (**Section 1.16.26**). However the Hot Springs Municipal Airport is explicitly recited as being “excluded from the District…” The document is recorded in Book 28 Misc., Page 40 on August 10, 1950.

Vested Drainage Right Form, U.S. Bureau of Reclamation
Within Tract A, Claim of vested Drainage Rights (**Section 1.16.27**), this document purporting to claim vested drainage rights in favor of the United States within certain property of the Hot Springs Municipal Airport. The document is executed on June 23, 1992 by the United States Bureau of Reclamation, and recorded in Book 131 Misc., Pages 19-34, on June 24, 1992. The document specifically mentions rights associated with U.S. Drain #1.0, shown on Exhibit A, U.S. Drain 1.0 Easement A-7. The document purports to claim that drainage rights have existed since October 25, 1950 and affect the SW ¼ of Section 10 and the SW ¼ of the NE ¼ of Section 10.

Continental Grain Company Pipeline Easement
Rights pursuant to Pipeline Easement created by document recorded in Book 84 Page 269, and transfer of rights to Continental Grain Company pursuant to document recorded August 19, 1991. The exact location of said Pipeline Easement is unknown and is therefore not shown on Exhibit A or **Figure 1-10**. The document simply states it shall run from Section 11 to Section 14. No additional legal description was ~~not~~ found in the property search.

Driveway and Power Poles
In Tract A, the Airport is served by a driveway and power poles from U.S. Highway 18. Although no easement was ~~not~~ found in the property search which describes this specific corridor, it is possible the power poles are allowed under the Electric and Telephone Easements granted in 1940, recorded October 08, 1941 in Book 20, Pages 334 and 335, shown as Item A-1 and A-2 on **Exhibit A**.

Roadway
A possible lack of Right of Way may exist in the SE ¼ of the SE ¼ of Section 10 in Tract A. A roadway exists adjacent to the Angostura Main Canal. No documentation was ~~not~~ found in the property search for this roadway.

Crosswinds Road
It appears that approximately a 400 foot long portion of Crosswinds Road lies outside the dedicated right of way in the SE ¼ of the SE ¼ of Section 3 within Tract B.

Driveway
It appears that a driveway exists across the northeasterly corner of Tract B. No easement was ~~not~~ found in the property search for this driveway.

1.16.30 Mining Lease

The City of Hot Springs has been in negotiations with Pete Lien and Sons, Inc. for surface mining on HSR. On July 20, 2015, Hot Springs City Council approved the Pete Lien and Sons Surface Mining Lease Agreement for surface mining on Airport property. The approximate location of this future lease agreement is shown in **Figure 1-12**. The mining lease and final mining plans are still subject to FAA review and approval. **Chapter 4** will discuss land use compatibility regarding mining on and near the Airport.

1.17 Environmental Inventory

1.17.1 Air Quality

The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for six pollutants, termed "criteria pollutants" and requires each state to adopt a plan to achieve the

NAAQS for each pollutant within specific timeframes. These air quality plans are known as State Implementation Plans (SIP). The State of South Dakota has developed a SIP, which contains the rules and programs the state uses to help ensure air quality continues to meet the NAAQS. The SIP focus is on non-attainment areas and maintenance areas. SIP rules are codified in South Dakota Legislature Chapter 34A-1: Airport Pollution Control. Currently there are no non-attainment areas or maintenance areas in Fall River County or the State of South Dakota.

1.17.2 Section 4(f)

Section 4(f) legislation was established under the Department of Transportation (DOT) Act of 1966 (now codified at 49 USC 303, 23 USC 138) and provides protection for publicly owned land in public parks, recreation areas, or wildlife and waterfowl refuges of national, state, or local significance or lands from a historic site of national, state, or local significance.

There are no publicly funded parks, recreation areas, or wildlife refuges within or adjacent to the Airport that are potentially eligible to meet the provisions of the U.S. Department of Transportation Act of 1966, section 4(f) [48 U.S.C. 303(C)]. Nearby public recreational land includes the Black Hills National Forest, Angostura Recreation Area and Buffalo Gap National Grassland.

1.17.3 Farmlands

The Federal Farmland Protection and Policy Act and the South Dakota Agricultural Land Preservation and Conservation Policy Act, South Dakota Statute §17.80-17.84, were enacted to ensure that impacts to agricultural lands and operations are integrated into the decision-making process. These laws are also intended to minimize, to the extent reasonable, actions that result in unnecessary and irreversible conversion of farmland to non-agricultural purposes.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), NRCS electronic Field Office Technical Guide (eFOTG), and the Fall River County Soil Survey were referenced to identify prime and unique farmland, and farmland of statewide and/or local importance on airport property. Soils mapped and designated by the NRCS as prime farmland, prime farmland if drained, and farmland of statewide importance are located within the vicinity of the Airport site as shown on **Figure 1-5**. These soils include:

- Jayem fine sandy loam, 2 to 9 percent slopes (Map Unit JaB) is classified as “prime farmland if drained” The Jayem series consists of very deep, well to somewhat excessively drained soils that formed in sediments weathered from noncalcareous sandstone.

- Haverson loam (Map Unit Ha) is classified as “prime farmland if drained.” The Haverson series consists of very deep, well drained soils that formed in alluvium from mixed sources. Haverson soils are on floodplains and low terraces.

- Alice fine sandy loam, 2 to 9 percent slopes (Map Unit AaC) is classified as “prime farmland if drained.” The Alice series consists of very deep, well drained, moderately rapidly permeable soils on upland hillslopes and river valley terraces. They formed in moderately coarse textured alluvium and windblown material.

- Ascalon fine sandy loam, 0 to 6 percent slopes (Map Unit AsB) is classified as “prime farmland if drained.” The Ascalon series consists of very deep, well drained soils that formed in moderate coarse textured calcareous material. Ascalon soils are on upland hillslopes and tableland plains.

- Schamber-Eckley complex, 9 to 40 percent slopes (Map Unit SmE) is classified as “not prime farmland.” The Schamber series consists of well to excessively drained soils that are very shallow over sand and gravel outwash sediments. The Eckley series consists of very deep, well drained soils formed in Tertiary pedisediments.

- Bankard fine sandy loam (Map Unit Bb) is classified as “not prime farmland.” The Bankard series consists of very deep, excessively to somewhat excessively drained soils that formed in sandy alluvium from mixed sources. Bankard soils are on flood plains and low terraces.

- Dailey fine sand, 0 to 6 percent slopes (Map Unit DaB) is classified as “not prime farmland.” The Dailey series consists of very deep, somewhat excessively drained soils that formed in sandy eolian deposits.

1.17.4 Floodplains

The Hot Springs Municipal Airport is located adjacent to the Cheyenne River. The 100-year floodplain of the Cheyenne River is adjacent to the existing airport property along the north as shown on **Figure 1-6**.

1.17.5 Fish and Wildlife Resources

The Airport is located within the Middle Rockies Ecoregion, and more specifically, the Black Hills Foothills Subsection as defined by the U.S. Forest Resource Service. The Middle Rockies ecoregion is characterized by individual mountain ranges of mixed geology interspersed with high elevation, grassy parkland. The Black Hills are an outlier of the Middle Rockies and share with them a montane climate, hydrography, and land use pattern. Ranching and woodland grazing, logging, recreation, and mining are common.

Most of the native habitats associated within the Airport property have been disturbed and replaced by agricultural and other developed uses. The majority of the undeveloped upland habitat within the Airport currently consists of areas in row crop and hay production and old field areas that are maintained by regular mowing. The Black Hills Foothills are dominated by little bluestem (*Schizachyrium scoparium*), grama grasses (*Bouteloua sp.*), and leadplant (*Amorpha canescens*).

Most of the native habitats within Airport property have been disturbed and replaced by agricultural uses. The majority of the undeveloped upland habitat within the Airport property currently consists of areas in turf grass and hay production. The current runways at the Airport consist of one mowed and maintained grassway (turf) runway, and one paved runway.

1.17.5.1 Hazardous Wildlife Attractants

According to the 2014 Wildlife Hazard Site Visit (WHSV), see **Appendix B**, and detailed discussion of recommendations in **Chapter 4**, the habitat in the area and on the Airport commonly supports deer and other mammals, and several bird species.

KLJ completed the WHSV in October 2014 in order to assist the Airport in identifying and prioritizing potential wildlife hazard issues at the Airport. The survey included daytime and nighttime observations on the Airport and involved observing wildlife on and around the airfield, and also identifying habitat-related wildlife issues on and around the Airport property.

1.17.5.1.1 *Deer and Mammals*

Because of their large size, deer are considered to be the most hazardous wildlife species to aircraft. Mule deer are common in the Hot Springs area and were seen during the site visit on airport property, outside of the perimeter fence. Excluding deer from the airfield with adequate

fencing is the only effective way to minimize the threat deer pose to aircraft. Continued maintenance of the current 10 foot perimeter fence should be effective in minimizing any threat that deer pose to aircraft at HSR. The fence should be kept tight to the ground and an apron should be attached to the bottom wherever deer are able to crawl under it.

1.17.5.1.2 *Medium Sized Mammals*

Signs of coyote, fox and skunk activity was observed on HSR during the site visit. These species, including badgers, raccoons and other medium sized mammals can be a hazard to small aircraft. In addition to a direct strike, these species can distract a pilot, cause a pilot to veer off a runway or overcompensate in attempting to avoid a strike. Their activity on the airfield can be minimized by avoiding outdoor storage or junk piles, removing hay bales from the airfield, and following the recommended airfield vegetation management described below in the section on grass management. When these species become frequent on the airfield, they should be removed through trapping, shooting or other control methods.

1.17.5.1.3 *Small Mammals*

The main issue with rodents and rabbits on an airfield is that they attract predators such as coyote, fox, badgers and hawks. Rodents are attracted to many habitats on an airfield but become especially abundant when associated with agricultural crops or alfalfa. Rodent activity appeared extremely high around the segmented circle for an unknown reason and was also evident near the east end of the turf runway. A small amount of pocket gopher activity was also observed on the airfield. While no rabbits were observed during the site visit, several trails in the taller grass along the perimeter fence appeared to be from rabbit. To keep rabbit and rodent numbers to a minimum, the vegetation recommendations discussed below should be followed. If necessary, jackrabbits can be controlled with traps or by spotlighting and shooting. Meadow voles, ground squirrels and pocket gophers may need to be controlled with traps or toxicants.

1.17.5.1.4 *Birds*

Turkey tracks observed outside the perimeter fence was the only game bird activity noted at HSR during the site visit. Pheasants and grouse are common bird species of the Hot Springs area and are likely to utilize the HSR airfield. These large upland birds can do considerable damage when struck by small planes or ingested into an engine. The abundant agricultural land at HSR, outside of the perimeter fence, appears highly attractive to pheasants. Pheasants and grouse may also be attracted to the grass habitats inside the airfield fence. Although there is little the Airport can do to keep these species off of the airfield, vegetation management such as eliminating crops and keeping the vegetation height at 12 inches or less should minimize ~~their~~ birdairfield activity on the airfield.

Non-native birds commonly roost and nest in airport structures. They are mostly a pest but can pose a serious threat to aircraft in a variety of ways. Pigeons were observed flying over and around the Airport but no evidence of pigeon activity was observed in the hangars and other airport structures. Eurasian collared doves were seen on occasion near the Airport buildings and are common during the winter months. Some of the Airport hangars contained nesting material up inside the area above the doors, indicating that house sparrows and possibly starlings may be nesting in these areas. While the nesting of these species may pose more of a nuisance than an aircraft hazard, filling or covering these areas where possible, will help to minimize their activity.

Blackbirds and starlings are common and abundant flocking species that can pose a threat to aircraft when in large numbers. During the site visit, a flock of approximately 10,000 red-winged blackbirds were observed feeding in the sudan grass on the airport, south of the airfield. Eliminating crops and managing airport vegetation, as recommended in the

Agricultural Land section below and in the WHSV, will help to keep threats from blackbirds to a minimum.

1.17.5.1.5 *Waterfowl*

Ducks and geese are the main waterfowl types in the Hot Springs area. Waterfowl and gull activity around HSR appears to be influenced in part by area water bodies that stay open throughout the year. Angostura Reservoir is a large open water reservoir located only two miles southwest of HSR, while the Cheyenne River flows adjacent to the area on the north.

1.17.6 Rare Threatened and Endangered Species

No federally listed endangered or threatened species are known to occur within the airport. However, Hyde County is within the distributional ranges of the northern long-earred bat (Myotis septentrianoalis), the finescale dace (Chrosomus negoaeus), the bald eagle (Haliaeetus leucopcephalus), the great sage-grouse (Centrocercus urophasianus), the osprey (Pandion haliaetus) and the swift fox (Vulpes velox).

The northern long-earred bat is a federally listed endangered species. The northern long-eared bat is one of the species of bats most impacted by the disease white-nose syndrome. Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves. Like most eastern bats, the northern long-eared bat roosts in trees during summer, and tree removal should occur between October 1 and March 31.

Finescale dace are currently listed as state endangered in South Dakota and state threatened in Wyoming and Nebraska. Populations occur as small, isolated demes that have been declining steadily since European settlement of this region over 100 years ago. Fish habitats, including those of the Finescale dace, are not present inside the project limits or within the near vicinity of the Airport Property.

The bald eagle is listed as state threatened in South Dakota. The bald eagle occurs during its breeding season in virtually any kind of American wetland habitat such as seacoasts, rivers, large lakes or marshes or other large bodies of open water with an abundance of fish. Studies have shown a preference for bodies of water with a circumference greater than 11 km (7 mi), and lakes with an area greater than 10 km2 (4 sq mi) are optimal for breeding bald eagles. There are no waterbodies that provide ideal or near ideal conditions for the bald eagle inside the project limits or near vicinity of the Airport Property.

The great sage-grouse is currently considered a candidate for federal listing. The great sage-grouse is the largest grouse in North America and is dependent on sagebrush-dominated habitats. Because the Airport property is regularly mowed and maintained, sagebrush is unlikely to occur inside the project limits.

The osprey is listed as state threatened in South Dakota, and tolerates a wide variety of habitats, nesting in any location near a body of water providing an adequate food supply. There are several water supplies near the Airport property and it is possible the osprey habitat will be slightly affected by construction projects at the Airport.

The swift fox is listed as state threatened in South Dakota. The swift fox inhabits open prairies, plains and shrubby desert areas away from extensively cultivated land. It is usually found in areas with gently rolling hills or undulating topography. In South Dakota, swift fox prefer short to midgrass prairies. Because the Airport property is flat and regularly mowed and maintained, it is unlikely that there is any habitat on site for the swift fox.

1.17.7 Hazardous Materials, Pollution Prevention and Solid Waste

The Resource Conservation and Recovery Act (RCRA), is the culmination of a long series of pieces of legislation, dating back to the passage of the Solid Waste Disposal Act of 1965, which addresses the problem of solid waste disposal and eventually evolved into an expression of the national concern with the safe and proper disposal of hazardous waste. Executive Order 12088 as amended, directs federal agencies to comply with applicable federal, state, and local pollution control standards when implementing their actions.

A review of several environmental record sources was completed to obtain information regarding hazardous and environmental waste or any hazardous material related impacts on airport property. Several activities on-site are regulated in reference to stormwater and oil storage. The following sections describe current hazardous and solid waste generation activities, the applicable county solid waste management plan, site-specific waste inventory and survey, and facility regulated environmental activities.

1.17.7.1 Hazardous and Solid Waste Generation Activities

Currently, hazardous and solid waste can be generated as part of the following airport facilities and activities:

- Aircraft Storage: Aircraft storage facilities include one private t-hangar, four private box hangars, and three City-owned hangars.
- Public arrival/departure (A/D) Building: The A/D includes restrooms, lounge, and vending area.
- Fueling Facilities: HSR has one above ground 10,000 gallon fuel tank.
- Snow Removal Equipment (SRE) and Maintenance Building: Airport equipment includes a tractor and associated equipment for airfield maintenance and snow removal.

Hazardous and solid waste generation from the above facilities are managed by HSR except for the private box and t-hangars.

Waste generation can generally be placed into four categories:

1. ***Incidental recyclable material*** that may be generated on a routine basis would include paper and cardboard, cans, glass, and recyclable plastic containers.
2. ***Day to day operations*** at the facility can also generate the following kinds of waste: municipal solid waste, organic materials (food and yard waste) and problem materials (such as electronics, fluorescent and HID lamps, and rechargeable batteries).
3. Any ***construction or remodeling projects*** conducted at HSR could generate construction and demolition debris as well as problem materials (electronics, latex paints, textiles/carpets, and appliances).
4. Waste generated in association with ***equipment, vehicle, or airplane maintenance*** can include antifreeze, tires, vehicle batteries, oil filters, and used oil.

1.17.7.2 Waste Management Requirements and Resources

South Dakota Codified Law (SDCL 34A-6) requires that for the purposes of proper, effective, and safe disposal of solid waste, any person intending to dispose of solid waste within South

Dakota must comply with the provisions of state law. In 1993, the state received approval from EPA for its program.

SDCL 34A-6-17 stipulates that each county of the state shall plan, initiate, and provide a solid waste management system. No solid waste management plan is available on the River Falls County website. The South Dakota Department of Environment and Natural Resources (DENR) website indicates that the City of Hot Springs falls within the Custer - Fall River Waste Management District with City officials serving on the Board. The Custer - Fall River Waste Management District operates the DENR-permitted Custer Fall River Landfill located near Edgemont, South Dakota. In addition to accepting municipal solid waste, the facility accepts rubble (non-construction), white goods, contaminated soil, and tires. Within the city limits, garbage service is mandatory for residential customers with the city providing a 90-gallon container for each residence with hauling services provided by Kieffer Sanitation out of Rapid City, South Dakota. The City of Hot Springs also provides an area to dispose of yard waste and branches at no cost to residents. The waste categories generated at the Airport and accepted at the Custer Fall River Landfill are transported to the landfill facility for disposal.

Many of the problem materials in the Airport waste categories described in **Section 1.17.7.1** are banned from land disposal by SDCL 34A-6-67 including yard waste, lead acid batteries, waste motor oil, or white good appliances. Materials diverted from land disposal count toward state waste reduction goals include paper, cardboard, plastic aluminum, and steel. It is the waste generator's responsibility to manage these materials in accordance with state and federal regulations. However, there currently is no organized recycling collection or drop-off service in the City of Hot Springs.

A local non-profit organization of local residents and businesses, Keep Hot Springs Beautiful, has been formed and is currently promoting recycling efforts. They offer a year-around aluminum recycling trailer and host semi-annual recycling collection events for televisions, computers, phones, and appliances as well as various types of metal and paper. They refer recycling questions to the City of Rapid City. There are multiple options for recycling in Rapid City, South Dakota, including the Materials Recovery Facility (MRF) operated by the City at the Rapid City Landfill and several private businesses.

In addition to the above recycling options, the nearest recycling facility to the City of Hot Springs listed on the DENR's website is Sander Sanitation Service, Inc. located in Custer, South Dakota; the facility accepts automotive batteries, aluminum cans, steel cans, compost materials, corrugated cardboard, newspapers, high grade paper, used oil (used oil from private individuals only), plastics, scrap metals ferrous and non-ferrous, and white goods.

1.17.7.3 Waste Generation Inventory and Survey

The City was interviewed regarding current waste generation at HSR. The following paragraphs summarize information provided by the City and from the Pilot User Survey described in **Section 1.11.1**.

City Information

Currently, there is no formal solid waste management program in use at HSR. Any waste disposal is managed by the City for land disposal.

On a day to day basis, it is assumed that the waste generated at HSR is minimal. Waste baskets for municipal solid waste are provided in the public A/D Building and possibly in other on-site structures such as hangars, maintenance facilities, and fueling areas. No organized

waste abatement programs are in-place to collect recyclables, monitor, or educate users of the public facilities.

The owners of the private box and t-hangars are responsible for removing their own waste. Currently, no organized waste abatement programs are in place to collect recyclables, monitor, or educate private owners.

No recycling bins are currently in-place at HSR; locally, neither the City nor the County maintain a recycling drop-off site. Some problem materials including tires and appliances are accepted at the Custer River Fall Landfill. The City has indicated that used oil is taken to a local business that burns used oil for heat.

Waste may also be generated as part of equipment and airplane maintenance in the private hangars. Generally, it is assumed that maintenance activities are primarily conducted off-site. However, some owners of base aircraft change their own oil as needed as describe in the Pilot Survey information below; private hangar owners are responsible for managing their own used oil and oil filters. No information is available on the volume of waste oil, filters, or other maintenance products generated at HSR.

Pilot Survey

Results of the Pilot Survey including questions pertaining to recycling habits were obtained as part of the survey described in **Section 1.11.1**. In general, the results of the survey indicated a wide variation in recycling habits by the pilots. Some indicated they "never" recycle and others indicated they "always" recycle, with the vast majority of responses saying they "sometimes" or "usually" recycle such items as paper, steel/aluminum, plastics and glass. They generally indicated that they transported their recyclables off-site.

The majority of the respondents also indicated that they actively collect maintenance waste. Those that actively collect maintenance waste generally indicated that waste management activities included: "give to people that need used oil", "take to Ford dealer", or brought the waste to their "home".

1.17.7.4 Other Regulated Environmental Activities

Because of the storage of certain materials on-site, the Airport activities fall under environmental regulatory requirements. Airport facilities are generally required to obtain a permit for the discharge of stormwater from industrial activities. In addition, airport materials must comply with federal regulations regarding oil pollution prevention. The following sections summarize past regulatory issues, the Industrial Stormwater Permit requirements, and the Spill Prevention, Control, and Countermeasure (SPCC) Plan.

Environmental Regulatory History

The DENRs Spill Reports for Fall River County indicates that there are no known spills within five miles of the Airport property. The DENR's website also indicated that a new 10,000 gallon above ground tank for aviation fuel was registered and installed at the Airport in 1999. The tank is owned by Automated Fuels Systems Inc. and operated by HSR. No other tank registrations are listed on the DENR's website.

The DENR does not list any coverage obtained by the Airport under Industrial Stormwater Permits or Construction Stormwater Permits over the past 13 years.

Industrial Stormwater Permit

Under the General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial Stormwater Permit) issued October 1, 2012, by the DENR, only "transportation by

air" facilities that are involved in vehicle maintenance (such as vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport deicing need coverage under the Industrial Stormwater Permit. As such, the Airport did not obtain coverage under the Industrial Stormwater Permit and no Stormwater Pollution Prevention Plan (SWPPP) is required for the facility.

SPCC Plan

The United States Environmental Protection Agency (U.S. EPA) has established regulations for oil pollution prevention in the Code of Federal Regulations, Title 40 (40 CFR), Parts 110 through 112. The single above ground 10,000 gallon fuel tank at the Airport *does* meet the three primary criteria requiring an SPCC Plan as follows:

- The facility must be non-transportation related and engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products.
- The facility must have an aggregate aboveground storage capacity greater than 1,320 gallons or below ground storage capacity greater than 42,000 gallons.
- There must be reasonable expectation that, due to its location, the facility could discharge oil into or upon the navigable waters or adjoining shorelines of the United States.

The City has indicated that an SPCC Plan has not been prepared for the facility.

1.17.8 Historical, Archeological, Architectural and Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes the Advisory Council on Historic Preservation (ACHP) and the National Register of Historic Places (NRHP). Section 106 of the NHPA requires consideration of the effects of undertaking on properties that are eligible for inclusion in the NRHP. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO) if there is a potential adverse effect to historic properties on or eligible for listing on the National Register of Historic Places.

The Archeological and Historic Preservation act of 1974 provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance by providing for the survey, recovery, and preservation of historical and archeological data which might otherwise be destroyed or irreparably lost due to a development project.

No Archeological or Historic properties are known to exist in the area of the Airport. However, this will need to be evaluated in the environmental process. This evaluation will include an evaluation of all structures older than or approaching 50 years in age

1.17.9 Noise

Noise is measured by the Day-Night Sound Level (DNL). It is the logarithmic average of sound levels in decibels and is based on a 24-hour Equivalent Sound Level (Leq). DNL (also known as Ldn) has been equated through social surveys with public reactions to different noise levels. DNL values incorporate a 10-decibel penalty for noise events occurring between 10:00 PM and 7:00 AM to account for increased noise sensitivity at night. The FAA considers areas impacted by DNL 65 noise levels and higher as significant. Residential, school, hospital, day care, and retirement home uses within these areas are not compatible.

The DNL measurement was developed under the direction of the EPA to measure the cumulative impact of multiple noise events in an average day. The U.S. Departments of Housing and Urban Development, Transportation, and Defense recognize it as a proper basis for land use planning

around airports. The recognized tool used to predict anticipated DNL coverage for a project, such as that outlined earlier, is the Integrated Noise Model (INM) developed by the FAA.

In accordance with the guidelines set forth in FAA Order 5050.4B, Chapter 5, Paragraph 47e, Section (1), a noise analysis is not required for proposed development options at airports where existing or forecast operation levels do not exceed 90,000 annual propeller operations or 700 annual jet operations. These numbers of propeller or jet aircraft operations result in cumulative noise levels not exceeding 60 Day/Night Level (Ldn) more than 5,500 feet from start of takeoff roll or 65 Ldn on the runway itself. Therefore, impacts in excess of these noise levels would not be expected outside of the Airport property limits. The operations levels at HSR are below these thresholds. To date, no noise assessments or noise contours have been created for HSR.

1.17.10 Water Quality

The Airport is located in the Middle Cheyenne-Spring watershed of the Cheyenne Basin. The Cheyenne River flows along the northern boundary of the Airport. The Cheyenne River flows to the north and northeast to connect with the Missouri River. The waters of the Missouri flow south and east to the Mississippi River, eventually arriving in the Gulf of Mexico.

The Cheyenne River basin is diverse, containing Black Hills National Forest and portions of Badlands National Park. Land use is primarily rangeland with some irrigated and dryland farming and a few mining areas. The Cheyenne River Watershed has several lakes and stream segments listed as impaired due to exceedances of standards set for various water quality parameters.

Surface water runoff from the runways and taxiways is treated in grassed swales along the length of the runway and taxiway facilities. As described in **Section 1.17.7.4**, an Industrial Stormwater Permit is not required because the Airport does not provide equipment maintenance or deicing services. Runoff ultimately discharges to the Cheyenne River by overland flow.

1.17.11 Wetlands

Wetlands are defined in federal Executive Order 11990 as

> "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The National Wetlands Inventory (NWI) Map shows no wetland areas on Airport property. The closest mapped wetlands are along the Cheyenne River to the North (see **Figure 1-7**). A field delineation of wetland habitat on the Airport property was out of scope of this master plan. Prior to completing any construction project at the Airport property, a formal wetland delineation will be conducted.

1.18 Sustainability

Airport sustainability is a broad term used by the FAA that encompasses a wide variety of practices applicable to planning, design, building and operating airport facilities. The FAA has defined three core principles:

1. Protecting the environment;
2. Maintaining high and stable levels of economic growth; and
3. Social progress that recognizes all stakeholders' needs.

There are many benefits of airport sustainability planning, including reduced energy consumption, reduced noise impacts, reduced hazardous and solid waste generation, reduced greenhouse gas emissions, improved water quality, improved community relations, and cost savings.

Currently, no specific sustainability plan has been developed for the Airport. Recommendations for airport sustainability are discussed in **Chapter 4**, *Facility Recommendations.*

Figure 1-1 – Airport Location Map

Figure 1-2 – Airport Vicinity Map

Figure 1-3 – Airport Layout

Figure 1-4 – Building Area

Figure 1-5 – Farmland Classification

Figure 1-6 – Floodplains

Figure 1-7 – National Wetlands Inventory

Figure 1-8 – Land Use Around Airport Property

Figure 1-9 – Future Rural District Fire House

Figure 1-10 – Airport Property Map

Figure 1-11 – Public and Tribal Land

Figure 1-12 – Pete Liens & Sons, Inc. Airport Mining Lease

2.0 Aviation Activity Forecasts

The objective of the activity forecasts chapter is to provide updated forecasts of aviation activity and input for the assessment of the facility requirements and the evaluation of future development alternatives at Hot Springs Municipal Airport (HSR). It also provides information needed to assess the type and timing of new facilities and aid in the evaluation of potential impacts of improvements on the Airport and its surroundings.

The forecasts are for a 20-year planning period, and comprise of short-term (5 year), mid-term (10 year), and long-term (20 year) increments. The forecasts are broken down into annual aircraft operations, itinerant and local operations, aircraft fleet mix, based aircraft, and identification of the most demanding (critical) aircraft. The forecast of aviation activity includes an analysis of existing national and state general aviation activity forecasts, the development of an airport service area, a tabulation of the Airport User Survey data, and the determination of current aviation activity at HSR. Using the estimation of current airport activity and reasonable forecasting methodologies, future projections are made based upon established growth rates, area demographics, industry trends, and consultant experience.

While forecasting is important to determine demand, it is only an estimate of possible future activity. There are various unforeseen factors that can affect the forecast, positively and negatively. Therefore, activity forecasts should be revisited periodically.

2.1 Forecasting Aviation Metrics

The forecasting metrics used for a general aviation airport consists of the number of based aircraft and aircraft operations. The baseline year used for forecasting both based aircraft and aircraft operations is 2014. The forecasts will be produced for a 20-year period, 2015 to 2035.

2.1.1 Based Aircraft

Based aircraft are aircraft that reside at an airport. Based aircraft forecasts assist in identifying the amount and type of hangars and aircraft parking apron space needed at an airport. **Table 2-1** shows the based aircraft at HSR per the various sources.

The Federal Aviation Administration (FAA) requires non-Primary National Plan of Integrated Airport Systems (NPIAS) airports, such as HSR, to enter the aircraft that are based at their facilities into the National Based Aircraft Inventory website (www.basedaircraft.com). As a result, the FAA requires the National Based Aircraft Inventory website to be used as the official list for based aircraft for Master Planning purposes. It is important to note that the National Based Aircraft Inventory does not include gliders or ultra-lights in its total validated based aircraft count since they do not have engines. Additionally, if the N-number of a specific aircraft has been registered at another airport, an airport cannot claim it as being based until the records are reconciled. Therefore, if an aircraft owner claims to be based at two airports, the aircraft is not counted in the national database at either airport. An attempt was made by HSR to correct this issue. An attempt was made by HSR to correct the National Inventory to match management records. However this was unsuccessful since “remaining” single aircraft is also listed another airport, and as a result cannot be registered as based at HSR. Also, since the National Based Aircraft Inventory does not include gliders or ultra-lights in its total validated based aircraft count. This is why the Airport Management records and the National Based Aircraft Inventory differ. However, the FAA requires the FAA’s National Based Aircraft Inventory to be used a baseline when forecasting based aircraft for master planning purposes.

The 2014 based aircraft used for forecasting utilized the 29 "Validated Aircraft" (28 single-engine, one helicopter) on the FAA's National Based Aircraft Inventory. As of March 31, 2015, there are five single-engine aircraft owners on a waiting list for hangars at HSR. For forecasting purposes, it was assumed hangars to accommodate these aircraft would be constructed by 2020.

Table 2-1
Summary of 2014 Based Aircraft

Source	Based Aircraft				
	Single-Engine	**Multi-Engine**	**Helicopter**	**Glider**	**Total**
Airport Management	29	-	1	5	**35**
Form 5010	27	-	1	3	**31**
FAA Terminal Area Forecasts (TAF)*	-	-	-	-	**19**
SDSASP (2015)**	-	-	-	-	**17**
National Based Aircraft Inventory (Validated Aircraft)	28	-	1	-	**29**

*FAA TAF and SDSASP do not indicate aircraft type, only total based aircraft.

**SDSASP provides forecasts for years 2015, 2020, 2025, 2030

Source: FAA Form 5010 (March 2015), TAF (2014), SDSASP (2015), FAA National Based Aircraft Inventory (BasedAIrcraft.com, March 2015), and Airport Management.

The largest operator at HSR is the Black Hills Soaring Club, a private glider club. One of the purposes of the aircraft forecasts is to assist in identifying the amount and type of hangars and aircraft parking needs. As a result, a separate forecast will be produced for gliders at HSR. This forecasts will used in **Chapter 4**, *Facility Recommendations* to evaluate total hangar and aircraft parking demands at HSR. Per Airport Management records, there are five gliders currently based at HSR. Five gliders will be used as the baseline for 2014.

2.1.2 Aircraft Operations

An aircraft operation is a takeoff or a landing at an airport. Thus, an airplane flying to an airport performs one operation when landing and another operation when departing. Aircraft operation forecasts are the most important activity metric for airfield planning because they help determine the level, capacity, and type of aviation activity for an airport to aid in the development of appropriate airport facilities to accommodate this level of activity.

Since HSR is a non-controlled airport, meaning that it does not have a traffic control tower, it is more difficult to obtain the exact number of operations that occur. Estimates are based on reviewing a number of sources including the Airport User Surveys and existing forecasts prepared by State and Federal agencies. **Table 2-2** shows the annual aircraft operations at HSR in 2014 per various sources. Airport management indicated that a total operations count of 6,820 accurately reflects the activity levels at HSR. A baseline of 6,820 aircraft operations will be used for the forecasting scenarios.

Table 2-2
Summary of 2014 Aircraft Operations

Source	2014 Aircraft Operations
Form 5010	6,820
FAA Terminal Area Forecasts (TAF)	6,820
SDSASP (2015)*	8,688

Notes: SDDOT Aeronautics does not collect aircraft operations data. Airport management does not track or maintain historic records of aircraft operations.

*SDSASP provides forecasts for years 2015, 2020, 2025, 2030

Source: FAA Form 5010 (March 2015), TAF (2014), , SDSASP (2012)

2.2 Airport User Survey

To help determine actual activity levels at HSR (**Section 1.11**), the Pilot User Survey asked users to estimate the number of operations they complete at HSR per year. From the nine based aircraft users who responded to this section of the survey, it is estimated that based aircraft operators average 120 annual operations per based aircraft. Additionally, from 10 transient users who responded, the estimated transient operations is approximately 270 annual operations, or an average of 27 operations per transient aircraft.

Additionally, 25% of respondents (6 of 24) indicated they project an increase in activity, 71% (17 of 24) project the same level of activity, and 4% (1 of 24) project a decrease in activity at HSR in the future. This information will be taken into account when forecasting operations at HSR.

2.3 Demographic and Economic Factors

Demographic and economic factors, such as population, disposable income, and geographic attributes, have an effect on aviation demand. Aviation demand is largely a function of demographic and economic activity. Socioeconomic data was considered in the preparation of the aviation activity forecasts. For this Master Plan, data was collected from Woods & Poole Economics. Woods & Poole is an independent firm that specializes in long-term economic and demographic projections through 2050 for every county in the United States, using more than 900 variables.

Table 2-3 shows Woods & Poole's projected growth (or decline) of South Dakota's and Fall River County's demographic and economic activity. Woods & Poole forecasts an increase in population, employment, and income for South Dakota and Fall River County, with Fall River County growing at a slower rate than the State of South Dakota as a whole. The slow growth in population for Hot Springs is due to the limited housing available. Once the City is able to provide enough housing to meet demand, the population is expected to grow faster than Woods & Poole's projections.

Table 2-3
Woods & Poole Demographic and Economic Forecasts

Year	South Dakota			Fall River County		
	Population (in 1,000s)	Employment (in 1,000s)	Income (in millions of 2009 dollars)	Population (in 1,000s)	Employment (in 1,000s)	Income (in millions of 2009 dollars)
2015	858.08	595.03	37,905.63	6.84	3.64	273.53
2020	895.31	642.19	42,491.23	6.86	3.79	295.89
2025	933.82	688.87	47,541.42	6.87	3.91	319.65
2030	972.64	733.76	52,669.05	6.87	4.01	340.76
2035	1,009.51	776.49	57,626.30	6.84	4.08	356.54
CAGR	0.8159%	1.3398%	2.1165%	0.0015%	0.5644%	1.3340%

Source: Woods & Poole Economics 2015

2.4 Airport Service Area

In determining the airport's general aviation service area, it is assumed that airport users choose to base their aircraft or use airports that are closest to their residence or business and provides the level of services required by their particular needs. An additional determining factor in this decision is the length of paved runway that is required by the type of aircraft being operated.

Current FAA planning guidelines for selecting an airport site indicate that a National Plan of Integrated Airport Systems (NPIAS) airport should be located 30 minutes or more average ground travel time from the nearest existing or proposed NPIAS airport. This is a valid assumption since the main advantage of flying is in the savings in long distance travel time. Service area boundaries for the Airport were constructed for two separate cases, 30-minute drive time service area and 60-minute drive time service area.

Both of the drive time service areas for the Airport were determined by travel along established thoroughfares. In this case, travel was assumed along the most direct route and at published speed limits. The drive time service areas are shown on **Figure 2-1**. There are no other public airports within the 30-minute drive time of HSR. There are three airports located within the 60-minute drive time of HSR: Edgemont Municipal (6V0), Custer County (CUT), and Custer State Park (3V0).

2.5 FAA Aerospace Forecast Fiscal Years 2015-2035

The FAA prepares *The FAA Aerospace Forecasts*, a national aviation forecast, annually. This forecast attempts to project commercial and general aviation activity levels in order for the FAA to determine the funding needs for various sections of the FAA, such as Air Traffic Control and Airspace. The current forecast document is for fiscal years 2015-2035.

The national active general fleet is projected to grow annually by an average of 0.4% by 2035, and the number of general aviation hours flown is projected to increase by 1.4% annually. The more expensive and sophisticated turbine-power aircraft are projected to grow by an average of 2.4% annually, with the turbine jet share growing at 2.8% per year by 2035. Conversely, the active piston-powered aircraft (including rotorcraft) is projected to decrease at an average annual rate of 0.5% by 2035; with single-engine fixed-wing piston aircraft projected to decline by an average of 0.6% per year, while the multi-engine fixed wing piston aircraft are forecasted to decline at a slower rate of 0.4% annually. Lastly, the number of

active general aviation pilots (excluding air transport pilots) is projected to increase by 0.1% annually by 2035.[10]

2.6 FAA Terminal Area Forecast

Annually, the FAA publishes the *FAA Terminal Aerospace Forecasts* (TAF). The TAF includes past data as well as forecasts of based aircraft and operations for all airports in the NPIAS. The FAA normally uses a conservative approach when forecasting general aviation airports similar to HSR, especially when no site-specific data is available. **Table 2-4** shows the TAF's forecasted number of based aircraft and aircraft operations for HSR. The FAA forecasts no growth in the number of based aircraft or for aircraft operations for HSR within the 20-year planning period (2015-2035).

Table 2-4
FAA TAF for HSR

	2015	2020	2025	2030	2035
Airport Operations					
Itinerant Operations					
Air Taxi & Commuter	0	0	0	0	0
GA	1,200	1,200	1,200	1,200	1,200
Military	120	120	120	120	120
Total Itinerant	1,320	1,320	1,320	1,320	1,320
Local Operations					
GA	5,500	5,500	5,500	5,500	5,500
Military	0	0	0	0	0
Total Local	5,500	5,500	5,500	5,500	5,500
TOTAL Operations	**6,820**	**6,820**	**6,820**	**6,820**	**6,820**
Based Aircraft					
TOTAL Based Aircraft	**19**	**19**	**19**	**19**	**19**

Source: FAA Terminal Area Forecast (TAF) for Hot Springs Municipal Airport.

2.7 South Dakota State Aviation System Plan (SDSASP)

The South Dakota State Aviation System Plan (SDSASP), as previously discussed in **Section 1.6.2**, provides a description and assessment of the performance of the current South Dakota State Aviation System, which consists of the 72 public use airports, as well as guidance for the future development of aviation in South Dakota. As part of the SDSASP, aviation activity forecasts prepared for HSR estimates that from 2015 to 2030 aircraft operations will grow at a Compound Annual Growth Rate (CAGR) of 0.48%, and based aircraft will grow by 1.09% annually as shown in **Table 2-5**.

Table 2-5
SDSASP Forecast for HSR

	2015	2020	2025	2030	CAGR
Total Annual Operations	8,688	8,900	9,117	9,339	0.48%
Total Based Aircraft	17	18	19	20	1.09%

Source: SDSASP for Hot Springs Municipal Airport.

[10] FAA Aerospace Forecasts Fiscal Year 2015-2035.
http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2014-2035/media/2015_National_Forecast_Report.pdf

2.8 Forecasting Methodologies

Three different methodologies were used when developing forecasts: regression analysis, FAA's forecasted CAGR (0.0%) for HSR, and the SDSASP's general aviation forecasted growth rates. Short-term (5 year), mid-term (10 year), and long-term (20 year) forecasts were developed with each methodology used. The different methodologies are described below.

It is anticipated the Airport can expand its facilities as needed to meet demand. As a result, all forecasting scenarios used are unconstrained forecasting. Meaning the forecasts assume that all airport facilities can be in place to meet demand as the demand warrants. For example, enough hangar space is provided at the Airport to meet based aircraft demand.

2.8.1 Regression Analysis

Regression analysis is a statistical technique that ties aviation activity (dependent variable) to socioeconomic metrics (independent variables), such as income and population. The independent variable in essence "explains" the projected aviation activity levels. Regression analyses should use simple models utilizing independent variables for which reliable forecasts are available. For these aviation activity models, the regression analyses used socioeconomic data collected from Woods & Poole. The analysis used the forecasted growth rates for Fall River County's for population, employment, total earnings, personal income, and retail sales.

2.8.2 FAA TAF

This forecast analysis applies the FAA's TAF for HSR forecasted annual growth rate of 0.0% to aircraft operations and 0% to based aircraft using the baselines established as discussed in **Section 2.6**.

2.8.3 SDSASP Forecasts

This forecast analysis applies the SDSASP's general aviation forecasted growth rates to the estimated aircraft operations and based aircraft baselines. As discussed in **Section 2.7**, the SDSASP estimates a CAGR of 0.48% for aircraft operations and 1.09% for based aircraft at HSR.

2.9 Based Aircraft Forecast

The based aircraft forecast is used to determine aircraft storage needs, hangars and apron space. Using the baseline of 29 based aircraft from the National Based Aircraft Inventory[11] (as previously discussed in **Section 2.1.1**), **Table 2-6** shows the forecasts prepared for this analysis. The forecasting scenarios range is 29 to 44 based aircraft within the 20-year planning period. This represents a range in CAGR of 0.00% to 1.33%. Based on the data available, these forecasts represent the most realistic upper and lower limits of what may occur at HSR within the planning period.

As of March 31, 2015, there are five single-engine aircraft owners on a waiting list for hangars at HSR. It was assumed in the various forecasting methods that these aircraft would construct hangars by 2020. After 2020, the listed CAGR for each forecasting methodology was used.

The highest based aircraft forecast (Income regression analysis), with 44 based aircraft and a CAGR of 1.33% in 20-year forecast, will be used for planning purposes. This is a realistic forecast estimate of the based aircraft as it reflects the high hangar demand as indicated in

[11] BasedAircraft.com. Dated March 5, 2015.

the data and comments gathered from the User Surveys (see **Sections 1.11.1.3** and **2.2**), as well as the hangar waiting list. Also, discussion with Airport Management indicated the higher growth rate better reflects the recent demand for based aircraft parking and storage needs at the Airport.

Table 2-6
Based Aircraft Forecasts

Year	Regression Analysis					SDSASP Growth	FAA TAF Growth
	Population	Employment	Earnings	Income *(Selected Forecast)*	Retail Sales		
2014 (Base)	29	29	29	29	29	29	29
2015	29	29	29	29	29	29	29
2020*	34	35	36	37	35	36	34
2025	34	37	39	40	36	38	34
2030	34	37	41	42	37	40	34
2035	34	38	43	44	37	42	34
CAGR	0.00%	0.56%	1.17%	1.33%	0.46%	1.09%	0.00%

*Five aircraft are added in 2020 to account for the hangar waiting list.
Source: SEH, Inc.

2.9.2 Based Aircraft Breakout

Table 2-7 shows the aircraft distribution for the planning period (2015-2035). As previously discussed in **Section 2.1.1**, there are 28 single-engine aircraft, one helicopter, and five gliders currently (2014) based at HSR. It is anticipated that total based aircraft will grow at the rate of 1.33% (Income regression analysis), as previously discussed. The FAA national growth rate for each aircraft type (as discussed in **Section 2.5**) was used for forecasting the composition of the total based aircraft based. The total based aircraft are expected to grow to a total of 41 single-engine aircraft, one multi-engine aircraft, and two helicopters by 2035.

Table 2-7
HSR Based Aircraft Forecast Summary

Based Aircraft	2014	2015	2020*	2025	2035
Single-Engine	28	28	36	38	41
Multi-Engine	0	0	0	1	1
Jet/Turbo Prop	0	0	0	0	0
Helicopter	1	1	1	1	2
Total	**29**	**29**	**37**	**40**	**44**

*Five single-engine aircraft are added in 2020 to account for the hangar waiting list.
Source: SEH, Inc.

2.9.3 Glider Forecast

As previously discussed in **Section 2.1.1**, the largest operator at HSR is a private glider club, the Black Hills Soaring Club. The National Based Aircraft Inventory does not include gliders or ultra-lights in its total validated based aircraft count since they do not have engines. However, due to the heavy activity of gliders at HSR a separate based glider forecast was produced. Using a baseline (2014) of five gliders, **Table 2-8** shows the forecasts prepared for this analysis. Using the same methodologies as the based aircraft forecast, the forecasting scenarios for gliders range from five (CAGR 0.00%) to seven (CAGR 1.33%) in the forecasting period. These forecasts represent the most realistic upper and lower limits of what may occur at HSR within the planning period. The highest glider forecast (Income regression analysis), with seven gliders and a CAGR of 1.33% in 20-year forecast, will be

used for planning purposes. This forecast estimate reflects the heavy glider activity at HSR. Moreover, discussions with Airport Management indicated the higher growth rate better reflects the growth of the Black Hills Soaring Club in recent years.

Table 2-8
Glider Aircraft Forecasts

Year	Regression Analysis					SDSASP Growth	FAA TAF Growth
	Population	Employment	Earnings	Income *(Selected Forecast)*	Retail Sales		
2014 (Base)	5	5	5	5	5	5	5
2015	5	5	5	5	5	5	5
2020	5	5	5	5	5	5	5
2025	5	5	6	6	5	6	5
2030	5	6	6	6	5	6	5
2035	5	6	6	7	6	6	5
CAGR	0.00%	0.56%	1.17%	1.33%	0.46%	1.03%	0.00%

Source: SEH, Inc.

2.10 Aircraft Operations Forecast

The Airport Master Record (Form 5010) and FAA TAF indicate that 6,820 operations occurred at HSR in 2014. Airport management concurs with the 6,820 annual operations as indicated in Form 5010 and the FAA TAF, and was used as the 2014 baseline for aircraft operations. **Table 2-9** shows the operations forecasts prepared for this analysis. The forecasting scenarios described in **Section 2.8** range from 6,820 to 9,028 total operations in the 20-year planning period, with a CAGR range of 0.0% to 1.33%.

Table 2-9
Aircraft Operations Forecasts

Year	Regression Analysis					SDSASP Growth	FAA TAF Growth
	Population	Employment (Selected Forecast)	Earnings	Income	Retail Sales		
2014 (Base)	6,820	6,820	6,820	6,820	6,820	6,820	6,820
2015	6,821	6,877	6,912	6,926	6,876	6,853	6,820
2020	6,840	7,145	7,374	7,492	7,122	7,020	6,820
2025	6,853	7,375	7,838	8,094	7,296	7,191	6,820
2030	6,852	7,560	8,288	8,629	7,427	7,366	6,820
2035	6,823	7,696	8,715	9,028	7,533	7,546	6,820
CAGR	0.001%	0.56%	1.17%	1.33%	0.46%	0.48%	0.00%

Source: *SEH, Inc.*

These forecasts represent the most probable upper and lower limits of what may realistically occur at HSR within the planning period based on available information on the Airport and local community today. The medium operations forecast (Employment regression analysis), with a CAGR of 0.56% and 7,696 operations in the final forecast year (2035), will be used going forward because it is a conservative estimation of the total operations forecast. This forecast is the most realistic given the information available, and represents the most plausible expectation of future activity at the Airport. Additionally, since the primary users are

residents of the Hot Springs area, employment growth in Falls River County correlates well to the growth in aircraft operations since the majority of the operations are local (discussed further in **Section 2.10.2**). Furthermore, the population regression analysis was not chosen as it does not accurately reflect the high demand for housing in Hot Springs. Once the City is able to provide enough housing to meet demand, the population is expected to grow faster than Woods & Poole's projections.

2.10.2 Local and Itinerant Operations Forecast

Local operations are operations to and from an airport that operate in the local traffic patterns or within sight of an airport. Itinerant operations, also known as transient operations, are take-offs and landings from aircraft traveling to or from other airports. The majority of operations at HSR are made up of local operations. After discussion with Airport Management about the characteristics of HSR users and review of the operations numbers indicated in the User Surveys, a ratio of 20% itinerant and 80% local traffic was used for this forecast, and is shown in **Table 2-10**.

Table 2-10
Forecasted Local and Itinerant Operations Forecast

Year	Itinerant (20%)	Local (80%)	Total
2014 (Base)	1,364	5,456	6,820
2015	1,375	5,501	6,877
2020	1,429	5,716	7,145
2025	1,475	5,900	7,375
2030	1,512	6,048	7,560
2035	1,534	6,157	7,696

Source: SEH, Inc.; Airport Management

2.10.3 Aircraft Seasonal Use Determination

A seasonal fluctuation in aircraft operations is expected at any airport. This fluctuation is most pronounced in regions where severe winter weather patterns exist in combination with non-towered air traffic control. **Table 2-11** provides monthly seasonal use trends for airports similar HSR. These seasonal trends will be used for forecasting purposes.

Table 2-11
Seasonal Use

Month	Percentage Usage
January	3.5%
February	4.0%
March	4.8%
April	7.5%
May	11.3%
June	13.5%
July	14.8%
August	13.0%
September	10.0%
October	8.0%
November	5.8%
December	3.8%

Source: SEH Planning Studies

2.11 Determination of Critical Aircraft

The FAA classifies airports by the type of aircraft traffic they experience, this classification is known as the Runway Design Code (RDC). This classification is based on two components: approach speed and wingspan or tail height of the aircraft. The Aircraft Approach Category, approach speed, is an alphabetical classification, denoted with letters A through E (A being the slowest and E being the fastest). While the Airport Design Group (ADG), wingspan or tail height, is a numerical classification, denoted with roman numerals I though VI (I being the smallest and VI being the largest). The RDC classification of a specific airport and its facilities are based on the RDC of its Critical Aircraft. Critical Aircraft is defined as the most demanding airplane, or family of airplanes, that have a minimum of 500 annual operations currently using or forecasted to use an airport. Existing aviation activity at HSR and airport sponsor input was used to determine the distribution of RDC aircraft type.

Because there is no Air Traffic Control Tower (ATCT) at HSR, the exact breakout of operations conducted by each RDC is not known. Information gathered from the User Surveys and discussions with Airport Management indicate that the majority of aviation traffic at HSR is small single-engine aircraft (A/B-I; e.g. Cessna 172) and gliders (A-II). Additionally, Airport Management estimated that approximately 5% of the HSR operations were helicopter traffic, 8% were B-II or larger aircraft traffic, and the remaining traffic were A/B-I or A-II aircraft. Airport Management also indicated that the Air National Guard conducts approximately 350 helicopter operations per year, South Dakota State Veterans Home operates a King Air (B-II) about 40 operations, Life Flight operates Beech Baron & Pilatus PC-12 (B-II) about 50 operations, and a Single Engine Air Tanker (SEAT) (AT-802F; B-II) is based at HSR in the summer months to help combat forest fires. Using this information, the operations forecast by RDC type is shown in **Table 2-12**.

Table 2-12
RDC Forecast (Operations per Year)

RDC (Fleet Mix)	2014 (Base)	2015	2020	2025	2030	2035
A-I/B-I (67%)	4,569	4,608	4,787	4,941	5,065	5,156
A-II (10%)	682	688	715	738	756	770
Subtotal	5,251	5,296	5,502	5,679	5,821	5,926
B-II (17.5%)	1,194	1,203	1,250	1,290	1,323	1,347
>B-II (0.5%)	34	34	36	37	38	38
Subtotal	1,228	1,237	1,286	1,327	1,361	1,385
Helicopter (5%)	341	344	357	369	378	385
Total Operations	**6,820**	**6,877**	**7,145**	**7,375**	**7,560**	**7,696**

Source: SEH; Airport Management

The current and forecasted future critical aircraft using HSR is a B-II single-engine aircraft, as shown in **Table 2-12**. This aircraft can be described as having a wingspan up to but not including 49 feet and an approach speed of 91 knots but not more than 121 knots, and a wingspan greater than 49 feet up to 79 feet. As a result, and for the purposes of this Master Plan, the Critical Aircraft for HSR is King Air 90~~ or Pilatus PC-12~~.

2.12 Factors that May Create Changes in the Forecast

Aviation forecasts attempt to predict the future based on what has happened in the past and known current conditions. Nevertheless, numerous factors, on a local and national scale, can greatly affect the future activity at any airport. The survey data collected was used to develop

realistic first year estimates; however these estimates do not account for those who did not respond to the surveys. Several circumstances could measurably alter the number of forecasted based aircraft, as well as levels and types of aviation activity at the HSR. Some examples are:

- Flight training
- Maintenance and repair facilities
- Pricing of fuel
- Charter operations

2.13 Comparison to Existing FAA TAF

The FAA requires that study-related forecasts be consistent with the TAF or include sufficient documentation to explain the difference**. Table 2-13** summarizes the forecast comparison to the TAF as recommended in Appendix C of the FAA document, *Forecasting Aviation Activity by Airport*. A forecast is considered to be consistent with the FAA TAF if it:

- Differs by less than 10% in the 5-year forecast and 15% in the 10-year forecast, or
- Does not affect the timing or scale of an airport project, or
- Does not affect the role of the Airport as defined in the current version of FAA Order 5090.3, Field Formulation of the National Plan of Integrated Airport Systems

2.13.1 Based Aircraft Forecast

The FAA forecasts show no growth for based aircraft for HSR, with a based aircraft forecast of 19 for the 20-year planning period (CAGR of 0.0%). The chosen based aircraft forecast has 29 aircraft in 2015, which is 10 greater than the TAF, and grows to 44 aircraft in 2035, at a CAGR of 1.33%. The chosen based aircraft forecast differs from the TAF's 5-year forecast by 94.7%, the 10-year forecast by 110.5%, and the 20-year forecast by 131.6%, as shown in **Table 2-13**. ***The difference between the chosen forecast and the FAA TAF is due to the FAA TAF's baseline of only 19 aircraft in 2014 and showing no growth for 20-year planning period.*** The based aircraft forecast does not affect the timing or scale of an airport project, nor does it affect the role of the Airport as defined in FAA Order 5090.3, and therefore is considered consistent with FAA TAF.

2.13.2 Aircraft Operations Forecast

The FAA forecasts show no growth in aircraft operations for HSR, with an operations forecast of 6,820 for the 20-year planning period (CAGR of 0.0%).The selected aircraft operations forecast indicates 7,696 aircraft operations at the end of the planning period. The preferred operations forecast differs from the TAF's 5-year forecast by 4.8%, the 10-year forecast by 8.1%, and the 20-year forecast by 12.8%, as shown in **Table 2-13**. ***This difference is primarily due to the FAA TAF forecasting no growth in operations at HSR.*** The operations forecast is consistent with FAA TAF as it differs by less than 10% in the 5-year forecast and 15% in the 10-year forecast, does not affect the timing or scale of an airport project, and does not affect the role of the Airport as defined in FAA Order 5090.

Table 2-13
FAA Template for Comparing Airport Planning and TAF Forecasts

AIRPORT NAME: Hot Springs Municipal Airport

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Total Operations				
Base yr.	2015	6,877	6,820	0.8%
Base yr. + 5yrs.	2020	7,145	6,820	4.8%
Base yr. + 10yrs.	2025	7,375	6,820	8.1%
Base yr. + 15yrs.	2030	7,560	6,820	10.9%
Base yr. + 20yrs.	2035	7,696	6,820	12.8%
Based Aircraft				
Base yr.	2015	29	19	52.6%
Base yr. + 5yrs.	2020	37	19	94.7%
Base yr. + 10yrs.	2025	40	19	110.5%
Base yr. + 15yrs.	2030	42	19	121.1%
Base yr. + 20yrs.	2035	44	19	131.6%

Source: FAA; SEH; Airport Management; BasedAircraft.com (3/5/15). ***Revised 8/17/15.***

Figure 2-1 – Drive Time Map

3.0 Capacity and Demand

3.1 Estimated Peak Hourly Demand

In order to arrive at a reasonable estimate of the actual demand on the Airport facilities, it is necessary to develop a method to calculate the estimated Maximum Peak Hourly Demand that might be expected to occur.

Using the information calculated in **Chapter 2.0**, a formula was derived which calculates the average daily operations (D) in a given month. The formula is as follows:

D = Average Daily Operations in a given month (M/30)

Where M = Monthly operations (A*T)

A = Total annual operations

T = Monthly percent of use (as discussed in **Table 2-11**)

On average, 90 percent of total daily operations occur between the hours of 7:00 AM and 7:00 PM, and the Maximum Peak Hour activity may be 50% greater than the average hourly operations calculated for this time period. These usage patterns are typical for airports with characteristics similar to Hot Springs Municipal Airport (HSR).

The Estimated Peak Hourly Demand (P) in a given month was determined by compressing 90 percent of the Average Daily Operations (D) into the 12-hour peak use period. This is demonstrated as follows:

P = 1.5(0.90D/12)

Where P = Estimated Peak Hourly Demand in a given month

D = Average Daily Operations in a given month

The calculations were made for each month for 2015 and 2035 operations levels. The totals for these annual operations are listed in **Chapters 2** of this report. The total aircraft operations for 2015 are 6,877 and 7,696 for 2035.

Table 3-1
Total Estimated Hourly Demand/Month

Month	"T" % Use	2015 "A" = 6,877			2035 "A" = 7,696		
		"M"	"D"	"P"	"M"	"D"	"P"
January	3.50%	241	8	0.9	269	9	1.0
February	4.00%	275	9	1.0	308	10	1.2
March	4.80%	330	11	1.2	369	12	1.4
April	7.50%	516	17	1.9	577	19	2.2
May	11.30%	777	26	2.9	870	29	3.3
June	13.50%	928	31	3.5	1039	35	3.9
July	**14.80%**	**1,018**	**34**	**3.8**	**1139**	**38**	**4.3**
August	13.00%	894	30	3.4	1000	33	3.8
September	10.00%	688	23	2.6	770	26	2.9
October	8.00%	550	18	2.1	616	21	2.3
November	5.80%	399	13	1.5	446	15	1.7
December	3.80%	261	9	1.0	292	10	1.1

Source: SEH

As depicted in **Table 3-1**, the Maximum Peak Hourly Demand for operations at the HSR occurs in the month of July, with 3.8 operations in 2015 and 4.3 operations in 2035.

3.2 Theoretical Hourly Capacity

The methodology for computing the relationship between an airport's demand versus its capacity is discussed in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. The method included in Advisory Circular (AC) 150/5060-5 is derived from computer models used by the FAA to analyze airport capacity and reduce delay at larger air carrier facilities.

Moreover, in order to facilitate a comparison, computations were made to approximate the hourly capacity of the Airport in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions. The determinations were made using the assumption recommended in AC 150/5060-5 for the particular airport layout and conditions combined with the forecast operational data generated with this study. For the theoretical airport hourly capacity, it was assumed that less than 2% of the aircraft using HSR have a maximum gross takeoff weight of 12,500 pounds or more, and the peak hour movement consists of 50 percent arrivals and 50 percent departures.

The result of this analysis indicates that, with the two runway configuration, HSR has an airfield theoretical hourly capacity of 98 aircraft in VFR conditions and 59 aircraft in IFR conditions.

3.3 Annual Service Volume

The Annual Service Volume (ASV) is a calculated estimate of an airport's annual capacity in aircraft operations. FAA AC 150/5060-5, *Airport Capacity and Delay* specifies the method used to calculate ASV, and considers the difference in runway use, aircraft mix, and weather conditions, as well as other factors that be encountered over a year's time.

For this analysis, based on the weather data collected from HSR's AWOS (see **Section 1.9.7.3**), it was assumed that weather conditions dictate IFR about 2.9% of the time, and that the Airport is not usable (weather conditions below published minimums) less than 3% of the time. Based upon the assumptions stated above, HSR's ASV is approximately 230,000 annual operations.

3.4 Summary of Airside Demand/Capacity Relationship

The comparison of an airport's demand versus its capacity is critical in determining the need and timing of capacity related improvements. A summary of the airport's demand/capacity relationship is presented in **Table 3-2**.

Table 3-2
Summary of Demand/Capacity Relationship

	2015	2035
Annual Peak Operations	6,877/230,000 = 2.99%	7,696/230,000 = 3.35%
Peak Hour VFR	3.8/98 = 3.88%	4.3/98 = 4.39%
Peak Hour IFR	3.8/59 = 6.44%	4.3/59 = 7.29%

Source: SEH

By comparing the relationship between the airport's theoretical demand and its capacity, the hourly and annual capacities of the runway system at HSR far exceed the operations forecasted for the entire 20 year planning horizon. No airfield improvements are or will be warranted on the basis of capacity.

4.0 Facility Recommendations

This section identifies airfield (airside) and building area (landside) facilities needed to satisfy the 20-year forecast of aviation demand at Hot Springs Municipal Airport (HSR). Airport facilities are developed in accordance with Federal Aviation Administration (FAA) airport design standards and airspace criteria. The following is an outline of facilities documented in this section:

- Runway Design Code
- Runway Length & Width Design Standards
- Instrument Approach Requirements
- Taxiway System
- Airport Visual Aids, Communications, and Weather Reporting
- Building Area Facilities

The basic intention of this study is to develop realistic recommendations for the planning period. The planning period of this study covers calendar years 2015 through 2035. Whether the recommendations for the future development will actually be implemented depends on the actual demand, ability of the Airport to accommodate the development, environmental impacts, and available resources of the local, state, and federal decision-makers to meet that demand. Of significant importance is that this Master Plan considers a future design that represents an aggressive approach to the planning process, addressing the most demanding contingencies that may present themselves during the planning period.

Due to the rapid changes occurring in general aviation industries as well as increased frequency of regulatory changes within the FAA, it is equally important that an ongoing process of evaluation for existing conditions and near-term trends be implemented to assure the validity of the contents and recommendations of this master plan.

4.1 South Dakota State Airport System Plan (SDSASP) Recommendations

As previously discussed in **Section 1.6.2**, the *South Dakota State Aviation System Plan* (SDSASP) classifies HSR as a Medium General Aviation Airport. **Table 4-1** includes the recommendations for a Medium General Aviation Airport. Any recommendations from the SDSASP will be discussed further in the sections that follow.

Table 4-1
SDSASP Medium General Aviation Airport Recommendations

Facility	Facility and Service Targets	HSR Facilities
Primary Runway		
Design Standards	B-II	B-II
Length	Minimum 4,200 Feet	4,506 Feet
Width	Minimum 75 Feet	100 Feet
Pavement	Paved	Paved
PCI	≥70 PCI	PCI of 93
Lighting	MIRLs	MIRLs
Approach	Non-Precision Approach	Non-Precision Approach
Taxiway		
Type	Turnarounds at Runway Ends	Turnarounds at Runway Ends
Lighting	Taxiway Lighting (MITLs)	Reflective Markers
Wind Coverage	Meet FAA 95% Coverage	98.84%
NAVAIDs		
Visual Guidance Slope Indicator	On both Runway Ends (VASI or PAPI)	PAPIs
REILs	REILs on both Runway Ends	*None*
Rotating Beacon	Rotating Beacon	Rotating Beacon
Lighted Wind Cones	Lighted Wind Cones	Lighted Wind Cone
Weather Reporting Equipment	Yes	Super AWOS
Radio Control Outlet (RCO)	Not a Target	GCO in RAP
Terminal/Administration Building	Yes	A/D Building
Ground Transportation	Courtesy Car/Rental Car Agreement Available	Courtesy Car
Food & Beverage Availability	Vending	Vending Machines
Internet Access	Yes	Dedicated Computer
Pilot Area	Yes	Pilot Lounge
Restrooms	For Public Use	Restrooms for Public Use
Paved Entry/Terminal Parking	Recommended	Paved Entry, Gravel Parking
Fuel	24-hour 100LL	24-hour 100LL
Aircraft Maintenance/Repair	Recommended, Minimum of On-Call Basis	*None*
Aircraft Charter	Available	*None*
Rental Aircraft	Available	*None*
Flight Training	Available	*None*
Aircraft Storage		
Covered Aircraft Storage	100% of Based Aircraft	Box Hangars & T-Hangars
Overnight Storage for Business Aircraft	Typical average aircraft/business user demand	3 Aircraft
Aircraft Apron Area	100% of average daily transients	14,000 SQYD
Planning Documents		
Land Use	Local Compliance Plans with Land Use	*None*
Height Zoning	Yes	*In Progress*
Emergency Plans	Yes	*None*
Security Plan	Yes	*None*
Minimum FBO Standards	Yes	*None*
Current ALP	<10 Years Old	2003 – *Currently Updating*

Source*: South Dakota State Aviation System Plan, 2010*

4.2 Airside Facility Recommendations

4.2.1 Runway Design Code (RDC)

As discussed in **Section 1.8** and **Section 2.11**, the FAA classifies airports and each runway facility by the Runway Design Code (RDC) of its Critical Aircraft. The Critical Aircraft for HSR has been identified in **Chapter 2** as King Air 90, with RDC of B-II, for the current and the ultimate (20-year) forecast. All facility recommendations going forward for Runway 1/19 are designed to handle a King Air, small aircraft weighing up to 12,500 pounds, with design standards that meet RDC B-II standards. The crosswind runway, Runway 6/24, is designed to accommodate small A/B-I aircraft. All facility recommendations for Runway 6/24 are designed to meet RDC A/B-I standards.

4.2.2 Runway Designations

Aircraft compasses and runway identifiers utilize magnetic north for directional guidance. For this reason, it is important to evaluate an airport's runway number designations every few years to ensure that the numbers painted on the runway truly represent the magnetic heading of the runway. The magnetic forces across the planet are constantly shifting, and therefore a declination must be applied to a compass to arrive at a true north heading. The current declination is used for the runway designation calculations. According to the National Geophysical Data Center, as of March 26, 2015, the current declination for Hot Springs is 7.88° east and is changing by 0.10° west per year[12].

4.2.2.1 Runway 1/19 Designation

The current true bearing for Runway 1/19 is North 28°39'6.124" West. Applying the declination of 7.88° east to the true bearing results in a magnetic heading of 20°46'18.124" for Runway 1 and 208°39'49.645" for Runway 19. This means that the runway designations should to be updated to Runway 2 and Runway 20 to reflect the current magnetic headings of the runways. ~~***It is recommended that Runway 1/19 be updated to Runway 2/20 as well as all corresponding airport markings, signage, and documentation.***~~ FAA Flight Standards will determine the appropriate time to make this change (i.e. update instrument approach procedures, airport facility directory, etc.), and will coordinate the change with the Airport. *For consistency purposes the runway will continue to be referred to as Runway 1/19 through the remainder of the Master Plan.*

4.2.2.2 Runway 6/24 Designation

The current true bearing for Runway 6/24 is South 28°39'6.124" East. Applying the declination of 7.88° east to the true bearing results in a magnetic heading of 70°10'32.408" for Runway 6 and 250°10'32.408" for Runway 24. This means that the runway designations should to be updated to Runway 7 and Runway 25 to reflect the current magnetic headings of the runways. ~~***It is recommended that Runway 6/24 be updated to Runway 7/25 as well as all corresponding airport markings, signage, and documentation.***~~ Again, FAA Flight Standards will determine the appropriate time to make this change (i.e. update instrument approach procedures, airport facility directory, etc.), and will coordinate the timing of this change with the Airport. *For consistency purposes the runway will continue to be referred to as Runway 6/24 through the remainder of the Master Plan.*

[12] http://www.ngdc.noaa.gov/geomag-web/#declination

4.2.3 Runway Pavement

4.2.3.1 Runway Pavement Condition

Runway 1/19 is constructed of asphalt pavement. SDSASP facility target for a Medium General Aviation Airport is the primary runway be paved. ***No additional improvements are recommended.***

The most current pavement ratings were taken from the 2010 SDDOT Airport Pavement Management Study. The 2010 Pavement Study found that Runway 1/19 has a pavement condition index (PCI) of 93, as previously discussed in **Section 1.9.8**. ***Routine maintenance, such as joint and crack sealing, should be performed on a schedule basis to extend the life of the pavement. No other surface improvements to the runway are recommended.***

4.2.3.2 Runway Pavement Strength

Runway 1/19 has a published pavement strength of 12,500 pounds for Single Wheel Gear (SWG) equipped aircraft. HSR's Critical Aircraft of a King Air 90 is a SWG aircraft with a maximum takeoff weight of less than 12,500 pounds. ***Runway 1/19's pavement strength meets the needs of the Critical Aircraft, no additional strengthening is recommended.***

Runway 6/24 is constructed of turf and as a result does not have a published pavement strength. Since Runway 6/24 is designed to handle small A/B-I aircraft weighing less than 12,500 pounds, the runway is not required to be paved. ***Runway 6/24 turf runway meets the design requirements for A/B-I aircraft and no additional surface strengthening is recommended.*** However, the City indicated they would like to plan for an ultimate non-precision approach with 1-mile visibility minimums to Runways 6 and 24 for longer-term planning (discussed further in **Section 4.2.6.2**). With this, Runway 6/24 is also recommended planned to be paved in the ultimate condition. ***As a result, it recommended that the Airport Layout Plan (ALP) show Runway 6/24 be ultimately paved to a width of 60 feet.***

It is important to note that paving the crosswind runway is not recommended for the planning period of this master planning process (beyond 20 years). The City indicated the desire to show Runway 6/24 as paved condition in the ultimate condition on the ALP in order to "save" the airspace around the Airport in the event HSR upgrades the runway in the distant future. Additionally, SDDOT would not currently support paving the crosswind runway at HSR, since, as a Medium General Aviation Airport, meets the SDSASP target of one paved runway.

4.2.4 Runway Length

The purpose of the runway length analysis is to determine if the length of the existing runway is adequate for existing and project aircraft fleet operations at HSR. Runway length is dependent on many factors including: airport elevation, temperature, wind velocity and direction, ambient air temperature, aircraft weight, flap settings, length of haul, runway surface (wet or dry), runway gradient, presence of obstructions, and any imposed noise abatement procedures or other prohibitions. While the FAA does not have standards for runway lengths, FAA Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance to determine the recommended runway length for an airport based on the above factors.

The process to determine recommended runway length begins by determining the landing weight of the Critical Aircraft and the aircraft anticipated to regularly use the Airport within the planning period. For aircraft weighing 60,000 pounds or less, the runway length is determined by family groupings of aircraft having similar performance characteristics (i.e. small and large airplanes). Small airplanes are defined by the FAA as airplanes weighing 12,500 pounds or

less at Maximum Takeoff Weight (MTOW), while large airplanes in this context exceed 12,500 but weigh less than 60,000 pounds. For aircraft weighing more than 60,000 pounds, the required runway length is determined by aircraft specific length requirements.

Table 4-2 shows the computed FAA recommended runway lengths for HSR using the guidance provided in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design.* The runway lengths in AC 150/5325-4B are calculated based on the anticipated types of aircraft using the facility, the Airport elevation, and site meteorological conditions, such as the mean maximum temperature during the hottest month of the year. According to the National Weather Service, the mean maximum temperature of the hottest month in the City of Hot Springs, South Dakota is 89.2°F (31.8°C) and occurs in July (see **Section 1.9.7.1**). The Airport has an elevation of 3,150.3 feet above mean sea level. The existing and anticipated Critical Aircraft for HSR a King Air 90, a RDC B-II aircraft, which is a small airplane weighing less than 12,500 pounds with less than 10 passenger seats.

Table 4-2
FAA Recommended Runway Lengths

Aircraft Type	Runway Length
Small Airplanes with Approach Speeds <30 knots	395’
Small Airplanes with Approach Speeds ≤50 knots	1,052’
Small Airplanes with Approach Speeds >50 knots	
Small Airplanes with <10 Passenger Seats	
95% of these Small Airplanes	**4,550’**
100% of these Small Airplanes	4,900’
Small Airplanes with ≥10 Passenger Seats*	4,900’

Source: AC 150/5325-4B, Runway Length Requirement for Airport Design.
*Figure 2-2 in AC 150/5325-4B, indicates *“Note: For airport elevations above 3,000 feet (915m), use the 100 percent of fleet grouping in Figure 2-1 [Small Airplane with Fewer than 10 Passenger Seats].”*

HSR’s Critical Aircraft places the Airport in the group of Small Airplanes with approach speeds greater than 50 knots. Within this grouping of aircraft, FAA recommends choosing a runway length to accommodate 95% or 100% of Small Airplanes based on the airport’s location and the amount of existing or planned aviation activities. The “95% of Small Airplanes with less than 10 passenger seats” criterion applies to airports that are primarily intended to serve medium size population communities with a diversity of usage. It also applies to those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. The “100% of Small Airplanes with less than 10 passenger seats” criterion applies to an airport that is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. The City of Hot Springs falls within the 95% category, with a recommended runway length of 4,550 feet.

4.2.4.2 Runway 1/19

Runway 1/19’s length of 4,506 feet meets the FAA recommended runway length of 4,550 feet. Additionally, Runway 1/19’s length of 4,506 feet exceeds the SDSASP’s recommended minimums length of 4,200 feet. Based on the FAA’s and SDSASP’s runway length recommendations, ***Runway 1/19’s length of 4,506 feet is adequate to accommodate the***

aircraft fleet currently using and forecasted to use HSR, no runway extension is recommended.

However, the previously approved ALP (2003) shows an ultimate runway length of 4,970 feet for Runway 1/19, with a 464-foot extension to the southwest. Since the completion of the previously approved ALP (2003), U.S. Highway 385 has widened from a two-lane highway to a four-lane divided highway. As a result of this widening, the longest possible extension for Runway 1/19 is 394 feet to the southwest (as public roads are not recommended within a Runway Protection Zones (RPZs), see **Section 4.2.7**), for a total ultimate runway length of 4,900 feet, shown in **Figure 4-1**. While there is currently not enough demand forecasted in 20-year planning period to justify construction of a runway extension, the City would like to continue to plan for this ultimate extension, with a total length of 4,900 feet, for Runway 1/19 for long-term planning. ***As a result, it recommended that the ALP show an ultimate length of 4,900 feet for Runway 1/19.***

Since Runway 1/19's extension is to be shown as an ultimate condition, a Runway Protection Zone (RPZ) Analysis would not be required until such time as the project were being planned for construction.

4.2.4.3 Runway 6/24

With a length of 3,926 feet, Runway 6/24 is designed to accommodate small A/B-I aircraft. Additionally, no respondents to the user survey indicated the need for more length. ***No runway extension is recommended for Runway 6/24.***

4.2.4.4 Draft AC 150/5325-4C, Runway Length Recommendation for Airport Design

In July 2013, the FAA released Draft AC 150/5325-4C, Runway Length Recommendation for Airport Design. The updated Draft Runway Length AC recommends using aircraft manufacturers' manuals to determine basic recommended runway length for large airplanes and light jets, instead of using the runway length curves as shown in AC 150/5325-4B. However, the runway length curves for large airplanes in Draft AC 150/5325-4C does not apply to HSR because of its existing and forecasted Critical Aircraft. It is just important to note that AC 150/5325-4C is currently in draft form, and guidance therein is not being used to base length recommendations until a final version of AC 150/5325-4C is adopted by the FAA. The runway length recommendations made in this Master Plan are based on guidance provided in AC 150/5325-4B.

4.2.5 Runway Width

Runway 1/19 is 100 feet wide, which exceeds the FAA's RDC B-II standards visibility minimums not lower than 1 mile standard of 75 feet and SDSASP's minimum width of 75 feet. ***Runway 1/19's width exceeds the corresponding FAA and SDSASP standards; therefore, no change in runway width is required.*** *When Runway 1/19 is reconstructed in the future, the Airport will need to evaluate the cost-benefit of reconstructing the runway to the existing 100-feet versus reducing the runway's width to the current FAA standard of 75 feet.*

Runway 6/24 is 235 feet wide, exceeding RDC A/B-I Small Aircraft standards of 60 feet for paved runway. However, turf runways are typically graded and markers are set to the width of the Runway Safety Area (240 feet for Runway 6/24). ***Runway 6/24's width exceeds the corresponding FAA standards; therefore, no change in runway width is required.*** However, as discussed in **Section 4.2.3.2**, the City indicated they would like to plan for an ultimate non-precision approach with 1 mile visibility minimums to Runways 6 and 24 for longer-term planning. ***With this, it is recommended that the ALP show Runway 6/24 be***

paved to a width of 60 feet in the ultimate condition. *Again, paving the crosswind runway is not recommended for the planning period of this master planning process (beyond 20 years). The City indicated the desire to show Runway 6/24 as paved condition in the ultimate condition on the ALP in order to "save" the airspace around the Airport in the event HSR upgrades the runway in the distant future. Additionally, SDDOT would not currently support paving the crosswind runway at HSR, since, as a Medium General Aviation Airport, meets the SDSASP target of one paved runway.*

4.2.6 Instrument Approach Procedures

Instrument approach procedures can be broken down into precision instrument or non-precision instrument approaches. Precision instrument approaches are those approaches that provide both vertical and horizontal guidance to the runway. An Instrument Landing System (ILS) is a common example of a precision approach. Most non-precision approaches have only directional guidance to the runway and can include any combination of the following types of approaches: localizer, RNAV/GPS (area navigation/global positioning system), RNAV/RNP (area navigation/required navigation), NDB (non-directional beacon), and VOR/TVOR (VHF Omni-directional range/terminal VHF Omni-directional range). A TACAN-A (tactical area navigation) is a circling approach with distance measuring (DME) information. The TACAN-A is used by military aircraft, although the DME information is available to civilian aircraft. The newest approach published at airports around the country is a Localizer Performance with Vertical Guidance (LPV) approach. An LPV approach is considered a non-precision approach yet it provides both horizontal and vertical guidance to pilots. Most LPV approaches require non-precision design standards at an airport.

The SDSASP recommends that HSR, as a Medium General Aviation Airport, have a non-precision approach on at least one runway end of the primary runway (see **Section 4.1**). HSR has two RNAV/GPS non-precision approaches, one to Runway 1 and the other to Runway 19.

4.2.6.1 Runway 1/19

As previously discussed in **Section 1.9.3** and shown in **Table 4-3**, HSR currently has two non-precision approach procedures. The details of the published approaches are shown in **Table 4-3.** The lowest approach minimums (ceiling and visibility) are to Runways 1 and 19 with a 700-foot ceiling and one mile visibility.

Table 4-3
HSR Instrument Approach Procedures

Runway	Approach	Visibility Minimums	Ceiling Minimums (Above Ground Level – AGL)
1	RNAV(GPS)	1 Mile	690’ (700’)
19	RNAV(GPS)	1 Mile	698’ (700’)
Note: All approaches have a circling option			

Source: U.S. Terminal Procedures, October 16, 2014

The controlling obstruction for Runway 1’s approach are trees south of the Airport within the approach path resulting in a 35 to 1 approach slope. ***To increase the Airport usability during inclement weather conditions, a non-precision LPV approach is recommended for Runway 1.*** Since an LPV approach has a 30 to 1 approach slope, it would not require the removal of the trees south of the Airport.

The controlling obstruction for Runway 19 is the fence located on north edge of the Airport property resulting in a 26 to 1 approach slope. HSR has eight-foot wildlife fencing around the

full perimeter of the Airport. SDDOT requires fencing around the entire airport perimeter. Additionally, the terrain north of the Airport limits Runway 19's ability to obtain lower approach minimums. ***As a result, no additional approach procedures are recommended.***

4.2.6.2 Runway 6/24

Runways 6 and 24 are visual runways, and currently do not have published instrument approaches. Runway 6/24 is designed to accommodate small A/B-I aircraft. Operators of these aircraft are more likely to fly during VFR conditions. No respondents to the user survey included comments indicating a need for approaches to the crosswind runway. ***Therefore, no instrument approaches for Runway 6/24 are recommended in the near-term.***

While there is no demand or user requests for improved approaches to Runway 6/24, the City indicated they would like to plan for an ultimate non-precision approach with 1 mile visibility minimums to Runways 6 and 24 for longer-term planning. With the increase from Visual to Non-Precision approaches, it is recommended that Runway 6/24 planned to be paved in the ultimate condition (previously discussed in **Section 4.2.3**). ***As a result, it recommended that the ALP show Runway 6/24 be ultimately paved with 1-mile non-precision approaches to both runway ends.***

Since Runway 6/24's increased approaches are shown as an ultimate condition, a RPZ Analysis would not be required until such time as the runway is planned to be paved and approaches improved.

4.2.7 Detailed Runway Design Standards

Runway design standards are based on the RDC of a runway. The existing and future RDC of Runway 1/19 is A/B-II Small Aircraft with not lower than 1 mile visibility approach. The existing RDC for Runway 6/24 is A/B-I Small Aircraft with Visual approach, and ultimate RDC for Runway 6/24 is A/B-I Small Aircraft with not lower than 1 mile visibility approach. **Table 4-4** lists the separation standards, safety area, and design criteria that are applicable to Runway 1 and 19's existing and future recommended design standards. This table represents the guidance outlined in AC 150/5300-13A, *Airport Design* and should be used in designing future improvements at the Airport.

Runway Safety Area (RSA) - RSA is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the paved surface.

Runway Object Free Area (ROFA) – ROFA is an area on the ground that is centered on a runway and provides enhanced safety for aircraft operations by clearing the area of above-ground objects. Some objects are acceptable in the ROFA, including objects that need to be located in that area for air navigation or aircraft ground maneuvering purposes and must be frangible, or objects that are less than three inches tall.

Runway Obstacle Free Zone (ROFZ) - ROFZ is a volume of airspace intended to protect aircraft in the early and final stages of flight. It must remain clear of object penetrations, except for frangible NAVAIDs located in the ROFZ because of their function. The OFZ is comprised of, where applicable, the Precision OFZ (POFZ), the Inner-Approach OFZ, and the Inner Transitional OFZ.

Runway Protection Zone (RPZ) – The RPZ is a trapezoidal shaped area off of each runway end designed to enhance the safety and protection of people and property on the ground. It is desirable to clear the entire RPZ of all above-ground objects. Airport service roads that are directly controlled by the Airport operator are permissible within the RPZ; however, new

public roads are not without an RPZ Analysis. In order to ensure that the RPZ is kept clear of incompatible uses, the land included in the RPZ should be controlled by the Airport sponsor.

Table 4-4
Runway Design Standards

	Existing & Future – Runway 1/19	Existing– Runway 6/24	Ultimate– Runway 6/24
Runway Design Code (RDC)	**A/B-II Small Aircraft Not Lower than 1 Mile**	**A/B-I Small Aircraft Visual Turf**	**A/B-I Small Aircraft Not Lower than 1 Mile Paved**
Runway Design			
Runway Width	75 ft	60 ft	60 ft
Shoulder Width	10 ft	10 ft	10 ft
Blast Pad Width	95 ft	80 ft	80 ft
Blast Pad Length	150 ft	60 ft	60 ft
Crosswind Component	13 knots	10.5 knots	10.5 knots
Runway Protection			
Runway Safety Area (RSA)			
Length Beyond Departure End	300 ft	240 ft	240 ft
Length Prior to Threshold	300 ft	240 ft	240 ft
Width	150 ft	120 ft	120 ft
Runway Object Free Area (ROFA)			
Length Beyond Runway End	300 ft	240 ft	240 ft
Length Prior to Threshold	300 ft	240 ft	240 ft
Width	500 ft	240 ft	240 ft
Runway Obstacle Free Zone (ROFZ)			
Length	*Refer to Paragraph 308*		
Width	*Refer to Paragraph 308*		
Approach Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	1,000 ft
Inner Width	250 ft	250 ft	250 ft
Outer Width	450 ft	450 ft	450 ft
Acres	8.035	8.035	8.035
Departure Runway Protection Zone (RPZ)			
Length	1,000 ft	1,000 ft	1,000 ft
Inner Width	250 ft	250 ft	250 ft
Outer Width	450 ft	450 ft	450 ft
Acres	8.035	8.035	8.035
Runway Separation			
Runway Centerline to:			
Holding Position	125 ft	125 ft	125 ft
Parallel Taxiway/lane Centerline	240 ft	150 ft	150 ft
Aircraft Parking Area	250 ft	125 ft	125 ft

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

4.2.8 Runway Orientation / Wind Coverage

A runway's orientation is its alignment in relation to magnetic north. The primary factor when determining runway orientation is the direction of the prevailing winds. Each aircraft has an acceptable crosswind component for takeoff and landing. Generally, the smaller the aircraft,

the more it is affected. Per the FAA AC 150/5300-13A*, Airport Design*, when the current runway system provide less than 95% wind coverage for any aircraft that use the Airport on a regular basis, a crosswind(s) runway should be considered. The 95% coverage is computed on the basis of the crosswind not exceeding 10.5 knots for RDC A-I and B-I; 13 knots for RDC A-II and B-II; 16 knots for RDC A-III, B-III, and C-I through D-III; and 20 knots for RDC A-IV through D-VI. For HSR, the runway configuration need to accommodate at least B-II aircraft, having a crosswind component of 13 knots.

Wind data for this analysis was collected from HSR's Super Automated Weather Observation System (Super AWOS) November 11, 2009 to June 9, 2015.[13] **Table 4-5** shows the current wind coverage at HSR with the current runway configuration. As previously discussed in **Section 1.9.7.3**, HSR's Super AWOS is not certified by the FAA, and is not connected to the National Oceanic and Atmospheric Administration (NOAA)'s Climate Data network[14]. Wind data collected through the NOAA at the actual airport site is the best source of information. However, the closest FAA certified AWOS are at Custer County Airport (CUS) and Rapid City Regional Airport (RAP). Both of these airports are a considerable distance from HSR and are surrounded by substantially different terrain, and their wind data is significantly different from what actually occurs at HSR. As a result, data from HSR's Super AWOS was used for this wind analysis.

Table 4-5
Wind Coverage – Runways 1/19 & 6/24

	Crosswind Component		
	10.5 knots	**13 knots**	**16 knots**
Runway 1/19	93.62%	96.06%	98.42%
Runway 6/24	95.19%	97.82%	99.49%
Combined	98.84%	99.15%	99.88%

Source: Hot Springs Municipal Airport Super AWOS. 11/11/2009 to 6/9/2015. Obtained from Potomac Aviation. https://potomacaviation.com/weather_index.asp?airportid=KHSR

Since HSR is designed as a B-II airport, the crosswind component should not exceed 13 knots. The FAA and SDSASP recommend a minimum of 95% coverage. Primary Runway 1/19 exceeds the 95% coverage for 13 knots (96.06%; B-II aircraft). Additionally, when both the primary and crosswind runways are included in the wind coverage analysis, the combined runways provide 98.84% wind coverage for 10.5 knots (A/B-I) and 99.15% for 13 knots (B-II). ***The runway orientations at HSR exceed the recommended 95% wind coverage, no reconfiguration or additional crosswind runway are recommended based on wind coverage.***

4.2.9 Taxiway System Recommendations

The Airport has one connector taxiway, connecting Runway 1/19 to the apron area, as shown in **Figure 1-3.** The connector taxiway is 50 feet wide. Runway 1/19 has a turnaround at each runway end.

Taxiway systems are designed to provide access to and from the runway(s), apron(s), hangars, and other aviation related areas on an airport. AC 150/5300-13A, *Airport Design*, provides basic taxiway system design principles, which include:

- Whenever possible, taxiways should be designed such that the nose gear steering angle is no more than 50 degrees.

[13] Potomac Aviation. HSR Super AWOS. https://potomacaviation.com/weather_index.asp?airportid=KHSR
[14] NOAA Climate Data Online. http://www.ncdc.noaa.gov/cdo-web/

- Turns should be 90 degrees wherever possible. For intersections, the preferred standard angles are 30, 45, 60, 90, 120, 135, and 150 degrees.
- Taxiway systems should use the "three-node concept." A pilot should have no more than three turn choices at an intersection, ideally, left, right, and straight ahead.
- Minimize runway crossings, and limit the runway crossing to the outer thirds of the runway.
- Avoid wide expanses of pavement. Wide pavements require placement of signs and edge lighting or markers far from the pilot's eye and reduces the conspicuity of visual cues.
- Taxiways should not provide direct access from an apron to a runway in order to reduce opportunity for human error.

4.2.9.1 Taxiway Design

Taxiway system design criteria are based on the airport's Airport Design Group (ADG) and Taxiway Design Group (TDG).

As discussed previously, ADG is determined by wingspan and tail height of the Critical Aircraft and ADG defines the Taxiway Safety Area (TSA), Taxiway Object Free Area (TOFA), and taxiway separation (to runway and parallel taxiway) standards. The taxiway system at HSR should be designed to ADG II standards to meet the demands of its Critical Aircraft, King Air 90. For an ADG II taxiway system, the taxiways' width must be 35 feet, and the pavement type and strength will be similar to the runway, able to handle 12,500 pounds aircraft. The connector taxiway is 50 feet wide. ***When the connector taxiway is reconstructed in the future or new taxiways are constructed, it is recommended that they be constructed to a width of 35 feet to meet ADG II standards.*** If the City desires, it may reconstruct the connector taxiway at the existing width of 50 feet; however, local funds will likely be needed to cover the additional fifteen feet of width as the additional width beyond FAA design standards is typically not ~~be~~ eligible for FAA funding

The TDG is determined by the undercarriage dimensions, overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance, of the most demanding aircraft projected to use the airport. HSR's Critical Aircraft, King Air 90, has a TDG 2. ***It is recommended that any future improvements to the taxiway system should be designed to TDG 2 standards.***

4.2.9.2 Hot Spot

The single taxiway that connects the apron area to Runway 1/19 (see **Figure 1-4**)~~, which~~ is considered a "Hot Spot" at HSR. The FAA defines a "Hot Spot" as a safety related problem area or intersection on an airport that does not meet the basic taxiway system design principles. The FAA recommends that all "Hot Spots" be redesigned to increase pilot situation awareness at an airport. Basic taxiway system design principles state that taxiways should not provide direct access from an apron to a runway in order to reduce opportunity for human error and minimize runway incursions. Alternative solutions to resolve this issue are evaluated in **Chapter 5**, *Alternative Analysis*. ~~This t~~The selected alternative as part of the alternatives analysis ~~and~~ will be incorporated in the partial-parallel taxiway design (see **Section 4.2.9.3**).

4.2.9.3 Parallel Taxiway

Currently, Runway 1/19 does not have a parallel taxiway and only has turnarounds at each runway end. At many smaller airports, back-taxiing is common. Back-taxiing is when a pilot taxis the aircraft from one runway end to the other for takeoff. For safety reasons, runway

occupancy time should be minimized, increasing safety. The SDSASP only recommends a turnaround at each runway end for Medium General Aviation Airports, such as HSR. For a full-length parallel taxiway system to be recommended, the FAA and SDSASP recommend a minimum of 20,000 annual aircraft operations. Although HSR does not meet the 20,000 annual operations threshold, the Airport experiences a mix of aircraft types (small single-engine to jet), the addition of a parallel taxiway would significantly improve safety. ***Due to the activity levels and mix of traffic at HSR, a full-length parallel taxiway for Runway 1/19 is ultimately recommended.*** Currently, HSR is in the design process to build a partial-length parallel taxiway for Runway 1/19, from the main apron to the Runway 19 end. This taxiway is anticipated to be built in 2016, ~~in~~ and is shown in **Figure 4-2**. The final design of the partial parallel taxiway and its connectors will be determined as part of the "Hot Spot" alternative analysis in **Section 5.2**.

Alternative solutions to resolve direct access from apron to taxiway issue are evaluated in **Chapter 5**, *Alternative Analysis*. The selected alternative as part of the alternatives analysis ~~and~~ will be incorporated in the partial-parallel taxiway design.

4.2.10 Airfield Lighting and Airport Visual Aids

Airport visual aids assist pilots in locating and landing at an airport. Runway 1/19 is a non-precision runway and is equipped with Medium Intensity Runway Lights (MIRLs). The SDSASP recommends MIRL lighting for Medium General Aviation Airports. The existing MIRL lighting system is close to 30 years old, consisting of direct bury cable, and is starting to require significant maintenance. The Airport is planning to upgrade Runway 1/19's lighting system by installing all the cable into conduit and more energy efficient fixtures. ***No additional runway lighting improvements are recommended for Runway 1/19.***

Both ends of Runway 1/19 are also equipped with 2-Light Precision Approach Path Indicators (PAPIs)[15].The SDSASP recommends a minimum of PAPIs and Runway End Identifier Lights (REILs) be installed at both ends of the primary runway for Medium General Aviation Airport. REILs consist of a pair of synchronized flashing lights, one on each side of the runway, providing positive identification of the runway end. ***It is recommended that Runway 1 and 19 ends be equipped with REILs to aid the pilot in visual approach guidance to both runway ends.***

Runway 6/24 is a visual runway equipped with runway edge markers (black and white cones). There are not any lights along the turf runway. Currently, this runway is used during day-light hours only. ***Since Runway 6/24 is a visual turf runway, no additional runway lighting is recommended.***

All existing taxiways at HSR are equipped with retro-reflective edge markers. AC 150/5340-30G, *Design and Installation Details for Airport Visual* Aids recommends Medium Intensity Taxiway Lights (MITLs) for taxiways at airports where runway lighting system are installed. MITLs provide increased visibility to taxing aircraft during night time and low visibility weather conditions. Moreover, the SDSASP recommends MITLs for Medium General Aviation Airports. The partial-parallel taxiway expected to be constructed in 2016 is being designed with retro-reflective edge markers. ***It is recommended that all taxiways be ultimately installed with MITLs to increase safety and meet SDSASP recommendations.***

The SDSASP recommends a lighted wind cone and rotating airport beacon at a Medium General Aviation Airport. HSR has a rotating airport beacon, a lighted wind cone, and a segmented circle on the airfield. ***No additional airport visual aids are recommended.***

15 PAPIs provide color-coded descent guidance to a runway.

4.2.11 Pavement Markings and Airfield Signage

Runway 1 and 19 are marked with Non-Precision Runway Markings, which include centerline, threshold, aiming points, and runway designator markings. ***As a Non-Precision Runway, Runway 1/19's runway markings meet FAA design standards, no additional pavement markings are recommended.***

The connector taxiway is marked with yellow centerline striping. The FAA has recently established new marking standards and recommend (not required) that all airports have surface painted runway holding position markings whenever a taxiway intersects a runway, found in AC 150/5340-1K, *Standards for Airport Markings*. Additionally, the new TDG 2 taxiway pavement design standards in AC 15/5300-13A, *Airport Design* decreases the taxiway centerline radius from 75 feet to 60 feet at 90 degree taxiway intersections, but taxiway intersections at angles other than 90 degrees still have a 75 foot taxiway centerline radius. ***It is recommended that the taxiway pavement markings be updated during the next scheduled painting to reflect the new taxiway centerline radius standards for TDG 2 to meet AC 15/5300-13A design standards.***

HSR is equipped with standard airfield signage, which provides essential guidance information that is used to identify items and locations on an airport. HSR is equipped with a wide array of FAA required signage including instruction, location, direction, destination, and information signs, and meet the standards given in AC 150/5340-1J, *Standards for Airport Sign Systems.* ***The airfield signage meets FAA standards and is in excellent condition, no improvements are recommended.***

4.2.12 Super AWOS

As previously discussed in **Section 1.9.7.3**, HSR has a Super Automated Weather Observation System (Super AWOS) located at the Airport. The Super AWOS provides up to date weather observations and generates routine aviation weather reports. The Super AWOS located at HSR is not certified by the FAA, and, as a result, can only be used an "advisory" for pilots using the Airport. ***It is recommended that HSR be equipped with a FAA certified AWOS.*** The future FAA certified AWOS would be located in the same position as the existing Super AWOS.

4.2.13 Airside Facility Requirements and Recommendations – Summary

After taking inventory of the existing facilities at HSR and determining the future needs of the facility, the Master Plan has developed the following airside facility recommendations:

Runway 1/19 (Fut. 2/20):

- Upon notice from the FAA, ~~U~~update Runway 1/19's designation to Runway 2/20 as well as all corresponding airport marking, signage, and navigation documentation (**Section 4.2.2.1** and **4.2.11**).
- Show an ultimate length of 4,900 feet for Runway 1/19 on the ALP (**Section 4.2.4.2**).
- Develop a non-precision LPV approach for Runway 1 (Fut. Runway 2) (**Section 4.2.6.1**).
- Install REILs on both ends of Runway 1/19 (Fut. Runway 2/20) (**Section 4.2.10**).

Runway 6/24 (Fut. 7/25):

- Upon notice from the FAA, update Runway 6/24's designation to Runway 7/25 as well as all corresponding airport marking, signage, and navigation documentation (**Section 4.2.2.2** and **4.2.11**).

- Show Runway 6/24 to be ultimately paved at 60-width with 1-mile non-precision approaches to both runway ends on the ALP for longer-term planning (**Sections 4.2.3, 4.2.5, and 4.2.6.1**).

Taxiway System:

- Reconstruct taxiways to 35 feet to meet ADG II standards as part of future improvements (**Section 4.2.9***).*
- Construct parallel taxiway to Runway 1/19 (fut. Runway 2/20) (**Section 4.2.9***).*
- Update taxiways system to TDG 2 design and marking standards as part of future improvements (**Section 4.2.9** and **4.2.11**).
- Install MITLs on all taxiways (**Section 4.2.10**).

Other:

- Install FAA certified AWOS (**Section 4.2.12**).

4.3 Landside Facility Recommendations

4.3.1 Aircraft Storage and Aircraft Parking Aprons

4.3.1.1 Hangar Storage

HSR currently has four privately owned box hangars, three City owned hangars, and one t-hangar building with six units (privately owned) (see **Figure 1-4**) for a total of approximately 37,600 square feet of hangar space. Moreover, there are nine tiedowns available on the apron for short-term and long-term aircraft parking. There is limited overnight transient aircraft hangar storage available at HSR. Currently all of HSR's 29 aircraft based (28 single-engine and 1 helicopter, see **Section 2.9**) are hangared. Also, per Airport Management, there is an "average" of three business aircraft stored in the large City hangar. Additionally, all five gliders are stored in the City owned, 4,000 square-foot Black Hills Soaring Club hangar. This averages to approximately 1,050 square feet (rounded) of hangar space per based aircraft, and 800 square feet per glider aircraft. As of March 31, 2015, there are five single-engine aircraft owners on a waiting list for hangars at HSR.

SDSASP recommends enough hangar space to accommodate 100% of aircraft based and the "average business aircraft user demand" at an airport. Per Airport Management, there is an "average" of three business aircraft overnight storage. Additionally, there are five single-engine aircraft owners on a waiting list for hangars at HSR. By 2035, it is forecasted that 44 aircraft (41 single-engine aircraft, one multi-engine aircraft, two helicopters, see **Section 2.9**), and seven gliders will be based at HSR. Using the hangar space calculations recommended by the SDSASP and total based aircraft, hangar demand for the 20-year planning period was determined and is shown in **Table 4-6.**

Table 4-6
Hangar Capacity Needs

	Existing	Forecasted			
	2014	2015	2020	2025	2035
Based Aircraft	29	29	37	40	44
Glider Aircraft	5	5	5	6	7
Average Business User Aircraft	3	3	4	4	6
Estimated Hangar Demand (sqft)	**37,600**	**37,600**	**47,050**	**51,000**	**58,100**
Existing Hangar Space (sqft)	37,600	37,600	37,600	37,600	37,600
Surplus/Deficit	**0**	**0**	**-9,450**	**-13,400**	**-20,500**

Source: SEH, Inc.

It is recommend that enough hangar space (box hangars or t-hangars) to accommodate 100% of the forecasted 44 based aircraft, 7 gliders, and the average daily business user be constructed by 2035. Possible hangar development layouts for short-term and long-term are evaluated in **Chapter 5**, *Alternative Analysis*.

The Black Hills Soaring Club is interested in additional hangar space (see **Section 1.10.4**). The Alternative Analysis will include examining the construction of a new hangar or expansion of the existing Glider Club hangar to accommodate the needs of this user.

4.3.1.2 Aircraft Parking Apron and Tiedowns

The apron area is approximately 14,000 square yards with nine aircraft tiedown positions. The SDSASP recommends at least enough tiedown spaces to accommodate all unhangared based aircraft and 100% of daily transient aircraft. Calculations for aircraft tiedown recommendations are shown in **Table 4-7**. Based on these calculations, the existing number of tiedowns are adequate, and ***two additional tiedown spaces (for a total of 11) are recommended by 2035***.

Table 4-7
Transient Aircraft Parking Space Needs

	Existing (2014)	2015	2020	2025	2035
Annual Transient Operations	6,820	6,877	7,145	7,375	7,696
Av. Month Transient Operations	568	573	595	615	641
Av. Day Transient Operations	19	19	20	20	21
Average Day Transient Aircraft	9	10	10	10	11
Recommended Tiedowns	**9**	**10**	**10**	**10**	**11**

Source: SEH, Inc.

4.3.2 Arrival/Departure (A/D) Terminal Building

The existing A/D building built in 1951, is approximately 2,304 square feet, and is located west of the apron (as previously shown in **Figure 1-4**). The A/D building offers restroom facilities, vending machines, and a pilot lounge area. The A/D building also has a dedicated computer with internet access for pilots. The Airport has two courtesy cars available for airport users. Currently, HSR does not have any rental car agreements for the Airport. SDSASP encourages a rental car agreement. ***It is recommended that HSR pursue an agreement with a local rental car company for the Airport.*** The A/D Building is in good condition, and had new carpet and a HVAC system installed in fall of 2014. The A/D Building is in need of new windows. ***No additional improvements are recommended for the A/D Building.***

4.3.3 Aircraft Maintenance/Repair

HSR does not have an FBO on the airfield, nor does the Airport provide any aircraft maintenance type services. The SDSASP states that providing access to aircraft maintenance and repair is an important element in serving the aircraft within South Dakota. As result, the SDSASP recommends that HSR, as a Medium General Aviation Airport, at minimum have aircraft maintenance and repair opportunities (aircraft mechanic) on an on-call basis. Additionally, multiple User Surveys indicated the inability to use HSR since it does not have an aircraft mechanic on the airfield. ***It is recommended that the Airport seek out opportunities with businesses or individuals that may be interested in relocating to HSR or offering aircraft maintenance services at HSR on an on-call basis.***

4.3.4 Aviation Fuel

HSR has a self-service fuel system located west of the apron, as previously shown in **Figure 1-4**. The fueling system consists of one 10,000 gallon aboveground tank, containing AvGas (100LL). The fuel tank was registered with the South Dakota Department of Environmental and Natural Resources in 1999. Automated Fuel Systems Inc. owns the fuel tank, and the fueling operations are managed by HSR Fueling. HSR Fueling is a group of local pilots at HSR. Neither HSR Fueling nor the Airport owns a fuel truck. The SDSASP recommends 24-hour access to AvGas, which is accommodated by the existing self-service fuel system. ***The current fuel system meets demand, no modifications are recommended.*** However, since there are aircraft that use Jet A fuel currently operating at HSR, the City should continue to evaluate the need for a Jet A fuel tank in the future.

As indicated in **Section 1.17.7.4**, the single above ground 10,000 gallon fuel tank at the Airport *does* meet the federal criteria requiring ~~an~~ Spill Prevention, Control, and Countermeasure (SPCC) Plan but no plan has been developed; *the absence of an SPCC Plan is considered noncompliant with 40 CFR Parts 110 and 112*. ***Therefore, it is recommended that an SPCC be developed as soon as possible to address federal requirements for spill prevention, control, and countermeasure of a petroleum product.***

AvGas is the only transportation fuel that still contains lead. Lead is a toxic substance that can be inhaled or absorbed in the blood stream. More than 200,000 piston-engine aircraft operating in the United States rely on AvGas to power their aircraft, and AvGas emissions have become the largest contributor to the low levels of lead emissions produced in this United States. The FAA, Environmental Protection Agency (EPA), and the aviation industry are partnering to remove lead from aviation fuels. The FAA is supporting the research of alternate fuels and is working with the aircraft and engine manufacturers, fuel producers, the EPA, and industry associations to overcome technical and logistical challenges to developing and deploying a new unleaded fuel. Additionally, the FAA is working with EPA to make a smooth transition from leaded to unleaded aviation fuels and to ensure the supply of aviation gasoline is not interrupted so that all aircraft can continue to fly.[16] ***HSR should continue to monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas, such as the 100LL currently sold at HSR.***

4.3.5 Automobile Parking and Access Roads

4.3.5.1 Automobile Parking

HSR has a gravel parking lot with approximately eight automobile parking spaces available (though no spaces are marked), located west of the A/D building. The parking lot is in fair condition and has lighting. SDSASP recommends the parking lot be paved. ***As a result, it is recommended that the parking lot be ultimately paved.***

It is important to note that many of the based aircraft users park their automobiles inside or near their private hangar, and the A/D Building parking lot is used mostly by transient users. Based on existing user trends at HSR, it is estimated that the required number of parking spaces is approximately 25% of based aircraft and 75% of transient users. **Table 4-8** shows the recommended number of parking spaces at HSR for the planning period. The existing number of parking spaces (8) is not adequate for HSR's current demand. ***It is recommend that an additional 19 parking spaces be added (total ~~of 21 spaces) and a total~~ of 27 parking spaces) be available by 2035.*** Possible locations for an automobile parking lot will be evaluated in **Chapter 5**, *Alternative Analysis* as part of hangar development alternative analysis.

[16] Aviation Gasoline. http://www.faa.gov/about/initiatives/avgas/

Table 4-8
Automobile Parking Needs

	2015	2020	2025	2035
Based Aircraft	35	42	26	51
Peak Day Transient Aircraft	17	18	18	19
Recommend Parking Spaces	**21**	**24**	**20**	**27**
Existing Parking Spaces	8	8	8	8
Auto Parking Space Deficit	-13	-16	-12	-19

4.3.5.2 Access Roads

The Airport is located five miles southeast of Hot Springs's downtown district. HSR is surrounded by roads in four directions: to the north is Crosswinds Road; to the east is Angostura Road; to the south is West Oral Road, and to the west is U.S. Highway 385. The primary access to the Airport is via an access road from U.S. Highway 385, on the west side of the airfield. The access roads leading to HSR are sufficient to accommodate daily traffic, even during peak periods. HSR's entrance road is paved. SDSASP recommends paved entrance road to the Airport. ***No additional access road improvements are recommended.***

4.3.6 SRE and Maintenance Equipment

The Airport owns and operates one piece of large equipment for airfield maintenance and snow removal, a 2003 CASE International MXM 120 Tractor and it is in good condition. The Airport also has a sweeper, snow blower, and 10-foot plow attachments for the tractor.

With an average annual snow fall of 34.7 inches (see **Section 1.9.7.2**), according to FAA's SRE and maintenance equipment calculations, using HSR's existing runway and taxiway system, the Airport's minimum recommended equipment is one snow blower, two plows, one sweeper, and one hopper spreader to meet snow removal needs at HSR. Based on the FAA's recommended minimum equipment, ***it is recommended at that HSR acquire a snow plow, as well as a hopper spreader attachment to aid in snow removal operations.***

Table 4-9
SRE and Maintenance Equipment Needs

Type	Existing	Eligible for FAA Funding	Recommendations
Plow	1 Attachment	2	***Acquire Equipment***
Snow Blower	1 Attachment	1	None
Sweeper	1 Attachment	1	None
Hopper Spreader	0	1	***Acquire Attachment***
Front End Loader	0	0	None

4.3.6.2 SRE/Maintenance Equipment Building

The equipment is stored in the 25-foot by 40-foot SRE building located southwest of the apron area (as previously shown in **Figure 1-4**). The SRE Building is in good condition. ***No additional improvements are recommended for the A/D Building.***

4.3.7 Fencing

HSR has eight-foot wildlife fencing around the full perimeter of the Airport. The fence consist of eight feet of woven wire topped with four strands of straight wire. SDSASP recommends that airfield access be controlled through the use of fencing and gates, which should be

appropriately sized based on the individual airport's needs. ***No additional fencing is recommended for HSR.***

4.4 Landside Facility Requirements and Recommendations – Summary

After taking inventory of the existing facilities at HSR and determining the future needs of the facility, the Master Plan has developed the following landside facility recommendations:

- Construct enough additional hangars to accommodate the forecasted 44 based aircraft, seven gliders in 2035, as well as the average demand for transient business users (**Section 4.3.1.1**).
- Install two additional tiedown spaces (total of 11) by 2035 (**Section 4.3.1.2**).
- Seek out opportunities with aircraft maintenance businesses or individuals that may be interested in relocating to HSR or offering services at HSR on an on-call basis (**Section 4.3.3**).
- Develop a SPCC plan for the fueling system as soon as possible to address federal requirements (**Section 4.3.4**).
- Pave and/or add 19 additional parking spaces by 2035 (**Section 4.3.5.1).**
- Acquire a snow plow and a hopper spreader attachment to assist in timely snow removal operations (**Section 4.3.6**).

4.5 Airport Property, Acquisition, and Easements

As discussed in **Section 1.16**, the Airport currently owns 511.2 acres in fee, and an additional 13.5 acres of Clear Zone (avigation) easements (see **Figure 1-10**). For more detailed information, the Exhibit 'A' Property Map of the Airport Layout Plan located in **Appendix C** or see property descriptions in **Appendix D**. The following sections list the possible encroachments to airport property and the recommendations for those encroachments.

A boundary survey was not included in the scope for this project and is typically not an eligible item for federal funding. All parcel lines and airport boundaries shown in **Figure 1-10** are based off of data provided by Fall River County G.I.S., and are in no way depicted as accurate and are shown in an approximate way only. ***It is recommended that the Airport acquire a Boundary Survey in order to determine surveyed property lines. If additional encroachments are found, it is recommended that the Airport facilitates preparing and filing the necessary easement documents for the possible encroachments listed***.

4.5.1 Encroachment Recommendations

Possible encroachments and recommendations identified through records research include:

Unrecorded Lease: Hot Springs Gun Club (Section 1.16.28)
Unrecorded Lease between the City of Hot Springs, and the Hot Springs Gun Club Inc., dated May 01, 1950. This document includes a legal description for the 22.9 acre tract in the northwest corner of the Airport property and provides for the use of the property as a Gun Club, so long as it does not create a hazard for any airplanes or persons using the Hot Springs Airport. ***Since Hot Springs Gun Club is on Airport property and a non-aeronautical use of airport land, it is recommended that HSR seek approval from FAA for a concurrent use.***

Unrecorded Lease: Agricultural Lease (Section 1.16.28)
Unrecorded Lease between the City of Hot Springs and S.E. Wilke, dated July 23, 1956, and subsequent Assignment of Lease to Calvin C. Benne, Jr., dated July 01, 1959. This

document provides the Lessee the benefit of using the Hot Springs Municipal Airport grounds for agricultural use only. ***Currently, there is no apparent agricultural use of this area. If lease no longer needed, it is recommended that executing and recording a Termination of Lease document. If lease is still active, it is recommended that HSR seek approval from FAA for a concurrent use.***

Unrecorded Lease: Frontier Airlines (Section 1.16.28)
Unrecorded Lease between the City of Hot Springs and Frontier Airlines, Inc., dated March 31, 1959. The terms of the lease appear to be for a 3-year period, beginning April 01, 1959 and ending April 01, 1962. ***It is recommended that executing and recording a Termination of Lease document.***

Existing Easements A-1, A-2, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, B-1, B-2, B-3 (Section 1.16)
It is recommended that HSR seek approval from FAA for a concurrent use of easements A-1, A-2, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, B-1, B-2, B-3 since they are a non-aeronautical use on airport property.

Dedication of Right of Way A-3 (Section 1.16.9)
This right of way corridor is currently not improved with any type of roadway, nor does it appear to connect to any existing public right of way. ***Therefore, it is recommended that this right of way be vacated. SEH notes that the parcel(s) that would be served by this right of way is (are) already currently served with an improved roadway known as Crosswinds Drive located across the northerly peninsula of the Airport***.

Angostura Irrigation District, U.S. Bureau of Reclamation (Section 1.16.26)
All of Tract A of the Airport property is recited in the document creating said Angostura Irrigation District. However the Hot Springs Municipal Airport is explicitly recited as being "excluded from the District…" The document is recorded in Book 28 Misc., Page 40 on August 10, 1950. ***Because of the ambiguity of the document, SEH recommends that a title attorney review pertinent documents related to the Angostura Irrigation District, in so far as they may, or may not, affect the Hot Springs Airport.***

Vested Drainage Right Form, U.S. Bureau of Reclamation (Section 1.16.27)
Claim of vested Drainage Rights claims vested drainage rights in favor of the United States within certain property of the Hot Springs Municipal Airport. The document purports to claim that drainage rights have existed since October 25, 1950 and affect the SW ¼ of Section 10 and the SW ¼ of the NE ¼ of Section 10. ***It is recommended that a title attorney review pertinent documents related to the Angostura Irrigation District, in so far as they may, or may not, affect HSR.***

Continental Grain Company Pipeline Easement (Section 1.16.29).
Rights pursuant to Pipeline Easement for the Continental Grain Company. The exact location of said Pipeline Easement is unknown and is therefore not shown on Exhibit A or **Figure 1-10**. The document simply states it shall run from Section 11 to Section 14. No additional legal description was ~~not~~ found in the property search. ***SEH recommends a discussion with the easement beneficiary in order to determine a more accurate location for the Pipeline Easement. If it is determine the easement is on Airport property, it is recommended that HSR seek approval from FAA for a concurrent use of the easement. If it is determined that the easement is no longer in use, it is recommended that HSR vacate the easement.***

Driveway and Power Poles (Section 1.16.29).
In Tract A, the Airport is served by a driveway and power poles from U.S. Highway 18. Although no easement was ~~not~~ found in the property search which describes this specific corridor, it is possible the power poles are allowed under the Electric and Telephone Easements granted in 1940, recorded October 08, 1941 in Book 20, Pages 334 and 335, shown as Item A-1 and A-2 on Exhibit A. ***If it is determined no easement exists for the power poles and would not otherwise be required by the utility authority, it is recommended that executing and recording a Termination of Lease document. If lease is still active, it is recommended that HSR seek approval from FAA for a concurrent use.***

Roadway (Section 1.16.29).
A possible lack of Right of Way may exist in the SE ¼ of the SE ¼ of Section 10 in Tract A. A roadway exists adjacent to the Angostura Main Canal. No documentation was ~~not~~ found in the property search for this roadway. ***If it is determined that the location of this road does not interfere with, or cause a hazard to, the operation of the Airport, it is recommended this roadway acquire an easement for the portion of the access road that crosses through Airport property, if no easement is recorded. It is recommended that HSR seek approval from FAA for a concurrent use of this driveway.***

Crosswinds Road (Section 1.16.29).
It appears that approximately a 400 foot long portion of Crosswinds Road lies outside the dedicated right of way in the SE ¼ of the SE ¼ of Section 3 within Tract B. ***If it is determined that the location of this portion of Crosswind Road does not interfere with, or cause a hazard to, the operation of the Airport, it is recommends that an easement for this portion of Crosswinds Road be acquired, if no easement is recorded. Once granted, vacation of the unused portion of Crosswinds Road as it crosses Tract B, should then be considered.***

Driveway (Section 1.16.29).
It appears that a driveway exists across the northeasterly corner of Tract B. No easement was ~~not~~ found in the property search for this driveway. ***If it is determined that the location of this driveway does not interfere with, or cause a hazard to, the operation of the Airport, it is recommended this driveway acquire an easement for drive, if no easement is recorded.***

4.5.1.1 Pete Lien and Sons Surface Mining Lease Agreement

Hot Springs City Council approved the Pete Lien and Sons Surface Mining Lease Agreement surface mining on Airport property on July 20, 2015. The approximate location of this lease agreement was shown in **Figure 1-12**. The mining lease and final mining plans are still subject to FAA review and approval. Further discussions about land use compatibility and compatibility criteria of mining activities on or near airport are discussed in **Section 4.7.2.1**.

4.5.2 Concurrent Use Agreement

As discussed in the previous section (**Section 4.5.1**), any airport property, when described in a grant or listed in the Exhibit 'A' Property Map, is considered to be "dedicated" or obligated property for airport purposes only and is subject to FAA Grant Assurances. FAA approval is required to release any land from dedicated aeronautical use on airport property. Many of the recommendations above recommend the Airport seek approval from the FAA for a concurrent use. A concurrent land use can be an appropriate compatible land use, to meet Grant Assurance 21, if the aeronautical land is to remain in use for its primary aeronautical purpose but may also be used for a compatible revenue producing non-aeronautical purpose.

Concurrent land use means that the land can be used for more than one purpose at the same time (aeronautical and non-aeronautical). For example, portions of land needed for clear approach surfaces could also be used for agriculture purposes at the same time. Concurrent use requires FAA approval, but no formal release of land is necessary. Any funds received by the airport (e.g. rent) for a concurrent use should be based on fair market rent and are considered airport revenue (Grant Assurance 25).

Any release, modification, reformation or amendment of an airport agreement between the airport owner and the United States must be based on a request made in writing and signed by a duly authorized official of the public agency that owns the airport with full concurrence of the airport owner. Evidence of such authorization must accompany the request. The FAA is not required to grant a land release or approve concurrent use. As described in Chapter 22 of Order 5190.6B, *FAA Airport Compliance Manual*, for a concurrent use request to the FAA, the Airport Sponsor will need:

1. Cover letter explaining why the land was originally purchased (such as protection) and that the proposed use will not interfere with the original "use" of the property, and explain the benefits of the proposed concurrent use;
2. Plat of the lease with a boundary description;
3. Summary Appraisal that includes a statement of fair market rent;
4. Draft copy of the lease agreement;
5. Copy of letter approving airspace study; and
6. National Environmental Policy Act (NEPA) Clearance.

~~4.5.2~~4.5.3 Property Acquisition

It is recommended that HSR ultimately purchase approximately 19.7 acres on the south side of the Airport for the ultimate extension of Runway 1/19, see **Figure 4-1**.

4.6 Airspace and Obstructions

14 Code of Federal Regulations (CFR) Part 77 defines and establishes the standards for determining obstructions to an airport's imaginary surfaces. Imaginary surfaces are geometric shapes that are in relation to the Airport and each runway, as defined in 14 CFR Part 77. The size and dimensions of these imaginary surfaces are based on the category of each runway for existing and planned airport operations. The five imaginary surfaces are the Primary, Approach, Horizontal, Conical, and Transitional. Any object which penetrates these surfaces is considered an obstruction and affects navigable airspace and must be removed.

The size and dimensions of each imaginary surface is based on the category of each runway for existing and planned airport operations. In respect to 14 CFR Part 77, Runway 1 and 19 (future Runway 2 and 20) are "Utility Runways" with non-precision instrument approaches. Runway 6 and 24 (future Runway 7 and 25) are "Utility Runways" with non-precision instrument approaches. The five imaginary surfaces and their dimensional criteria for HSR's ultimate conditions are defined below.

Primary Surface - The Primary Surface is an imaginary obstruction-limiting surface that is specified as a rectangular surface longitudinally centered about a runway. A surface longitudinally centered on a runway.

- As a paved non-precision utility runway, Runway 1/19's Primary Surface extends 200 feet beyond each end of the runway. Runway 1/19's ultimate Primary Surface is 500 feet wide and 5,300 feet long.
- As an ultimate paved non-precision utility runway, Runway 6/24's Primary Surface extends 200 feet beyond each end of the runway. Runway 6/24's ultimate Primary Surface is 500 feet wide and 4,326 feet long.

Approach Surface - The Approach Surface is an imaginary obstruction-limiting surface that is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway.

- As a paved non-precision utility runway, Runway 1 and 19's approach surface expands uniformly to a width of 2,000 feet at a distance of 5,000 feet, with a slope of 20 to 1.
- As an ultimate paved non-precision utility runway, Runway 6 and 24's approach surface expands uniformly to a width of 2,000 feet at a distance of 5,000 feet, with a slope of 20 to 1.

Horizontal Surface - The Horizontal Surface is an imaginary obstruction-limiting surface that is specified as a portion of a horizontal plane surrounding a runway and is located 150 feet above the established airport elevation, 3,149.7 feet. The perimeter of which is constructed by swinging arcs of a specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs.

- The Horizontal Surface has an arc radius of 5,000 feet from the ends of each Primary Surface, at elevation of 3,299.7 feet.

Conical Surface - The Conical Surface is an imaginary obstruction-limiting surface that extends from the edge of the Horizontal Surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Transitional Surface - The Transitional Surface is an imaginary obstruction-limiting surface that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary and approach surfaces up to the Horizontal Surface (3,149.7 feet).

4.6.1 Obstructions

Per 14 CFR Part 77, Obstructions are defined as any object of natural growth, terrain, permanent or temporary construction equipment, or permanent or temporary manmade structure that penetrates an imaginary surface. Prior to any airport development, an Airspace Study must be conducted regardless of project scale to verify that there will be no hazardous effect to air navigation due to construction.

An obstruction survey was completed as part of the Master Plan to determine if there are any obstructions to HSR's existing or ultimate Part 77 Imaginary Surfaces. Per Grant Assurance 20, the Airport must "*take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the Airport […] will be adequately cleared and protected by […] mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards*."

Figure 4-3 shows the obstructions to HSR's existing Part 77 surfaces, and **Table 4-10** lists the obstructions and recommended disposition. The Service Road and a portion of the

perimeter fence on the north side of the Airport obstruct Runway 19's Approach Surface (existing and ultimate). ***It is recommended that a portion of the fence and Service Road be lowered, relocated or mitigated through lighting as to not obstruct Runway 19's Approach Surface.*** For obstructions that indicate "Complete Airspace Study" as the recommended disposition in **Table 4-10**, the Airport should complete and submit an airspace case utilizing the FAA Obstruction Evaluation/Airport Airspace Analysis website (OEAAA.faa.gov) website to determine whether the obstruction is a hazard to air navigation and needs to be mitigated.

Table 4-10
Obstructions Existing Part 77 Surfaces

#	Type	Surface (Penetration)[1]	On or Off Airport	Recommended Disposition
1	Fence	RW 1 Approach (3.9')	On	**Lower or Relocate**
2	Service Road	RW 1 Approach (0.5')	On	**Lower**
3	Dirt Pile	Transitional (-73')	Off	To Remain
4	Tree	Transitional (3')	On	**Remove**
5	Fence	Transitional (3')	On	**Lower or Relocate**
6	W. Oral Road	RW 19 Approach (-10')	Off	To Remain
7	U.S. Highway 385	RW 19 Approach (-53')	Off	To Remain
8	U.S. Highway 385	RW 6 Approach (-19.7')	Off	To Remain
9	Rig/Superstructure	Horizontal (64')	Off	**Complete Airspace Study**
10	Tree	Horizontal (3.8')	Off	**Complete Airspace Study**
11	Tree	Conical (13.9')	Off	**Complete Airspace Study**
12	Cell Tower	Conical (-73.3')	Off	To Remain

[1]A negative penetration is the amount clear of (below) the Part 77 surface indicated.

Figure 4-4 shows the obstructions to HSR's ultimate Part 77 surfaces, and **Table 4-11** lists the obstructions and recommended disposition. Ultimately, when Runway 6 and 24's approaches are improved from Visual to Non-Precision of 1-mile it will increase the size of the Approach Surfaces and, as a result, shift the Conical Surface outwards 200 feet to the west and east. This results in additional obstructions to HSR's ultimate Conical Surface on the west side of the Airport due to the hilly terrain west of the Airport. As indicated in **Table 4-11**, the Airport should complete and submit an airspace case utilizing the FAA Obstruction Evaluation/Airport Airspace Analysis website (OEAAA.faa.gov) website to determine whether the obstruction is a hazard to air navigation and needs to be mitigated for these additional obstructions. In addition, Runway 1/19's ultimate extension 364 feet to the southwest will require the relocation of W. Oral Road because it will obstruct Runway 1 ultimate approach surface and be within the RPZ. Once the W. Oral Road is realigned, no additional obstructions will result due to Runway 1/19's ultimate extension.

Table 4-11
Obstructions Ultimate Part 77 Surfaces

#	Type	Surface (Penetration)[1]	On or Off Airport	Recommended Disposition
1	Fence	RW 1 Approach (3.9')	On	**Lower or Relocate**
2	Service Road	RW 1 Approach (0.4')	On	**Lower**
3	Dirt Pile	Transitional (-73')	Off	To Remain
4	Tree	Transitional (1.5')	On	**Remove**
5	Fence	Transitional (3')	On	**Lower or Relocate**
6	W. Oral Road	Ultimately Relocated	Off	**Ultimately Relocated**
7	U.S. Highway 385	RW 19 Approach (-43')	Off	To Remain

8	U.S. Highway 385	RW 6 Approach (-0.2')	Off	To Remain
9	Rig/Superstructure	Horizontal (62.8')	Off	**Complete Airspace Study**
10	Tree	Horizontal (2.6')	Off	**Complete Airspace Study**
11	Tree	Conical (19.8')	Off	**Complete Airspace Study**
12	Cell Tower	Conical (-73.3')	**Off**	To Remain
13	Tree	Conical (2.4')	**Off**	**Complete Airspace Study**
14	Pole	Conical (65')	**Off**	**Complete Airspace Study**
15	Pole	Conical (24.6')	**Off**	**Complete Airspace Study**

[1]A negative penetration is the amount clear of (below) the Part 77 surface indicated.

4.7 Planning Documents

The SDSASP recommends that Airport Sponsors have planning documentation in place in an effort to strengthen emergency response, security, and the protection of the Airport's existing and future infrastructure. These planning efforts help protect airports from incompatible land uses, and prepare them in the event of an emergency. The SDSASP recommended planning documents are discussed further in the sections that follow. All plans should be tailored to meet the specific needs and individual roles of the Airport.

4.7.1 Current Airport Layout Plan (ALP)

~~NPIAS airports are required to have an Airport Layout Plan (ALP) on file with the FAA. Additionally, i~~It is recommended that airports have a current ALP on file that accurately depicts the most recent development on the airport. The SDSASP recommends that Medium General Airports update their ALP every ten years. HSR's last ALP was completed in 2003. This Master Planning effort includes updating HSR's ALP.

4.7.2 Local Comprehensive/Land Use Plan

When airports, such as HSR, accepts funds (e.g. grants) from the FAA, they must agree to certain Grant Assurances. These assurances require the recipients to maintain and operate their facilities safely and efficiently, and in accordance with specified conditions.[17] Grant Assurances 21, *Compatible Land Use* requires an airport sponsor "*take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the Airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which federal funds have been expended."* Moreover, the SDSASP also recommends that all airports have local comprehensive and land use plans in place.

Ensuring compatible land use on and near airports is an important responsibility to ensure safe operations of the national airport system. It is important to have local comprehensive plans both acknowledge the existence of an airport~~s~~, as well as include provisions to address compatible land use concerns in areas around an airport. By including an airport in local planning efforts it is better protected from the encroachment of incompatible land uses which can hinder aircraft operations and threaten the safety of individuals in proximity, should an incident occur. By working with their local communities, an airport can address land use concerns in the vicinity of an airport (e.g. height, population density, visual obstructions, wildlife attractants, and noise). To implement effective land use planning and control

[17] FAA Airport. Assurances: Airport Sponsors.
http://www.faa.gov/airports/aip/grant_assurances/media/airport-sponsor-assurances-aip.pdf

measures around an airport, it is essential that the Airport Owner, elected officials, land-use planners, and developers understand the components of an effective compatible airport land-use plan. A comprehensive plan will incorporate federal and state airport design criteria, safety of flight requirements, and land use provisions unique to the local community.

Currently, the City of Hot Springs nor the Airport has any land use ordinances in place. ***It is recommended that HSR work with the City of Hot Springs and Fall River County to include the Airport in their comprehensive and land use planning efforts, and to plan for existing and future compatible development on and/or near the Airport.***

4.7.2.1 Surface Mining Lease

On July 20, 2015, Hot Springs City Council approved the Pete Lien and Sons Surface Mining Lease Agreement surface mining on Airport property. The approximate location of this lease agreement was shown in **Figure 1-12**. The mining lease and final mining plans are still subject to FAA review and approval.

Mining, such as oil, gas, or mineral extraction, are compatible with airport activities as long as they follow all FAA guidance and requirements, and are permitted by state agencies and local municipalities. Mining activities on airport property have rapidly grown in recent years. As a result, the FAA is preparing specific guidance on how to handle oil, gas, and mineral extraction on and near federally obligated airports (e.g. NPIAS airports). On September 8, 2014, the FAA published Deliberative Draft Advisory Circular (AC) 150/5100-20, *Guidance on the Extraction of Oil and Gas on Federally Obligated Airports* for public comment. While this AC is still in Draft Form, for the purposes of this Master Plan, it is a good reference for existing FAA guidance and requirements applicable to mining operation on or near airport property. Airport Sponsors are encouraged to coordinate with the local FAA Airports District or Regional offices to ensure the development of acceptable on-airport mining projects.

4.7.2.1.1 *Guidance on the Extraction of Oil and Gas on Federally Obligated Airports*

Draft AC 150/5100-20, *Guidance on the Extraction of Oil and Gas on Federally Obligated Airports*[18] discusses oil and gas development on or near federally obligated airport land, including any drilling that penetrates the property (surface and subsurface). This guidance does not encourage gas and oil leasing on-airport property and does not specifically discuss extraction of water wells, coal, ore, sand, and gravel or other solid minerals. However, the guidance within the AC are applicable to any on-airport or near-airport construction or land use. Also, this AC does not create new requirements, but is a compilation of existing FAA guidance and requirements applicable to airport construction for oil and gas development on airport land. These include, but are not limited to:

- FAA AC 70/7460-1K, Obstruction Marking and Lighting
- FAA AC 150/5070-6 Airport Master Plans
- FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
- FAA AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports
- FAA AC 150/5370-2, Operational Safety on Airports During Construction
- FAA AC 150/5200-36A, Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessment and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports
- FAA Order 1050.1, Environmental Impacts: Policies and Procedures

[18] http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentid/1025487

- FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects
- FAA Order 5190.6, FAA Airport Compliance Manual
- FAA Order 5200.11, FAA Airports (ARP) Safety Management System (SMS)
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters
- FAA's Policy and Procedures Concerning the Use of Airport Revenue (Revenue 28 Use Policy) (64 FR 7696 February 16, 1999)

Any and all mining activities on or near airport land must comply with the Airport Sponsor's federal aid obligations and restrictions. In particular, airport sponsors must ensure that:

- the airport ~~must~~ preserve its rights and powers over the Airport property, and maintain ~~a~~ Good Title at all times;
- the mining activities will not conflict with current or planned aviation uses of the Airport land;
- the infrastructure meets airport design standards, are not obstructions to air navigation as defined in 14 CFR Part 77, do not create wildlife attractants, do not create light or radio signal interference, do not impair visibility or flight conditions and are constructed to ensure safe and continuous public airport operations;
- any on-airport allowable well development and related infrastructure (e.g. roads, fencing) must be shown on the approved ALP;
- the mining activities and infrastructure conform to applicable environmental standards; and
- the revenue generated from leases is collected and spent in accordance with the FAA's Revenue Use Policy and in compliance with Grant Assurances 24 (Fee and Rental Structure) and 25 (Airport Revenues), and applicable law. An acceptable lease must provide the Airport fair market value for the conveyed mineral rights.

In addition, a change in the airport's Airport Layout Plan (ALP), such change from aeronautical use to non-aeronautical (e.g. mining), requires the Airport to submit a proposed amendment, revision, or modification of their ALP for FAA approval. Certain levels of FAA approval of an ALP change require environmental evaluation under the National Environmental Policy 99 Act (NEPA). Before the developer may occupy, construct, or operate on airport land, the Airport Sponsor must request to revise or modify the approved ALP for the proposed development in compliance to FAA requirements and standards. The lease is contingent upon the FAA approval of the ALP. The Draft AC describes a step-by-step process that an airport sponsor should use to assure compliance with FAA requirements and standards when drafting and negotiating a lease or production agreement.

4.7.3 Airport Height Zoning

The SDSASP recommends that all airports have ~~a~~ Height Zoning in place. Height Zoning protects the airspace surrounding an airport from obstructions to the Part 77 Imaginary Surface (see **Section 4.6**) and discourages the development of height-sensitive structures in the vicinity of an airport. HSR currently does not have any Height Zoning in place. ***It is recommended that the Airport should coordinate with the City of Hot Springs and Fall River County community to develop and enact Height Zoning.***

4.7.4 Emergency Response Plan

The SDSASP recommends that all airports have an Emergency Response Plan. Emergency Plans prepare an airport for emergencies that are likely to occur. Emergency response plans often include~~s~~ procedures to respond to various emergency situations, and mutual aid agreements with surrounding community entities. These plans provide procedures for handling situations such as aircraft accidents, fuel spills, fires, and natural disasters. Moreover, the Emergency Response Plan is significantly strengthened by establishing agreements with local police, fire, and medical services to respond to these emergencies. The City of Hot Springs is currently developing an Airport Emergency Plan. ***It is recommended that the City continues to work toward completing the Airport Emergency Plan.***

4.7.5 Security Plan

The SDSASP recommends that all airports have a Security Plan. In general, Security Plans establish procedures and protocol for securing an airport, ~~address passenger and cargo screening requirements,~~ and outline response procedures for bomb threats, crowd control, crime, seizure of aircraft, and escorting of high profile individuals. Security plan should be tailored to meet the individual needs of each airport, based upon their role classification. HSR currently does not have a Security Plan. ***It is recommended that HSR prepare a Security Plan for the Airport.***

4.7.6 Minimum FBO Standards

The SDSASP recommends ~~the~~ Minimum FBO Standards for Medium General Aviation Airports. Minimum FBO Standards provide the minimum requirements to conduct business on an airport. These Standards vary from airport to airport, based on the factors of aeronautical activity, type and level of operations, type and number of based aircraft, and type and level of commercial services provided. Minimum FBO Standards address the minimum range, level, and quality of products and services a~~n~~ FBO offers to the public in a safe, efficient, and professional manner. Even though HSR currently does not have an FBO or Aircraft Mechanic currently operating at the airport, ***it is recommended that the Airport develop Minimum FBO Standards for commercial operators so that they are in place if and when an operator pursues operations in Hot Springs.***

4.8 Wildlife Attractants

As discussed in **Section 1.17.5.1**, the USDA completed a Wildlife Hazard Site Visit (WHSV) in 2014 as part of this Master Plan effort (see **Appendix B**). The survey included daytime and nighttime observations on the Airport and involved observing wildlife on and around the airfield, and also identifying habitat-related wildlife issues on and around the Airport property.

The WHSV recommended that the Airport staff develop and record wildlife events and actions taken in an Airfield Inspection Log. This information gathered and logged can then be utilized to effectively show patterns, movements and species of animals on the airfield and the effectiveness of hazing and other activities. In addition, thorough records also provide a degree of protection to the Airport in the case of litigation related to a damaging wildlife strike.

The WHSV also included several recommendations for reducing wildlife attractants and thus the potential for aircraft wildlife strikes. These recommendations considered methods to reduce deer and mammals as well as waterfowl and other hazardous birds on the Airport, and are listed below. See the WHSV in **Appendix B** for specifics regarding the WHSV recommendations.

WHSV Recommendations:

- Follow the grass habitat management guidelines and work toward establishing a dense grass habitat on the airfield with minimal weeds.
  - Preferred grass management should include: maintaining warm season grasses; a mowing regime that produces a dense cover while minimizing seed production; eliminates non grass species; maintains a grass height between 6 and 12 inches; and discourages ground nesting birds.
- Convert airport cropland to a grass hay or alfalfa crop, and manage as recommended in the section on Agricultural Land.
- Inspect the airfield perimeter fence monthly, or more often as necessary. Repair or attach an apron anywhere that deer could enter.
- Remove all small trees and shrubs from the airfield, inside of the perimeter fence.
- Remove the three large trees identified on airport property.
- Obtain a USFWS Permit to lethally take Geese and Gulls. Permits should be renewed annually.
- Conduct rodent control on the airfield around the segmented circle or wherever infestations are noticed.
- Explore the possibility of modifying the irrigation canal in a manner that eliminates standing water when not in use.

4.9 Sustainability Plan Recommendations for Solid and Hazardous Waste

As indicated in **Section 1.18**, no specific sustainability plan has been developed for the Airport. There can be many benefits of airport sustainability planning, including reduced energy consumption, reduced noise impacts, reduced hazardous and solid waste generation, reduced greenhouse gas emissions, improved water quality, improved community relations, and cost savings. The following discussion focuses on the sustainability recommendations regarding hazardous and solid waste generation.

Under the current facility operations, waste generated in private hangars is looked at as separate from the waste generated in the public-accessed facilities and, as a result, the City has little control over the private hanger waste. Under the recommendations outlined below, that control does not change; however, the proposed programs are meant to educate and promote proper waste management methods for all airport users. It should be noted that given the Airport proximity to the City of Hot Springs, the facility may be eligible for the City-wide curbside pickup of municipal solid waste.

The purpose of the proposed recommendations is to ensure waste generated at the Airport is managed in compliance with environmental regulations and reduce landfill disposal of waste as stipulated under SDCL 34A-6. Given the small amount of waste generated at the facility, the hazardous and solid waste sustainability efforts will probably not represent a cost savings to the City. Because the quantities of saleable materials generated at the Airport is anticipated to be low, it is most cost effective to utilize the convenience of local and regional programs or private businesses to manage recyclable materials. As a result, the hazardous and solid waste sustainability efforts will not generate additional revenue based on recyclable commodities.

4.9.1 Waste Reduction

The South Dakota solid waste management hierarchy (SDCL 34A-6-1.2) generally gives highest preference for waste reduction at the source, followed by recycling and reuse, energy

production, and land disposal. Any efforts to reduce waste generation at a facility not only reduces the volume of waste requiring land disposal, it reduces the overall volume of waste generated to begin with. Waste reduction is generally recognized by packaging reduction, office paper reduction, composting, and material re-use.

Three areas have been identified to establish and meet potential waste reduction goals for the Airport:

1. Promote the use of multiple use beverage containers for water, coffee, etc.

2. Upgrade notifications to airport users from paper to electronic media using electronic mail, website notifications, etc.

3. Utilize the Department of Environmental and Natural Resources (DENR) web resources to identify potential re-use or proper disposal of site materials and equipment. Options should be explored to reduce solid waste generation through logistical changes, purchasing policies, or recycling efforts for any unique waste materials generated routinely or as part of special construction projects.

Once implemented, the programs should be evaluated annually to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

4.9.2 Waste Education

Waste education can be the most important way to encourage proper management of hazardous and solid waste. The EPA and DENR websites as well as the City of Rapid City have resources available to residents and businesses to help with waste education through brochures and web-based programs. People who are aware of the impacts that waste can have on the environment are more likely to seek out and use waste abatement programs.

Three areas have been identified to establish and meet potential waste education goals for the Airport:

1. Obtain and display for airport users published brochures from the EPA, DENR, or the City of Rapid City to promote proper waste management activities. Particular efforts should be made in the proper management of maintenance waste including antifreeze, tires, vehicle batteries, oil filters, and used oil.

2. Establish site-specific airport waste abatement goals and prepare signage or notifications for airport users to assist the facility in meeting the goals.

3. Partner with Keep Hot Spring Beautiful in providing waste abatement and education opportunities.

Once implemented, the programs should be evaluated annually to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

4.9.3 Waste Recycling

Recycling in the form of source separation has become the backbone for diversion from land disposal. However, knowledge and convenience remain the driving force behind successful recycling programs. Knowledge in the form of waste education recommendations is presented above in **Section 4.9.2**. Convenience and availability are addressed here.

Three areas have been identified to establish and meet waste recycling goals for the airport:

1. Provide easy access~~,~~ to recycling bins on-site for basic recyclable material (newspaper, cardboard, cans, glass, and plastic) in order to promote recycling in areas with highest waste generation such as A/D building and the self-service fueling area.

2. Provide centralized indoor storage area for the storage of problem materials, particularly those banned from land disposal including fluorescent lamps, electronics, appliances, used motor oil and motor oil filters, tires, and lead acid, nickel-cadmium, and vehicle batteries.

3. Assign duties to airport or City personnel to monitor recycling bins and the problem material storage area and make arrangements, as necessary, to transport materials to appropriate facilities. Because the closest recycling facilities may be located in Custer or Rapid City, a partnership with other waste generators or collection programs such as Keep Hot Springs Beautiful or local schools would be most cost-effective. Records should be kept on the volume of material transported for recycling and compared to the volume of waste material generated in order to document the amount of waste that has been diverted from land disposal on an annual basis.

Once implemented, the programs should be evaluated annually to determine if the waste reduction efforts are adequate, if there have been any regulatory changes, and whether any modifications are necessary.

Figure 4-1 – Runway 1/19 Ultimate Extension

Figure 4-2 – Partial Parallel Taxiway (2016)

Figure 4-3 – Existing Part 77 Obstructions

Figure 4-4 – Ultimate Part 77 Obstructions

5.0 Alternatives Analysis

There are several key areas at Hot Springs Municipal Airport (HSR) which need to be improved to meet existing standards and to accommodate the existing and projected aviation demand. Alternatives for hangar development have been closely examined to determine the most efficient and cost-effective development approach while considering environmental impacts.

Goals of the following development alternatives include:

- Comply with Federal Aviation Administration (FAA) Design standards given in Advisory Circular (AC) 150/5300-13A, *Airport Design*
- Be compatible with other existing and proposed uses on and off the Airport
- Minimize negative environmental impacts
- Be cost effective

5.1 Alternative Analysis 1 - Hangar Development

As previously discussed in **Section 4.3.1.1**, there is a large demand for hangar space at HSR. Hangar demand depends on a variety of variables, and the space required for hangar facilities is dependent on the number and type(s) of aircraft that are anticipated to be stored at the Airport. The primary goal of the hangar development alternatives is ability to adapt the layout to different types and sizes of hangars, and ~~is~~ to ensure the development follows a logical sequence.

As part of the Master Plan process, hangar development alternatives were examined utilizing the area north and southwest of the existing apron area. Initially two alternatives were developed. Both show development to help meet immediate (Phase 1), near-term (Phase 2), and long-term (Phase 3) hangar demands. While these alternatives show 3 phases of development, actual construction of the taxilanes and hangars will occur when demand warrants.

Both alternatives are similar in the “basic” layout and have the ability to accommodate a variety of hangar sizes, shown in dark blue dashed lines (see **Figures 5-1** and **5-2**). They both show an apron expansion with five additional tiedowns, and a future glider hangar west of the existing Black Hills Glider Club hangar. In addition, both alternatives show a large future automobile parking lot west of the existing large City hangar, and parking spaces south of the Airport access road. The parking lots shown accommodate significantly more parking spaces than the forecasted demand for the planning period. However, these parking lots can be constructed and expanded as needed to accommodate actual parking space ~~the~~ demand in the future~~s~~. The primary difference between the two alternatives is phasing and the location of future t-hangars. The differences between the two layouts are discussed in the sections that follow.

5.1.1 Alternative 1A

Phase 1 (shown in blues) of Alternative 1A shows development for smaller Airplane Design Group (ADG) I aircraft (aircraft with wingspan <49’) with two t-hangar buildings and two 50-foot by 50-foot box hangars northeast of the existing hangars, as shown in **Figure 5-1**. Phase 1 also has two box hangars adjacent the existing glider hangar, and this area was designed to accommodate ADG II aircraft (aircraft with wingspan 79’ ≥ 49’). Phase 2 of this alternative is directly northwest of the existing hangars (shown in purple). Phase 3 (shown in oranges) is the remaining areas available for development, and is designed to accommodate ADG II

aircraft. Both Phase 2 and 3 are designed with the ability to accommodate box hangars ranging in size, from 50-foot by 50-foot to 100-foot by 100-foot.

5.1.2 Alternative 1B

Phase 1 (shown in blues) for Alternative 1B is in the same area as Alternative 1A; however Alternative 1B shows development for ADG I aircraft with five 60-foot by 60-foot box hangars and two 50-foot by 50-foot box hangars, instead of t-hangars (shown in **Figure 5-2**). Similar to Alternative 1A, Alternative 1B also shows two additional box hangar adjacent the existing glider hangar designed to ADG II aircraft as part of Phase 1. Phase 2 of this alternative is directly ~~is~~ north of Phase 1 (shown in purple) and is designed to accommodate both ADG I and ADG II aircraft with three t-hangar buildings and four box hangars. Phase 3 (shown in oranges) is the remaining areas available for development, and is designed to accommodate ADG II aircraft. Again, both Phase 2 and 3 are designed with the ability to accommodate box hangars ranging in size, from 50-foot by 50-foot to 100-foot by 100-foot.

5.1.3 Alternative 1C

Alternative 1C was developed at the September 29th, 2015 meeting, and is shown in **Figure 5-3**. At this meeting, the Airport Advisory Committee chose aspects of Alternatives 1A and 1B that best fit the short-term, mid-term and long-term needs of the Airport. Phase 1 (shown in blues, similar to Alternative 1A) shows development for ADG I aircraft with two 50-foot by 50-foot box hangars, two six-unit t-hangar buildings, and an 80-foot extension of the existing City hangar ~~(shown in **Figure 5-3**)~~. Phase 2 (shown in purples) of Alternative 1C is directly north of Phase 1 and is designed to accommodate both ADG I and ADG II aircraft with three t-hangar buildings and four box hangars (similar to Alternative 1B). Phase 3 (shown in oranges) is the remaining areas available for development, and is designed to accommodate ADG II aircraft. Both Phase 2 and 3 are designed with the ability to accommodate box hangars ranging in size, from 50-foot by 50-foot to 100-foot by 100-foot.

5.1.4 Alternative Analysis 1 - Preferred Alternative 1C

At the meeting ~~scheduled for~~ September 29th, 2015, Airport Advisory Committee chose Alternative 1C as the preferred alternative for hangar development at HSR. The hangar development in Alternative 1C will be shown on the final Airport Layout Plan.

5.2 Alternative Analysis 2 – Direct Access

Taxiway systems are designed to provide access to and from the runway(s), apron(s), hangars, and other aviation related areas on an airport. Basic taxiway system design principles, per Advisory Circle (AC) 150/5300-13A, *Airport Design*, states that taxiways should not provide direct access from an apron to a runway in order to reduce opportunity for human error and minimize runway incursions.

Runway 1/19 does not have a parallel taxiway, and only a single connector taxiway at mid-field and turnarounds at each runway end. Currently, HSR is in the process of designing a partial-length parallel taxiway for Runway 1/19, from the main apron to the Runway 19 end. This taxiway is anticipated to be built in 2016. The FAA recommends that as part of this partial taxiway project, the direct access from the apron area to Runway 1/19 be eliminated. Three alternatives have been developed to remove the direct access, and are discussed in the sections below. None of the alternatives impact any future hangar development discussed in **Section 5.1**.

5.2.1 Alternative 2A

Alternative A eliminates the existing runway connector taxiway at mid-field, as shown in **Figure 5-4**. Once constructed, this alternatives would require aircraft to enter and exit Runway 1/19 at the Runway 19 end. Alternative A would cost approximately $50,000. This cost estimate assumes the need for topsoil borrow for the area of pavement removal. This alternative in not ideal as it requires aircraft to taxi along the entire length of the runway to reach the Runway 1 end, limiting the use of the runway by other aircraft. It also has the potential to increase the amount of time an aircraft is on the runway, which may increase the chance of a runway incursion.

5.2.2 Alternative 2B

Alternative B relocates the 100-foot long apron connector taxiway slightly to the north, as shown in **Figure 5-5**. This alternatives would require the relocation of the three and the removal of one existing tiedowns. However, Alternative B gives aircraft the ability to enter and exit Runway 1/19 from the Runway 19 end or mid-field. Alternative B would cost approximately $35,000.

5.2.3 Alternative 2C

Alternative C relocates 335-foot long runway connector taxiway slightly to the north, as shown in **Figure 5-6**. Similar to Alternative B, Alternative C gives aircraft the ability to enter and exit Runway 1/19 from the Runway 19 end or mid-field. Alternative C would cost approximately $70,000.

5.2.4 Summary of Alternatives

Table 5-1 summarizes the alternatives.

Table 5-1
Summary of Direct Access Alternatives

	Alternative 2A Remove Existing Runway Connector Taxiway	**Alternative 2B** Relocate Apron Connector Taxiway	**Alternative 2C** Relocate Runway Connector Taxiway
Cost (approx.)	$50,000	$35,000	$70,000
Runway 1/19 Access	Runway 19 End Only	Runway 19 End & Mid-Field	Runway 19 End & Mid-Field
Other	Limits access to Runway 1/19	Relocation of 3 tiedowns, removal of 1 tiedown	No impacts to existing tiedowns

5.2.5 Recommended Alternative – Alternative 2B or 2C

Alternative 2B or 2C are recommended, as both alternatives achieve the FAA goal of no direct access from the apron to the runway. Alternative 2B impacts the existing apron/tiedowns, but is the least expensive alternative; while Alternative 2C does not impact the existing apron/tiedowns, but is the most expensive to construct.

5.2.6 Alternative Analysis 2 - Preferred Alternative 2C

Per email sent on November 18th, 2015, the Airport Advisory Committee chose~~n~~ Alternative 2C as the preferred alternative to correct the direct access issue at HSR. Alternative 2C will be shown on the ALP and will be incorporating in the design of the partial parallel taxiway.

Figure 5-1 – Hangar Area Development Alternative 1A

Figure 5-2 – Hangar Area Development Alternative 1B

Figure 5-3 – Hangar Area Development Alternative 1C – Preferred Alternative

Figure 5-4 – Direct Access – Alternative 2A

Figure 5-5 – Direct Access – Alternative 2B

Figure 5-6 – Direct Access – Alternative 2C

6.0 Environmental Inventory

6.1 Introduction

The National Environmental Policy Act of 1969 (NEPA) requires that environmental impacts of proposed airport development be considered throughout the planning period. Three categories of environmental actions relevant to airport development are outlined in 40 Code of Federal Regulations (CFR) Parts 1500 – 1508. Every project proposed for an airport is categorized into one of these three actions:

- Categorical Exclusions – Projects categorically excluded are those actions that have been found under normal circumstances to have no potential for significant environmental impact.
- Actions Normally Requiring an Environmental Assessment (EA) – Projects normally requiring an EA are actions that have been found by experience to sometimes have significant environmental impacts.
- Actions Normally Requiring an Environmental Impact Statement (EIS) – The purpose of an EA is to determine whether or not a project will have significant impacts. Based on the results reported in an EA, the FAA then prepares either a finding of no significant impact (FONSI) or an EIS. An EIS further investigates a project's potential environmental impacts.

The major product of the Master Plan process is the ALP, which shows an airport's existing and planned development. Federal Aviation Regulations require that an airport operator undertake an environmental analysis for the planned development for FAA review and approval if it plans to apply for federal grants to fund development depicted on the ALP. Due to the limited shelf-life of environmental studies, a formal EA or categorical exclusion documentation will be developed when a project is imminent to ensure the environmental work is current within the timeframe during which the actual project would be undertaken.

The following sections address possible environmental impacts at a planning level for the improvements recommended in **Chapters 4** and **5**.

6.2 Compatible Land Use & Zoning

Land-use compatibility conflicts are a common problem around many airports in the United States, both for large transport airports and smaller GA facilities. In urban areas, as well as some rural settings, airport owners find that essential expansion to meet the demands of airport traffic is difficult to achieve due to the nearby development of incompatible land uses.

These incompatible uses typically consist of medium to high density residential areas, built closely to an existing airfield prior to enactment of suitable land-use zoning legislation. The residents of these developments, with substantial investments in their homes, may view the Airport and its activities as a threat to their health, safety, and quality of life. The issue of airport noise is generally the most apparent perceived environmental impact upon the surrounding community. Conflicts may also exist in the protection of runway approach and transition zones to assure the safety of the flying public and the adjacent property owners.

The land use adjacent to the Airport property includes agricultural land to the north, east, west and south; and commercial land to the southeast. The largest concentration of residences is located in the town of Hot Springs, approximately four miles northwest of the Airport property.

These land uses are compatible with all recommended future airport development (**Figure 1-8**).

In relation to the pending Pete Lien and Sons Surface Mining Lease Agreement, mining is compatible with airport activities as long as they follow all FAA guidance and requirements, and are permitted by state agencies and local municipalities. See **Section 4.7.2.1** for guidance regarding mining leases on and near airport property.

6.3 Noise

The FAA has determined that the cumulative ~~noise energy~~ exposure of individuals to noise resulting from aviation activities must be established in terms of yearly day/night average sound level (DNL). Noise exposure is considered significant if the 65 DNL or greater encroaches on any noise sensitive area.

None of the future recommended development at the Airport will alter the current noise levels at the Airport. As a result, a noise analysis is not necessary.

6.4 Social Impacts

Airport development has the potential to impact not only the natural environment but also the human environment. These impacts are judged as significant if they cause the relocation of any resident or business, alteration of surface transportation patterns, division or disruption of established communities, disruption of orderly, planned development at the Airport, or an appreciable change in employment.

No homes are proposed to be disrupted or acquired for any of the future recommended development of the Airport.

6.5 Induced Socio-economic Impacts

These secondary or indirect impacts involve shifts in population, changes in economic climate, or shifts in levels of public service demand. Assessment of socioeconomic impacts is usually associated with major development at air carrier airports, which involve terminal building development, major roadway alignments, and similar work. The extent of indirect socioeconomic impacts of the future recommended development, is not of the magnitude that would normally be considered significant.

6.6 Environmental Justice and Children's Environmental Health and Safety Risks

Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to.

The future recommended development project areas would not result in changes to these substances, nor would these projects result in additional exposure of these substances to children, therefore effects to this impact category are assumed not to be significant.

6.7 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and the accompanying Presidential Memorandum,

and Order DOT 5610.2, Environmental Justice, require FAA to provide for meaningful public involvement by minority and low-income populations and analysis, including demographic analysis, that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.

None of the future recommended development will require the relocation of any unwilling participants, low income or otherwise. Therefore, environmental justice impacts are not anticipated.

6.8 Conversion of Farmland

Federal conversion of farmland to non-agricultural uses is regulated by the Farmland Protection Policy Act (FPPA) through the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS). Farmland is defined by the underlying soil type (not the use of the land) and is classified by the USDA as "prime farmland", "prime farmland if drained", or "farmland of statewide importance." Preservation of prime farmland is a priority for the USDA, and the sponsors of projects funded with federal support are required to assess the effects of the projects on prime farmland.

Evaluation of farmland impacts will be required in the EA due to the land acquisition aspect as part of the ultimate Runway 1/19 extension (**Section 1.17.3**), see **Figures 1-5 and 4-1**.

6.9 Fish, Wildlife and Plants

The Fish and Wildlife Coordination Act requires that agencies consult with the State wildlife agencies and the Department of the Interior (FWS) concerning the conservation of wildlife resources. The Fish and Wildlife Conservation Act also encourages conservation of non-game fish and wildlife and their habitats.

An "An Endangered Species" is defined as any member of the animal or plant kingdom determined to be in danger of extinction throughout all or a significant portion of its range. A "Threatened Species" is defined as any member of the plant or animal kingdom likely to become endangered in the foreseeable future.

Although the Airport is within the breeding range of the Northern long-eared bat, the nature of the future recommended development is such that no effects on federal threatened or endangered species are anticipated.

6.10 Affected Areas under the Protection of USDOT Act, Section 4(f)

Section 4(f) of the Department of Transportation (DOT) Act provides protection for publicly owned land in parks, recreation areas, or wildlife and waterfowl refuges of national, State, or local significance or lands from an historic site of national, State, or local significance.

The existing airport property is not located in or near any publicly owned lands (parks, recreation areas, or wildlife and waterfowl refuges). The nearest land is 3.5 miles to the southeast. No Tribal land is located within Fall River County. White Clay Tribal land is located in the next county east, Shannon. No impacts to any Section 4(f) properties can be expected as part of the future recommended development (see **Figure 1-11**).

6.11 Wetlands

Wetlands as defined in Executive Order 11990, "Protection of Wetlands", as "those areas that are inundated by surface or ground water with frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that

requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, and natural ponds."

The National Wetlands Inventory (NWI) Map shows no wetland areas on Airport property. The closest mapped wetlands are along the Cheyenne River to the North (see **Figure 1-7**). A formal wetland delineation will need to be completed prior to any work on site. Any impacts to wetlands will be under the Jurisdiction of the U.S. Army Corps of Engineers.

6.12 Floodplains

Floodplains are defined by Executive Order 11988, "Floodplain Management", as "the lowland and relatively flat areas adjoining coastal waters…including at a minimum, that area subject to a one percent or greater change of flooding in any given year...", that is, an area which would be inundated by a 100-year floodplain, mitigating measures must be investigated in order to avoid significant changes to the drainage system.

The Cheyenne River flows along the northern boundary of the Airport. The 100-year floodplain of the Cheyenne River is located within a one-mile radius of the airport property (**Figure 1-6**). None of future recommended development will have any impact to floodplain.

6.13 Coastal Zone Management Programs and Coastal Barriers

The Coastal Barrier Resources System contains undeveloped coastal barriers along the Atlantic and Gulf coasts and Great Lakes. The Coastal Zone Management Act applies to the States having an approved Coastal Zone Management (CZM) plan.

The Airport is not located within a coastal area and would not affect coastal resources governed by the Coastal Barriers Resources Act (CBRA) or the Coastal Zone Management Act (CZMA). Therefore, none of future recommended development projects would result in impacts to this environmental category.

6.14 Wild and Scenic Rivers

Wild and scenic rivers are designated as part of the National Wild and Scenic River Programs by the U.S. Department of the Interior under the Wild and Scenic River Act to protect the most beautiful and unspoiled rivers in the nation. River segments are designated based on their outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values and are to be preserved in free-flowing condition for the benefit and enjoyment of present and future generations.

There are no Wild and Scenic Rivers in the vicinity of the Airport. The closest river in the vicinity is the Missouri River, which is located approximately 250 miles to the east of the airport. Therefore, none of the future recommended development impacts will occur under this category.

Major water bodies in the area include the Cheyenne River and the Fall River located adjacent to the Airport property on the north and west, and the Angostura Reservoir located two miles southwest of the Airport property.

6.15 Water Quality

The Federal Water Pollution Control Act, as amended (commonly referred to as the Clean Water Act), provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of

wetlands, location with regard to an aquifer or sensitive ecological area such as a wetlands area, and regulate other issues concerning water quality. Additionally, a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act is required for point-source discharges into waters of the U.S. and for construction activities to protect~~ion~~ from construction related erosion and sedimentation. A 404 permit is required to place dredged or fill material in waters of the U.S. including jurisdictional wetlands.

Typically, pollutants carried in airport runoff include spilled fuel and oil, deposits from rubber tires, and accidentally discharged chemicals, i.e. agricultural spray operations, aircraft de-icing, and washing agents. For most airport improvements, design, control during construction, and other mitigation measures can avoid significant impacts to water quality.

For aerial spray wash and deicing facilities at airports, water quality standards require the collection of materials to prevent distribution into storm water runoff. The deicing materials may be recycled from a runoff tank.

Under the General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial Stormwater Permit) issued October 1, 2012, by the DENR, only "transportation by air" facilities that are involved in vehicle maintenance (such as vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport deicing need coverage under the Industrial Stormwater Permit. As such, the Airport did not obtain coverage under the Industrial Stormwater Permit and no Stormwater Pollution Prevention Plan (SWPPP) is required for the facility.

6.16 Historical, Architectural, Archeological, and Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes the Advisory Council on Historic Preservation (ACHP) and the National Register of Historic Places (NRHP). Section 106 of the NHPA requires consideration of the effects of undertaking on properties that are eligible for inclusion in the NRHP. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO) if there is a potential adverse effect to historic properties on or eligible for listing on the National Register of Historic Places.

The Archeological and Historic Preservation act of 1974 provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance by providing for the survey, recovery, and preservation of historical and archeological data which might otherwise be destroyed or irreparably lost due to a development project.

No Archeological or Historic properties are known to exist in the area of the future recommended development. However, an Archeological or Historic evaluation will need to be included in any environmental process for any development. This evaluation will include an evaluation of all structures older than or approaching 50 years in age.

6.17 Air Quality

The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for six pollutants, termed "criteria pollutants" and requires each State to adopt a plan to achieve the NAAQS for each pollutant within specific timeframes. These air quality plans are known as State Implementation Plans (SIP). The State of South Dakota has developed a SIP, which contains the rules and programs the State will use to help ensure air quality continues to meet the NAAQS.

The potentially significant impact of a proposed action on the attainment and maintenance of air quality standards must be disclosed. Conformity with the SIP must also be demonstrated. Currently there are no non-attainment areas in the State of South Dakota.

Because Fall River County is not in a non-attainment or maintenance area, no air quality analysis will be required (FAA Order 5050.4B).

6.18 Energy Supply and Natural Resources

The effects of Airport development on energy and natural resources are generally related to the amount of energy required for stationary facilities (i.e., terminal building cooling or heating equipment, electrical lighting for the interior of buildings and the airfield, and approach or radar control systems), For most GA and non-hub air carrier airports, changes in energy demands or other natural resource consumption will normally not result in significant impacts.

Additional energy supply will be needed for the proposed Hangar expansion. However, this additional energy supply is not normally considered to be significant and demand will not exceed supply.

6.19 Light Emissions

Aviation lighting required for the purposes of obstruction marking, security of parked aircraft and vehicles, and visual aids to navigation are the main source of flight emissions emanating from airports. An analysis is necessary only if a proposal would introduce new airport lighting facilities that might affect residential or other sensitive land uses.

Installation of REILs along both runway ends (**Section 4.2.3**) and installation of MITLs (**Section 4.2.3**) is recommended. Light emissions associated with these types of lighting are not considered significant and should not result in an impact to this category.

6.20 Solid Waste Impacts

Airport improvements, which consist of development such as runways, taxiways, hangar development and terminal buildings, do not normally have a direct significant effect on solid waste collection or disposal. The future recommended development does not include uses that will significantly increase the solid waste generated at the site.

6.21 Construction Impacts

Construction activities can create environmental impacts at the construction site and in the surrounding area. These impacts are generally temporary in nature, and subside once construction is completed. Through prudent engineering and construction practices, construction impacts associated with future recommended development can be minimized.

The environmental categories that can be affected by construction often include construction noise, dust and noise from heavy equipment traffic, disposal of construction debris, and air and water pollution. Many of the specific types of impacts that could occur and permits or certificates that may be required are covered in the descriptions of other appropriate impact categories.

7.0 Financial Plan and Implementation

There are many projects planned for the Hot Springs Municipal Airport (HSR) in the upcoming years as discussed throughout this Master Plan. Understanding the costs of these projects and particulars of the funding partners (FAA, SDDOT, etc.) is essential to determine the feasibility of the plan. This chapter will discuss the various sources of potential funding, provide a brief description of the planned projects, and summarize the Capital Improvement Plan (CIP) for all of the planned development.

7.1 Funding Sources

In South Dakota, airport development projects are usually funded by several sources, including the Federal Aviation Administration (FAA) Airport Improvement Program (AIP), South Dakota Department of Transportation (SDDOT) Aeronautics Commission grants, local (Airport and/or City) funding, and private investment.

7.1.1 FAA Airport Improvement Program (AIP)

The FAA AIP was created by the Airport and Airways Act of 1982 to assist in the development of a nationwide system of public-use airports. AIP replaced the previous programs, including the Airport Development Aid Program (ADAP) and the earlier Federal Aid to Airports Program (FAAP). AIP provides an increased level of funding, higher federal participation rate, and greater project eligibility. Amendments to the program since 1982 have consistently increased funding levels, participation rate, and eligibility.

The AIP has limits on eligibility. Generally, grant eligible items include airfield and aeronautical related facilities, such as: runways, taxiways, aprons, lighting, and visual aids, as well as land acquisition, planning, and environmental tasks needed to accomplish the Airport improvement projects. Most revenue producing items like hangars, fuel farms, and FBO facilities are not eligible for AIP funds. Additionally, equipment eligibility is limited to safety equipment like Aircraft Rescue and Firefighting (ARFF) trucks and snow removal equipment (SRE). Mowers, earth moving equipment, and airport operations vehicles are not eligible for funding. The FAA utilizes a priority system to rank development items. Generally, the smaller the Airport and the farther the item is from the runway, the lower priority it receives (e.g. runways have priority over taxiways, which have greater priority than aprons, which have priority over roads, etc.). However, development or equipment required by rule or law has a high priority.

Currently, federal participation in the AIP is 90% of the eligible cost of airport projects, leaving the Airport sponsor responsible for the other 10%. In South Dakota, SDDOT Aeronautics has typically provided a grant for 50% of the sponsors share on AIP grants. All funding from both State and Federal agencies must be for planning, design, construction, or pavement maintenance projects, and cannot be used to supplement the operating expenses of the airport.

There are two types of AIP funds that an airport will receive: entitlement and discretionary.

7.1.1.1 Entitlement Funds

General aviation airports receive an entitlement of $150,000 per year. General aviation airports are defined as airports that do not offer commercial airline service, are open to the public, have at least 10 based aircraft, and are located 20 miles outside of the nearest National Plan of Integrated Airport Systems (NPIAS) airport. If an airport desires to receive discretionary funds (**Section 7.1.1.2**) for a development item, the airport's CIP should include at least two years of entitlement funds dedicated to the project. An airport can use entitlement

funds on any eligible item; however, excessive use of entitlements on low priority work can have a negative effect on the FAA's discretionary funding plans for that airport. Currently, as of July 2015, HSR's existing FAA Entitlement balance is $320,450.

7.1.1.2 Discretionary Funds

Approximately half of the AIP appropriations each year can be dispersed by the FAA at their discretion, rather than the fixed entitlement grants. The FAA has many priority programs they fund each year; examples are runway safety areas, runway surface treatments, and projects which improve overall system capacity (e.g. new runways at hub airports). Airports, such as HSR, compete best for discretionary funding for safety, security, and pavement preservation projects.

7.1.2 South Dakota State Airport Funding

The SDDOT provides funding to public airports across South Dakota. The purpose of the SDDOT Aeronautics grant program is to address the needs of each individual airports, as well as the Targets established by the South Dakota State Aviation System Plan (SDSASP) (see **Section 4.1**). The State grant program provides funding for land acquisition, airport maintenance and construction projects, obstruction removal, perimeter fencing, fueling systems, hangars owned and operated by the airport sponsor, and portions of terminal buildings that are dedicated to public use. Projects ineligible for State funding include maintenance buildings, revenue product parking lots, and other revenue producing sources except for fueling systems and hangars constructed within a federal aviation project.

In order for an airport to be eligible for South Dakota State Funding it must: (1) be included in the State Aviation System Plan (SDSASP); (2) demonstrate need for the project; (3) show the proposed projects/development on an approved Airport Layout Plan (ALP); (4) be designed at a minimum (for construction projects) in accordance with Design Group AI & BI Aircraft and/or specifications contained in the SDSASP; (5) and must have the requisite amount of matching local funds available prior to Aeronautics Commission approval.

HSR meets or will meet all State eligibility requirements, as HSR (1) is listed in the SDSASP as a Medium General Airport (see **Section 4.1**); (2) demonstrates needs for proposed projects as described within this Master Plan (**Chapters 4** and **5**); (3) shows all proposed projects/development on the Updated ALP as part of this Master Plan (see **Appendix C**); (4) shows all projects (as necessary) designed to B-II standards and/or SDSASP specifications (see **Chapter 4**); (5) and a funding plan for all proposed projects are shown in **Table 7-3** at the end of **Chapter 7**.

7.1.2.1 SDDOT Aviation Fuel Tax

Funding for the SDDOT Aeronautics Commission grants is generated exclusively from tax on aviation fuel, six cent per gallon of Aviation Gas (AvGas) and four cents per gallon of Jet Fuel. The allocation of the taxes for aviation fuel is shown in **Table 7-1** and **Table 7-2**.

Table 7-1
SDDOT AvGas Fuel Tax Allocation

Amount	Recipient
$0.0250	State Aeronautics Fund
$0.0027	Wholesaler Allowance for Shrinkage.
$0.0323	Allocated to the Airport from which the Fuel was Sold.

Source: Policies & Procedures for Use of State Funds. SDDOT Aeronautics Commission. Last Revised April 25, 2012.

Table 7-2
SDDOT Jet Fuel Tax Allocation

Amount	Recipient
$0.02775	State Aeronautics Fund
$0.00050	Wholesaler Allowance for Shrinkage.
$0.01175	Allocated to Air Carrier Airports based on Number of Carrier Departures. Separately Calculated for Each Commercial Airline (See Note[1]).

Note[1]: In case of non-commercial airplane jet fuel sales, the $0.01175 is allocated to the airport where the fuel was purchased.
Source: Policies & Procedures for Use of State Funds. SDDOT Aeronautics Commission. Last Revised April 25, 2012.

7.1.2.2 State Criteria Utilized in Funding Projects

The SDDOT Aeronautics Commission has several criteria used to determine funding rates for specific projects, and are listed below:

1. Projects involving Federal/State/Local funding, State aid will be limited to an 80% share (80% State/20% Local) of the amount of funds required to match eligible, federally funded items.
2. General Aviation airport projects are not limited to a maximum State participation in federally participating projects.
3. The State/Local project construction of minimum airport facilities, to comply with Design Group AI/BI aircraft (75% of all aircraft less than 12,500 pounds) airport requirements or State Licensing Standards, is eligible for 75% State/25% Local. The maximum amounts available under this project will be $75,000 State funds for any one airport.
4. Airport runways which meet Design Group AI/BI aircraft (75% of all aircraft less than 12,500 pounds) airport requirements, but which do not meet the requirements of a Design Group AI/ BI aircraft (100% of all aircraft less than 12,500 pounds) airport, may be considered for State aid on a 75% State/25% Local matching share, provided that federal assistance will not be available to the project in the time frame of a five year construction plan.
5. Preventive maintenance projects on General Aviation airports are eligible for State funding (50% State/50% Local) matching share.
6. Financial assistance agreements authorizing State funds in a federally participating project shall be approved by the Aeronautics Commission. Beginning with FY89 projects and thereafter, all of these projects can be approved for State grant increases. The grant increase shall be limited to the same percentage increase as the federal grant increase. If, for some reason, the federal share increase cannot be obtained or is partially limited funded, the State increase shall be limited to the same percentage. No State increase shall be allowed until all costs have been incurred and the project is ready for closeout. State grant increase shall be approved by the Aeronautics Commission.

   All other state financial assistance agreements are not eligible for a grant increase unless approved by the Aeronautics Commission.
7. Political subdivisions can use allocated State fuel tax funds to match State aid and can be used on approved maintenance and safety oriented projects at private airports approved for public use.

7.2 Capital Improvement Plan

A Capital Improvement Program (CIP) is developed for each airport in the State of South Dakota that qualifies for state and/or federal funding. Airports typically develop a CIP to show their development plans and the anticipated funding sources. The CIP is updated every year to help state officials plan for upcoming construction projects at airports. A quality CIP must be realistic and reflect the maximum practical amount of funds available from the FAA AIP, SDDOT Aeronautics, local funding, etc. The CIP should also reflect eligibility and priorities of the federal and state programs. The result is a CIP with a higher probability for accomplishment. Past participation rates and eligibility rules are the best available guide to develop a CIP for HSR.

Future development at HSR, as included in this Master Plan study, covers a 20-year period (2015-2035). Estimated development costs based on the Airport Layout Plan are included in the CIP. The projects are based on the recommended facility requirements as discussed in **Chapter 4** and the selected alternatives in **Chapter 5**. The demand for certain facilities, especially in the latter time frame, and the economic feasibility of their development are the prime factors influencing the implementation of a project's timeframe. Estimated costs are expressed in 2016 dollars with no adjustments for inflation, and include design, construction, and construction administration. All projects programmed beyond 2016 will need to account for escalation for the year they are accomplished.

HSR receives $150,000 annually in FAA Entitlement funds to pay for the FAA portion of federally eligible projects. The CIP for HSR shown in **Table 7-1** and discussed in the sections that follow, use HSR beginning entitlement balance of $320,450 (December 2015). When reorganizing and prioritizing projects in HSR's CIP, the available FAA Entitlement funds, as well as the local participation required for each project were kept in mind. It is important that the CIP be as realistic as possible for the first five years of the CIP. Implementation of any of these projects can be adjusted as needed to accommodate existing needs for the Airport in the future.

7.2.1 5 Year CIP (2015 – 2020)

The 5 Year CIP is the short-term plan discussing the capital improvements planned at HSR for the next five years (2015 to 2020).

7.2.1.1 2015 Design Partial Parallel Taxiway

Due to the activity levels and mix of traffic at HSR, a full-length parallel taxiway for Runway 1/19 is ultimately recommended. On March 27, 2015, the FAA issued a Finding of No Signification Impact (FONSI) for Environmental Assessment (EA) for the construction of a full-length parallel taxiway for Runway 1/19. In 2015, HSR completed the design for a partial-length parallel taxiway, from the main apron to the Runway 19 end (see **Section 4.2.9.3**). As part of the design, the direct access from the apron area to Runway 1/19 was eliminated by off-setting the runway connector taxiway to the north (see **Section 5.2.6**). This project cost $74,500, and was eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

7.2.1.2 2016 Construct Partial Parallel Taxiway

The design for the partial parallel taxiway to Runway 1/19 was completed in 2015. It is anticipated the construction of the partial parallel will be completed in 2016. This project consists of the construction of a partial parallel taxiway from mid-field to the Runway 19 end, and includes off-setting the runway connector taxiway to the north and the retro-reflective edge marking along the entire length of the taxiway. This project is estimated to cost

$1,025,000. This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%, and will require approximately an additional $602,050 in State Apportionment funds.

7.2.1.3 2017 Design and Construct Hangar Taxilane (Alternative 1C, Phase 1)

There is a large demand for hangar space at HSR. This project consists of design and construction the taxilanes as part of Phase 1 of the preferred hangar development, as shown in Alternative 1C (**Figure 5-3**). This project is estimated to cost $250,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. This project will require borrowing $75,000 FAA Non-Primary Entitlement from another General Aviation airport.

7.2.1.4 2018 Design and Construct T-Hangars (Alternative 1C, Phase 1)

This project consists of design and construction of t-hangars as part of Phase 1 of the preferred hangar development, as shown in Alternative 1C (**Figure 5-3**). This project is estimated to cost $600,000 (2016 dollars). Since the t-hangars will be owned and operated by the Airport, this project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. This project will require borrowing $390,000 FAA Non-Primary Entitlement from another General Aviation airport.

7.2.1.5 2019 No Projects – Repay Entitlements

In 2019, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2017 Taxilane and 2018 T-Hangar projects.

7.2.1.6 2020 No Projects – Repay Entitlements

In 2020, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2018 T-Hangar project.

7.2.2 10 Year CIP (2021 – 2025)

The 10 Year CIP is the mid-term plan discussing the capital improvements planned at HSR for the five to ten year period (2021 to 2025).

7.2.2.1 2021 Acquire Plow Truck and Hopper Spreader Attachment

Based on the FAA's recommended minimum equipment, it is recommended that HSR acquire an additional plow, as well as a sweeper and hopper spreader attachment to aid in snow removal operations (see **Section 4.3.6**). The two pieces of SRE equipment are estimated to cost $90,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

7.2.2.2 2021 Design Partial Parallel Taxiway, Phase II

A full-length parallel taxiway for Runway 1/19 is ultimately recommended (see **Section 4.2.9.3**). The FAA issued a Finding of No Significant Impact (FONSI) for an EA for a full-length parallel taxiway for Runway 1/19. A partial-length parallel taxiway, from the main apron to the Runway 19 end is anticipated to have been constructed in 2016. This project will consist of the design of a partial parallel taxiway from the main apron to the Runway 1 end. This project is estimated to cost $75,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

7.2.2.3 2022 Construct Partial Parallel Taxiway, Phase II

This project will consist of the construction of a partial parallel taxiway from the main apron to the Runway 1 end. This project will include the installation of Medium Intensity Taxiway Lights (MITLs) along the full-length of the full parallel taxiway (see **Section 4.2.10**). The

design for this project is anticipated to have been completed in 2021. This project is estimated to cost $1,000,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. It is assumed this project will require $775,500 in State Apportionment funds.

7.2.2.4 2022 Install REILs

The SDSASP recommends Runway End Identifier Lights (REILs) be installed at both ends of the primary runway for a Medium General Aviation Airport (see **Section 4.2.10**). This project consists of the installation of REILs for Runway 1 and 19. This project is estimated to cost $30,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

7.2.2.5 2023 No Projects – Repay Entitlements

In 2023, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2018 T-Hangar project.

7.2.2.6 2024 No Projects – Repay Entitlements

In 2024, HSR will repay $15,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2018 T-Hangar project, and saving the remaining $135,000 for future projects.

7.2.2.7 2025 No Projects

There are no projects planned for 2025. The Airport will save their $150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.3 20 Year CIP (2026 – 2036)

The 20 Year CIP is the long-term plan discussing the capital improvements planned at HSR for the final ten years (2026 to 2036).

7.2.3.1 2026 Design Runway 1/19 Reconstruction

This project consists of the design to reconstruct Runway 1/19. The 2010 SDSASP rated the pavements of all the primary runways for all public airports in South Dakota. The SDSASP rated Runway 1/19 at HSR having a pavement condition index (PCI) of 93. A PCI is an indicator of the pavement condition on a scale of 0 to 100, where 100 is the best condition and 0 is the worst. A PCI rating of 100 is considered optimal, where a PCI of 70 or greater is considered acceptable. Major pavement rehabilitation, such as reconstruction, is recommended when the PCI is less than 60. It is estimated that Runway 1/19 will have a PCI of approximately 55 in 2026. This project is estimated to cost $200,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. The timing of this project can be adjusted as necessary depending on the actual PCI of the runway.

7.2.3.2 2027 Reconstruct Runway 1/19

This project consists of the reconstruction of Runway 1/19. In 2027, it is estimated that the PCI of Runway 1/19 will be approximately 55. It is anticipated that the design of the project will have occurred in 2026. Pavement rehabilitation and reconstruction is recommended approximately every 20 years. This project is estimated to cost $2,350,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%, and will require approximately an additional $1,710,000 in State Apportionment or FAA Discretionary funds. The timing of this project can be adjusted as necessary depending on the actual PCI of the runway.

7.2.3.3 2028 Pavement Maintenance

Joint and crack sealing is recommended approximately every five years, and seal coating approximately every 10 years to extend the life of the pavement. This project consists of routine maintenance, such as joint and crack sealing on all Airport pavement. This project is estimated to cost $150,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

7.2.3.4 2029 No Projects

There are no projects planned for 2029. The Airport will save their $150,000 annual FAA Non-Primary Entitlement funds for future projects.

7.2.3.5 2030 Design and Construct Hangar Taxilanes (Alternative 1C, Phase 2)

This project consists of design and construction of t-hangars as part of Phase 2 of the preferred hangar development, as shown in Alternative 1C (**Figure 5-3**). This project is estimated to cost $450,000 (2016 dollars). Since the t-hangars will be owned and operated by the Airport, this project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. This project will require borrowing $90,000 FAA Non-Primary Entitlement from another General Aviation airport.

7.2.3.6 2031 Design and Construct T-Hangar (Alternative 1C, Phase 2)

This project consists of design and construction of t-hangars as part of Phase 2 of the preferred hangar development, as shown in Alternative 1C (**Figure 5-3**). This project is estimated to cost $750,000 (2016 dollars). Since the t-hangars will be owned and operated by the Airport, this project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%. This project will require borrowing $525,000 FAA Non-Primary Entitlement from another General Aviation airport.

7.2.3.7 2032 No Project – Repay Entitlements

In 2032, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2030 Taxilane and 2031 T-Hangar projects.

7.2.3.8 2033 No Project – Repay Entitlements

In 2033, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2031 T-Hangar project.

7.2.3.9 2034 No Project – Repay Entitlements

In 2034, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2031 T-Hangar project.

7.2.3.10 2035 No Project – Repay Entitlements

In 2035, HSR will repay $150,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2031 T-Hangar project.

7.2.3.11 2036 Pavement Maintenance

Joint and crack sealing is recommended approximately every five years, and seal coating approximately every 10 years to extend the life of the pavement. This project consists of routine maintenance, such as joint and crack sealing on all Airport pavement. This project is estimated to cost $150,000 (2016 dollars). This project is eligible for FAA Entitlement funds, with the project funding ratio of FAA 90%, SDDOT 5%, and Airport 5%.

In 2036, HSR will also repay $15,000 of their own FAA Non-Primary Entitlement funds against the funds borrowed for the 2031 T-Hangar project.

7.2.4 Recommended Projects Not Included in the 20-Year CIP

There are several recommended projects and airport improvements in Chapter 4, Facility Recommendations that are not shown in the 20-Year CIP. This is due to either the project being the responsibility of the Airport Sponsor, or the project is estimated to occur beyond the 20-year period. These recommended projects are described in detail in the sections that follow.

7.2.4.1 Sponsor Planning Projects

There rea recommended projects within this Master Plan that are the responsibility of the Airport Sponsor. As a result, the projects listed below are not included the 20-Year Capital Improvement Plan since no Federal or State funding will be used for these projects

Planning Documentation

- The Airport is required to have a Spill Prevention, Control, and Countermeasure (SPCC) Plan but no plan has been developed; ***the absence of an SPCC Plan is considered noncompliant with 40 CFR Parts 110 and 112***. It is recommended the Sponsor develop an SPCC Plan *as soon as possible* (see **Sections 1.17.7** and **4.3.4** for more details).
- The SDSASP recommends that Airports have planning documentation in place in an effort to strengthen emergency response, security, and the protection of the Airport's existing and future infrastructure. These planning efforts help protect airports from incompatible land uses, and prepare them in the event of an emergency. It is recommended that HSR:
  - Develop and enact comprehensive and land use plans (**Section 4.7.2**).
  - Develop and enact Height Zoning (**Section 4.7.3**).
  - Prepare an Emergency Response Plan for the Airport (**Section 4.7.4**). The City of Hot Springs is currently developing an Airport Emergency Plan.
  - Prepare a Security Plan for the Airport (**Section 4.7.5**).
  - Develop Minimum FBO Standards for commercial operators (**Section 4.7.6**).

Miscellaneous

- HSR currently does not have any rental car agreements for the Airport, and the SDSASP encourages a rental car agreement. It is recommended that the Sponsor pursue an agreement with a local rental car company (**Section 4.3.2**).
- HSR does not have an FBO on the airfield, nor does the Airport provide any aircraft maintenance type services. The SDSASP recommends that HSR at minimum have aircraft maintenance and repair opportunities (aircraft mechanic) on an on-call basis. It recommended that the Sponsor seek out opportunities for an aircraft mechanic with businesses or individuals that may be interested in relocating to HSR, or offering aircraft maintenance services at HSR on an on-call basis (**Section 4.3.3**).
- AvGas is the only transportation fuel that still contains lead. Lead is a toxic substance that can be inhaled or absorbed in the blood stream. The FAA, Environmental Protection Agency (EPA), and the aviation industry are working to remove lead from aviation fuels. It is recommended that the Sponsor monitor the FAA's and EPA's progress for updated regulations and replacements for AvGas (**Section 4.3.4**).
- **Sections 1.16** and **4.5** list possible encroachments and recommendations to remedy the encroachments to Airport Property. It is recommended that the Sponsor acquire a Boundary Survey and remedy the encroachments found.
- Mitigate Part 77 obstructions (trim, remove, of light per recommendations discussed in **Section 4.6.1**.

- The USDA completed a Wildlife Hazard Site Visit (WHSV) in 2014 as part of this Master Plan effort. It is recommend that HSR mitigate wildlife attractants and hazards per the recommendations given the WHSV Report located in **Appendix B**.
- Currently, no specific sustainability plan has been developed for the Airport. The City should implement sustainability initiatives as discussed in **Section 4.8** to reduce energy consumption, reduce hazardous and solid waste generation, and improve water quality at the Airport.

7.2.4.2 Projects Beyond 20-Years

There is currently not enough demand forecasted in the 20-year planning period to justify the airfield recommendations listed below. However, it is recommended that these improvement be shown as the ultimate condition on the Airport Layout Plan (ALP).

- Both Runway 1/19 and 6/24 need to be updated to 2/20 and 7/25 to reflect the runways' current magnetic headings (**Section 4.2.2**). FAA Flight Standards will determine the appropriate time to make this change (i.e. update instrument approach procedures, airport facility directory, etc.), and will coordinate the change with the Airport.
- An ultimate length of 4,900 feet for Runway 1/19 on the ALP (**Section 4.2.4**).
  - This project will require an EA, the acquisition of approximately 19.7 acres of land, and the relocation of W. Oral Road before Runway 1/19 can be extended 394 feet to the south.
- Runway 6/24 ultimately paved at 60-width with 1-mile non-precision approaches to both runway ends (**Sections 4.2.4.3**, **4.2.5**, and **4.2.6.2**).
- Longer-term hangar development, including additional tiedowns and automobile parking, as shown in Phase 3 of the preferred Hangar Development Alternative 1C (shown in **Figure 5-3**, see **Sections 4.3.1.1** and **5.1.4**). All hangar development will be constructed when demand warrants.

Table 7-3
HSR Capital Improvement Plan (2016-2036)

Figure 7-1 – 5 Year CIP

Figure 7-2 – 10 Year CIP

Figure 7-3 – 20 Year CIP

Appendix A

Pilot and Business User Surveys

Appendix B

2014 Wildlife Hazard Site Visit

Appendix C

Airport Layout Plan

Appendix D

Exhibit ‘A’ Property Research (CD)