



Chapter 7: Airport Layout Plan

Background and Purpose

This Chapter presents the Airport Layout Plan (ALP) and associated drawings for the Black Hills/Clyde Ice Field Airport (SPF). The ALP drawing set graphically depicts the development of the airport proposed over the 20-year planning period and beyond. The ALP drawings reflect the culmination of the master planning process evaluating aviation demand, airside and landside facility needs, and options for development of airside and landside facilities. The preferred development plan is shown on the ALP drawings located at the end of this chapter. The rationale for preferred development and the public involvement process is documented in Chapter 5: Alternatives Analysis.

The ALP is intended to serve as the framework for future development and growth. All airport development must be done in accordance with an FAA-approved ALP. Proposed development must be shown on an approved ALP to be eligible for FAA Airport Improvement Program (AIP) grant funding. Projects must be justified based on safety, security, capacity, planning, environmental and infrastructure needs meeting FAA standards within the next five years to be eligible for AIP funding. Proper environmental approval must also be completed before proceeding to project implementation. More information is available in FAA Order 5100.38, AIP Handbook.

The ALP drawing set reflects airport design standards in accordance with the following documents:

- FAA AC 150/5070-6B, Airport Master Plans (Change 2)
- FAA AC 150/5300-13A, Airport Design (Change 1)
- FAA ARP SOP No. 2.00, Airport Layout Plan Review Checklist (October 2013)

These drawings will be submitted to the FAA and South Dakota Department of Transportation for their review and comment. FAA approval of the ALP indicates that the existing facilities and proposed development depicted on the ALP conforms to the FAA airport design standards in effect at the time of the approval. Approval indicates the FAA finds the proposed development to be safe and efficient.

The airport has an FAA grant assurance obligation to keep the ALP document current. Periodic “as-built” updates should be completed during the closeout of projects to update existing conditions. The Master Plan and accompanying ALP drawing set should be updated every 10 years at a general aviation airport to evaluate aviation needs and the development plans.



ALP Drawing Set

The ALP drawing set contains several sheets depicting the existing facilities, planned development, and other pertinent information concerning the airport. The following sections describe the specific elements found on each sheet with the ALP drawing set. ALP drawings in this planning study include:

- Sheet A-1: Title Sheet
- Sheet A-2: Airport Data Sheet
- Sheet A-3: Airport Layout Plan (Existing)
- Sheet A-4: Airport Layout Plan (Future & Ultimate)
- Sheet A-5: Terminal Area Drawing (Existing)
- Sheet A-6: Terminal Area Drawing (Future & Ultimate)
- Sheet A-7: Inner Approach Surface - Runway 13 End
- Sheet A-8: Inner Approach Surface - Runway 13-31
- Sheet A-9: Inner Approach Surface - Runway 31 End
- Sheet A-10: Inner Approach Surface - Runway 4-22
- Sheet A-11: Inner Approach Surface - Runway 8 End
- Sheet A-12: Inner Approach Surface - Runway 26 End
- Sheet A-13: Inner Approach Surface - Runway 8 End (Future & Ultimate)
- Sheet A-14: Inner Approach Surface - Runway 26 End (Future & Ultimate)
- Sheet A-15: Part 77 Airspace Plan (Existing)
- Sheet A-16: Part 77 Airspace Plan (Existing) 4-22 Profile
- Sheet A-17: Part 77 Airspace Plan (Ultimate)
- Sheet A-18: Runway Departure Surface
- Sheet A-19: Land Use Plan
- Sheet A-20: Airport Property Map

Sheet A-1: Title Sheet

The title sheet is an index to the ALP drawing set. It also provides pertinent information such as the airport sponsor, airport name, grant number the project is funded through, location and vicinity maps, revision numbers and the date the plan was completed.

The title sheet also includes the airport wind coverage tables and wind roses for space purposes. The title sheet has been updated from the 2017 SPF ALP.

Sheet A-2: Airport Data Sheet

The data sheet provides technical information on airport facilities and design standards for the existing and future airport configurations. Elements include an airport data table, runway data table, taxiway data table and the coordinate summary table.

The data tables for this ALP depict into existing conditions and future (F) and ultimate (U) goals. This sheet has been updated from the 2017 SPF ALP.



Sheets A-3 & A-4: Airport Layout Drawings

The Airport Layout Drawing is a graphical depiction of the airport facilities and design standards. Existing conditions and future development phases are distinguished.

Table 7-1 - Major Airport Development Phases and Projects

Future (F)	
Acquire ### Acres of Land	Two Group II Hangars for FBO/SASO Operations on current apron
New Apron with Two Connector Taxiways	T-Hangar Row and 25' Wide Taxilane to the North
New Terminal Building	Group I Box Hangars and Group II T-Hangars to the West with new 25' Wide Taxilane Based on Demand
New FBO Parking	Hangar Access Road to the West
Runway 8-26 (4,900' x 60') with 26 End Displaced Threshold (TODA 4,300')	Relocate Civil Air Patrol Building
Upgrade Runway 8-26 Approach (Non-Precision)	Reconfigure Fuel Farm Access
Connecting Taxiway to Runway 8 and 26 Ends	Recreational Aviation Building
Relocate Airport Rotating Beacon	Fire Station on New West Hangar Access Road
Snow Removal Equipment Building	New Auto Parking Lot for All Current and New Hangars to the West
Ultimate	
Upgrade Runway 13-31 to RDC C-II by Widening from 75' to 100'	Two Group II FBO/SASO Hangars on New Apron
Remove Current Buildings within Runway 13-31 Object Free Area	Place New Fuel System on New Apron West of New Group II FBO/SASO Hangars
Upgrade Runway 13 RPZ to 500'x1,010'x1,700'	35' Taxiway to the North for New Hangar Development
Reduce Runway 31 RPZ to 500'x1,010'x1,700'	Group I and Group II Hangars West of New Taxiway Based on Demand
Update Airspace Easement for Runway 31 End over I-90	Access Parking Lots for New Hangar Rows
Turnaround on Runway 31 End	Group I and Group II Hangars East of New Taxiway Based on Demand
Eliminate Runway 26 End Displaced Threshold	Access Parking Lots for New Hangar Rows
New Apron West with One Taxiway Connector	Develop Through the Fence Area Northeast of Runway 26 End with Taxiway Connecting to 26 End

Source: KLJ Analysis.

The ALP sheet depicts the Runway Protection Zones (RPZs); land use protection areas on the ground near each runway end. This sheet has been updated from the 2017 SPF ALP.



Sheets A-5 & A-6: Terminal Area Plans

The Terminal Area Plan drawing provides a large-scale view of areas with significant terminal facility development, so that features such as aprons, buildings, hangars, and parking lots are easily discernable. Dimensions are included to clearly depict clearance from objects. There are no areas that do not conform to existing FAA design standards.

Sheets A-7 through A-14: Inner Portion of the Approach Surface Drawings

This drawing provides plan and profile views of the portions of approach surfaces that are typically to a point on the approach slope 100 feet above the runway threshold elevation. Several approach surfaces are shown including FAR Part 77, FAA threshold siting, and glidepath qualification surface approach surfaces.

Roadways and railroads assume a standard mobile vehicle per Part 77 criteria. Standards include 10 feet for private roads, 15 feet for public roads, 17 feet for interstate highways and 25 feet for railroads. These heights are added to the ground elevation.

Sheets A-15 through A-17: Part 77 Airspace Plan

This drawing shows the FAR Part 77 Imaginary Surfaces for the ultimate layout of the Airport. The Part 77 surfaces are the basis for identifying obstructions to the airspace around an airport. The FAA determines if any of the obstructions to Part 77 surfaces are hazards to air navigation.

Part 77 defines five distinct surfaces, each with a different size and shape. The dimensions of these surfaces are based on the type of runway and the type of approach ultimately planned for the Airport. The imaginary surfaces are defined below.

Primary Surface - The primary surface is rectangular, is centered on the runway, extends 200 feet beyond a paved runway, and has a width that varies based on airport-specific criteria. The elevation of the primary surface corresponds to the elevation of the nearest point of the runway centerline.

Approach Surface - Each runway end has an approach surface. The approach surface is centered on the extended runway centerline, starts at the end of the primary surface, and has a width equal to that of the primary surface. Approach surfaces slope upward and outward from the runway ends.

Transitional Surface - The transitional surface is a sloping 7:1 surface that extends outward and upward at right angles to the runway centerline from the sides of the primary surface and from the sides of the approach surfaces.

Horizontal Surface - The horizontal surface is a flat, elliptical surface at an elevation 150 feet above the established airport elevation (4,083.1' MSL). The extent of the horizontal surface is determined by swinging arcs of a 10,000-foot radius from the center of each end of the primary surface for other-than-utility runways.



Conical Surface - The conical surface extends outward and upward from the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet. The conical surface rises to a maximum elevation of 4,283.1' MSL.

Sheet A-18: Runway Departure Surface

The Runway Departure Surface Drawing portrays the full extent of the departure surfaces for all existing, future and ultimate runways which will have instrument approach procedures. The departure surface is a 40:1 slope beginning at the end of the runway. The surfaces are 1000' wide at the runway extending out 10,000' to a total width of 6,466'.

Sheet A-19: Airport Land Use Drawing

The Airport Land Use Drawing depicts both on- and off-airport land uses and zoning in the area around the airport. Land uses around airports should be compatible with airport operations. The airport should enact zoning to control land uses from incompatibility activities. Examples of land use compatibility issues at airports include:

- Aircraft Noise
- Nearby Lighting
- Glare, Smoke, and Dust Emissions
- Wildlife Attractions and Landfills
- Airspace Obstructions
- Electromagnetic Interference
- Concentrations of People
- Structures Near Runway Ends

Sheet A-20: Airport Property Map

This sheet serves as an Airport Property Map and is not an Exhibit 'A' to FAA 3.00 Standard Operating Procedures.