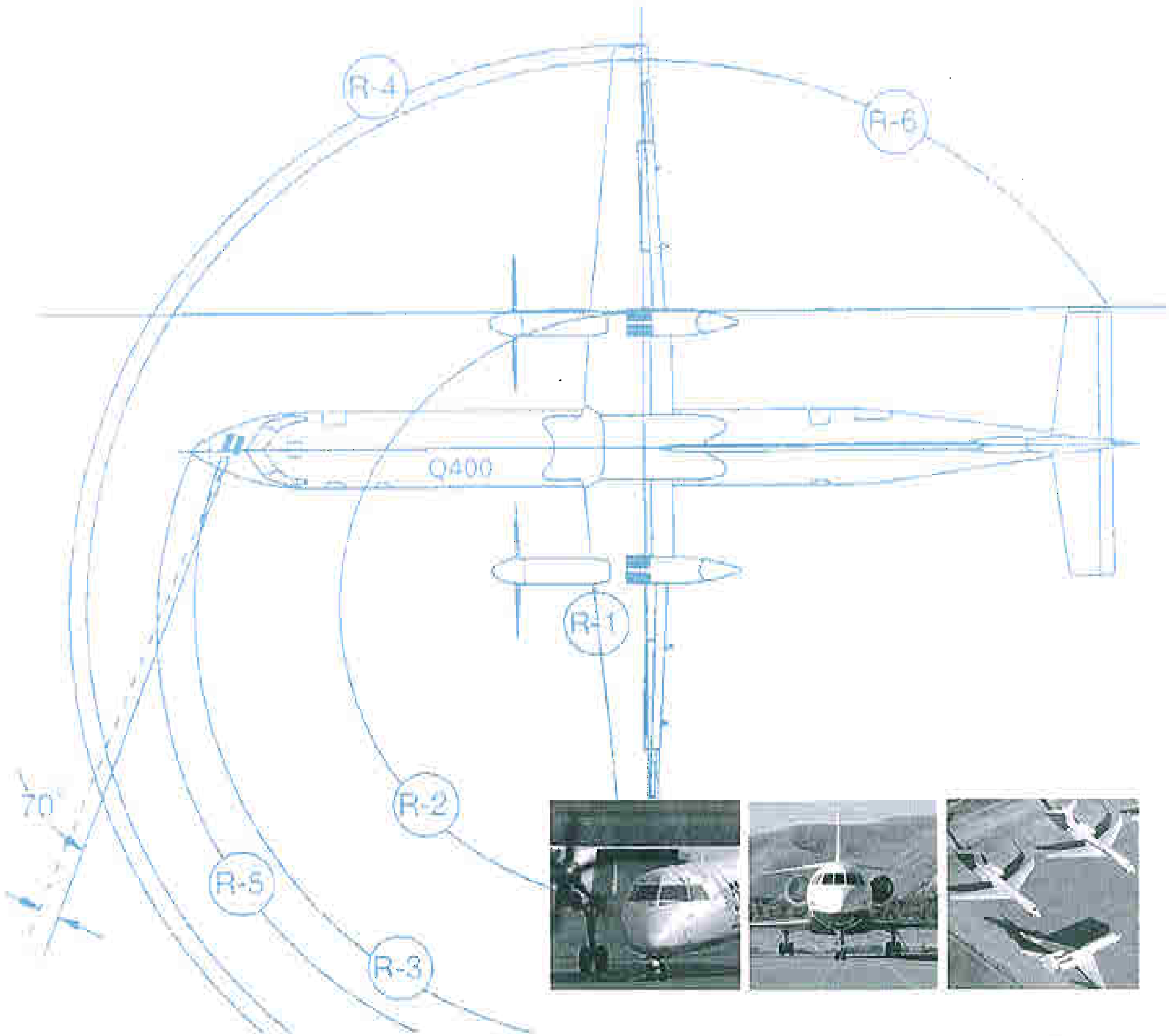
04

Friedman Memorial Airport



MASTER PLAN UPDATE

FINAL TECHNICAL REPORT

Friedman Memorial Airport Master Plan Update

Final Technical Report

Prepared for:
Friedman Memorial Airport Board

Prepared by:
Toothman-Orton Engineering Company
Mead & Hunt Inc.

June 2004

"The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration (Project Number 3-16-0043-24) as provided under Title 49 U.S.C., Section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws."

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Preface

The Federal Aviation Administration (FAA) developed the airport master planning process to assist the nation's airports in developing improvement plans to meet future aviation demand. The Master Plan Update for Friedman Memorial Airport (Hailey, Idaho) will serve as a resource guide for managing and improving the Airport in the near-term (five-year) and long-term (20-year) timeframes. The Master Plan Update uses the year 2002 for baseline data and analytical purposes, with a planning horizon extending through to the year 2022. This study provides a framework for defining the community's long-range aviation needs and exploring the Airport's ability to accommodate those needs.

1. Plan Goals and Objectives

The goal of the airport master planning process is to provide general facility development guidelines that satisfy aviation demand while remaining compatible with the environment, other modes of transportation, community development, and other established community goals. Some of the specific goals of the Friedman Memorial Airport Master Plan Update are as follows:

- Operational safety for the aircraft fleet that can reasonably use the airfield is an important consideration. Given the site constraints imposed by the Airport's limited land envelope and surrounding terrain, this is a challenge and will be a major focus of the master planning effort.

- Air service is an important component of the Wood River Valley economy. Therefore, this master plan will strive to develop plans to optimize commercial air service capabilities, which in turn serve to further improve air service opportunities.

- A Joint Powers Agreement adopted in May 1994 by the City of Hailey and Blaine County lays the groundwork establishing the operating parameters for the Airport Authority. A no growth policy is the current reality of the local community. That being said, this master planning effort identifies the capacity of various airport facilities which in turn defines the point at which the Airport can no longer accommodate additional activity.

The preamble to the 1994 Master Plan Update will continue to be a reference point:

> *"The Friedman Memorial Airport is critical to the success of our resort economy, yet it has an enormous impact on the adjacent community. The goals of this Master Plan are to eliminate as many of the safety deviations as possible while not expanding the impact on the adjacent community. We seek the highest quality and safest airport possible within the physical limits imposed by the geography and the human use of adjacent lands. As pressure for use reaches the physical limits of the facility, we need to look for alternatives away from the valley cities rather than expansion at the present site."*

2. Plan Scope and Documentation

While the Airport Master Plan Update is tailored to meet Friedman Memorial Airport's specific needs, it also adheres to guidelines established by the FAA. Important FAA master planning objectives incorporated within the Friedman Memorial Airport Master Plan Update include:

- Provide an effective graphic representation of the Airport's existing and recommended ultimate development and anticipated functional areas.

- Assess the feasibility of the recommended development action through a prioritized and phased schedule of recommended improvements.

- Provide concise and descriptive documentation that can be clearly understood by the community and agencies charged with approving, promoting, funding, and implementing the Airport improvement program.

To meet these objectives and address the specific needs of the Friedman Memorial Airport, the Master Plan Update incorporates a series of analyses, including:

- Inventory of Existing Facilities
- Projections of Aviation Demand
- Demand/Capacity Analysis and Determination of Facility Requirements
- Alternative Plan Concepts
- Environmental Overview
- Financial Plan
- Airport Layout Plan Update

These analyses were documented in *working papers*, which became chapters in this final master plan report. The working papers were considered draft documents and were subject to revision throughout the master planning process. The updated Airport Layout Plan (ALP) is one of the culminating elements of this planning process, as it provides the official graphic representation of the Airport's existing and proposed facilities. Once the FAA approves the ALP, certain projects may be eligible for grant funding.

3. Relationship to Other Plans

This Airport Master Plan Update replaces the 1994 Airport Master Plan Update, the 1998 ALP Update and Narrative Report, and the 2002 ALP Update.

4. Administration

This section lays out some of the administrative aspects of the Master Plan Update project, including the key airport personnel involved, the project consultant team, and the public involvement process.

4.1 Involvement by Key Airport Personnel

The Board of Commissioners (Board) of the Friedman Memorial Airport Authority, in discussions with the Airport Manager and the community, identified the need to conduct a master plan update process. They did so because there were many compelling issues that the Airport and the community were facing related to aviation activities and industry trends. It was considered prudent to evaluate options for accommodating current demands and identify opportunities for improving the Airport within the context of a long-range planning exercise. The members of the Board were the primary reviewers of the Master Plan Update products and processes. The Airport Manager was also a principal involved participant in the Master Plan Update process.

4.2 Project Consultant Team

Toothman-Orton Engineering Company, which was hired by the Board to assist with various improvement projects at the Airport, entered into an agreement to update the Airport's Master Plan. This agreement was the culmination of nearly a one-year effort to define the scope of the master plan based on the important issues that needed to be addressed. These discussions involved planners at the Federal Aviation Administration Airports District Office and Northwest Mountain Region office, as well as other subconsultants retained by Toothman-Orton, assembled as part of a Master Plan Team to assist the Airport in the development of a Master Plan Update.

Subconsultants gathered to work with Toothman-Orton and the Key Airport participants on this Master Plan Update, and their area of expertise, are listed below.

Mead & Hunt – general airport planning, including terminal planning and architectural concepts

Pavement Consultants, Inc. – pavement condition index (PCI) program development

Harris Miller Miller Hanson – aircraft noise analysis

4.3 Public Involvement Process

It is important to the success of this master planning process that the community be allowed to participate and opportunities for information sharing are available. The public was made aware of the Master Plan Update process and the needs of the Airport from the inception of the study. This aspect of the project focused on positive communication with the public and will include Board briefings, public involvement workshops, involvement at the federal government level (through the FAA), and a master plan web page.

Friedman Memorial Airport Authority Board of Commissioners Briefings. The Airport Board will represent Airport and local interests. The planning consultants met with the Board during the course of the study (as part of their regularly scheduled meetings) to review study progress and draft reports. Specific milestones for master plan meetings with the Board included: project kickoff; projections of aviation demand; facility requirements; alternative plan concepts; and final recommended improvement plan. For some of these milestones, several meetings were held (see Chapter Four, Alternative Plan Concepts).

Public Involvement Workshops and Hearing. The Master Plan Update's public information process incorporated informational workshops. The workshop forum provided the opportunity for interested persons to discuss airport/master plan issues directly with Airport staff and members of the consultant team. The workshops were advertised in advance in the local media. Information stations were established to provide information on the Airport, as well as on proposed projects, to concerned individuals. Additional descriptions of public workshops and hearing held are included in Chapter Four, Alternative Plan Concepts.

Federal Aviation Administration. Planners and airport certification personnel from the FAA Airports District Office in Seattle, WA were involved in the master plan study through its completion. They reviewed and commented on master plan documents, and provided guidance regarding FAA policies and standards.

Airport Master Plan Web Page. A web page was developed and maintained to help inform the public about the Master Plan Update. The address is www.friedmanairport.com.

Master Plan Contents

This page provides a list of the major deliverables anticipated for the Master Plan Update. It is intended as a "road map" showing the various elements of the master plan study. Each of these areas will be addressed in a working paper, which will ultimately be consolidated as chapters in the final master plan report. Working papers developed throughout the master plan process are considered works in progress and are subject to revision.

Preface

This section includes a discussion of the plan goals and objectives, the planning scope and documentation, the relationship of this plan to other plans, and addresses some administrative matters.

1. Inventory of Existing Facilities

The inventory section documents existing conditions and historical data, thereby providing the background information essential to the completion of the Master Plan Update. Study elements build on the major philosophical decisions and limits defined in prior planning studies.

2. Projections of Aviation Demand

This element of the study provides projections of short-, intermediate-, and long-range demand within the boundaries identified in Chapter One. Components of demand include passenger enplanements, aircraft operations, based aircraft, and fleet mix. Demand projections are "unconstrained" in that they predict what could occur within the established planning limits in the absence of physical constraints which serve to limit it are made in following study sections to provide facilities to accommodate demand.

3. Demand/Capacity Analysis and Determination of Facility Requirements

This element evaluates long-range airfield and landside facility requirements for the Airport. Existing and future facility requirements, as well as development standards, are identified by comparing the Airport's projected demand levels established in Chapter Two to the Airport's capacity, or its ability to accommodate demand. Limitations to capacity can be defined or established in this Chapter.

4. Alternative Plan Concepts

Alternative methods for accommodating aviation demand at the Airport are documented in this element. This includes airfield issues, terminal area, general aviation, access/parking, etc. This element of the master plan also provides a comparative evaluation of the alternative plans against a variety of criteria (e.g., safety, economics, environmental impacts) identifies significant limitations that may exist to accommodating demand, and develops a final recommendation.

5. Environmental Overview

This element of the master planning process provides a review of the recommended development plan, in terms of possible environmental issues.

6. Financial Plan

The financial plan consists of a capital improvement program for implementation of the recommended plan (list of projects and estimated project costs).

7. Airport Layout Plan Update

The airport layout plan (ALP) is the official drawing depicting the Airport's existing and proposed facilities and the future facilities associated with the selected alternative. Once it is approved by the Federal Aviation Administration, certain projects will be eligible for federal grant funding.

Chapter One
Inventory of Existing Facilities

As outlined in Federal Aviation Administration (FAA) Advisory Circular 150/5070-6A, *Airport Master Plans*, the initial step in the Master Plan process for the Friedman Memorial Airport is the collection and evaluation of information about the Airport and the area it serves. The inventory task for the Friedman Memorial Airport (FMA) is accomplished through physical inspection of the facilities, field interviews and surveys, telephone conversations, review of previous Airport studies, and review of appropriate Airport management records.

The objective of the inventory task is to document existing conditions, thereby providing the background information essential to the completion of the Master Plan Update. The inventory information covers a broad spectrum and includes information on the following elements of the Airport:

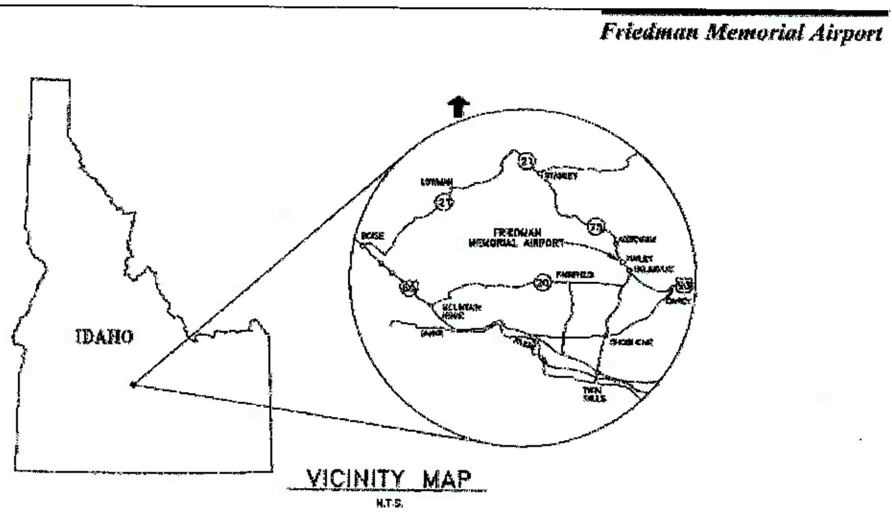
- Airside and landside facilities and their uses
- Surface transportation data
- Air traffic activity data
- Auxiliary and service support facilities
- Weather data
- Other airport studies
- Airspace structures
- Available navigational aids (NAVAIDs)

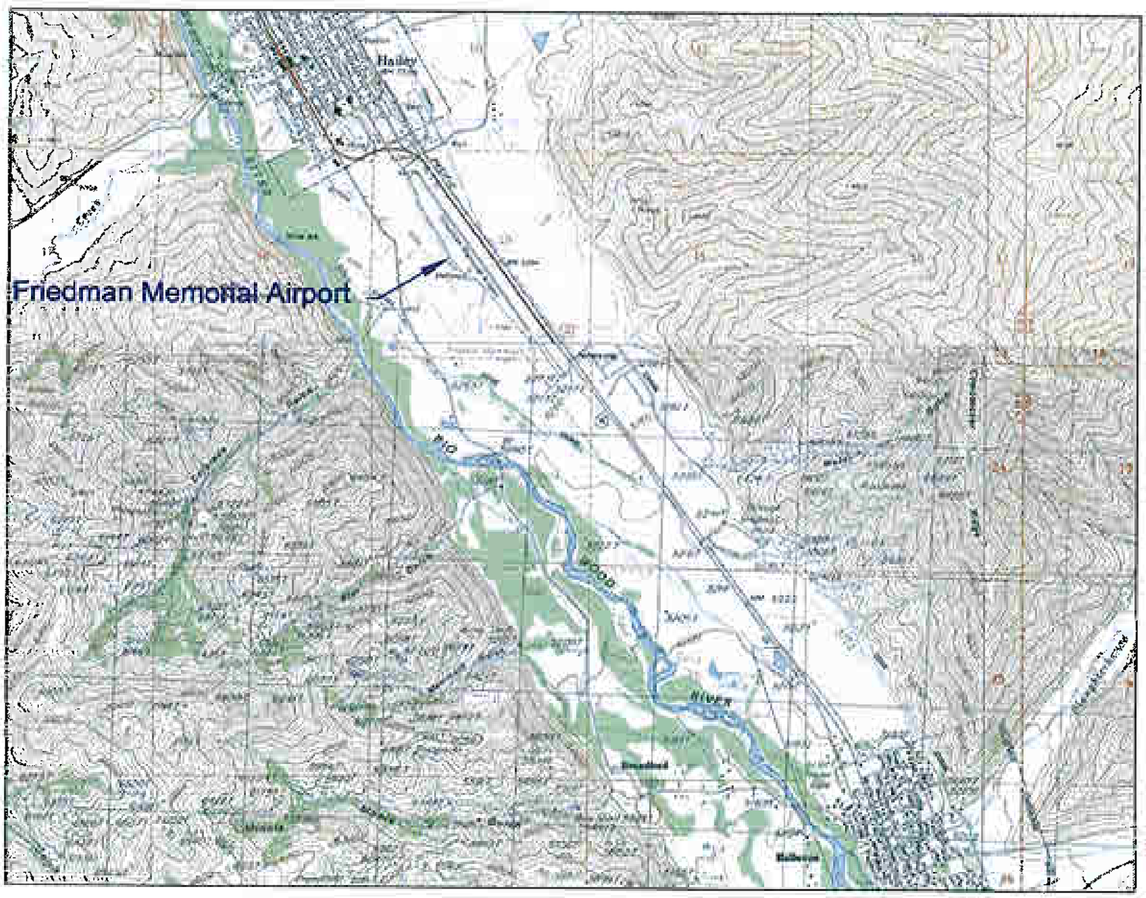
A large volume of data was collected, reviewed, and analyzed during the inventory effort at Friedman Memorial Airport. Much of the detailed information is presented and supplemented in subsequent chapters of this Master Plan, as appropriate; to support the various technical analyses required as part of this project. This chapter presents an overall summary and status. This chapter is organized in the following sections:

1.1 General Airport Description and Location
1.2 Existing Airport Environment
1.3 Existing Airport Facilities
1.4 Airspace
1.5 Airport Activity Statistics
1.6 Existing Planning Documents

1.1 General Airport Description and Location

Friedman Memorial Airport is located in the City of Hailey, within Blaine County. Blaine County is centrally located in central Idaho in an area known as the Wood River Valley. The Big Wood River runs north and south between the Smoky, Pioneer, and Boulder Mountains. **Exhibit 1-1** depicts a vicinity map of the airport location. Friedman Memorial Airport is located immediately south of the central business district of Hailey and approximately two miles north of the City of Bellevue. State Highway 75 runs directly adjacent to the east side of the Airport, southeast to northwest through the cities of Bellevue and Hailey, with Ketchum 11 miles to the north and Twin Falls 75 miles to the south.





Source: Airport Layout Plan; USGS, Topographic Map
Prepared by: Mead & Hunt, Inc.

Exhibit 1-1

No Scale

north

Vicinity Map

Ex1-01_vicinity map.dwg

Master Plan Update

Friedman Memorial Airport, designated by the airport code SUN, occupies approximately 211 acres or 0.33 square miles. The Airport is jointly owned by the City of Hailey and the County of Blaine, Idaho and is located 13 miles south of the Sun Valley recreation area. The Airport provides both scheduled air service and general aviation services to the Wood River Valley and central Idaho, which includes the communities of Hailey, Bellevue, Ketchum, Sun Valley and Carey. Horizon Air and Skywest provide regular scheduled service with nonstop service to Salt Lake City, Utah and Seattle, Washington. Horizon Air also provides seasonal (winter) non-stop service to Boise, Idaho, and is participating in a private-public partnership that successfully won a small community air service pilot program grant from the U.S. Department of Transportation. The grant program is in effect for one year beginning December 15, 2002 to provide non-stop service from Los Angeles International to Friedman Memorial Airport.

Historical Development. On December 28, 1931, a portion of land owned by the Friedman family was deeded to the City of Hailey for use as an airport with the condition that if the land should ever cease to be used as an airport, the property would revert back to the Friedman heirs.

In 1960, the first Blaine County Airport Commission was established when the City of Hailey entered into a joint operating agreement with Blaine County and the State of Idaho, thus enabling the Airport to utilize state and federal funding sources. Resolution #77-28 in 1977 established a seven-member commission and created the Airport's manager position.

As the original owner, the City of Hailey wanted more representation on the Airport Commission in late 1987. Negotiations followed, and in 1988 the Airport Commission was restructured to include eleven members. In 1994 a Joint Powers Agreement was reached between Blaine County, political subdivision of the State of Idaho, and the City of Hailey regarding the oversight and operation of Friedman Memorial Airport. The purpose of this joint powers agreement was to create a new Authority, consisting of five members, for the management and operation of the Airport, to eliminate safety deviations without expanding the impact of the Airport on the adjacent community, and to implement the 1994 Master Plan Update. The Joint Powers agreement provides the groundwork establishing the operating parameters for the Airport Authority. During the early 1990's an exhaustive, public master planning process was conducted which culminated in a Master Plan adopted in 1994. The Preamble from the 1994 Master Plan Update continues to provide the framework for the operation and development of the airport. The Preamble reads:

> "The Friedman Memorial Airport is critical to the success of our resort economy, yet it has an enormous impact on the adjacent community. The goals of this Master Plan are to eliminate as many of the safety deviations as possible while not expanding the impact on the adjacent community. We seek the highest quality and safest airport possible within the physical limits imposed by the geography and the human use of adjacent lands. As pressure for use reaches the physical limits of the facility, we need to look for alternatives away from the valley cities rather than expansion at the present site."

These principles remain in effect today, and continue to guide the operation and development of the airport. The scope of this planning study was prepared in cooperation with the FAA and the Airport Authority and approved in this context. Emphasis for this planning study is placed on further efforts to define the "safest airport possible" and to identify the "physical limits of the facility".

Prior to 1976 all aircraft operations were conducted from an aggregate base (+8.5 inches) runway with a one-inch bituminous surface treatment (BST) top surface constructed in 1969. This surfaced served adequately since the overwhelming majority of operations were by small, light aircraft of less than 15,000 pounds weight. The runway received a three-inch thick asphalt concrete surface in 1976 as a result of increasing, regular use by small and medium jets, to include the Gulfstream II and the turboprop Convair 440 operated by Sun Valley Key Airline, a commuter service airline. Operating weights of these aircraft were identified in the ADAP submitted for the project as 54,000 pounds and 49,200 pounds, respectively.

The runway received a two-inch overlay in 1983 as part of Airport Improvement Program (AIP) project. This overlay was placed according to the Grant Application as a result of "extensive cracking and deterioration on the runway", more particularly on the south end touchdown zone where approximately 95 percent of all approaches are made. The resulting runway strength was reported in 1983 to be 65,000-pound single wheel; 95,000 pounds dual wheel; and 150,000-pound dual tandem gear. The runway surface was grooved in 1983 to provide a skid-resistant surface. . A non-structural porous friction course (PFC) skid resistant surface was placed in 1995. This PFC surface was removed and replaced in 1997. Extensive patching of the underlying two inch pavement mat placed in 1983 was accomplished in both 1995 and 1997 necessitated by apparent deterioration of the asphalt concrete layer. The 1995 Project Design Report documents the existence of rutted and cracked pavement particularly in this area of aircraft wheel paths. Significant repairs to the two-inch A.C. mat placed in 1983 in addition to work done in 1995 were also accomplished. The PFC application (±3/4 inch) provides no additional strength to the runway; as such, the reported pavement strengths on the airports 5010 Form and in the Facilities Directory remain as identified in 1983. An important element of this study will be consideration of alternatives for rehabilitation of the existing aged and deteriorating runway pavement.

The 1994 Master Plan established an Airport Reference Code (ARC) of B-III for the Airport. This classification is for aircraft with approach speeds of more than 91 knots but less than 121 knots and wingspans of 79 feet up to but not including 118 feet. Proposed facility improvements were established based on this ARC. An update to portions of the 1994 Master Plan prepared in 1997 did not re-evaluate the designated ARC but rather refined the detailed approach to implementing the 1994 planning concepts. Separations of critical operational surfaces were specifically developed based on the DeHavilland Dash 8-200 aircraft with a wingspan of 90.0 feet. Recent improvements to airport taxiways and parking apron during 1999 through 2002 are designed based on the Gulfstream IV as the critical aircraft. This is a dual wheel aircraft with a maximum certificated takeoff weight of 72,000 pounds. Design considerations include with occasional use by dual wheel aircraft with maximum certificated takeoff weights up to 95,000 pounds. No pavements exist at the Airport that include aircraft over 95,000 pounds maximum certificated takeoff weight in the design fleet mix.

1.2 Existing Airport Environment

Topography. Topographically, Hailey is located within the narrow valley of the Wood River with mountainous terrain to the north, east and west. The width of the valley floor is approximately 1.5 miles in the Hailey area. The hillsides in this region normally range between 35 and 40 percent in slope, with the valley floor ranging from zero to ten percent in slope from the river to the base of the hills. In the vicinity around Hailey, the peaks are 1,200 to 2,200 feet above the principal stream valleys. The Big Wood River meanders through the valley flowing in a north-south direction. This river lies approximately 4,000 feet west of the Airport runway.

Soil. The Wood River Valley has a wide variety of soil types. Hailey, however, can be characterized into two predominate soil associations: Little Wood gravelly loam and Hutton gravelly loam. The Hutton series is somewhat poorly drained clay loam. Soils at the Airport are generally structurally stable but moderately frost susceptible.

Meteorological/Climate Conditions. There are three weather stations reporting to the National Climatic Data Center in the vicinity of the airport. A station three miles north/northwest of Hailey reporting only precipitation data, and stations in Ketchum to the north and Picabo to the southeast reporting both temperature and precipitation data. **Table 1-1** summarizes the elevation, distance to the airport, and the temperature and precipitation data reported by each of the three stations. Temperature data for Hailey has been estimated as an average between the Ketchum and Picabo stations.

Table 1-1
Climatography Data

		Station Name		
	Units	Hailey 3 NNW	Ketchum Ranger Station	Picabo
Elevation	MSL	5424	5890	4830
Distance to Airport	NM	4.1	11.2	15.8
Temperature Normals				
Annual Mean	Deg F	40.9	39.5	42.2
Hottest Month (JUL) – Avg. Daily Max	Deg F	82.8	80.9	84.7
Coldest Month (JAN) – Avg. Daily Min	Deg F	5.3	3.9	6.7
Precipitation Normals				
Annual Avg.	Inches	15.17	18.91	12.91
Low Month (AUG)	Inches	0.52	0.82	0.39
Peak Month (DEC/JAN)	Inches	2.32	2.32	1.62
Degree-Days				
Heating Degree-Days	Total	8970	9398	8542
Cooling Degree-Days	Total	163	97	228

Note: Hailey 3 NNW Temperature Normals and Degree-Days estimated as an average of the Ketchum and Picabo stations.
Heating and Cooling Degree-Days use base of 65 degrees Fahrenheit.
Source: *Climatography of the United States*, Idaho, 1971-2000, National Climatic Data Center

As shown in Table 1-1, Hailey has an annual average temperature of 40.9 degrees. The hottest month is July with an average daily high of 82.8 degrees F. The Hailey area can be classified as a semi-arid desert zone receiving just over 15 inches of precipitation a year. August usually receives the least amount of precipitation, while the most precipitation occurs in December and January (in the form of snow).

The lower elevations south of the Airport can receive significant ground fog, which is created by the warmer surface temperatures south of the valley mixing with the cooler temperatures of the higher elevations. The Airport is technically operating under visual flight rules 95 percent of the time, with ceilings at or above 1,000 feet and visibility at or above three statute miles. However, aircraft frequently are not able to approach the Airport due to fog and low cloud conditions and due to instrument flight procedures that can only provide for approaches when ceiling minimums are greater than 1,900 feet. Therefore, the Airport is actually operational a smaller percentage of the time, since there are no published instrument procedures with typical IFR minimums. This often forces diversions to Twin Falls.

Hailey has considerable wind exposure resulting from canyon winds in the lower county from lack of mountain enclosure. **Exhibit 1-2** depicts the all weather wind rose and wind coverage of the Airport's single runway. With allowable crosswinds of 12 miles-per-hour, the existing northwest-southeast runway orientation provides 96.6 percent wind coverage; and with allowable crosswinds of 15 miles-per-hour, provides 99.3 percent wind coverage.

1.3 Existing Airport Facilities

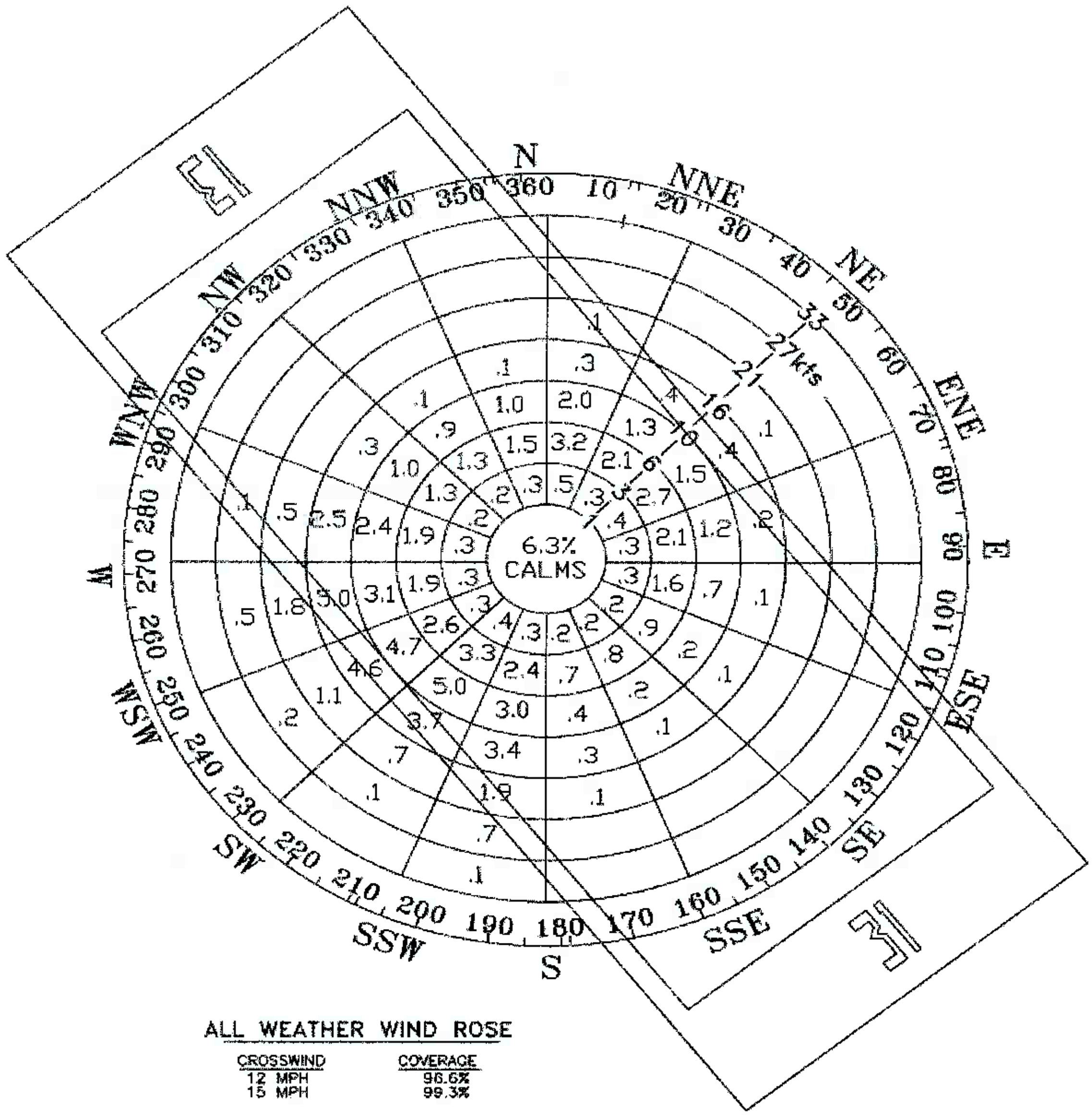
Existing airport facilities are presented in four categories: airside, airport passenger terminal building, airport access and parking, and support facilities. The airside facilities include such areas as the runways, taxiways, aprons, aircraft parking and storage areas, airfield lighting, and navigational aids. The landside facilities include such items as the airport terminal building, vehicular access, auto parking and support facilities. The support facilities may include fuel facilities, aircraft rescue and firefighting (ARFF) facilities, airport maintenance, snow removal equipment (SRE) and facilities, and utilities. The existing airside, landside, and support facilities are detailed below. The current Airport Layout Drawing is depicted in **Exhibit 1-3**.

1.3.1 Airside Facilities

The airfield consists of many components that are required to accommodate safe aircraft operations. This consists of runways, taxiways, and an apron network; the visual and electronic navigational aids associated with runways; runway protection zones and general aviation facilities.

Runways. Friedman Memorial Airport has a single runway, Runway 13-31. The runway pavement is 6,952 feet long by 100 feet wide with a Bituminous Porous Friction Course (PFC) surface. The average runway slope is approximately one percent upward from south to north. The northernmost 1700 feet slopes at an average of 0.6 percent while the southernmost 1700 feet slopes at an average of 1.0 percent. Runway safety area dimensions and grading are presently compatible with ARC B-III standards. Declared distances have been applied to the runway to provide runway safety areas and appropriate Runway Protection Zones (RPZs) off the ends of the runway and clear approach surfaces. **Table 1-2** summarizes the declared distances on Runway 13-31.

Friedman Memorial Airport



ALL WEATHER WIND ROSE

CROSSWIND	COVERAGE
12 MPH	96.6%
15 MPH	99.3%

SOURCE: NATIONAL CLIMATIC CENTER OBSERVATION
PERIOD: 1980 TO 1989 OBSERVATIONS: 100%

Source: Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit 1-2

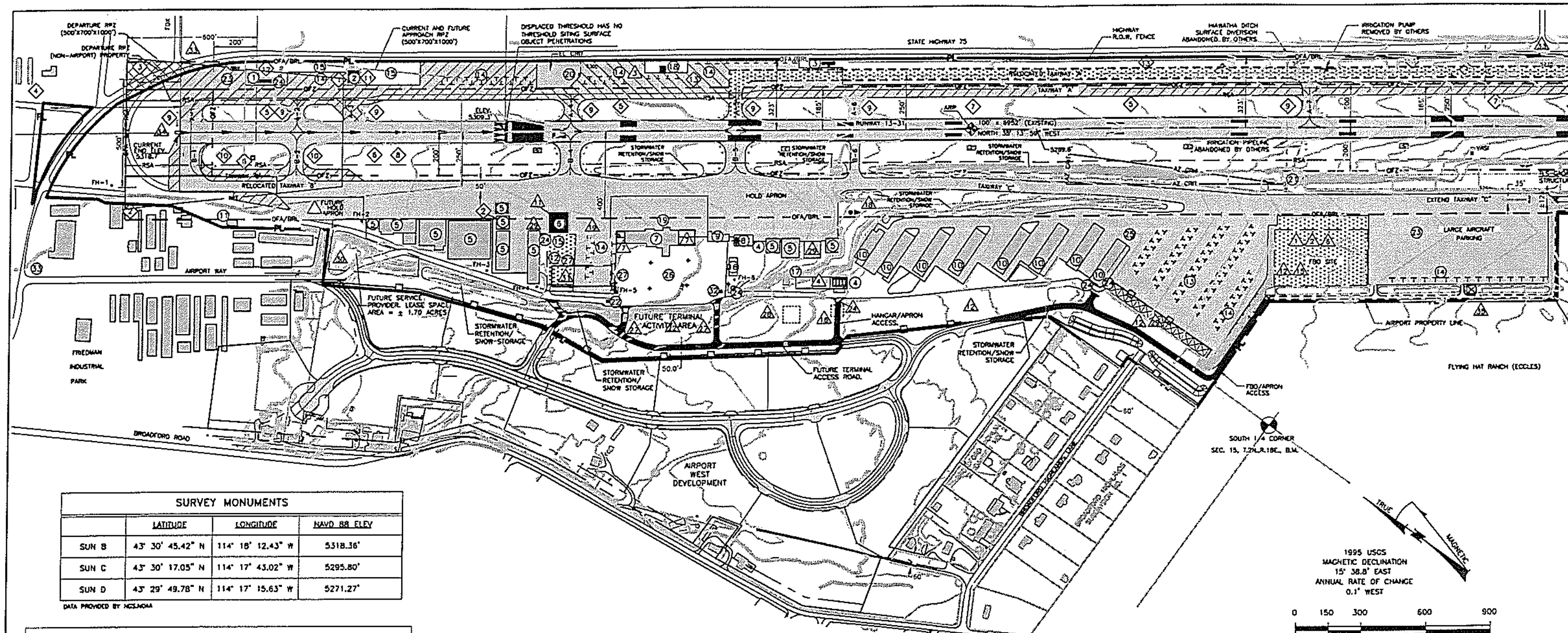
No Scale

north

All Weather Windrose & Wind Coverage

Ex1-02_windrose.dwg

Master Plan Update



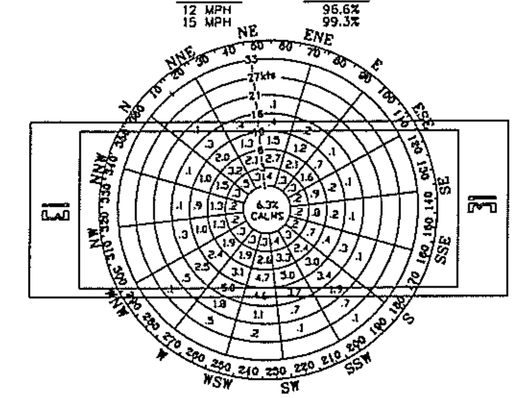
SURVEY MONUMENTS

	LATITUDE	LONGITUDE	NAVD 88 ELEV
SUN B	43° 30' 45.42" N	114° 18' 12.43" W	5318.36'
SUN C	43° 30' 17.05" N	114° 17' 43.02" W	5295.80'
SUN D	43° 29' 49.78" N	114° 17' 15.63" W	5271.27'

DATA PROVIDED BY NGS/NOAA

ALL WEATHER WIND ROSE

CROSSWIND	COVERAGE
12 MPH	96.6%
15 MPH	99.3%



SOURCE: NATIONAL CLIMATIC CENTER
OBSERVATION PERIOD: 1980 TO 1989
OBSERVATIONS: 100%

MODIFICATIONS TO FAA AIRPORT DESIGN STANDARDS

#	DESIGN STANDARD, DESCRIPTION, LOCATION, EFFECT AND AUTHORITY	DURATION
1	RUNWAY 13-31 OBJECT FREE AREA WIDTH – EAST SIDE. THE CURRENT WIDTH IS ±219' BECAUSE OF THE LOCATION OF A FBO HANGAR WHICH IS SHORT OF THE STANDARD 400' (AC 150/5300-13, CHG. 5, PAR. 211 AND 307). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE GREATER SEPARATIONS AT 323' BUT REMAINS SHORT OF THE STANDARD BECAUSE OF THE LOCATION OF THE AIRPORT PROPERTY LINE AND FENCE COINCIDENT TO STATE HIGHWAY 75 RIGHT-OF-WAY. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE BECAUSE ACQUISITION OF THE HIGHWAY RIGHT-OF-WAY OR MOVING ALL AIRPORT FACILITIES TO THE WEST IS UNECONOMICAL. FUTURE OFA WILL BE 323' ONCE THE FBO FACILITIES ARE REMOVED.	PERMANENT
2	RUNWAY 13-31 OBJECT FREE AREA WIDTH – WEST SIDE. THE CURRENT WIDTH IS ±280' BECAUSE OF THE LOCATION OF AIRCRAFT PARKING WHICH IS SHORT OF THE STANDARD 400' (AC 150/5300-13, CHG. 5, PAR. 211 AND 307). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE GREATER SEPARATIONS AT 392' WHICH WILL REMAIN LESS THAN THE 400' STANDARD BECAUSE OF THE LOCATION OF AN AIRCRAFT HANGAR BUILDING. THE HANGAR ONLY RESTRICTS 60 LINEAR FEET WITH THE REMAINING OFA AT THE STANDARD DIMENSION OF 400'. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE BECAUSE RELOCATION OF THE HANGAR TO PROVIDE AN ADDITIONAL 8' OF CLEARANCE FOR ONLY 60 FEET IS CONSIDERED UNECONOMICAL. STRUCTURES LOCATED IN THE OFA AT THE NORTHWEST CORNER ARE ON PRIVATE PROPERTY. GROUND SURFACE IN THIS AREA IS SIGNIFICANTLY LOWER THAN THE RUNWAY ELEVATION. IT IS NOT CONSIDERED ECONOMICAL TO CORRECT THIS DEVIATION.	PERMANENT
3	RUNWAY 13 OBJECT FREE AREA LENGTH BEYOND RUNWAY END. THE CURRENT LENGTH VARIES FROM 0' TO 600' AS A RESULT OF THE DIAGONAL PLACEMENT OF IDAHO STATE HIGHWAY 75 ACROSS THE EXTENDED RUNWAY CENTERLINE NORTH OF THE RUNWAY 13 THRESHOLD AND THE SUBSEQUENT LOCATION OF THE AIRPORT SECURITY FENCE. THIS IS SHORT OF THE STANDARD 600' (AC 150/5300-13, CHG. 5, PAR. 211 AND 307). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE AN OVERALL ADDITIONAL 350' LENGTH WHICH REMAINS SHORT OF THE STANDARD BECAUSE OF THE LOCATION OF HIGHWAY 75. THE AMOUNT OF LAND IN COMPLIANCE WITH THE OFA STANDARDS IS CURRENTLY 8.82 ACRES. THIS REMAINS SHORT OF THE RECOMMENDED AREA OF 11.0 ACRES. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE TO EXIST BECAUSE OPTIONS AVAILABLE TO PROVIDE A COMPLETE OFA, WHICH INCLUDE; SHIFTING THE RUNWAY AN ADDITIONAL 300 FEET TO THE SOUTH, OR RELOCATING STATE HIGHWAY 75 TO THE NORTH TO PROVIDE A COMPLETE OFA ARE NOT CONSIDERED ECONOMICAL.	PERMANENT
4	RUNWAY 31 DEPARTURE RUNWAY PROTECTION ZONE. PRIOR DEVIATION CORRECTED BY DECLARED DISTANCES.	
5	RUNWAY 13-31 RUNWAY OBSTACLE FREE ZONE – EAST SIDE. THE CURRENT WIDTH VARIES FROM ±120' TO 140' BECAUSE OF THE LOCATION OF AIRCRAFT WING TIPS AS THEY TAXI ON THE PARALLEL TAXI WAY WHICH IS SHORT OF THE STANDARD OF 200' (AC 150/5300-13, CHG. 5, PAR. 211 AND 306). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR THE STANDARD DIMENSION.	TEMPORARY
6	RUNWAY 13-31 RUNWAY OBSTACLE FREE ZONE – WEST SIDE. THE CURRENT WIDTH IS ±155' BECAUSE OF THE LOCATION OF AIRCRAFT WING TIPS AS THEY TAXI ON THE PARALLEL TAXIWAY WHICH IS SHORT OF THE STANDARD OF 200' (AC 150/5300-13, CHG. 5, PAR. 211 AND 306). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR THE STANDARD DIMENSION.	TEMPORARY
7	RUNWAY 13-31 CENTER LINE TO PARALLEL TAXIWAY CENTER LINE – EAST SIDE. TAXIWAY A SEPARATION – THE CURRENT SEPARATION VARIES FROM ±160' TO 185' BECAUSE OF THE LOCATION OF FBO HANGARS AND AIRCRAFT TIEDOWN RAMP WHICH IS SHORT OF THE STANDARD OF 300' (AC 150/5300-13, CHG. 5, PAR. 209). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR 250' WHICH IS SHORT OF THE STANDARD. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE BECAUSE IT PROVIDES THE REQUIRED CLEARANCE FOR THE DESIGN AIRCRAFT (AC 150/5300-13, CHG. 5, PAR. 6 AND 209, APPENDIX 11 PAR. 7, TABLE 2-3, TABLE 4-1, AND TABLE 4-3). ADDITIONALLY ACQUISITION OF THE HIGHWAY RIGHT-OF-WAY OR MOVING ALL AIRPORT FACILITIES TO THE WEST IS UNECONOMICAL.	PERMANENT
8	RUNWAY 13-31 CENTER LINE TO PARALLEL TAXIWAY CENTER LINE – WEST SIDE. TAXIWAY B SEPARATION – THE CURRENT SEPARATION IS ±200' BECAUSE OF THE LOCATION OF THE AIRCRAFT TIEDOWN RAMP WHICH IS SHORT OF THE STANDARD OF 300' (AC 150/5300-13, CHG. 5, PAR. 209). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR 250' WHICH IS SHORT OF THE STANDARD. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE BECAUSE IT PROVIDES THE REQUIRED CLEARANCE FOR THE DESIGN AIRCRAFT (AC 150/5300-13, CHG. 5, PAR. 6 AND 209, APPENDIX 11 PAR. 7, TABLE 2-3, TABLE 4-1, AND TABLE 4-3). ADDITIONALLY THE MOVING OF NUMEROUS HANGAR BUILDINGS TO PROVIDE THE STANDARD SEPARATION IS UNECONOMICAL.	PERMANENT

MODIFICATIONS TO FAA AIRPORT DESIGN STANDARDS

#	DESIGN STANDARD, DESCRIPTION, LOCATION, EFFECT AND AUTHORITY	DURATION
9	RUNWAY 13-31 RUNWAY CENTER LINE TO HOLD LINE SEPARATION – EAST SIDE ON TAXIWAY A – THE CURRENT SEPARATION VARIES FROM 125' TO 145' BECAUSE OF THE LOCATION OF FBO HANGAR BUILDINGS AND THE PARALLEL TAXIWAY AND IS SHORT OF THE STANDARD OF 200' (AC 150/5340-1G, PAR. 21). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR THE STANDARD DIMENSION.	TEMPORARY
10	RUNWAY 13-31 RUNWAY CENTER LINE TO HOLD LINE SEPARATION – WEST SIDE ON TAXIWAY B – THE CURRENT SEPARATION IS ±165' BECAUSE OF THE LOCATION OF THE AIRCRAFT TIEDOWN RAMP AND THE PARALLEL TAXIWAY AND IS SHORT OF THE STANDARD OF 200' (AC 150/5340-1G, PAR. 21). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR THE STANDARD DIMENSION.	TEMPORARY
11	PARALLEL TAXIWAY SAFETY AREA WIDTH – NORTH 1/2 EAST SIDE – TAXIWAY A. THE CURRENT WIDTH IS ±69' BECAUSE OF THE LOCATION OF AN FBO HANGAR AND THE RSA WHICH IS SHORT OF THE STANDARD OF 118' (AC 150/5300-13, CHG. 5, PAR. 211 AND 403). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL ELIMINATE THIS CONDITION, AS THERE WILL BE NO PARALLEL TAXIWAY IN THIS LOCATION.	TEMPORARY
12	PARALLEL TAXIWAY OBJECT FREE AREA WIDTH – NORTH 1/2 EAST SIDE – TAXIWAY A. THE CURRENT WIDTH IS ±152' BECAUSE OF THE LOCATION OF AN FBO HANGAR WHICH IS SHORT OF THE STANDARD OF 186' (AC 150/5300-13, CHG. 5, PAR. 211 AND 404). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL ELIMINATE THIS CONDITION, AS THERE WILL BE NO PARALLEL TAXIWAY IN THIS LOCATION.	TEMPORARY
13	PARALLEL TAXIWAY OBJECT FREE AREA WIDTH – SOUTH 1/2 EAST SIDE – TAXIWAY A. THE CURRENT WIDTH IS ±178' BECAUSE OF THE LOCATION OF AN IRRIGATION PUMP WHICH IS SHORT OF THE STANDARD OF 186' (AC 150/5300-13, CHG. 5, PAR. 211 AND 404). IMPLEMENTATION OF THE ALP UPDATE RECOMMENDATIONS WILL PROVIDE FOR 166' WHICH IS SHORT OF THE STANDARD. THIS MODIFICATION OF AIRPORT DESIGN STANDARDS WILL CONTINUE BECAUSE IT PROVIDES THE REQUIRED CLEARANCE FOR THE DESIGN AIRCRAFT (AC 150/5300-13, CHG. 5, PAR. 6 AND 209, APPENDIX 11 PAR. 7, TABLE 2-3, TABLE 4-1, AND TABLE 4-3). ADDITIONALLY ACQUISITION OF THE HIGHWAY RIGHT-OF-WAY OR MOVING ALL AIRPORT FACILITIES TO THE WEST IS UNECONOMICAL.	PERMANENT
14	TRANSPONDER LANDING SYSTEM, LAOA LOCATION. THE LAOA WILL BE LOCATED AT A POINT WHICH PROVIDES A 75 FOOT TAXIWAY-CENTERLINE-TO-OBJECT SEPERATION. THIS IS LESS THAN THE RECOMMENDED STANDARD OF 93 FEET FOR ALL DESIGN GROUP III AIRCRAFT BASED ON APPLICATION OF THE FORMULA PROVIDED IN AC150/5300-13 CHG. 4, TABLE 4-1. THIS LOCATION PROVIDES AN ACCEPTABLE LEVEL OF SAFETY FOR THE DEHAVILLAND Q400 AIRCRAFT (93' WINGSPAN).	PERMANENT

NOTE:

MODIFICATION TO STANDARDS ⟨1⟩ AND ⟨3⟩ THROUGH ⟨13⟩ WERE PREVIOUSLY APPROVED ON NOV. 25, 1998. MODIFICATION ⟨2⟩ WAS ALSO APPROVED BUT ADDITIONAL LANGUAGE HAS BEEN ADDED TO THIS REVISION.

CRITICAL AIRCRAFT DATA

AIRPORT ELEMENT	AIRCRAFT NAME	APPROACH SPEED / APPROACH CLASS	WING SPAN / DESIGN GROUP	TAKEOFF WEIGHT / AIRCRAFT SIZE	LENGTH OF HAUL
FACILITY SEPARATIONS RUNWAY LENGTH	DHC-8 (DASH 8)	90 KN. / A	90.0' / III	41,000 lb. (DW) / LARGE	< 60,000 lb. 400 MILES
PAVEMENT STRENGTH	BAe-146-200	117 KN. / B	86.4' / III	88,250 lb. (DW) / LARGE	> 60,000 lb. 500 MILES

BUILDING AND FACILITIES

CURRENT	FUTURE	DESCRIPTION
1	1	FBO HANGAR/OFFICE
2	2	FBO HANGAR
3	3	GLIDER RIDES OFFICE
4	4	FUEL FACILITY
5		EXISTING HANGAR
6	6	FBO MAINTENANCE HANGAR
7	7	TERMINAL BUILDING/EXPANSION
8		AIRPORT RESCUE & FIRE FIGHTING
9		AIRPORT MANAGERS OFFICE
10		EXISTING T-HANGARS AND HANGAR MULTI-UNIT
11	11	FOREST SERVICE TRAILER & HELIPAD
12	12	PILOT/FBO AUTOMOBILE PARKING
13		BASED AIRCRAFT TIEDOWN RAMP
14		TRANSIENT AIRCRAFT TIEDOWN RAMP
15	15	FBO AUTOMOBILE PARKING
16	16	SNOW REMOVAL/MAINTENANCE EQUIPMENT BUILDING
17		STORAGE BUILDING
18	18	AIR TRAFFIC CONTROL TOWER
19	19	TERMINAL RAMP
20		MLS ELEVATION BUILDING
21		MLS AZIMUTH BUILDING
22	22	PARKING ATTENDANT BOOTH
23		LARGE AIRCRAFT PARKING
24	24	AUTOMATIC VEHICLE ACCESS GATE
	25	FUTURE HOLD APRON AREA
26		TERMINAL AUTOMOBILE PARKING
	27	TERMINAL/RENTAL AUTOMOBILE PARKING
	28	RENTAL CAR AUTOMOBILE PARKING
	29	FUTURE HANGAR SITE
	30	FUTURE SERVICE PROVIDER
	31	FUTURE DEICING AREA
32		FUTURE SERVICE PROVIDER
33	33	STOPLIGHT LOCATIONS
34	34	CURRENT THRESHOLD TO BE REMOVED
	35	AUTOMATED WEATHER STATION

AIRPORT DATA

	CURRENT	FUTURE
AIRPORT ELEVATION (NAVD 88)	5318.7' msl	5318.7' msl
A R P COORDINATES (2000) NAD 83	43°30'16.02" N 114°17'46.35" W	43°30'16.02" N 114°17'46.35" W
MAGNETIC DECLINATION OR VARIATION (1995)	15° 38.8' EAST	
ANNUAL RATE OF MAGNETIC CHANGE	0.1° WEST	
MEAN MAXIMUM TEMPERATURE	87° F	87° F
TERMINAL NAVAIDS (PRIVATE MLS)	MLS/GPS/NDB	MLS/GPS/NDB/TLS
VISUAL APPROACH AIDS	VASI-4	VASI-4
TAXIWAY LIGHTING	MITL	MITL
TAXIWAY MARKING	FAR Part 139	FAR Part 139
NPIAS ROLE	PCS	PCS
FLOOD PLAIN AREA	NONE	NONE
AIRPORT REFERENCE CODE (COMPOSITE)	B-III	B-III

RUNWAY DATA

	CURRENT		FUTURE	
RUNWAY IDENTIFICATION	13	31	13	31
APPROACH VISIBILITY MINIMUMS	VISUAL	VISUAL	VISUAL	NPI
F A R PART 77 – APPROACH SLOPE	20:1	20:1	20:1	34:1
ACTUAL CLEAR APPROACH SLOPE	0:1 *	18.75:1	20:1	20:1
RUNWAY LENGTH	6952'	6602'	6952'	6602'
RUNWAY WIDTH	100'		100'	
PAVEMENT TYPE	ASPHALT		ASPHALT	
PAVEMENT STRENGTH (DW)	95,000-D		95,000-D	
RUNWAY LIGHTING TYPE	MIRL	MIRL	MIRL	MIRL
RUNWAY MARKING TYPE	PIR	PIR	PIR	PIR
% EFFECTIVE GRADIENT	0.63%		0.63%	
MAXIMUM GRADIENT WITHIN RUNWAY LENGTH	1.0%		1.0%	
LINE OF SIGHT REQUIREMENTS	MEET		MEET	
% WIND COVERAGE – ALL WEATHER	96.6%		96.6%	
% WIND COVERAGE – IFR	–		–	
VISUAL APPROACH AIDS	–	VASI-4	–	VASI-4
INSTRUMENT APPROACH AIDS	MLS **	– GPS	MLS **	GPS TLS
AIRPORT REFERENCE CODE BY RUNWAY (COMPOSITE)	B-III	B-III	B-III	B-III
RUNWAY SAFETY AREA DIMENSIONS – WIDTH FROM R/W CL	150'	150'	150'	150'
RUNWAY SAFETY AREA DIMENSIONS – LENGTH BEYOND RW END	600'	600'	600'	600'
OBJECT FREE AREA DIMENSIONS – WIDTH FROM R/W CL	±219' E	±320' W	±323' E	±392' W
OBJECT FREE AREA DIMENSIONS – LENGTH BEYOND RW END	0'-600'	600'	0'-600'	600'
OBSTACLE FREE ZONE DIMENSIONS – WIDTH FROM R/W CL	±120' E	±155' W	200'	200'
OBSTACLE FREE ZONE DIMENSIONS – LENGTH BEYOND RW END	±160'	200'	200'	200'
RUNWAY END ELEVATIONS (NAVD 88)	5318.7'	5267.5'	5318.7'	5267.5'
TOUCHDOWN ZONE ELEVATIONS	5309.3'	5289.6'	5309.3'	5289.6'
DISPLACED THRESHOLD ELEVATION (NAVD 88)	5309'		5309'	
END COORDINATES – RW 13 NAD 83	43°30'44.06" 114°18'13.54"		43°30'44.06" 114°18'13.54"	
END COORDINATES – RW 31 NAD 83	43°29'47.99" 114°17'19.15"		43°29'47.99" 114°17'19.15"	

* DISPLACED THRESHOLD PROVIDES A 20:1 CLEAR APPROACH SLOPE.

** THE MLS IS A PRIVATE USE SYSTEM OWNED BY HORIZON AIRLINES.

LEGEND

EXISTING	FUTURE	DESCRIPTION
		AIRPORT PAVEMENT
		AIRPORT PAVEMENT TO BE ABANDONED
		AIRPORT PAVEMENT TO BE REMOVED
PL		AIRPORT PROPERTY LINE/PERIMETER FENCE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		BUILDING TO BE REMOVED
		BUILDING
RSA	RSA	RUNWAY SAFETY AREA (RSA)
OFA BRL	OFA BRL	OBJECT FREE AREA (OFA) BUILDING RESTRICTION LINE (BRL)
RPZ	RPZ	RUNWAY PROTECTION ZONE (RPZ)
OFZ	OFZ	OBJECT FREE ZONE (OFZ)
EL CRIT	EL CRIT	MLS ELEVATION ANTENNA CRITICAL AREA
AZ CRIT	AZ CRIT	MLS AZIMUTH ANTENNA CRITICAL AREA
		DRAINAGE
		SECTION LINE
		FACILITY CONSTRUCTION
VASI		RUNWAY VISUAL LANDING AIDS (FAA)
		RUNWAY THRESHOLD LIGHTS
FH	FH	FIRE HYDRANT
		SECTION CORNER
		TOPOGRAPHIC CONTOURS
		AIRCRAFT TIE DOWN
		AIRCRAFT HOLD LINE MARKINGS
		AIRCRAFT HOLD LINE SIGNS
		SNOW STORAGE/STORM WATER RETENTION

CURRENT DECLARED DISTANCES***

DISTANCES	TORA	TODA	ASDA	LDA
RUNWAY 13	6952'	6952'	6952'	5451'
RUNWAY 31	6602'	6952'	6602'	6602'

*** THESE DECLARED DISTANCES TAKE INTO ACCOUNT THE R/W 13 DISPLACED THRESHOLD WHICH WILL BE 1,501' FROM THE END OF THE RUNWAY AND PROVIDES NOISE MITIGATION FOR THE CITY OF HAILEY.

APPROVALS

FEDERAL AVIATION ADMINISTRATION — DATE

MARY ANN MIX – CHAIRMAN, FRIEDMAN MEMORIAL AIRPORT AUTHORITY — DATE

REVISIONS

NO.	ITEM	DATE
1	REVISED – AS CONSTRUCTED THROUGH 7/31/01	SEPT 2001
2	REVISED AIRSPACE PLANS FOR 34:1 APPROACH	SEPT 2001
3	REVISED FOR AIRPORT WEST LAYOUT	MAR 2002

E-FILE NAME	SH002.DWG
DESIGNED	CPS
DRAWN	TCC
CHECKED	CPS
APPROVED	

TOOTHMAN-ORTON ENGINEERING COMPANY
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FRIEDMAN MEMORIAL AIRPORT
AIRPORT LAYOUT PLAN
HAILEY, IDAHO

DATE: MARCH 2002
PROJECT: 99036

EXHIBIT 1-3

Table 1-2

Current Declared Distances

Distances (feet)	TORA	TODA	ASDA	LDA
Runway 13	6,952	6,952	6,952	5,451
Runway 31	6,002	6,952	6,602	6,602

TORA - The length of runway declared available and suitable for satisfying take-off run requirements, or the distance from brake release to lift-off, plus safety factors.

TODA - The TORA plus the length of any remaining runway or clearway beyond the far end of the TORA available for satisfying takeoff distance requirements.

ASDA - the length of runway plus stopway declared available and suitable for satisfying accelerate-stop distance requirements.

LDA - The length of runway declared available and suitable for satisfying landing distance requirements.

Source: Airport Layout Plan, 2002

The pavement of Runway 13-31 is rated in "fair" condition on the Airport's FAA 5010 form, published October 2002. Runway pavements are rated for single wheel, dual wheel, and dual tandem. The gear type and configuration that an aircraft is equipped with dictates how that aircraft's weight is distributed to the pavement and also determines the pavements response to loading. Examinations of gear configuration, tire contact areas, and tire pressure in common use indicate that pavement strength is related to aircraft maximum take-off weight. As previously reported, the pavement strength of Runway 13-31 has been rated for 65,000-pound single wheel aircraft, 95,000-pound dual wheel aircraft, and 150,000-pound for dual tandem wheel configurations since 1983. The 1994 Master Plan identifies that a short term use of the airfield by dual wheel aircraft in excess of the 95,000 pound dual wheel weight limitation was terminated as a result of observed pavement damage. The 1995 and 1997 Porous Friction Course (PFC) replacement project reported significant deterioration of the two-inch overlay placed in 1983.

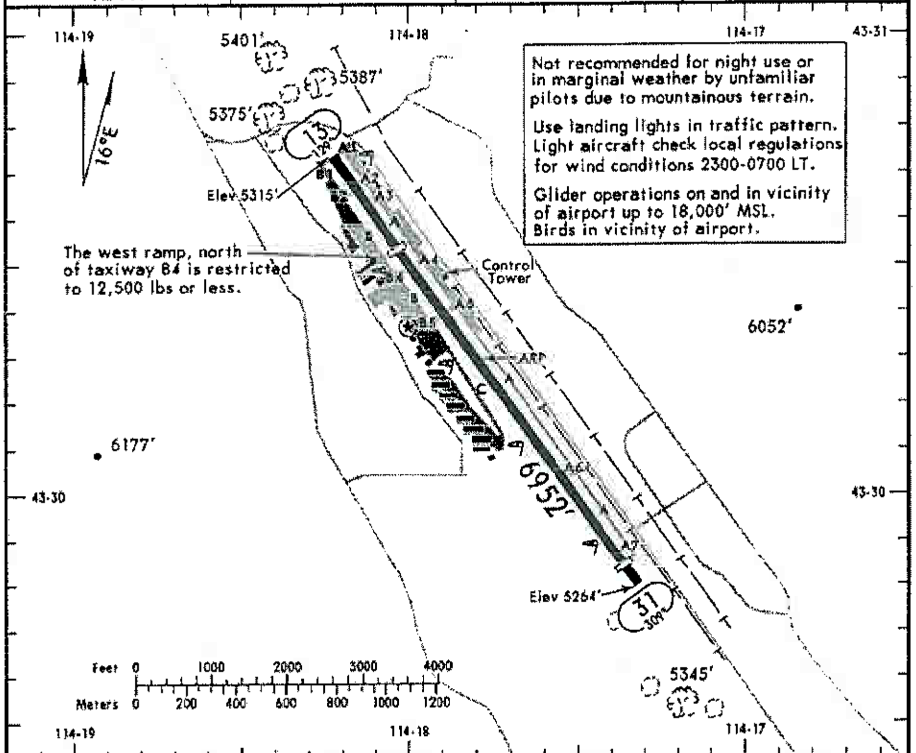
Taxiways. The airport is served by partial parallel taxiways on both sides of Runway 13-31. **Exhibit 1-4** depicts the published Airport Diagram. Taxiway A is a nearly full-length parallel taxiway on the east side of the airport. It extends from the FBO apron on the north side of the airport to Taxiway A-8 on the south side of the airport. Further extension of the taxiway to A-9 is planned for early in 2003. Portions of this taxiway will either be relocated or removed as depicted on the current ALP, to remove taxiing aircraft from the runway Obstacle Free Zone (OFZ) as depicted on the current ALP. The taxiway will be removed north of Taxiway A-5. South of A-5 it will be relocated to 250 feet from the runway centerline. Taxiway B is situated on the west side of the airport extending from the north end of 13-31 to just south of the main apron near Taxiway B-6. . A phased relocation of this segment of the parallel taxiway to 250' separation has been in progress since 2000. Relocation will be complete in spring of 2003. Taxiway B also continues from the south end of the main apron to the south providing access to the general aviation aprons and hangars in this area. These aprons and this portion of Taxiway B were constructed in 2000 and 2001. **Table 1-3** summarizes the taxiway widths and separations at the Airport and **Exhibit 1-5** depicts the taxiway layout.

KSUN
Apt Elev **5313'**

JEPPESEN
8 DEC 00 (12-1)

HAILEY, IDAHO
FRIEDMAN MEML
N 43 30.3 W114 17.8

*HAILEY Ground	*Tower	UNICOM 122.95	SALT LAKE Center
121.7	CTAF 125.6		118.05



ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS LANDING BEYOND Threshold	Glide Slope	TAKE-OFF	WIDTH
13 ❶	❷ MIRL porous friction course overlay	5451'		6602'	100'
31	❷ MIRL VASI-L (angle 3.5°)	6602'			

❶ When Twr inop land rwy 31, take-off rwy 13.
❷ Activate on 125.6 when Twr inop.

TAKE-OFF & OBSTACLE DEPARTURE PROCEDURE

	Rwy 13	Rwy 31
1 & 2 Eng / 3 & 4 Eng	2700-3	NA

FOR FILING AS ALTERNATE

A B C D	NA

OBSTACLE DP: Climbing right turn heading 150° to intercept the HLE NDB 160° bearing to HLE NDB. Aircraft departing HLE NDB bearings 030° clockwise 330° from HLE NDB climb on course. All others continue climbing in HLE NDB holding pattern (hold southeast, left turns, 330° inbound) to cross HLE NDB at or above 8500'.

AMEND 1

CHANGES: See other side.

Source: Jeppesen Sanderson, Inc.
Prepared by: Mead & Hunt, Inc.

Exhibit 1-4

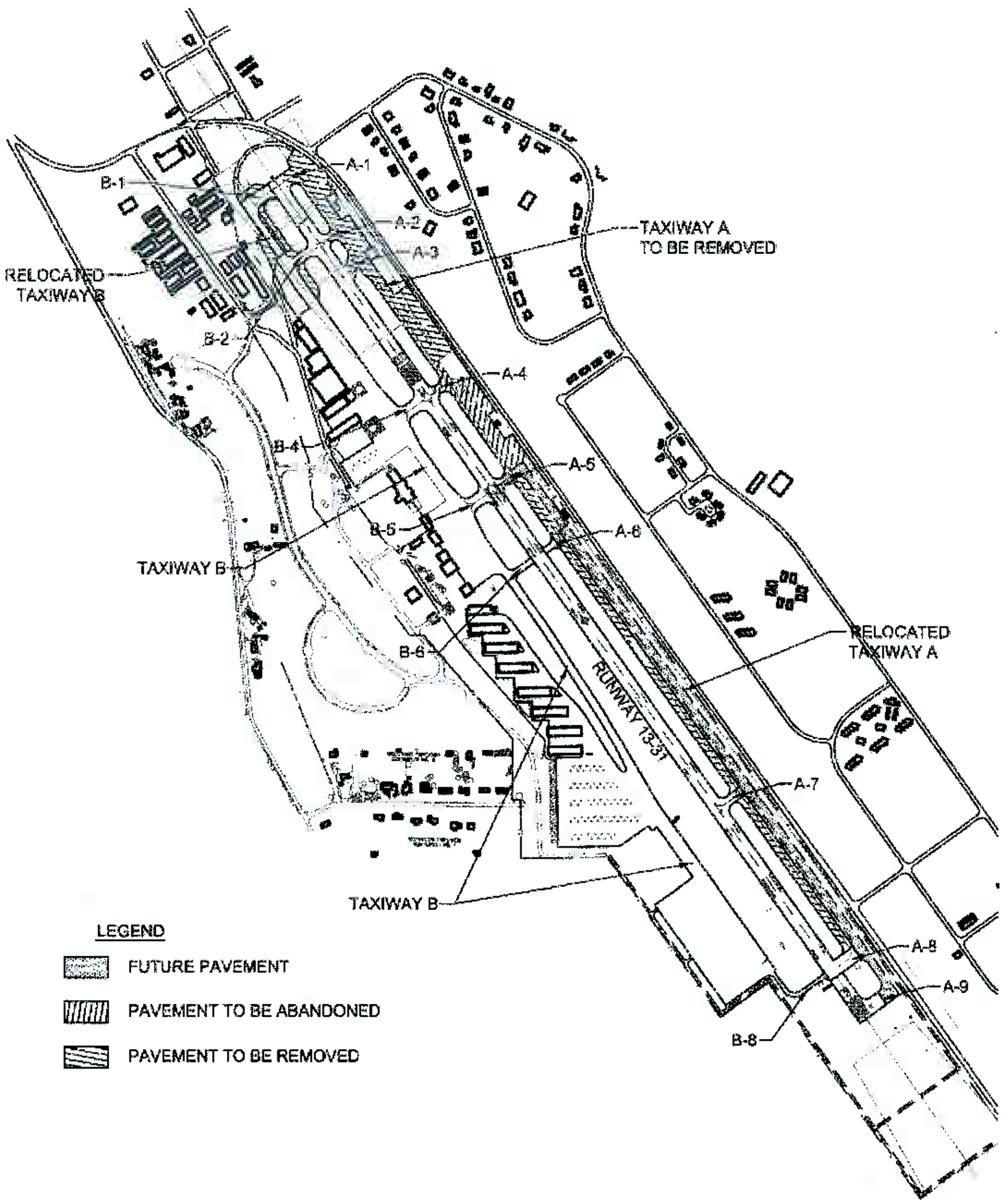
No Scale

north

Airport Diagram

Ex-04_arpt diagram.dwg

Friedman Memorial Airport



Source: Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit 1-5

0 1,000 ft. north

Taxiway System

Ex1-05_twy.dwg

Master Plan Update

Table 1-3

Taxiway Inventory

Taxiway	Segment	Width (ft)	Separation from Runway Centerline (ft)
Ex-A	A-1 to A-3	50	160
	A-3 to A-5	50	174
	A-5 to A-8	50	185
Fu-A	A-5 to A-9	50	250
B	B-1 to B-6	50	250
	B-6 to tie-down apron	35	250 at north end, 335 at south end
	Tie-down apron to south end	35	335

Source: 1994 Master Plan Update; Airport Layout Plan, 2002

As shown on Exhibit 1-5 there are numerous connecting taxiways between the runway and the parallel taxiways on each side of the runway. Connectors A-1 to A-4 are to be removed with the removal of Taxiway A through this area.

Aprons. The aprons serve the needs of the various aviation segments that use the Airport. There are three types of apron areas at the Airport: the air carrier apron, general aviation aprons, and hold aprons. The current ALP depicts a new Fixed Base Operator (FBO) site and removal of the existing FBO facilities along with all apron areas east of the runway and west of the runway north of connecting Taxiway B-6 with the exception of the air carrier apron near the terminal. These facilities and aprons are within the runway OFZ and runway Object Free Area (OFA) and will be removed. The removed apron area has been replaced at the southwest corner of the airfield adjacent to the new FBO location. **Exhibit 1-6** depicts the various aprons located around the airfield that will be in place after the relocation of the FBO and removal of east side aprons. Portions of the Air Carrier Apron and the Taxiway B Hold Aprons are located within the Runway 13-31 OFA and Taxiway B OFA. The various aprons are summarized in **Table 1-4**.

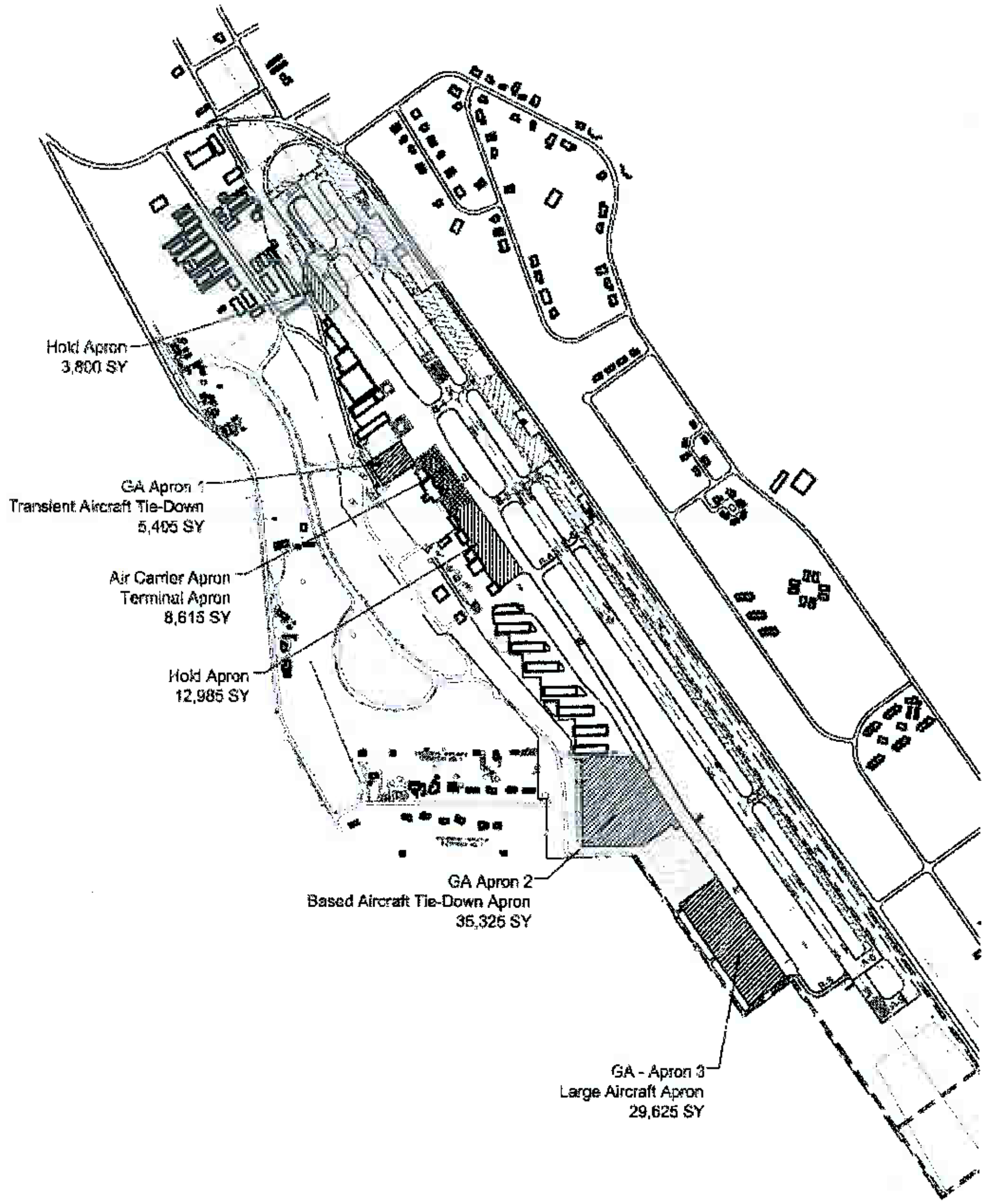
Table 1-4

Apron Inventory

Apron Type	Description	Area (SY)
Air Carrier	Terminal Apron	8,615
General Aviation	GA Apron 1 – Transient Aircraft Tie-Down Apron	5,405
	GA Apron 2 – Based Aircraft Tie-Down Apron	35,325
	GA Apron 3 – Medium to Large Aircraft Apron	29,625
	Total GA Apron	**70,355**
Hold	Runway 13 Northwest Hold Apron	3,800
	Taxiway B-5 Hold Apron	12,985
	Total Hold Apron	**16,785**

Source: Airport Layout Plan, 2002

Friedman Memorial Airport



Source: Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit 1-6

0 1,000 ft. north

Aircraft Aprons

Ex1-08_apron.dwg

Master Plan Update

Lighting and Navigational Aids. Lighting and navigation aids are used to facilitate identification, approach, landing, and taxiing at night and in adverse weather conditions. Friedman Memorial Airport is equipped with a number of lighting and navigational aids consisting of:

- Air Traffic Control Tower that operates from 7:00 a.m. MST to 11:00 p.m. MST, daily. The tower is located on the airfield's east and is operated by Serco Management Services, Inc. as part of the National Air Traffic Control Contract with the FAA.
- The Microwave Landing System (MSL) is privately owned and operated by Horizon Airlines. The MLS elevation station is located on the east side of the airfield, adjacent to the displaced threshold for Runway 13, while the Azimuth station is located on the west side approximately 1850 feet north of the Runway 13 end. The MLS is used exclusively by Horizon Airlines for Runway 13 approaches. The MLS includes a localizer and a glide slope antenna providing for a six degree glideslope.
- A non-directional beacon (NDB) located twelve miles south of the airfield.
- Medium intensity runway lights (MIRL) and threshold lights consisting of six lights at each end of the runway.
- Medium intensity taxiway lights (MITL) at most locations on the airfield.
- Visual approach slope indicator (VASI-4) system on Runway 31.
- Distance remaining signs along Runway 13-31
- A rotating beacon and two wind socks.
- Precision instrument markings on ends of Runway 13 and 31 due to the presence of the MLS.
- Yellow centerline striping on all taxiways
- RNAV GPS approach to Runway 31

In addition to the above, a Transponder Landing System (TLS) approach to Runway 31 has been developed and the TLS equipment was installed in the fall of 2003.

General Aviation Facilities. Friedman Memorial Airport has a number of aircraft storage hangars located along the west side of the airfield. These facilities include general aviation T-hangars, FBO maintenance and aircraft storage hangars, and corporate aircraft storage hangars. Aircraft hangars are generally located in three areas: the northwest side just north of the passenger terminal building; the southwest side just south of the passenger terminal building; and a large grouping of T-Hangars and multi-unit hangars north of GA apron #2 and west of Taxiway B. According to the Airport management records there are currently 143 aircraft based at Friedman Memorial Airport; 98 single-engine, 17 twin-engine piston, 12 twin-engine turboprops, and 16 jets.

One fixed base operator serves the needs of general aviation aircraft users: Sun Valley Aviation. Sun Valley Aviation is a full service FBO that offers aircraft maintenance, charter service, flight instruction, fuel services, hangared aircraft parking, and tie-down spaces. It also provides for aircraft sales and rentals. Sun Valley's main office and hangar facility is at the northeast corner of the airfield. These facilities will be relocated by 2004 to the area designated as General Aviation Apron 5 on Exhibit 1-3. Existing structures located at the northeast corner of the airfield will be removed.

1.3.2 Airport Passenger Terminal Building

The airport passenger terminal building is located approximately midway along the southwest side of Runway 13-31. The original building was constructed in 1976. The building has been renovated and expanded a number of times since, with the most recent renovation completed in 2001. The existing terminal building totals approximately 14,320 square feet and is accessed via a single-level loop road.

The terminal building houses two airline ticketing counters with adjacent airline offices and baggage make-up space, three rental car counters, a small snack/ gift shop retail concession, a retail art gallery, baggage claim facilities, two sets of non-secured restrooms, and a secured departure lounge on the ground floor. Recent improvements have been made to the terminal building to comply with new security criteria. This includes the addition of explosive trace detention equipment, which all checked baggage must pass through. A temporary setup for this equipment/process has been placed in the vicinity of the airline ticketing counters.

1.3.3 Airport Access and Parking

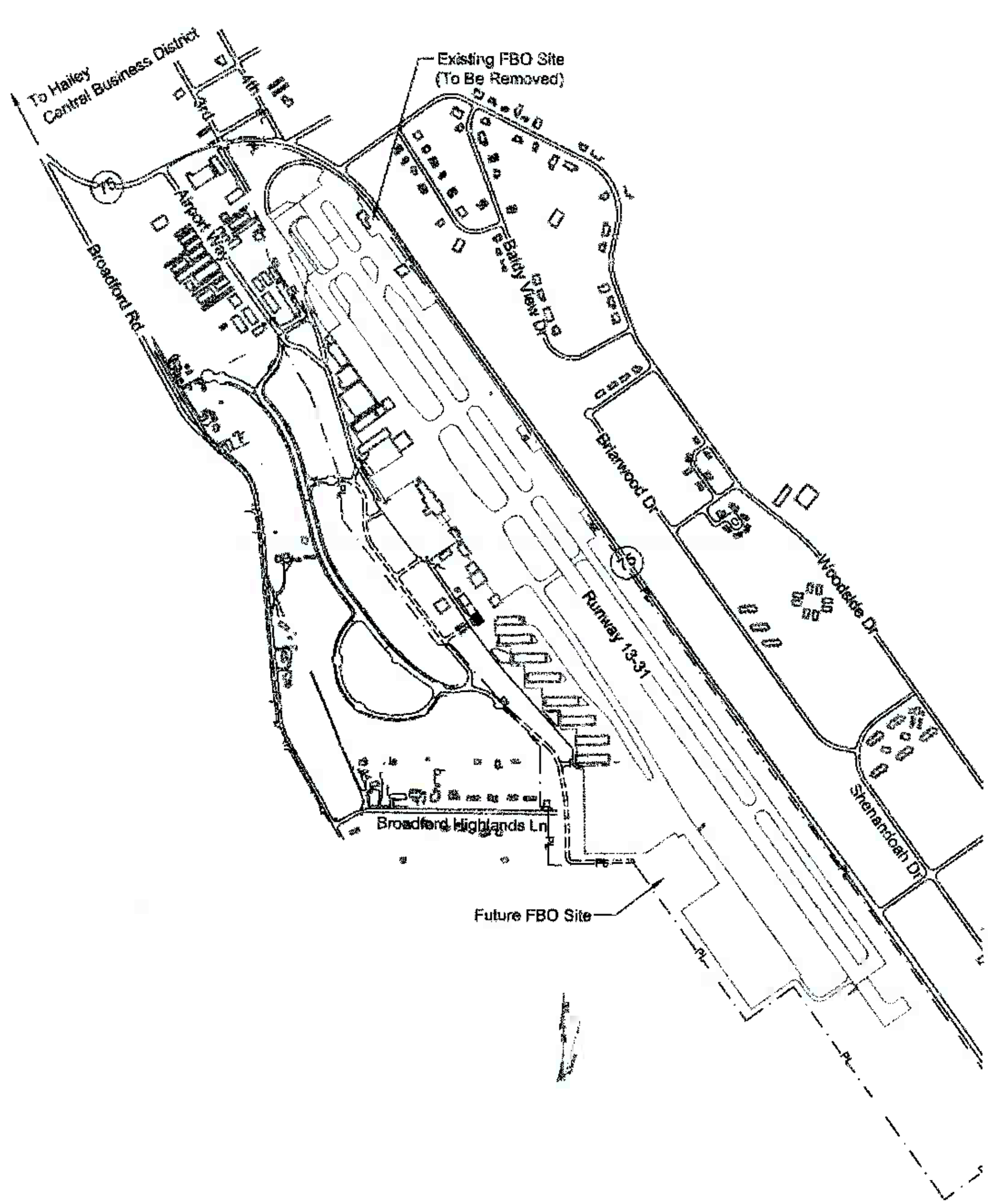
Ground Access. Access to Friedman Memorial Airport is from the north via Airport Way, which runs north south along the west side of the Airport. The paved two-lane road serves as the primary access for all activities on the Airport, since the road extends beyond the terminal area to serve the T-hangars and private hangar facilities south of the terminal apron. **Exhibit 1-7** shows the roadway network surrounding the Airport.

The major arterial highway through Blaine County is State Highway 75, which runs along the east of Friedman Memorial Airport. State Highway 75 serves as the main arterial through the Wood River Valley and is a two-lane roadway in the vicinity of the Airport. Airport Way accesses directly onto Highway 75, virtually at the mid-point of the "S" curve that the highway makes around the north end of the Airport. It passes through the principal commercial zone for the City of Hailey.

A recently completed commercial-light industrial development located adjacent to the west side of the airport provides new access roads to the terminal and GA hangars, apron and FBO facilities at the southwest area of the airport as shown on Exhibit 1-7. This planning study will evaluate how to use these new access roads to serve the new and proposed facilities along the west side of the airfield, including the terminal area.

Parking. Public parking at the Airport is located to the west of the terminal building with a total of 242 parking spaces provided. The parking lot is divided to include short and long-term public parking, rental car parking, handicap parking, and employee parking. **Table 1-5** summarizes the number of spaces reserved for each type of use. The FBO and the hangar facilities each have ground vehicle parking in the vicinity of their facilities. Airport management reports available public parking in the vicinity of the terminal is routinely at capacity during holiday periods.

Friedman Memorial Airport



Source: Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit 1-7

0 1,000 ft. north

Roadway Network

Ex1-075_roadways.dwg
Master Plan Update

Table 1-5
Parking Inventory

Use	Number of Spaces
Public Parking – Long Term	137
Public Parking – Short Term	15
Reserved for Rental Car	45
Reserved for Handicap	11
Reserved for Employee	34
Reserved for TSA	7
Total	**249**

Source: Interview with Ampco System Parking, 2002

1.3.4 Support Facilities

Aircraft Rescue and Firefighting (ARFF). The current ARFF building is located south of the Airport Manager's office, adjacent to the main terminal apron. The Airport is currently listed as ARFF Index A. The station houses the Airport's fire fighting equipment and occupies approximately 7,100 square feet. The Airport's ARFF equipment includes the following:

- 1985 Oshkosh P-19 ARFF vehicle, in excellent condition, with a capacity of 1,000 gallons of water; 130 gallons foam concentrate and 500 lbs. dry chemical.
- 1979 Dodge one-ton "Quick Response" vehicle, in good condition, with a capacity of 130 gallons of water; 14 gallons of foam concentrate and 500 lbs. dry chemical.
- 2003 E-One ARFF vehicle with a capacity of 1,500 gallons.

The recent addition to the ARFF building also provides a training room for Airport ARFF personnel.

Airport Maintenance and Snow Removal Equipment. Snow removal equipment and other miscellaneous maintenance equipment is housed in a portion of the ARFF building and in the Snow Removal/Maintenance Equipment Building just west of the ARFF building. The Snow Removal/Maintenance Equipment Building occupies approximately 3,185 square feet. The Airport's Snow Removal Equipment includes the following:

- 2002 Case 921C front end loader with bucket and interchangeable implements including a 22-foot runway plow, 20-foot ramp plow, and 500 HP rotary snow plow, excellent condition.
- 1989 John Deere front end loader with a seven-yard snow bucket, good condition.
- 1980 Case W20B front-end loader with two buckets and a parking lot plow, good condition.
- 1995 Sweepster Plow Truck with interchangeable 22-foot runway plow and 22-foot broom, excellent condition.
- 1980 Idaho Norland Plow Truck with 24-foot runway plow, good condition.
- 1985 Ford 9000 Dump Truck with 12-foot frost plow, good condition.
- 1995 Tiger Tractor (New Holland) with rotary snow plow, excellent condition.
- 1992 Schmidt 700 HP (350 HP drive/350 HP blower) rotary snow plow, excellent condition.
- 1984 Chevrolet 1 ton Pickup Truck with 9-foot adjustable plow and 300 gallon deicing device, good condition.

Fuel Facilities. Sun Valley Aviation handles the majority of the fuel service at Friedman Memorial Airport. Their fuel storage is located near the northern end of the T-hangar area west of Taxiway B. This is an above ground facility with four 20,000 gallon tanks, one for avgas and three for Jet A. All fuel is dispensed from this facility via tank truck by Sun Valley Aviation. Adequate area is reserved for future facility expansion adjacent to the north end of the existing facility.

Currently, the Blaine County Pilot's Association operates a self-fueling co-op facility located near the south end of the T-hangar area west of Taxiway B adjacent to the taxilane access to the T-hangars. This is a 5,000-gallon underground tank with a small pump for self-fueling. The Airport's current minimum standards do not permit the operation of fuel co-ops on the airport. As this facility's lease is nearly expired, negotiations are in progress with Sun Valley Aviation to operate this facility.

Airport Manager's Office. The airport manager's office is located in a separate building approximately 200 feet south of the passenger terminal building. This small structure houses the airport manager, the chief of operations, the head of finance, two professional support staff, and a conference room. The building was originally bought by the Sun Valley Company, and served as the temporary home to Skywest Airlines. It was then converted to an office building for use by airport staff.

Functionally, the building is not adequate for current and future working situations. The current plan is to add another staff position, which would likely require utilization of the conference room by staff. This would be necessary as an interim measure since there is no other space to accommodate another employee. Sole access to the men's bathroom is through an office room. The scope of this master plan includes efforts to explore options for improving the administrative office space, including but not limited to inclusion of the office space into an improved passenger terminal building.

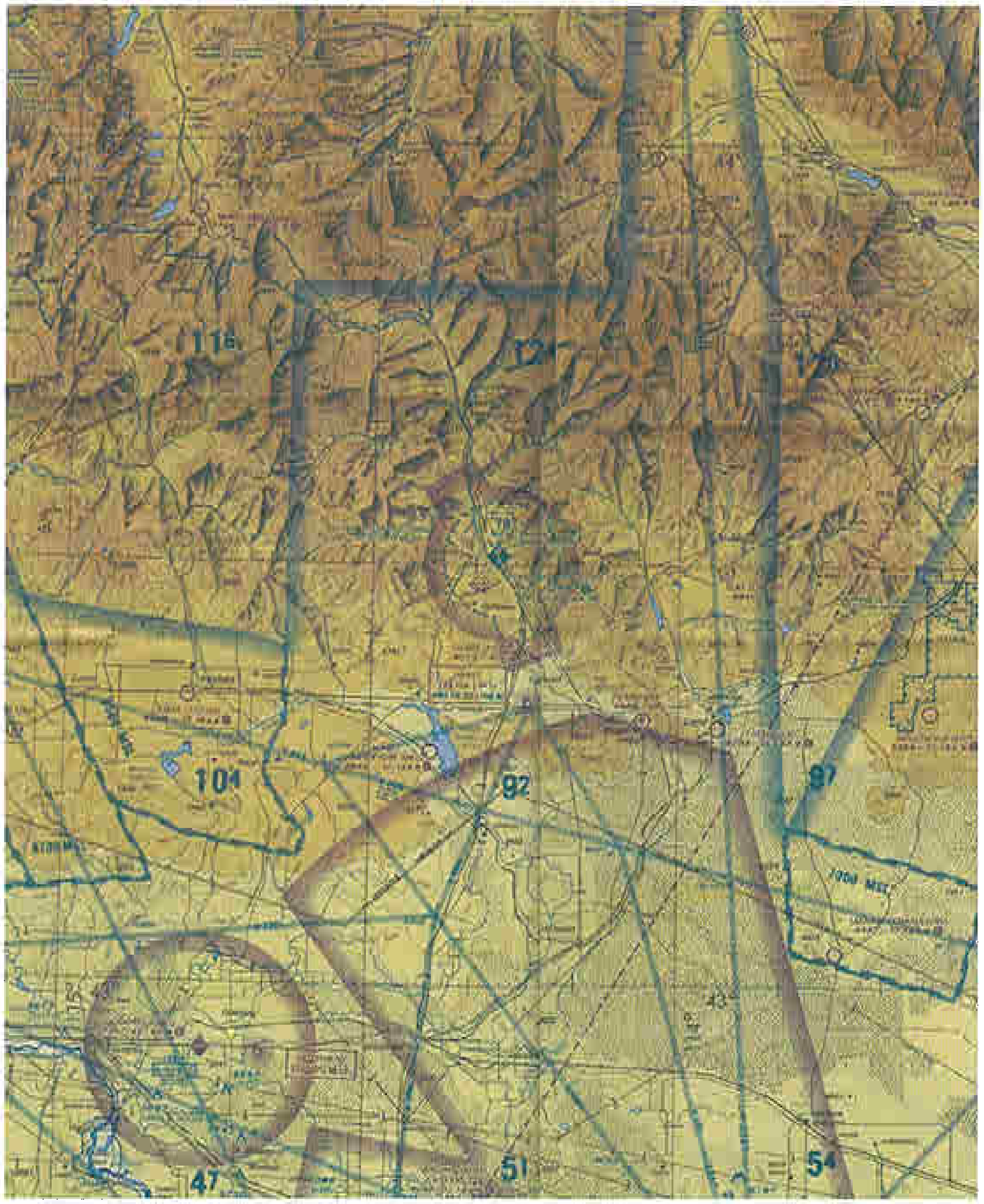
The previous Airport manager's office, in a building immediately adjacent the current office building, was removed as part of an improvement to the ARFF station.

1.4 Airspace

The Federal Aviation Administration Act of 1958 established the FAA as the responsible agency for control and use of navigable airspace within the United States. An analysis of airspace use is critical in determining the capacity and operational interaction of Friedman Memorial Airport with surrounding airports. Friedman Memorial Airport is located on the Salt Lake City Sectional Chart, and **Exhibit 1-8** depicts the airspace structure surrounding the Airport.

There are six airports within 25 nautical miles of Friedman Memorial Airport, which are shown on Exhibit 1-8 and listed in **Table 1-6**.

Friedman Memorial Airport



Source: Salt Lake City Sectional Aeronautical Chart, October 31, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit 1-8

0 10 NM

north

Airspace

Ex1-08_airspace.dwg

Master Plan Update

Table 1-6

Airports within 25 nm of Friedman Memorial Airport

Airport	Ownership	Owner	Runway Length & Type	Location from Friedman
Friedman Memorial	Public	City of Hailey/Blaine Co.	6,602 – Asphalt	-
Sluder	Private	C.D. Sluder	4,000 – Gravel	6 nm S
Magic Reservoir	Public	State of Idaho	4,000 – Turf	15 nm SSW
Picabo	Private	Picabo Livestock Co.	3,000 – Turf	16 nm SE
Flat Top	Private	Flat Top Sheep Co.	3,000 – Gravel	18 nm E
Carey	Public	Carey	2,650 – Turf	20 nm SE
Camas County	Public	Camas County	2,950 – Dirt	24 nm SW

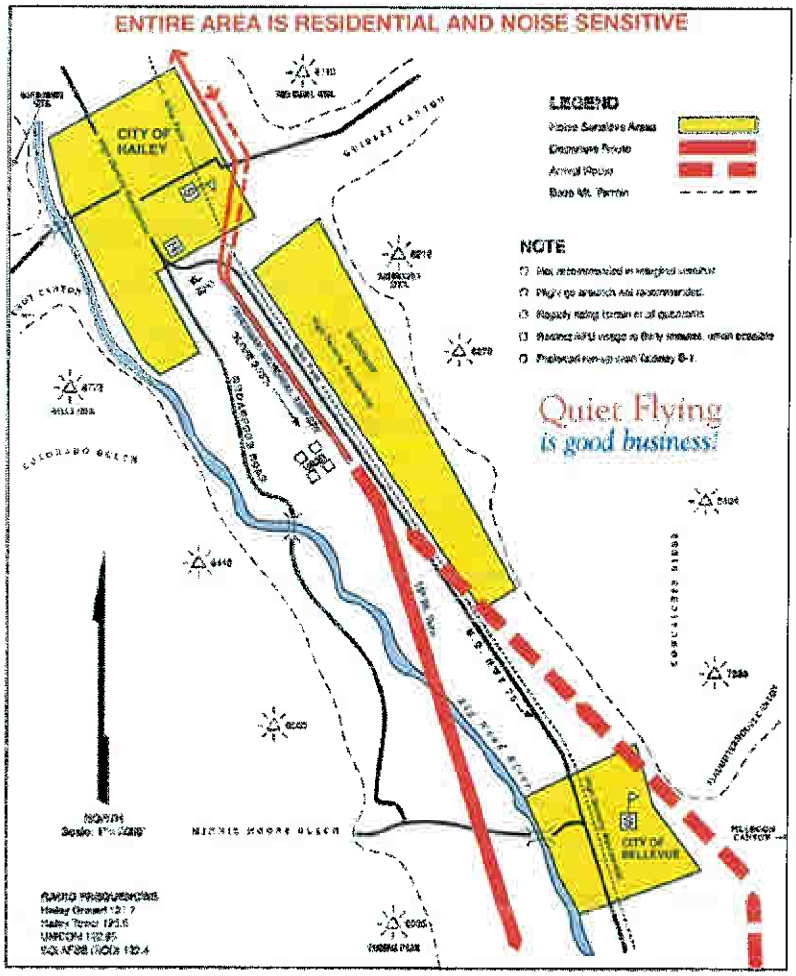
Source: Salt Lake City Aeronautical Chart, 2002; FAA Airport Master Record (Form 5010-1)

Voluntary Noise Abatement Program. In response to local community concerns, Friedman Memorial Airport developed an aggressive program to reduce aircraft noise impacts. Preferred hours of operation at the airport are 7:00 a.m.-11:00 p.m., local time to coincide with hours during which the ATCT and Friedman Memorial Airport ARFF operations are staffed. Aircraft are also asked to follow specific noise abatement arrival and departure routes. The airport and community also request that aircraft over 12,500 pounds do not land from the north or depart to the north. **Exhibit 1-9** depicts the noise abatement brochure and recommendations that Friedman Memorial Airport provides and requests that pilots adhere to. Signs on the runway also reinforce this program and contribute to its effectiveness. In addition to this voluntary noise abatement program, the Airport has a mandatory time limit on auxiliary power unit (APU) usage of 30 minutes.

Head-to-Head Operations. The restrictive topography surrounding the airport (and to a lesser degree the noise sensitivity of the developed area) results in an unusual traffic pattern and approach and departure patterns at the Airport. The traffic pattern at the Airport is unique in that operations are conducted "head-to-head" to and from the runway. Typically, aircraft operate in one direction on a runway, however due to the terrain in the area and based on safety and operational concerns, the existing patterns are used. In terms of flight patterns, almost all arrivals are on Runway 31 (from the south) and will approach the airport from the east side of the valley. Arrivals on Runway 13 are infrequent and are primarily by light aircraft. Departures will almost always be to the south on Runway 13 (departures to the north go into rising terrain and stronger crosswinds, which is not as safe) and aircraft are advised to make a 15-degree right turn after takeoff to avoid overflight of Bellevue. Departures on Runway 31 are infrequent and are primarily by light aircraft. While a head-to-head pattern is uncommon it is not unprecedented and, through the control tower, air traffic is well coordinated.

Runway Approaches. There are two published non-precision instrument approaches to the Airport. An RNAV (GPS) approach to Runway 31 allows aircraft approaches with minimums of 1-1/4 mile visibility and a 1,900-foot ceiling. **Exhibit 1-10** depicts this RNAV (GPS) approach. An NDB/DME or GPS-A approach is also published, although this approach requires that aircraft fly visually and only allows aircraft approach with minimums of 5-mile visibility and a 2,700-foot ceiling. **Exhibit 1-11** depicts this NDB/DME or GPS-A approach. Additionally, the FAA has developed a Transponder Landing System (TLS) approach to Runway 31. Necessary instrumentation for this approach is scheduled for installation in 2003. This approach is anticipated to provide approach minimums down to approximately a 950-foot ceiling, a significant improvement over the current 1,900-foot ceiling minimum.

Friedman Memorial Airport



PLEASE READ!

FRIEDMAN MEMORIAL AIRPORT
ENTIRE AREA IS RESIDENTIAL AND NOISE SENSITIVE

Noise Abatement Recommendations

- In response to local community concerns, Friedman Memorial Airport has a noise abatement program. The program is applicable to all types of aircraft.
- The Airport Authority and your neighbors request that aircraft above 12,500 lbs. never land from the north or depart to the north.
- All aircraft are asked not to operate between the hours of 11:00 p.m. and 6:00 a.m., Mountain Time, under any circumstances, except emergencies.
- Preferred hours of operations are 2:00 a.m.-11:00 p.m., Mountain Time, to coincide with hours during which Hailey tower and Friedman Memorial Airport crash/fire/rescue/operations are staffed.

Please comply with Arrival and Departure Routes.

Noise Abatement Center [illegible] • Airport Manager's Office [illegible]

Source: Freidman Memorial Airport
Prepared by: Mead & Hunt, Inc.

Exhibit 1-9

No Scale

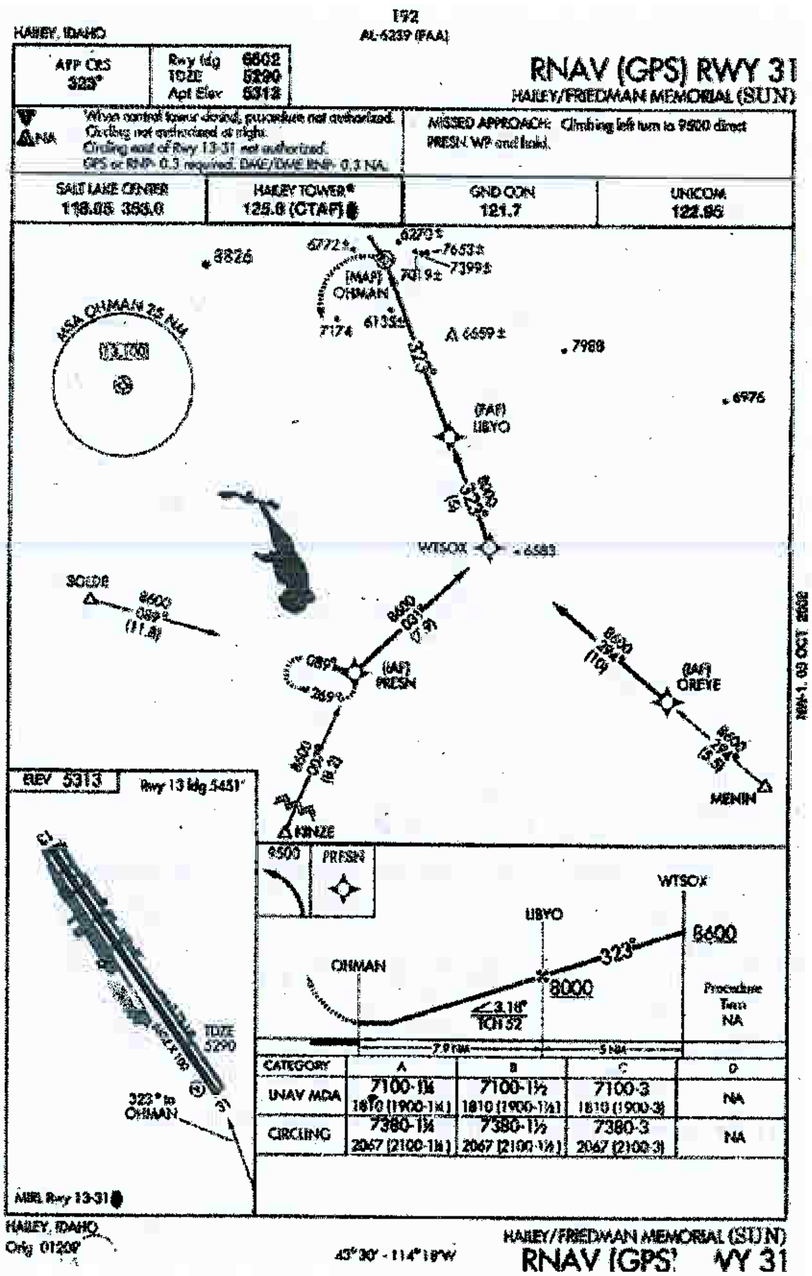
north

Noise Abatement Procedures

Ex1-09_noise abate.dwg

Master Plan Update

Friedman Memorial Airport



Source: U.S. Terminal Procedures, U.S. Department of Transportation
Prepared by: Mead & Hunt, Inc.

Exhibit 1-10

No Scale

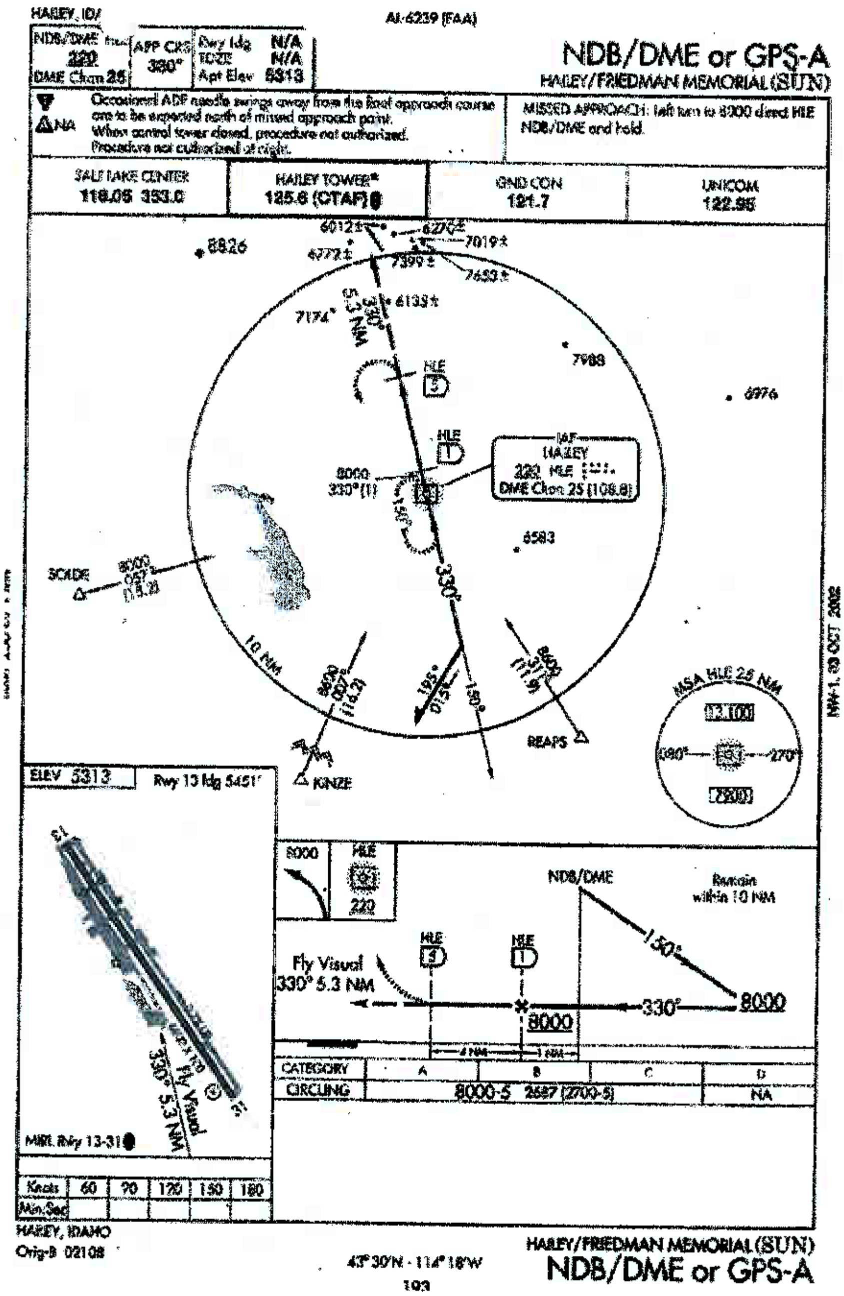
north

RNAV (GPS) Runway 31
Approach Plate

Ex1-10_RNAV.dwg

Master Plan Update

Friedman Memorial Airport



Source: U.S. Terminal Procedures, U.S. Department of Transportation
Prepared by: Mead & Hunt, Inc.

Exhibit 1-11

No Scale

north

NDB/DME or GPS-A Approach Plate

Ex1-11_NDB.dwg

Master Plan Update

1.5 Airport Activity Statistics

Historical levels of passengers from 1990 through 2002 are presented in **Table 1-7**. Annual passenger enplanements have increased at a compounded annual growth rate of 5.6 percent over this period.

Table 1-7

Historical Passenger Enplanements

Year	Horizon	Skywest	Total
1990	33,656	630	34,286
1991	23,715	17,163	40,878
1992	27,011	23,485	50,496
1993	26,737	28,463	55,200
1994	29,299	33,705	63,004
1995	31,230	33,501	64,731
1996	27,346	35,725	63,071
1997	18,985	41,954	60,939
1998	19,328	42,102	61,430
1999	21,221	47,082	68,303
2000	24,803	45,386	70,189
2001	14,944	44,129	59,073
2002 (estimated)	-	-	65,752

Source: Airport Management Records

Historic aircraft operations at the Airport since 1990 are presented in **Table 1-8**. Activity at the Airport is primarily a mix of air carrier and general aviation activity. Table 1-8 summarizes activity reported by the FAA Air Traffic Activity Data System (ATADS), the official source of historical air traffic operations of the FAA.

Table 1-8

Historical Aircraft Operations

	Air Carrier					
Year	Air Carrier	Commuter	Total Air Carrier	Total GA	Total Military	Total Operations
1990	130	6,302	6,432	49,320	50	55,802
1991	25	10,156	10,181	47,174	106	57,461
1992	24	10,595	10,619	53,630	30	64,279
1993	30	10,034	10,064	55,882	39	65,985
1994	38	9,234	9,272	52,648	28	61,948
1995	201	8,629	8,830	48,564	18	57,412
1996	19	8,871	8,890	61,339	18	70,247
1997	14	7,524	7,538	57,417	4	64,959
1998	3	9,219	9,222	49,672	7	58,901
1999	2	11,257	11,259	51,064	32	62,355
2000	8	13,760	13,768	51,503	21	65,292
2001	222	12,744	12,966	37,856	27	50,849
2002 *	1,018	15,557	16,575	41,271	51	57,898
2002 **	933	14,261	15,194	37,832	47	53,073

*Estimated ** First 11 months of year. Source: FAA Air Traffic Activity Data System (ATADS)

There is some helicopter activity occurring at the airport which is included in the operations totals presented in Table 1-8. Helicopter operations are generally Forest Service helicopters, with an occasional medivac helicopter operation. Conversations with the tower indicate that helicopter activity averages around 6 operations per month except during the summer when it can occasionally jump to 30 or 40 operations per day when the Forest Service and/or Bureau of Land Management (BLM) is actively fighting a forest fire in close proximity to the airport. Helicopter operations are recorded by the Hailey Tower as general aviation operations unless the helicopter has a bucket or some other payload, in which case it is recorded as an air taxi/commuter operations.

The Bureau of Land Management (BLM) for the past few years has stationed some of their aerial firefighting units at the airport during the fire season. These units have included a variety of the BLM's airborne equipment but are generally small single-engine air tankers that respond quickly to pop-up fires (initial attack) carrying under 1,000 gallons of retardant. Airport Management records indicate that BLM operations totaled 390 in year 2001 and 98 operations in year 2002. These operations are recorded by the Hailey Tower as air taxi/commuter operations and are included in the air taxi operations presented in Table 1-8.

Based aircraft at the Friedman Memorial Airport have decreased slightly over the past ten years. This is primarily due to the fact that very little hangar construction has been completed at the Airport during this period due to lack of useable, vacant land accessing the Airport and the fact that there has been a slight increase in the size of the average aircraft. The last historical fleet mix available for the airport is from the 1990 FAA 5010 Safety Inspection Form. A current list of airport tenants in Airport Management Records provides the current number of based aircraft and the fleet mix. The 1990 and current fleet mix at the airport is summarized in **Table 1-9**.

Table 1-9

Based Aircraft

Year	Single Engine	Multi-Engine Piston	Turboprop	Turbine	Total
1990	107	25	10	7	149
	72%	17%	7%	5%	
Current – 2002	98	17	12	16	143
	69%	12%	8%	11%	

Source: 1990 - FAA Safety Inspection Form 5010
2002 - Airport Management Records

1.6 Existing Planning Documents

Documents referenced in this study include, but are not limited to the following:

- *Friedman Memorial Airport Master Plan Update/Noise Contour Map Study 1991-2011*, Carter & Burgess, Inc., 1994
- *Airport Feasibility Study*, Coffman Associates, Inc., 1990
- *Airport Layout Plan Narrative Report*, Toothman-Orton Engineering Company, 1998
- *Airport Layout Plan*, Toothman-Orton Engineering Company, 2002
- National Plan of Integrated Airport Systems (1998-2002)
- FAA Aerospace Forecasts Fiscal Years 2001-2012

- FAA Terminal Area Forecast, Fiscal Years 2000-2015
- FAA Advisory Circular 150/5300-13, change 7, *Airport Design*
- FAA Advisory Circular 150/5070-6A, *Airport Master Plans*
- *SH-75 Corridor 2025 Population and Employment Forecasts*, Parsons Brinkerhoff, February 14, 2002.

Chapter Two
Projections of Aviation Demand

This element of the Friedman Memorial Airport Master Plan Update provides projections of future aviation demand at the Airport. Projections of short-, intermediate-, and long-term activity at the Airport are based on 5-, 10-, and 20-year milestones (2007, 2012, and 2022), using 2002 as the base year of analysis. Year 2002 data serves as the base year of data as it is the most recent year for which a full year of activity data is currently available.

Projections of aviation demand are an important element of the master planning process as they provide the basis for several key analyses, including:

- *Determining the role of the Airport, with respect to the type of aircraft to be accommodated in the future*
- *Evaluating the capacity of existing Airport facilities and their ability to accommodate projected aviation demand*
- *Estimating the extent of airside and landside improvements required in future years to accommodate projected demand*

This chapter uses the most recent aircraft activity available at Friedman Memorial Airport to project future levels of aviation demand through the year 2022. The forecast analysis contained in this chapter includes methodologies based on historical aviation trends at the Airport, as well as other socioeconomic trends related to the Wood River Valley. National projections of aviation activity developed by the Federal Aviation Administration (FAA) were also reviewed within the context of this forecast analysis.

The ability to accurately forecast future aviation activity levels at an airport is impacted to a certain degree by the amount and validity of historical information that is available regarding that airport. In the case of Friedman Memorial Airport, a towered airport, a combination of tower and Airport records provides accepted and valid information. Information from previous planning studies was also reviewed.

This chapter provides discussions of the methodologies and findings used for projecting passenger enplanements, aircraft fleet mix, aircraft operations, and based aircraft at Friedman Memorial Airport. The projections of aviation demand are documented in the following sections:

2.1 Role of the Airport
2.2 Industry Trends
2.3 Forecasting Approach
2.4 Passenger Enplanement Projections
2.5 Commercial Air Carrier Aircraft Operations and Fleet Mix Projections
2.6 Air Cargo Activity
2.7 Military Operations Projections
2.8 General Aviation Activity Projections
2.9 Activity Peaking Characteristics

2.1 Role of the Airport

In order to project aviation demand at Friedman Memorial Airport with some degree of certainty, it is important to understand the role of the Airport. This section presents historical data that define the Airport's role, including the geographical area served by the Airport.

An airport's air trade area (i.e., the geographical area it serves) is defined by several factors, including geographical and access considerations, as well as by the proximity of alternative aviation facilities. The Airport's primary market area is comprised of Blaine County and the Wood River Valley, which includes the communities of Hailey, Bellevue, Ketchum and Sun Valley. The Airport provides both scheduled air service and general aviation services to the area. Viewed from another perspective, noting the significance of the Sun Valley ski resort as a true destination resort, one could argue that the area's market is the entire nation.

Horizon Air provides scheduled, nonstop service to Seattle, while Skywest provides non-stop service to Salt Lake City. At present, Horizon Air provides seasonal (winter) non-stop service to Boise, Idaho, and is participating in a private-public partnership that successfully won a small community air service pilot program grant from the U.S. Department of Transportation. The grant program is in effect for one year beginning December 15, 2002 to provide non-stop service from Los Angeles International Airport to Friedman Memorial Airport. Horizon Air has previously offered the Boise service sporadically during its history of service to Friedman Memorial Airport.

2.2 Industry Trends

In order to project aviation demand at Friedman Memorial Airport it is important to understand changes occurring locally, and those within the U.S. aviation industry as a whole. Local trends have an obvious effect on the use of the Airport; especially with regard to air service (and the location of competing airports). U.S. trends, especially with general aviation, also have an effect on aviation demand based on the fact that this is a unique destination with a nationwide market base (and beyond). The following subsections provide some discussion of these perspectives.

2.2.1 Local Aviation Trends

Certain trends at Friedman Memorial Airport are worth noting. For example, it is significant to note that by the end of 2002, airport passenger traffic at SUN had largely rebounded from the September 11, 2001 downturn. This demonstrates the local market's resilience to adverse external influences. It also demonstrates that the area is impacted to a lesser degree by prolonged economic downturns as compared to the rest of the U.S. economy. This is likely because of the nature of the destination resort (which is becoming more and more active on a year-round basis) and the relative affluence the area enjoys.

Other trends that are manifested locally include an increase in fractional ownership of private aircraft; an evolution of the regional aircraft fleet to the larger (e.g., 70-passenger Q400) aircraft; and longer routes (e.g., Los Angeles service). The community has clearly demonstrated a strong desire to improve air service to the area, and has achieved some recent successes with new air routes.

2.2.2 National Aviation Trends

Each year the FAA publishes its national aviation forecast. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by State and local authorities, the aviation industry and the general public. The current edition of this annual forecast is *FAA Aerospace Forecasts-Fiscal Years 2002-2013*. Following are excerpts from this document.

- *The period after 2004 is projected to return to more normal levels of growth in demand for aviation products and services.*
- *It is assumed that domestic capacity will gradually return to the pre-September 11, 2001 capacity levels over a three-year period (i.e., by 2004).*
- *However, air carrier operations are not expected to return to pre-September 11, 2001 activity levels until 2005.*
- *It appears that many regionals/commuters were able to maintain their pre-September 11, 2001 flight schedules and, in some instances, have increased their schedules in response to the transfer of additional routes from their larger code-share partners. Over the 12-year forecast period, regional/commuter capacity is expected to increase at an average annual rate of 6.5 percent.*
- *The regional/commuter passenger fleet is forecast to increase at an average annual rate of 5.2 percent over the forecast period, from 2,427 in 2001 to 4,457 aircraft in 2013. The number of regional jets (up to 70 seats) in regional/commuter service is projected to grow from 696 in 2001 to 2,894 in 2013, an average annual increase of 12.6 percent.*
- *The business/corporate side of general aviation appears well situated to benefit from the stringent security restrictions imposed on flying by commercial aircraft. Safety concerns for corporate staff, combined with increased check-in and security clearance times at many U.S. airports appear to have increased the interest in fractional or corporate aircraft ownership as well as in on-demand charter flights.*
- *The current forecast assumes that business use of general aviation aircraft will expand much more rapidly than personal/sport use. This is due largely to the expected continued rapid growth in fractional ownership and is reflected in the changing composition of the general aviation aircraft fleet mix. The active general aviation fleet is projected to increase at an average annual rate of only 0.3 percent over the 12-year forecast period, growing from 216,150 to 225,260 aircraft in 2013. The number of jet aircraft is projected to increase from 7,150 in 2001 to 10,850 in 2013, an average annual increase of 3.5 percent.*

2.3 Forecasting Approach

There are a number of different forecasting techniques available for use in the projection of aviation activity, ranging from subjective judgement to sophisticated mathematical modeling. Due to the fact that a large number of variables affect a facility plan, it is important that each variable be considered in the context of its use in the plan. For variables that significantly affect the nature and extent of facilities, redundancy has been achieved through the utilization of several forecasting techniques so as to minimize the uncertainty associated with the range of the forecast variable.

The analysis includes the assessment of historical trends on aviation activity data at the local, regional, and national level. Aviation activity statistics on such items as passenger enplanements, aircraft operations and based aircraft are collected, reviewed and analyzed. Similarly, socioeconomic factors such as population, income, tourism are analyzed for the effect they may have had on aviation growth. The comparison of relationships among these various indicators provides the initial step in the development of realistic forecasts of aviation demand.

The following general methodologies were used in projecting various components of aviation demand at the Airport.

2.3.1 Time-series Methodologies

Historical trend lines and linear extrapolation are some of the most widely used methods of forecasting. These techniques utilize time-series types of data and are most useful for a pattern of demand that demonstrates an historical relationship with time. In utilizing this technique, an assumption is made that the same factors that have influenced demand will continue to affect future demand. While this is a rather broad assumption, it often provides a reliable benchmark for comparing the results of other analyses. Linear extrapolation establishes a linear trend by fitting a straight line using the least squares method to known historic data. Historic trend lines, as utilized in these analyses, examine historic compounded annual growth rates and extrapolate future data values by assuming a similar compounded annual growth rate in the future.

2.3.2 Market Share Methodology

Market share, ratio, or top-down models are utilized to scale large-scale aviation activity down to a local level. Inherent to the use of such a method is the demonstration that the proportion of the large-scale activity that can be assigned to the local level is a regular and predictable quantity. This method has been used extensively in the aviation industry for aviation demand forecasting at the local level. Its most common use is in the determination of the share of total national traffic activity that will be captured by a particular region, or airport. Historical data is examined to determine the ratio of local airport traffic to total national traffic. From outside data sources, in this case the FAA, projected levels of national activity are determined and then proportioned to Friedman based upon the observed and projected trends.

2.3.3 Socioeconomic Methodologies

Socioeconomic, or correlation analysis examines the direct relationship between two or more sets of historical data. In this case socioeconomic analyses have been performed, relating historical aviation activity to historical population levels within Blaine and Camas Counties. Based upon the observed and projected correlation between historical aviation activity and the socioeconomic data sets, future aviation activity projections are developed based upon the projected socioeconomic data sets. In this case projected population levels were obtained from Woods & Poole Economics, Inc., an independent firm that specializes in long-term economic and demographic projections. It is projected that Blaine and Camas County's combined population will increase from 21,422 in 2002 to 35,571 by 2022, representing a compounded annual growth rate of 2.6%. This forecasting methodology is subject to how accurately an airport's activity reflects local demographic makeup.

2.4 Passenger Enplanement Projections

This section presents projections of commercial passenger enplanements (i.e., passenger boardings) at the Airport. Airport enplanements are a function of a variety of factors including population, the local economy, the level/quality/cost of air service, and the availability of alternatives. It is important to understand the local air service market and the factors that influence enplanements. Accordingly, the Friedman Memorial Airport Master Plan Update evaluates enplanements from several perspectives with special emphasis on the local and regional factors that impact enplanements.

In a leisure market like that served by Friedman Memorial Airport, the demographic characteristics of the airport's market area (sometimes called the airport catchment area) that drive airline passenger traffic include population, rental and non-rental housing, vacation homes, and transient bed space in hotels and motels. Typically, in these types of markets, the bulk (75% or more) of the airline passenger traffic is referred passenger traffic as opposed to traffic that is initiated in the local market. Accordingly, the factors mentioned above, to a large extent, determine demand for commercial air service. For example, increasing the number of hotel rooms in strong leisure markets usually results in increased demand for commercial air service. Likewise, communities whose economic base includes a significant leisure component tend to generate more air travelers than do other communities that do not rely on leisure travelers to support the local economy.

These factors, considered together, are used to determine an area's demand for air service and conversely the level of air service that the area can support. Theoretically, in a deregulated environment, the demand for air service should determine the level of air service available in a community. However, air carriers make air service decisions based on two primary factors: return on investment and company strategy. As the commercial airline industry has consolidated, the number of air carriers has been reduced and the level of competition in many markets has been reduced as well. The result is under-served and over-priced markets, especially smaller markets. Likewise, enplanements are also influenced by the proximity of larger competing commercial service airports that attract travelers from the local airport catchment area due to lower fares and improved air service.

To develop an overall perspective regarding passenger enplanements at Friedman Memorial Airport, it is important to answer five questions:

1. What share of the airport catchment area population is currently using Friedman Memorial Airport?
2. How many enplanements can the Friedman Memorial Airport catchment area generate with the current level of air service?
3. How does air service at Friedman Memorial Airport compare to that found at other leisure/recreation markets in the region?
4. How would improvements to commercial air service impact enplanements?
5. What are reasonable projections for future passenger enplanements?

In completing the Friedman Memorial Airport passenger enplanement projections, three projection methodologies, presented below, were utilized. Additionally, a "true market" estimate and Comparative Analysis Evaluation were completed to provide additional perspective regarding the selection of the most appropriate enplanement projection method for use in this long-range planning study.

2.4.1 Historic Trend Line

This is a trend line projection, which basically assumes future trends will mimic those of the past. This methodology documents recent historic trends, and assumes that the factors affecting those trends will continue to influence demand levels at similar rates in the future. Trend line projections are typically used in planning studies to provide a baseline that represents static market conditions. The results of this type of projection, in small markets, are influenced by abrupt changes in available service or aircraft fleet.

The projections of passenger enplanements that result from using this methodology are presented in **Table 2-1**. As shown, enplanements are projected to increase from 66,292 in 2002 to approximately 198,000 in 2022, representing a compounded annual growth rate of 5.6 percent.

2.4.2 Market Share

The Airport's share of total U.S. domestic enplanements over the last 13 years is presented in **Table 2-2**. As shown in Table 2-2, the Airport's market share has varied considerably over the time period 1990-2002, from .00741 percent in 1990 to .00890 percent in 2002. The 13-year high was experienced in 1994 of .01121 percent and the low in 1990 at .00741 percent. It is interesting to note the drastic changes in enplanements at the Airport relative to service available – this is a key point in evaluating demand relative to the overall market. For example, air service improvements in the early 1990's resulted in a significant increase in enplanements at the Airport. Correspondingly, reductions in air service in 1996-97 resulted in a slight decrease in enplanements.

Even with these fluctuations, Friedman Memorial Airport enplanements have increased at a 5.6 percent compounded annual growth rate over the period 1990-2002. This compares with an average annual increase in the U.S. enplanements of 4.0 percent. It is projected that Friedman Memorial Airport will continue its role as a spoke airport, primarily serving origin and destination passengers.

This demand scenario assumes that a market share representing roughly the historic average will continue into the future (see Table 2-2). Based on this assumption, enplanements are projected to increase from 66,292 in 2002 to 139,141 in 2022. This increase represents a compounded annual growth rate of 3.8 percent, which is not unreasonable given the historic (1990-2002) rate of growth of 5.6 percent and recognizing recent air service improvements that show early promise in increasing passenger activity at the Airport.

2.4.3 Socioeconomic Methodology

Changes in an area's population, employment, and income all impact the propensity of that area's residents to use air travel. Therefore, a socioeconomic methodology for the projection of enplanements was also used in this study. For the Friedman Memorial Airport, the population of the Airport's market area was used as the independent variable. It is assumed under this methodology that as a market area's population increases or decreases, the level of enplanements will fluctuate in a corresponding manner.

Table 2-1
Enplanement Projections
Historic Trend Line Methodology

Year	SUN Enplanements	Annual Growth Rate
Historical:		
1990	34,286	
1991	40,878	19.2%
1992	50,496	23.5%
1993	55,200	9.3%
1994	63,004	14.1%
1995	64,731	2.7%
1996	63,071	-2.6%
1997	60,939	-3.4%
1998	61,430	0.8%
1999	68,303	11.2%
2000	70,189	2.8%
2001	59,073	-15.8%
2002	66,292	12.2%
Compounded Annual Growth Rate 1990-2002	*5.6%*	
Average Growth Rate 1990-2002		*6.2%*
Projected:		
2007	87,251	6.3%
2012	114,837	6.3%
2022	198,931	7.3%
Compounded Annual Growth Rate 2002-2022	*5.6%*	

Sources: Historical Enplanement Data - Airport Management Records.
Projected enplanements - Mead & Hunt, Inc., January 2003.

Table 2-2
Enplanement Projections
Market Share Methodology

Year	SUN Enplanements	U.S. Enplanements	SUN Market Share	Annual Growth Rate SUN	Annual Growth Rate U.S.
Historical					
1990	34,286	462,700,000	0.00741%		
1991	40,878	453,500,000	0.00901%	19.2%	-2.0%
1992	50,496	475,000,000	0.01063%	23.5%	4.7%
1993	55,200	520,038,158	0.01061%	9.3%	9.5%
1994	63,004	562,059,193	0.01121%	14.1%	8.1%
1995	64,731	582,042,553	0.01112%	2.7%	3.6%
1996	63,071	613,635,594	0.01028%	-2.6%	5.4%
1997	60,939	637,702,521	0.00956%	-3.4%	3.9%
1998	61,430	649,125,618	0.00946%	0.8%	1.8%
1999	68,303	675,406,435	0.01011%	11.2%	4.0%
2000	70,189	703,901,367	0.00997%	2.8%	4.2%
2001	59,073	712,828,008	0.00829%	-15.8%	1.3%
2002	66,292	738,832,173	0.00897%	12.2%	3.6%
Compounded Annual Growth Rate 1990-2002	*5.6%*	*4.0%*			
Average Market Share 1990-2002			*0.00973%*		
Average Growth Rate 1990-2002				*6.2%*	*4.0%*
Projected:					
2007	88,979	889,792,412	0.01000%	6.1%	3.8%
2012	104,285	1,042,850,536	0.01000%	3.2%	3.2%
2022	139,141	1,391,405,043	0.01000%	2.9%	2.9%
Compounded Annual Growth Rate 2002-2022	*3.8%*	*3.2%*			

Sources: Historical Enplanement Data - Airport Management Records.
Historical and Projected U.S. Enplanement Data - FAA/APO Terminal Area Forecast.
Projected enplanements - Mead & Hunt, Inc., January 2003.

Enplanement projections were derived based on the ratio of enplanements occurring at Friedman Memorial Airport to the population of the Airport's primary market area (Blaine and Camas counties). The ratio of enplanements per person is then applied to accepted population projections for the Airport's market area, producing projections of future enplanements at the Airport (see **Table 2-3**). Under this methodology, it is assumed that the average ratio of enplanements per person in the market area that was experienced at the airport over the last ten years will grow at a similar rate in the future, and then increase at a slight rate (due to the community's active air service development program). The ratio of enplanements per person is assumed to increase from 3.3075 in 2007 to 4.0021 in 2022.

Enplanement projections using the socioeconomic methodology indicate an increase from 66,292 in 2002 to 142,360 in 2022. This represents a compounded annual growth rate of approximately 3.9 percent.

2.4.4 True Market Estimate of Passenger Demand

In calendar year 2002, Friedman Memorial Airport enplaned 66,292 passengers. During the past five years, enplanements rose to a high of 70,189 in 2000. Overall, enplaned passenger traffic at Friedman Memorial Airport has increased over the past 13 years. In order to estimate the "true market" of potential passenger demand to the Wood River Valley, several pieces of information are analyzed: information from the U.S. Department of Transportation, a ticket lift survey, and Chamber of Commerce data. This is not a perfect analysis, since it assumes all people would fly if it is an option. Rather, it is intended to quantify a large group of inbound travelers that could use commercial air service if it were available. The following paragraphs describe the analysis; while the calculations are contained in **Appendix B**.

Based on DOT data, 71.2% of people coming to the Sun Valley area are "referred" passengers (referred from other markets); indicating that the local traffic makes up 28.8% of the total passenger traffic. A ticket lift study (see **Table 2-4**) provides a sample from local travel agents and represents local people buying tickets and flying to some destination. These trips are called "initiated" passenger trips. To estimate the initiated passengers, the analysis used the ticket lift survey information and the associated passenger leakage to estimate the local market.

Referred passengers are estimated based on studies provided by the Sun Valley Chamber of Commerce and Lucas Marketing Group. For 2000, the Chamber reported that the area had approximately 230,000 visitors, which is the equivalent of 460,000 origination and destination (O&D) trips. Other studies indicate that 26.4 % of these visitors were from Idaho. To estimate referred passengers, all Idaho travelers were deducted from the 460,000 total referred passenger trips and the balance (338,369) was split according to the DOT data (71.2%/28.8%). To determine the total for the market (initiated plus referred), the columns (from the table in Appendix B) titled "Initiated Pax Generated" and "Referred Pax Generated" were added. The total estimate for the year 2000 "true market" is 398,549 O&D trips, or 199,274 enplanements.

2.4.5 Comparative Analysis Evaluation

Because enplanements are closely tied to: (1) community economics and demographics, (2) level of available commercial air service and (3) the distance of the local airport from a larger competing airport, the Comparative Analysis Evaluation uses all of these factors in the analysis of enplanement projections. This methodology incorporates comparisons with other communities with similar characteristics to Sun

Table 2-3

Enplanement Projections

Socioeconomic Methodology

Year	SUN Enplanements	ACA Population	Enplanements Per Person
Historical:			
1990	34,286		
1991	40,878		
1992	50,496		
1993	55,200	16,624	3.3206
1994	63,004	17,398	3.6214
1995	64,731	18,208	3.5551
1996	63,071	18,770	3.3602
1997	60,939	19,135	3.1847
1998	61,430	19,317	3.1801
1999	68,303	19,437	3.5141
2000	70,189	20,084	3.4948
2001	59,073	20,754	2.8463
2002	66,292	21,422	3.0946
Compounded Annual Growth Rate	*2.1%*	*2.9%*	
Average Enplanements Per Person 1993-2002			*3.3075*
Projected:			
2007	82,255	24,869	3.3075
2012	103,047	28,323	3.6383
2022	142,360	35,571	4.0021
Compounded Annual Growth Rate 2002-2022	*3.9%*	*2.6%*	

Sources: Historical Enplanement Data - Airport management records.
Population Data:
Historical - U.S. Census Bureau
Future - Woods & Poole Economics
Projected Enplanements - Mead & Hunt, Inc., January 2003.

Table 2-4
Airport Use By Community

Community		Originating Airport: Sun Valley	Boise	Twin Falls	Total
Ketchum	Pax	991	320	85	1,396
	%	71.0%	22.9%	6.1%	
Hailey	Pax	523	465	60	1,048
	%	49.9%	44.4%	5.7%	
Total Passengers		1,514	785	145	2,444
% of Total Sample		61.9%	32.1%	5.9%	100.0%

Source: SUN Ticket Lift Survey, 2001.

Valley, but different levels of air service to evaluate the effect of air service changes on passenger enplanements.

Of the variables mentioned in the previous paragraph, the process utilized to estimate the economic and demographic strength of each community requires additional explanation. First, the primary economic and demographic indicators are calculated for five leisure/recreation communities in the Rocky Mountain region (see **Table 2-5**). Using this method, Friedman Memorial Airport has a regional economic/demographic rating, termed the Air Travel Indicator (ATI) of .82. In short, the ATI value is a measure of the community's propensity to generate commercial air travelers. Next, Friedman Memorial Airport's enplanements are compared with other airports in the same region whose ATI scores are similar to Friedman Memorial Airport. By selecting airports that have comparable ATI rating points and comparable mileage distances from competing airports but different levels of air service (available airline seats), it is possible to estimate Friedman Memorial Airport enplanements based on hypothetical changes in the level of air service at Friedman Memorial Airport. Another way to consider the Comparative Analysis Evaluation is, what would enplanements at Friedman Memorial Airport be, today, if the airport had a different level of commercial air service? For this exercise, Friedman Memorial Airport has been compared to airports serving the communities of Aspen (CO) Eagle (CO) Jackson Hole (WY), and Steamboat Springs (CO) (see **Table 2-6**).

The following is a summary of each of these communities compared to Friedman Memorial Airport:

Aspen (CO) - Sun Valley: Aspen is approximately 48 miles further from Denver than Sun Valley is from Boise, the nearest, competing, larger airport. Sun Valley's ATI is .82 while Aspen's comparable score is .74. However, Aspen has significantly more available airline seats, approximately 166% more, than Sun Valley. Accordingly, Aspen's total calendar year 2000 origin and destination traffic was 184% greater than Sun Valley. In this example, even though Sun Valley's ATI is higher than Aspen's ATI, the lack of available airline seats at Friedman Memorial Airport is limiting air travel.

Eagle (CO) – Sun Valley: Eagle, which serves Vail and Beaver Creek ski areas, has had a strong air service program for many years. As a result, it has the second highest number of available airline seats of any of the five communities studied. Additionally, Eagle's ATI score (1.66) was the highest of the five communities. Eagle County Regional Airport is 156 miles from Denver as compared to Sun Valley's distance of 138 miles from Boise (this is not a significant difference). It is not surprising that Eagle's high ATI score and large number of available airline seats generated 137.5% more passenger traffic than Friedman Memorial Airport for the same period. It is interesting to note that in the previous example Aspen had a lower ATI than Eagle, but had more available seats and more origin and destination traffic. This would indicate that in leisure markets available seats might be more important to generating airline passenger traffic than the demographic strength of the community. This reinforces the notion that Sun Valley's passenger traffic is constrained by a shortage of available airline seats.

Jackson Hole (WY) – Sun Valley: Both of these communities have approximately the same economic/demographic strength. Compared to Friedman Memorial Airport, Jackson Hole is significantly further from a larger competing airport (Salt Lake City). Jackson Hole is served by more and larger jet aircraft than is Sun Valley. The quality of air service is higher and the number of available airline seats is 104.6% greater than Friedman Memorial Airport. If Friedman Memorial Airport had the same level of air service as exists today in Jackson Hole, Friedman Memorial Airport's annual enplaned passengers are

Table 2-5
Enplanement Projections
Comparative Analysis Evaluation

Statistic		Sun Valley, ID	Aspen, CO	Eagle, CO	Jackson Hole, WY	Steamboat Springs, CO
Air Service						
Mileage to competitive airport	1/	138	186	156	282	192
Competitive airport		BOI	DEN	DEN	SLC	DEN
Origin & destination Passengers	2/	134,680	382,080	345,300	313,910	211,060
Percent passengers to SUN passengers		100.0%	283.7%	256.4%	233.1%	156.7%
Available seats (departures)	2/	136,374	362,716	323,914	279,008	177,982
Available seats (total)	2/	272,748	725,432	647,828	558,016	355,964
Percent available seats to SUN available seats		100.0%	266.0%	237.5%	204.6%	130.5%
Initiated passengers	2/	37,280	81,270	35,810	45,250	25,150
Percent initiated passengers of total passengers		27.7%	21.3%	10.4%	14.4%	11.9%
Referred passengers	2/	97,400	300,810	309,490	268,660	185,910
Percent referred passengers of total passengers		72.3%	78.7%	89.6%	85.6%	88.1%
Demographics						
Population by county	3/	18,999	14,872	41,659	18,251	19,690
Percent population to SUN population		100.0%	78.3%	219.3%	96.1%	103.6%
Available housing units by county	4/	12,186	10,096	22,111	10,267	11,217
Percent housing units to SUN housing units		100.0%	82.8%	181.4%	84.3%	92.0%
Available vacation homes by county	4/	3,723	2,728	5,932	2,121	1,977
Available renter occupied homes	4/	2,423	2,780	5,499	3,473	2,448
Total available vacation/renter occupied homes		6,146	5,508	11,431	5,594	4,425
Percent vacation/renter occupied homes to SUN		100.0%	89.6%	186.0%	91.0%	72.0%
Pillows for rent (hotel/motel/condo)	4/	6,066	7,908	16,588	12,500	18,917
Percent pillows for rent to SUN		100.0%	130.4%	273.5%	206.1%	311.9%

Sources 1/ Microsoft MapPoint 2002
2/ Calendar Year 2000, U.S. Department of Transportation, Data Base Products, Inc.
3/ Calendar Year 2000, U.S. Census Bureau
4/ Calendar Year 2000, Sun Valley/Ketchum Chamber of Commerce
Analysis prepared by Mead & Hunt, Inc., 2002.

Table 2-6

Enplanement Projections

Comparitive Analysis Methodology - Air Travel Indicator

	Population by County	Total Housing	Vacation Homes	Rental Homes	Transient Pillows	Air Travel Indicator
Demographic Values:						
Sun Valley, ID	18,999	12,186	3,723	2,423	6,066	
Aspen, CO	14,872	10,096	2,728	2,780	7,908	
Eagle, CO	41,659	22,111	5,932	5,499	16,588	
Jackson Hole, WY	18,251	10,267	2,121	3,473	12,500	
Steamboat Springs, CO	19,690	11,217	1,977	2,448	18,917	
	113,471	65,877	16,481	16,623	61,979	
Air Travel Share:						
Sun Valley, ID	*0.17*	*0.18*	*0.23*	*0.15*	*0.10*	*0.82*
Aspen, CO	0.13	0.15	0.17	0.17	0.13	0.74
Eagle, CO	0.37	0.34	0.36	0.33	0.27	1.66
Jackson Hole, WY	0.16	0.16	0.13	0.21	0.20	0.86
Steamboat Springs, CO	0.17	0.17	0.12	0.15	0.31	0.92
	1.00	1.00	1.00	1.00	1.00	

Source: Mead & Hunt, Inc., 2002.

estimated to be approximately 132,145. Since these two communities are so demographically aligned (Sun Valley ATI = .82, Jackson Hole ATI = .86), if everything else was equal, they should have similar volumes of passenger traffic. But Jackson Hole has 104% more airline seats than Sun Valley so it generated 133% more airline passengers in calendar year 2000.

Steamboat Springs (CO) – Sun Valley: Steamboat Springs is 54 mountainous miles further from a larger competing airport (Denver) than is Sun Valley. This example utilizes a community, that has a slightly higher economic/demographic rating score (ATI = .92) but a 30% greater number of available airline seats. Not surprising, Steamboat Springs had 17.9% more origin and destination passengers in calendar year 2000 than did Friedman Memorial Airport.

Of the four leisure/recreation communities that have been compared with Friedman Memorial Airport, none are exactly like Sun Valley in terms of ATI value and distance from a competing airport. However, it is clear from these examples that the supply of available airline seats has more to do with air passenger traffic than does the demographic strength of the community. This analysis, therefore, supports the selection of an aggressive passenger enplanement projection.

2.4.6 Recommended Passenger Enplanement Projection

The passenger enplanement projection using the market share methodology (Section 2.4.2) is recommended for long-range planning of Friedman Memorial Airport. This methodology recognizes that historical fluctuations in passenger demand at the Airport are the direct result of the air service available in the community. Furthermore, this methodology recognizes the marketing efforts the community is engaged in to improve air service to Hailey and places strong emphasis on the early success of that program and the long-term viability for sustaining it.

Enplanement Projection Comparison. To provide a more comprehensive comparison of trends and projection methodologies, previously prepared enplanement projections, including those from the 1994 Friedman Memorial Airport Master Plan and 1998 Airport Layout Plan Update, were compared to the projections developed in this Master Plan Update (see **Table 2-7**).

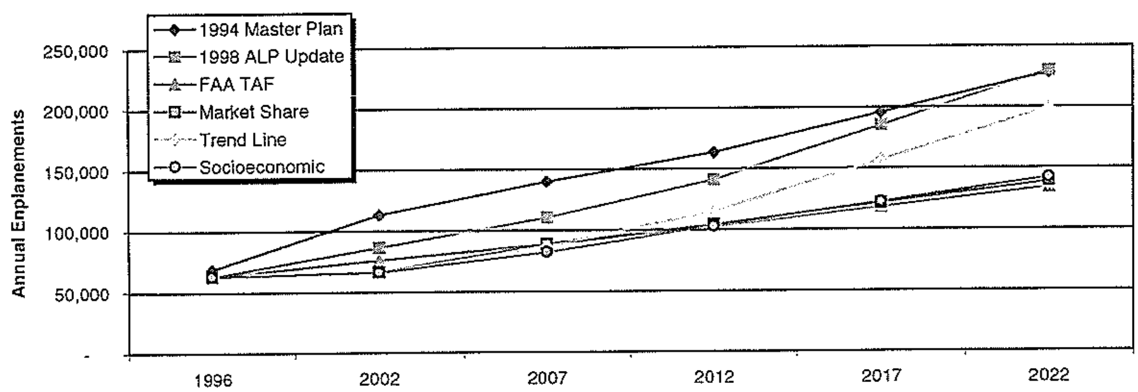
Each year, the FAA prepares Terminal Area Forecasts (TAFs) for use in the FAA's decision-making and planning process. The TAF includes all U.S. airports that have at least one of the following: an air traffic control tower; commercial airline service; 60,000 itinerant or 100,000 total annual operations; or at least 10 based aircraft. The current TAF for Friedman Memorial Airport is based on 1999 data and projects annual activity through the year 2015. Forecasts for those years not included in the TAF were extrapolated using implied growth rates. A similar methodology was used to interpolate/extrapolate projections from other sources to provide a basis for comparison among similar years.

Considering the Comparative Analysis Evaluation, it is clear that enplanements at Friedman Memorial Airport are restricted by the level of air service. The economics and demographics in the Friedman Memorial Airport catchment area are comparable to both Aspen and Jackson Hole, two communities that enjoy a higher level and quality of air service and higher enplanements. This comparison points to the ability of the Friedman Memorial Airport catchment area to support additional air service.

Table 2-7
Enplanement Projection Comparison *1/*

Year	Historical Enplanements	1994 Master Plan Update 2/	1998 ALP Report	FAA TAF	2004 Master Plan Update: Trend Line	2004 Master Plan Update: Market Share (preferred)	2004 Master Plan Update: Socio-Economic
Historical:							
1990	34,286						
1991	40,878						
1992	50,496						
1993	55,200						
1994	63,004						
1995	64,731						
1996	63,071	69,000					
1997	60,939						
1998	61,430						
1999	68,303						
2000	70,189						
2001	59,073	113,375					
2002	66,292		86,583	76,130 3/			
CAGR 1990-1996	*10.7%*						
CAGR 1997-2000	*4.8%*						
CAGR 1990-2002	*5.6%*						
Projected:							
2007		140,183	110,504	89,153	87,251	**88,979**	82,255
2012		163,424	141,035	102,176	114,837	**104,285**	103,047
2022		228,308	229,731	134,207	198,931	**139,141**	142,360
CAGR 2002-2022		*6.4%*	*5.0%*	*3.6%*	*5.6%*	*3.8%*	*3.9%*

Enplanement Projection Comparison Graph:



Notes: 1/ Does not include air charter enplanements.
2/ Projected through 2022 using implied growth rates from 1994 Master Plan.
3/ FAA Terminal Area Forecast (TAF) Year.
CAGR = Compounded Annual Growth Rate.

Sources: Historical Enplanement Data - Airport Management Records.
Projected Enplanements, Mead & Hunt, Inc., 2003.

The true market estimate and the Comparative Analysis Evaluation evaluates the strength of the Friedman Memorial Airport catchment area using different methods. The true market estimate indicates that the current airport catchment area market is large enough to support strong growth. Furthermore, the Comparative Analysis Evaluation makes the case that the Friedman Memorial Airport catchment area can support additional service and that these improvements would result in significant to aggressive growth in enplanements.

Contingency Demand Scenario. For long-range strategic planning purposes, a contingency demand scenario, which serves to estimate additional future demand based on the leakage analysis and air service initiatives, was defined. The demand/capacity and facility requirements analysis components of this master planning process will incorporate both the preferred 2022 projection of approximately 139,000 annual enplanements, as well as a contingency demand scenario of 200,000 annual enplanements. Planning of certain airport facilities (such as terminal area) based on the latter number should be characterized as strategic in nature, based on the recognition that uncertainty exists in the future, and also based on the initial impacts of Boise and Los Angeles service, both of which appear promising.

2.4.7 Air Charter Enplanement Projection

Historical air charter enplanement data are presented in **Table 2-8**. At Friedman Memorial Airport, air charter enplanements during the period 1993-2002 have ranged from a high of 4,712 in 1996 to a low of 2,779 in 2002. Throughout the 10-year historical period, an average of 3,405 annual air charter enplanements occurred at the Airport. For planning purposes, 3,405 annual air charter enplanements, the historical average experienced at the airport from 1993-2002, are projected to occur at the Airport.

2.5 Commercial Air Carrier Operations and Fleet Mix Projections

Projections of air carrier operations and fleet mix were developed using the recommended enplanement projection, supplemented with historical and expected trends in load factors, types of aircraft, and average seats per departure.

2.5.1 Air Carrier Operations Projections

Historical air carrier operations as reported by the FAA Air Traffic Activity Data System (ATADS) are presented in **Table 2-9**. Also depicted in Table 2-9 are the number of scheduled air carrier operations as reported by the Official Airline Guide (OAG) and the annual difference between these two data sets. Up until 1997 the number of actual air carrier operations was slightly less than the number of scheduled air carrier operations which is to be expected as a small number of scheduled flights are generally anticipated to be cancelled for weather or mechanical problems throughout the course of a year. After 1997, however, there is a significant and generally increasing number of reported air carrier operations occurring at the Airport in relation to the number of scheduled air carrier operations. This is believed to be a result of the manner in which the Airport traffic control tower (ATCT) records fractional ownership aircraft operations. Discussions with the Hailey tower indicate that they record all aircraft with three letter designators, which includes fractional ownership types due the type of FAA certificate and rules that they fly under, as air carrier operations. The significant rise in fractional ownership after 1997 seems to indicate that these increasing numbers of reported air carrier operations are conducted by fractional ownership type aircraft.

Table 2-8
Historical and Projected Air Charter Enplanements

Year	Air Charter Enplanements
Historical:	
1993	3,081
1994	2,229
1995	3,610
1996	4,712
1997	3,701
1998	4,140
1999	3,502
2000	3,268
2001	3,023
2002	2,779
Average Enplanements 1993 - 2002	*3,405*
Projected:	
2007	3,405
2012	3,405
2022	3,405

Sources: Historical Enplanement Data - Airport management records.
Projected Enplanements - Mead & Hunt, Inc., 2002.

Table 2-9

Historic Operations
Friedman Memorial Airport

Year	Air Carrier Reported by FAA ATADS	Scheduled Air Carrier Reported by OAG	Difference 1/	Revised Historical Operations Breakdown: Air Carrier 2/	General Aviation 3/	Military 4/	Total Operations 4/
Historical:							
1992	10,619	10,362	257	10,619	53,630	30	64,279
1993	10,064	10,490	-426	10,064	55,882	39	65,985
1994	9,272	8,940	332	9,272	52,648	28	61,948
1995	8,830	9,098	-268	8,830	48,564	18	57,412
1996	8,890	9,150	-260	8,890	61,339	18	70,247
1997	7,538	8,082	-544	7,538	57,417	4	64,959
1998	9,222	7,170	**2,052**	7,170	51,724	7	58,901
1999	11,259	8,018	**3,241**	8,018	54,305	32	62,355
2000	13,768	8,526	**5,242**	8,526	56,745	21	65,292
2001	12,966	7,986	**4,980**	7,986	42,836	27	50,849
2002*	16,575	8,232	**8,343**	8,232	49,615	51	57,898

* Estimated

1/ Difference is assumed to be operations by fractional ownership aircraft, due to the fact that the Hailey Tower records operations by "fractional ownership" aircraft as commercial air carrier operations.

2/ Only Scheduled Air Carrier Operations after 1997

3/ General Aviation Operations reported by FAA ATADS plus fractional ownership aircraft (Difference) after 1997

4/ FAA Air Traffic Activity Data System (ATADS)

Sources: FAA Air Traffic Activity Data System (ATADS)
Official Airline Guide (OAG)
Projections - Mead & Hunt, Inc.

Therefore after 1997 the number air carrier operations reported as occurring at the airport is assumed to also include fractional ownership type aircraft. However, for airport planning purposes, we are interested in the number of commercial air carrier operations, or those transporting the general public with a published schedule. Fractional ownership type aircraft are considered general aviation type operations as they do not operate on a published schedule and operate on demand of their owners. For airport planning purposes, a revised historic operations breakdown was developed separating the scheduled air carrier operations from the fractional ownership aircraft operations. Table 2-9 depicts this revised historic operations breakdown. After 1997, air carrier operations represent only scheduled air carrier operations and general aviation operations have been increased to include the fractional ownership aircraft operations.

Historical and projected data for scheduled air carrier operations at the Airport are presented in **Table 2-10**. At Friedman, the average seats per scheduled passenger departure reached an all time high of 35.3 in 2002. This increase in average seat size is due to airlines at the Airport shifting their fleets from 30 seat turboprop aircraft in the 1990s, to new service in recent years by the Dash8-Q400 70-seat turboprop aircraft. In the U.S., the regional/commuter fleet totaled 2,268 aircraft in 2000 and by the year 2013 the regional/commuter fleet is anticipated to total 4,457 aircraft, with most of this fleet increase occurring in the 40 to 70 seat regional jet type aircraft. This shift in equipment type nationally is anticipated to begin to manifest itself at Friedman Memorial Airport as enplanements at the Airport increase. Fleet changes by regional/commuter carriers are anticipated to increase the average seat size per departure at the Airport. Linear extrapolation of the trend in average seats per departure since 1992 indicates that the average seat per departure is projected to increase to 37.3 in 2007, 40.5 in 2012, and 46.9 in 2022.

Historic load factors at the airport, as shown in Table 2-10, range from a low of 37.1 percent in 1992 to a high of 55.2 percent in 1999, resulting in an average of 46.4 percent since 1992. In 2002, the load factor for the Airport was 45.2 percent. Nationally, regional/commuter airlines load factors are projected to decline slightly in 2002 (from 58.6 to 57.9 percent and then increase to 58.8 percent in 2003), and thereafter gradually increase to 63.0 percent in 2013. For this analysis, the load factor for the Airport was kept constant at it's historic average of 46.4%.

As shown in Table 2-10, based on the projected enplanements, average seats per departure, and load factor, scheduled passenger departures are expected to increase from 4,116 in 2002 to 6,399 in 2022.

2.5.2 Air Carrier Fleet Mix

The commercial air carrier fleet mix projections for the Airport are presented in **Table 2-11**. Passenger aircraft were grouped into categories by the number of seats they are typically configured with. For purposes of this analysis, passenger aircraft were grouped into five categories.

As noted earlier, the most significant change anticipated in fleet mix is due to a number of carriers shifting their fleets nationally and locally from smaller turboprop aircraft to larger regional jet and turboprop type aircraft. Nationally, various regional jet type aircraft, generally with 40 to 70 seats are replacing turboprop aircraft. At Friedman Memorial Airport, the DeHavilland Dash 8-Q400 is indicative of this trend in seating capacity. Discussions with airline market/route planning staff (Horizon) indicate they are quite pleased with the performance of the Q400 and they anticipate more of these aircraft in their future fleet. The average seats per departure is projected to increase from its current level of 35.3 to 46.9 by 2022.

Table 2-10
Air Carrier Operations Projections
Friedman Memorial Airport

Year	Enplanements	Scheduled Passenger Dep	Avg. Seats		Load Factor		Total Scheduled Air Carrier Operations
Historical:							
1992	50,496	5,181	26.3		37.1%		10,362
1993	55,200	5,245	27.2		38.7%		10,490
1994	63,004	4,470	29.4		47.9%		8,940
1995	64,731	4,549	32.2		44.2%		9,098
1996	63,071	4,575	31.9		43.2%		9,150
1997	60,939	4,041	32.0		47.1%		8,082
1998	61,430	3,585	31.6		54.3%		7,170
1999	68,303	4,009	30.9		55.2%		8,018
2000	70,189	4,263	32.0		51.5%		8,526
2001	59,073	3,993	32.2		45.9%		7,986
2002 *	65,752	4,116	35.3		45.2%		8,232
		CAGR	*3.00%*	*Average*	*46.4%*	*CAGR*	*-2.27%*
Projected:							
2007	88,979	5,136	37.3		46.4%		10,272
2012	104,285	5,548	40.5		46.4%		11,095
2022	139,141	6,399	46.9		46.4%		12,799
CAGR (2002-2022)	*3.82%*	*2.23%*	*1.43%*				*2.23%*

Notes: * estimated
CAGR = compounded annual growth rate

Sources: Historical Enplanements - Airport Management Records.
Historical Scheduled Passenger Departures - Official Airline Guide (OAG)
Projections - Mead & Hunt, Inc.

Table 2-11

Air Carrier Fleet Mix Projections
Friedman Memorial Airport

Scheduled Commercial Aircraft Operations (departures)

		Historical						Projected					
Seat Range	Typical Aircraft	2000	%	2001	%	2002	%	2007		2012		2022	
<20	Beech 1900, Jetstream 31	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
20-39	Saab 340, Emb120, DCH8-300	4,263	100%	3,868	97%	3,573	87%	4,109	80%	3,883	70%	3,456	54%
40-59	CRJ, EMB145, ATR 42	0	0%	0	0%	0	0%	205	4%	444	8%	768	12%
60-85	Q400, CRJ700, ERJ170, ATR 72	0	0%	125	3%	543	13%	822	16%	1,221	22%	1,920	30%
86-100	AvroRJ, CRJ900	0	0%	0	0%	0	0%	0	0%	0	0%	256	4%
Total Scheduled Passenger Aircraft Departures		4,263		3,993		4,116		5,136		5,548		6,399	
Average Seats Per Departure		32.0		32.2		35.3		37.3		40.5		46.9	
Total Enplanements		70,189		59,073		65,752		88,979		104,285		139,141	
Enplanements per Departure		16.5		14.8		16.0		17.3		18.8		21.7	
Average Annual Load Factor		51.5%		45.9%		45.2%		46.4%		46.4%		46.4%	

Sources: 2000-2002 Historical - Scheduled Passenger Departures by Equipment Type & Seats - Official Airline Guide (OAG)
Enplanements Projections, Mead & Hunt, Preferred Methodology
Fleet Mix Projections - Mead & Hunt, Inc.

It should be noted that this fleet mix projection is based upon unconstrained conditions and any conditions that limit the type of aircraft that can operate to/from the airport may alter the actual operational fleet at the Airport. At present, the Airport is not configured in a compatible manner with the Airport Reference Code C-III, Q400 aircraft. This master planning effort strived to correct that situation.

2.5.3 Critical Aircraft

The critical (or design) aircraft is determined based on the most demanding aircraft that is anticipated to regularly operate at the Airport. The FAA typically defines this as an aircraft that has at least 500 annual operations at the airport. The FAA organizes airport design standards by Airport Reference Code (ARC) and the ARC is defined based on the Airport's critical or design aircraft. The ARC incorporates characteristics of the most demanding aircraft that operates at an airport on a regular basis and includes the following two components: Aircraft Approach Category and Airplane Design Group. The aircraft approach category, denoted by letter, represents the approach speed characteristics of the critical/design aircraft. The airplane design group, denoted by Roman numeral, is based on the wingspan and relates to the physical characteristics of the critical/design aircraft. The current critical aircraft at the Airport is the Dash-8 200 series, which is an ARC B-III. The Dash 8-Q400 turboprop aircraft is the largest and fastest commercial air carrier aircraft currently operating at the Airport. It has a wingspan of 93 feet 3 inches, a length of 107 feet 9 inches, and a tail height of 27 feet. The Q400 stall speed (1.3 VSR) at max weight and flaps 15 is 136 knots. At flaps 35 it is 131 knots. This aircraft has an ARC of C-III based on a wingspan less than 118 feet and approach speed less than 141 knots. For weight and pavement design, the critical aircraft is the Gulfstream IV.

As enplanements increase, there will be a desire for passenger operations by regional jet type aircraft. New technology regional jet aircraft entering the fleet today operate more efficiently and with greater mission flexibility and reliability than their predecessors. This efficiency and flexibility has contributed to vast orders for new regional jet type aircraft such as the Bombardier (CRJ) and Embraer regional jet type aircraft. These types of aircraft have begun and are projected to takeover as the workhorses of the regional/commuter air carrier fleets and a desire for regular operations by these types of aircraft at Friedman Memorial Airport is expected in the future.

These regional jet type aircraft have wingspans ranging from 65.8 feet for the Embraer 135/140/145 (37 to 50 seat regional jets), up to 94.2 feet for the (currently in development) Embraer 190 (98 seat regional jet with first flight planned for 2004). The CRJ200 with 50 seats has a wingspan of 69.7 feet and the CRJ700 with 70 seats has a wingspan of 76.3 feet. All of these regional jets are anticipated to operate with approach speeds of less than 141 knots, placing them into Approach Category C, although it should be noted that information regarding approach speeds on the 90 seat regional jets is currently unavailable (first delivery of these aircraft is not expected until 2003 or later). The regional jets with wingspans under 79 feet have an airport reference code of C-II and the regional jets with wingspans under 118 feet have an airport reference code of C-III. The 1994 Master Plan Update envisioned this occurring via the BAE 146 (now called the AVRO RJ85), an early version regional jet, which was projected to be the critical aircraft. This planning effort considers the evolution of the regional aircraft fleet.

Again it is worth noting that the projected demand for these types of aircraft at the Airport is based upon unconstrained conditions and any conditions that limit the type of aircraft that can operate to/from the airport may alter the actual critical aircraft that will operate at the Airport.

2.6 Air Cargo Activity

Air cargo activity at the Airport includes operations by two separate operators, FedEx and AmeriFlight. FedEx generally operates a single Cessna Caravan flight per day to Friedman Memorial Airport; it arrives in the morning and departs in the evening. Ameriflight provides service for UPS to the Airport. Their operations include 2 flights per day by a Navaho, once in the morning and once in the evening, and an occasional Beech 1900 turboprop flight.

Given the leisure market area that the airport serves significant changes in the amount of air cargo activity is not anticipated through the planning period. Therefore, it is projected that air cargo activity will remain relatively flat at an average of 3 to 4 flights per day by two separate operators.

2.7 Military Operations Projections

Military aircraft operations at Friedman Memorial Airport include limited training and other operations conducted by the various armed services. **Table 2-12** presents historical and projected military operations for Friedman Memorial Airport. As shown in Table 2-12, total military operations between 1992 and 2002 ranged from 4 to 51, with an average of 25 per year. In projecting military activity, it is important to recognize that an airport's military operations are not influenced by the same factors that affect civil aviation. Rather, military activity is subject to factors relating to national defense. Therefore, it is projected that military operations at the Airport will remain flat at an average of 25 operations a year through the 20-year planning horizon, but may vary from year to year.

2.8 General Aviation Operations Projections

General aviation is defined as that portion of civil aviation that encompasses all facets of aviation except commercial and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be projected. Projections were developed for the number of based aircraft, the based aircraft fleet mix, and aircraft operations. As was noted earlier and is shown in Table 2-9, the number of general aviation operations occurring at the Airport has been revised from those reported by the FAA Air Traffic Activity Data System (ATADS) to include aircraft operations by fractional ownership aircraft.

It is also significant to note that general aviation aircraft operations are only partially tied to the number of based aircraft at the Airport. This is based on the fact that the majority of general aviation aircraft operations are conducted by aircraft originating outside of the local area.

2.8.1 Based Aircraft Projections

Based aircraft at Friedman Memorial Airport appear to have decreased slightly over the past 10 years. This may be due to the fact that very little hangar construction has been completed at the Airport during this period due to lack of useable, vacant land accessing the Airport and the fact that there has been a slight increase in the size of the average aircraft. During that time, the number of aircraft has decreased slightly from 148 in 1990 to 143 in 2002. Reliable historic based aircraft totals are not available for any years between 1990 and 2002 so the number of based aircraft has been assumed to steadily decrease from 1990 to 2002. Nationally, the enactment of the General Aviation Revitalization Act of 1994, signaled

Table 2-12
Military Operations Projections
Friedman Memorial Airport

Year		Total Military Operations
Historical:		
1992		30
1993		39
1994		28
1995		18
1996		18
1997		4
1998		7
1999		32
2000		21
2001		27
2002		51
	Average	*25*
Projected:		
2007		25
2012		25
2022		25

Sources: Historic Military Operations - FAA Air Traffic Activity Data System (ATADS)
Projections - Mead & Hunt, Inc.

a significant change in the general aviation industry. Since 1994, unit shipments of general aviation aircraft recorded unprecedented growth. Active general aviation aircraft increased from 188,000 in 1995 to 216,000 in 2001. The number of based aircraft at Friedman has not increased in step with the national number of aircraft and active pilots, mainly due to a lack of available general aviation facilities at the Airport. The current hangars at the Airport have all been leased for some time and additional hangars have not been built, which has limited growth at the Airport in this sector of the aviation market. *An undefined level of demand is, therefore, assumed to exist.*

Historical based aircraft at the Airport, as well as projected demand, are presented in **Table 2-13**. This unconstrained forecast assumes that if additional general aviation facilities were available, particularly aircraft storage hangars, the number of based aircraft would begin to more closely follow the projected increases in based aircraft nationally.[1] As shown in Table 2-13, the Airport's market share of the nation's based aircraft peaked at 0.085% in 1994. Assuming that this market share could easily be attained with additional general aviation facilities, it is projected there will be a demand for 201 based aircraft by 2022.

2.8.2 Based Aircraft Fleet Mix

Table 2-14 depicts the historical and projected based aircraft fleet mix. Airport records indicate that in 2002, approximately 69 percent of the Airport's based aircraft were single-engine piston, 12 percent were multi-engine, 8 percent were turboprop, and 11 percent were jets. Projections of a future general aviation fleet mix at the Airport were derived by reviewing national FAA projections regarding trends in aircraft types to historical trends in based aircraft fleet mix at the Airport. In order to project the future based aircraft fleet mix, it was assumed that the Airport would continue to have a strong presence of single-engine aircraft but that multi-engine and jet aircraft would increase their presence at the Airport. By 2022, the fleet mix composition is assumed to be 65 percent single engine, 11 percent multi-engine, 7 percent turboprop, and 17 percent jet aircraft.

2.8.3 General Aviation Operations Projections

General aviation operations projections were prepared using several methodologies, and as can be seen in **Table 2-15**, the results vary significantly. Historical operations have declined significantly since 1992, which results in decreasing or nearly flat operations projections through a linear extrapolation and trend line methodologies. Because of the anomaly of activity in 2001, these methods of projecting are not considered appropriate for the situation.

With the operations per based aircraft (OPBA) methodology, general aviation aircraft operations are projected by comparing the number of general aviation aircraft based at the Airport to the number of general aviation operations that occur at the Airport on an annual basis. The OPBA is recognized by the FAA as an accepted method to relate the number of operations to a known variable; in this case, based aircraft. OPBA is calculated by dividing the number of general aviation operations that occur at an airport by the number of general aviation aircraft based at the Airport. This methodology results in the highest projection of general aviation operations at 73,292 in 2022, which is anticipated as this methodology takes into account the increased based aircraft demand and based aircraft operations that would likely result if additional aircraft storage facilities were available.

[1] No aircraft storage hangars have been built since 1992, which had the highest based aircraft per resident ratio.

Table 2-13
Based Aircraft Projections
Friedman Memorial Airport

Year	*Preferred* Market Share Methodology: SUN Based Aircraft	Total U.S. Active Aircraft	SUN Market Share	Socio-Economic Methodology: SUN Based Aircraft	Blaine & Camas Co. Population	Based Aircraft per resident
Historical:						
1992	148	185,650	0.080%	148	15,884	0.0093
1993	148	177,120	0.084%	148	16,624	0.0089
1994	147	172,936	0.085%	147	17,398	0.0084
1995	147	188,089	0.078%	147	18,208	0.0081
1996	146	191,129	0.076%	146	18,770	0.0078
1997	146	192,414	0.076%	146	19,135	0.0076
1998	145	204,710	0.071%	145	19,317	0.0075
1999	145	219,464	0.066%	145	19,437	0.0075
2000	144	217,533	0.066%	144	20,084	0.0072
2001	144	216,150	0.067%	144	20,754	0.0069
2002	143	214,350	0.067%	143	21,440	0.0067
		Peak (1992-2002)	*0.085%*		*Average (1992-2002)*	*0.0078*
Projected:						
2007	186	218,250	0.085%	194	24,869	0.0078
2012	191	224,310	0.085%	221	28,323	0.0078
2022	201	236,430 [1]	0.085%	278	35,571	0.0078
CAGR (2002-2022)	*1.72%*	*0.49%*		*3.38%*	*2.56%*	

Notes: Historical based aircraft totals are not available, they are assumed to have steadily decreased from 149 in 1990 to 143 in 2002.
CAGR = Compounded annual growth rate.
[1]Projected by Mead & Hunt through linear extrapolation of the existing FAA forecast figures

Sources: Current/Historical SUN Based Aircraft - Airport Management Records
Historical & Projected U.S. Active/Based Aircraft - FAA Aerospace Forecasts Fiscal Years 2002-2013
Historical Blaine & Camas County Population - U.S. Census Bureau
Projected Blaine & Camas County Population - Woods & Poole Economics, Inc.
Projected SUN Based Aircraft - Mead & Hunt, Inc.

Table 2-14

Based Aircraft Fleet Mix Projections
Friedman Memorial Airport

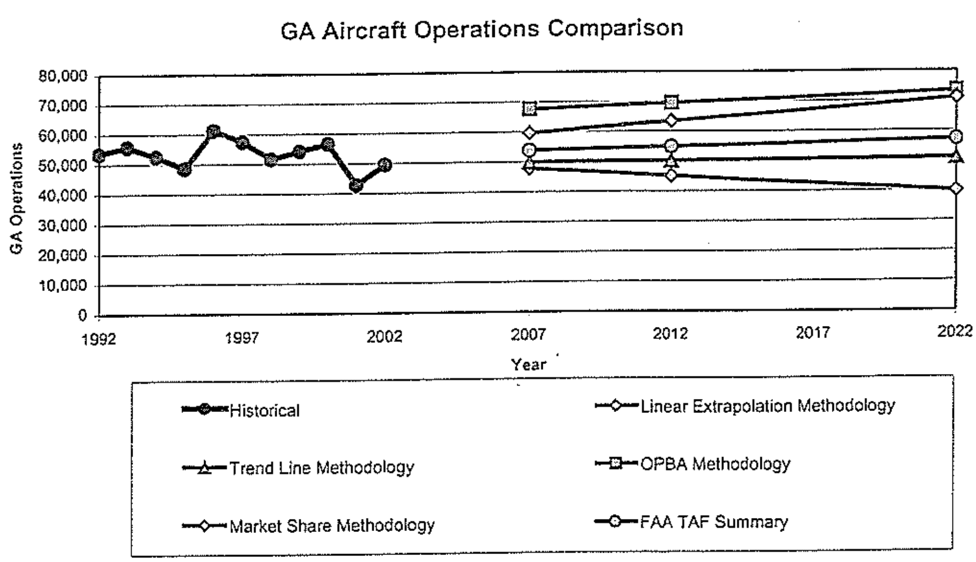
Year	Single Engine	%	Multi Engine	%	Turboprop	%	Jet	%	Total
Historical:									
1990	107	72%	25	17%	10	7%	7	5%	149
2002	98	69%	17	12%	12	8%	16	11%	143
Projected:									
2007	121	65%	22	12%	13	7%	30	16%	186
2012	124	65%	23	12%	13	7%	31	16%	191
2022	131	65%	22	11%	14	7%	34	17%	201
CAGR (2002-2022)	*1.45%*		*1.32%*		*0.80%*		*3.87%*		*1.72%*

Notes: CAGR = Compounded annual growth rate.
Numbers may not add due to rounding.

Sources: 1990 SUN Based Aircraft - FAA Safety Inspection Form 5010
2002 Current SUN Based Aircraft - Airport Management Records
Total SUN Based Aircraft - Based Aircraft Projections, Mead & Hunt, Preferred Methodology
Projected Fleet Mix - Mead & Hunt, Inc.

Table 2-15
General Aviation Operations Projections
Friedman Memorial Airport

Year	Historical	Linear Extrapolation Methodology	Trend Line Methodology	OPBA Methodology	*Preferred* Market Share Methodology	FAA TAF Summary
Historical:						
1992	53,630					
1993	55,882					
1994	52,648					
1995	48,564					
1996	61,339					
1997	57,417					
1998	51,724					
1999	54,305					
2000	56,745					
2001	42,836					
2002	49,615					
Projected:						
2007		47,873	49,975	67,656	59,719	53,939
2012		45,232	50,337	69,535	63,472	55,051
2022		39,950	51,070	73,292	70,976	57,275 [1]
CAGR (2002-2022)		*-1.08%*	*0.14%*	*1.97%*	*1.81%*	*0.72%*



Notes: CAGR = Compounded annual growth rate.
OPBA = Operations per Based Aircraft
[1]Projected by Mead & Hunt through linear extrapolation of the existing FAA forecast figures

Sources: Historical General Aviation Operations - Airport Management/ATCT Records.
TAF - FAA Terminal Area Forecast
Mead & Hunt, Inc.

The market share methodology has been utilized to scale the national number of projected general aviation operations down to a local level. Friedman's market share or percent of the total U.S. general aviation operations has averaged 0.14% percent from 1996 to 2002. Utilizing the FAA's forecasts regarding future general aviation activity and assuming that Friedman's market share remains consistent indicates that general aviation operations would likely increase from 49,615 in 2002 to 70,976 in 2022. This forecast lies between the OPBA methodology on the top and the linear extrapolation and trend line methodologies on the bottom and serves as the preferred general aviation operations projection for use in this Master Plan Update.

2.9 Activity Peaking Characteristics

When projecting future activity levels at an airport, it is also important to identify and project peak period activity levels. These projections are important for various facility planning purposes. Since Friedman Memorial Airport, similar to many commercial service airports, should be designed to accommodate peak demand periods, these projections are important to subsequent facilities planning. Peaking characteristics are developed for passenger enplanements and aircraft operations using the following methodologies:

- Monthly enplanements supplied by the Airport are analyzed to determine peak month enplanement percentages relative to the year's total activity.

- Monthly operations as reported by the FAA Air Traffic Activity Data System (ATADS) and from published air carrier schedules are reviewed to determine peak operations relative to the year's total activity.

- The various components of Airport operations have historically peaked in different months during the year. The following peak months were observed:

    - Enplanements peaked in August, 2002 with 8,149 passengers (12.4%).
    - Monthly air carrier operations reported prior to 1998 were reviewed to determine the scheduled air carrier peak month. Only monthly data prior to 1998 was included so that the air carrier peak month could be established without the inclusion of any significant numbers of fractional ownership aircraft operations. The air carrier operations have historically peaked in July or August with approximately 11.7% of the year's air carrier operations. In 2002 this correlates to 963 scheduled air carrier operations.
    - General aviation operations peaked in July of 2002 with 7,824 operations (15.8%). The monthly number of general aviation and air carrier operations minus the number of scheduled air carrier operations was reviewed so that fractional ownership aircraft are included in the general aviation operations totals.
    - Military operations peaked in August with 26 operations (50.7%).

The peak months in all cases consist of 31 days. Therefore, to derive peak month average day (PMAD) estimates for the various demand components at the Airport, peak month estimates were divided by 31.

Peak hour percentages are then applied to projected PMAD estimates to derive peak hour operational levels. Peak hour percentages have been developed based upon actual air carrier schedules, as well as actual peak data from the Airport.

Projections of peak demand characteristics for enplanements and aircraft operations at the Airport are presented in **Table 2-16**. Relevant assumptions (i.e., peak month, peak day and peak hour percentages) are also included in Table 2-16.

Table 2-16

Peak Demand Characteristics
Friedman Memorial Airport

Year	Enplanements	Operations: Commercial Air Carrier	General Aviation	Military	Total
2002*					
Annual	65,752 [1]	8,232 [3]	49,615 [6]	51 [8]	57,898
Peak Month	8,149 [1]	963	7,824 [6]	26 [8]	8,813
Average Day	263	31	252	1	284
Peak Hour	. 55 [2]	4 [4]	25	1	30
Projected:					
2007					
Annual	88,979	10,272	59,719	25	70,016
Peak Month	11,028	1,202	9,417	13	10,632
Average Day	356	39	304	1	344
Peak Hour	74	5	30	1	36
2012					
Annual	104,285	11,095	63,472	25	74,592
Peak Month	12,925	1,298	10,009	13	11,320
Average Day	417	42	323	1	366
Peak Hour	87	5	32	1	39
2022					
Annual	139,141	12,799	70,976	25	83,800
Peak Month	17,244	1,497	11,193	13	12,703
Average Day	556	48	361	1	410
Peak Hour	116	6	36	1	43
Assumptions:					
Peak Month	12.4% [1]	11.7% [5]	15.8%	50.7%	
Average Day	1/31	1/31	1/31	1/31	
Peak Hour	20.8% [2]	12.9%	10.0% [7]	100.0% [7]	

* Estimated

Notes: Peak Month, Average Day, and Peak Hour numbers calculated based upon Peaking Assumptions unless otherwise noted.

[1]Airport Management Records
[2]Peak hour of departing seats from current airline schedules
[3]Official Airline Guide (OAG)
[4]Current Airline Schedules
[5]Typical peak month percentage of air carrier operations as reported by the FAA Air Traffic Activity Data System (ATADS) prior to 19
[6]GA and Air Carrier Operations and as reported by ATADS minus scheduled air carrier operations
[7]Based upon professional judgement, general industry planning standards, and conversations with Airport management and ATCT personnel.
[8]FAA Air Traffic Activity Data System (ATADS)

Source: Projections - Mead & Hunt, Inc.

Chapter Three
Demand/Capacity and Facility Requirements Analysis

This chapter of the Friedman Memorial Airport Master Plan Update provides documentation of certain technical components of the overall planning effort. It was intended to be a purely technical list of facility needs for the Airport owners to consider in light of current and projected demands. As such, this document sets the stage for the development of alternative plan concepts and a review of improvement options. Given the natural and physical constraints of the current airport site, it was possible that all facility needs may not be met. This chapter is one installment in a planning process that considered aviation demands, as well as the affect of those demands on the community.

A review of the relationship between airport facilities, and long-range demand for the various Airport users was conducted to identify capacity deficiencies. Capacity, as defined for this study, represents the processing and storage capabilities of a facility or airport system. It takes into consideration the level of service or convenience that is acceptable to the County, City, Airport users, and community served by the Airport.

The various airport components are analyzed separately to determine their ability to serve existing and projected demand levels, which in turn serve to identify gross facility requirements and/or airfield limitations. These facility requirements are then combined to identify airport improvement alternatives, where necessary. Ideas and recommendations for improving the Airport will be explored in the next phase of the study, which will ultimately be documented in Chapter 4, *Alternative Plan Concepts*.

The analysis of demand vs. capacity and the list of facility needs are presented in the following sections:

3.1 Airfield Demand/Capacity Analysis
3.2 Airfield Facility Requirements
3.3 Terminal Facility Requirements
3.4 General Aviation Facility Requirements
3.5 Support Facility Requirements
3.6 Surface Transportation and Auto Parking Requirements
3.7 Summary of Additional Required Facilities

3.1 Airfield Demand/Capacity Analysis

The purpose of the airfield demand/capacity analysis is to assess the capability of the airfield facilities to accommodate the projected aircraft operations demand. In evaluating the ability of the Airport to accommodate the projected demand levels, airfield/runway capacity and aircraft delay were identified using the methodologies outlined in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*.

For airport planning, airfield capacity has been defined in two ways. The first definition of *capacity*, sometimes referred to as *throughput capacity*, is defined as the maximum number of aircraft operations that an airfield can accommodate during a specific period of time when there is a continuous demand for service. This continuous demand for service means that there are always aircraft ready to takeoff or land. The definition of throughput capacity does not include delay and reflects the capability of the airfield to accommodate aircraft during peak periods. The throughput capacity varies according to weather conditions, types of aircraft, and airport traffic control/ATC airspace handling procedures. The number and location of runway exits and the share of touch and go operations also influence the airfield's throughput capacity.

The other definition of *capacity* is the number of aircraft operations during a specific time corresponding to a tolerable level of delay. This is commonly referred to as the *practical capacity*. Aircraft delays increase as the number of aircraft operations (aircraft demand) nears (or exceeds) the airfield's practical capacity under a specific operating condition. An important difference in these two measures of capacity is that one is defined in terms of delay and the other is not. There are several reasons for considering two definitions of capacity. There is a general lack of agreement as to what constitutes acceptable levels of delay to all airports and their airfield components. Additionally, the relationship between demand and delay is greatly influenced by the pattern of demand (i.e., peaking characteristics) which is also unique to each airfield. As such the definition of practical capacity can be unique to each airport since the demand characteristics and level of service thresholds vary from airport to airport.

The following airfield capacity and aircraft delay components are used in this evaluation:

Peak hour capacity. Peak hour capacity is the maximum number of aircraft operations that can occur in one hour under specific operating conditions assuming a continuous demand for service. This is the maximum throughput capacity of the airfield in an hour.

Annual service volume (ASV). The ASV, as defined in FAA Advisory Circular (AC) 150/5060-5, *Aircraft Capacity and Delay,* is a reasonable estimate of an airport's annual capacity. This is the practical capacity of the airfield, or an estimate as to the annual number of aircraft operations that can be accommodated at the facility in a year. The determination of the ASV includes consideration of the differences in runway use, weather conditions, aircraft mix, and the pattern of demand at the Airport, and assumes an acceptable level of delay (based upon that defined within FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*).

Average annual delay per operation. This measure is an estimate of the average delay each aircraft operation in a given year would experience. Some aircraft operations, such as those in peak operating hours, would likely experience higher delays on average while other operations, such as nighttime operations, would likely experience lower delays on average. Annual service volume as defined within FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay* generally results in around 2.3 minutes of average delay per aircraft (and 11.5 to 23.0 minutes of peak delay) when annual demand equals annual service volume.

3.1.1 Factors Affecting Runway Capacity

The throughput capacity of an airfield system, including the runways and associated exit taxiways, is not constant over time. As discussed above, there are a variety of factors that can affect the airfield capacity at an airport including:

(1) the airfield layout and runway configuration,

(2) number and location of exit taxiways,

(3) runway use restrictions,

(4) runway use as dictated by wind conditions,

(5) the percentage of time the Airport experiences poor weather conditions, i.e. low cloud ceilings and/or visibility conditions,

(6) the level of touch-and-go activity, and

(7) the types of aircraft operating at the Airport (aircraft mix).

Guidelines contained in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, are generally used to calculate the hourly runway capacities for various operating configurations and conditions using the above mentioned factors. The hourly capacity of the airfield is defined as the measure of the maximum number of aircraft operations which can be accomplished on the airport or runway system in an hour under a given set of operating conditions. However, Friedman Memorial Airport is very uncommon in that operations are conducted "head-to-head" with arrivals from the south and departures to the south.[1] The FAA's airport capacity methodologies do not include guidance regarding "head-to-head" operating environments. The FAA methodologies always assume that operations are conducted in a single direction on a given runway. Therefore the hourly capacity of the airfield and its operating conditions were determined through conversations with airport traffic control tower (ATCT) personnel at the Airport rather than through FAA prescribed methodologies.

The Airport almost exclusively operates in a single operating configuration with departures on Runway 13 and arrivals on Runway 31. ATCT personnel estimate that during their busiest hours (10am to 7pm) on their busiest day they could likely accommodate around 400 to 450 operations. This correlates to a maximum hourly capacity of approximately 45 to 50 operations. Examination of historical traffic records indicates that in 2002 the peak activity days reported by the ATCT (during their full operating hours of 7am to 11pm) were July 9th with 520 total operations and July 12th with 540 operations. This correlates to 33 or 34 operations per hour when averaged over the 16 hour day that the ATCT is open. However the majority of this activity occurs in the nine-hour period that is the busy hours between 10am and 7pm. If it is assumed that 80% of these peak day operations occur in the busy hours, a peak hour capacity of 46 to 48 operations per hour appears reasonable based upon historical traffic records. The previous Master Plan estimated peak capacity as 45 operations per hour. Three different methods all result in a peak hour

1 Nearly all airports in the U.S. operate runways in a "one-way flow" mode based on prevailing winds, Friedman Memorial Airport has arrivals and departures in opposite or "head-to-head" directions.

capacity for the airfield of around 45 operations per hour. Therefore this capacity number of 45 operations per hour still appears valid.

The Airport rarely operates with any other runway-use configuration, except for during poor weather conditions when it is below arrival and departure minimums. ATCT personnel stated that it is rare when they are below minimums and estimated it at 15 days per year or 4% of the time. During those times airfield capacity is nearly zero due to weather being below arrival and departure minimums.

Utilizing the runway-use configurations and capacities a weighted hourly capacity was established based on the occurrence rate of each runway use configuration/weather condition and their respective hourly capacities. **Table 3-1**, summarizes the hourly capacity for the airfield's operating configurations.

Table 3-1
Airfield Hourly Capacity

Configuration	Description	Occurrence Rate	Hourly Capacity
VFR 1	Head-to-Head, Runway 13 Arrivals, Runway 31 Departures	96%	45
IFR 1	Below minimums	4%	0
	Weighted Hourly Capacity		43

Source: FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*
FMA ATCT Personnel
Mead & Hunt, Inc.

3.1.2 Annual Service Volume

Annual service volume (ASV) is a reasonable estimate of an airport's annual practical capacity. It encompasses the differences in runway use, aircraft mix, weather conditions, pattern of demand, and other factors an airport experiences over one year.

The formula for calculating ASV is comprised of three variables: C_W (weighted hourly capacity), D (the ratio of annual demand to average daily demand in the peak month), and H (the ratio of average daily demand to average peak hour demand during the peak month). These variables are multiplied together (C_W*D*H) to obtain the ASV for the airport. The weighted hourly capacity, $C_{W,}$ as calculated above was determined to be 43 operations per hour.

The Daily Demand Ratio (D) is the ratio of annual demand to average daily demand in the peak month. The ratio of annual demand to average daily demand in the peak month is dependent upon the number of operations occurring in the peak month. **Table 3-2** depicts the percentage of annual operations occurring within the peak month in each of the last five years.

Table 3-2
Peak Month Operations

Year	Annual Operations	Peak Month	Peak Month Operations	Peak Month %
1998	58,901	July	7,716	13.0%
1999	62,355	July	9,037	14.5%
2000	65,292	July	10,463	16.0%
2001	50,849	August	6,479	12.7%
2002	55,878	July	8,796	15.7%
			5 year average	*14.4%*

Source: FAA Air Traffic Activity Data System (ATADS)

Over the last five years peak month operations have averaged 14.4% of the total annual operations. Given that the peak month has 31 days, the average daily demand in the peak month is 0.4645% of the annual activity. This results in a Daily Demand Ratio (D) of 215.

The Hourly Demand Ratio (H) is the ratio of average daily demand to average peak hour demand during the peak month. As was noted earlier, the majority of the daily operations at Friedman Memorial Airport occur between the hours of 10am and 7pm. Assuming that 80% of the Airport's daily operations occur in this nine-hour period, it is estimated that 8.8% of the daily operations occur within the peak hour. This results in an Hourly Demand Ratio of 11.25.

Utilizing the weighted hourly capacity (43), the Daily Demand Ratio (215), and Hourly Demand Ratio (11.25). The ASV for Friedman Memorial Airport utilizing the aforementioned data, is defined as follows:

ASV = (Weighted Hourly Capacity)*(D)*(H)
ASV = (43) * (215) * (11.25)
ASV = 104,000 operations

The previous master plan update calculated ASV to be approximately 125,000 operations. The difference is primarily attributed to slightly different peaking characteristics.

3.1.3 Range of Delay

The second factor in determining the Airport's practical capacity is to calculate the amount of delay an aircraft may experience at the Airport. This is expressed in minutes per aircraft operation. The relationships between the ratio of demand to service volume and average annual aircraft delay are shown in **Table 3-3.** Peak delays for individual aircraft can be 5 to 10 times greater than average delays.

Table 3-3
FAA Estimated Delay Ranges

Ratio of Demand to Service Volume	Average Aircraft Delay per Operation (min)	Peak Delay Range for Individual Aircraft (min)
0.1	0.05	0.0-0.5
0.2	0.10	0.5-1.0
0.3	0.20	1.0-2.0
0.4	0.25	1.5-2.5
0.5	0.35	2.0-3.5
0.6	0.50	2.5-5.0
0.7	0.65	3.5-6.5
0.8	0.95	5.0-9.5
0.9	1.40	7.0-14.0
1.0	2.30	11.5-23.0
1.1	4.40	22.0-44.0

Source: FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*
Mead & Hunt, Inc.

As the ratio of demand to service volume increases and exceeds one, the estimated average aircraft delay and the estimated peak delay range for individual aircraft both increase rapidly with relatively small increases in the annual demand.

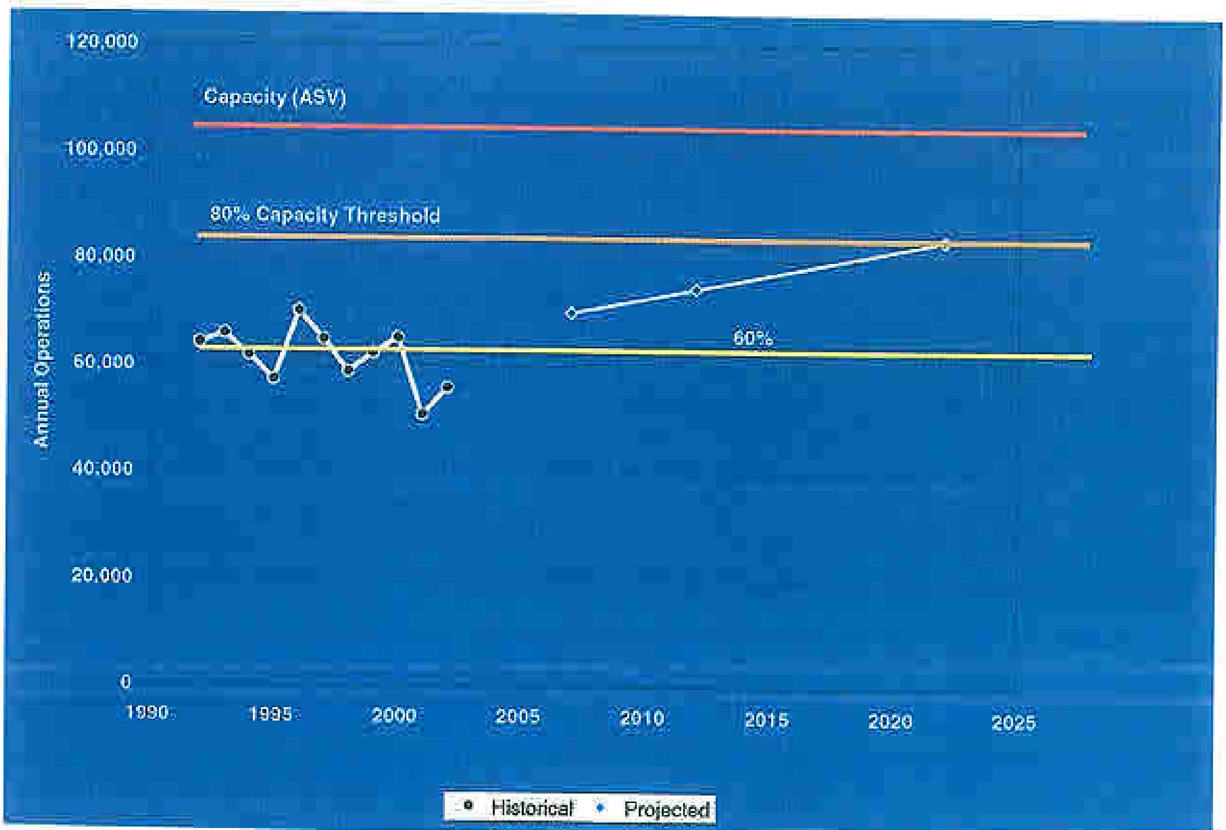
Planning standards indicate that when an Airport's demand reaches 60 percent of its capacity (ratio of annual demand to ASV), or an average of 0.5 minutes of delay per annual operation, new airfield facilities (to increase capacity) should be planned. This standard is based on the need to complete a thorough investigation of the alternatives and the required environmental evaluations. When annual operations reach 80 percent of the airport's annual capacity (ratio of annual demand to ASV), new airport facilities should be programmed or demand management strategies[2] should be implemented. This standard is also meant to provide adequate time for planning and project implementation before demand exceeds capacity. However, it must be recognized that the definition of an airfield's practical capacity also includes an acceptable level of delay. Acceptable and/or tolerable levels of delay are generally defined by airport users and operators for each airport. For the purposes of this analysis, the above parameters will be used as the thresholds for the assessment of Friedman Memorial Airport's airfield layout and facilities to meet the projected demand levels.

[2] Demand management strategies are oftentimes difficult to implement at airports; however, several have been implemented at SUN. These include management of IFR traffic for two periods a year (July and December peaks); management of overnight parking during the July peak; and limited aircraft operations (departures only) during some snow removal operations.

The ratio of the Airport's projected annual demand, as presented in Chapter 2: *Projections of Aviation Demand*, to the Airport's calculated ASV and average delay information, is presented in **Table 3-4**. As can be seen in Table 3-4, the Airport has been operating around the 60 percent capacity-planning threshold for quite some time. Around 2022 it is projected that annual operations will reach the 80% capacity-implementation threshold. The average delay per aircraft is anticipated to increase to 1.1 minutes in 2022 with peak delays in the 6 to 11 minute range.

Table 3-4
Demand Capacity and Delay Summary
Friedman Memorial Airport

Year	Annual Demand	Ratio of Annual Demand to ASV	Average Aircraft Delay (min)
Annual Service Volume (ASV) = 104,000			
Historical:			
1992	64,279	0.62	0.53
1993	65,985	0.63	0.56
1994	61,948	0.60	0.48
1995	57,412	0.55	0.40
1996	70,247	0.68	0.66
1997	64,959	0.62	0.54
1998	58,901	0.57	0.43
1999	62,355	0.60	0.49
2000	65,292	0.63	0.55
2001	50,849	0.49	0.31
2002	55,878	0.54	0.38
Projected:			
2007	70,016	0.67	0.66
2012	74,592	0.72	0.78
2022	83,800	0.81	1.11



Sources: FAA Advisory Circular, 150/5060-5, *Airport Capacity and Delay*
Mead & Hunt, Inc.

3.1.4 Runway Demand/Capacity Summary

Based on the analysis conducted for this Master Plan Update, it is concluded that the Airport's current airfield layout generally has adequate capacity through the 20-year planning period for the projected levels of aviation activity. However, the Airport is currently operating above 60 percent of its practical capacity. It is projected that the Airport will reach 80 percent of its capacity near 2022. Based on the 60 percent capacity level and the long lead times for planning such facilities, planning for additional aviation capacity for the Wood River Valley should commence in the immediate future.

3.1.5 Taxiway Operations Analysis

The future relocation of Sun Valley Aviation from the northeast corner of the airfield to the southwest side of the airfield will increase taxiing times for aircraft going to/from this fixed base operator (FBO) as well as increase the potential for head-to-head conflicts between taxiing aircraft. Due to the Airport's head-to-head operating procedures, aircraft access the runway for departure at the north end on Runway 13, and exit the runway from its northern half after arrival on Runway 31. With the relocation of the FBO to the southwest side of the field, south of the tie-down apron and T-hangars, nearly all of the Airport's GA traffic will be required to taxi south on Taxiway B after arrival and north on Taxiway B for departure. This creates the potential for numerous head-to-head conflicts for taxiing aircraft.

Table 3-5 calculates the likelihood of an arrival exiting the runway while a departing aircraft is attempting to taxi from the relocated FBO to the departure end of Runway 13/31. For this analysis an annual average day (AAD) has been established as annual operations divided by 365 days (57,989/365 = 159 operations). Peak hour operations on the average day have been estimated as 10% of the average day's operations (159 x 10% = 16 operations).

Table 3-5
Probability of Taxiway Conflict Between Arriving and Departing Aircraft – Peak Hour on 2002 AAD

Arrival Aircraft Likelihood

Current 2002 PMAD Peak Hour Operations =	16
Percent Arrivals =	50.0%
PMAD Peak Hour Arrivals =	8
Likelihood of arrival in a given min =	13.3%
Likelihood of arrival in a given sec =	0.22%

Departure Aircraft Taxi Times Past Various Arrival Aircraft Exit Locations

Aircraft Type	Percentage of Total Ops	Exit Taxiway Cumulative Utilization Percentages B-6	B-5	B-4	B-2	B-1
Distance from Arrival Threshold to Exit (ft)		3,800	4,300	5,100	6,400	6,800
Single Engine	50.0%	100%	100%	100%	100%	100%
Multi-Engine	20.0%	81%	98%	100%	100%	100%
Turbo Prop	15.0%	2%	8%	49%	92.0%	100%
Jets	15.0%	2%	8%	49%	92.0%	100%
Total	100.0%	66.8%	72.0%	84.7%	97.6%	100.0%
Percentage of total arrivals using given exit		66.8%	5.2%	12.7%	12.9%	2.4%
Distance from new FBO to runway exit (ft)		2,100	2,600	3,400	4,700	5,100
Time for departing aircraft to pass exit (min)[1]		1.38	1.71	2.24	3.10	3.36
Time for departing aircraft to pass exit (sec)[1]		83	103	134	186	202
Prorated taxi time required for no conflict (sec)		107				
Likelihood of arrival during departure taxi time		**24%**				

[1]Assumed taxi speed of 15 knots (25.3 ft/sec)
Sources: Exit Taxiway Cumulative Utilization Percentages: FAA AC 150/5300-13, *Airport Design*
Mead & Hunt, Inc.

As shown above, there is approximately a 24 percent chance that an arriving aircraft will exit the runway while a departing aircraft is taxiing north on Taxiway B, creating a conflicting taxiway movement. When conflicting taxiway movements occur one of the aircraft will be required to exit Taxiway B onto a hold pad so that the other aircraft can pass. Utilizing a methodology similar to that shown above, **Table 3-6** summarizes the likelihood of conflicting taxiway movements for the base year as well as projected years for both annual average days (AAD) and peak month average days (PMAD).

Table 3-6
Probability of Conflicting Taxiway Movements

Type of Day	Year	Peak Hour Operations	Probability of Conflicting Taxiway Movement[1]
Annual Avg. Day (AAD)	2002	16	24%
	2007	19	28%
	2012	20	30%
	2022	23	34%
Peak Month Avg. Day (PMAD)	2002	30	44%
	2007	36	53%
	2012	39	58%
	2022	43	64%

[1]Likelihood of an arrival occurring during each average aircraft departure taxi time.
Sources: FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*
Mead & Hunt, Inc.

The increased probability for conflicting taxiway movements in the future is due to the projected increase in peak hour arrivals. These conflicting taxiway movements on both annual average and peak month average days appear manageable; however, they will significantly increase the workload of ATCT personnel for the coordination of ground movements.

Alternatives for improving the taxiway system to reduce the likelihood for conflicting taxiway movements should be examined within Chapter Four, *Alternative Plan Concepts*.

3.2 Airfield Facility Requirements

The airfield includes the runway and taxiway system. The ability of the airfield system to serve the projected demand levels and the characteristics of that demand, in terms of requirements and design standards, is presented in the following sections:

- Identification of Standards
- Runway Length
- Runway Width
- Pavement Strength
- Taxiway System
- Airfield Safety Areas
- FAR Part 77 Surfaces
- Navigational Aids (NAVAIDS)
- Air Traffic Control Tower (ATCT)

3.2.1 Identification of Standards

The selection of the appropriate design standards for the development of airfield facilities is based primarily upon the characteristics of the aircraft projected to use the Airport on a regular basis, along with the types of approaches to be provided to each runway at the Airport. The most critical characteristics of the aircraft to use the facility are the approach speed and the physical dimensions and weight of the design aircraft. The aircraft approach speed, wingspan, and weight, along with the types of approaches to be provided, have a direct effect on runway and airfield design criteria. This includes runway length, width, separation standards, safety areas, object free areas, obstacle free zones and runway protection zones. Additionally, taxiway design standards are primarily based on aircraft wingspan.

In FAA Advisory Circular (A/C) 150/5300-13, *Airport Design*, aircraft are given an Airport Reference Code (ARC). The ARC is a coding system that relates airport design criteria to the operational and physical characteristics of aircraft that are intended to operate at the Airport. The first component, the Approach Category, groups aircraft into five categories based upon their approach speed which are designated as letters A through E. Aircraft Approach Categories A and B typically include small piston engine aircraft and a limited number of smaller, commuter turboprops and business jets having approach speeds of less than 121 knots. Category C consists of larger business jets, as well as commercial service regional and other commercial jet and propeller aircraft. Category D and E consist of the larger jet aircraft generally associated with widebody commercial and/or military use and some high performance smaller jets generally associated with military use.

The second component, the Airplane Design Group (ADG), is a Roman numeral which groups aircraft by wingspan. ADG I and II primarily includes small piston aircraft, business jets, turboprop aircraft and some commercial regional jets. ADG IIII includes large business jets and most regional and narrow body commercial aircraft. ADG IV and V includes large jetliners utilized for commercial service and military service. Currently only large military aircraft such as the Galaxy C5 are included in ADG VI.

Table 3-7 summarizes the parameters for each of the Aircraft Approach Categories and Airplane Design Groups common to Friedman Memorial Airport. The table also lists representative aircraft types for each design group for some of the aircraft included in the projections.

Table 3-7
Aircraft Approach Category and Airplane Design Group

Classifications	Parameters	Representative Aircraft
Approach Category	**Aircraft Approach Speed**	
Category A	Less than 91 knots	Piper PA-28, Cessna 172, & Cessna 207
Category B	91 knots or more but less than 121 knots	Beech King Air, Cessna 402, Piper Cheyenne, Falcon 900, Citation II, Emb 120
Category C	121 knots or more but less than 141 knots	Learjet 25, Dash 8 Q400, CRJ 200, ERJ 145, Avro RJ, G-3, G-5, Global Express
Category D	141 knots or more but less than 166 knots	G-2, G-4, CRJ-100
Design Group	**Wing Span**	
Group I	Up to but not including 49 feet	Piper PA-28, Cessna 172, Beech King Air, & Lear 25
Group II	49 feet (15m) up to but not including 79 feet	Citation II, Emb 120, G-2, G-3, G-4, CRJ 200, CRJ 700, CRJ 900, & ERJ 145
Group III	79 feet (24m) up to but not including 118 feet	Q400, Avro RJ, ERJ 190, G-5, Global Express

Source: FAA Advisory Circular 150/5300-13, Airport Design
Mead & Hunt, Inc.

The critical, or design aircraft, is defined as the most demanding aircraft that operates at an airport on a regular basis. As discussed in Chapter 2, *Projections of Aviation Demand*, the Dash 8-Q400 is the largest and fastest commercial air carrier aircraft currently operating at the airport. It has a wingspan of 93 feet 3 inches, a length of 107 feet 9 inches, a tail height of 27 feet, an approach speed of 136 knots, and a maximum takeoff weight (MTOW) of 64,500 pounds. The largest and heaviest general aviation aircraft currently operating at the airport and included in the forecast of future activity are the Gulfstream 4 and 5 and Bombardier Global Express. The Gulfstream 4 has a maximum takeoff weight of 74,600 pounds, the Gulfstream 5 a maximum takeoff weight of 90,900 pounds, and the Global Express with a maximum takeoff weight of approximately 95,000 pounds. Approach category and design group are identified above.

Horizon Air is currently operating the Q400 on some of their routes to Friedman Memorial Airport. Indications from them are that they are quite happy with this aircraft and will be obtaining more of them in the future, without any indications of eliminating them from their fleet. Therefore regular operations by the Q400 are anticipated through the planning period.

As enplanements increase, it is anticipated that there will be some carrier demand for operations by regional jet type aircraft at the airport in addition to the turboprops currently providing service. A number of regional carriers whose fleets have traditionally included a mix of turboprop and regional jet aircraft are transitioning to an all jet fleet. Turboprops will still have a place in the regional/commuter fleet in the future; however, it is projected that regional jets will takeover as the workhorses of the regional/commuter fleet given the vast number of orders for these aircraft.

As enplanements grow through the forecast period additional air carrier service is anticipated from both the existing carriers providing currently providing service to the Airport as well as from new regional/commuter carrier service. Given the evolution of the regional commuter fleet towards regional jets, a carrier demand for operations by these types of aircraft is anticipated. **Table 3-8** summarizes the characteristics of some of the most popular regional jet aircraft in operation or production.

Table 3-8
Regional Jet Aircraft Characteristics

Aircraft	Seats	FAA Airport Reference Code	Wingspan (feet)	Gross Weight (lbs.)	Production Status
Current Critical Commercial Service Aircraft (Turboprop)					
Dash 8 – Q400	70	C-III	93.3	64,500	Service Entry 2000
Regional Jets					
Dornier 328 Jet	32	C*-II	68.8	34,524	Production Terminated
ERJ 135 ER	37	C*-II	65.8	41,888	Service Entry 1999
ERJ 140 ER	44	C*-II	65.8	44,313	Service Entry 2002
CRJ 200	50	C-II	69.7	47,450	In service
ERJ 145 ER	50	C*-II	65.8	45,415	In service
CRJ 700	70	C-II	76.3	72,750	Service Entry 2001
ERJ 170 STD	70	C*-III	85.3	78,153	Service Entry 2003
BAe 146-200	85	B-III	86.4	93,000	Production Terminated
Avro RJ85	85	B-III	86.4	97,000	Production Terminated
CRJ 900	90	C*-II	76.3	80,500	Service Entry 2003
ERJ 190-100 STD	98	C*-III	94.2	101,389	Service Entry 2004

Notes: *estimated, approach speed information not readily available
Current runway length may limit the ability of some of the above aircraft to operate at the Airport.
Source: Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

The Avro RJ85 is a newer version of the BAe 146-200 aircraft which has newer engines and allows a slightly increased maximum takeoff weight. The previous Master Plan established the BAe 146-200 as its critical design aircraft. Therefore, regional jets were also anticipated within the previous Master Plan and the BAe 146-200 was established as the critical design aircraft. The BAe 146-200 regional jet is an approach category B aircraft; however, the Q400 (and most regional jets) are approach category C aircraft. Therefore an increase in the approach category of the critical/design aircraft is included within this Master Plan Update.

The Avro RJ85 and the ERJ 190 have gross weights in excess of the airport's current weight limitation of 95,000 pounds for dual wheel aircraft. The remainder of the regional jet fleet does not significantly alter the critical design aspects associated with the Dash 8 Q400 for dimensional characteristics or the Global

Express/G-5 for aircraft weight characteristics. Therefore, for the purposes of planning the future of Friedman Memorial Airport the critical aircraft design characteristics are depicted in **Table 3-9**.

Table 3-9
Critical Design Standards

Characteristic	Critical Aircraft	
Aircraft Weight	G-V/Global Express	95,000 Dual Wheel (DW)
Approach Speed	Various	Approach Category C - Less than 141 knots
Wingspan	Q400/ERJ 190	ADG III - Less than 95 feet
Tail Height	ERJ 190	Less than 33.7 feet
Airport Reference Code	Various	C-III

Source: Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

Table 3-10 presents the design standards set forth in AC 150/5300-13, Change 7, *Airport Design* based upon the critical design standards identified above. Note that these dimensions are the FAA recommended design standards, not that which is currently provided on the airfield. The previous Master Plan designated the airfield as a B-III facility. The FAA recommended design standards associated with this B-III designation are identified in the following table under the previous design standards column. Areas of noncompliance with full B-III standards currently exist at Friedman Memorial Airport. Modifications to standards are included on the current Airport Layout Plan drawing. The "Current FAA Recommended Design Standards" columns identify the design standards associated with the type of aircraft currently operating at the Airport. These standards are listed based upon the Airport Reference Code (ARC) associated with the critical design aircraft as well those standards for which an aircraft specific design standard can be applied. Due to current and projected aircraft activity, the FAA Airport Reference Code at the Airport is now C-III rather than B-III.

Table 3-10
FAA Airfield Design Standards

	Existing Airfield/ Previous Design Standards (Modification)	Current FAA Recommended Design Standards	
		Airport Reference Code Standard	Aircraft Specific[1]
Airport Reference Code	B-III	C-III	
Runway Length	-	*See Section 3.2.2*	
Runway Width	100	100	
RSA Width	300	500 [2]	
RSA Length beyond runway end	600	1,000	
Runway OFZ Width	400	400	
Runway OFZ Length beyond runway end	200	200	
Runway OFA Width	800 (723)	800	
Runway OFA Length beyond runway end	600 [3]	1,000	
Runway Centerline to Parallel Taxiway Centerline	300 (250)	400	297.5
Runway Centerline to Edge of Aircraft Parking	400	500	400.0
Taxiway Width	50	50	
Taxiway Safety Area Width	118	118	
Taxiway OFA Width	186	186	153.0

Note: All dimensions in feet
[1]Based upon aircraft with 95-foot wingspan.
[2] RSA width would be approximately 600 feet to meet approach category D standards.
[3] Portions of Runway 13 end are less than 600 feet.
Sources: FAA Advisory Circular 150/5300-13, Change 7, *Airport Design*
FAA Airport Design Computer Program, Version 4.2D
Airport Layout Plan, 2002
Mead & Hunt, Inc.

As can be seen above, the most significant changes associated with a change in the ARC from B-III to C-III include an increase in the RSA dimensions, length of the runway OFA, the runway to taxiway separation, and the runway to aircraft parking separation standard. The following sections discuss the Airfield Design Standards in more detail, highlighting those areas where the existing airfield does not meet the FAA design standards.

3.2.2 Runway Length

Runway 13/31 is 6,952 feet long, however it currently has declared distances applied to it. The predominant departure direction on Runway 13 has a Takeoff Run Available (TORA), Takeoff Distance Available (TOA), and an Accelerate-Stop Distance Available (ASDA) of 6,952 feet. The predominant arrival direction on Runway 31 has Landing Distance Available (LDA) of 6,602 feet. To determine the adequacy of the existing runway, specific runway length requirements have been documented based upon guidance from FAA Advisory Circular 150/5325-4A, *Runway Length Requirements for Airport Design*, based upon information from aircraft manufacturer's, and based upon data analysis from a vendor that supplies aircraft performance data for the airlines.

FAA Design Recommendations. FAA Advisory Circular 150/5325-4A, *Runway Length Requirements for Airport Design*, states the following regarding recommended runway lengths: "Today's fleet of airplanes requires a wide range of runway lengths under a variety of environmental conditions. A few of the conditions which will most alter recommended runway lengths are airport elevation, aircraft operating weight, and runway surface conditions."

"The FAA recommended runway length for the primary runway is determined by considering the family of airplanes having similar performance characteristics or a specific airplane needing the longest runway. In either case, the choice should be based on airplanes that are forecasted to use the runway on a regular basis. A regular basis is considered 250 departures a year. When the maximum gross weight of airplanes forecasted to use the runway is over 60,000 pounds, the runway length is normally designed for a specific airplane."

Table 3-11 summarizes the FAA recommended runway lengths for various aircraft groups 60,000 pounds or less at Friedman Memorial Airport. These recommended runway lengths take into account the Airport's elevation (5,317 feet MSL), and mean daily maximum temperature of the hottest month (82.8 degrees F). The FAA runway length analysis also includes an increase in runway takeoff lengths for the maximum difference in the runway centerline elevation, however since departures are predominantly in the Runway 13 direction at FMA, which is downhill, this increase was not applied to the figures depicted in Table 3-7.

Table 3-11
FAA Recommended Runway Lengths for Aircraft Under 60,000 lb.

Aircraft Group or Family	Recommended Runway Length (ft)
Small Airplanes with approach speeds of less than 50 knots	1,230
Small Airplanes with less than 10 passenger seats	
75 percent of these small airplanes	4,640
95 percent of these small airplanes	6,420
100 percent of these small airplanes	6,490
Small Airplanes with 10 or more seats	6,490
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	6,550
75 percent of these large airplanes at 90 percent useful load	**8,600**
100 percent of these large airplanes at 60 percent useful load	**10,000**
100 percent of these large airplanes at 90 percent useful load	**11,000**

Note: Small airplanes are those with gross weights under 12,500 lb.
Source: FAA Computer Program, *Airport Design Version 4.2D*
FAA AC 150/5325-4A, *Runway Length Requirements for Airport Design*

As can be seen in Table 3-11, 6,952 feet for departures on Runway 13 and 6,602 feet for departures on Runway 31 is not of adequate length to serve some of the groups of large aircraft under 60,000 pounds. Most of these types of aircraft can still operate at Friedman on hot days, although they are generally required to reduce their useful load. Useful load is the difference between the airplane's maximum certified takeoff weight and it operating empty weight[1]

[1] The operating empty weight typically includes the airplane's empty weight, crew, crew's baggage and supplies, removable passenger service equipment and emergency equipment, engine oil, and unusable fuel. Thus, passengers and baggage, cargo, and usable fuel comprise the useful load.

Specific Airplane Requirements. The adequacy of the existing runway to service existing and projected commuter type aircraft was reviewed. Of particular interest in this analysis is the passenger load capability that is attainable for specific aircraft and destinations based upon the Airport's current runway length. For this analysis aircraft specific takeoff performance data was obtained from Aerodata, Inc., a vendor that supplies such data to airlines and other aircraft owners/operators.

Table 3-12 summarizes some of the takeoff performance characteristics associated with specific aircraft.

Table 3-12
Takeoff Performance Characteristics – Runway 13

Aircraft Type	Engines	Certified MTOW	OEW	Max. Useful Load	OAT	SUN RWY 13 MRTOW	Useful Load	% of Max. Useful Load
Dash 8 Q400	PW150A	63,930	37,804	26,126	50	63,700	25,896	99%
(70 seats)					86	57,800	19,996	77%
Dornier 328jet	PW306B	35,300	20,800	14,500	50	35,300	14,500	100%
(32 seats)					86	33,200	12,400	86%
Emb 145	AE3007A1	45,415	26,109	19,306	50	42,810	16,701	87%
(50 seats)					86	39,940	13,831	72%
CRJ200ER	CF34-3B1	51,000	30,500	20,500	50	47,090	16,590	81%
(50 seats)					86	42,390	11,890	58%
CRJ700	CF34-8C1	72,500	43,600	28,900	50	68,400	24,800	86%
(70 seats)					86	62,900	19,300	67%

Note: All weights in pounds, engine bleeds off, still air conditions, dry runway
Numbers are approximate, consult using airline for specific operating procedures.
MTOW = Maximum Takeoff Weight
OEW = Operating Empty Weight
OAT = Outside air temp (degrees F)
SUN RWY 13 MRTOW = Maximum Runway 13 Takeoff Weight at SUN for given temperature

Source: Aerodata, Inc.
Airport Planning Manuals from aircraft manufacturer
Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

As can be seen in Table 3-10, on a standard day of around 50 degrees F only the Dash 8 Q400 turboprop and the Dornier 328jet can operate at roughly their certified MTOW from Friedman Memorial Airport. On a hot day all of the representative commuter aircraft including the Q400 and Dornier 328 would be required to operate with a reduced MTOW.

When the aircraft is required to reduce their MTOW and therefore useful load due to the operating environment (i.e. runway length, temperature, etc.) they are required to reduce the amount of fuel that they can carry or reduce their payload/passenger load. Most aircraft can carry a payload that is greater than a full passenger load; therefore some reduction in useful load may be attainable without losing any passengers and/or fuel. **Table 3-13** summarizes the approximate range available for the aforementioned aircraft with full passenger loads from Friedman Memorial Airport for their reduced MTOW's. A full passenger load assumes 200-pounds for each passenger with baggage.

Table 3-13

Range from Friedman Memorial Airport with full passenger load

Aircraft Type	OAT	SUN RWY 13 MRTOW (lb)	Payload/Full Passenger Load (lb)	Approximate Range NM
Dash 8 Q400	50	63,700	14,000	1,350
(70 seats)	86	57,800		500
Dornier 328jet	50	35,300	6,400	900
(32 seats)	86	33,200		665
Emb 145	50	42,810	10,000	625
(50 seats)	86	39,940		275
CRJ200ER	50	47,090	10,000	700
(50 seats)	86	42,390		<200
CRJ700	50	68,400	14,000	900
(70 seats)	86	62,900		400

Note: Still air range with IFR fuel reserves
All ranges approximate, consult using airline for specific operating procedures
OAT = Outside air temp (degrees F)
SUN RWY 13 MRTOW = Maximum Runway 13 Takeoff Weight at SUN for given temperature

Source: Aerodata, Inc.
Airport Planning Manuals from aircraft manufacturer
Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

Current nonstop markets from Friedman Memorial Airport include Salt Lake City, Seattle, and Los Angeles. Potential future markets include such destinations as San Francisco, Denver, and Phoenix. **Table 3-14** depicts these markets and summarizes the distance between Friedman Memorial Airport and these destinations.

Table 3-14
Market Distances from Friedman Memorial Airport

Destination	Distance, NM
Salt Lake City - SLC	192
Seattle - SEA	412
Denver - DEN	484
San Francisco/Oakland – SFO/OAK	510
Los Angeles - LAX	604
Phoenix - PHX	613

Source: Great Circle Mapper

The ability to economically serve future markets is limited for some aircraft types from Friedman Memorial Airport, particularly on hot days. The market distances can be grouped into a range requirement of approximately 500 NM for Denver and San Francisco/Oakland, and 600 NM for Los Angeles and Phoenix. **Table 3-15** summarizes the approximate passenger load attainable for the various aircraft types to these markets.

Table 3-15
Passenger Load Capability

Aircraft Type	OAT	SUN RWY 13 MRTOW (lb)	Market/Passenger Load Capability SLC 200 NM	SEA 412 NM	DEN/SFO 500 NM	LAX/PHX 600 NM
Dash 8 Q400	50	63,700	70	70	70	70
(70 seats)	86	57,800	70	70	70	66
Dornier 328jet	50	30,900	32	32	32	32
(32 seats)	86	29,700	32	32	32	32
Emb 145	50	42,810	50	50	50	50
(50 seats)	86	39,940	50	46	43	40
CRJ200ER	50	47,090	50	50	50	50
(50 seats)	86	42,390	39	34	32	29
CRJ700	50	68,400	70	70	70	70
(70 seats)	86	62,900	70	70	67	61

Note: Engine bleeds off on takeoff, still air conditions
Passenger Load Capability is approximate, consult using airline for specific operating procedures.
OAT = Outside air temp (degrees F)
SUN RWY 13 MRTOW = Maximum Runway 13 Takeoff Weight at SUN for given temperature

Source: Aerodata, Inc.
Airport Planning Manuals from aircraft manufacturer
Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

As shown above, the passenger load capability for the 50 seat regional jets, particularly the CRJ200 is severely impacted by warmer temperatures from Friedman Memorial Airport. Service to markets around 600 NM would limit the passenger load capability to approximately 29 passengers or 58% of its capability. Therefore regular service by the CRJ200 would not be likely with the existing runway length; service with other aircraft such as the CRJ700 would be more likely. The CRJ700 is also a more likely candidate for future service from SUN given that is currently within the fleet of Horizon Air, which is currently providing service at SUN with the Q400. Skywest, however, is committed to the CRJ-200.

On standard temperature days all of the aircraft could operate to/from the markets shown with roughly full passenger loads. Therefore seasonal service during the winter could economically be provided by nearly any regional/commuter type aircraft. Regular summer time service would require higher performance type aircraft such as the Q400, Dornier 328, or CRJ700. The CRJ700 from SUN at an air temperature of 86 degrees F would be limited to a passenger load of approximately 67 passengers (95% load factor) on a trip to DEN or SFO and 61 passengers (87% load factor) on a trip to LAX or PHX.

To provide the ability for full passenger loads for the stage lengths shown on hot days from SUN would require additional runway length for some of the aircraft, particularly the Emb145, CRJ200, and CRJ700. **Table 3-16** summarizes the approximate amount of runway length required for full passenger loads by these aircraft on an 86 degree F day to the markets shown.

Table 3-16
Runway Length Required for Full Passenger Capability (Hot Day – 86 Deg F)

		Market			
Aircraft Type		SLC 200 NM	SEA 412 NM	DEN/SFO 500 NM	LAX/PHX 600 NM
Emb 145	MTOW Required (lb)	39,500	40,600	41,200	41,900
(50 pass.)	Runway Length Required (ft)	6,800	7,150	7,250	7,350
CRJ200ER	MTOW Required (lb)	44,500	45,500	46,000	46,500
(50 pass.)	Runway Length Required (ft)	7,500	7,900	8,100	8,400
CRJ700	MTOW Required (lb)	60,000	62,900	63,400	64,600
(70 pass.)	Runway Length Required (ft)	5,800	6,800	7,100	7,400

Note: Engine bleeds off on takeoff, still air conditions, 86 Deg F, full passenger load
Required MTOW & Runway Lengths are approximate, consult using airline for specific operating procedures.
MTOW = Maximum Takeoff Weight

Source: Aerodata, Inc.
Airport Planning Manuals from aircraft manufacturer
Aerospace Source Book, Aviation Week & Space Technology
Mead & Hunt, Inc.

3.2.3 Runway Width

FAA Advisory Circular, 150/5300-13, *Airport Design*, recommends that runways serving C-III aircraft be 100 feet wide. Runway 13/31 is currently 100 feet wide, meeting the FAA recommendation.

3.2.4 Runway Pavement Strength

Pavement strength for the runways at Friedman Memorial Airport is rated for single wheel, dual wheel, and dual tandem. The gear type and configuration that an aircraft is equipped with dictates how that aircraft's weight is distributed to the pavement and also determines pavement response to loading. The current reported pavement strength ratings (reported in the airport facilities directory) are presented in **Table 3-17**.

Table 3-17
Runway Pavement Strength

Classification	Runway 13/31
Single Wheel (SW)	75,000
Dual Wheel (DW)	95,000
Dual Tandem (DT)	150,000

Source: FAA form 5010, *Airport Master Record*

A runway pavement analysis, dated March 26, 2002, completed for the Airport by Toothman-Orton Engineering Company reports pavement strengths of SW-62,000 lbs.; DW-85,000 lbs.; and DT-145,000 lbs. These weight reductions reflect the aged conditions (20 years) of the runway pavement. Recently completed taxiway and heavy aircraft apron improvements considered the G-4 to be the critical aircraft for pavement design. Pavement strengths are reported by Toothman-Orton to be SW-70,000 lbs.; DW-93,000 lbs.; and DT-144,000 lbs.

The existing pavement strength is adequate for nearly all aircraft operating at the Airport and nearly all commercial regional jet type aircraft as projected in this Master Plan Update. In terms of common regional jet type aircraft, only the Avro RJ85 with a gross weight of 97,000 pounds and the ERJ 190 with a gross weight of 101,389 would have issues based on the 95,000 pound limitation in place.

3.2.5 Taxiway System

FAA AC 150/5300-13, *Airport Design*, establishes minimum recommended standards for taxiway geometric layouts, separations, and pavement widths. For Airports serving ADG III aircraft, the FAA recommends runway to taxiway centerline separations of 400 feet, 152 feet between parallel taxiway centerlines, and a taxiway pavement width of 50 feet. For aircraft specific design standards for aircraft with wingspans less or equal to 95 feet, the FAA recommends runway to taxiway centerline separations of 297.5 feet and 124 feet between parallel taxiway centerlines. The geometric layout and separations from the Airport's taxiways are not currently in compliance with FAA standards.

The current ALP depicts future runway to taxiway centerline separations of 250 feet. This proposed 250-foot separation provides for a clear 400-foot wide Runway Obstacle Free Zone (OFZ) for all aircraft with wingspans less than 100 feet. The OFZ precludes taxiing and parked aircraft and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function. The 250-foot runway to taxiway separation depicted on the current ALP does result in aircraft taxiing within the Runway Safety Area (RSA) which extends 250 feet from the runway centerline. FAA design standards for the RSA require that it be free of objects, except that need to be located in the runway safety area because of their function. Alternatives for improving the taxiway system for compliance with FAA design standards will be presented in Chapter Four, *Alternative Plan Concepts*.

3.2.6 Airfield Safety Areas

This section presents FAA design standards for various airfield safety areas as they relate to Friedman Memorial Airport. The following airfield safety areas are reviewed in this section:

- Runway Protection Zone (RPZ)
  - Controlled Activity Area
- Runway Object Free Area (OFA)
- Runway Safety Area (RSA)
- Obstacle Free Zone (OFZ)
  - Runway OFZ
  - Inner-Approach OFZ
  - Inner-Transitional OFZ
- Taxiway Safety Area
- Taxiway Object Free Area

The aforementioned existing airfield safety areas are reviewed in the following sections relative to applicable FAA standards and guidance in their current layout and location on the existing airfield. Any modifications to the existing airfield presented in Chapter Four, *Alternative Plan Concepts*, will need to appropriately consider and attempt to provide and/or protect the following airfield safety areas.

Runway Protection Zone

The Runway Protection Zone (RPZ) is trapezoidal in shape and is centered on the extended runway centerline. The function of the RPZ is to enhance the protection of people and property on the ground, typically achieved by airport control through land acquisition. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. The RPZ is primarily a land use planning tool. The RPZ begins 200 feet past the end of the runway pavement that is useable for departures and landings. The actual dimensions of the RPZ, length and width, are contingent on the type of aircraft operating on the runway, as well as the type of approach available. Generally, as the aircraft size increases and the type of approach becomes more precise, the dimensions of the RPZ increase. The FAA recommended and existing dimensions of the RPZs and the approach slopes for Runways 13/31, are reflected in **Table 3-18**.

Table 3-18
Existing Runway Protection Zone Dimensions

Runway	Approach Visibility Minimum	Surface	FAA Recommendation
Runway 13	Visual	Inner RPZ width (ft)	500
(Approach & Departure RPZ)	and not lower than 1-mile	Outer RPZ width (ft)	1,010
	(Approach Category C)	RPZ length (ft)	1,700
Runway 31	Visual	Inner RPZ width (ft)	500
(Approach RPZ)	and not lower than 1-mile	Outer RPZ width (ft)	1,010
	(Approach Category C)	RPZ length (ft)	1,700
Runway 31	Approach Category C	Inner RPZ width (ft)	500
(Departure RPZ)		Outer RPZ width (ft)	1,010
		RPZ length (ft)	1,700

Note: It is not required that the Airport Owner have control of all of the land within the RPZ, however it is recommended that the Owner have adequate control through either ownership or easements to clear the area of incompatible objects and activities for the protection of people and property.

Sources: FAA Advisory Circular 150/5300-13 change 7, *Airport Design*,
Airport Layout Plan, 2002

The departure RPZ begins 200 feet beyond the far end of the takeoff run available (TORA). The TORA on Runway 31 is 6,002 feet. The TORA on Runway 31 was shortened due to a decision by the Airport to move the existing ARC B-III departure RPZ on the north end largely onto airport property with the concurrence of the FAA. The larger dimension of the ARC C-III dimension RPZ may necessitate a review of its location.

The current ALP, which was designed for Approach Category B aircraft, depicts RPZ's with a dimension of 500 feet (inner width) by 700 feet (outer width) by 1,000 feet. Now that Approach Category C aircraft are regularly operating at the airport the larger RPZ's depicted in Table 3-11 are applicable. These larger RPZ's result in increased portions of these surfaces lying off of airport property for which the airport has no control over land uses. It is not required that the Airport Owner have control of all the land within the RPZ, however it is recommended that the Owner have adequate control through either ownership or easements to clear the area of incompatible objects and activities for the protection of people and property.

The RPZ contains two subareas, the runway object free area and the controlled activity area. The runway object free area is discussed in the following section.

Controlled Activity Area - The controlled activity area is that portion of the RPZ beyond and to the sides of the runway OFA. It is recommended the controlled activity area be owned by the Airport, though it is not required. This area should be free of land uses which create glare and smoke, and should not have uses that encourage the congregation of people. The construction of residences, fuel-handling facilities, churches, schools and offices are not recommended in the controlled activity area. While it is desirable to clear all uses from this area, some uses are permitted provided they do not attract wildlife, are outside the runway OFA, are below the approach surface, and do not interfere with the Airport NAVAIDs. Recommended land uses for the controlled activity area are primarily agricultural operations and open green space.

Runway Object Free Area

The Runway Object Free Area (OFA) is a two-dimensional ground area centered on the runway. FAA standards prohibit parked aircraft and objects within the OFA except those NAVAIDs and objects which are frangible mounted.

The length and width of the OFA are determined by the type of aircraft which are anticipated to use the runway based on approach categories and the approach visibility minimums. Runway 13/31 serves aircraft with an approach category C, therefore, has an OFA width of 800 feet centered on the runway centerline and an OFA length of 1,000 feet beyond the runway end.

The existing OFA dimensions are compared to the FAA requirements in **Table 3-19**. As shown in Table 3-12, the current Object Free Areas are not within compliance of FAA design standards. State Highway 75 runs along the east side of the runway within the OFA for its entire length.

Table 3-19
Existing Runway Object Free Area Dimensions

RWY	FAA Requirement		Existing		
	OFA Width from CL (ft)	OFA Length[1] (ft)	OFA Width (ft)	OFA Length[1] (ft)	Controlling Factor
13	400	1000	219 east[2]	0 – 600	FBO Hangar, State Highway 75
31	400	1000	320 west[3]	0 – 1000	Aircraft Hangar

Note: [1]Length beyond runway end.
[2]Implementation of current ALP recommendations, which includes the relocation of the FBO hangar, results in an OFA width from centerline of 323'. The controlling object is the State Highway 75 right-of-way.
[3]Implementation of current ALP recommendations results in OFA width from centerline of 392'. The controlling object is an aircraft hangar building.
Source: Mead & Hunt, Inc, Airport Layout Plan, 2002.

Runway Safety Area

The Runway Safety Area (RSA) is a critical two-dimensional area surrounding the runway. The FAA requires that the RSA be:

- cleared, graded, and free of potential hazardous surface variations and be properly drained,
- capable of supporting snow removal equipment, aircraft rescue and firefighting (ARFF) equipment, and aircraft (without causing damage to the aircraft), and
- free of objects except those mounted on low-impact resistant supports whose location is fixed by function.

Based on FAA criteria, the RSA for Runway 13/31 should be 500 feet wide centered on the centerline and extend 1,000 feet beyond each runway end. **Table 3-20** presents the existing RSA dimensions versus the FAA requirements.

Table 3-20
Existing Runway Safety Area Dimensions

	FAA Requirement		Existing		
RWY	RSA Width from CL (FT)	RSA Length[1] (FT)	RSA Width (FT)	RSA Length (FT)	Controlling Factor
31	250	1000	150 east	600	Taxiway A, State Highway 75
13	250	1000	150 west	600	Taxiway B, Transverse Grading

Note: [1]Length beyond runway end.
Source: Airport Layout Plan, 2002.

As shown in Table 3-20, the current safety areas meet the requirements for ADG B-III aircraft (300 feet wide and 600 feet beyond the runway end); however, they do not meet the requirements for ADG C-III aircraft. Improvements to the RSA's will be explored in Chapter Four, *Alternative Plan Concepts.*

Obstacle Free Zone

The Obstacle Free Zone (OFZ) is a three-dimensional volume of airspace that supports the transition of ground to airborne operations or vice versa. The OFZ clearing standards prohibit airplanes from taxiing and parking in the OFZ. Also, only objects which are frangible mounted and needed for the safe movement of aircraft operations are allowed to penetrate the OFZ. The OFZ is comprised of the runway OFZ, the inner approach OFZ, and the inner-transitional OFZ.

<u>Runway OFZ</u> - As defined by the FAA, the runway OFZ is an area of airspace centered above the runway centerline. The runway OFZ clearing standards prohibit taxiing, parking airplanes, and objects from penetrating the OFZ. The only objects allowed are NAVAIDs which are frangible mounted and fixed by location. The FAA requirements for the OFZ are 400 feet wide for runways which serve large airplanes, and 250 feet wide for runways which serve small aircraft with approach speeds less than 50 knots. Runway 13/31 serves large airplanes, and therefore the OFZ is 400 feet wide and extends 200 feet beyond the runway ends. Taxiway A is currently within the runway's OFZ; however, implementation of

ALP recommendations which will relocate all taxiways to at least 250 runway centerline to taxiway centerline will provide for a clear OFZ.

Inner-Approach OFZ - The inner-approach OFZ is a defined volume of airspace centered on the approach area that applies only to runways with approach lighting. For this reason, the inner-approach OFZ standards outlined by the FAA do not apply to either Runway 13 or 31 at Friedman Memorial Airport.

Inner-Transitional OFZ - The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies only to runways with lower than 3/4 statute mile approach visibility minimums. From this definition, neither Runway 13 nor 31 have an inner-transitional OFZ.

Taxiway Safety Area

The Taxiway Safety Area is a critical two-dimensional area centered on the taxiway centerline which shall be:

- cleared and graded with no potentially hazardous ruts, humps, depressions or other surface variations,
- drained by grading or storm sewers to prevent water accumulations,
- capable, under dry conditions of supporting snow removal equipment, ARFF equipment, and the occasional passage of aircraft without causing structural damage to the aircraft, and
- free of objects, except for objects that need to be located in the taxiway safety area because of their function.

Based on FAA criteria, the Taxiway Safety Area for taxiways serving ADG III aircraft shall be 118 feet wide.

Taxiway Object Free Area

The Taxiway Object Free Area (OFA) is also centered on the taxiway centerline. The OFA shall be clear of service vehicle roads, parked aircraft, and all above ground objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The OFA for taxiways serving ADG III aircraft shall be 186 feet wide, for aircraft with wingspans less than or equal to 95 feet they shall be 153 feet. As was noted earlier, current and planned taxiways at the airport lie within the Runway 13/31 Runway Safety Area. Coordination with the FAA regarding an interpretation of FAA design standards at Friedman Memorial Airport and alternatives for improving the taxiway system for compliance with FAA design standards will be presented in Chapter Four, *Alternative Plan Concepts.*

3.2.7 FAR Part 77 Surfaces

Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, establishes standards for determining which structures pose potential obstructions to air navigation. This is accomplished by defining specific airspace areas in the environs of an airport that cannot contain any protruding objects. These airspace areas are referred to as imaginary surfaces. Objects affected include existing or proposed objects of natural growth, terrain, or permanent or temporary construction, including equipment which is permanent or temporary in nature. Imaginary surfaces outlined in FAR Part 77 include:

- Primary Surface
- Transitional Surface
- Horizontal Surface
- Conical Surface
- Approach Surface

Like the RPZs, the dimensions of FAR Part 77 surfaces vary depending on the type of runway approach. Friedman Memorial Airport's existing Part 77 surface for approaches to Runway 13 and 31 are designated as visual approaches. A Transponder Landing System (TLS) approach to Runway 31 has been developed by the FAA and is depicted on the current ALP. Necessary instrumentation and equipment was installed 2003, although it was not type-certified as of May 2004. The current ALP depicts the future Runway 31 approach as a non-precision instrument (NPI) approach.

Although the FAA can determine which structures are hazards to air navigation, the FAA is not authorized to regulate off-airport tall structures. Under FAR Part 77, an aeronautical study can be undertaken by the FAA to determine whether the structure in question would be a hazard to air navigation. There is no specific authorization in any statute that permits the FAA to limit structure heights or determines which structures should be lighted or marked. Definitions of the key FAR Part 77 surfaces are as follows.

Primary Surface

The primary surface is a surface longitudinally centered on a runway. A runway with a hard surface has a primary surface extending 200 feet beyond the end of the runway. The width of the primary surface ranges from 250 to 1,000 feet depending on the existing or planned approach (visual, non-precision, or precision). Runway 13/31 currently has visual approaches and is a larger than utility runway (serving aircraft over 12,500 pounds). In the future there is a planned non-precision instrument approach with visibility minimums greater than ¾ mile. Both the existing and planned approach require a primary surface of 500 feet in width.

Transitional Surface

The transitional surface extends outward and upward at right angles to the runway centerline at a slope of 7 feet horizontally for each foot vertically (7:1) from the sides of the primary and approach surfaces. The transitional surfaces extend to where they intercept the horizontal surfaces at a height of 150 feet above the established airport elevation of 5318.7 feet MSL (NAVD 88). The horizontal surface therefore has a height of 5,468.7 feet MSL.

Horizontal Surface

The horizontal surface is a horizontal plane located 150 feet above the established airport elevation, covering an area from the transitional surface to the conical surface. The perimeter is constructed by swinging arcs from the center of the primary surface and connecting the adjacent arcs by lines tangent to those arcs. The current radius of the horizontal surface arcs is 5,000 feet as the runway has visual approaches; however the planned NPI approach requires that the runway have a horizontal surface radius of 10,000 feet.

Conical Surface

The conical surface extends outward and upward from a periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

Approach Surface

The approach surface is longitudinally centered on the extended runway centerline and extends outward and upward from each end of the primary surface. An approach surface is applied to each end of the runway based on the type of approach. The required approach slope for Runways 13 and 31 is currently 20:1 (horizontal feet to vertical feet) for the visual approaches. The future NPI approach to runway 31 will have a 34:1 approach slope.

The inner edge of the approach surface has the same width as the primary surface and for the current visual approaches it expands uniformly in width to 1,500 feet. The approach surface for visual approaches is 5,000 feet long. The approach surface associated with the future Runway 31 NPI approach has an inner width of 500 feet, an outer width of 3,500 feet, and a length of 10,000 feet.

In order to allow for the heights of vehicles on roadways, the approach surface must clear rail lines by 23 feet, interstate highways by 17 feet, public roads by 15 feet, and private roads by 10 feet (or the height of the highest mobile object that would normally traverse it, whichever is greater.)

Part 77 Penetrations

The current Airport Layout Plan depicts and summarizes penetrations to the FAR Part 77 surfaces based upon survey information from AMPC and NOAA. These penetrations are summarized in **Table 3-21**.

Table 3-21

FAR Part 77 Penetrations

Item No.	Description	Max. Elev.	Surface Penetrated	Penetration (ft)	Recommended Action
1	Tree	5370	Approach	23	Note 1
2	Tree	5352	Approach	4	Note 1
3	Building	5335	Transitional	4	Note 1
4	Pole	5354	Transitional	27	Remove
5	Pole	5350	Transitional	24	Remove
6	Hangar	5345	Primary	30	Remove
7	Pole	5349	Transitional	24	Remove
8	Antenna	5345	Primary	39	Remove
9	Pole	5347	Transitional	25	Remove
10	Hangar	5340	Primary	28	Remove
11	Pole	5343	Transitional	28	Remove
12	Air Traffic Control Tower	5353	Transitional	49	Relocate
13	Hangar	5347	Transitional	15	None
14	Hangar	5328	Transitional	12	Remove
15	Hangar	5348	Transitional	23	None
16	Building Vent	5313	Transitional	9	None
17	Electrical Box	5281	Transitional	5	Remove
18	Sign	5285	Transitional	5	None
19	Road	5303	Transitional	17	None
20	Pole	5309	Transitional	4	Note 2
21	Tree	5339	Approach	7	Note 2
22	Tree	5344	Transitional	29	Note 2
23	Tree	5331	Transitional	2	Note 2
24	Windsock	5281	Transitional	8	Obstruction Light
25	MLS Structure	5299	Transitional	16	Obstruction Light
26	MSL Antenna	5289	Transitional	5	Obstruction Light
27	Windsock	5332	Transitional	12	Obstruction Light
28	Hangar	5340	Transitional	4	Obstruction Light
29	17-foot truck on Hwy 75		Approach		Note 1

Note: [1] The current and future displaced threshold for the Runway 13 Approach eliminates penetrations of the FAR Part 77 20:1 approach surface for Runway 13.
[2] Adjust approach visibility minimums to greater than ¾ mile.

Source: Airport Layout Plan, 2002

Penetrations of the FAR Part 77 surfaces must be removed unless a FAA aeronautical study, based on proposed operations, determines otherwise. To determine otherwise, the FAA must find no substantial adverse effects as defined in Order 7400.2, *Procedures for Handling Airspace Matters*, Chapter 7, Evaluating Aeronautical Effect, Section 1, General. A determination of non-hazard request should be made with the FAA for those penetrations that are to remain.

3.2.8 Navigational Aids (NAVAIDs)

NAVAID requirements for the Friedman Memorial Airport are based on recommendations contained in Advisory Circular 150/5300-13, Change 7, *Airport Design*, FAA Order 7031.2C, *Airway Planning Standards Number One - Terminal Air Navigation Facilities and Air Traffic Control Services*, and general trends in aviation.

NAVAIDs provide services related to airport operations, precision guidance to a specific runway end, and non-precision guidance to a runway or an airport itself. The distinction between a precision and non-precision NAVAID is that a precision approach provides the pilot with electronic glide slope (descent) and distance information, while a non-precision approach does not offer glide slope and may or may not offer distance information. Safety considerations and an airport's operations role determine whether an airport is equipped with precision or non-precision approach capability. The type, mission, and volume of aeronautical activity, used in association with meteorological, airspace, and capacity data, determine an airport's eligibility and need for various NAVAIDs. In addition, and in the case of Friedman Memorial Airport, local conditions such as topography and terrain impact the ability to safely implement approaches utilizing some NAVAIDs.

For this study, NAVAIDs are divided into three general categories: terminal area NAVAIDs, electronic approach NAVAIDs, and visual NAVAIDs. These three categories of NAVAIDs are discussed in the following subsections.

Terminal Area NAVAIDs

NAVAIDs classified in this category provide positive control to aircraft and maintain an orderly flow of air traffic within a specified area. Terminal area NAVAIDs are provided to prevent collisions between aircraft during the landing and take-off sequence as well as to support sufficient maneuvering. Terminal area NAVAIDs currently available at Friedman Memorial Airport include the Friedman Memorial Airport Traffic Control Tower (ATCT) and the Salt Lake Center. The ATCT is currently open from 7:00 am to 11:00 pm. The ATCT is discussed in greater detail in Section 3.2.9.

Electronic Approach NAVAIDs

This category of NAVAIDs assists aircraft executing an approach to the airport. An instrument approach is a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from en route or local flight to a point from which landing may be made visually. **Table 3-22** presents the NAVAIDs and lighting currently available at the Airport, as well as those proposed or currently in development.

Table 3-22
NAVAIDS and Lighting

	Instrument NAVAIDS			
RWY	**MLS**[1]	**TLS**	**RNAV/GPS**	**NDB/DME or GPS-A**
13	E			
31		P	E	
Terminal				E

	Visual NAVAIDS/Lighting				
RWY	**VASI**	**MIRL**	**Rotating Beacon**	**Wind Cone**	**MITL**
13		E			
31	E	E			
Terminal			E	E	E

[1]The MSL is a private use system owned by Horizon Airlines

Notes: E - Existing
P - Planned
MLS - Microwave Landing System
TLS - Transponder Landing System
RNAV - Area Navigation
GPS - Global Positioning System
DME - Distance Measuring Equipment
GPS-A - Global Positioning System (circling approach)
NDB - Non-directional Beacon
VASI - Visual Approach Slope Indicator
MIRL - Medium Intensity Runway Lights
MITL - Medium Intensity Taxiway Lights

Source: Airport Layout Plan, U.S. Terminal Procedures, U.S. Department of Transportation

The only currently published Airport approaches is a RNAV/GPS approach to Runway 31 with approach minimums of 1-1/4 mile visibility and a 1,900-foot ceiling and a NDB/DME or GPS-A circling approach to the Airport with approach minimums of 5 miles visibility and a 2,700-foot ceiling.

Precision Instrument Approaches:

- None

Non-Precision Instrument Approaches:

- RNAV (GPS) to Runway 31.
- NDB/DME or GPS-A to the Airport.

The availability of instrument approach procedures at an airport permits aircraft landings during periods of limited visibility. The extent to which approach minimums, in terms of ceiling and visibility, can be lowered is dependent on a number of factors. These include the instrumentation available upon which the approach procedure may be developed and obstructions in the approach and/or missed approach areas. At times, instrument approaches are restricted to certain aircraft and flight crews which have been certified to conduct the procedure by the FAA.

Options for improving the instrument approach capability of the airport have been studied extensively by the FAA in the past. Due to obstacles and high terrain in close proximity to the airport, options for improving the instrument approach capability of the airport are limited. The TLS installed in 2003 has been found to be the best alternative for improved approach minimums at this time.

Visual NAVAIDs & Lighting

Visual NAVAIDs and airfield lighting provide aircraft guidance once the aircraft is within sight of the Airport. The visual aids and lighting also assist the aircraft in maneuvering on the ground. Numerous visual NAVAIDs are provided at the Airport as noted in Table 3-22.

3.2.9 Airport Traffic Control Tower

The Airport Traffic Control Tower (ATCT) is located on the east side of the airfield, across from the passenger terminal building. The visual coverage for the existing airfield is adequate; however, the tower is located within the Runway Object Free Area and is a FAR Part 77 penetration. The age and condition of the building is also a concern, and the structure is inadequate based on FAA standards.

3.3 Terminal Facility Requirements

This section provides passenger terminal recommendations for current and projected demand, based on passenger enplanements and potential aircraft types serving the Wood River Valley

- Existing Passenger Terminal Building
- Passenger Terminal Building Space Recommendations
- Space Recommendation Conclusions

3.3.1 Existing Passenger Terminal Building

The existing Friedman Memorial Airport passenger terminal building is a one-story high building located approximately midway along the `west side of Runway 13/31. The terminal building has a total existing gross square footage of 14,318 SF, which does not include overhang or canopy areas. The original terminal was constructed in 1976. A renovation and addition project occurred in 1985, in which approximately 2,000 SF was added to improve public restrooms, passenger waiting areas, queuing areas in front of ticketing counters, and water and sewer lines. In 1991, a new baggage claim wing, departure lobby and entry were added onto the terminal. The carpeting was replaced at this time and the existing sprinkler system revamped. New ADA bathrooms were added on the south side of the terminal building in 1995. The most recent renovation consisting of reconstruction of the original restrooms, replacement of the entryway subfloor and carpeting took place in 2001.

This existing facility houses two airline ticketing counters with adjacent airline offices and exclusive baggage make-up space, three rental car counters, a small snack/gift shop retail concession, a retail art gallery, baggage claim facilities, two sets of non-secured restrooms, and a secured departure lounge. Airport administration functions are conducted in a separate building adjacent to the terminal.

3.3.2 Passenger Terminal Building Space Recommendations

Passenger terminal facilities are functionally divided into two categories, usable and unusable space. The former is sub-divided into revenue generating and non-revenue generating areas, which in turn are further sub-divided into the following sub-categories:

Usable space

Revenue generating:

- Airline spaces include ticketing counters, ticketing offices and baggage make-up areas. These spaces are leased from the airport for the use of conducting airline operations.
- Concessions are spaces leased by various tenants to conduct business at the Airport. Storage areas maintained by tenants are also considered concession areas.

Non-revenue generating:

- Public spaces include circulation, lobby, waiting and seating areas, public conference rooms, secured and non-secured restrooms, secured hold rooms, baggage claim and passenger queuing areas.
- Support spaces include mechanical, electrical, communication rooms, general airport storage and maintenance spaces, and airport security stations.
- Non-public common spaces such as the baggage claim input area.

Non-usable space

- Building structure, atriums and utility chases

Space recommendations, in terms of size and layout, contribute to the efficiency of an airport's operations and have to be analyzed prior to development. The space recommendations of a terminal facility are dependent on peak hourly demand activity, which is determined from the seating capacity and boarding load factors of aircraft serving the airport. Presently, the DeHavilland Dash 8-200 and Q400, with seating capacities of 37 and 70 seats, respectively; and the Embraer 120, with 30 seats, are the aircraft types being used. Projected utilization of regional jets is factored into the analysis, as reflected in the peak hour numbers presented in **Table 3-23**.

Table 3-23

Projected Peak Hourly Total Passengers

Demand Level (annual enplanements)	Peak Hour Enplanements	Peak Hour Deplanements	Total Peak Hour Passengers
66,000 1/	55	55	110
89,000	74	74	148
104,000	87	87	174
140,000	116	116	232
200,000	167	167	334

Note: [1]Existing data from 2002 peak hour boarding load factors and flight schedule.

Source: Mead & Hunt, Inc.

From the Airport's current flight schedule, an afternoon peaking characteristic is present, with three aircraft enplaning/deplaning within a one-hour period. The current (2002) peak hour total passenger number of 110 was determined using a 45.2% boarding load factor which was derived from existing data collected from airlines. Current peak hour total passengers equal 110, of which 55 are assumed to be peak hour enplaning passengers (PHEP) and 55 are assumed to be peak hour deplaning passengers (PHDP). For the period beyond 2002, projections are based on preferred enplanement, peaking and boarding load factors documented in Chapter 2, *Projections of Aviation Demand*.

With the above assumptions, **Table 3-24** was developed to quantitatively show the current and projected square footage recommendations for the passenger terminal building. Gross square footage calculations are as follows:

Demand Level (Annual Eps)	**Square Footage**
66,000 (2002)	20,458
89,000	26,233
104,000	29,457
139,000	37,456
200,000	52,904

Detailed descriptions of the individual spaces, and the methodologies used to calculate the projected space recommendations, are further elaborated in Appendix C.

Table 3-24

Terminal Space Recommendations

	Existing Space	**Projected Demand Scenarios (Recommended Space)**				
Annual Enplanements	66,292	66,292	88,979	104,285	139,141	200,000
Peak Hour Enplaned Pax	55	55	74	87	116	167
Peak Hour Deplaned Pax	55	55	74	87	116	167
Peak Hour Total Pax	110	110	148	174	232	334
Airline Space						
Airline Ticketing						
ATO Counter - LF	42	36	48	48	60	86
ATO Office Area	1,346	1,260	1,680	1,680	2,100	3,019
Baggage Make-Up	1,588	1,100	1,485	1,737	2,311	3,322
Baggage Claim						
Bag Input	0	1,230	1,230	1,230	1,230	2,130
Bag Belt - LF	42	75	95	109	139	200
Subtotal Airline Space	**2,934**	**3,590**	**4,395**	**4,647**	**5,641**	**8,470**
Revenue Space						
Rental Car						
RAC Counter - LF	21	30	40	40	40	60
RAC Office Area	285	600	800	800	800	1,200
Snack/Gift Shop	181	400	540	632	840	1,208
Other Lease Space	94	500	675	790	1,050	1,510
Subtotal Revenue Space	**560**	**1,500**	**2,015**	**2,222**	**2,690**	**3,918**
Public Space						
Public Circulation	3,698	3,900	5,265	6,160	8,193	11,776
Public Lobby/Seating	940	1,150	1,553	1,816	2,416	3,473
ATO Queue Area	420	720	960	960	1,200	1,680
Bag Claim PAX Area	1,109	1,495	2,018	2,361	3,141	4,514
RAC Queue Area	236	300	400	400	400	600
Security Queue Area	100	200	270	316	420	604
Passenger Hold Room	1,667	1,238	1,671	1,955	2,600	3,737
Gates	2	2	2	2	3	3
Restrooms (Secured)	0	300	405	474	630	906
Restrooms (Non-Secured)	560	545	736	861	1,145	1,646
Subtotal Public Space	**8,730**	**9,848**	**13,227**	**15,303**	**20,145**	**28,936**
Support Space						
Airport Administration	0	1,600	1,600	1,600	1,800	1,800
Airport Security	788	1,100	1,485	1,737	2,311	3,322
Mechanical/Electrical/Storage	161	1,320	1,670	1,921	2,399	3,449
Subtotal Support Space	**949**	**4,020**	**4,755**	**5,259**	**6,510**	**8,570**
Building Structure/ Non-usable Space	**1,145**	**1,500**	**1,791**	**2,026**	**2,470**	**3,011**
Total Gross SF	***14,318***	***20,458***	***26,294***	***29,457***	***37,456***	***52,904***
Revenue Space	3,494	3,860	5,180	5,639	7,101	10,258
Non-Revenue Space	9,479	15,098	19,262	21,792	27,884	39,636

Notes: All figures represent square foot (SF) unless otherwise noted.
Some numbers may not add due to rounding.
[1]Existing data from 2002 peaking calculations.

Sources: Terminal Floor Plans
FAA AC150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*
FAA AC150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations*
Mead & Hunt, Inc.

3.3.3 Terminal Space Recommendation Conclusions

Additional square footage is recommended in the near term in certain areas where facilities are inadequate for efficient operations, specifically baggage claim facilities, passenger queuing areas, rental car offices, airport support areas, offices and support facilities for TSA screening personnel, and general circulation. Adding a larger food & beverage service and restrooms within the secured hold room area would enhance Airport services and increase revenue generation but are not essential. Similarly, relocating Airport administrative staff would be beneficial to operations. Actual improvement areas may depend on how high a percentage of the terminal area can be renovated for higher efficiency through renovation work of its interior layout. Airline operational demands, physical site restrictions, and structural constraints are other factors that may influence renovation or improvement options. Actual time line of renovation projects should respond to passenger load levels. Our recommendations for improvements to the Friedman Memorial Airport, based on the analysis above, include:

- Adding a baggage belt system and expanding the baggage claim operational and passenger areas for greater efficiency. Existing passenger areas conflict with queuing space of the rental car counters, causing congestion. The baggage shelf operational length is inadequate and the baggage claim passenger area is undersized. Both should be rectified immediately.

- Improving the baggage claim input area to provide higher security and protection of equipment. A drive-through enclosure is recommended. The baggage claim input area is currently housed under a canopy with three overhead doors separating the baggage claim area from the sterile baggage input area. The existing baggage claim shelf could remain for use as large equipment claim devices. Renovation of this area should be undertaken at the same time as the baggage claim area.

- Improving general circulation and queuing areas will require additions to the existing structure at the center portion of the terminal building as the overall depth is not sufficient to handle the various activities that occur there. This effort would likely impact existing airline ticketing offices and include relocation of restrooms and existing mechanical facilities west of the ticketing counters.

- Increase Airport support spaces. Existing storage and mechanical spaces are in small rooms in multiple locations. Centralizing some of these functions could improve operational efficiency and free up areas for circulation use.

- Reconfiguring the rental car counters to provide more counter length and adding offices for administrative purposes.

- Reconfiguring airline ticketing space and baggage make-up areas to improve operational functions and storage capacity.

- Enlarging the retail concession space would allow additional flexibility for the retailer to improve service options. Adding restrooms and a small food concession within the secured hold room could also reduce the need for landside waiting areas. This would be a beneficial, but unessential upgrade, for passengers and possibly for the concessionaire who would have a captive market within the hold room area.

- Providing support spaces and offices for TSA staff that are close in proximity to their screening stations.
- Relocating Airport administrative staff from their remote location. Existing administrative facilities are undersized but may serve well as administrative office space for TSA personnel.
- Any major terminal building improvement project should consider the use of enclosed passenger loading bridges.

3.4 General Aviation Facility Requirements

The demand-capacity assessment of the Airport's general aviation facilities includes evaluating the aircraft storage buildings and aircraft parking areas. The fueling services and automobile parking requirements are assessed separately and are presented in Section 3.6, *Support Facility Requirements.* The general aviation development options will be discussed in Chapter Four: *Alternative Plan Concepts.*

3.4.1 Aircraft Parking Aprons

Typically, paved apron areas are provided for aircraft that do not have hangar storage. General aviation parking requirements can vary widely from airport to airport. This depends on the percentage of transient aircraft parking at the Airport and the number of based aircraft tied-down on the ramp in lieu of an aircraft storage hangar. Airports that experience extended periods of inclement weather tend to have larger percentages of their based aircraft stored in hangars. In addition, aircraft that have higher values are also usually stored in hangars. At Friedman Memorial Airport there are a significant number of aircraft stored at tie-downs and on aprons despite the fact that the airport has some periods of inclement weather. This is most significantly due to the lack of available aircraft storage hangars.

The current ALP depicts a new FBO site and removal of the existing FBO facilities along with all apron areas east of the runway and west of the runway north of connecting Taxiway B-6 with the exception of the air carrier apron near the terminal. These facilities and aprons are within the runway OFZ and runway OFA and will be removed. After the relocation of the FBO from the northeast corner of the airfield to the southwest side, there will be three general aviation apron areas at the Airport which total 70,355 square yards. The three aprons are summarized as follows:

- The transient aircraft tie-down apron is located north of the terminal building apron and totals 5,405 square yards.
- The large aircraft apron for transient's is located at the south end of Taxiway B (adjacent to the future FBO site) and totals 29,625 square yards.
- The based aircraft tie-down apron is located between the T-Hangars and the future FBO site and totals 35,325 square yards. This apron has 81 tie-downs, 64 of which are primarily for based aircraft and 17 of which are for transient aircraft. Therefore approximately 27,910 square yards of the apron is primarily for based aircraft and 7,415 square yards is for transient aircraft.

Friedman Memorial Airport experiences drastic swings in the amount of apron required for aircraft parking depending upon the time of year and other activities occurring within the valley. To manage these various swings in demand the Airport uses all of the apron areas as efficiently as possible and has made a change in their management policy in regards to tie-down rental requirements. Renters of based aircraft tie-downs are now required to pay for the position for a minimum of nine months. Typical aircraft parking generally provides an allowance for aircraft circulation and taxilanes. During peak periods at FMA, however, the aircraft are parked nose-to-tail without any allowance for taxilanes – this practice accommodates the maximum number of aircraft. The Airport also utilizes unoccupied based aircraft tie-downs for transient aircraft parking during peak periods. The Airport estimates that through this efficient utilization of all existing apron spaces, combined with the new management policy on based aircraft tie-downs that on average the existing aircraft parking demand approximately equals the current apron capacity.

Therefore, while current apron space approximately equals aircraft parking demand, the projected increase in future activity (increased demand for based aircraft and itinerant operations) results in a deficiency in the amount of apron space. Table 3-25 summarizes the transient and based aircraft tie down apron requirements for the Airport. This analysis assumes that ratios regarding the percentage of itinerant operations, the percentage of itinerant operations parking at the airport, and the percentage of based aircraft parking at tie-downs remains relatively constant through the planning period. It should be noted that any future aircraft hangar demand that is not provided could increase the based aircraft apron demand and vice versa.

Table 3-25
Total GA Apron Requirements

		Projected		
	2002	2007	2012	2022
Relevant Activity				
PMAD General Aviation Operations	252	304	323	361
Based Aircraft	143	186	191	201
Apron Space Recommended SY)				
Transient Aircraft Apron	51,170	61,700	65,569	73,283
Based Aircraft Apron	19,185	24,925	25,594	26,934
Total	70,355	83,500	91,163	100,217
Existing Aircraft Aprons (SY)				
Transient Aircraft Tie Down	5,405			
Based Aircraft Tie Down	35,325			
Large Aircraft Apron/Transient	29,625			
Total	70,355			
Additional Aircraft Apron Recommended (SY)	0	13,145	20,808	29,862

Source: Mead & Hunt, Inc.

The Airport's existing aprons are not adequate to meet the projected demand. Development options to meet the projected amount of aircraft apron space will be discussed in Chapter Four: *Alternative Plan Concepts*.

Air Cargo Area. Air cargo activity at the Airport includes operations by two separate operators, FedEx and AmeriFlight. FedEx generally operates a single Cessna Caravan flight per day to Friedman Memorial Airport; it arrives in the morning and departs in the evening requiring one aircraft parking position.

Ameriflight provides service for UPS to the Airport. Their operations include 2 flights per day by a Navaho, once in the morning and once in the evening, and an occasional Beech 1900 turboprop flight, they also require one aircraft parking position.

Given the leisure market area that the airport serves significant changes in the amount of air cargo activity is not anticipated through the planning period. Therefore, it is projected that air cargo activity will remain relatively flat at an average of 3 to 4 flights per day by two separate operators. There is a need for two to three aircraft parking positions in a location with landside access for air cargo operations. Development options for an air cargo activity area will be presented in Chapter Four: *Alternative Plan Concepts*

Bureau of Land Management (BLM) Apron/Staging Area. The Bureau of Land Management stages small single engine aircraft at the Airport for aerial fire fighting during the fire fighting season from approximately June through October. They typically stage three aircraft at the Airport during the summer. Their optimum apron needs are an area 180 feet by 205 feet or 4,100 SY. They also need room for a single semi-trailer near the apron for materials storage along with water access for filling the small single engine bomber aircraft. Development options for the location of the BLM facilities will be presented in Chapter Four: *Alternative Plan Concepts.*

United States Forest Service (USFS) Apron/Staging Area. The Forest Service stages a single helicopter at the Airport for aerial fire fighting from June through the end of September, although they can have as many as three or four helicopters at the Airport during fire events in the proximity of the Airport. They currently stage near their operations near the north end of Taxiway B; this area is adequate but not optimum for them. Development options for the location of the USFS operations will be presented in Chapter Four: *Alternative Plan Concepts.*

Deicing Pad. There is a need for a single deicing pad to collect/contain glycol during the deicing season. The largest projected commercial aircraft is the Q400, which is 95 feet wide and 107.9 feet long. Containment pad requirements assume containing an area up to 20 feet outside of the aircraft's dimensions or 135 feet by 150 feet or 2,250 SY. Development options for the location of deicing pad will be presented in Chapter Four: *Alternative Plan Concepts*. Co-location of the deicing pad with the BLM facilities could provide a good consolidation of space given that their need for the space occurs during different times of the year.

3.4.2 Aircraft Storage Hangars

Similar to based aircraft tie down requirements, the storage building requirements, or hangar requirements, for general aviation aircraft typically depend on the local climate conditions, as well as the size and type of the based fleet at the Airport and local preferences. There are currently 44 based aircraft utilizing the aircraft tie-down apron, while the remainders are based within a storage hangar.

Since all of the existing aircraft storage space is currently leased at this time, there is currently a waiting list and a demand for aircraft storage facilities that is not accommodated. The projections of based aircraft demand as presented in Chapter 2, *Projections of Aviation Demand* have been used for the determination of future aircraft storage building requirements. Calculations to determine additional aircraft storage hangar space needs are based upon the following planning ratios for space:

- T-Hangars are assumed to be standard tees (1,400 square feet recommended per aircraft)
- Conventional Hangars are sized to accommodate a planning standard of 1,400 square feet per single engine airplane, 2,500 square feet per multi-engine airplane, and 3,600 square feet per turboprop and jet.

Calculations also include the following planning ratios as to the type of storage hangar to plan for each based aircraft type:

- Single engine: 60% are stored in a hangar; 95% T-Hangars and 5% conventional hangars
- Multi-engine: 90% are stored in a hangar; 30% T-Hangars and 70% conventional hangars
- Turboprop: 100% conventional hangars
- Jet: 100% conventional hangars

The space planning ratio used for each type of hangar and aircraft does not include the lead-ins, access, taxilanes, or taxiways to access the hangars. It represents only the building for the storage of the aircraft. **Table 3-26** summarizes the aircraft storage building requirements for the Airport for the based aircraft projections.

Table 3-26
Additional Aircraft Hangar Space Demand

		Projected Demand		
	Factor	**2007**	**2012**	**2022**
Increase Based Aircraft Hangar Demand				
Single Engine	60%	14	16	20
Multi-Engine	90%	5	5	5
Turboprop	100%	1	1	2
Jet	100%	14	15	18
Aircraft Storage				
T-Hangar Units				
Single Engine	95%	13	15	19
Multi-Engine	30%	1	1	1
Additional T-Hangar Unit Demand		**14**	**16**	**20**
Conventional Hangars				
Single Engine	5%	1	1	1
Multi-Engine	70%	4	4	4
Turboprop	100%	1	1	2
Jet	100%	14	15	18
Additional Conventional Hangar Space Demand (SF)		**65,400**	**69,000**	**83,400**

Source: Mead & Hunt, Inc.

As can be seen above, additional hangar facilities will be recommended to meet the projected increase in the number of based aircraft. By the year 2007 there will be a demand for an additional 65,400 square feet of conventional hangar space and 14 T-Hangars with that demand growing to 83,400 square feet of conventional hangar space and 20 T-hangars by 2022.

Any future hangar development shall also include the appropriate apron and access requirements in front of the hangar. The Airport should replace or maintain the existing hangar facilities through the planning period as necessary. It should also be noted that any future aircraft hangar demand that is not provided could increase the based aircraft apron demand and vice versa. Development options to meet the projected amount of aircraft storage space will be discussed in Chapter Four: *Alternative Plan Concepts*.

3.5 Support Facility Requirements

Ancillary facilities needed to support the operation of the Airport were also identified and explored. Requirements were developed for the following support areas:

- Aircraft Rescue and Firefighting (ARFF)
- Fuel Storage
- Airport Maintenance and Snow Removal Equipment (SRE) Buildings
- Airport Perimeter Road

3.5.1 Aircraft Rescue and Firefighting

Friedman Memorial Airport Aircraft Rescue and Firefighting (ARFF) services are located south of the Airport Manager's office. The present location allows the ARFF trucks to maintain the three-minute initial vehicle response time to the midpoint of the airfield. The ARFF building occupies approximately 4,435 square feet. A 2,700-square foot addition was constructed in 2003, which makes the building adequate to house all ARFF equipment for the long-term future.

ARFF requirements for Friedman Memorial Airport are defined in FAR Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*. The requirements for determining the ARFF index are based on the combination of the length of the air carrier aircraft and the average daily departures of the air carrier aircraft. The average daily departures is based on the longest aircraft that has a minimum of five daily departures at the Airport. The current ARFF index at the Airport is Index A, which includes aircraft less than 90 feet in length.

The **ARFF Index A** criteria is:

- Aircraft less than 90 feet in length (i.e., Emb 120, Saab 340, Dash 8-200, ATR 72, CRJ 200, ERJ 135).
- One ARFF vehicle carrying at least 500 pounds of sodium-based dry chemical or halon 1211, and 1,500 gallons of water, and the commensurate quantity of AFFF for foam production; ***or***
- 450 pounds of potassium-based dry chemical and water with a commensurate quantity of aqueous film forming foam agent (AFFF) to total 100 gallons, for simultaneous dry chemical and AFFF foam application.

The Airport currently has two daily departures with a Dash 8-Q400 aircraft that is 107.9 feet length. The (2002) number of daily departures does not place the airport into ARFF Index B, however operations by larger regional aircraft are projected to increase in the future. Based upon anticipated need for the Airport to meet **ARFF Index B**, it's criteria is:

- Aircraft at least 90 feet in length but less than 126 feet in length with a minimum of five daily departures (i.e., Dash 8-Q400, ERJ 145, AVRO RJ85, CRJ 700, CRJ 900).
- One ARFF vehicle carrying at least 500 pounds of sodium-based dry chemical or halon 1211, and 1,500 gallons of water, and the commensurate quantity of AFFF for foam production; ***or***
- Two ARFF vehicles: one carrying the extinguishing agents as described above and one vehicle carrying an amount of water and commensurate quantity of AFFF so that the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons.

The passenger air carrier fleet mix projections as presented in Chapter 2, *Projections of Aviation Demand*, project that approximately 34 percent of the passenger carrier operations at the Airport in 2022 will be commercial aircraft with over 60 seats. This correlates to around 6 departures per day and most of these types of aircraft are over 90 feet length. The exact aircraft type and model that would be expected to comprise that segment of the fleet cannot be accurately projected. It will be completely dependant upon the carrier providing the service, their unique aircraft fleet, the markets served, and frequency of daily service. However, it is reasonable to assume that most of these aircraft will require ARFF Index B standards and given that daily departures will total over five, an upgrade to ARFF Index B standards within the planning period is anticipated.

It is projected that the Airport will need to upgrade to Index B ARFF requirements within the planning period. The expansion of the ARFF facility and the acquisition of an additional ARFF vehicle expected this summer will provide ARFF Index B for the airport.

3.5.2 Fuel Storage

The majority of the fuel services are currently provided by Sun Valley Aviation. Their fuel storage is located near the northern end of the T-Hangar area west of Taxiway B. This is an above ground facility with four 20,000 gallon tanks, one for avgas and three for Jet A. All fuel is dispensed from this facility via tank truck by Sun Valley Aviation. Adequate area is reserved for future facility expansion adjacent to the north end of the existing facility.

Currently, the Blaine County Pilot's Association operates a self-fueling co-op facility located near the south end of the T-Hangars. This is a 5,000-gallon underground tank with a small pump for self-fueling. This facility is to be purchased and run by Sun Valley Aviation in the near future. No significant expansion or additional change in the operation of this self-fuel facility is anticipated within the planning period.

3.5.3 Airport Maintenance and Snow Removal Equipment (SRE) Buildings

Snow removal equipment and other miscellaneous maintenance equipment is housed in a portion of the ARFF building and in the Snow Removal/Maintenance Equipment Building just west of the ARFF building. The Snow Removal/Maintenance Equipment Building occupies approximately 3,185 square feet. The Airport's Snow Removal Equipment includes the following:

- Case 921C front end loader with bucket and interchangeable implements including a 22-foot runway plow, 20-foot ramp plow, and 500 HP rotary snow plow
- John Deer front end loader with 7-yard snow bucket

- Case W20B front end loader with bucket and parking lot plow
- Sweepster Plow Truck with interchangeable 22-foot runway plow and 22-foot broom
- Idaho Norland Plow Truck with 24-foot runway plow
- Ford 9000 Dump Truck with 12-foot frost plow
- Tiger Tractor (New Holland) with rotary snow plow
- Schmidt 700 HP (350 HP drive/350 HP blower) rotary snow plow
- Chevrolet 1-ton Pickup Truck with 9-foot adjustable plow and 300 gallon deicing device

Currently, not all snow removal equipment can be appropriately housed in existing facilities. Additional facilities are necessary for accommodation of all snow removal and maintenance equipment. FAA AC 150/5220-15, *Building for Storage and Maintenance of Airport Snow and Ice Control Equipment: A Guide* states the following regarding the benefits of an adequate SRE building. During winter months an SRE building provides a warm, sheltered environment to repair and service the snow and ice control equipment. An airport maintenance, storage, and snow removal equipment building will protect the airport's investment in snow and ice control equipment, as well as in stored ice control materials, and it will support safe all-weather aircraft operations. Airport authorities often find it advantageous to size the building to include storage for field lighting and other airport maintenance equipment, friction measuring equipment, rubber removal devices, and inspection or bird patrol vehicles.

Typical parking space dimensions in accordance with FAA AC 150/5220-15, *Building for Storage and Maintenance of Airport Snow and Ice Control Equipment: A Guide* are:

- 25 feet by 40 feet (1000 SF) for large blowers, plows.
- 20 feet by 40 feet (800 SF) for sweepers and loaders.
- 20 feet by 30 feet (600 SF) for spreaders.

The airport has 7 different vehicles with large plow implements, and two smaller trucks. A sheltered environment should be provided for these vehicles during winter months along with adequate space for material storage, equipment service areas and personnel support areas. Vehicle storage needs total 7,000 to 8,000 square feet, material storage needs range from 200 to 1000 square depending upon the number and quantity of materials stored, and equipment service and personnel support areas typically total 2,000 to 4,000 square foot. A typical storage and maintenance facility with storage for the aforementioned vehicles designed in accordance with AC 150/5220-15 typically totals 9,000 to 12,000 square feet. Development options for a new or expanded storage and maintenance facility designed in accordance with AC 150/5220-15 will be presented in Chapter Four: *Alternative Plan Concepts*.

3.5.4 Airport Perimeter Service Road

The Airport does not currently have a "within the fence" perimeter road clear of all controlled aircraft movement areas. Implementation of a service road clear of controlled movements will be extremely difficult given the deficiencies that presently exist in regards to FAA design standards between the runway and parallel taxiways and the topography of the airfield. Where attainable however, the Airport should construct a perimeter road system so that access around the airfield can be provided without runway crossings and outside of controlled movement areas. Alternative Plans developed within Chapter Four, *Alternative Plan Concepts*, should protect for the implementation of an airport perimeter road where practicable.

3.6 Surface Transportation and Auto Parking Requirements

Ground access systems serve passengers, employees and others who require access to the airport and the Passenger Terminal Facility landside. These include the curb frontage and parking facilities for passengers, employees and rental cars. The existing surface transportation features at Friedman Memorial Airport have been reviewed to determine their ability to meet anticipated demand for the planning period. Components analyzed were:

- Airport Access
- Terminal Curb Frontage
- Terminal Area Automobile Parking

3.6.1 Airport Access

The only access to Friedman Memorial Airport is from the north via Airport Way, which runs north-south along the west side of the Airport. The paved two-lane road serves as the primary access for all activities on the Airport, since the road extends beyond the terminal area to serve the T-Hangars and private hangar facilities south of the terminal apron. Airport Way passes through the principal industrial zone for the City of Hailey.

The major arterial highway through Blaine County is State Highway 75, which parallels Airport property on the east side and is a significant obstruction to the Runway 13/31 Object Free Area (OFA). State Highway 75 serves as the main arterial through the Wood River Valley and is a two-lane roadway in the vicinity of the Airport. Airport Way accesses directly onto Highway 75, virtually at the mid-point of the "S" curve that the highway makes around the north end of the Airport. Highway 75 passes through the principal commercial zone for the City of Hailey. The Idaho Department of Transportation is in the process of studying this highway.

Recently completed commercial-light industrial development infrastructure located adjacent to the west side of the airport ("Airport West") provides relocated access to the terminal and GA hangars, apron and FBO facilities at the southwest area of the airport as is shown on Exhibit 1-6. This planning study, within Chapter 4, *Alternative Plan Concepts*, will evaluate how best to use these new access locations to serve the terminal area and the new and proposed facilities along the west side of the airfield.

3.6.2 Terminal Curb Frontage

Curb frontage is the recommended length of sidewalk immediately adjacent to the terminal that is used for loading and unloading of passengers and baggage. The length is directly related to vehicle types and curb dwell time. Existing total enplaning and deplaning curb lengths measures 245 LF.

Table 3-27 depicts terminal curb front requirements. Based on the preferred forecast total recommended curb length for 2002 is calculated to be 170 LF. By 2022, the total recommended curb length is projected to be 340 LF. In a high growth scenario where enplanements reach 200,000, a total curb length of 510 LF will be recommended, of which 255LF each would be enplaning and deplaning curbs. These projections were derived by calculating the enplaning and deplaning curb lengths separately using peak 20 minute of peak hour enplanements and deplanements.

Table 3-27
Terminal Curb Length Requirements

	Existing	**Recommended**				
Enplanements		**65,752**	**88,979**	**104,285**	**139,141**	**200,000**
Year	**2002**	**2002**	**2007**	**2012**	**2022**	
Enplaning Curb, LF						
Private Cars	125	50	75	75	100	150
Commercial	35	35	35	70	70	105
Sub Total	**160**	**85**	**110**	**145**	**170**	**255**
Auto Spaces	5	2	3	3	4	6
Taxi/Limo/Commercial Spaces	1	1	1	2	2	3
Sub Total	**6**	**3**	**4**	**5**	**6**	**9**
Deplaning Curb, LF						
Private Cars	50	50	75	75	100	150
Commercial	35	35	35	70	70	105
Sub Total	**85**	**85**	**110**	**145**	**170**	**255**
Auto Space	2	2	3	3	4	6
Taxi/Limo/Commercial Spaces	1	1	1	2	2	3
Sub Total	3	**3**	**4**	**5**	**6**	**9**
Total Enplaning and Deplaning Curb Length (LF)	**245**	**170**	**220**	**290**	**340**	**510**

Sources: Friedman Memorial Airport Parking Data
Mead & Hunt, Inc., March 2003

In 2002, peak levels occur during departure of a single 70 seater aircraft. Applying a 75% boarding load factor results in 53 passengers. This would be the equivalent of approximately 96% of PHEP. Based on a peak month daily parking rate of 85%, an estimated 5 vehicles are expected to use the enplanement curb over a 20 minute period, assuming one passenger being dropped off per vehicle. An additional resort factor has been added to account for 25% of parking passengers arriving in twos, of which 75% deposit their companions curbside prior to parking. This results in another 9 vehicles using the enplaning curb for a total of 14 vehicles. Private auto/taxi/rental car curb dwell time is approximately 3 minutes with commercial vehicles averaging 4 minutes. Assuming that a 20 minute period can accommodate 5.7 vehicles per 25 feet, and 5 limousines/shuttles per 35 feet, in addition to 75% of the vehicles being private autos/taxis/rental cars with a recommended slot length of 25 feet and 25% being limousines/shuttles with a recommended slot length of 35 feet, the respective number of vehicles are 11and 3 respectively. Total recommended enplanement curb for 2002 is 50LF for autos and 35 for limousines/shuttles. Upon applying enplanement projections to these calculations, 2022 requirements total 170LF for enplaning curb. The existing enplanement curb is adequately sized through the 2012. In a high growth scenario, approximately 255LF would be recommended.

In 2002, peak levels occur during arrival of two aircraft, a 70 seater and a 30 seater. Applying a 75%

boarding load factor would be the equivalent of approximately 136% of PHDP, resulting in 75 passengers. The same percentages as those used for the enplaning curb calculations were used for vehicle determination except for the number of parking passengers who pick-up their traveling companions, which was reduced to 25%. A deplaning curb tends to have longer curb dwell times and typically takes 4 minutes for each auto and 5 minutes per limousine. As a result, a 20 minute period allows 5 autos per 25 foot length and 4 limousines/shuttles per 35 feet. A total of 85 feet is recommended for the deplaning curb for 2002, rising to 170 feet in 2022. The existing curb length is inadequate beyond current enplanement levels. In a high growth scenario, approximately 255LF would be recommended.

3.6.3 Terminal Area Automobile Parking

Terminal area parking facilities include short-term and long-term parking for passengers, employee, staff and visitor parking, and car rental spaces. When possible, parking should be conveniently located and maximum walking distance to the terminal should be no more than 1,000 feet. **Table 3-28** summarizes parking needs for the preferred enplanement forecast scenario.

Table 3-28
Terminal Area Parking Requirements

	Existing	Recommended				
Enplanements	**65,752**	**65,752**	**88,979**	**104,285**	**139,141**	**200,000**
Year	**2002**	**2002**	**2007**	**2012**	**2022**	
AUTO PARKING						
Public Parking Spaces - Short* Term, Handicap	17	17	23	27	36	51
Public Parking Spaces - Long* Term, Handicap	146	143	193	226	300	433
Employee & Staff Parking	34	32	43	51	67	97
Rental Car Ready/Return Spaces	45	66	89	104	139	200
TSA Parking	7	12	16	19	25	36
Totals	**249**	**270**	**365**	**426**	**567**	**817**

Notes: All figures represent number of parking spaces.
*Existing peak month occupancy data plus 15% .

The 2002 short term and long term parking requirements were determined using existing use data of 85% daily average occupancy during its peak months of October through December, multiplied by a 15% factor to increase ease of finding a parking space. The recommended numbers of spaces are 17 and 143 respectively, which is almost equivalent to existing available spaces. Parking facilities are undersized and need immediate improvement as they are at capacity during peak months, and especially around holiday seasons when the overflow lot has to be utilized on a daily basis. Based on projected growth, a total of 300 short term and 36 long term spaces would be recommended in 2022. Should enplanements reach 200,000 passengers, the combined total would rise to 484 spaces.

The existing employee lot is located to the south of the terminal and has 34 spaces. Seven additional spaces are reserved for TSA employees. Based on the number of existing Airport, airline, tenant and TSA employees and staff, approximately 44 are recommended for 2002. The employee lot, which is currently 41 spaces, is short 3 spaces. Approximately triple the number of spaces will be recommended by 2022.

Rental ready/return lots are usually located near the baggage claim and rental auto concession (RAC) facilities. The existing lot has 45 spaces and is located north of the terminal. Existing spaces are split evenly among the three rental car companies. RAC operators indicated that double the number of spaces would be needed for future operations and the existing lot is undersized currently. Using 66 spaces as the base 2002 requirement, projections show a need for 89 in 2007, and 139 in 2022. If high growth enplanements of 200,000 passengers are achieved, an estimated 200 spaces are projected to be required.

Car Condos. Car condos are something that has become quite popular in the resort environment. Resort communities with large numbers of vacation homes and seasonal residents have people that store their vehicle for extended periods. Some of these people would like to have someplace where they could leave their car that would offer some protection and shelter as well as be conveniently located for them for when they travel to and from the community. Demand for these units can be substantial in some communities. Kalispell, Montana near Glacier Park for instance has over 112 car condo units, with more planned; Bozeman, Montana has over 200 units. Demand for car condo's at FMA is anticipated to come from both air carrier passengers as well as general aviation aircraft owners. One car condo vendor stated that they likely wouldn't have a problem leasing 200 to 300 units at FMA given the resort community environment.

The standard size of a car condo unit is 12 feet by 22 feet. The units are typically constructed in buildings that are double sided with 16 units per side, however they can be constructed single sided and with unique configurations if necessary. Buildings over a certain length require fire protection sprinklers. 28 feet is generally provided between the car condo buildings for access and maneuvering into and out of the units and the buildings require electricity and need to be within 300 feet of a fire hydrant.

This type of development will be considered, along with other facility needs, in Chapter Four, *Alternative Plan Concepts*.

3.7 Summary of Additional Required Facilities

This section presents a summary of the facilities identified for development or in need of additional study within the planning period.

- Based on the current airfield demand/capacity level (60%), the projected demand/capacity (80%), and the long lead times for planning such facilities, planning for additional aviation capacity for the Wood River Valley should commence in the immediate future.
- Alternatives for improving the taxiway system to reduce the likelihood for conflicting taxiway movements should be examined.
- An increase in the approach category of the critical/design aircraft is included within this Master Plan Update. Due to current and projected aircraft activity, the FAA Airport Reference Code at the Airport is now C-III rather than B-III. The most significant changes associated with a change in the ARC from B-III to C-III include an increase in the RSA dimensions, length of the runway OFA, the runway to taxiway separation, the runway to aircraft parking separation standard, and the RPZ dimensions.

- Runway length does not meet FAA recommendations for the type of aircraft and loads currently using and projected to use the facility.
- Penetrations of FAR Part 77 surfaces must be removed or a determination of non-hazard request should be made with the FAA for those penetrations that are to remain.
- The TLS installed in 2003 has been found to be the best alternative for improved approach minimums at this time and the Airport should continue to push for type-certification from the FAA.
- A new ATCT should be constructed.
- Terminal building improvements are recommended.
- There is demand for additional aircraft apron space in the future and immediately for additional aircraft storage hangars.
- The current airport maintenance building and snow removal equipment (SRE) building is undersized.
- Where attainable a perimeter service road should be constructed.
- Additional terminal curbfront and terminal area parking is recommended.

Ideas and recommendations for improving the Airport and to meet the facility requirements or current FAA design standards will be explored in the next phase of the study, which will ultimately be documented in Chapter 4, *Alternative Plan Concepts*. Given the natural and physical constraints of the current airport site, it is possible that all facility needs may not be met.

Chapter Four
Alternative Plan Concepts

A primary focus of the Friedman Memorial Airport Master Plan Update is to identify and evaluate airport development alternatives that satisfy existing aviation demand, accommodate future aviation-related demand, responds to Airport and community needs, and maximizes revenue-generating opportunities while effectively remaining a good neighbor to adjacent communities. To satisfy those needs, alternative plan concepts were developed which attempt to accommodate current and future demands while complying with airfield safety requirements identified in Chapter Three, *Demand Capacity Analysis and Determination of Facility Requirements*. Alternative development plans were evaluated using operational, environmental, economic, public input, and other criterion. The process of developing alternatives was an iterative process that resulted in substantial coordination amongst the consultant team, the Airport Board, Airport management, the Federal Aviation Administration (FAA) and the general public.

This chapter of the Master Plan Update is organize to first present the recommended plan, and then to present the alternatives themselves and the factors that effected the evaluation. The majority of the various facility and safety improvement alternative exhibits are presented in **Appendix D.** This chapter is organized based on the following major sections:

4.1 Recommended Airport Improvement Plan
4.2 Alternative Plan Concepts
4.3 Alternatives Coordination/Evaluation Process Milestones

4.1 Recommended Airport Improvement Plan

A series of alternative plans were developed which depict improvements required to meet safety standards associated with existing aircraft operations and improvements recommended to meet the projected demand at the Airport. Some facility improvements can be accommodated on the Airport; however, seriously needed safety improvements require major reconfiguration of the airfield and/or building areas. This reconfiguration requires the Airport to expand beyond it's current boundaries. The alternatives considered are documented and explored later in this chapter.

Following presentation and evaluation of the Alternative Plan Concepts, it became clear to the Airport Board that substantial improvements at the existing site were required to meet Airport Reference Code (ARC) C-III standards defined by existing aircraft operations (Q400). Implementation of the required improvements depicted in the alternatives is very costly, will have significant adverse impacts to the community, and would not offer any long-term solutions. The Board concluded that the alternatives presented to meet demands at the existing airport site were not desirable and in fact unacceptable to many in terms of the impact and disruption the improvements would have on the community and the fact that the improvements could not resolve all issues related to safety (e.g., FAR Part 77 terrain obstacles) and air service reliability at this site. Following debate among the Airport Board members and input from the public-at-large, the Board voted unanimously to include analysis of a new airport at another location in the list of alternatives. This option appears desirable as the best long-term solution for aviation safety and for meeting the air transportation needs of the Wood River Region. The Board also recognizes that the process of alternative site evaluation is lengthy and that it could take as long as 10 years to implement a new airport at a new site. In the interim the Board recognizes the importance of continued improvement of safety and air service at the existing site.

Interim improvements programmed for implementation in the near term (less than 10 years) at Friedman Memorial Airport are shown in **Exhibit 4-1**, *Recommended Airport Improvements* and **Exhibit 4-2** *Recommended Improvements Terminal Area.* The improvements are summarized as follows:

- Specific RSA improvements include:
  - Sterilize Taxiway B during times that C-III operations by scheduled airlines are conducted
  - Add 200 feet of pavement to the south end of the runway on existing airport property and move the north threshold nearly the same amount to optimize physical RSA compliance on the north end
  - improve grading laterally and south of the runway to meet RSA grading criteria to the maximum extent feasible
  - Construct an EMAS (engineered materials arresting system) barrier on the north end of the runway to offset the lack of the desired physical safety area.
  - Establish declared distances for the airfield which increase the takeoff distance available from 6,952 feet to 7,152 feet.
- Other Interim airfield improvements include:
  - Pursue removal of tree obstacles located south of the runway
  - Relocate buildings currently in RSA/OFA (airport traffic control tower, FBO) as planned
  - Relocate Taxiway A, as shown on the current ALP
  - Expand aircraft parking apron north of the terminal
- Terminal area improvements:
  - Expand terminal building and reorganize security space/functions to meet 10-year demands
  - Improve airport entrance road to route traffic through Airport West and across terminal curbfront as depicted in the current ALP
  - Improve public auto parking to accommodate 424 spaces
  - Improve rental car service/storage area to accommodate rental car concessions
- General aviation improvements:
  - Relocate FBO to south FBO site, as currently planned
  - Allow for the development of conventional hangars in "infill" areas, as planned
  - Install a combination wash rack deicing pad located near the north end of airfield
  - Add long-term FBO auto parking

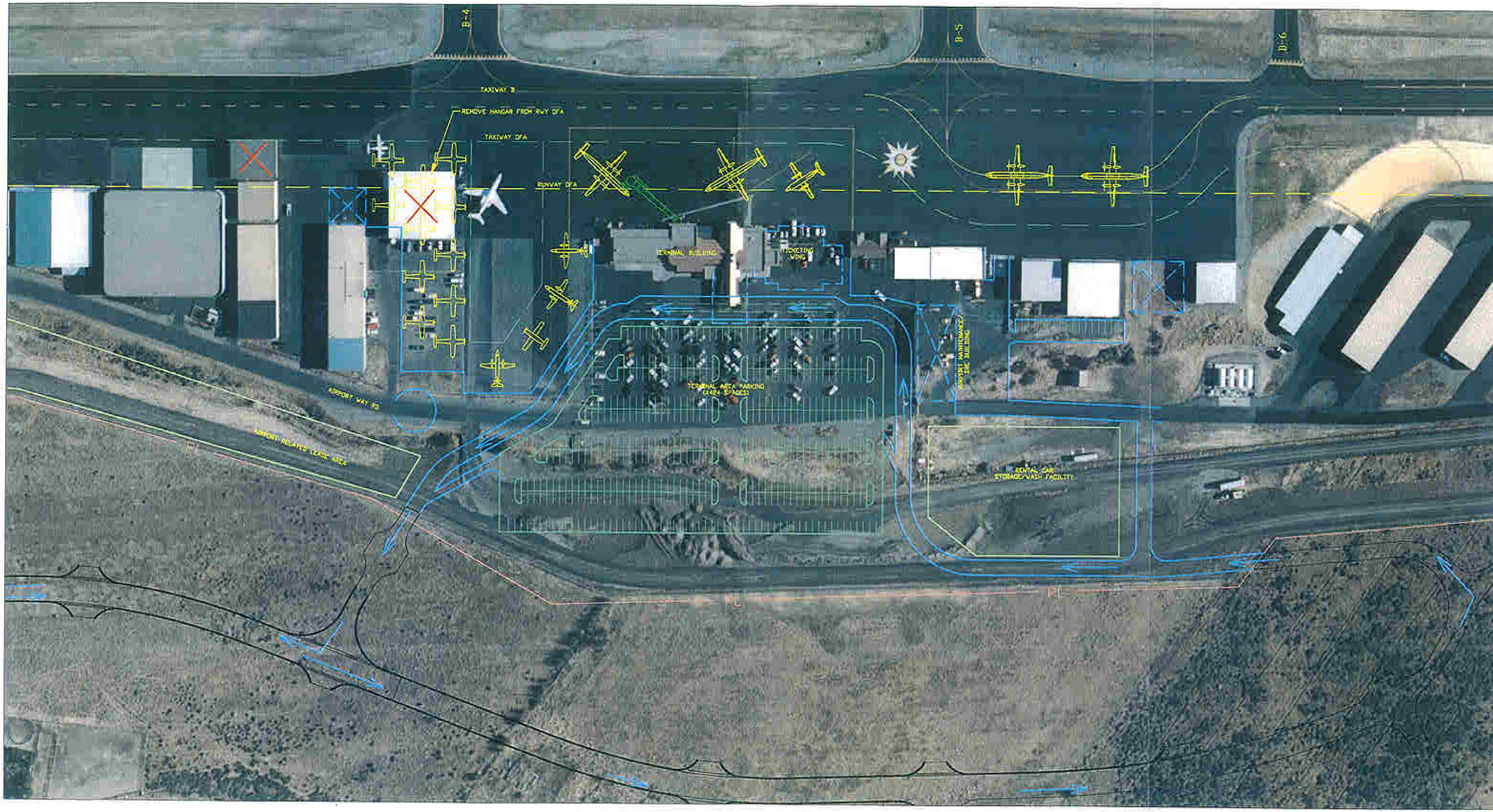
Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit 4-1

0 500 ft.

north

Recommended Airport Improvements



Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit 4-2

0 150 ft. north

Recommended Improvements
Terminal Area

- Other facility improvements:
  - Dedicate staging area for Forest Service helicopters at north end of airfield
  - Dedicate staging area for BLM tankers and cargo aircraft in new apron north of terminal
  - Add 10,000 SF airport maintenance/snow removal equipment building
  - Provide AWOS IIIP, as currently planned
  - Acquire additional snow removal and runway deicing equipment

4.2 Alternative Plan Concepts

This section presents the alternative plan concepts for various possible facility improvements developed for Board evaluation, public presentation, and public comment. The process of developing and evaluating the alternatives was an iterative one. The concepts were developed for evaluation and public review and comment prior to the development of facility recommendations.

This section describes the alternative plan concepts which address each of the Airport's functional facilities and key safety standard compliance issues. The section is organized as follows:

- Airfield Facilities
- Terminal Building and Terminal Area
- Support Facilities
- Aircraft Storage Hangars
- Other Facilities
- Full Demand Accommodation and Costs
- Summary of Initial Presentation of the Alternative Plan Concepts

It is significant to note that the facility improvement alternatives were developed independent of each other; therefore, there are areas of overlap. These component alternatives were refined as the process moved forward with the end result being development of a composite plan.

4.2.1 Airfield Facilities

The airfield includes the runway and taxiway system. The projected demand levels and the characteristics of that demand, in terms of requirements and design standards were evaluated in Chapter Three, *Demand/Capacity Analysis and Determination of Facility Requirements*. The following subsections present alternative improvement concepts for the Airfield system. Appendix D contains each of the Alternative Plan Concept exhibits.

4.2.1a Airfield (Runway length and runway end safety area, object free area)

Exhibits D-1 through D-7 depict various improvement alternatives for meeting the recommended runway length (7400 feet) and improving the runway safety area and runway object free areas to meet FAA design standards for design Group C-III aircraft off the end of the runways. Each exhibit depicts, describes, and evaluates with a list of Pros and Cons, each alternative. The change in FAA Aircraft Approach Category from "B" to "C" increases the runway safety area dimensions beyond the runway end from a required 300 foot width by 600 foot length to a 500 foot width by 1000 foot length. It should be noted that the alternatives described below address the issue of *length only* and do not imply compliance with FAA standards for safety area *lateral* to the runway. The following alternatives depict various runway lengths and levels of compliance with FAA design standards.

- **Exhibit D-1** depicts Runway Length Alternative 1. The alternative involves revising the declared distances at the Airport so the end of the new FAA Approach Category C-III Runway Protection Zones (RPZ) remain largely on airport and do not extend any further off the Airport than the current FAA Approach Category B-III RPZs. This alternative reduces the Runway 31 Landing Distance Available (LDA) from 6602 feet to 5332 feet. A reduction in landing length, particularly one of this magnitude, is considered a severe adverse impact and restriction of the current commercial service at the Airport.
- **Exhibit D-2** presents Runway Length Alternative 2A. This alternative revises the declared distances to provide full RSA on the north end and maintains the Runway 31 Departure RPZ largely on airport property. This alternative reduces the Runway 31 LDA from 6602 feet to 6033 feet. As noted above any reduction in landing length severely impacts and restricts the current commercial service at the Airport. This alternative would also require acquisition of 16.4 acres of land to the south for additional RPZ.
- **Exhibit D-3** depicts Runway Length Alternative 2B. Alternative 2B is similar to Alternative 2A with the addition of extending the runway and safety area on the south end 200 feet which places the end of the required safety area on the Airport property line. This is done to minimize the amount of Runway LDA that is lost. The Runway 31 LDA is reduced from 6602 feet to 6233 feet. As previously stated, any reduction in Runway 31 landing length is considered an adverse impact and restriction to the current commercial service at the Airport.
- **Exhibit D-4** depicts Runway Length Alternative 3. This alternative depicts the relocation of the curve in State Highway 75 to outside of the RSA along with the 200-foot extension of the runway and safety area on the south end to place the end of the RSA on the south property line. The relocation of the curve in State Highway 75 at the north end of the Airport would reduce the design speed of State Highway 75 to approximately 30 mph and require at least 4.5 acres of property acquisition for the roadway relocation. Additionally this segment of highway is new as it was reconstructed in the summer of 2003.
- **Exhibit D-5** presents Runway Length Alternative 4. This alternative includes the installation of an engineered materials arresting system (EMAS) for Runway 31 aircraft overruns. This approach requires an RSA determination from the FAA Regional Airports District Manager that full safety area compliance is not practicable. EMAS is not a substitute for, nor equivalent to, any length or width of RSA, however it would provide an RSA improvement for Runway 31 overruns. This approach is now viewed favorably by the FAA.

- **Exhibit D-6** depicts Runway Length Alternative 5. Alternative 5 includes shifting Runway 13-31 569 feet south on its existing centerline to provide full safety area length on the north end clear of State Highway 75. This runway shift through the use of declared distances could increase the runway length for Runway 13 departures from 6952 feet to 7521 feet, meeting the recommended runway length of 7400 feet. It also maintains the current Runway 31 LDA at 6602 feet. Implementation would require property acquisition at the south end of the airport of at least 6.3 acres for RSA and OFA extension and 19.7 acres for RPZ.
- **Exhibit D-7** presents Runway Length Alternative 6. This alternative was developed as a response to comments received regarding balancing the RSA provided on both the north and south ends within the existing airport property line. It involves shifting the runway 385 feet south so that the RSA extends approximately 185 feet off of airport property on both the north and south ends. An RSA determination from the FAA Regional Airports District Manager that full safety area compliance is not practicable would be required.

4.2.1b Airfield (lateral runway safety area and object free area issues)

Exhibits D-8 through D-11 depicts various improvement alternatives for improving the runway to taxiway separation and lateral RSA grading to meet FAA design standards. Each exhibit depicts, describes and evaluates with a list of Pros and Cons, each alternative.

The increase in FAA Airport Approach Category from "B" to "C" increases the required runway safety area dimensions from a 300 foot width to a 500 foot width. FAA Airport Design standards require a runway to taxiway centerline separation of at least 297.5 feet for the critical/design aircraft (Q400). This width exceeds the 250 feet currently associated with Taxiway B on the west side and the 160 feet to 250 feet provided by Taxiway A on the east side. Completion of currently planned improvements will remove the northerly portion of Taxiway A and relocate the remaining southerly portion to a 250 foot separation. This separation is consistent with the previous design aircraft the Dash 8-200. FAA Airport Design standards also require a runway object free area of 800 feet in width or 400 feet from the runway centerline. Along the east side of the airport the existing perimeter fence, located on the right-of-way of State Highway 75 is only 323 feet from the runway centerline. Given the current site constraints, meeting full facility requirements laterally at the Airport requires substantial improvements and associated off-airport impacts. It should be noted that these alternatives address the issue of lateral requirements only and do not imply compliance with FAA standards length-wise off of the end of the runway. Full compliance for the runway requires the selection of *both* a runway length and lateral improvement alternative. While individual alternatives to comply with either the lateral or off-the-end requirements may appear feasible, it is the requirement to comply with both concurrently that demonstrates the limitations of the existing site. The following exhibits depict various lateral runway/taxiway improvement alternatives.

- **Exhibit D-8** depicts Lateral Runway/Taxiway Alternative A1. Alternative A1 includes shifting the runway 50 feet east to provide 300 feet separation to Taxiway B on the west side. All facilities on the east side are to be removed. State Highway 75 now becomes a greater penetration to the Runway 13-31 OFA and FAR Part 77 surfaces.

- **Exhibit D-9** depicts Lateral Runway/Taxiway Alternative A2. This alternative is similar to A1 with the primary exception being that it also includes the relocation of State Highway 75 127 feet east where it is outside the Runway OFA.
- **Exhibit D-10** presents Lateral Runway/Taxiway Alternative B. Alternative B maintains the current runway centerline and depicts the relocation of Taxiway B 50 feet to the west to provide 300 foot separation between the runway and taxiway. Relocating Taxiway B 50 feet west would eliminate virtually all aircraft parking in front of the terminal building; as well as two recently constructed hold aprons on Taxiway B. It would also require the removal or shortening of some hangar facilities.
- **Exhibit D-11** describes Lateral Runway/Taxiway Alternative C. This alternative maintains State Highway 75 in its current location and shifts Runway 13-31 and Taxiway B west to provide adequate runway OFA and runway to taxiway separation. This alternative eliminates all aircraft parking in front of the terminal building, the hold aprons on Taxiway B, substantial amounts of aircraft apron area, and numerous aircraft hangars.

4.2.2 Terminal Building and Terminal Area

Various terminal building and terminal area improvement plans were developed. Alternative 1 options are presented as "renovation" or expansion of the existing terminal building. These alternatives all maintain the current terminal apron which includes the parking of aircraft within the Runway 13-31 OFA. The following exhibits depict the various Alternative 1 options for expansion and improvement of the existing terminal facilities.

Alternative 1 options are "renovation" concepts

- **Exhibit D-12** Terminal Area Improvement Alternative 1A
- **Exhibit D-13** Terminal Area Improvement Alternative 1B
- **Exhibit D-14** Terminal Building Alternative 1A (2 Level Expansion Option)
- **Exhibit D-15** Terminal Building Alternative 1B (1 Level Expansion Option)

Alternative 2 options are presented as "new build" concepts and include the construction of a complete new terminal building located with greater separation from the Runway 13-31 centerline so that aircraft parked on the terminal apron are clear of the runway OFA. The following exhibits depict the various Alternative 2 options for expansion and improvement of the existing terminal facilities.

Alternative 2 is a "new build" concept

- **Exhibit D-16** Terminal Area Improvement Alternative 2
- **Exhibit D-17** Terminal Building Rendering Alternative 2

Alternatives which focus on renovations enhancing existing security and capacity for the near term air service demand are considered appropriate in light of the potential of a new airport being developed as the long term solution to demand.

4.2.3 Support Facilities

Ancillary facility requirements needed to support the operation of the Airport were also identified in Chapter Three, *Demand Capacity Analysis and Determination of Facility Requirements*. The following exhibits present facility development alternatives for the accommodation of those facilities identified.

- **Exhibit D-18** Air Cargo Alternatives
- **Exhibit D-19** Deicing Pad/Wash Rack Alternatives

4.2.4 Aircraft Storage Hangars

By 2022 additional aircraft storage hangar demand is projected to exceed 110,000 SF. The following exhibits depict aircraft storage hangar development alternatives. Construction of all of the alternatives depicted totals 81,850 SF, which falls short of the 2022 projected hangar demand. Alternatives which provide hangar capacity meeting the full demand projection require property acquisition and are not deemed feasible at this time.

- **Exhibit D-20** Alternatives 1 thru 3
- **Exhibit D-21** Alternatives 4 and 5

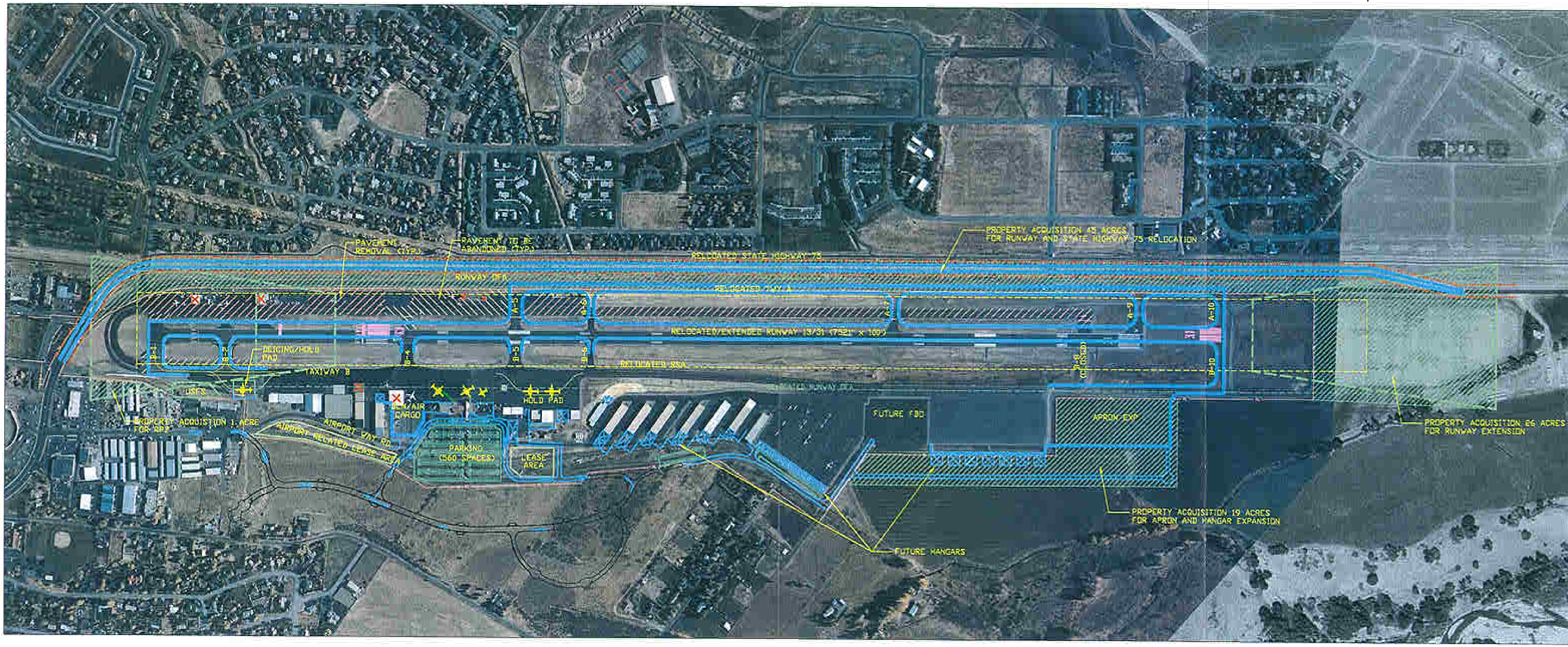
4.2.5 Other Facilities

Other facilities to support the operation of the Airport were also identified in Chapter Three, *Demand Capacity Analysis and Determination of Facility Requirements*. The following exhibit presents facility development alternatives for the accommodation of airport maintenance and SRE building alternatives.

- **Exhibit D-22** Airport Maintenance and SRE Building Alternatives

4.2.6 Full Demand Accommodation and Costs

Exhibit 4-3 depicts the combined airfield improvements required to achieve *both* off-the-end and lateral RSA and OFA standards for design group C-III at the existing airport site along with improvements to accommodate the majority of the aviation demand projected for 2020. Cost estimates were prepared for the major capital improvement items required to achieve C-III RSA and OFA at the existing airport site. These cost estimates can be found in Appendix E. Major items are: Relocate Runway 13-31 50' east of existing centerline and extend runway to 7,400 feet; expand the heavy aircraft apron; relocate/construct a partial parallel Taxiway A at a 300-foot separation; and relocate Highway 75 approximately 130 feet to the



Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit 4-3

0 700 ft. north

Airport Improvements Required for Full 2020 Demand Accommodation

east; and acquire the additional land needed to accomplish the improvements. **Table 4-1** summarizes the costs associated with these projects.

Table 4-1

Major Capital Improvement Costs

Project	Estimated Cost
Relocate Runway 13-31, (50' east)	$7,400,000
Heavy Aircraft Apron Expansion	$4,600,000
Relocate Taxiway A, (300' separation)	$3,600,000
Relocate State Highway 75 (130' east)	$6,000,000
Land Acquisition (3.1 acres - Light Industrial)	$700,000
Land Acquisition (41.9 acres - Agricultural)	$1,300,000
Land Acquisition (Highway 75 ROW)	?
Relocate Pedestrian/Bike Path	?
	$23,600,000
EIS at this site	$1,500,000
	$25,100,000
New Terminal	$9,000,000
Other Improvements	$5,000,000
	$39,100,000

Note: Does not include indirect costs associated with Airfield closure, Highway 75 traffic disruption, Highway 75 EIS, community disruption (noise, dust, materials hauling, etc.)

Source: Toothman-Orton Engineering Company
Mead & Hunt, Inc.

As shown in the table above direct major capital improvement costs required to achieve C-III design standards at the Airport will total in excess of $40 million.

4.2.7 Summary of Initial Presentation of the Alternative Plan Concepts

After presentation of the Alternative Plan Concepts, particularly the airfield alternative plans, it became clear to the Airport Board that substantial improvements, costs, and impacts are required to meet ADG C-III standards at the existing site. Implementing these improvements would create significant disruption to the surrounding community and others. Therefore, the Airport Board directed the consultant team to include an additional alternative; study of a new airport, as a final means to provide compliance with FAA design standards and to meet the current and long-term aviation needs of the community. A summary of the evaluation and public coordination process associated with the development of the recommended airport improvement plans is presented in the following sections.

4.3 Alternatives Coordination/Evaluation Process Milestones

The following paragraphs summarize the significant events of the recommended plan evaluation and coordination process.

August 12, 2003 Alternative Plan Concepts Airport Board Presentation

The Alternative Plan Concepts presented in Section 4.1 of this Chapter were presented to the Airport Board. These alternatives were designed to meet C-III design standards and other components of demand at the current site. At that meeting, the Board directed the consultant team to include the alternative of a new airport as a way to meet current and long-term aviation needs of the Wood River Valley. The Board made it very clear that the alternatives presented to meet demands at the existing airport site were not very desirable, both in terms of the impact and disruption the improvements would have on the community, as well as the fact that the improvements would not adequately resolve all issues related to safety (e.g., FAR Part 77 terrain obstacles) and air service reliability. The Board also recognized that the community has little control over the types of airplanes that operate at the Airport, and that what little control exists is eroding. The Board believed there was strong justification for considering a new airport as an alternative way to meet C-III design standards and other existing and projected safety and user needs. Because of the seriousness of this potential alternative, the Board scheduled a series of public meetings so that the concerns of the community could be heard.

August 26, 2003 Public Information Workshop

This workshop was advertised in the local paper and approximately 30 people attended. All of the proposed improvement alternatives were presented at that workshop, including the concept of resolving the existing and long-term issues at a new airport site. The general response from the public was in support of the concept of building a new airport as the best solution to meeting existing and projected demands. Numerous written comment forms were also completed that reflect this opinion. One of the major questions that was asked, however, related to the disposition of the existing airport if a new one were to be built. At that point in time, the public was advised that issue would be studied as a part of the site selection and feasibility study process. In discussing the concept of a new airport, a timeframe of approximately 10 years was established. The Board concluded interim improvements which target safety and air service would still need to be programmed and implemented at the existing airport until a new airport could be completed.

September 4, 2003 Airport Board Meeting

The consultant team was directed by the Airport Board to present facility improvement recommendations, but that no action would be taken. The consultant recommended airport improvement plan, which was presented to the Board in detail, is summarized in Section 4.1 at the beginning of this Chapter and depicted on **Exhibits 4a** and **4b**.

The Board opened discussion of the recommended plan to the members of the public that were present. Many in attendance expressed support for building a new airport, but also indicated that a logical question for further analysis would relate to the disposition of the current airport.

September 24, 2003 Public Hearing
This hearing included a presentation of the consultant's recommended airport improvement plan, as well as the alternative of meeting existing and projected needs at the current airport site. Approximately 60 people were in attendance, including the local press. Public testimony was then given by many of the people present. The overwhelming majority of the public comments indicated strong support for building a new airport.

The public was told that additional written comments would be accepted as part of the public record until October 1, 2003. Public comment would be considered by the Airport Board as it deliberated on the subject at its' regular October 7, 2003 meeting. Of the 30 written comments submitted by the public to the Airport Board, 26 indicated support for a new airport, one did not support building a new airport, and three were unclear as to the author's intentions.

October 7, 2003 Airport Board Meeting
The Airport Board deliberated on alternatives to improve aviation safety and meet the existing and projected aviation needs of the Wood River Valley. Four out of five Board members were present. Those present discussed the technical issues and the public comments related to the alternative ways to proceed. The Board voted "to accept the consultant's recommendation to pursue an alternative airport location to meet the long-term traffic demands. The existing Friedman Memorial Airport will continue to function and improvements shall be made so the Airport will be as safe as possible until such time as the new airport is operational."

The Airport Board also instructed the consultant team and the Airport Manager to meet with the FAA prior to the scheduled November 4, 2003 Airport board meeting to work out the details of an interim capital improvement program and to discuss and define the planning process for a new airport site selection study.

October 28, 2003 FAA-ADO Master Plan Update Project Coordination Meeting
This meeting was held in the offices of the FAA Airports District Office (ADO) in Seattle, WA on October 28, 2003. Present at the meeting were: Mary Ann Mix (Chairperson – Airport Board), Rick Baird (Airport Manager), Lowell Johnson (FAA), Wade Bryant (FAA), Bill Watson (FAA), Don Larson (FAA), Sandy Simmons (FAA), Chuck Sundby (Toothman-Orton Engineering Company), and Tom Schnetzer (Mead & Hunt). The agenda included the following broad topics which were discussed in detail at the meeting:

- Planning for a new airport to serve Blaine and surrounding counties.
- Refining interim improvement plan for FMA until new airport becomes operational.

A PowerPoint presentation of the Master Plan Update (the same presentation given at the September 24, 2003 Public Hearing), was given to those present to review the project from its start to the current status. The group began discussions at the end of the presentation on both of the primary agenda topics. Major discussion points are documented below.

New Airport Recommendation:

- General consensus is that a new airport is the best long-term solution for aviation safety and for meeting the air transportation needs of the Wood River Valley and surrounding communities.
- FAA remarks included references to the myriad challenges the Airport Board would encounter in pursuing a new airport, including: land acquisition, political forces, financing issues, and environmental issues related to a new site. FAA staff mentioned several airports that have attempted to build a new airport without success; although it was acknowledged that the examples are not comparable to the situation at FMA and in most cases the airport sponsor's lack of resolve to face the difficult challenges was a major factor leading to the failure of those projects.
- Disposition of the current airport is agreed to be as important an issue as building a new airport at another site.
- Airport and consultants agreed that the above issues would be addressed in the various feasibility studies that will be planned/scoped.
- FAA has listed projects in the Airport's current CIP to include: site selection/feasibility, master planning, and environmental assessment.
- Site selection/feasibility studies should include the finalist sites from the 1990 Coffman study and additional sites that are reasonable to include. The previous study is viewed as a starting point for the new planning studies and analyses the Board intends to undertake at this time. The new planning studies will represent an independent feasibility analysis that will include, among other items, significant study of Federal Aviation Regulations (FAR) Part 77 issues so that it can be determined that the preferred site can support establishment of precision instrument approach procedures.
- Wind data should be collected for one year for the finalist or candidate site(s).
- Financial feasibility study is considered critical to the site selection process and should be adequately detailed.
- Environmental baseline study should be adequately detailed to conduct a thorough review of environmental impact categories, with a focus on project-stopper issues.

Interim Improvements to Friedman Memorial Airport:

- Interim improvements to FMA were discussed in terms of a 10-year time frame.
- Both safety and capacity improvements would continue to be made at FMA so that it could continue to function at the highest levels.
- Specific RSA improvements discussed include: sterilize Taxiway B during times that C-III operations by scheduled airlines are conducted; add 200 feet of pavement to the south end of the runway on existing airport property and move the north threshold the same amount to achieve greater RSA compliance on the north end; improve grading laterally and south of the runway to meet RSA grading criteria; explore EMAS (engineered materials arresting system) as a potential improvement on the north end of the runway.

- With the above improvement plan, the FAA indicated it could make a determination that the RSA's possess on equivalent level of safety relative to FAA design standards.
- The FAA agreed that, as part of the overall improvement plan, improvements to the Runway Safety Area could be accomplished without acquiring additional land.

Chapter Five
Capital Improvement Plan

This chapter of the Friedman Memorial Airport Master Plan Update documents the Capital Improvement Plan (CIP) for the Airport. The Friedman Memorial Airport Board has determined through the Master Plan process that it must thoroughly evaluate the alternative of meeting existing and projected aviation demand for the region at another location. A 10-year timeframe has been assumed for the study implementation, design and partial construction of a long term solution to existing and future service needs, herein referred to as the "preferred airport alternative."

Improvements recommended for the Airport for the next 10 years are classified in two general development phases. These phases are referred to as Near-term Improvements at FMA for 2004-2008 and Implementation Steps of Preferred Airport Alternative. Particular focus is given to detailing the near-term (2004-2008) improvement projects. The CIP does not address potential projects beyond a ten (10) year horizon nor provide significant project detail past 2008 due to the uncertainties associated with airport long range planning efforts.

The following sections are included in this chapter of the Friedman Memorial Airport Master Plan Update:

5.1 Capital Improvement Plan – Near-term Improvements at FMA (2004-2008)
5.2 Near-Term Improvement Project Descriptions
5.3 Implementation Steps of Preferred Airport Alternative
5.4 Potential Funding Sources

5.1 Capital Improvement Plan – Near-term Improvements at FMA (2004-2008)

Table 5-1 presents the Near-term Improvements at FMA and includes projects for years 2004 through 2008.

Anticipated funding sources evaluated include the FAA's Airport Improvement Program (entitlement and discretionary) and Airport funds. An anticipated amount from each source is assigned to the eligible projects listed by year. Using current year (2003) dollars, the total value of the Near-Term CIP is approximately $15.5 million, with $1.4 million anticipated to come from local funding sources. FAA/AIP participation is identified as 95% for the years 2004 through 2007, which is consistent with the newly authorized program (Vision 100 – Century of Aviation Reauthorization Act). Participation after 2007 returns to 90% since the current 95% is identified as "temporary" as suggested by the FAA.

5.2 Near-Term Improvement Project Descriptions

The sections describe each of the Near-Term Improvement Projects outlined in the CIP.

Table 5-1
Capital Improvement Program Summary
Friedman Memorial Airport

Year	Project	Total Cost	AIP Eligible	Funding Source 1/	Funding percent Federal	Funding percent Local	FAA Funds	Airport Funds
Near-term Improvements at FMA (2004-2008)								
2004	Airport Site Selection and Feasibility Study	$1,032,466	Yes	AIP	95%	5%	$980,843	$51,623
	Air Traffic Control Tower (ATCT) Relocation, Phase 1	$79,770	Yes	AIP	95%	5%	$75,782	$3,989
	Terminal Building Improvements, Phase 1	$262,343	Yes	AIP	95%	5%	$249,226	$13,117
	Expand Terminal Area Auto Parking, Phase 1	$300,000	No	FMAA	0%	100%	$0	$300,000
	Acquire Trailer Mounted De-Icing Equipment	$53,500	Yes	AIP	95%	5%	$50,825	$2,675
	Total 2004	**$1,728,079**					**$1,356,675**	**$371,404**
2005	Terminal Building Improvements, Phase 2	$847,000	Yes	AIP	95%	5%	$804,650	$42,350
	Safety Area Grading and Runway Shift	$500,000	Yes	AIP	95%	5%	$475,000	$25,000
	Install EMAS on Runway 13	$3,000,000	Yes	AIP	95%	5%	$2,850,000	$150,000
	Expand Terminal Area Auto Parking, Phase 2	$200,000	No	FMAA	0%	100%	$0	$200,000
	SRE/Maintenance Vehicle Building	$150,000	Yes	AIP	95%	5%	$142,500	$7,500
	Total 2005	**$4,697,000**					**$4,272,150**	**$424,850**
2006	Air Traffic Control Tower Improvements, Phase 2	$652,632	Yes	AIP	95%	5%	$620,000	$32,632
	Airport Master Plan Preferred Airport Alternative	$400,000	Yes	AIP	95%	5%	$380,000	$20,000
	Total 2006	**$1,052,632**					**$1,000,000**	**$52,632**
2007	EA (Pre-EIS) Preferred Airport Alternative	$900,000	Yes	AIP	95%	5%	$855,000	$45,000
	Acquire Snow Removal Equipment	$500,000	Yes	AIP	95%	5%	$475,000	$25,000
	Replace Runway 13-31 Porous Friction Course	$3,500,000	Yes	AIP	95%	5%	$3,325,000	$175,000
	Total 2007	**$4,900,000**					**$4,655,000**	**$245,000**
2008	North Terminal Apron Expansion	$300,000	Yes	AIP	90%	10%	$270,000	$30,000
	EIS Preferred Airport Alternative	$800,000 [2]	Yes	AIP	90%	10%	$720,000	$80,000
	Relocate South Parallel Taxiway, Phase 2	$2,000,000	Yes	AIP	90%	10%	$1,800,000	$200,000
	Construct De-Icing/Wash Facility at North Hold Apron	$50,000	Yes	AIP	90%	10%	$45,000	$5,000
	Total 2008	**$3,150,000**					**$2,835,000**	**$315,000**
	Subtotal Near-Term Improvements (2004-2008)	**$15,527,711**					**$14,118,825**	**$1,408,886**

Major Potential Costs, Preferred Airport Alternative	Cost range [2]		AIP Eligible?
Acquire Land, Preferred Airport Alternative	$2,000,000 -	$5,000,000	Yes
Design of Preferred Airport Alternative	$5,000,000 -	$10,000,000	Yes
Construct Preferred Airport Alternative	$60,000,000 -	$80,000,000	Yes
Total	**$67,000,000**	**$95,000,000**	

Notes: All costs in current (2003) dollars
This Capital Improvement Plan is subject to revision and is to be updated periodically by the Airport.
1/ Airport Improvement Program (AIP) funding references entitlement or discretionary funds.
2/ Costs are unknown at this time and are listed for Order of Magnitude purposes only. Actual project costs dependent upon the Preferred Airport Alternative.
Sources: Toothman-Orton Engineering Company, Mead & Hunt, Inc.
Prepared: May 28, 2004

5.2.1 Airport Site Selection and Feasibility Study (2004)

The Airport Site Selection and Feasibility Study is the initial major planning effort to complete as part of the evaluation of the ultimate solution to existing and long term aviation needs for the Wood River Region. The Study also includes analysis of the future use of Friedman Memorial Airport and a comparison of the "best" alternative location to the existing site. The Site Selection Study is to focus on the feasibility of siting and developing an airport which conforms to FAA safety standards associated with existing users as well as providing the ability to accommodate future demands.

5.2.2 Airport Traffic Control Tower Relocation (2004 & 2006)

The Airport Traffic Control Tower (ATCT) is located on the east side of the airfield, across from the passenger terminal building. The visual coverage for the existing airfield is adequate; however, the tower is located within the Runway Object Free Area and is a FAR Part 77 penetration. The age, physical condition, and space constraints of the building are of concern, and the structure is inadequate based on FAA standards. This project includes the construction of a new ATCT and the removal of the existing ATCT. The initial phase of the project to be accomplished in 2004 is an alternative location analysis and a concept design and budget report.

5.2.3 Terminal Building Improvements (2004 & 2005)

This project involves the expansion of the existing passenger terminal building. The existing Friedman Memorial Airport passenger terminal building is a one-story high building located approximately midway along the west side of Runway 13/31. The terminal building has a total existing gross square footage of 14,318 SF; however, it is presently undersized. Industry standards indicate that a terminal of approximately 20,500 SF would be more appropriate for current and near-term passenger demand levels. One of the primary drivers of this need is the security screening function imposed on passengers and their luggage after September 11, 2001. As a result, additional square footage is presently recommended in certain areas where facilities are inadequate for efficient operations.

Terminal improvements are to be coordinated with access and parking lot improvements described as separate projects. Significant changes to the terminal curbfront and traffic flow are planned to alleviate existing flow problems and provide expanded curbfront capacity and functionality.

Proposed improvements will attempt to accommodate demands for up to the ten (10) year horizon. Following this time period it is expected that a complete new terminal facility will be required at either the existing airport location or a new location.

5.2.4 Acquire Trailer Mounted De-Icing Equipment (2004)

This project involves the acquisition of trailer mounted de-icing equipment to increase the deicing capability of the Airport. Larger equipment than the small pickup truck bed unit is needed to accommodate deicing of the Runway 13-31. The high percentage of private jet aircraft using the airport and the approach speed C air carrier aircraft require improved deicing capability.

5.2.5 Replace Runway 13-31 Porous Friction Course (2005)

The current Runway 13-31 Porous Friction Course (PFC) placed in 1997 is starting to deteriorate and will soon be in need of replacement. In order to maintain the safety of this runway, it is proposed to replace this PFC with a new PFC surface course. This will require milling off the existing PFC and the 2 inch thick asphalt concrete surface placed in 1983, which is of questionable integrity, underneath the PFC. Once removed a new 2-inch layer of dense graded asphalt concrete followed by a new PFC surface course will be placed. Work may also include installation of pavement edge drains to control moisture content in the pavement section.

Due to the uncertain nature of the long term solution to aviation needs, it is not considered a wise investment to do any more than maintain existing runway service capacity at this time. This PFC replacement is considered needed maintenance to preserve the capability of the existing facility, no more.

5.2.6 Runway Edge Lighting Modification (2005)

The current runway edge lights are of twelve (12) inch height and located two (2) feet outside of the edge of the runway pavement. The short height coupled with the location near the pavement results in significant added work effort and hence cost for snow removal. This situation can be improved by moving the lights to a ten (10) foot offset. This location will permit replacement of the twelve (12) inch tall lights with twenty-four (24) inch tall lights. This revision will result in significant savings in operational costs and time required to clear the runway and the frequency of clearing the lights hence improving safety.

The improvement can be accomplished by offsetting each lot in lieu of replacing the entire ducted underground lighting circuit. This work would be completed concurrent with the PFC replacement project described in Item 5.2.5.

5.2.7 Expand Terminal Area Auto Parking and Access (2004 & 2005)

The Airport currently has 249 parking spaces in the terminal area. These facilities are currently undersized and need immediate improvement as they are at capacity during peak months, and especially around holiday seasons when the overflow lot has to be utilized on a daily basis. Current parking needs total 270 spaces with the parking demand projected to reach 365 by 2007. This project involves the expansion of the current parking facilities and a reconfiguration of the terminal entrance road. This improvement effort must be coordinated with and completed in consort with Item 5.2.3 above.

5.2.8 Snow Removal Equipment/Maintenance Building (2005)

Snow removal equipment and other miscellaneous maintenance equipment are housed in a portion of the ARFF building and in the Snow Removal/Maintenance Equipment Building just west of the ARFF building. The Snow Removal/Maintenance Equipment Building occupies approximately 3,185 square feet. Currently, not all snow removal equipment can be housed in existing facilities. Additional facilities are necessary for accommodation of all snow removal and maintenance equipment. An airport maintenance, storage, and snow removal equipment building is necessary to protect the airport's investment in snow and ice control equipment, as well as in stored ice control materials, and it will support safe all-weather aircraft operations. A feasibility study will be completed to determine whether the Sun Valley Aviation maintenance hangar, which the Airport will take over in July 2005, can be cost effectively modified for re-use in this capacity or if a complete new building is needed. The alternative under consideration is removal of the portion of the building currently in the runway OFA. If this conversion can be accomplished cost effectively the remaining portion of the building outside the OFA can be reused. Approximately 30 feet of building must be removed leaving approximately a 70' x 100' structure or 7,000 square feet.

5.2.9 Safety Area Grading and Runway Shift (2006)

Through the Master Plan Update process it became clear to the Airport Board that substantial improvements at the existing site were required to meet Airport Reference Code (ARC) C-III standards defined by *existing aircraft operations* (Q400). Implementation of the required improvements depicted in the alternatives is very costly, will have significant impacts to the community, and will not offer any final, long-term solutions. The Board concluded that the alternatives presented to meet demands at the existing airport site were not desirable and in fact unacceptable to many in terms of the impacts and disruption the improvements would have on the community. Additionally, in spite of the significant cost and disruption, the improvements could not resolve all issues related to safety (e.g., FAR Part 77 terrain obstacles) and air service reliability at this site and would also not limit the potential, if not inevitable, design standard creep associated with the ever growing and expanding private jet fleet and expanding role of fractional ownership and their use of larger, faster jet aircraft. Since FAA policy does not permit access limitations based on compliance with design guidelines there is no apparent end to the potential for modifications due to expanding, legal usage.

Until such point as the decision process is completed and until a new airport can be constructed to achieve FAA airport design standards interim Runway Safety Area (RSA) improvements, both laterally and on the runway ends, are recommended. Specific RSA improvements included in this project include:

- Add 200 feet of pavement to the south end of the runway on existing airport property and move the north threshold nearly the same amount to optimize physical RSA compliance on the north end.
- Improving grading laterally and south of the runway to meet RSA grading criteria to the maximum extent feasible. Grading will also improve lateral drainage from the runway pavement.

5.2.10 Relocate South Parallel Taxiway, Phase 2 (2006)

The east side parallel taxiway (Taxiway A) currently has a centerline separation of only 185 feet or less from the Runway 13-31 centerline. This places aircraft wingtips within the Runway 13-31 Obstacle Free Zone (OFZ) which does not meet design standards. The problem was identified in the prior master plan update. The north half of the taxiway is be removed as part of a separate project. This project includes the relocation of the south half of Taxiway A to 250 feet from the Runway centerline. This clears the

Runway OFZ of the critical aircraft wingtips. The project includes the removal of the existing south half of Taxiway A and the construction of a new taxiway with a 250-foot centerline separation with the Runway. A segment of the taxiway, approximately 350 feet, has been completed at the south end of the airport. Implementation of this project will essentially complete the safety area and object free area clearing program recommended in the 1994 master plan.

5.2.11 Install EMAS System, Runway 13 (2007)

This project includes the installation of an Engineered Materials Arresting System (EMAS) to the north of Runway 13-31 for Runway 31 overruns. The FAA has recently adopted the position that interim Runway Safety Area (RSA) improvements can be achieved to an equivalent level of safety by installation of EMAS systems. It is reported that eleven (11) such systems are installed with an additional seven (7) systems pending. The installation of this system is costly and special operational procedures and equipment are also required. These costs must be carefully weighed against the recommendations of the site selection study and the timing of implementation of a preferred alternative.

5.2.12 Acquire Snow Removal Equipment (2007)

This project includes the acquisition of additional snow removal equipment, to replace dated primary equipment.

5.2.13 North Terminal Apron Expansion

The existing auto parking area located west of the Sun Valley maintenance hangar will be relocated. This area will be converted to use for aircraft associated with existing cargo fleet operations and Bureau of Land Management (BLM) aerial fire suppression aircraft. An additional apron area of approximately 19,200 square feet can be provided.

5.2.14 Construct De-Icing/Wash Facility at North Hold Apron (2008)

This project involves the construction of a de-icing and wash facility at the North Hold Apron. There is a need to collect/contain glycol during the deicing season. The North Hold Apron location provides the closest connection to the sanitary system for the collection and treatment of glycol. This location is also near the departure end for the vast majority of all departing aircraft operations. It is anticipated that facilities for aircraft washing can also be incorporated into this element.

5.3 Implementation Steps of Preferred Airport Alternative

Table 5-1 presents the implementation steps associated with the Preferred Airport Alternative. These projects cannot be accurately defined until more information is known regarding the Preferred Airport Alternative. Costs have been provided for order-of-magnitude reference only. It is assumed that the first steps will be completed or funded between 2004 and 2007 and therefore funded at 95% FAA/AIP participation. Subsequent elements are anticipated to occur after 2007 and are therefore funded at 90%

FAA/AIP participation. Participation after 2007 returns to 90% since the current 95% is identified as "temporary" as suggested by the FAA.

Using current year (2003) dollars, the total order-of-magnitude estimate associated with the Implementation Steps of Preferred Airport Alternative is approximately $88 million, with $8.5 million anticipated to come from local funding sources.

5.3.1 Airport Master Plan Preferred Airport Alternative (2006)

This project is the next step after the initial Site Selection Study for a new airport. Upon the identification of a preferred new airport location, an Airport Master Plan to accurately identify and plan the development of this new facility will be required. This planning study will be required at either a new location or the existing location since this study recommends interim (10 year) improvements only at the existing site.

5.3.2 EA (Pre-EIS) Preferred Airport Alternative (2007)

This project is the third step after the initial Site Selection Study and Airport Master Plan in the process of establishing a long term solution to airport needs. Upon the identification of a preferred airport alternative and an Airport Master Plan and ALP to accurately identify and plan the development of a new or improved facility an Environmental Assessment will be required to evaluate the potential environmental effects of the alternative.

5.3.3 Acquire Land, Preferred Airport Alternative (2008)

Land acquisition is a necessary step in the construction and implementation of long term airport improvements for the Wood River Region whether at a new site or the existing site. This project includes the acquisition of land for implementing of the preferred airport alternative. The cost for land is highly variable depending on the acreage required and the location. Acquisition costs will be significant, but will be unknown until such time as the preferred alternative is selected.

5.3.4 EIS Preferred Airport Alternative (2008)

The construction of a new air carrier airport is anticipated to push the Environmental Assessment (EA) into an Environmental Impact Statement (EIS) or expanded facility at the existing site. This project is the next (fourth) step after the initial Site Selection Study, Airport Master Plan, and EA (Pre-EIS) in the planning process for long term airport needs. Significant environmental analysis is anticipated with either a decision to relocate the existing airport to a new location or attempt to accommodate current and future demand at the existing location.

5.3.5 Design of Preferred Airport Alternative (2008 & 2009)

This project is the next (fifth) step after the initial Site Selection Study, Airport Master Plan, EA (Pre-EIS), and EIS in the planning & design process for a long term airport improvement. The project involves the engineering and architectural design associated with the first phase of improved airport facilities at the preferred alternative location. Since the extent of improvements associated with the preferred alternative is unknown, no accurate cost can be provided at this time.

5.3.6 Construct Preferred Airport Alternative

This project includes the construction of the improvements recommended in prior planning efforts to achieve long term airport capability. Total costs of improvements regardless of the ultimate solution selected will be significant, expected to be not less than $40 million and perhaps on the order of $100 million.

5.4 Potential Funding Sources

Management and operation of Friedman Memorial Airport is provided by the Friedman Memorial Airport Authority (FMAA) as a result of the Joint Powers agreement executed in May, 1994 between Blaine County and the City of Hailey. FMAA provides funding for its day to day operations and capital improvements with revenue from airport operations. Assistance is available for many of the airport's major capital improvement projects from the Federal Aviation Administration's Airport Improvement Program (FAA/AIP). Projects submitted for Federal grant funding must be shown on an adopted Airport Layout Plan. The following section describes the Federal grant programs available as potential funding sources for many of the capital improvement projects recommended in this Master Plan.

5.4.1 Airport Improvement Program

The Federal Aviation Administration administers the Airport Improvement Program (AIP), which was created by the Airport and Airway Improvement Act of 1982, as amended. The current AIP program, referred to as *Vision 100*, provides both entitlement funds (based on annual enplanements) and discretionary funds for eligible projects. Vision 100 is in effect for a four (4) year period which commencing with Fiscal Year 2004 (FY'04) which starts on October 1, 2003. Friedman Memorial Airport receives entitlement funding based on its annual enplanements and is eligible for discretionary funding on a project by project basis. Under the current Vision 100 bill, the Airport will receive at least $1.0 million annually in entitlement funds. Project eligibility is based on FAA Order 5100.38A, *Airport Improvement Program Handbook.* Eligible projects include airside improvements, landside improvements (except automobile parking), and terminal building improvements. As a primary commercial service airport within the State, Friedman Memorial Airport can expect to receive up to ninety-five (95) percent funding for all eligible projects during the next four (4) fiscal years with five (5) percent required from local funding sources. This is an increased level of participation as preceeding participation has been limited to ninety (90) percent. The ninety (90) percent level may return following the expiration of Vision 100.

The AIP is funded by aviation user fees or taxes, which includes an airline ticket tax, freight waybill tax, international departure fee, and taxes on general aviation and jet fuel.

Chapter Six
Environmental Overview

The purpose of this chapter of the Friedman Memorial Airport (FMA) Master Plan Update is to present information related to environmental issues associated with both the recommended interim improvement plan for Friedman Memorial Airport and the composite alternative that was developed in the effort to meet design standards at the current site. This composite alternate is described in detail in Section 4.2.6 of Chapter Four, Alternative Plan Concepts. The recommended interim improvement plan depicted in the Airport Layout Plan and described in Section 4.1 of Chapter Four, Alternative Plan Concepts includes several projects needed at the Airport to continue to improve the safety and efficiency of the airport's operation. The timeframe for the interim improvements is 10 years. This is based on the estimated time period required to build an improved or new airport capable of serving the Wood River Region. Aside from the recommended interim physical improvements, one of the major recommendations of the Master Plan Update is to evaluate a new airport as the ultimate correction of existing safety area deficiencies and the means to serve the long-term needs of the Wood River Region. Environmental considerations associated with the new airport recommendation are not addressed in this chapter. The pursuit of that ultimate solution will be the subject of comprehensive and rigorous environmental analysis and review in other planning studies identified in the CIP.

This environmental chapter is meant to be an overview of the relative effects of the alternatives discussed above. The information presented depicts a portion of the considerations made by the Airport Board in concluding a new airport site must be considered as a long term solution. This chapter is not intended to provide the level of detail of the environmental documentation techniques the Federal Aviation Administration (FAA) typically requires before a project can actually be implemented. FAA requires that one of the following environmental documents be prepared prior to actual project construction: a categorical exclusion, an environmental assessment, or an environmental impact statement. The specific foreseeable effects related to a project dictate the degree of effort required. The overview is intended to provide a generalized discussion of the major environmental issues that are relevant to the two primary alternatives at FMA, and lay the basic groundwork for future project specific efforts.

This chapter is organized into the following sections:

- 6.1 Environmental impact categories
- 6.2 Recommended interim improvement plan
- 6.3 On-site composite improvement alternative
- 6.4 Future actions relating to alternatives

6.1 Environmental Impact Categories

The FAA Northwest Mountain Region has developed an environmental checklist containing twenty-three (23) environmental categories. The categories to be considered are identified in Column 1 of Table 6-1. A number of these environmental categories do not apply to the conditions at the existing site; therefore, they will not be discussed in the remaining sections. The environmental categories which are considered applicable to the two alternatives addressed in this Chapter are identified in **Table 6-1**. A generalized assertion of potential effects is also provided in the table. Three classifications of effect are used. They are:

1) NSE = no significant effect anticipated from proposed improvements
2) + = potential beneficial impacts from proposed improvements
3) – = potential adverse impacts from proposed improvements

These assertions are based on consultant's knowledge of the environs surrounding the area and descriptive information provided by others, not specific detailed analysis.

Table 6-1
Environmental Overview Categories

Category	Interim Improvements		Composite Alternative	
	Applicable	Effect	Applicable	Effect
Noise	Y	NSE	Y	-
Compatible Land Use	Y	NSE	Y	-
Social Impacts	Y	+	Y	-
Induced Socioeconomic Impacts	Y	+	Y	-
Environmental Justice	N		N	
Air Quality	Y	NSE	Y	NSE
Water Quality	Y	+	Y	+
Section 4(f) Impacts	N		Y	
Cultural Resources	N		Y	-
Biotic Communities	N		Y	-
Endangered and Threatened Species	Y	NSE	Y	NSE
Essential Fish Habitat	N		N	
Migratory Bird Act	N		N	
Wetlands	N		N	
Floodplains	N		N	
Coastal Zone Management Program	N		N	
Wild and Scenic Rivers	N		N	
Farmlands	N		Y	-
Energy Supply and Natural Resources	Y	NSE	Y	NSE
Light Emissions	Y	NSE	Y	-
Solid Waste Impacts	N		N	
Construction Impacts	Y	-	Y	-
Hazardous Materials	Y	NSE	Y	NSE

Notes: - =Potential **adverse** environmental issues associated with alternative.
+ = Potential **beneficial** environmental issues associated with alternative.
NSE = no significant effect anticipated

Y = Applicable
N = Not Applicable

The possible environmental effects of the two alternatives are qualitatively discussed in the following sections.

6.2 Recommended Interim Improvement Plan

Potential effects are discussed in this section for those environmental categories where a potential for impact of some degree is considered applicable and some effect is foreseeable based on currently available information and general knowledge. A summary of the proposed interim improvements is included in Section 4.1 of Chapter Four, Alternative Plan Concepts.

Noise. The proposed 200-foot south shift of Runway 13/31, which is a component of the plan to improve the Runway Safety Area at the north end of the airfield, would have the possible effect of widening the noise exposure footprint 200 feet south. Based on detailed noise contour evaluation conducted as an element of using declared distances to increase the takeoff run available to the south from 6602 feet to 6952 feet and the finding of no significant change to the noise contours, this minor shift is not expected to create any measurable effect. This minor shift will not provide added opportunity for increased use by larger or noisier aircraft than currently use the airfield. Since action is directed at improving the operational environment for the current aircraft fleet only, it is not anticipated the action will alter the level of noise events and characteristics associated with individual aircraft or the fleet in general.

Compatible land use. The City of Hailey and Blaine County have land-use and zoning ordinances in place, which consider appropriate land use in the vicinity of the airport. Land uses adjacent to- and within close proximity to the airfield are a mix of residential, light industrial, recreation, and agriculture or open space. Since the improvements proposed in this alternative are contained in the existing land envelope, the effects upon residential and recreational land uses near the airfield will be no different than current conditions.

Social impacts. Interim improvements to the airport do not require any residential or business relocation. No changes are proposed in this alternative which will alter surface transportation patters or cause a degradation of service. Improvements to the terminal access road system will create a minor change in surface traffic patterns. This change, which is considered beneficial, has been previously depicted and approved in prior planning efforts.

Induced socioeconomic impacts. The induced impacts related to the projects proposed in this alternative are beneficial for the most part since they are needed to preserve and improve the Airport safety and service level for a ten (10) year period. Air service issues are key to this, since the Airport is improving the airfield in direct response to keeping up with the safety and operational needs of the air carrier fleet (Q400) serving the Wood River Valley.

Air quality. Air quality in the Wood River Valley is generally considered very good with low concentrations of pollutants associated with transportation. The proposed improvements are not expected in and of themselves to increase the number or change the type of aircraft using the airfield. The project area is not in or near a non-attainment area.

Water quality. One of the projects planned for implementation, is the establishment of an aircraft deicing area. Once this is built, fluids used to deice and anti-ice aircraft surfaces, which run off the plane and onto the ground, will be collected and either treated or recycled. Recent pavement improvement projects have also incorporated the use of grassy swales as biofiltration devices prior to discharge to subsurface soils. This practice is expected to continue with all new pavement projects proposed in this alternative with a cumulative positive benefit to groundwater.

Endangered and Threatened Species. Potential impacts to endangered or threatened species have been previously reviewed within the proposed improvement areas and found to be insignificant. Construction of improvements will take place during summer months within the existing land envelope, which will avoid impacts to Bald Eagle wintering and nesting activities along the Wood River.

Energy supply and natural resources. This category addresses additional use of energy for the proposed projects, as well as the availability of basic materials to construct the projects. Increased energy requirements for the proposed projects are minimal and not considered to be an issue. Improvements to the existing terminal building will likely result in a higher degree of efficiency in energy use. Similarly, the construction projects planned for the Airport will require basic materials; however, they are available for use from local resources. In fact, the larger airfield pavement projects will use recycled asphalt concrete and aggregate materials as part of the implementation, which is consistent with past construction practices.

Light emissions. Proposed improvements include improved runway lighting and new lighting for the proposed extension and possible lighting of apron areas. All project improvements will comply to the greatest extent possible with the City of Hailey lighting ordinance, which limits intensity of new lighting. Airfield security lighting requirements and lighting related to operational safety will take precedence in the event of conflict. Some existing obstruction lighting will be removed when existing structures on the airfield are demolished or removed as planned.

Construction impacts. Construction activities associated with the recommended interim improvement plan will have some short-term impacts on the community; namely, the transport of materials and the noise caused by construction equipment. These impacts will be similar to those experienced during the past several construction seasons. Work required outside of normal work hours established by the City of Hailey ordinance will require advance approval. Construction material delivery will require traffic control along Highway 75 as provided in the past. There will also be the normal routine noise associated with construction equipment activity. Expansion and renovation of the terminal building will disrupt passenger traffic and security operations to some extent. All affects can be mitigated to a certain degree by carefully planned construction phasing. The benefits associated with the improvements will undoubtedly greatly effect the short term effects of construction.

Hazardous materials. The specific projects included as part of the recommended improvement plan will include a detailed assessment of whether hazardous materials may exist and will be a factor in the actual construction. This is primarily applicable to building renovation. This category, overall, is not anticipated to represent a significant set of issues for the Airport owner.

6.3 On-Site Composite Improvement Alternative

The "on-site composite alternative" includes all those projects that would be required to satisfy safety and operational concerns at the current FMA site. A summary of the improvements proposed is included in Section 4.2.6 of Chapter Four, Alterative Plan Concepts. Briefly, the composite development plan requires a number of significant activities which include: land acquisition, additional runway length, relocation of runway centerline to the east requiring reconstruction, and relocation of Highway 75 to the east. These improvements are costly, expected to exceed $40 million, and will have significant short-term and long-term effects on the airport users and surrounding environs.

Noise. The proposed composite alternative will have significant short and long-term impacts relative to noise. Short-term impact is associated with the noise of construction. This impact is transient but disruptive to those in close proximity to the airport particularly if night construction work is necessary as has been the case during periods over the last several construction seasons.

Long-term noise impacts will be felt by all those surrounding and south of the airport as a result of continued aviation activity at this location. This impact will be long-term, as implementation of this alternative would no doubt preclude relocation of the airport for a greater time period than ten (10) years. It should be noted that this alternative will not necessarily preclude the need to relocate the airfield at some future time. These long-term noise impacts can be mitigated to a certain degree by continuation of the existing voluntary noise abatement program and voluntary compliance by users with the requested limitation of aviation activity between the hours of 11 p.m. and 6 a.m. Single event aircraft noise, particularly associated with Stage II aircraft, will remain an issue as long as operations continue at this location.

There will be added long term noise effects to the area east of the airport resulting from the relocation of Highway 75 approximately 130 feet to the east. Noise associated with highway traffic will be expected to be more noticeable due to its closer proximity. Mitigation of this impact via operational controls is not feasible as there is unrestricted use on the highway system. Mitigation would have to be on an individual basis by those effected.

Overall noise contour exposure maps are expected to shift slightly to the south and increase slightly with increasing use of the airfield. Large or dramatic changes in noise contours are not anticipated but would require additional analysis prior to implementation of this alternative.

Compatible land use. This alternative requires acquisition of adjacent farmlands located south of and west of the airfield. It also will require changes in the highway right-of-way on the east side of the airfield. The long-term operation of the airport at this location may require or promote changes in land use in the vicinity of the airport. Existing planning and ordinances would require review and possible modification.

Social impacts. This alternative can be expected to have a high social impact since it will affect residences, businesses, and surface transportation patterns. Some effects will be transient related to construction while others will be permanent. Relocation of Highway 75 to the east will place it adjacent to the existing multi-use pedestrian path. If this action did not require the path to be relocated due to a physical conflict it will impact its function and value as a result of the close proximity to heavy vehicle traffic. This proximity also poses significant safety concerns.

This alternative will result in an "expanded airport presence" which will likely create a qualitative change to the overall community which can not be evaluated precisely or quantified.

Induced socioeconomic impacts. This area of impact considers disruption of community or change in business or economic activity both direct and secondary. It also considers impact to public service demands or changes to population growth and patterns. It is a widely held opinion that significant disruption to the surrounding community will result from this alternative. This disruption is considered significant enough to warrant consideration of the feasibility of an alternate airfield location prior to proceeding with implementation.

Air quality. Qualitatively, air quality will be affected by increased air traffic and relocated highway traffic. Based on past experience with airfield projects, the increase in aircraft activity will not cause a significant increase in air emissions. However, a quantitative analysis of impacts to air quality is required prior to implementation of proposed improvements to ensure that no violations of the National Ambient Air Quality Standards will occur. The closer proximity of Highway 75 to adjacent residences can be expected to have an adverse impact to air quality at some specific locations, as well as users of the adjacent pedestrian path.

Water quality. This alternative would result in the creation of more impervious surface; however, through design it is believed that the effects of runoff can be mitigated. One of the projects in this alternative is the establishment of an aircraft deicing area. Once this is built, fluids used to deice and anti-ice aircraft surfaces, which run off the plane and onto the ground, would be collected and either treated or recycled. This is a benefit to the environment. Improvements would also continue to include best management practices for stormwater management with positive benefit to groundwater.

Section 4(f). The public park located at the north end of the airport, the abandoned rail line to the east, and the multi-use pedestrian path east of Highway 75, would be adversely affected by the relocation of State Highway 75 which will be required to accomplish required improvements.

Cultural resources. There is a possibility that the land acquisition required under this alternative would have some adverse impacts to cultural resources. Because of the nature and character of the ranch buildings to the south, reductions in open space; and encroachment upon structures caused by the proposed improvements may be considered an adverse impact on a cultural resource.

Biotic communities. This study effort does not include any field reconnaissance to determine the degree to which the proposed development would affect flora and fauna. However, it is clear that the expansion of the airport land envelope and relocation of adjacent facilities associated with this alternative has the potential for an adverse effect on biotic communities, which requires further review if implemented.

Endangered and threatened species. As indicated for the biotic communities category, no field reconnaissance of the proposed improvement areas has been performed. Prior to moving forward with the proposed improvements under this alternative, a thorough investigation of the area will be required to ascertain the presence or absence of endangered or threatened species in the project area.

Farmland. This alternative would reduce the amount of agricultural land in the vicinity of the Airport, based on the need to acquire such land for aviation purposes. FAA is primarily concerned with adverse impacts to "Prime" or Unique" farmlands as defined by Natural Resource Conservation Service (NRCS). Prior to implementation of this alternative, the NRCS should be contacted regarding the status of adjacent farmlands. It is important to note that acquisition of this land can be expected to be costly and very difficult.

Energy supply and natural resources. This category addresses additional use of energy for the proposed projects, as well as the availability of basic materials to construct the projects. Increased energy requirements for the proposed projects are minimal and not considered to be an issue. Similarly, the construction projects planned for the Airport will require basic materials. The materials are readily available for use, however their use will incrementally deplete the supply available in the vicinity. Relative to the interim improvements alternative reviewed in the preceding section; this alternative will require a significantly greater material volume to construct.

Light emissions. The proposed improvements will result in an increase in the number of airfield lights. An obstruction study based on full airspace compliance could cause a significant increase in the number of obstruction lights on objects like tall poles, buildings, and potentially trees or terrain. This is highly likely if navigational aids intended to improve all weather reliability require compliance with instrument approach airspace standards. Within the City of Hailey, these lights may not meet the City of Hailey lighting ordinance. In the surrounding area, the community has opposed obstruction lights, particularly those placed high above the populated area on items such as communications towers.

Construction impacts. Due to the extensive construction involved with this alternatives the effects will be large on a number of constituents. The runway relocation/reconstruction will require an extensive period of closure which will have a large detrimental impact on airfield users and the local business economy. Relocation of Highway 75 will adversely impact traffic on one of the busiest highways in Idaho. The only means to mitigate these impacts is to compress the work schedule by extending daily work hours, working at night, and on weekends, which will in and of itself have a negative impact to the community. Increased number of work crews will serve to alleviate the magnitude of the daily routine construction activity. The increased magnitude of the improvements will exponentially increase all of the negative elements associated with construction such as; noise, dust, traffic disruption, curtailment of access, and increased use of materials.

These impacts will exist during the time of construction of improvements; likely to be more than one construction season. Once construction is complete the impacts will cease. During the construction period, significant disruption to travel and the local economy must be expected.

Hazardous materials. The specific projects included as part of the recommended improvement plan will include a detailed assessment of whether hazardous materials may exist and will be a factor in the actual construction. This category, overall, is not anticipated to represent a significant set of issues for the Airport owner.

6.4 Future Actions Relating to Alternatives

Recommended interim alternative. All improvements recommended in this alternative should be able to proceed based on a categorical exclusion associated with each grant year. Currently submittal of the standard form Northwest Mountain Region Airports Division Environmental Checklist will suffice.

Detailed planning and design of projects must consider local ordinance requirements associated with work hours, noise, lighting, etc. Projects must also give significant thought to proper sequencing of events to minimize affects to users. This may add cost to individual projects. Construction activities must comply with Idaho Transportation Department traffic control procedures and local ordinance.

In summary, implementation of this alternative is expected to have short-term effects associated with construction activities but no quantifiable or significant long term effects.

On-site composite improvement alternative. This alternative attempts to depict an operational scenario where the location can be configured to meet the standards associated with existing airport users; namely a C-III compliant airport.

This alternative is expected to generate significant short and long-term effects in a number of areas. Direct and indirect impacts are considered to be negative, and of a significance that justifies evaluation of an alternative airport location as a feasible solution.

It can be anticipated that pursuit of this composite improvement alternative will require a full environmental process including an environmental impact statement. It will also require significant reevaluation of a portion of the Highway 75 corridor analysis completed by the Idaho Transportations Department. The recently completed corridor analysis did not address relocation as an alternative.

Of particular concern, however, is that even if this alternative could successfully negotiate the environmental process its implementation will not correct the adverse conditions associated with all-weather reliability, high performance aircraft operating in constrained airspace, and the established intense land use immediately adjacent to the airfield. Additionally, the solution only addresses the compliance requirements related to existing uses providing no ability to accommodate more demanding users who may choose to use the airfield. In the current regulatory environment it appears the Airport Authority has no ability to limit or exclude these users despite airfield capabilities and limitations.

Friedman Memorial Airport
Master Plan Update

Appendix A/**Glossary of Terms**

GLOSSARY OF TERMS AND ACRONYMS

ADVISORY CIRCULAR (AC) - Series of Federal Aviation Administration (FAA) publications consisting of all material of a policy, guidance, and informational nature.

AIRCRAFT APPROACH CATEGORY - A grouping of aircraft based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

Category A: Speed less than 91 knots
Category B: Speed 91 knots or more but less than 121 knots
Category C: Speed 121 knots or more but less than 141 knots
Category D: Speed 141 knots or more but less than 166 knots
Category E: Speed 166 knots or more

AIRCRAFT DELAY - The additional travel time at an airport or in the air, caused by aircraft traffic congestion, taken by an aircraft to move from its origination to its destination.

AIRCRAFT OPERATION - An aircraft arrival (landing) or departure (takeoff) represents one aircraft operation at an airport. Aircraft operations are typically recorded by the FAA in four categories: air carrier, air taxi, general aviation, and military. General aviation includes operations performed by all civil aircraft not classified as air carrier or air taxi aircraft.

AIRCRAFT RESCUE AND FIREFIGHTING FACILITY (ARFF) - The airport fire station.

AIRFIELD CAPACITY (HOURLY) - The maximum number of aircraft operations (total of landings and takeoffs) that can take place on an airfield in one hour under specific conditions.

AIRPLANE DESIGN GROUP (ADG) - A grouping of airplanes based on wingspan. The groups are as follows:

Group I: Up to but not including 49 feet (15 m)
Group II: 49 feet (15 m) up to but not including 79 feet (24 m)
Group III: 79 feet (24 m) up to but not including 118 feet (36 m)
Group IV: 118 feet (36 m) up to but not including 171 feet (52 m)
Group V: 171 feet (52 m) up to but not including 214 feet (65 m)
Group VI: 214 feet (65 m) up to but not including 262 feet (80 m)

AIRPORT ELEVATION - The highest point on an airport's usable runway expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM (AIP) - A program administered by the U.S. Department of Transportation, FAA, to provide financial grants-in-aid for airport development projects such as runways, taxiways, aircraft parking aprons, public areas in terminal buildings, and land acquisition associated with airport development and approach protection.

AIRPORT LAYOUT PLAN - A plan (drawings) developed for an airport showing boundaries and proposed additions to all areas owned or controlled by the sponsor for airport purposes, the location and nature of existing and proposed airport facilities and structures, and the location on the airport of existing and proposed non-aviation areas and improvements thereon.

AIRPORT MASTER PLAN - An assembly of appropriate documents and drawings covering the development of a specific airport from a physical, environmental, economical, social, and political jurisdictional perspective. The Airport Layout Plan is a part of this plan. The narrative Master Plan provides justification of ALP proposed improvements.

AIRPORT ROTATING BEACON - Navigational aid that indicates the location of an airport by projecting beams of light spaced 180 degrees apart. Alternating white/green flashes identify a lighted civil airport, while white/white flashes identify an unlighted civil airport.

AIRPORT SPONSOR - A public agency or tax-supported organization, such as an airport authority, that is authorized to own and operate an airport, to obtain funds, and to be legally, financially, and otherwise able to meet all applicable requirements of the current laws and regulations.

AIRPORT SURVEILLANCE RADAR (ASR) - Designed to provide relatively short-range coverage in the general vicinity of an airport and to serve as an expeditious means of handling terminal area traffic through observation of precise aircraft locations on a radarscope.

AIRPORT TRAFFIC CONTROL (ATC) - A service provided to users of the national airspace system to promote the safe, orderly, and expeditious flow of airport traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC) - A facility established to provide airport traffic control service to aircraft operating on an instrument flight rule (IFR) flight plan within controlled airspace and principally during the enroute phase of flight.

ANNUAL SERVICE VOLUME (ASV) - A quantifiable measure used to determine airfield capacity. ASV accounts for differences in variables such as runway use, aircraft mix, and weather conditions, that would be encountered over a year's time, and thus is a reasonable estimate of an airport's annual capacity.

APPROACH LIGHTING SYSTEM (ALS) - Navigational aid which is a configuration of lights positioned symmetrically along the extended runway centerline, beginning at the runway threshold and extending towards the approach.

AUTOMATIC WEATHER OBSERVATION STATIONS (AWOS) - Automatic recording instruments that measure meteorological conditions such as cloud height, visibility, wind speed and direction, temperature, and dewpoint. Also referred to as ASOS or AWSS, depending on the funding program or ownership.

AVIGATION EASEMENT - A type of land acquisition that involves less-than-fee purchase (see also LESS-THAN-FEE ACQUISITION). One form of avigation easement grants an airport the right to perform aircraft operations over the designated property, including operations that might cause noise, vibration, and other effects. A stronger form of easement is a deed restriction that may include (1) the right to perform aircraft operations over the property, and (2) public acquisition of a landowner's rights restricting future development of the property for any use more intensive than that existing at the time of the transaction. This easement may also include specific prohibitions on the uses for which the property may be developed. Maximum heights of structures and other objects may also be specified.

BUILDING CODE - A legal document that sets forth requirements to protect the public health, safety, and general welfare as it relates to the construction and occupancy of buildings and structures. The code establishes minimum acceptable conditions for matters found to be in need of regulation. Topics generally covered are exits, fire protection, structural design, sanitary facilities, light, and ventilation. Sound insulation may also be included.

BUILDING RESTRICTION LINE - A line which identifies suitable building area locations on airports. The line is typically depicted for a specific building height above runway centerline elevation.

DAY-NIGHT AVERAGE SOUND LEVEL (DNL) - A method for predicting, by a single number rating, cumulative aircraft noise affecting communities in airport environs. The DNL value represents decibels of noise as measured by an A-weighted sound-level meter. In the DNL procedure, the noise exposure from each aircraft takeoff or landing at ground level around an airport is calculated, and these noise exposures are accumulated for a typical 24-hour period. Daytime and nighttime noise exposures are considered separately. A weighting factor equivalent to a penalty of 10 decibels is applied to operations between 10 p.m. and 7 a.m. to account for the increased perceived sensitivity of people to noise during the sleeping hours. The DNL values can be expressed graphically on maps using contours of equal noise exposure. DNL may also be used for measuring other noise sources, such as automobile traffic, to determine combined noise effects. This metric was previously referred to as Ldn; however the international convention is DNL.

DECISION HEIGHT - Height at which a decision must be made, during an instrument approach, to continue the approach or execute a missed approach.

DECLARED DISTANCE – The distances the airport owner declares available for the airplane's takeoff run, takeoff distance, accelerate-stop distance and landing distance requirements.

DISPLACED THRESHOLD - A runway landing threshold that is located at a point other than the designated beginning of the runway (where departures would begin).

DISTANCE MEASURING EQUIPMENT (DME) - Navigational aid that furnishes distance information between aircraft and a ground station with a very high degree of accuracy.

ENGINEERED MATERIALS ARRESTING SYSTEM (EMAS) - high energy absorbing materials of selected strength, which will reliably and predictably crush under the weight of an overrunning aircraft.

ENGINE RUNUP AREA - An area on an airport where aircraft engines are serviced or tested. The noise from such servicing or testing can affect neighborhoods adjacent to an airport.

ENPLANED/DEPLANED PASSENGERS - The volume of passengers outbound from an airport (enplaned) or inbound to an airport (deplaned). The annual passenger volume of an airport is the total of enplaned and deplaned passengers.

ENVIRONMENTAL ASSESSMENT (EA) - An assessment of the environmental effects of a proposed action for which federal financial assistance is being requested or for which federal authorization is required. The EA serves as the basis for the FAA's Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI), as specified in FAA Orders 1050.1D and 5050.4A.

ENVIRONMENTAL IMPACT STATEMENT (EIS) - A document prepared under the requirements of NEPA, Section 102(2) (c). The EIS represents a federal agency's evaluation of the effect of a proposed action on the environment. Regulations relating to the preparation of an EIS are published in FAA Order 1050.1D and 5050.4A.

FAR PART 77 - Federal Aviation Regulations Part 77 - Establishes standards for identifying obstructions to aircraft in navigable airspace.

FAR PART 150 - Federal Aviation Regulations Part 150 - Prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving those programs.

FEDERAL AVIATION ADMINISTRATION (FAA) - The FAA is the agency of the U.S. Department of Transportation that is charged with (1) regulating air commerce to promote its safety and development; (2) achieving the efficient use of navigable airspace of the United States; (3) promoting, encouraging, and developing civil aviation; (4) developing and operating a common system of airport traffic control and air navigation for both civilian and military aircraft; and (5) promoting the development of a national system of airports.

FEE SIMPLE LAND ACQUISITION - The full purchase of land and improvements by an airport sponsor. The land is usually maintained or leased for uses that are compatible with airport operations.

FINDING OF NO SIGNIFICANT IMPACT (FONSI) - A finding by the FAA that a proposed action by an airport sponsor will have no significant impact on the environment. Specific guidelines for the preparation of a FONSI report (see Environmental Assessment) are included in FAA Orders 1050.1D and 5050.4A.

FIXED BASE OPERATOR (FBO) - Private enterprises offering flight training instruction, aircraft maintenance and repair, aircraft fueling services, aircraft storage and parking, and other ground support services to the general aviation community.

FLIGHT SERVICE STATION (FSS) - Air traffic facility that provides a variety of services, such as pilot briefings, en route communications, relaying of ATC clearances, aviation weather broadcasts, IFR flight plan receiving and processing, and NAVAID monitoring.

FRANGIBLE NAVAID - A navigational aid (NAVAID) which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

GENERAL AVIATION (GA) - All civil aviation except that classified as air carrier or air taxi. The types of aircraft typically used in general aviation activities vary from multi-engine jet aircraft to single-engine piston aircraft.

GLOBAL POSITIONING SYSTEM (GPS) - A United States satellite-based radio navigational, positioning, and time transfer system operated by the Department of Defense. The system provides highly accurate position and velocity information and precise time on a continuous global basis to an unlimited number of properly-equipped users. The system is unaffected by weather and provides a worldwide common grid reference system based on the earth-fixed coordinate system.

HAZARD TO AIR NAVIGATION - An object which, as a result of an aeronautical study, the FAA determines will have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft, operation of air navigation facilities, or existing or potential airport capacity.

HELIPAD - A small area designated for takeoff, landing, or parking of helicopters.

HOLD APRON - Airfield area designated for departing aircraft waiting for clearance for departure, or arriving aircraft waiting for available gate space at the terminal.

IFR CONDITIONS - Weather conditions that require aircraft to be operated in accordance with instrument flight rules.

IFR MINIMUMS AND DEPARTURE PROCEDURES (FAR PART 91) - Prescribed takeoff rules. For some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums or departure procedures, or both. Both may be required to assist pilots in avoiding obstacles during climb to the minimum enroute altitude.

INSTRUMENT FLIGHT RULES (IFR) - Rules specified by the FAA for flight under weather conditions in which visual reference cannot be made to the ground and the pilot must rely on instruments to fly and navigate.

ITINERANT OPERATIONS - All aircraft arrivals and departures other than local operations.

LAND USE COMPATIBILITY - The compatibility of land uses surrounding an airport with airport activities and particularly with the noise from aircraft operations.

LAND USE CONTROLS - Controls established by local or state governments to carry out land use planning. The controls include zoning, subdivision regulations, land acquisition (in fee simple, lease-back, or easements), building codes, building permits, and capital improvement programs (or provide sewer, water, utilities, or other service facilities).

LAND USE PLANNING - Comprehensive planning carried out by units of local government, for all areas under their jurisdiction, to identify the optimum uses of land and to serve as a basis for the adoption of zoning or other land use controls.

LEAD-IN LIGHTING SYSTEMS (LDIN) - Navigational aid consisting of at least three flashing lights installed at or near ground level to define the desired course to an ALS or to a runway threshold.

LESS THAN FEE ACQUISITION - The purchase of development rights from landowners by airport sponsors in areas that should remain at very low densities or in open space uses. The airport sponsor negotiates with the landowner to determine the fair market value of the unused development rights. Once sold, the land cannot be developed except in specified ways. (See also FEE SIMPLE ACQUISITION)

LOCALIZER TYPE DIRECTIONAL AID (LDA) - A navigational aid used for nonprecision instrument approaches with utility and accuracy comparable to a localizer; however, it is not part of a complete ILS and is not aligned with the runway.

LOCAL OPERATION - An aircraft operation which remains no more than 25 nautical miles from the departure point, or which terminates at the point of departure, or which does not include a stop of a greater duration than 15 minutes. Touch-and-go operations are an example of local operations.

MEDIUM INTENSITY APPROACH LIGHTING SYSTEM (MALS) - Navigational aid that enhances nonprecision instrument and night visual approaches.

MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) - Navigational aid used by pilots during instrument landing approach to align aircraft with runway centerline. It is an economy ALS system approved for CAT I precision approaches.

MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHERS (MALSF) - Navigational aid that is identical to the MALS except that sequenced flashing lights are added to the outer three light bars. The sequenced flashing lights improve pilot recognition of the ALS when here are distracting lights in the airport vicinity.

MICROWAVE LANDING SYSTEM (MLS) - Navigational aid that provides the pilot of a properly equipped aircraft with electronic guidance to control the aircraft's alignment and descent until the runway environment is in sight. MLS is also used to define a missed approach course or a departure course.

MISSED APPROACH POINT (MAP) - A point during an instrument approach procedure at which, if the visual reference to continue the approach does not exist, a missed approach procedure must be executed.

MITIGATION MEASURE - An action that can be planned or taken to reduce the severity of (mitigate) an adverse environmental impact. As set forth in Council on Environmental Quality (CEQ) 1500 (Section 1508.20), "mitigation" includes:
(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing the impact by limiting the degree or magnitude of the action and its implementation.
(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
(e) Compensating for the impact by replacing or providing substitute resources or environments.
A proposed airport development project, or alternatives to that project, may constitute a mitigation measure as defined by the CEQ.

MOVEMENT AREA - Runways, taxiways, and other areas of an airport used for taxiing, takeoff, and landing of aircraft which are under strict control of the ATCT personnel.

NAVIGATIONAL AID (NAVAID) - Any visual or electronic device (airborne or on the ground) that provides point-to-point guidance information or position data to pilots of aircraft in flight.

NEPA - National Environmental Policy Act of 1969 (PL 91-190).

NOISE ABATEMENT PROCEDURES – Recommended changes to otherwise normal operational procedures affecting runway use, in flight approach and departure routes and procedures, and in other airport traffic procedures that are made to shift adverse aviation effects away from noise-sensitive areas (such as residential neighborhoods).

NOISE EXPOSURE CONTOURS - Lines drawn on a map that connect points of equal cumulative noise exposure (DNL) values. They are usually drawn in 5 dB intervals, such as DNL 75 dB values, DNL 70 dB values, DNL 65 dB values, and so forth.

NONDIRECTIONAL RADIO BEACON (NDB) - A low/medium frequency radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction- finding equipment can determine his bearing to or from the radio beacon and track to or from the station.

NON-MOVEMENT AREA - Taxiway and ramp areas not under the control of the ATCT. Aircraft maneuvering in this area is at the discretion of the individual pilot.

NORTH AMERICAN DATUM (NAD) 83 - The geodetic datum to which local geographical latitude and longitude coordinates are generally referenced.

NORTH AMERICAN VERTICAL DATUM (NAVD) 88 - The geodetic datum to which local vertical ("2") coordinates are generally referenced.

OBJECT FREE AREA (OFA) - An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ) - A clearing standard that precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function.

OBSTRUCTION - An object that exceeds a limiting height or penetrates an imaginary surface described by current Federal Aviation Regulations (Part 77).

OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM (ODALS) - Navigational aid that may be installed on a runway with a nonprecision approach or on a runway that is difficult to identify due to an excessive number of lights in the area.

PRECISION APPROACH CATEGORY I (CAT I) RUNWAY - A runway with an instrument approach procedure which provides for approaches to a decision height (DH) of not less than 200 feet (60 m) and visibility of not less than ½ mile (800 m) or Runway Visual Range (RVR) 2400 (RVR 1800 with operative touchdown zone and runway centerline lights).

PRECISION APPROACH CATEGORY II (CAT II) RUNWAY - A runway with an instrument approach procedure which provides for approaches to a minima less than CAT I to as low as a decision height (DH) of not less than 100 feet (30 m) and RVR of not less than RVR 1200.

PRECISION APPROACH CATEGORY III (CAT III) RUNWAY - A runway with an instrument approach procedure which provides for approaches to minima less than CAT II.

PRECISION APPROACH PATH INDICATOR (PAPI) - A system of lights so arranged as to provide visual descent guidance information during the approach to a runway. Uses light units similar to the VASI but are installed in a single row of either two or four light units.

PRECISION INSTRUMENT APPROACH PROCEDURE - A standard instrument procedure for an aircraft to approach an airport in which an electronic glide slope is provided, e.g., an instrument landing system (ILS) and precision approach radar.

RADAR - Method of determining the location of objects whereby radio waves are transmitted into the air and are then received when they have been reflected by an object in the path of the beam.

RNAV – Area navigation instrument approaches to a runway. This concept introduces positive vertical guidance (i.e., 3D) approach criteria based on the performance of receivers utilizing position corrections (GPS) from components of the FAA's Wide Area Augmentation System (WAAS).

RUNWAY - A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes.

RUNWAY END IDENTIFIER LIGHTS (REIL) - Navigational aid that identifies the approach end of a particular runway.

RUNWAY OBJECT FREE AREA (ROFA) - The ROFA is a two-dimensional ground area surrounding the runway, and is centered on the runway centerline. FAA standards prohibit parked aircraft and objects, except NAVAIDs and objects fixed by function, from locating within the OFA.

RUNWAY OBSTACLE FREE ZONE (ROFZ) - The defined volume of airspace centered above the runway centerline. The ROFZ clearing standards prohibit taxiing, parked airplanes, and object penetrations, except frangible NAVAIDs with fixed locations.

RUNWAY PROTECTION ZONE (RPZ) - A trapezoidal area at ground level whose perimeter conforms to the projection on the ground of the innermost portion of the Approach Surface as defined in FAR Part 77. The RPZ is centered on the extended runway centerline and begins at the end of the FAR Part 77 Primary Surface, terminating below the points or line where the Approach Surface reaches a height of 50 feet above the elevation of the runway end. FAA regulations require that RPZ's be kept free of obstructions and any uses which cause an assemblage of persons.

RUNWAY SAFETY AREA (RSA) - A defined two-dimensional 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 runway.

RUNWAY THRESHOLD - The beginning of that portion of a runway usable for landing or takeoff.

RUNWAY VISUAL RANGE (RVR) - An instrumentally derived visibility value that represents the horizontal distance a pilot will see down the runway from the approach end, resulting from existing meteorological conditions.

TACTICAL AIR NAVIGATION (TACAN) - A navigational system which lends itself to military and naval requirements.

TAXILANE - The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY - A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY AND TAXILANE OBJECT FREE AREA (TOFA) - TOFA is a two-dimensional ground area surrounding the taxiway or taxilane, and centered on the centerline. FAA standards prohibit parked aircraft and objects, except NAVAIDs and objects fixed by function, from locating within the TOFA.

TAXIWAY SAFETY AREA (TSA) - A two-dimensional area centered on the taxiway centerline. Design standards for the TSA dictate that the TSA must be cleared and graded without surface variations; drained; capable of supporting snow removal, ARFF, and aircraft under dry conditions; and free of objects, except for objects that are fixed by function.

TERMINAL RADAR APPROACH CONTROL (TRACON) - Radar approach facility for an airport.

THRESHOLD - The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced or relocated.

TOWER/AIRPORT TRAFFIC CONTROL TOWER (ATCT) - A central operations facility in the terminal airport traffic control system, consisting of à tower cab structure, including an associated IFR room if radar equipped, using air/ground communications and/or radar, visual signaling, and other devices, to provide safe and expeditious movement of terminal airport traffic.

TRAFFIC PATTERN - The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.

UNITED STATES STANDARD FOR TERMINAL INSTRUMENT PROCEDURES (TERPS) - Criteria used to formulate, review, approve, and publish procedures for instrument approach and departure aircraft to and from civil and military airports.

VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION (VOR) - A navigational aid transmitting very high frequency navigation signals 360 degrees in azimuth.

VFR CONDITIONS - Weather conditions that permit aircraft to be operated in accordance with visual flight rules.

VHF OMNI-DIRECTIONAL RANGE/TACTICAL AIR NAVIGATION (VORTAC) - A navigational facility consisting of the following components at one site: VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME).

VISUAL APPROACH - An approach to an airport wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of a radar facility and having an airport traffic control authorization, may deviate from the prescribed instrument approach procedure and proceed to the airport of destination, served by an operational control tower, by visual reference to the surface.

VISUAL APPROACH SLOPE INDICATORS (VASI) - A system of lights so arranged as to provide visual descent guidance information during the approach to a runway. Most VASI installations consist of two bars, near and far, and may consist of 2-, 4-, or 12-light units.

VISUAL FLIGHT RULES (VFR) - Rules that govern the procedures for conducting flight under visual conditions (Federal Aviation Regulations, Part 91).

ACRONYMS

AC	Advisory Circular
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Fire Fighting
ARTCC	Air Route Traffic Control Center
ATCT	Airport Traffic Control Tower
BRL	Building Restriction Line
CAGR	Compounded Annual Growth Rate
DME	Distance Measuring Equipment
DNL	Day-Night Noise Level
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
GPS	Global Positioning System
HIRLs	High Intensity Runway Lights
IFR	Instrument Flight Rules (FAR Part 91)
MALSR	Medium Intensity Approach Lights with Runway Alignment Indicator Lights
MLS	Microwave Landing System
MSL	Mean Sea Level
NAVAID	Navigational Aid
NDB	Non-Directional Beacon
NPI	Non-Precision Instrument
OFA	Object Free Area
OFZ	Obstacle Free Zone
OPBA	Operations Per Based Aircraft
PAPI	Precision Approach Path Indicator
PMAD	Peak Month Average Day
REIL	Runway End Identification Lights
RSA	Runway Safety Area
TACAN	Tactical Air Navigation
TAF	Terminal Area Forecast
TRACON	Terminal Radar Approach Control
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rule (FAR Part 91)
VOR	Very High Frequency Omni-Directional Range
VORTAC	Very High Frequency Omni-Directional Radar Tactical Air Navigation
WAAS	Wide Area Augmentation System

Friedman Memorial Airport
Master Plan Update

Appendix B/**True Market Estimate**

Appendix B

Friedman Memorial Airport - True Market Estimate
Calendar Year 2000

Rank	Airport	Initiated O&D Paxs	SUN Retention	Initiated Paxs Generated	Referred Paxs Generated	Total O&D Paxs Generated	Percent of Total
1	Seattle/Tacoma, WA	6,210	78.6%	7,904	95,709	103,613	26.0%
2	Los Angeles, CA	3,930	72.4%	5,431	39,222	44,652	11.2%
3	San Francisco, CA	2,010	73.9%	2,721	17,544	20,264	5.1%
4	Orange County, CA	1,640	68.8%	2,385	16,675	19,061	4.8%
5	Portland, OR	2,460	24.1%	10,218	8,303	18,521	4.6%
6	New York JFK, NY	1,070	100.0%	1,070	14,035	15,105	3.8%
7	San Diego, CA	1,360	54.4%	2,501	10,492	12,992	3.3%
8	San Jose, CA	970	65.4%	1,484	9,345	10,829	2.7%
9	Salt Lake City, UT	1,060	71.8%	1,476	9,345	10,821	2.7%
10	New York Newark, NJ	570	69.2%	823	7,261	8,084	2.0%
11	Oakland, CA	880	14.3%	6,160	1,320	7,480	1.9%
12	Spokane, WA	720	17.2%	4,176	2,571	6,747	1.7%
13	Tucson, AZ	960	15.8%	6,080	452	6,532	1.6%
14	Chicago O'Hare, IL	490	59.5%	824	5,419	6,244	1.6%
15	Phoenix, AZ	660	64.3%	1,027	5,003	6,029	1.5%
16	Boston, MA	480	81.8%	587	4,968	5,555	1.4%
17	Atlanta, GA	400	64.7%	618	4,447	5,065	1.3%
18	Washington Dulles, DC	340	94.4%	360	4,308	4,668	1.2%
19	Saint Louis, MO	480	13.3%	3,600	1,042	4,642	1.2%
20	Denver, CO	390	69.3%	563	3,682	4,245	1.1%
21	Sacramento, CA	320	75.0%	427	3,752	4,179	1.0%
22	Philadelphia, PA	270	91.7%	295	3,613	3,908	1.0%
23	Minneapolis, MN	230	65.2%	353	3,161	3,514	0.9%
24	Las Vegas, NV	450	62.4%	722	2,501	3,223	0.8%
25	Ontario, CA	270	78.3%	345	2,849	3,194	0.8%
26	Kansas City, MO	230	46.2%	498	2,467	2,965	0.7%
27	Dallas/Fort Worth, TX	230	65.6%	350	2,571	2,921	0.7%
28	Orlando, FL	230	57.5%	400	2,223	2,623	0.7%
29	Albuquerque, NM	230	59.1%	389	2,050	2,439	0.6%
30	Cincinnati, OH	210	50.0%	420	1,598	2,018	0.5%
31	Houston Inter., TX	130	66.7%	195	1,529	1,724	0.4%
32	Fort Lauderdale, FL	130	50.0%	260	1,459	1,719	0.4%
33	Anchorage, AK	140	100.0%	140	1,529	1,669	0.4%
34	Austin, TX	180	33.3%	540	1,112	1,652	0.4%
35	Pittsburgh, PA	180	33.3%	540	1,042	1,582	0.4%
36	Raleigh/Durham, NC	120	62.5%	192	1,390	1,582	0.4%
37	Grand Junction, CO	210	50.0%	420	1,146	1,566	0.4%
38	Palm Springs, CA	210	57.7%	364	1,181	1,545	0.4%
39	Boise, ID	120	100.0%	120	1,424	1,544	0.4%
40	New Orleans, LA	170	63.6%	267	1,216	1,483	0.4%
41	Baltimore, MD	200	33.3%	600	869	1,469	0.4%
42	Fresno, CA	190	50.0%	380	1,077	1,457	0.4%
43	Reno, NV	160	72.7%	220	1,216	1,436	0.4%
44	Eugene, OR	100	40.0%	250	1,077	1,327	0.3%
45	West Palm Beach, FL	130	63.0%	206	1,112	1,318	0.3%
46	Nashville, TN	100	50.0%	200	1,112	1,312	0.3%
47	Tampa, FL	120	76.5%	157	1,112	1,269	0.3%
48	Detroit, MI	100	66.7%	150	1,077	1,227	0.3%
49	Cleveland, OH	130	45.5%	286	903	1,189	0.3%
50	New York La Guardia, NY	160	50.0%	320	834	1,154	0.3%
Total of Above		32,730	8.6%	70,012	311,341	381,353	95.7%
Total of All Markets		**37,280**	**61.9%**	**60,180**	**338,369**	**398,549**	**100.0%**

Sources: SUN Ticket Lift Survey, 2001 and U.S. DOT data.

Friedman Memorial Airport
Master Plan Update

Appendix C/**Terminal Space Program**

Appendix C
Terminal Space Program

This section provides passenger terminal recommendations for current and projected demand, based on passenger enplanements and potential aircraft types serving the Wood River Valley

- Existing Passenger Terminal Building
- Passenger Terminal Building Space Recommendations
- Space Recommendation Conclusions

1. Existing Passenger Terminal Building

The existing Friedman Memorial Airport passenger terminal building is a one-story high building located approximately midway along the west side of Runway 13/31. The terminal building has a total existing gross square footage of 14,318 SF, which does not include overhang or canopy areas. The original terminal was constructed in 1976. A renovation and addition project occurred in 1985, in which approximately 2,000 SF was added to improve public restrooms, passenger waiting areas, queuing areas in front of ticketing counters, and water and sewer lines. In 1991, a new baggage claim wing, departure lobby and entry were added onto the terminal. The carpeting was replaced at this time and the existing sprinkler system revamped. New ADA bathrooms were added on the south side of the terminal building in 1995. The most recent renovation consisting of reconstruction of the original restrooms, replacement of the entryway subfloor and carpeting took place in 2001.

This existing facility houses two airline ticketing counters with adjacent airline offices and exclusive baggage make-up space, three rental car counters, a small snack/gift shop retail concession, a retail art gallery, baggage claim facilities, two sets of non-secured restrooms, and a secured departure lounge. Airport administration functions are conducted in a separate building adjacent to the terminal.

2. Passenger Terminal Building Space Recommendations

Passenger terminal facilities are functionally divided into two categories, usable and unusable space. The former is sub-divided into revenue generating and non-revenue generating areas, which in turn are further sub-divided into the following sub-categories:

Usable space

Revenue generating:
- Airline spaces include ticketing counters, ticketing offices and baggage make-up areas. These spaces are leased from the airport for the use of conducting airline operations.
- Concessions are spaces leased by various tenants to conduct business at the Airport. Storage areas maintained by tenants are also considered concession areas.

Non-revenue generating:
- Public spaces include circulation, lobby, waiting and seating areas, public conference rooms, secured and non-secured restrooms, secured hold rooms, baggage claim and passenger queuing areas.
- Support spaces include mechanical, electrical, communication rooms, general airport storage and maintenance spaces, and airport security stations.
- Non-public common spaces such as the baggage claim input area.

Non-usable space

- Building structure, atriums and utility chases

Space recommendations, in terms of size and layout, contribute to the efficiency of an airport's operations and have to be analyzed prior to development. The space recommendations of a terminal facility are dependent on peak hourly demand activity, which is determined from the seating capacity and boarding load factors of aircraft serving the airport. Presently, the DeHavilland Dash 8-200 and Q400, with seating capacities of 37 and 70 seats, respectively; and the Embraer 120, with 30 seats, are the aircraft types being used. Projected utilization of regional jets is factored into the analysis, as presented in Table C-1.

Table C-1
Projected Peak Hourly Total Passengers

Demand Level (annual enplanements)	Peak Hour Enplanements	Peak Hour Deplanements	Total Peak Hour Passengers
66,000 1/	55	55	110
89,000	74	74	148
104,000	87	87	174
140,000	116	116	232
200,000	167	167	334

Note: [1]Existing data from 2002 peak hour boarding load factors and flight schedule.
Source: Mead & Hunt, Inc.

From the Airport's current flight schedule, an afternoon peaking characteristic is present, with three aircraft enplaning/deplaning within a one-hour period. The current (2002) peak hour total passenger number of 110 was determined using a 45.2% boarding load factor which was derived from existing data collected from airlines. Current peak hour total passengers equal 110, of which 55 are assumed to be peak hour enplaning passengers (PHEP) and 55 are assumed to be peak hour deplaning passengers (PHDP). For the period beyond 2002, projections are based on preferred enplanement, peaking and boarding load factors documented in Chapter 2, *Projections of Aviation Demand*.

With the above assumptions, Table C-2 was developed to quantitatively show the current and projected square footage recommendations for the passenger terminal building. Approximately 20,458 gross square feet was calculated to be the recommended area for 2002 and the projected square footage recommendations at the various peak hourly enplanement levels are 26,294 SF, 29,457 SF, and 37,456 SF, respectively. In the contingency demand scenario, approximately 52,900 SF is recommended. Detailed descriptions of the individual spaces, and the methodologies used to calculate the projected space recommendations, are further elaborated in the following subsection.

Revenue Generating Space

Current revenue generating space totals approximately 24% of the usable area. Revenue generating space includes areas leased by airlines for ticketing counters, offices, storage, and baggage make-up. Retail concessions and other lease spaces within the Passenger Terminal Facility are also included in this category, as is Transportation Security Administration (TSA) administrative and personnel spaces (for future facility planning). All available lease spaces within the terminal building are currently occupied.

Table C-2
Terminal Space Recommendations

	Existing Space	Projected Demand Scenarios (Recommended Space)				
Annual Enplanements	66,292	66,292	88,979	104,285	139,141	200,000
Peak Hour Enplaned Pax	55	55	74	87	116	167
Peak Hour Deplaned Pax	55	55	74	87	116	167
Peak Hour Total Pax	110	110	148	174	232	334
Airline Space						
Airline Ticketing						
ATO Counter - LF	42	36	48	48	60	86
ATO Office Area	1,346	1,260	1,680	1,680	2,100	3,019
Baggage Make-Up	1,588	1,100	1,485	1,737	2,311	3,322
Baggage Claim						
Bag Input	0	1,230	1,230	1,230	1,230	2,130
Bag Belt - LF	42	75	95	109	139	200
Subtotal Airline Space	**2,934**	**3,590**	**4,395**	**4,647**	**5,641**	**8,470**
Revenue Space						
Rental Car						
RAC Counter - LF	21	30	40	40	40	60
RAC Office Area	285	600	800	800	800	1,200
Snack/Gift Shop	181	400	540	632	840	1,208
Other Lease Space	94	500	675	790	1,050	1,510
Subtotal Revenue Space	**560**	**1,500**	**2,015**	**2,222**	**2,690**	**3,918**
Public Space						
Public Circulation	3,698	3,900	5,265	6,160	8,193	11,776
Public Lobby/Seating	940	1,150	1,553	1,816	2,416	3,473
ATO Queue Area	420	720	960	960	1,200	1,680
Bag Claim PAX Area	1109	1,495	2,018	2,361	3,141	4,514
RAC Queue Area	236	300	400	400	400	600
Security Queue Area	100	200	270	316	420	604
Passenger Hold Room (secured)	1,667	1,238	1,671	1,955	2,600	3,737
Gates	2	2	2	2	3	3
Restrooms (Secured)	0	300	405	474	630	906
Restrooms (Non-Secured)	560	545	736	861	1,145	1,646
Subtotal Public Space	**8,730**	**9,848**	**13,227**	**15,303**	**20,145**	**28,936**
Support Space						
Airport Administration	0	1,600	1,600	1,600	1,800	1,800
Airport Security	788	1,100	1,485	1,737	2,311	3,322
Mechanical/Electrical/Storage	161	1,320	1,670	1,921	2,399	3,449
Subtotal Support Space	**949**	**4,020**	**4,755**	**5,259**	**6,510**	**8,570**
Building Structure/ Non-usable Space	**1,145**	**1,500**	**1,791**	**2,026**	**2,470**	**3,011**
Total Gross SF	***14.318***	***20.458***	***26.294***	***29.457***	***37.456***	***52.904***
Revenue Space	3,494	3,860	5,180	5,639	7,101	10,258
Non-Revenue Space	9,479	15,098	19,262	21,792	27,884	39,636

Notes: All figures represent square foot (SF) unless otherwise noted.
Some numbers may not add due to rounding.
[1]Existing data from 2002 peaking calculations.

Sources: Terminal Floor Plans,
FAA AC150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*,
FAA AC150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations*
Mead & Hunt, Inc.

Airline Space. Airline space includes areas used by airlines to conduct passenger services as well as airline administrative functions. These include airline ticketing counters, airline ticketing and operations offices, storage and baggage make-up. Currently, there are two existing airlines operating out of two ticketing counters: Horizon Air and Skywest. The recommended areas were calculated based on typical counter lengths, number of agent positions and office depths recommended in the FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities.* Input from airline representatives, and consultant established criteria for the various demand scenarios defined in Chapter Two, *Projections of Aviation Demand* are also factored in.

Airline Ticketing Counter

Ticketing transactions and baggage check-in are conducted at the airline ticketing counter prior to enplanement. Airlines have exclusive use of these spaces and any planning or design work will involve coordination with the respective airlines.

The existing airline ticketing counters total 42 lineal feet (LF) in length, with Horizon Air occupying 24.3 feet and Skywest occupying 17.7 feet. Altogether the counter accommodates eight agent positions, four for each airline. Of the eight positions, two of Horizon's are sub-standard and a small section of Skywest's is occupied by a column. Based on the FAA's requirements for non-hub airports, peak hour enplanements and feedback from airline representatives, a total of six agent positions was calculated to be adequate for 2002. Using the FAA's recommended counter length of 12 feet for a two position, baggage service counter, the total length recommended for 2002 would be 36 feet. This number is projected to grow to 60 feet with the addition of two more agent positions each by the year 2022. Two airline counters are projected to be adequate for the entire planning period although possible locations for a third carrier should be investigated during the planning phase. Should enplanements reach the contingency demand scenario level, an additional 24 feet of counter would be warranted.

Airline Ticketing and Operations (ATO) Office

Due to the size and operation of the Airport, these functions should be centralized behind or adjacent to the ticketing counter. Airline ticketing offices include the area behind the ticketing counter and the adjacent offices for use by staff to handle related administrative duties. Storage and break rooms are included in these spaces. The operation's office supports activities such as accounting, management, communications, reservations, and vehicle and equipment storage. The base 2002 recommended area was calculated using the counter length multiplied by a functional depth of 35 feet. This projection takes into consideration the addition of baggage conveyor belts within the space in the future. The result is 1,260 SF of recommended Airline Ticketing and Operations office space for 2002. The existing ATO area totals 1,346 SF, which includes the Airport storage space that was renovated to accommodate displaced Skywest offices when the TSA baggage screening area was incorporated. With the projected increase in enplanements, ATO space of 3,019 SF is recommended.

Baggage Make-up Area

The Baggage Make-up Area is used for sorting and loading of baggage onto carts to be towed to the enplaning aircraft. Baggage is manually carried between the common TSA baggage screening area and baggage make-up currently. Approximately 1,588 SF of space exists but only 1,100 SF is recommended for 2002. This number was determined by applying a 20 SF per PHEP ratio. In an ideal scenario, the existing spaces would be adequate for conducting bag make-up operations as well as maintain some equipment storage. In reality, the shallowness of the existing bag make-up spaces, and in Horizon's area, the existence of two structural columns, create an inefficient operational space. Based on our experience, a functional depth of 30 feet has been found to be more appropriate for this type of operation. Although physically adequate for 2002, improvements should commence prior to the facility being undersized in 2012. The amount of space recommended for baggage makeup is projected to increase to 3,322 SF in the high growth scenario.

Concessions. Non-airline concession spaces include areas leased out by the Airport to generate revenue and include car rental services, food and beverage concessionaires, and other private businesses. Current total concession areas equal approximately 560 SF.

Rental Car Space

Existing rental auto concession (RAC) areas total 285 SF and are operated by three operators, Budget, Avis and Hertz. The total active counter length equals 21 LF with each rental space having a width of 9 ½ feet. These spaces do not have an adjacent private office for administrative use. A fourth rental space of similar size is currently being leased out to an art gallery proprietor. The recommended 2002 RAC areas were calculated based on a minimum functional counter length of 10 feet each, and a depth of 20 feet for office and counter space. This results in each RAC area being 200 SF, which should remain adequate throughout the planning period. In a high growth scenario, an additional 20 feet of counter length would be recommended to account for expansion to existing counters and addition of a fourth rental company.

Queuing space was calculated using a 10-foot queuing depth, which resulted in 300 SF of space for 2002. This space recommendation will increase depending on the addition of future RAC counters. The queuing area is considered a non-revenue generating public space.

Food, Beverage and Gift Shop Concession

Food, beverage and gift shop services are provided by a single concessionaire. The existing facility consists of an L-shaped counter and offers pre-packaged snacks and drinks and a small selection of gift/news items. It currently occupies 181 SF of space, of which approximately 39 SF is a remote storage space. The location of this retail service in the unsecured waiting area is appropriate but its layout is highly undesirable. Alternatively, a location within the hold room area could be beneficial and should be considered. The existing facility is grossly undersized and limits the food and beverage options that could be supported in an airport this size. A minimum of 400 SF is recommended for current demand and an estimated 1,208 SF would be supportable under the contingency demand scenario

Other Leased Space

The fourth car rental space (94 SF) is currently being leased to a local artist. No additional spaces are available for lease. In determining 2002 recommendations, provisions for TSA support facilities such as a breakroom for personnel and an office for a supervisory officer have been included. Although certain TSI space is currently located off-site (due to lack of available lease space), these functions are more appropriate to be placed in near proximity to the terminal. A total of 500 SF is adequate for current demand levels, with up to 1,510 SF recommended under the contingency demand scenario.

Non-Revenue Generating Space

Non-revenue generating space ratios are generally higher than the FAA recommended standards in non-hub airports of this size as enplanement levels cannot sustain a high percentage of retail concessions. Smaller terminals are also usually expanded or renovated piecemeal and circulation inefficiencies contribute to a higher public space ratio. Non-revenue generating areas typically include lobby, waiting and seating areas, public restrooms, circulation, passenger queuing areas, mechanical rooms, storage, security stations and non-public common use areas such as baggage claim input. Total existing non-revenue generating space equals 9,486 SF, which is equivalent to 73% of the airport's usable area.

Public Space

Public Circulation, Lobbies, Waiting Areas and Seating

Public circulation usually accounts for approximately 20-30% of the terminal building's usable area and consists of the passenger queuing areas and circulation walkways connecting the various terminal spaces. This high ratio is typical as high volume traffic is sporadic and walkways have to be designed for these peak volumes. Lower ratios would compromise the efficiency of passenger circulation. Current total circulation areas equal 3,698 SF or 28% of usable area. Using a maximum 30% ratio to account for the Airport's resort factor, the 2002 recommended circulation is 3,900 SF. Existing circulation spaces are adequate for current enplanements in theory but based on the shallowness of the terminal building, significant circulation inefficiencies exist. Improvements to bottleneck areas at ticketing, security and rental car queuing areas should be considered a priority. Public circulation recommended areas are projected to increase to 8,193 SF by 2022, and 11,776 in a high growth scenario.

The existing terminal does not have a typical airport layout with a centralized lobby through which passenger functions feed off of. Instead, it has separate enplanement and deplanement waiting areas catering to current passenger flow patterns. Total existing unsecured enplanement waiting areas measure 940 SF with an estimated 55 seats. A secondary waiting area at baggage claim has minimal seating because its location conflicts with general circulation patterns. Additional seating is located throughout the walkways that connect those two areas. Unsecured waiting areas with seating capacity are important in airports without amenities such as restrooms and snack concessions within the sterile hold room as passengers tend to wait longer in non-sterile areas in order to patronize these facilities. Based on guidelines found in FAA Advisory Circular 150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations*, approximately 1,150 SF would be recommended for 2002 enplanement levels. In an efficiently configured waiting area, each seat occupies 15 SF, which includes aisle circulation. Based on this number, approximately 76 seats could be accommodated. By 2022, the recommended area for the lobby area is projected to be 2,416 and should accommodate 160 seats. Landside waiting areas can be reduced in size if amenities are provided within the secured hold room. At a 200,000 enplanement level, the recommended lobby size would be 3,473 SF with 232 seats.

Restrooms

Existing restrooms are located adjacent to the departure waiting area and across from the ticketing counters. The total area occupied by restrooms equal 560 SF with each restroom offering two toilet fixtures each. Restroom sizes are dependant on the number of fixtures dictated by local building codes but in airports, they are typically sized more generously to facilitate peak traffic occurrences. Using the guidelines set within the FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, a ratio of 1,650 SF per 500 peak hour total passenger was applied and yielded a recommended area of 363 SF. A factor of 1.5 was applied to accommodate general public use, resulting in 545 SF. The number of landside fixtures is expected to double over the next 20 years.

Restroom facilities within the secured hold room are non-existent currently and would be an improvement suitable for the number of enplanements experienced at this Airport. Approximately 300 SF should be allocated for 2-3 stall restrooms for the convenience of passengers within the hold room. The total secured restroom area recommended is projected to be 630 SF by 2022. Total recommended restroom facilities airside and landside are projected to be 2,552 SF in a high growth scenario.

Airline Ticketing Passenger Queue Area

The queuing area is the area in front of the ticketing counters allowing passengers to wait their turn for the next available ticketing agent. This is considered a non-revenue generating public area. A queuing depth of 20 feet is the recommended allowance for this activity at a resort airport due to the higher bag to person ratio, as well as the increased numbers of oversized luggage. The recommended area is a result of this number multiplied by the projected counter length. For 2002, 420 SF exists but 720 SF is recommended. The existing queue area is highly inadequate and conflicts with general circulation patterns within the terminal. With projected growth, 1,200 SF would be recommended by the year 2022 and 1,680 for a 200,000 enplanement scenario.

Baggage Claim Area

The existing baggage claim device is a shallow sloping shelf fed directly from the exterior through three 8 foot overhead rolling slat doors. This system has been found to be insufficient as the entire 42 LF of shelf cannot be reloaded efficiently during peak periods and baggage tends to fall off the shelf. Upgrading to a baggage belt is highly recommended to reduce congestion and improve efficiency in the baggage claim area. The recommended length for 2002, as calculated by using an FAA factor of 1.2 bags per LF of baggage belt and 0.5 bags per LF of shelf. Assuming 1.5 checked bags per deplaned passenger during a peak 20-minute period, approximately 39 ft of baggage belt frontage would be recommended in 2002. Being a resort destination airport, a separate shelf frontage ratio was also projected to account for 25% of deplaned passengers carrying large sporting equipment during the same peak 20-minute period. The shelf length recommended for 2002 is 16 feet. This recommended total belt and shelf frontage is expected to grow to 140 feet by 2022, of which 123 feet would be belt frontage, and

34 would be shelf frontage. Total recommended baggage claim frontage area in a high growth scenario is estimated at 200 LF.

The baggage claim passenger area provides circulation space for passengers and their bag carts to retrieve their bags from the baggage belt. In a resort airport where baggage to passenger ratio is higher, a 20 SF per lineal foot of belt/shelf frontage is used to determine the space recommended for this function. The recommended area amounts to 1,495 SF for 2002 and increases to 3,141 SF over the next 20 years. An area of 4,514 would be recommended for a high growth enplanement level. The existing baggage claim passenger area, at 1,109 SF, is adequately sized but inefficiently laid out in relationship to the car rental counters and its queuing areas. A common complaint has been of congestion during peak winter travel months.

Baggage Claim Input Area

The baggage claim input area includes baggage cart drop-off space, equipment storage areas and circulation on the non-public side of this operation. Currently, a 14 foot deep canopy protects the three openings separating the baggage claim area from the airside input area and a defined baggage claim input area is non-existent. For planning purposes, we used a typical drive-through delivery system which improves security, operational efficiency and provides complete protection from the elements for openings and equipment, to determine the recommended area. In this case, a 30 SF per lineal foot of baggage claim input belt frontage or shelf length allowance was used to calculate adequate square footage for baggage cart maneuverability and provide some storage space. Variations on baggage input area enclosures will be discussed in the Alternatives chapter. Based on a standard drive-through configuration, the recommended space was calculated to be 1,230 SF for 2002, assuming an input belt frontage of 25 LF and a shelf input frontage of 16 LF. The size of this space is projected to be adequate to handle baggage volume over the next 20 years. An additional baggage claim input area of 900 SF would be recommended to handle volumes at the 200,000 passenger level. This would be the result of a second baggage claim device being added. The size of the baggage claim input area will vary depending on the baggage claim device configuration used.

Passenger Hold Room

Passenger hold rooms provide spaces for passenger seating, airline agent podiums for ticket collection and last minute check-in, enplaning passenger queuing areas and at times, deplaning aisles and business carrels. Hold rooms are within secured areas of the passenger terminal building and in a non-hub airport of this size, a common hold room is typical. The existing terminal has a secured hold room of 1,667 SF. All enplaning traffic exit through this secured hold room but deplaning passengers enter directly into the bag claim area. Consolidating entries and exits into the terminal from airside areas should be considered to minimize passenger confusion and improve security operations. Requirements for 2002 are based on all PHEP being in the hold room 30 minutes prior to departure and applying a 15 SF per person ratio. An additional 50% was then added to the total square footage for circulation, standing room, airline agent podiums and queuing space. The resulting hold room area recommended for 2002 is 1,238 SF. The existing hold room is projected to be adequate through 2007. This common hold room can adequately service two or three gates with access to the various aircraft parking positions. At higher enplanement levels, approximately 2,600 SF would be recommended in 2022 and 3,737 SF would be recommended when a 200,000 passenger level is achieved.

Gates

The existing passenger terminal facility currently services 12 commercial flights per day out of two gates. Future gate requirements are influenced by the number of aircraft using the gate during the peak hour, the types of aircraft serviced and the length of time occupied by an aircraft. Long term projections using the FAA's gate utilization nomograph indicate a need for three gates toward the year 2022 and beyond. Furthermore, the Airport should consider the use of enclosed passenger loading bridges in any terminal renovation project, as these provide an enhanced customer experience.

Support Space. Airport support spaces include areas serving users indirectly, such as security, janitorial and space for mechanical, electrical, plumbing, fire protection and communication equipment. Currently these spaces occupy a total of 949 SF or 7.3% of the terminal building's usable area. A breakdown of the recommended and projected support spaces is shown in Table 3-24. FAA guidelines suggest a 10-15% occupancy ratio of a building's usable area for support spaces.

Airport Administration Space

Airport administration handles the daily management activities of the airport and the spaces include a conference room, offices, support and storage spaces. The existing administrative space (approximately 1,200 SF) is located in a building adjacent the terminal building, but relocating these functions into the terminal facility has been indicated as preferable. Accordingly, 1,600 SF was determined to be an appropriate size for housing 6-7 administrative staff and a reasonably sized conference room through the mid-term. Assuming the addition of an additional staff member in the long term, there will be a projected space recommendation of 1,800 SF by 2022. This number is estimated to be sufficient through a 200,000 enplanement level.

Security

Recent security screening protocols have significantly increased the per-passenger processing time. TSA regulations and screening technology is evolving, however, and the screening speed is expected to improve over time. Currently, the security checkpoint occupies 788 SF and consists of one set of screening equipment. The 2002 recommendation of 1100 SF for checkpoint and bag screening is based on a standard TSA single-lane layout. A single lane configuration is projected to be adequate for the planning period but the addition of a second checkpoint lane is recommended beyond the 100,000 enplanement levels to increase operational efficiency and introduce an equipment redundancy factor.

Checked baggage screening functions are a recent addition to airport operations at a facility of this size. The solution that resulted from having to meet federal deadlines consists of three stations within a narrow common screening area between the two ticketing counters. Passengers are redirected to the security line following check-in at the airline counter and TSA personnel convey the bags manually to the respective airline's bag make-up area. This space currently occupies 230 SF. Although this square footage is adequate for operations using trace detection equipment, the current layout is not ideal as circulation for both TSA personnel and passengers is congested. It also does not allow for larger explosive detection equipment to be incorporated should regulations change. Approximately 400 SF in a base 2002 scenario would allow adequate flexibility in checked baggage screening operations.

Queuing spaces for both checked baggage and the security checkpoint are currently congested as they conflict with general circulation or lobby areas. A minimum of 100 SF at each location is recommended for 2002.

Mechanical, Maintenance and Storage Spaces

Currently, these support spaces are located in two rooms and occupy 161 SF. Two rooms that were being used for Airport storage have been turned into airline office space because part of their offices was converted into TSA checked baggage screening station. The terminal is lacking in storage space and mechanical area is disproportionately low for a building this size. Using an average ratio of approximately 12%, the 2002 recommended area is calculated to be 1,320 SF. These areas should grow accordingly with enplanement increases and an estimated 2,399 SF is forecasted for the year 2022. At higher growth levels, 3,449 SF would be recommended.

Non-usable Space/Building Structure. FAA guidelines recommend that building structure or non-usable space occupies 5 percent of the gross square footage of a building. This includes wall thicknesses, atriums and chases that were not accounted for in square footage take-offs for items described in Sections 3.3.1 and 3.3.2. The existing passenger terminal building has 1,145 SF of non-usable space which is approximately 9.2% of the gross terminal square footage. The high ratio is resultant of existing building layout inefficiencies. Some of these can be corrected during future renovations but non-usable space to gross square feet area will likely remain higher than FAA recommended ratios.

3. Terminal Space Recommendation Conclusions

Additional square footage is recommended for 2002 in certain areas where facilities are inadequate for efficient operations, specifically baggage claim facilities, passenger queuing areas, rental car offices, airport support areas, offices and support facilities for TSA screening personnel, and general circulation. Adding a larger food & beverage service and restrooms within the secured hold room area would enhance Airport services and increase revenue generation but are not essential. Similarly, relocating Airport administrative staff would be beneficial to operations. Actual improvement areas may depend on how high a percentage of the terminal area can be renovated for higher efficiency through renovation work of its interior layout. Airline operational demands, physical site restrictions, and structural constraints are other factors that may influence renovation or improvement options. Actual time line of renovation projects should respond to passenger load levels. Our recommendations for improvements to the Friedman Memorial Airport, based on the analysis above, include:

- Adding a baggage belt system and expanding the baggage claim operational and passenger areas for greater efficiency. Existing passenger areas conflict with queuing space of the rental car counters, causing congestion. The baggage shelf operational length is inadequate and the baggage claim passenger area is undersized. Both should be rectified immediately.

- Improving the baggage claim input area to provide higher security and protection of equipment. A drive-through enclosure is recommended. The baggage claim input area is currently housed under a canopy with three overhead doors separating the baggage claim area from the sterile baggage input area. The existing baggage claim shelf could remain for use as large equipment claim devices. Renovation of this area should be undertaken at the same time as the baggage claim area.

- Improving general circulation and queuing areas will require additions to the existing structure at the center portion of the terminal building as the overall depth is not sufficient to handle the various activities that occur there. This effort would likely impact existing airline ticketing offices and include relocation of restrooms and existing mechanical facilities west of the ticketing counters.

- Increase Airport support spaces. Existing storage and mechanical spaces are in small rooms in multiple locations. Centralizing some of these functions could improve operational efficiency and free up areas for circulation use.

- Reconfiguring the rental car counters to provide more counter length and adding offices for administrative purposes.

- Reconfiguring airline ticketing space and baggage make-up areas to improve operational functions and storage capacity.

- Enlarging the retail concession space would allow additional flexibility for the retailer to improve service options. Adding restrooms and a small food concession within the secured hold room could also reduce the need for landside waiting areas. This would be a beneficial, but unessential upgrade, for passengers and possibly for the concessionaire who would have a captive market within the hold room area.

- Providing support spaces and offices for TSA staff that are close in proximity to their screening stations.

- Relocating Airport administrative staff from their remote location. Existing administrative facilities are undersized but may serve well as administrative office space for TSA personnel.

- Any major terminal building improvement project should consider the use of enclosed passenger loading bridges.

Friedman Memorial Airport
Master Plan Update

Appendix D/**Alternative Plan Concepts**

PRO:
- MINIMIZES THE AIRPORT'S IMPACT ONTO ADJACENT PROPERTIES.
- NO CHANGES ANTICIPATED FOR THE PLANNED TLS INSTALLATION.

CON:
- REQUIRES 3.4 ACRES OF RPZ PROPERTY ACQUISITION.
- REDUCES RUNWAY 31 LDA 1270' – FROM 6602' TO 5332'.
- REDUCES RUNWAY RUNWAY 13 TORA 700' – FROM 6952' TO 6252'.
- REDUCES RUNWAY 13 LDA AND RUNWAY 31 TORA AND ASDA.
- DOES NOT PROVIDE RECOMMENDED RUNWAY LENGTH OF 7400'.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	6252	6952	6952	5302
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5302	6952	6033	5332
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 1 DESCRIPTION:
REVISE DECLARED DISTANCES SO THAT FAA ARC C–III RPZ'S REMAIN LARGELY ON AIRPORT PROPERTY AND DO NOT EXTEND ANY FARTHER OFF THE AIRPORT THAN THE CURRENT FAA ARC B–III RPZ'S

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo, Airport Layout Plan-2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-1

0 600 ft.

north

Runway Length Alternative 1

PRO:
- NO MODIFICATIONS TO PLANNED TLS INSTALLATION AS THE RUNWAY 31 END IS UNCHANGED.

CON:
- REQUIRES 16.4 ACRES OF RPZ PROPERTY ACQUISITION.
- REDUCES RUNWAY 31 LDA 569' – FROM 6602' TO 6033'.
- REDUCES RUNWAY 31 TORA AND ASDA.
- DOES NOT PROVIDE RECOMMENDED RUNWAY LENGTH OF 7400'.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	6952	6952	6952	5451
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5451	6952	6033	6033
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 2A DESCRIPTION:
REVISE DECLARED DISTANCES TO PROVIDE FULL RSA ON NORTH END AND MAINTAIN RUNWAY 31 DEPARTURE RPZ LARGELY ON AIRPORT PROPERTY

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-2

0 800 ft.

north

Runway Length Alternative 2A

PRO:
- MAXIMIZES RUNWAY LENGTH ATTAINABLE WITHIN EXISTING AIRPORT PROPERTY LINE.
- INCREASES RUNWAY 13 TORA/TODA/ASDA 200' – FROM 6952' TO 7152'.
- INCREASES RUNWAY 13 LDA AND RUNWAY 31 TODA.

CON:
- REQUIRES 19.7 ACRES OF RPZ PROPERTY ACQUISITION.
- REDUCES RUNWAY 31 LDA 369' – FROM 6602' TO 6233'.
- REDUCES RUNWAY 31 TORA AND ASDA.
- DOES NOT PROVIDE RECOMMENDED RUNWAY LENGTH OF 7400'.
- INCREASES FAR PART 77 PENETRATIONS OF THE RUNWAY 31 APPROACH SURFACE.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	7152	7152	7152	5651
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5651	7152	6233	6233
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 2B DESCRIPTION:
REVISE DECLARED DISTANCES TO PROVIDE FULL RSA ON NORTH END AND
MAINTAIN RUNWAY 31 DEPARTURE RPZ LARGELY ON AIRPORT PROPERTY
EXTEND RUNWAY & SAFETY AREA ON SOUTH END TO THE PROPERTY LINE (200')

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-3

0 800 ft.

north

Runway Length Alternative 2B

PRO:
- MAINTAINS EXISTING RUNWAY 31 LDA AT 6602'.
- INCREASES RUNWAY 13 TORA/TODA/ASDA 200' – FROM 6952' TO 7152'.
- INCREASE RUNWAY 13 LDA AND RUNWAY 31 TODA.

CON:
- REQUIRES STATE HIGHWAY 75 RELOCATION
- REDUCES DESIGN SPEED OF STATE HIGHWAY 75 TO APPROXIMATELY 30 MPH.
- REDUCES RUNWAY 31 TORA.
- REQUIRES AT LEAST 4.5 ACRES OF PROPERTY ACQUISITION FOR ROADWAY RELOCATION AND 17.6 ACRES OF RPZ PROPERTY ACQUISITION.
- INCREASES FAR PART 77 PENETRATIONS OF THE RUNWAY 31 APPROACH SURFACE.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.
- DOES NOT PROVIDE RECOMMENDED RUNWAY LENGTH OF 7400'.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	7152	7152	7152	5651
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5651	7152	6602	6602
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 3 DESCRIPTION:
RELOCATE STATE HIGHWAY 75 OUTSIDE OF RSA AND
EXTEND RUNWAY & SAFETY AREA ON SOUTH END TO PROPERTY LINE (200')

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-4

0 800 ft.

north

Runway Length Alternative 3

Ex 4-05 alt 4

PRO:
- ENHANCES SAFETY FOR RUNWAY 31 OVERRUNS.
- MAINTAINS NEARLY ALL EXISTING DECLARED DISTANCES.
- MINIMIZES THE AIRPORT'S IMPACT ONTO ADJACENT PROPERTIES.
- NO MODIFICATIONS TO PLANNED TLS INSTALLATION AS THE RUNWAY 31 END IS UNCHANGED.

CON:
- EMAS IS NOT A SUBSITUTE FOR, NOR EQUIVALENT TO, ANY LENGTH OR WIDTH OR RUNWAY SAFETY AREA.
- REQUIRES 16.4 ACRES OF RPZ PROPERTY ACQUISITION.
- REDUCES RUNWAY 31 TORA.
- AN RSA DETERMINATION FROM THE FAA REGIONAL AIRPORTS DIVISION MANAGER WOULD BE REQUIRED FOR THE CONTINUATION OF THE EXISTING DECLARED DISTANCES AS THE FULL SAFETY AREA IS NOT PROVIDED ON THE NORTH END.
- DOES NOT PROVIDE RECOMMENDED RUNWAY LENGTH OF 7400'.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	6952	6952	6952	5451
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5451	6952	6602	6602
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 4 DESCRIPTION:
INSTALL ENGINEERED MATERIALS ARRESTING SYSTEMS (EMAS) FOR RUNWAY 31 AIRCRAFT OVERRUNS AND OBTAIN AN RSA DETERMINATION FROM THE FAA REGIONAL AIRPORTS DISTRICT MANAGER THAT FULL SAFETY AREA COMPLIANCE IS NOT PRACTICABLE

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-5

0 800 ft.

north

Runway Length Alternative 4

PRO:
- MAINTAINS EXISTING RUNWAY 31 LDA AT 6602'.
- INCREASES RUWNAY 13 TORA/TODA/ASDA 569' – FROM 6952' TO 7521'.
- INCREASES RUNWAY 13 LDA AND RUNWAY 31 TORA AND TODA.
- PROVIDES 7521' FOR TAKEOFF ON RUNWAY 13, MEETING RECOMMENDED RUNWAY LENGTH OF 7400'.

CON:
- REQUIRES AT LEAST 6.3 ACRES OF PROPERTY ACQUISITION FOR RSA AND OFA EXTENSION TO THE SOUTH AND 19.7 ACRES OF RPZ PROPERTY ACQUISITION.
- INCREASES FAR PART 77 PENETRATIONS OF THE RUNWAY 31 APPROACH SURFACE.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	7521	7521	7521	6020
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	6020	7521	6602	6602
(EXISTING)	(6002)	(6952)	(6602)	(6602)

ALTERNATIVE 5 DESCRIPTION:
SHIFT RUNWAY 569' TO THE SOUTH TO PROVIDE FULL SAFETY AREA ON NORTH END AND MAINTAIN RUNWAY 31 LDA

Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

Exhibit D-6

0 800 ft. north

Runway Length Alternative 5

PRO:
- INCREASES RUNWAY 13 TORA/TODA/ASDA 384' – FROM 6952' TO 7336'
- MAINTAINS CURRENT RUNWAY 31 LDA.

CON:
- RSA DEFICIENCIES OF 0.19 ACRES EXIST OFF THE NORTH END OF THE RUNWAY.
- RSA DEFICIENCIES OF 2.12 ACRES EXIST OFF THE SOUTH END OF THE RUNWAY.
- AN RSA DETERMINATION FROM THE FAA REGIONAL AIRPORTS DIVISION WOULD BE REQUIRED FOR THE RSA DEFICIENCIES THAT ARE REQUIRED UNTIL SUCH TIME AS A NEW FACILITY CAN BE BUILT FOR THE ACCOMMODATION OF C–III AIRCRAFT.
- INCREASES FAR PART 77 PENETRATIONS OF THE RUNWAY 31 APPROACH SURFACE.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.

REVISED DECLARED DISTANCES (APPROX.):

	TORA	TODA	ASDA	LDA
RUNWAY 13	7336	7336	7336	5451
(EXISTING)	(6952)	(6952)	(6952)	(5451)
RUNWAY 31	5451	7336	6602	6602
(EXISTING)	(6002)	(6952)	(6602)	(6602)

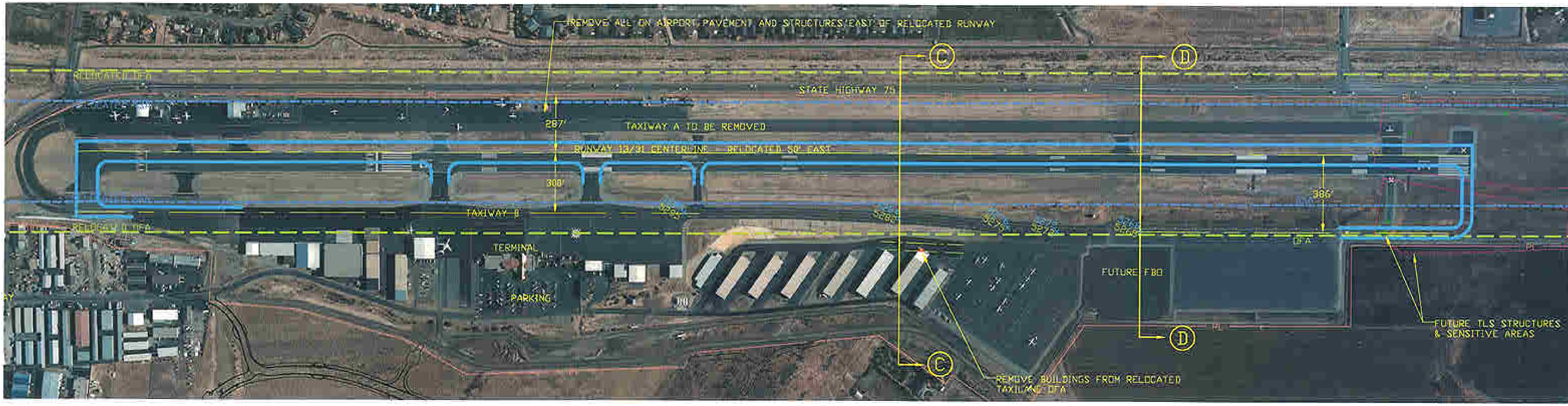
ALTERNATIVE 6b DESCRIPTION:
SHIFT RUNWAY 385' SOUTH TO BALANCE NORTH & SOUTH RSA PROVIDED AND OBTAIN RSA DETERMINATION FROM THE FAA REGIONAL AIRPORTS DISTRICT MANAGER THAT FULL SAFETY AREA COMPLIANCE IS NOT PRACTICABLE.

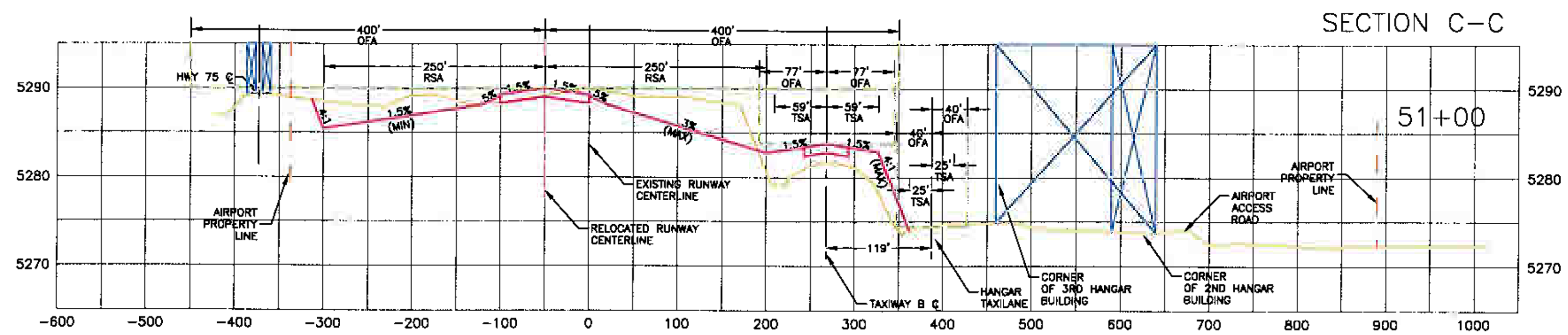
Note: Runway length alternatives address the issue of length only and do not imply compliance with FAA standards laterally.
Source: Aerial Photo; Airport Layout Plan, 2002
Prepared by: Mead & Hunt, Inc.

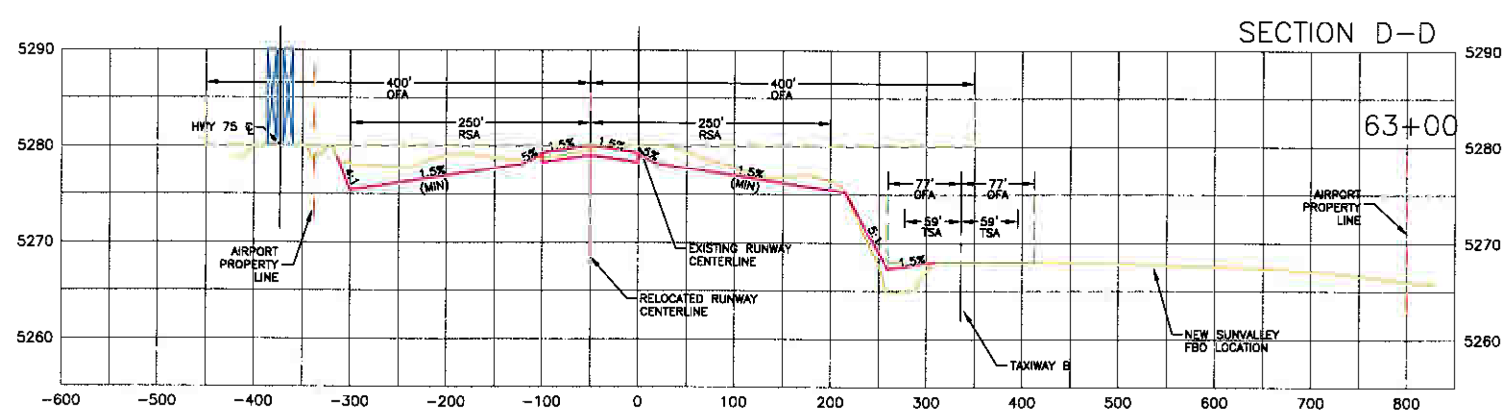
Exhibit D-7

0 800 ft. north

Runway Length Alternative 6







PRO:
- PROVIDES REQUIRED 300' RUNWAY TO TAXIWAY SEPARATION.
- DECREASES LONGITUDINAL GRADING FOR PROPOSED TAXIWAY B-8.

CON:
- REQUIRES RELOCATION OF RUNWAY 13/31.
- INCREASES OFA PENETRATIONS ON EAST SIDE OF RUNWAY AND WILL REQUIRE AN INCREASED MODIFICATION TO STANDARD FROM THE FAA (287' FROM RELOCATED RUNWAY CENTERLINE TO PROPERTY LINE). TO MAINTAIN EXISTING OFA MODIFICATION TO STANDARD REQUIRES RELOCATION OF ROAD AND RIGHT-OF-WAY 50 FEET EAST.
- STATE HIGHWAY 75 BECOMES INCREASED FAR PART 77 PENETATION.
- REQUIRES REMOVAL OF ALL EAST SIDE PARALLEL TAXIWAYS.
- REQUIRES TAXIWAY B ELEVATION CHANGES SOUTH OF TAXIWAY B-6.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.
- ELIMINATES ALL STORMWATER AND SNOW STORAGE AREAS BETWEEN RUNWAY AND TAXIWAY.

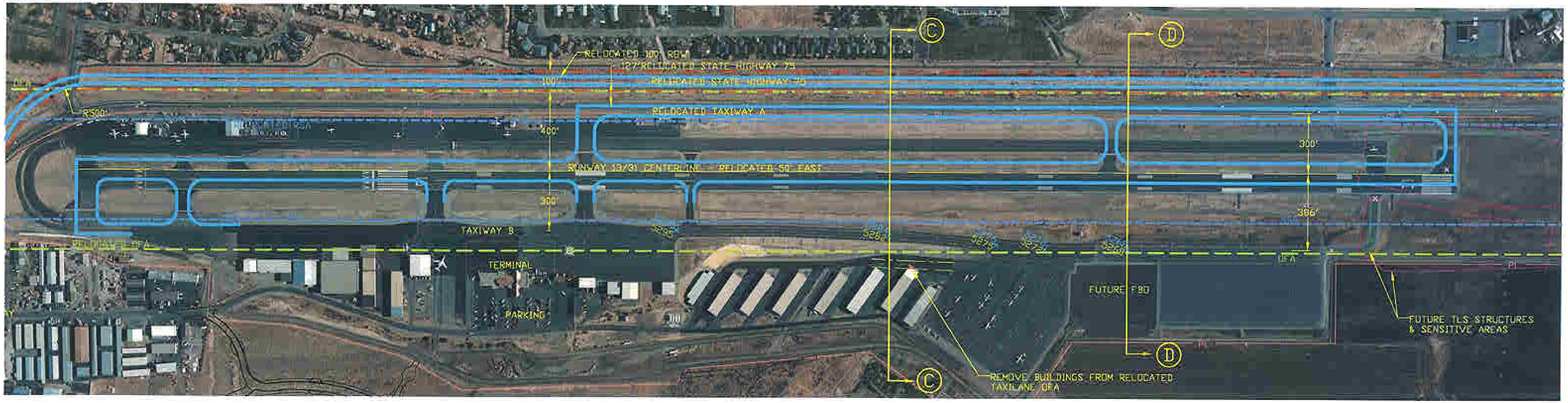
ALTERNATIVE A1 DESCRIPTION:
SHIFT RUNWAY 50' EAST

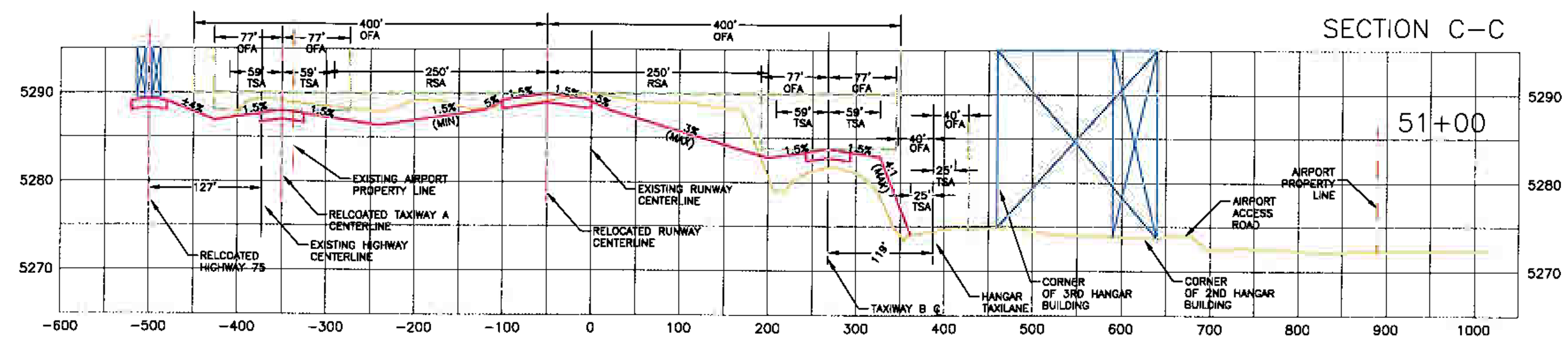
Source: Aerial Photo, Toothman-Orton Airport Cross Sections
Prepared by: Mead & Hunt, Inc.

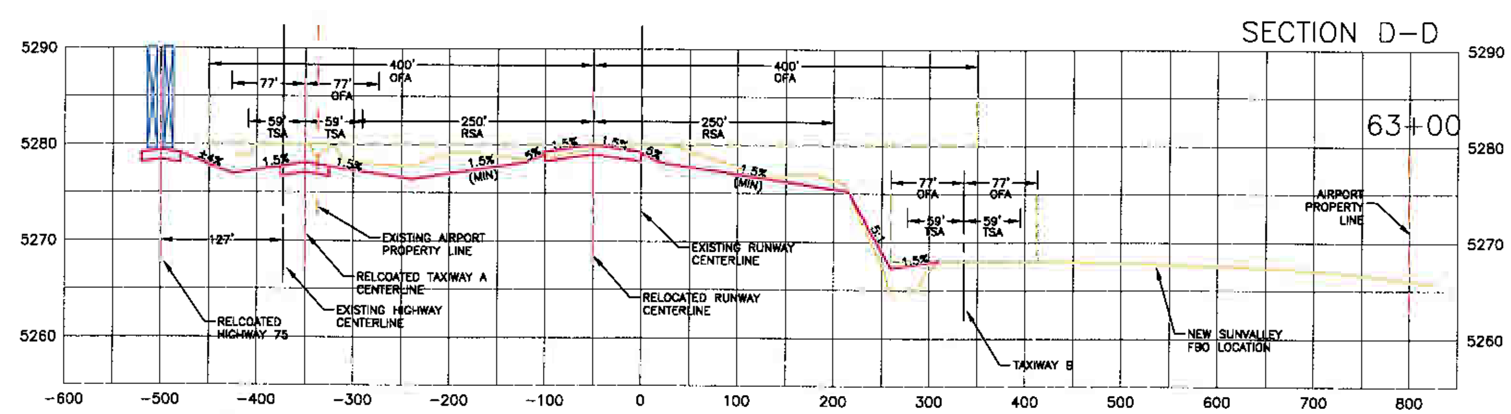
Exhibit D-8

0 500 ft.
Plan View Scale
north

Lateral Runway/Taxiway Improvements Alternative A1







PRO:
- PROVIDES REQUIRED 300' RUNWAY TO TAXIWAY SEPARATION.
- PROVIDES FULL RUNWAY OFA ON EAST SIDE.
- PROVIDES ADEQUATE SEPARATIONS FOR PARALLEL TAXIWAYS ON BOTH SIDES OF RUNWAY.

CON:
- REQUIRES RELOCATION OF RUNWAY 13/31.
- REQUIRES RELOCATION OF STATE HIGHWAY 75.
- REQUIRES TAXIWAY B ELEVATION CHANGES SOUTH OF TAXIWAY B-6.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.
- ELIMINATES ALL STORMWATER AND SNOW STORAGE AREAS BETWEEN RUNWAY AND TAXIWAY.

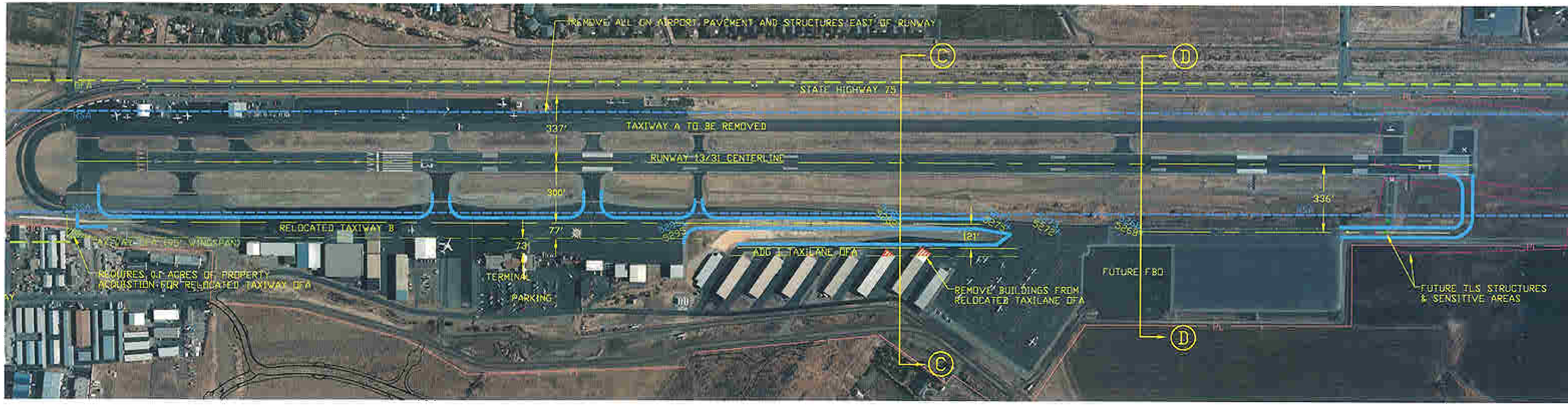
ALTERNATIVE A2 DESCRIPTION:
SHIFT RUNWAY 50' EAST AND
RELOCATE STATE HIGHWAY 75 127' EAST

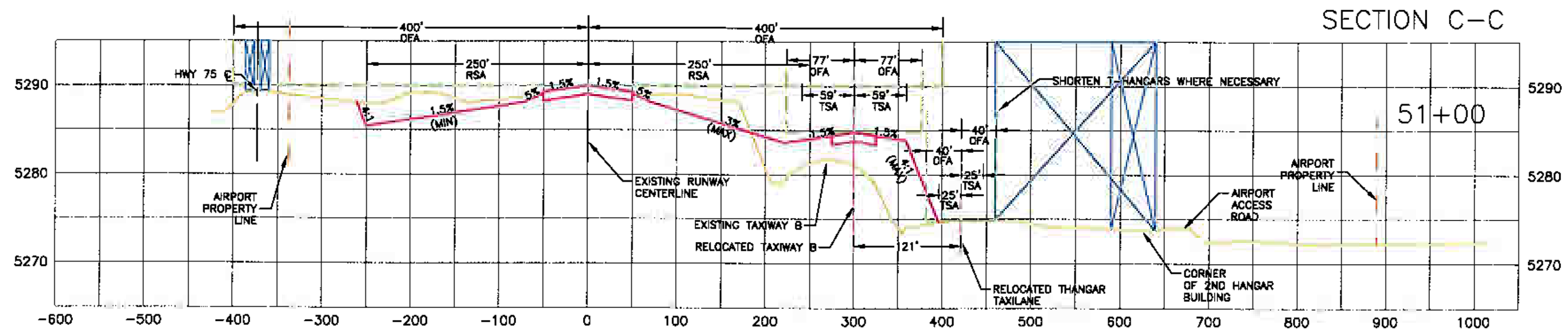
Source: Aerial Photo, Toothman-Orton Airport Cross Sections
Prepared by: Mead & Hunt, Inc.

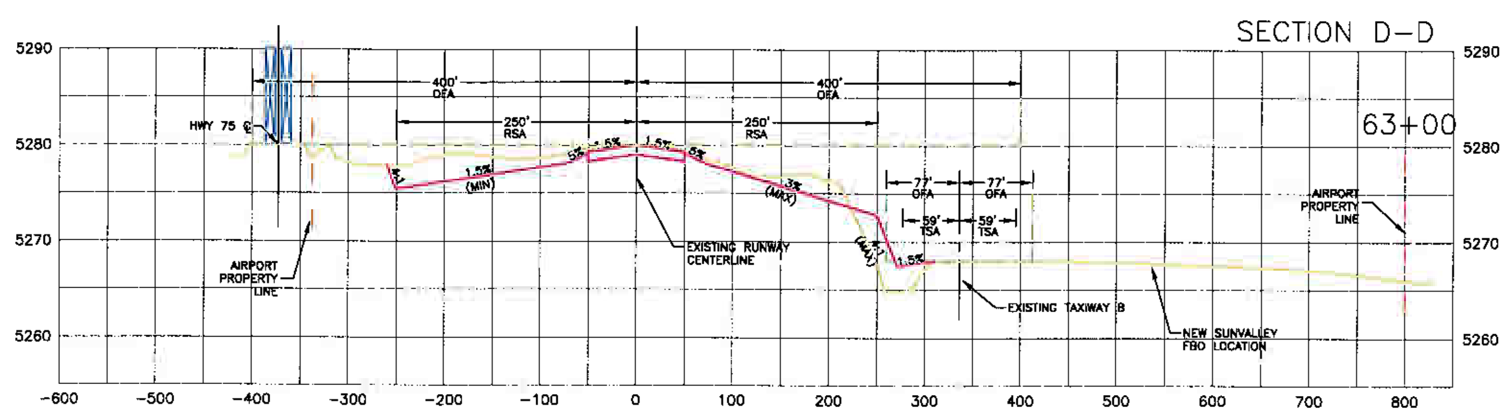
Exhibit D-9

0 500 ft.
Plan View Scale
north

Lateral Runway/Taxiway Improvements
Alternative A2







PRO:
- PROVIDES REQUIRED 300' RUNWAY TO TAXIWAY SEPARATION.

CON:
- ELIMINATES VIRTUALLY ALL AIRCRAFT PARKING IN FRONT OF TERMINAL BUILDING.
- ELIMINATES HOLD APRONS ON TAXIWAY B.
- REQUIRES 0.1 ACRES OF LAND AQUISITION FOR TAXIWAY RELOCATION.
- REQUIRES REMOVAL OF ALL EAST SIDE PARALLEL TAXIWAYS.
- REQUIRES TAXIWAY B ELEVATION CHANGES SOUTH OF TAXIWAY B-6.
- MAY IMPACT OR REQUIRE CHANGES TO THE PLANNED TLS INSTALLATION.
- ELIMINATES ALL STORMWATER AND SNOW STORAGE AREAS BETWEEN RUNWAY AND TAXIWAY.

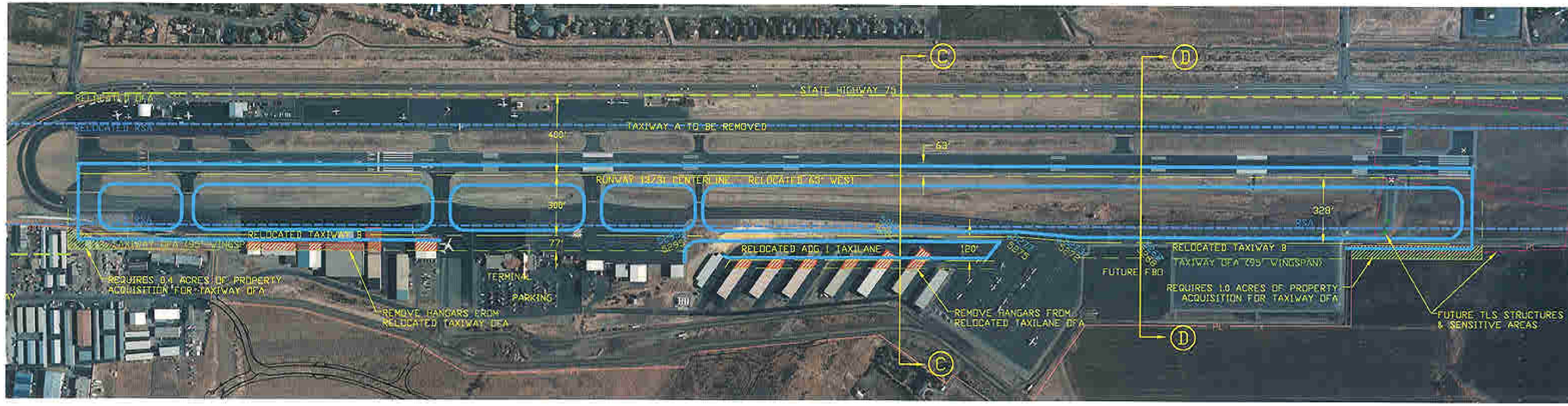
ALTERNATIVE B DESCRIPTION:
MAINTAIN RUNWAY CENTERLINE, SHIFT TAXIWAY B 50' WEST

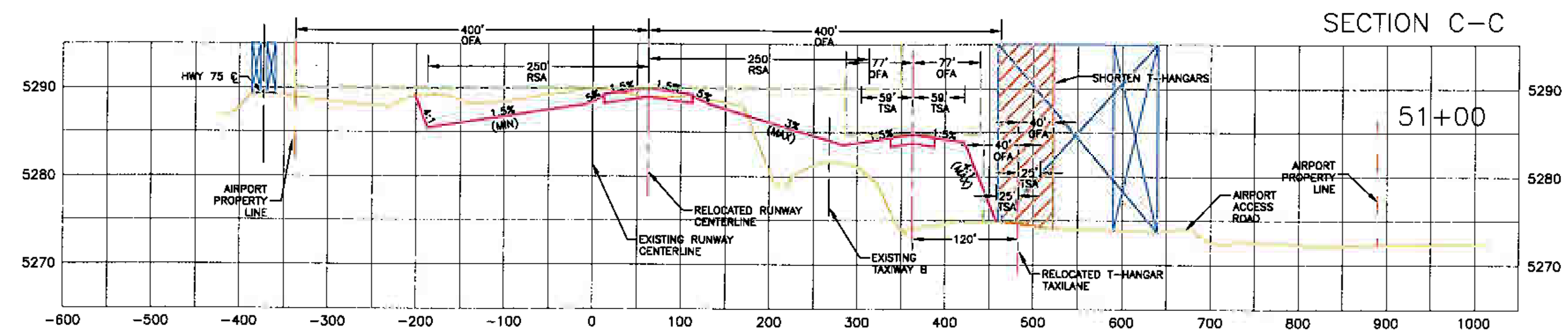
Source: Aerial photo, Toothman-Orton Airport Cross Sections
Prepared by: Mead & Hunt, Inc.

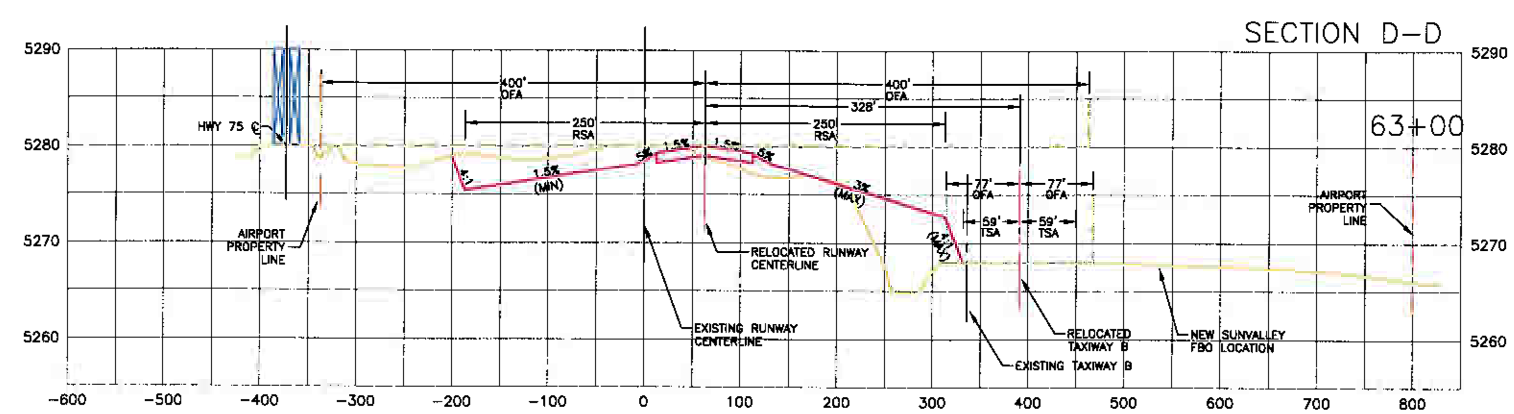
Exhibit D-10

0 500 ft.
Plan View Scale
north

Lateral Runway/Taxiway Improvements Alternative B







PRO:
- PROVIDES REQUIRED 300' RUNWAY TO TAXIWAY SEPARATION.
- PROVIDES CLEAR RUNWAY OFA ON THE EAST SIDE.

CON:
- REQUIRES RELOCATION OF RUNWAY 13/31.
- REQUIRES 1.4 ACRES OF PROPERTY ACQUISITION FOR TAXIWAY OFA'S.
- ELIMINATES ALL AIRCRAFT PARKING IN FRONT OF TERMINAL BUILDING.
- ELIMINATES HOLD APRONS ON TAXIWAY B.
- ELIMINATES SUBSTANTIAL AMOUNTS OF AIRCRAFT APRON AREAS.
- REQUIRES REMOVAL OF NUMEROUS AIRCRAFT HANGARS.
- REQUIRES TAXIWAY B ELEVATION CHANGES SOUTH OF TAXIWAY B-6.
- INCREASES LONGITUDINAL GRADING FOR PROPOSED TAXIWAY B-8.
- MAY IMPACT OR REQUIRE CHANGES TO PLANNED TLS INSTALLATION.
- ELIMINATES ALL STORM WATER AND SNOW STORAGE AREAS BETWEEN RUNWAY AND TAXIWAY.

ALTERNATIVE C DESCRIPTION:
MAINTAIN HIGHWAY 75 AND
SHIFT RUNWAY & TAXIWAY WEST TO PROVIDE REQUIRED SEPARATIONS

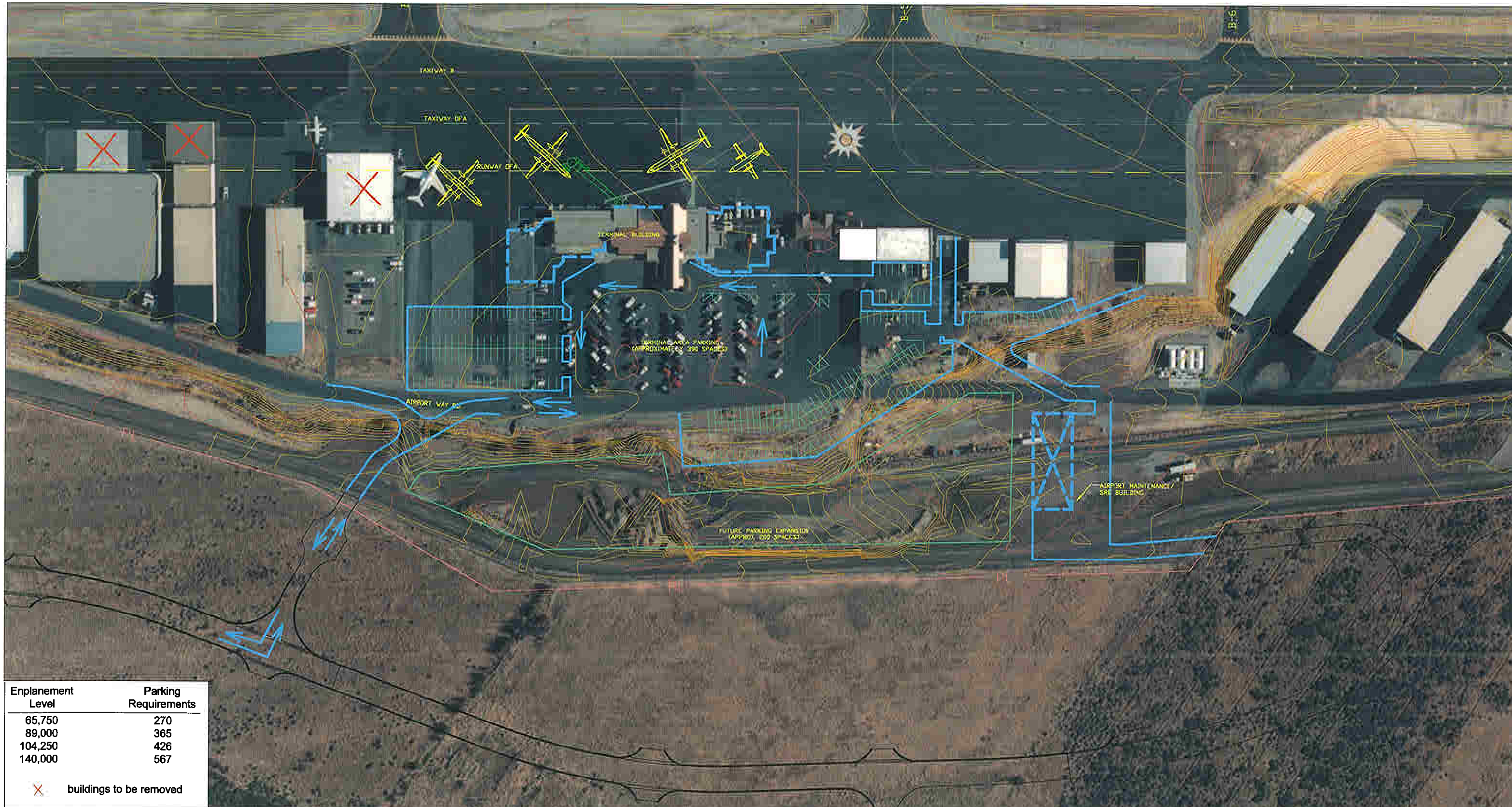
Source: Aerial Photo, Toothman-Orton Airport Cross Sections
Prepared by: Mead & Hunt, Inc.

Exhibit D-11

0 500 ft.
Plan View Scale

north

Lateral Runway/Taxiway Improvements
Alternative C



Enplanement Level	Parking Requirements
65,750	270
89,000	365
104,250	426
140,000	567

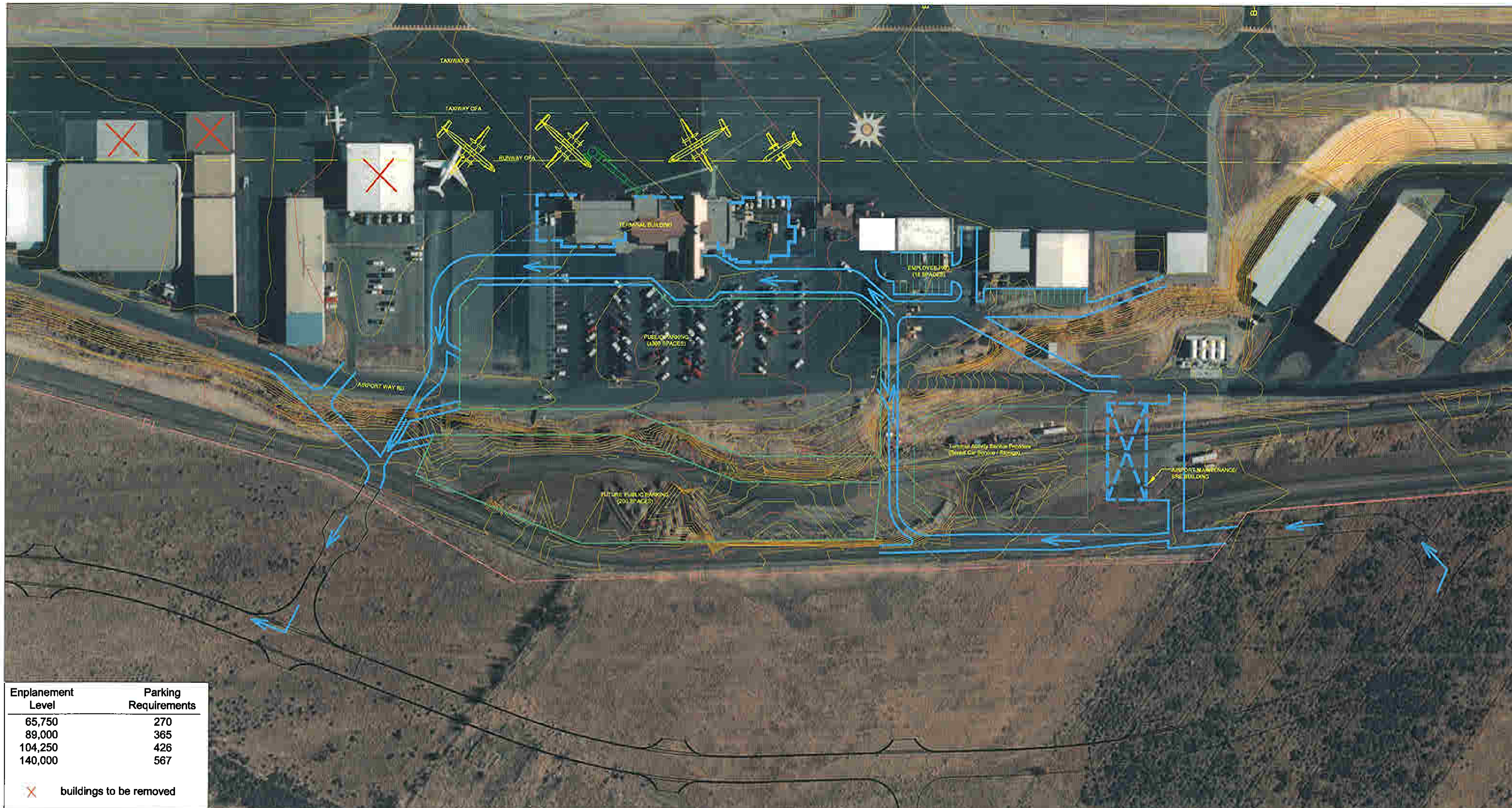
X buildings to be removed

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

0 150 ft. north

Exhibit D-12

Terminal Area Improvements Alternative 1A



Enplanement Level	Parking Requirements
65,750	270
89,000	365
104,250	426
140,000	567

X buildings to be removed

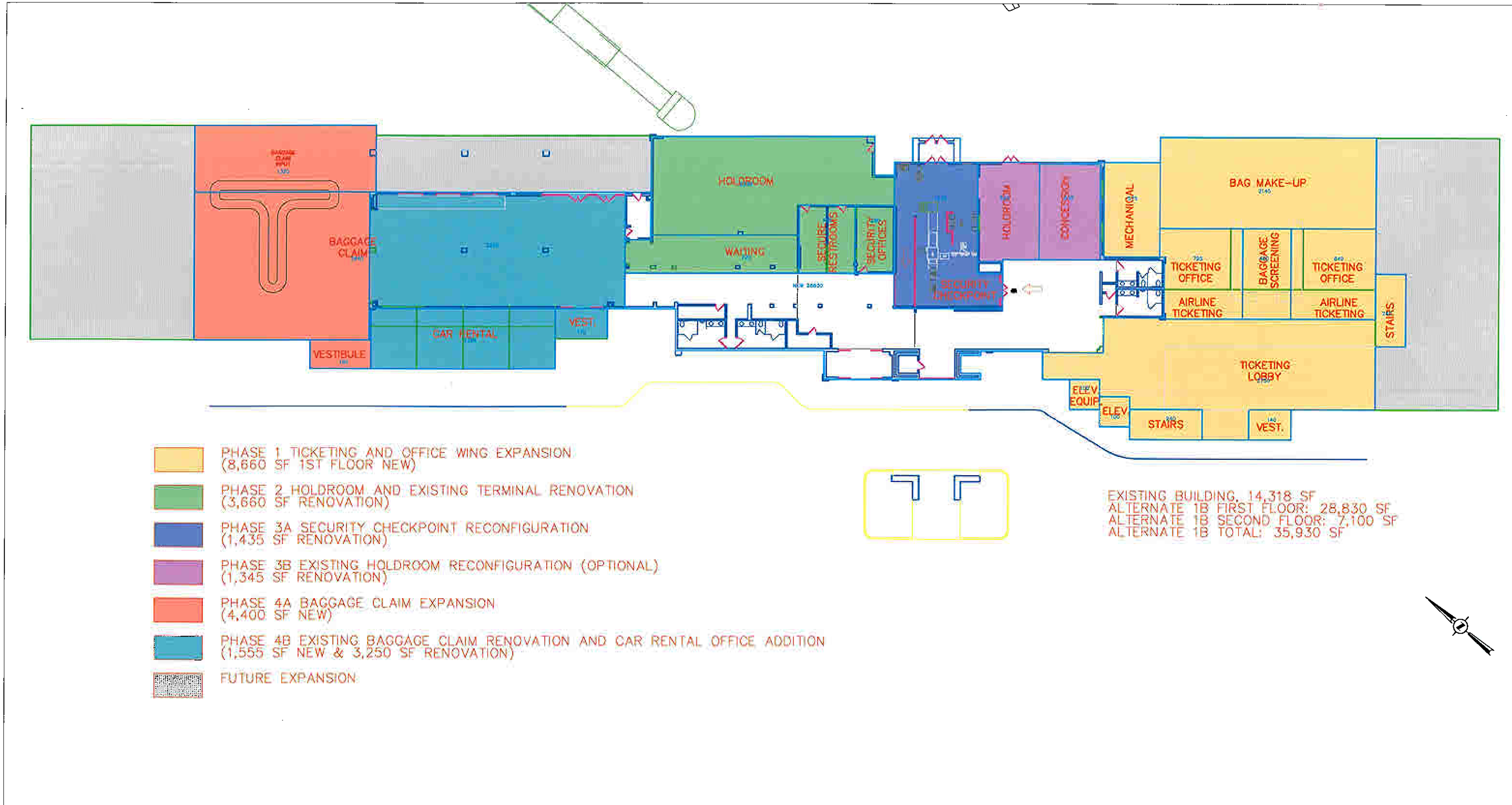
Note: Traffic flow on terminal circulation road could be clockwise

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit D-13

0 150 ft. north

Terminal Area Improvements
Alternative 1B

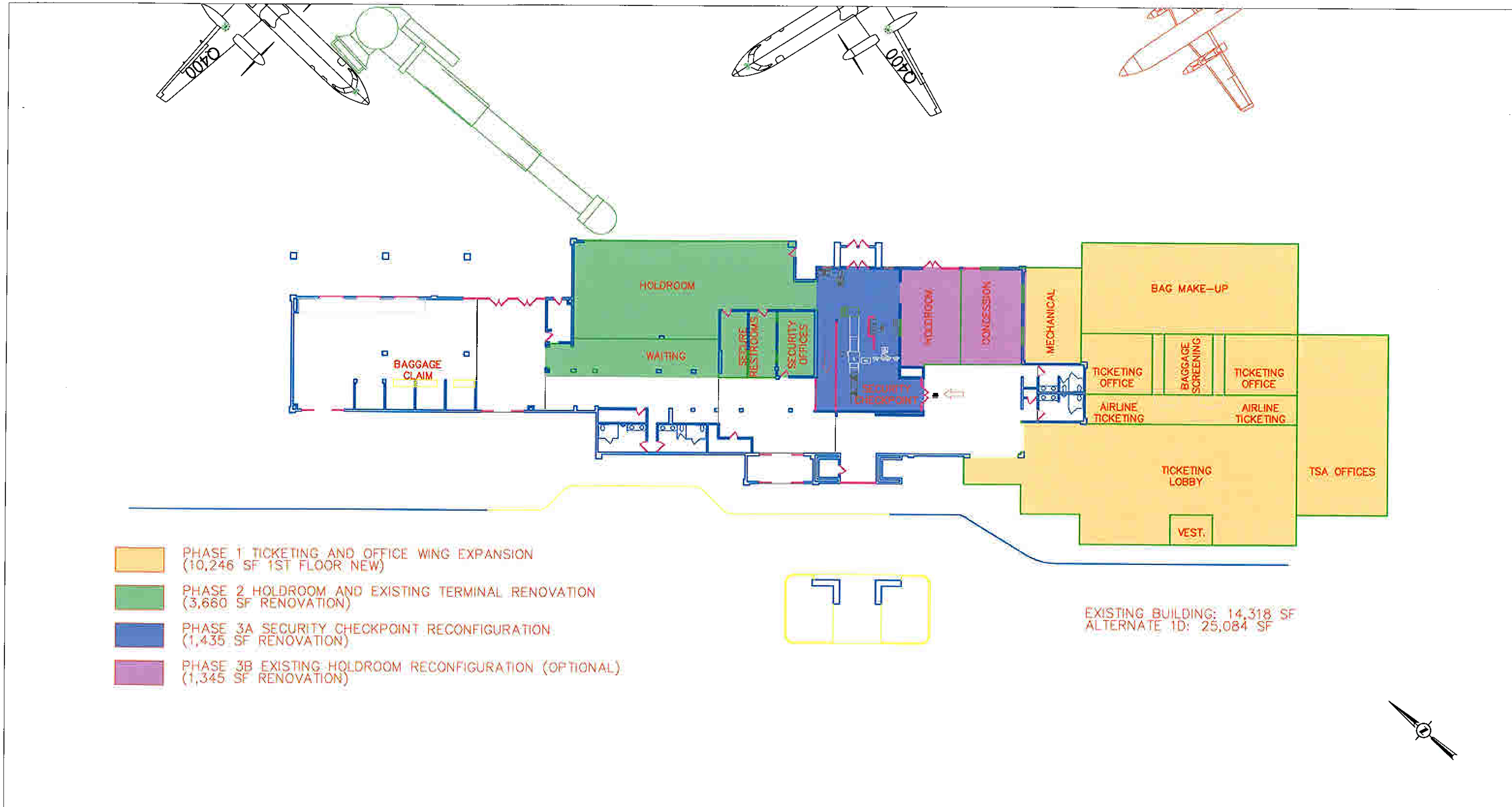


Source: Existing Terminal Floor Plan
Prepared by: Mead & Hunt, Inc.

Exhibit D-14

0 32 ft.

Terminal Building Alternative 1A
1ST Floor Plan

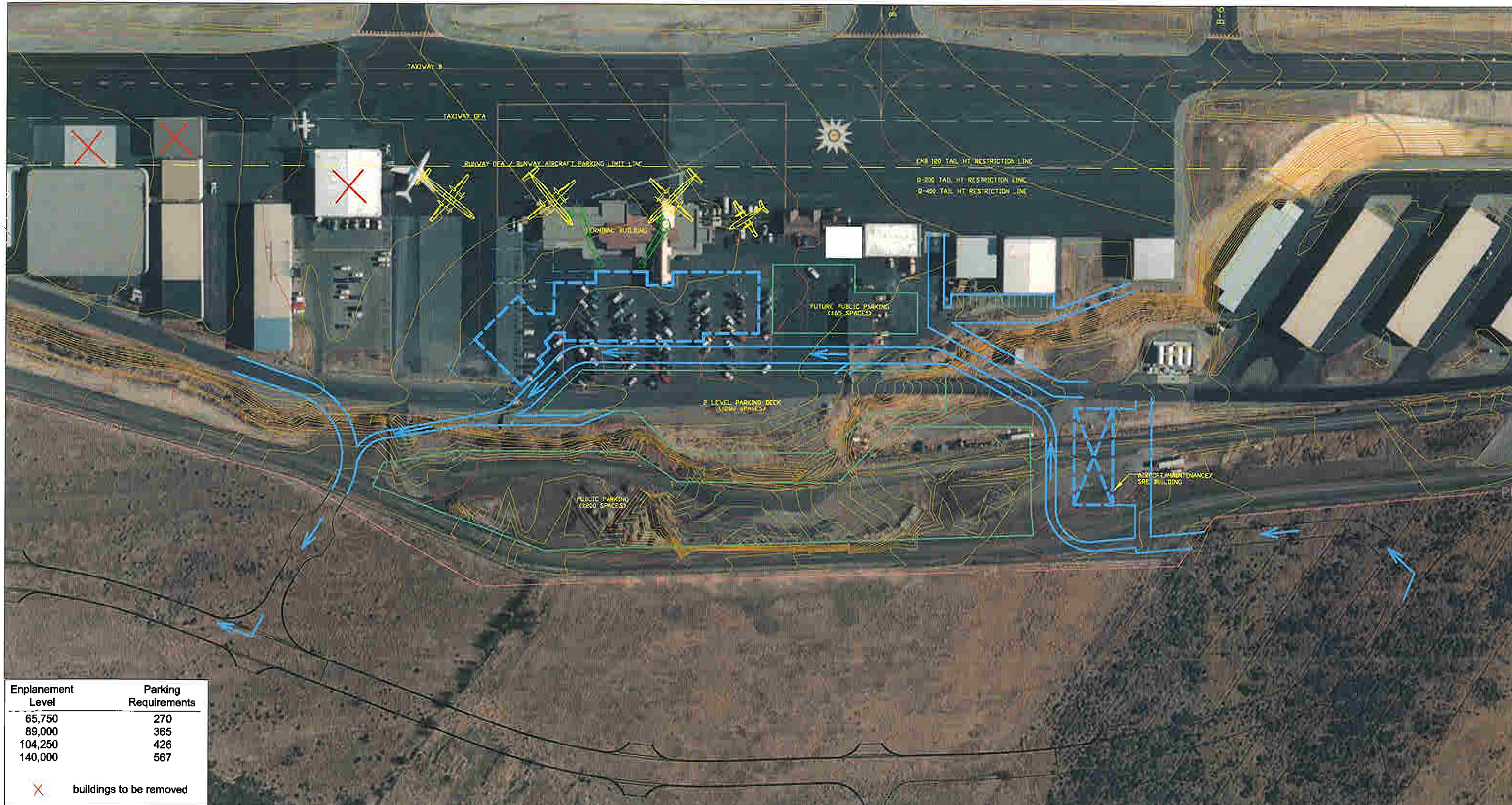


Source: Existing Terminal Floor Plan
Prepared by: Mead & Hunt, Inc.

Exhibit D-15

0 32 ft.

Terminal Building Alternative 1B
1ST Floor Plan



Note: Traffic flow on terminal circulation road could be clockwise

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit D-16

0 150 ft.

north

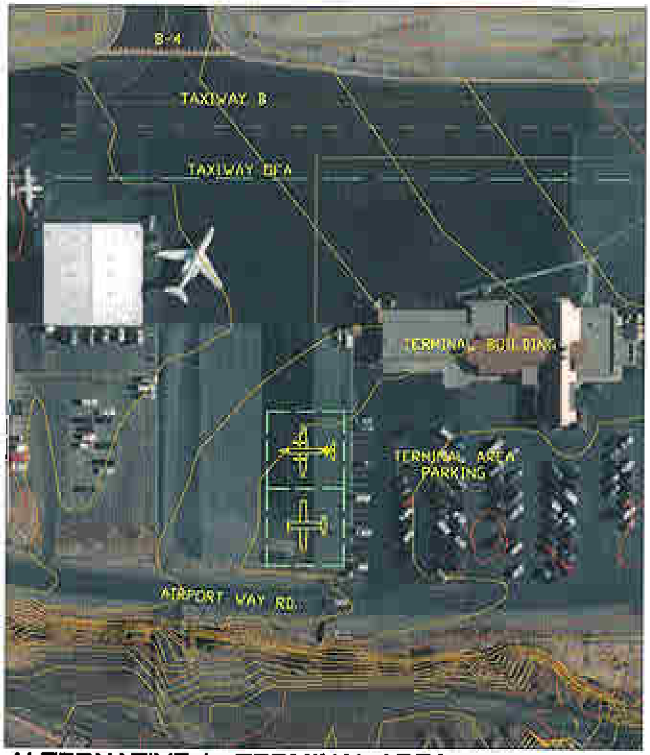
Terminal Area Improvements
Alternative 2

Source: Mead & Hunt
Prepared by: Mead & Hunt, Inc.

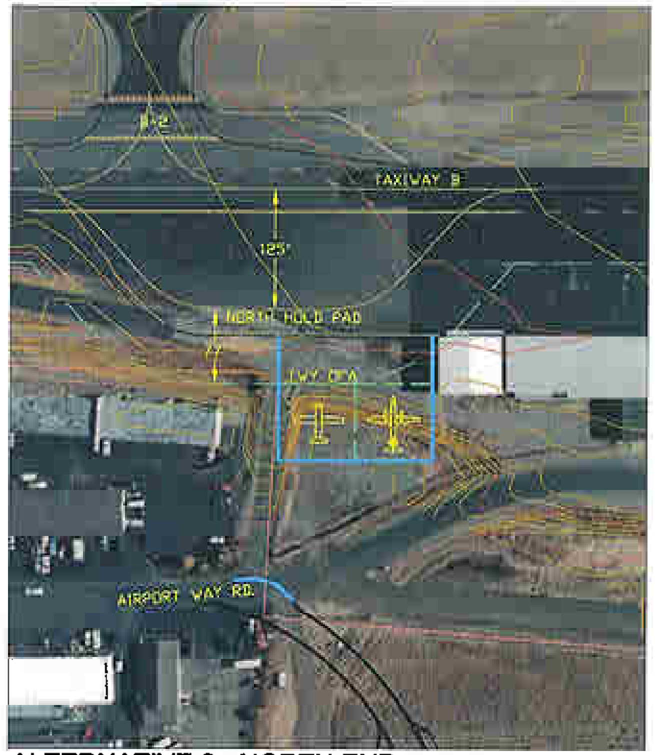
Exhibit D-17

No Scale

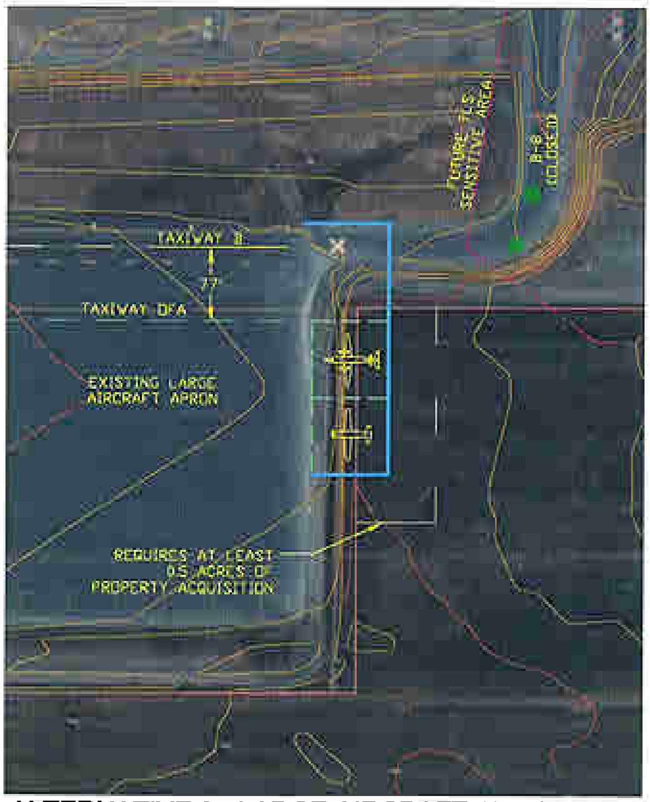
Terminal Building Rendering
Alternative 2



ALTERNATIVE 1 - TERMINAL AREA



ALTERNATIVE 2 - NORTH END



ALTERNATIVE 3 - LARGE AIRCRAFT APRON EXP.

ALTERNATIVE 4 - LARGE AIRCRAFT APRON

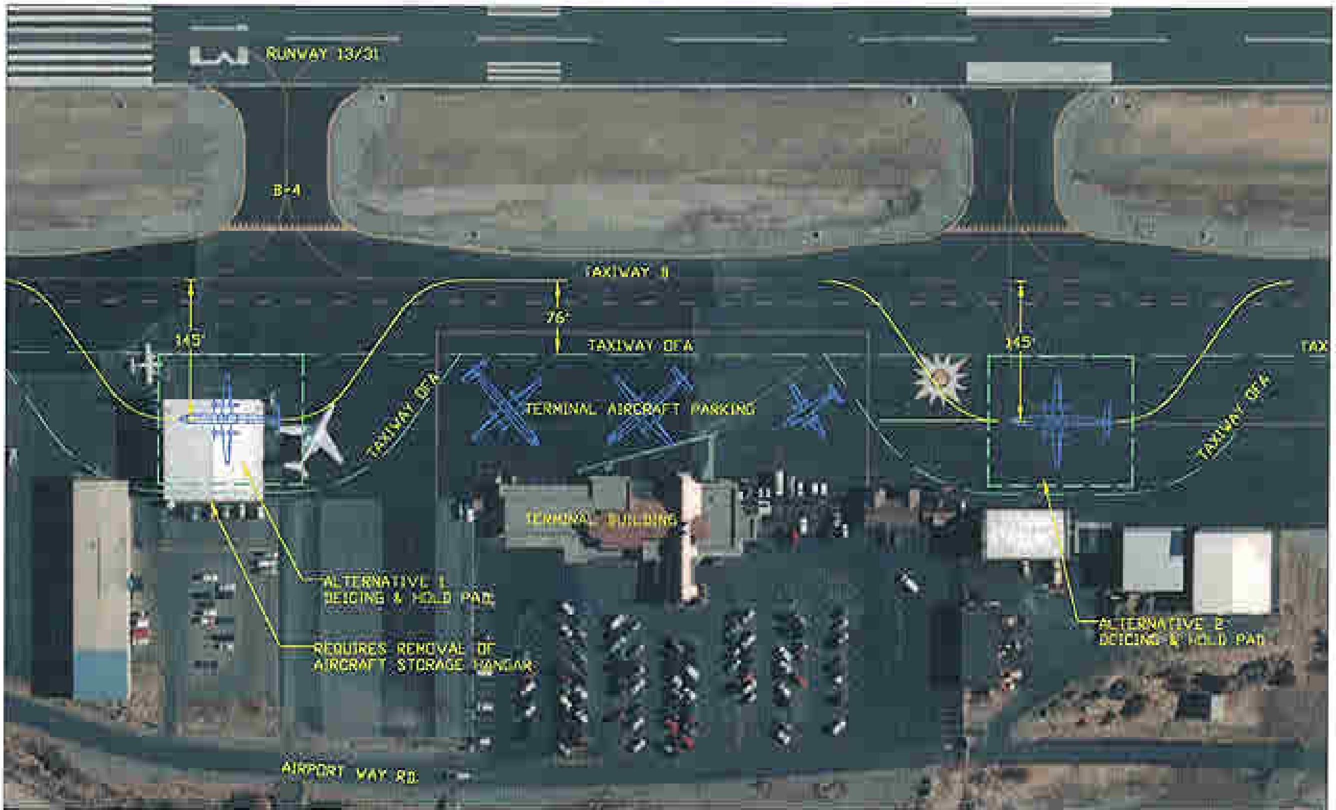
Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit D-18

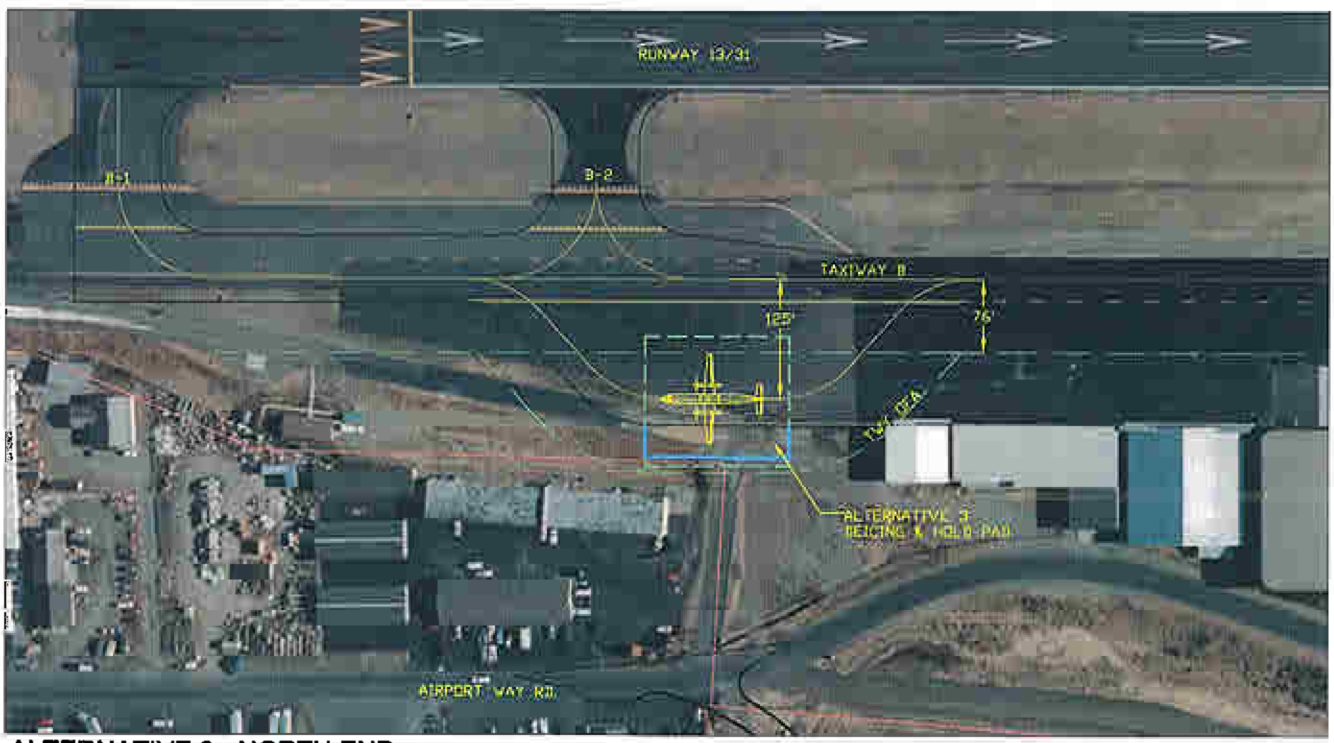
0 200 ft.

north

Air Cargo Alternatives



ALTERNATIVE 1 & 2 - NORTH OR SOUTH OF TERMINAL AREA



ALTERNATIVE 3 - NORTH END

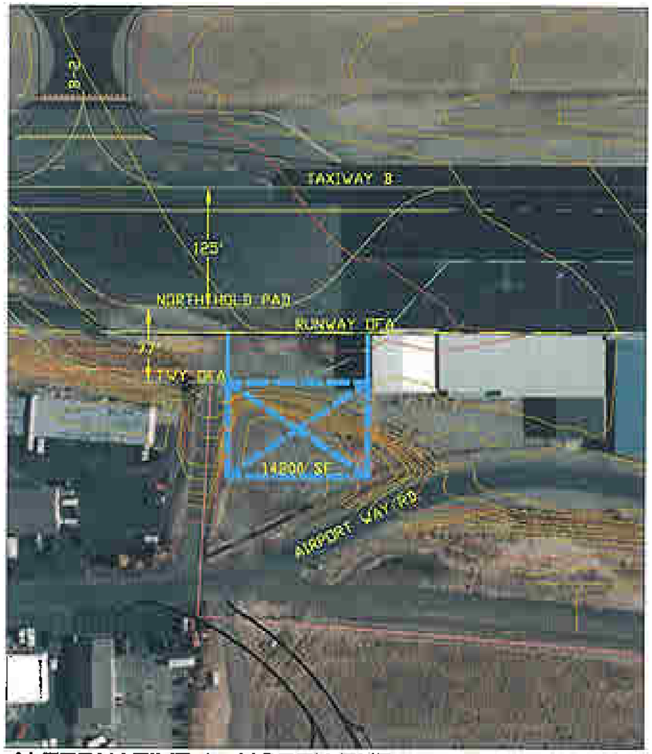
Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit D-19

0 200 ft.

north

Deicing Pad/Wash Rack Alternatives



ALTERNATIVE 1 - NORTH END

ALTERNATIVE 2 - NORTH OF TERMINAL AREA

ALTERNATIVE 3 - SOUTH OF TERMINAL AREA

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

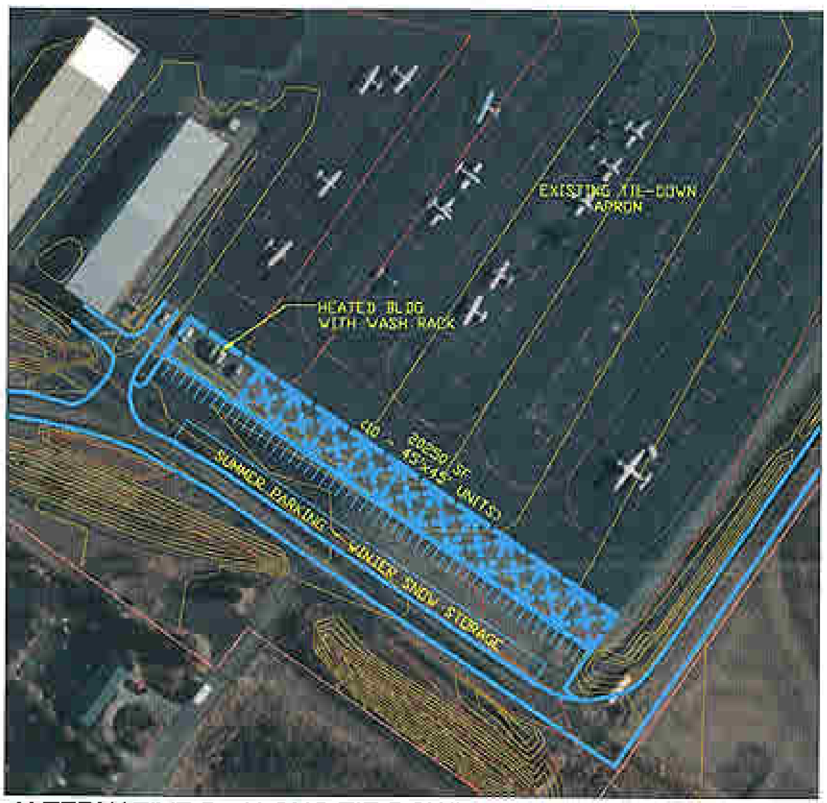
Exhibit D-20

0 200 ft.

north

Aircraft Storage Hangars
Alternatives 1 thru 3

ALTERNATIVE 4 - T-HANGER EXPANSIONS



ALTERNATIVE 5 - ALONG TIE-DOWN APRON

Aircraft Storage Hangar Summary
Alternatives vs. Demand

Alternative	Hangar Space (SF)
2 - N. of Terminal Area	3250
3 - S. of Terminal Area	6400
4 - T-Hangar Expansions	37750
5 - Along Tie-Down Apron	20250
	67650
Alternative 1 - North End	14200
2022 Add'l Hangar Demand	111400

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

0 200 ft.

north

Exhibit D-21

Aircraft Storage Hangars
Alternatives 4 & 5

ALTERNATIVE 1 - SOUTH OF TERMINAL AREA

Source: Aerial Photo
Prepared by: Mead & Hunt, Inc.

Exhibit D-22

0 200 ft.

north

Airport Maintenance and Snow Removal Equipment (SRE) Storage Building

Friedman Memorial Airport
Master Plan Update

Appendix E/**Alternatives Cost Estimate**

ʼriedman Memorial Airport | 20/Feb/04 |

Iailey, Idaho

RELOCATE RUNWAY 13-31, 50' OFFSET

ITEM	DESCRIPTION	UNIT	QTY.	UNIT PRICE	EXTENDED AMOUNT
1	Mobilization	LS	1	$325,000.00	$325,000.00
2	Safety Compliance	LS	1	$35,000.00	$35,000.00
3	Construction Access Traffic Control	LS	1	$35,000.00	$35,000.00
4	Contractor Quality Control	LS	1	$125,000.00	$125,000.00
5	Contractor Surveys	LS	1	$125,000.00	$125,000.00
6	Dust Control	LS	1	$45,000.00	$45,000.00
7	Asphalt Removal - Rotomilling or Pulverizing	SY	85,703	$2.50	$214,257.50
8	Saw Cut Asphalt	LF	600	$1.32	$792.00
9	Excavation (P-152)				
9A	Unclassified Excavation	CY	69,250	$6.00	$415,500.00
9B	Overdepth Excavation-Remove/Replace	CY	2,000	$25.00	$50,000.00
10	Crushed Aggregate Base Course (P-209)	CY	29,678	$41.00	$1,216,798.00
11	Bituminous Concrete Pavement (P-401)	Ton	30,050	$60.00	$1,803,000.00
12	Bituminous Tack Coat (P-603)	Gal	8,904	$3.00	$26,712.00
13	Shouldering	CY	9,500	$25.00	$237,500.00
14	Drainage Structures				
14A	Install 6-Inch Multiflow Edgedrain	LF	15,000	$11.00	$165,000.00
14B	Install 4-Inch Solid Polyethylene Outlet Pipe	LF	1,000	$23.47	$23,470.00
14C	Install Drywell 10 ft. X 10 ft.	EA	5	$1,900.00	$9,500.00
15	Pavement Markings (P-620)				
15A	Permanent WHITE Paint	SF	10,000	$0.78	$7,800.00
15B	Permanent Yellow Paint	SF	5,000	$0.78	$3,900.00
16	Topsoil (T-905)	CY	5,000	$15.87	$79,350.00
17	Seeding (T-901)	Acre	6.0	$1,150.00	$6,900.00
18	Electrical Cable #8 (L-108)				
18A	#8, 5kV	LF	17,500	$1.50	$26,250.00
18B	Counterpoise #8	LF	17,500	$0.57	$9,975.00
19	Electrical Duct (L-110)				
19A	2-Inch PVC, 1-Way (Direct Earth Buried)	LF	17,500	$8.05	$140,875.00
19B	2-Inch PVC, 2-Way (Concrete Encased)	LF	1,500	$15.53	$23,295.00
20	Medium Intensity Edge Light				
20A	Remove Existing Light	EA	100	$155.25	$15,525.00
20B	Medium Intensity Runway Light (L-861T), L-867 Base	EA	100	$650.00	$65,000.00
21	Electrical Junction Box (L-868) with 3/4" Lid	EA	20	$575.00	$11,500.00
22	Airfield Guidance Sign (L-858)				
22A	A) Relocate Existing Lighted Sign	EA	22	$1,380.00	$30,360.00
23	Move Exisitng VASI Unit	LS	1	$15,000.00	$15,000.00
24	Move Existing TLS Unit	LS	1	$30,000.00	$30,000.00
23	Force Account Allowance	LS	1	$25,000.00	$25,000.00
	SUBTOTAL				$5,343,259.50
	CONTINGENCY (15%)				$801,488.93
	TOTAL SCHEDULE A				$6,144,748.43

ENGINEERING (20%)	$1,228,949.69
TOTAL	$7,373,698.11

Friedman Memorial Airport
Hailey, Idaho
RELOCATE TAXIWAY A, 300' SEPARATION

20/Feb/04

ITEM	DESCRIPTION	UNIT	QTY.	UNIT PRICE	EXTENDED AMOUNT
1	Mobilization	LS	1	$150,000.00	$150,000.00
2	Safety Compliance	LS	1	$15,000.00	$15,000.00
3	Construction Access Traffic Control	LS	1	$15,000.00	$15,000.00
4	Contractor Quality Control	LS	1	$60,000.00	$60,000.00
5	Contractor Surveys	LS	1	$60,000.00	$60,000.00
6	Dust Control	LS	1	$22,500.00	$22,500.00
7	Asphalt Removal - Rotomilling or Pulverizing	SY	26,000	$1.89	$49,140.00
8	Saw Cut Asphalt	LF	2,000	$1.32	$2,640.00
9	Excavation (P-152)				
9A	Unclassified Excavation	CY	16,750	$8.20	$137,350.00
9B	Overdepth Excavation-Remove/Replace	CY	1,500	$32.92	$49,380.00
10	Crushed Aggregate Base Course (P-209)	CY	12,250	$45.82	$561,295.00
11	Bituminous Concrete Pavement (P-401)	Ton	9,800	$60.87	$596,526.00
12	Bituminous Tack Coat (P-603)	Gal	2,200	$5.00	$11,000.00
13	Shouldering	CY	10,025	$30.00	$300,750.00
14	Drainage Structures				
14A	Install 6-Inch Multiflow Edgedrain	LF	16,000	$11.00	$176,000.00
14B	Install 4-Inch Solid Polyethylene Outlet Pipe	LF	400	$23.47	$9,388.00
14C	Install Drywell 10 ft. X 10 ft.	EA	2	$1,900.00	$3,800.00
15	Pavement Markings (P-620)				
15A	Permanent Yellow Paint	SF	5,000	$0.78	$3,900.00
15B	Permanent Yellow Paint with Glass Beads	SF	5,000	$0.78	$3,900.00
16	Topsoil (T-905)	CY	3,000	$15.87	$47,610.00
17	Seeding (T-901)	Acre	5.0	$1,150.00	$5,750.00
18	Electrical Cable #8 (L-108)				
18A	#8, 5kV	LF	17,500	$1.50	$26,250.00
18B	Counterpoise #8	LF	17,500	$0.57	$9,975.00
19	Electrical Duct (L-110)				
19A	2-Inch PVC, 1-Way (Direct Earth Buried)	LF	17,500	$8.05	$140,875.00
19B	2-Inch PVC, 2-Way (Concrete Encased)	LF	550	$15.53	$8,541.50
20	Medium Intensity Edge Light				
20A	Remove Existing Taxiway Light	EA	100	$155.25	$15,525.00
20b	Medium Intensity Taxiway Light (L-861T), L-867 Base	EA	100	$661.25	$66,125.00
21	Electrical Junction Box (L-868) with 3/4" Lid	EA	10	$575.00	$5,750.00
22	Airfield Guidance Sign (L-858)				
22A	A) Relocate Existing Lighted Sign	EA	14	$1,380.00	$19,320.00
23	Force Account Allowance	LS	1	$4,000.00	$15,000.00
	SUBTOTAL				$2,588,290.50
	CONTINGENCY (15%)				$388,243.58
	TOTAL SCHEDULE A				$2,976,534.08

ENGINEERING (20%)	$595,306.82
TOTAL	$3,571,840.89

Friedman Memorial Airport 20/Feb/04

Hailey, Idaho

HEAVY APRON EXPANSION ESTIMATE

ITEM	DESCRIPTION	UNIT	QTY.	UNIT PRICE	EXTENDED AMOUNT
1	Mobilization	LS	1	$200,000.00	$200,000.00
2	Safety Compliance	LS	1	$20,000.00	$20,000.00
3	Construction Access Traffic Control	LS	1	$20,000.00	$20,000.00
4	Contractor Quality Control	LS	1	$75,000.00	$75,000.00
5	Contractor Surveys	LS	1	$75,000.00	$75,000.00
6	Dust Control	LS	1	$30,000.00	$30,000.00
7	Asphalt Removal - Rotomilling or Pulverizing	SY	1,520	$1.89	$2,872.80
8	Saw Cut Asphalt	LF	750	$1.32	$990.00
9	Excavation (P-152)				
9A	Offisite Borrow Material	CY	93,325	$8.20	$765,265.00
9B	Overdepth Excavation-Remove/Replace	CY	500	$32.92	$16,460.00
10	Crushed Aggregate Base Course (P-209)	CY	13,660	$45.82	$625,901.20
11	Bituminous Concrete Pavement (P-401)	Ton	18,440	$60.87	$1,122,442.80
12	Bituminous Tack Coat (P-603)	Gal	4,100	$5.00	$20,500.00
13	Shouldering	CY	3,400	$30.00	$102,000.00
14	Drainage Structures				
14A	Install 6-Inch Multiflow Edgedrain	LF	5,490	$11.00	$60,390.00
14B	Install 4-Inch Solid Polyethylene Outlet Pipe	LF	800	$23.47	$18,776.00
14C	Install Drywell 10 ft. X 10 ft.	EA	4	$1,900.00	$7,600.00
15	Pavement Markings (P-620)				
15A	Permanent Yellow Paint	SF	2,000	$0.78	$1,560.00
15B	Permanent Yellow Paint with Glass Beads	SF	2,000	$0.78	$1,560.00
16	Topsoil (T-905)	CY	3,000	$15.87	$47,610.00
17	Seeding (T-901)	Acre	3.0	$1,150.00	$3,450.00
18	Electrical Cable #8 (L-108)				
18A	#8, 5kV	LF	1,200	$1.50	$1,800.00
18B	Counterpoise #8	LF	1,200	$0.57	$684.00
19	Electrical Duct (L-110)				
19A	2-Inch PVC, 1-Way (Direct Earth Buried)	LF	1,200	$8.05	$9,660.00
19B	2-Inch PVC, 2-Way (Concrete Encased)	LF	150	$15.53	$2,329.50
20	Medium Intensity Edge Light				
20A	Remove Existing Taxiway Light	EA	25	$155.25	$3,881.25
20b	Medium Intensity Taxiway Light (L-861T), L-867 Base	EA	25	$661.25	$16,531.25
21	Electrical Junction Box (L-868) with 3/4" Lid	EA	2	$575.00	$1,150.00
22	Airfield Guidance Sign (L-858)				
22A	A) New Lighted Sign	EA	6	$5,000.00	$30,000.00
23	Security Fencing	LF	2,800	$12.50	$35,000.00
24	Force Account Allowance	LS	1	$4,000.00	$15,000.00
	SUBTOTAL				$3,333,413.80
	CONTINGENCY (15%)				$500,012.07
	TOTAL SCHEDULE A				$3,833,425.87

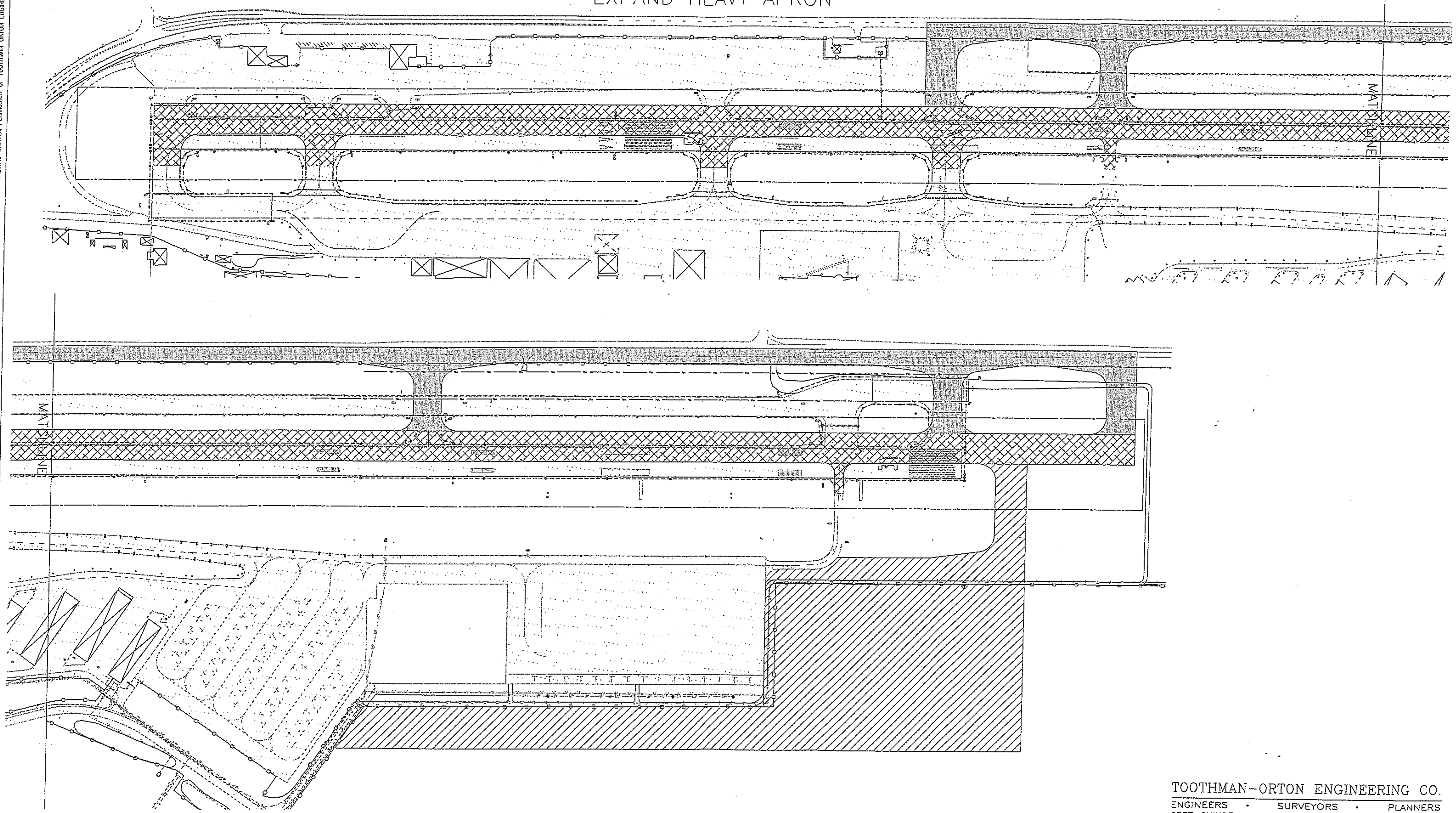
ENGINEERING (20%)	$766,685.17
TOTAL	$4,600,111.04

PRELIMINARY, SH-75 RE-ALIGNMENT (130' - OFFSET)
COST ESTIMATE
September 19, 2003

No.	Description	Quantity	Unit	Unit Cost	Extended Cost
1	Removal of Obstructions	1	LS	$250,000.00	$250,000.00
2	Construction Surveying	1	LS	$100,000.00	$100,000.00
3	Construction Traffic Control	1	LS	$175,000.00	$175,000.00
4	Removal of Bituminous Surface	45,200	SY	$4.00	$180,800.00
5	Excavation-Existing Highway	108,200	CY	$8.00	$865,600.00
6	Excavation-Street Construction	18,000	CY	$13.20	$237,600.00
7	Soft Spot Repair	9,000	CY	$20.00	$180,000.00
8	Plantmix Pavement Class-III	16,380	TON	$61.50	$1,007,370.00
9	Tack Coat	4,520	GAL	$2.50	$11,300.00
10	3/4" Base Aggregate	21,000	TON	$15.00	$315,000.00
11	2" Granular Subbase	66,600	TON	$15.00	$999,000.00
12	Curb and Gutter	4,500	LF	$12.20	$54,900.00
13	Bike Path	1,200	SY	$20.00	$24,000.00
14	Pavement Markings	41,000	LF	$0.80	$32,800.00
15	Special Pavement Markings	1,500	SF	$2.40	$3,600.00
16	Install Survey Monument	2	EA	$318.00	$636.00
17	Sign Relocation	30	EA	$250.00	$7,500.00
18	Drywell	7	EA	$3,500.00	$24,500.00
19	SD Manhole	5	EA	$3,000.00	$15,000.00
20	Catch Basins	7	EA	$850.00	$5,950.00
21	Landscaping	1	LS	$20,000.00	$20,000.00
22	Relocate Traffic Signal - Fox Acres Road	1	LS	$75,000.00	$75,000.00
	Total Cost of Construction				$4,600,000.00
	CE&I (15%)	1	LS	$690,000.00	$690,000.00
	Right-of-Way	1	LS	$150,000.00	$150,000.00
	Mobilization (7%)	1	LS	$322,000.00	$322,000.00
	Contingency (5%)	1	LS	$230,000.00	$230,000.00
	Total Project Cost				$6,000,000.00

Notes:
1. Roadway improvements include: SH-75 between 3rd Avenue and South termini of the Friedman Memorial Airport.
2. Cost estimate does not include administration cost by ITD or City of Hailey.

MASTER PLAN ESTIMATE
RELOCATE/EXTEND RUNWAY
RELOCATE TAXIWAY A
EXPAND HEAVY APRON



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