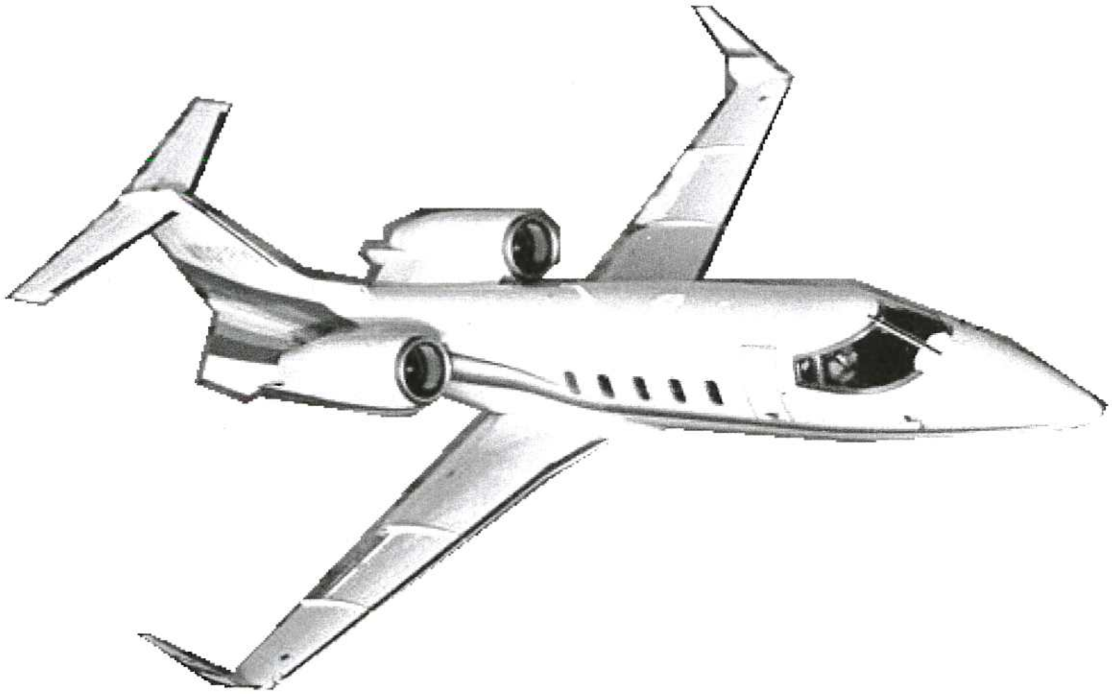
HEBER CITY MUNICIPAL AIRPORT

RUSS MCDONALD FIELD

Heber City, Utah



Feasibility Study

Final Report

May 12, 2003

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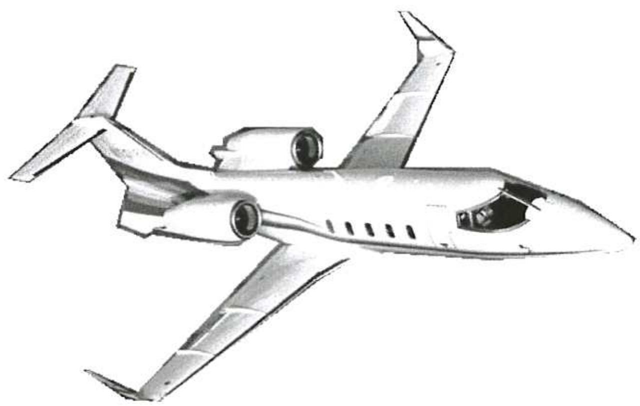


CHAPTER

1

PURPOSE AND OBJECTIVES

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

1.0 PURPOSE

This Feasibility Study is provided in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, Change 7, *Airport Design*, Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, and other related regulations and ACs.

The Feasibility Study will evaluate the existing condition of Heber City Municipal Airport, Russ McDonald Field and consider the need or lack of need for expansion in relation to airport activity, forecasts, economic impact, noise impact, costs, and benefits to the community. In addition, this study will evaluate the current facilities in accordance with FAA recommended design standards and update the Airport Layout Plan (ALP) accordingly.

1.1 OBJECTIVES

As Heber City, the airport sponsor, continues in its effort to plan for the future of Heber City and Heber City Municipal Airport a Feasibility Study and ALP Update will be accomplished. This study has identified the following objectives:

- To inform and educate the community about the project and solicit community input;
- To refine the estimated project costs;
- To determine the financial feasibility of accomplishing the project;
- To prepare a graphical layout for the project (ALP Drawing Set);
- To identify potential partnering opportunities for funding the local share; and
- To achieve a go/no go decision for the project.

In addition, the following questions were identified and are addressed in the study:

- Is the runway relocation needed;
- Why is the runway relocation being considered;
- Where would the State Highway be relocated and who will pay for it;
- What land would need to be acquired;
- How much is it going to cost to construct the runway and taxiway (i.e. engineering, soil stabilization/earthwork, paving);
- Will the larger runway result in increased operations and maintenance costs;
- What are the benefits of relocating the runway (i.e. airport revenues, local expenditures, tax revenue, induced impacts);
- Will there be increased noise exposure and expanded flight paths; and
- What happens if the runway is not relocated?

The questions are briefly discussed below and, along with the objectives, are further answered throughout this study. The overall objective is to provide the means for Heber City to evaluate the benefits and cost of either expanding the airport or maintaining the airport in its present condition.

1.2 ISSUES

- Is the runway relocation needed? The runway relocation is needed if Heber City Municipal Airport is to meet the airport design standards for an Airport Reference Code (ARC) of D-II. *(see Section 2.0)*

- Why is the runway relocation being considered? The relocating of Runway 3/21 is being considered in order to upgrade Heber City Municipal Airport from the existing ARC of B-II to an ARC of D-II. This will enable the airport to more safely and efficiently accommodate the increasing number of Category C and Category D aircraft. *(see Section 2.0)*

- Where would the State Highway be relocated and who will pay for it? The relocation of the State Highway around the area needed for the airport is eligible for 90.94% Federal Aviation Administration (FAA) and 4.53% Utah State Division of Aeronautics grant participation. The remaining 4.53% would be local funds. Alternative Airport Configuration 2.1 depicts the minimum distance the highway must be shifted (i.e. relocated); any additional relocation would be at the discretion of the Utah Highway Department, Wasatch County, and Heber City (i.e. realignment/bypass), the increase in cost, beyond the minimum relocation requirement, would not be funded by the FAA. *(see Section 4.2.1)*

- What land would need to be acquired? Each of the alternatives evaluated in this study require differing amounts of land acquisition. The amount of land acquisition required varies from none to approximately 114 acres. *(see Section 4.2.1 and Section 4.2.2)*

- How much is it going to cost to construct the runway and taxiway? The approximate cost of a complete runway reconstruction is $4,800,000; complete taxiway reconstruction would cost approximately $1,500,000 *(see Section 4.2.1 and Section 4.2.2)*

- Will the larger runway result in increased operations and maintenance costs? An increase in operations is inevitable with the growth of the community and trends in general aviation activity. If the runway is expanded it will more safely accommodate Category C and Category D aircraft, and will allow those categories to continue to grow at an unconstrained level. Additional paved area would result in increased maintenance costs; however, increased revenues would also be expected. *(see Section 2.3 and Section 5.4)*

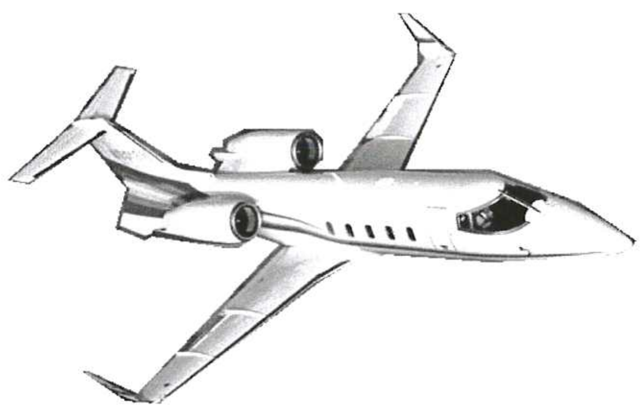
- What are the benefits of relocating the runway? The benefits of relocating the runway include enhanced safety by meeting D-II design standards. Heber City and the surrounding communities will see a growth in local spending that directly and indirectly correlate with the airport growth. *(see Section 3.1 and Section 5.1)*

- Will there be increased noise exposure and expanded flight paths? There would be a slight increase in noise exposure, approximately one to five decibels depending on the chosen alternative. However, expanded flight paths are not anticipated. *(see Section 4.4)*

- <u>What happens if the runway is not relocated?</u> If the runway remains in its present position two things would need to be accomplished. First, the existing facilities would need to be modified in order to meet ARC B-II design standards. Second, the City would need to adopt an ordinance limiting operations to aircraft with certificated takeoff weights of 12,500 pounds or less. If this cap were not imposed, the airport would risk losing federal grant funding for capital improvement and pavement maintenance projects, as they would be viewed as being out of compliance with design standards for the fleet of aircraft regularly using the airport. In addition, the FAA would not fund projects that would strengthen the pavement areas, expand the apron, or make other accommodations for larger aircraft. *(see Section 2.3.4 and Section 4.1)*

Chapter 2

INVENTORY & FORECASTS



CHAPTER

2

INVENTORY & FORECASTS

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

2.0 INTRODUCTION

The Heber City Municipal Airport, Russ McDonald Field, hereafter referred to as Heber City Municipal Airport, is located within Utah's Mountainland Region, an area that ranges from lush valleys to towering peaks. The airport is located forty-five miles to the southeast of Salt Lake City in Wasatch County. Situated two miles south of Heber City, the airport also serves the surrounding communities of Charleston, Daniel, Midway, and Park City (Summit County). Wasatch County elevations range from approximately 5,600 feet in the valley to 10,584 feet on Current Creek Peak. The valley's water supply is provided by a series of reservoirs, including: Strawberry Reservoir, constructed in 1910, Deer Creek Reservoir, 1938, Current Creek Reservoir, 1965, and the Jordanelle Reservoir, constructed in 1995. Heber Valley is bordered by Wasatch Mountain State Park to the north and west and the Uinta National Forest to the south and east.

TABLE 2-1
AIRPORT INVENTORY

AIRPORT DATA	
Identifier	36U
FAA Site Number	25164.*A
FAA NPIAS Number	49-0057
Airport Reference Code	B-II
Owner	Heber City
AIRPORT FACILITIES	
Runways	3/21: 6,900' x 75', asphalt
Airport Elevation	5,637' MSL (surveyed)
Taxiways	Full length parallel
Aprons	Approximately 41,500 S.Y.
Runway Markings	Visual
Pavement Strength	12,500 pounds
Tie-Downs	Approximately 66
Hangar Facilities	54 box hangars (various sizes)
Fuel Storage	100LL (10,000 gallon tank); Jet A (10,000 gallon tank)
Runway Lighting	Pilot Controlled MIRL
Taxiway Lighting	MITL
Visual Aids	Beacon, Lighted Segment Circle with Windcone, Threshold Lights, PAPI-4
Instrument Approach	GPS
NAVAIDS	None
Approach Minimums	1903 HAA/ 1 ½ mile Visibility (Category A & B only)
Non-Standard Conditions	Runway/Taxiway Separation
Weather Equipment	AWOS-3
Fixed Base Operator	Wasatch Aero Services

The continental climate in the area has average temperatures ranging from 34 degrees Fahrenheit in January to an average high of 87 degrees in July. The growing season in Heber Valley is short, ranging from mid-June to early September, with the majority of rain fall between October and May. Precipitation averages approximately 15 inches per year on the valley floor to between 25 and 36 inches in the higher elevations. Nearly half of the precipitation in the valley falls as snow, with an average of 70 inches per winter season.

Table 2-1 summarizes the airport inventory. Existing airside facilities consist of Runway 3/21; which is a 6,900 foot long by 75 foot wide asphalt runway with a full length parallel taxiway. According to FAA Form 5010, the pavement strength is 12,500 pounds.

The Airport Reference Code (ARC) is a system established by the Federal Aviation Administration (FAA) that is used to relate airport design criteria to the operational and physical characteristics of the aircraft currently operating and/or intended to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the Aircraft Approach Category and correlates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the Aircraft Design Group and relates to aircraft wingspan (physical characteristics). Generally, aircraft approach speed applies to runway dimensional criteria and safety zones prior to and beyond the end of the runway. Aircraft wingspan is primarily associated with separation criteria involving taxiways and taxilanes. Table 2-2 has been included to provide a definition of both Aircraft Approach Categories and Aircraft Design Groups. Figure 2-1 shows examples of aircraft and their ARC.

TABLE 2-2
AIRCRAFT APPROACH CATEGORIES & DESIGN GROUPS

Aircraft Approach Category: An aircraft approach category is a grouping of aircraft based on an approach speed of 1.3 times the stall speed of the aircraft at the maximum certificated landing weight.

Aircraft Category	Approach Speed
Category A	Speed less than 91 knots 105 MPH
Category B	91 knots or more but less than 121 knots 139 MPH
Category C	121 knots or more but less than 141 knots 162 MPH
Category D	141 knots or more but less than 166 knots 191 MPH
Category E	166 knots or more

Aircraft Design Group: The aircraft design group subdivides aircraft by wingspan. The aircraft design group concept links an airport's dimensional standards to aircraft approach categories or to aircraft design groups or to runway instrumentation configurations.

Design Group	Aircraft Wingspan
Group I	Up to but not including 49 feet
Group II	49 feet up to but not including 79 feet
Group III	79 feet up to but not including 118 feet
Group IV	118 feet up to but not including 171 feet
Group V	171 feet up to but not including 214 feet
Group VI	214 feet up to but not including 262 feet

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

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FIGURE 2-1 – AIRPORT REFERENCE CODES

Currently, the airport is classified with an ARC of B-II. In order to designate a specific ARC for an airport, aircraft in that ARC should perform a minimum of 500 annual itinerant operations, an operation is defined as one landing or takeoff. The aircraft currently using the Heber City Municipal Airport, with more than 500 annual itinerant operations, have an ARC ranging from A-I to B-II. Aircraft with ARCs ranging from C-I to D-II currently accomplish approximately 300 operations per year. Airport users and fleet mix are discussed later in this chapter. It is anticipated that aircraft with an ARC of C-II and D-II will exceed 500 annual operations in the near future. Examples of aircraft for each ARC are shown in Figure 2-1. This information indicates that fundamental development items in the short-term should be based on an ARC of B-II, while future and ultimate development items in the medium and long-term should be based on an ARC of D-II.

TABLE 2-3
AIRPORT DESIGN STANDARDS

DESIGN CRITERIA	RUNWAY 3/21
Airport Reference Code	B-II
Approach Type	Visual (Circling)
Approach Minimums	1903 HAA / 1.5 mile Visibility
FAA AIRPORT DESIGN STANDARDS (AC 150/5300-13, Change 7)	
Runway centerline to parallel taxiway centerline	240' (233' actual)
Runway centerline to edge of aircraft parking apron	250'
Runway width	75'
Runway shoulder width	10'
Runway safety area width	150'
Runway safety area length beyond runway end	300'
Runway Object Free Area width	500'
Runway Object Free Area length beyond runway end	300'
Runway Obstacle Free Zone width	400'
Runway Obstacle Free Zone length beyond runway end	200'
Runway Protection Zone	500' x 700' x 1,000'
Taxiway width	35'
Taxiway Safety Area width	79'
Taxiway Object Free Area width	131'
Taxilane Object Free Area width	115'
Runway centerline to aircraft hold lines	200'
AIRSPACE SURFACE (FAR Part 77) **Visual (Circling) – Larger than Utility**	
Primary surface width	500'
Primary surface length beyond runway ends	200'
Approach surface length	5,000'
Approach surface slope	20:1
Transitional surface slope	7:1
Horizontal surface radius from runway	5,000'
Conical surface width	4,000'
Conical surface slope	20:1

2.1 CURRENT BASED AIRCRAFT & OPERATIONS

Inventory shows there are approximately 84 based aircraft including 20 based gliders at the Heber City Municipal Airport. The FAA 5010 Form indicates 64 based aircraft and 12 gliders. The FAA 5010 Form also estimates total operations for 2002 to be 37,060, including 5,000 air taxi operations, 20,000 local general aviation, 12,000 itinerant general aviation, and 60 military operations. A summary of the current FAA 5010 Form is listed in Table 2-4. This is consistent with operation estimates derived by extrapolating traffic counts obtained from Wasatch Front Regional Council.

TABLE 2-4 AIRPORT MASTER RECORD (FAA FORM 5010)	
	2002
Based Aircraft	64
Gliders	12
Air Taxi Operations	5,000
General Aviation Local Operations	20,000
General Aviation Itinerant Operations	12,000
Military Operations	60
TOTAL OPERATIONS	37,060

General aviation activity includes a wide variety of aircraft, ranging from single-engine piston to multi-engine turbojets or rotorcraft. Typical general aviation operations at Heber City Municipal Airport include personal or business transportation, freight and cargo flights, as well as recreational and training flights.

2.2 EXISTING ACTIVITY

The table below summarizes the existing aircraft fleet and operations based on four sources: Terminal Area Forecast (TAF), Wasatch Front Regional Council (WFRC), FAA 5010 Form, and a recent inventory.

TABLE 2-5 EXISTING AIRCRAFT AND OPERATIONS				
	TAF	WFRC	5010	ACI*
Based Aircraft	76	74	76	84
Annual Ops	37,060	33,880	37,060	33,880

** Inventory 2002*

According to jet logs compiled by Wasatch Aero Services between March of 2002 and August of 2002, there are approximately 52 operations by turbine aircraft per month. These operations vary depending upon the time of year, ranging from approximately 15 operations in May to over 70 operations in March and July. Figure 2-2 summarizes the percentage of aircraft by approach and design categories. Examples of the aircraft that have been operating at Heber City Municipal Airport can be found in Table 2-6.

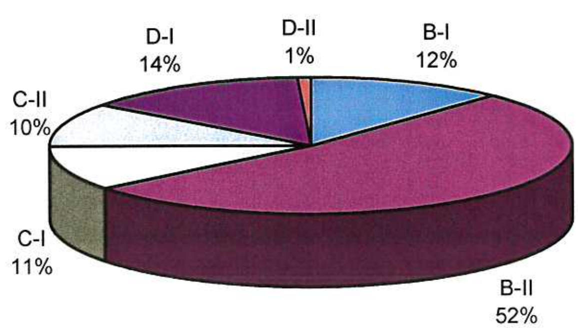


FIGURE 2-2 – 7 MONTH JET LOG

TABLE 2-6 JET AIRCRAFT LOG				
B-II	C-I	C-II	D-I	D-II
Citation V	Learjet 45	Citation X	Learjet 60	Gulfstream II
Hawker 800	Westwind I	Challenger 600	Learjet 35A	
King Air 200	Hawker 700	Falcon 900		
Falcon 50				

Itinerant operations are being conducted by: AH Aviation LLC; Blue Sky Ventures LLC; Bombardier Capital Incorporated; Dyson, Dyson & Dunn Incorporated; Fleet National Bank; Interplanetary Aviation Incorporated, J.M. Thomas Forest Products Company; John R. Miller Enterprises LLC; PVK Investments LLC; Target Corporation; amongst others. Private users and charter companies such as Flex Jet and Executive Jet are also contributing to these itinerant operations.

Heber City Corporation has adopted a city ordinance to limit aircraft operations. Section 10.40.040, *Airport Landings and Takeoffs Restricted*, states: A) aircraft with a certified single wheel gear weight in excess of 30,000 pounds are prohibited from landing or taking off from the Heber City Municipal Airport; B) aircraft with a certified single wheel gear weight in excess of 12,5000 pounds and less than 30,000 pounds are limited to 450 operations per year at the Heber City Airport; and C) Violations of this ordinance shall be a Class B Misdemeanor and may be punishable by a fine of up to $1,000 and a sentence to imprisonment for a term not to exceed six months.

2.3 FORECASTS OF AVIATION ACTIVITY

Forecasts of aviation activity serve as a guideline for the timing required for implementation of airport improvement programs. While such information is essential for successful comprehensive airport planning, it is important to recognize that forecasts are only approximations of future activity, based upon historical data and viewed through present situations. Many factors, such as growth in the established flight training school, hangar development, the availability of aircraft for rent, or the decision by a business jet operator to base an aircraft at Heber City Municipal Airport, will all have significant impacts on the long-term levels and types of operations. Forecasts, therefore, must be used with careful consideration, as they may lose their validity with the passage of time and should be updated periodically.

An examination of the historical levels of activity and a forecast of future activity levels are essential components of any airport planning project. Numerous sources of data exist from several federal, state, and local agencies. Data from these sources, along with discussions with airport users and the Fixed Base Operator, were analyzed to determine the present activity level. Once a baseline activity level was determined, trends were developed that include the consideration of unique local factors that may influence airport demand to develop a constrained and unconstrained forecast. These forecasts were then used to develop a timeline for future facility improvements.

For the purpose of these forecasts, "Local GA" operations are considered those operations that originate and terminate at the Heber City Municipal Airport, and those flights that remain relatively close distance to the airport, such as training and local recreational flights. On the other hand, "Itinerant GA" operations include operations of based aircraft to other airports, as well as non-Heber City Municipal based aircraft, also called transient aircraft, operating to the Heber City Municipal Airport.

2.3.1 EXISTING FORECASTS

The FAA Terminal Area Forecast (TAF) shows no increase in operational levels through 2015 from the current level of 37,060 operations and 76 based aircraft. The TAF's reflection of no growth is not a realistic growth forecast for Heber City Municipal Airport and, therefore, is not used in the rationale for the activity forecasts. The following table summarizes the information obtained from the TAF report:

TABLE 2-7
TAF BASED AIRCRAFT & OPERATIONS

		1990	1995	2000		2005	2010	2015
Based Aircraft	Historical	50	38	76	Forecast	76	76	76
Itinerant General Aviation		5,000	12,000	12,000		12,000	12,000	12,000
Itinerant Military		60	60	60		60	60	60
Itinerant Air Taxi		10	5,000	5,000		5,000	5,000	5,000
Local General Aviation		6,500	20,000	20,000		20,000	20,000	20,000
TOTAL OPERATIONS		11,570	37,060	37,060		37,060	37,060	37,060

A second forecast was available from Wasatch Front Regional Council (WFRC). The format of their forecast is similar to the FAA TAF, and is summarized below:

TABLE 2-8
WFRC BASED AIRCRAFT & OPERATIONS

		1991	1996	2001		2006	2011	2016	2021
Based Aircraft	Historical	42	58	74	Forecast	85	98	113	137
Itinerant General Aviation		18,165	17,835	20,073		22,522	25,021	27,214	28,398
Itinerant Military		60	75	85		100	100	100	100
Itinerant Air Taxi		75	90	170		335	805	1,965	4,020
Local General Aviation		12,200	12,000	13,552		15,305	17,284	19,519	21,514
TOTAL OPERATIONS		30,500	30,000	33,880		38,262	43,210	48,798	54,032

Finally, a third forecast was available from the 1995 Master Plan. Although the 1995 Master Plan shows excessive growth in 2000 beyond the existing number of based aircraft it is important to note that the future growth rate is consistent with the other forecasts.

TABLE 2-9
1995 AIRPORT MASTER PLAN

		1992	1995		2000	2005	2010	2015
Based Aircraft	Historical	69	89	Forecast	129	137	145	155
TOTAL OPERATIONS		33,968	44,775		64,538	77,337	85,362	94,221

2.3.2 FORECASTS OF BASED AIRCRAFT

For based aircraft forecasts two methods were used: market share (top-down) and per capita (bottom-up). For the market share method the current ratio of based aircraft was compared to the total aircraft based in the State of Utah. The resulting percentage was applied to projections of total based aircraft in Utah to determine a forecast of based aircraft for Heber City Municipal Airport. Future based aircraft per capita were determined by analyzing the current ratio of the combined population of Heber City, Charleston, Daniel, Midway, and Park City per based aircraft. This ratio was then compared to the United States Census Bureau's forecasts based on the 2000 Census.

The forecast based upon the market share method, defined above, resulted in 169 aircraft in the year 2021. The following table summarizes the results:

TABLE 2-10 MARKET SHARE METHOD FORECAST			
Year	Heber City Based Aircraft	Utah Based Aircraft	United States Based Aircraft*
2001	84	1,833	229,170
2006	100	2,183	272,820
2011	120	2,598	324,785
2016	142	3,093	386,647
2021	169	3,682	460,293

**Source: General Aviation Manufacturers Association (GAMA)*

The current ratio of 211 people per based aircraft was applied to the extrapolated forecast for the service area to determine the per capita forecast. The following table summarizes the method, which resulted in 167 aircraft in 2021:

TABLE 2-11 PER CAPITA METHOD FORECAST							
Year	Population*						Based Aircraft
	Heber City	Charleston	Daniel	Midway	Park City	Service Area	
2001	7,291	378	770	2,121	7,371	17,931	84
2006	8,129	429	873	2,405	9,295	21,131	100
2011	9,064	486	990	2,728	11,721	24,989	118
2016	10,107	551	1,123	3,093	14,780	29,654	141
2021	11,269	625	1,273	3,507	18,637	35,312	167

**Source: US Census Bureau, 2000 Census*

The final forecast of based aircraft was derived by averaging the per capita method, the market share method, the WFRC forecast, and the 1995 Airport Master Plan and taking into account that Heber City Municipal Airport has been experiencing higher than the average growth rates for general aviation airports in the State of Utah for the last five years; this resulted in 148 aircraft in 2021. The following graph and table summarizes the various based aircraft forecasts:

TABLE 2-12 BASED AIRCRAFT SUMMARY FORECAST						
Year	TAF	Market Share	Per Capita	WFRC	1995 AMP	Armstrong
2001	76	84	84	74	129	84
2006	76	100	100	85	137	105
2011	76	120	118	98	145	116
2016	76	142	141	113	155	130
2021	76	169	167	137	164	148

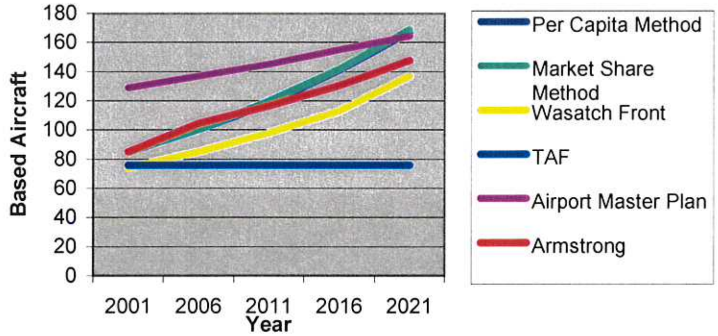


FIGURE 2-3 – BASED AIRCRAFT FORECAST

The forecasted based aircraft fleet mix was determined by trending the existing fleet mix towards the forecasted national fleet mix obtained from the 2001 *General Aviation Manufacturers Association (GAMA) Statistical Databook*. The following fleet mix percentages were used:

	Baseline (%)	Future–20 Year (%)
Single-Engine Piston (SEP)	70.5%	68.8%
Multi-Engine Piston (MEP)	3.4%	9.5%
Turbo-Prop (Multi)	2.3%	2.7%
Turbojet	1.1%	3.9%
Helicopter	0.0%	2.1%
Experimental & Other	22.7%	12.4%

The trend resulted in the based aircraft fleet mix forecast summarized below:

TABLE 2-13
BASED AIRCRAFT FLEET MIX FORECAST

Year	Based A/C	SEP	MEP	Turboprop	Turbojet	Helicopter	Other
2001	84	59	3	2	1	0	19
2006	105	73	5	2	2	1	21
2011	116	81	8	3	3	1	20
2016	130	89	10	3	4	2	20
2021	148	103	14	4	6	3	18

The current ratio of local GA flights versus itinerant GA flights is approximately 47 percent to 53 percent, respectively. This ratio is forecasted to remain relatively constant over the planning period. The operations forecasts, broken down for Category A/B and Category C/D aircraft, were developed using two scenarios. The first scenario, an Unconstrained Forecast, Table 2-16, was developed with the assumption that the airport would be improved from an ARC of B-II to an ARC of D-II as demand warrants. The second scenario, a Constrained Forecast, Table 2-18, was developed assuming that the airport is maintained at the current ARC of B-II.

2.3.3 UNCONSTRAINED FORECAST

In analyzing the unconstrained forecast, the total annual operations forecast of 632 operations per based aircraft (OPBA) was derived from comparing similar airports, such as Logan and Provo, Utah and Greeley, Colorado. These airports are similar in size and number of aircraft that can be expected to utilize Heber City Municipal Airport once the airport has been upgraded to an ARC of D-II. The OPBA for these airports are summarized in Table 2-14.

TABLE 2-14 OPERATIONS PER BASED AIRCRAFT (OPBA)					
Year	Heber, UT	Logan, UT	Provo, UT	Greeley, CO	Average
2001	448	513	867	649	632

The resulting annual aircraft operations are summarized in Table 2-15. The forecasted annual operations were derived by trending the current 448 operations per based aircraft towards the forecasted 632 operations per based aircraft from Table 2-14.

TABLE 2-15 UNCONSTRAINED AIRCRAFT OPERATIONS FORECAST					
Year	Based A/C	OPBA	Local	Itinerant	TOTAL
2001	85	448	17,760	20,328	38,088
2006	105	520	26,817	27,783	54,600
2011	116	555	29,850	34,522	64,372
2016	130	592	33,932	43,056	76,988
2021	148	632	39,634	53,902	93,536

Table 2-16 further separates the forecast by Category A/B and Category C/D turbine aircraft operations. Figure 2-4 illustrates this forecast over the planning period. The current ratio of Category A/B to Category C/D is 66 percent to 33 percent, respectively. It is assumed that this ratio will trend towards a fifty-fifty split (matching national fleet mix of Category A/B and Category C/D aircraft) as the airport offers upgraded facilities.

The following assumptions were made in developing the Unconstrained Aircraft Operations forecast:

- 50 percent of based turbojet aircraft are Category C or D;
- 50 percent of transient turbojet aircraft are Category C or D;
- Development of maximum aircraft services;
- OPBA will increase to a similar level as Logan, Provo, and Greeley; and
- A Category C or D approach is not feasible at the existing site due to surrounding terrain.

TABLE 2-16 UNCONSTRAINED AIRCRAFT OPERATIONS					
Year	Based Aircraft	Turbine Aircraft		Other Ops	TOTAL
		Category A/B	Category C/D		
2001	85	613 (67.1%)	300 (32.9%)	37,175	38,088
2006	105	926 (62.9%)	548 (37.2%)	53,126	54,600
2011	116	1,018 (58.6%)	720 (41.4%)	62,634	64,372
2016	130	1,129 (54.3%)	950 (45.7%)	74,909	76,988
2021	148	1,263(50.0%)	1,263 (50.0%)	91,010	93,536

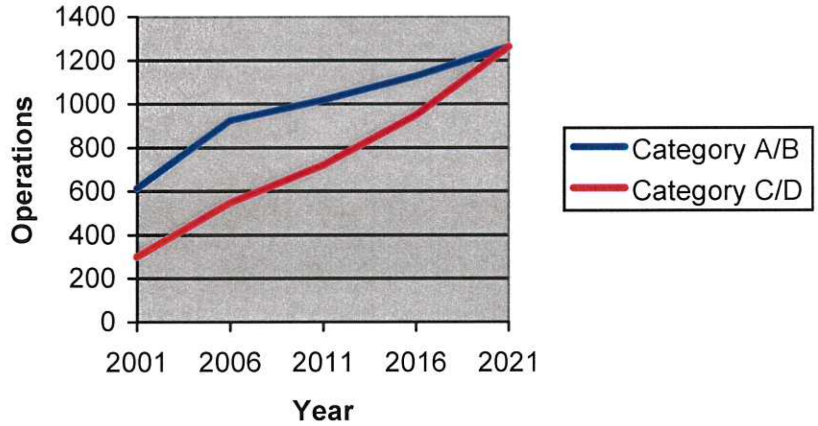


FIGURE 2-4 – UNCONSTRAINED AIRCRAFT OPERATIONS

2.3.4 CONSTRAINED FORECAST

For the Constrained Forecast Spanish Fork and Brigham City airports were used to compare the OPBA of similar airports with an ARC of B-II. It is assumed that the operations per based aircraft at Heber City Municipal Airport will trend towards the average OPBA of 545.

TABLE 2-17 OPERATIONS PER BASED AIRCRAFT (OPBA)				
	Heber City, UT	Spanish Fork, UT	Brigham City, UT	AVERAGE
2001	448	282	853	545

Based on recent aircraft logs prepared by Wasatch Aero Services Fixed Base Operator, one-third of turbojet operations are conducted by Category C or D aircraft, with the remaining two-thirds being Category A or B. Under the constrained forecast, operations by aircraft weighing over 12,500 pounds would not be permitted. Therefore, it is anticipated that there would be no operations by Category C or D aircraft and operations by Category A and B turbine aircraft would be limited. Table 2-18 and Figure 2-5 summarize the forecasted turbine operations.

The following assumptions were made in developing the Constrained Aircraft Operations forecast:

- OPBA will increase to similary levels as Spanish Fork and Brigham City; and
- Aircraft operations will be limited to aircraft with a certificated takeoff weight of 12,500 pounds or less.

TABLE 2-18 CONSTRAINED AIRCRAFT OPERATIONS FORECAST					
Year	Based Aircraft	Turbine Aircraft		Other Operations	TOTAL
		Category A/B	Category C/D		
2001	85	613	300	37,175	38,088
2006	105	419	0	48,983	49,402
2011	116	453	0	56,866	57,319
2016	130	494	0	66,968	67,462
2021	148	545	0	80,115	80,660

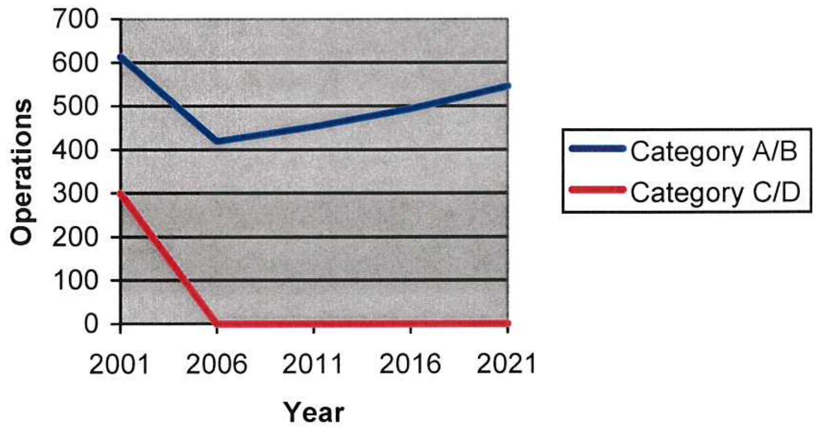


FIGURE 2-5 – CONSTRAINED AIRCRAFT OPERATIONS

2.3.5 SUMMARY OF FORECASTS

The following table summarizes the difference in operations between the Unconstrained and Constrained forecast:

TABLE 2-19
SUMMARY OF FORECASTS

Year	Unconstrained Forecast Based A/C	Unconstrained Turbine Aircraft Cat A/B	Unconstrained Turbine Aircraft Cat C/D	Unconstrained Other Ops	Unconstrained TOTAL	Constrained Forecast Based A/C	Constrained Turbine Aircraft Cat A/B	Constrained Turbine Aircraft Cat C/D	Constrained Other Ops	Constrained TOTAL
2001	85	613	300	37,175	38,088	85	613	300	37,175	38,088
2006	105	926	548	53,126	54,600	105	419	0	48,983	49,402
2011	116	1,018	720	62,634	64,372	116	453	0	56,866	57,319
2016	130	1,129	950	74,909	76,988	130	494	0	66,968	67,462
2021	148	1,263	1,263	91,010	93,536	148	545	0	80,115	80,660

As can be seen from Table 2-19, it is expected that total operations in 2021 will be approximately 13,000 less in the constrained forecast than the unconstrained forecast. Figure 2-6 illustrates the differences in the total operations forecasts.

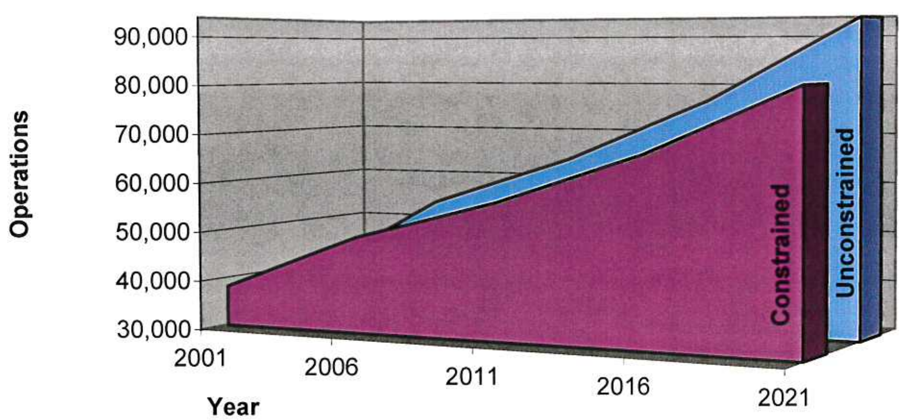
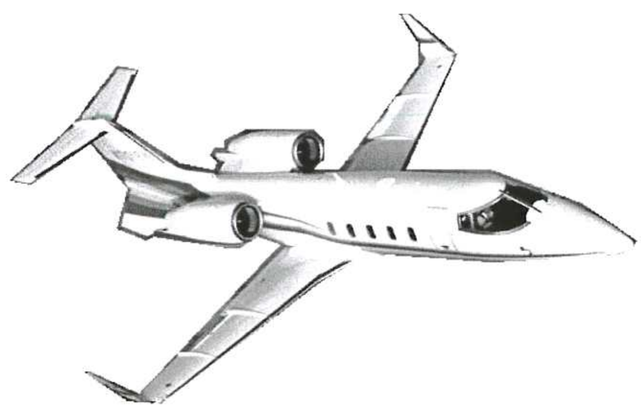


FIGURE 2-6 – TOTAL OPERATIONS

Chapter 3

FACILITY REQUIREMENTS



CHAPTER

3

FACILITY REQUIREMENTS

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

3.0 FAA SAFETY & DESIGN STANDARDS

The primary focus of the recommended development plan for the Heber City Municipal Airport is to enhance air and ground operations and improve safety. In doing so, emphasis has been placed on improving the airside facilities in order to meet the increasing demand of Category C and Category D aircraft. Currently, the airport meets the majority of B-II Airport Reference Code (ARC) standards. The design standards presented here address improving the airport to meet all of the B-II standards and improving the facilities to meet D-II standards. The standards for an ARC of B-II and D-II, as set forth in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, Change 7, *Airport Design*, and in Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, are shown in the following table:

TABLE 3-1
FAA DESIGN STANDARDS

DESIGN CRITERIA	B-II	D-II
Runway centerline to parallel taxiway centerline	240'	300'
Runway centerline to edge of aircraft parking apron	250'	400'
Runway width	75'	100'
Runway shoulder width	10'	10'
Runway Safety Area width	150'	500'
Runway Safety Area length beyond runway end	300'	1,000'
Runway Object Free Area width	500'	800'
Runway Object Free Area length beyond runway end	300'	1,000'
Runway Obstacle Free Zone width	400'	400'
Runway Obstacle Free Zone length beyond runway end	200'	200'
Runway Protection Zone	500'x700'x1,000'	500'x1,010'x1,700'
Taxiway width	35'	35'
Taxiway Safety Area width	79'	79'
Taxiway Object Free Area width	131'	131'
Taxilane Object Free Area width	115'	115'
Taxiway centerline to aircraft hold lines	200'	250'
AIRSPACE SURFACES	**Visual (Circling) Larger than Utility**	**Visual (Circling) Larger than Utility**
Primary Surface width	500'	500'
Approach Surface dimensions	500'x2,000'x5,000'	500'x3,500'x10,000'
Approach Surface slope	20:1	34:1
Transitional Surface slope	7:1	7:1
Horizontal Surface radius from runway	5,000'	10,000'
Conical Surface width	4,000'	4,000'
Conical Surface slope	20:1	20:1

Note: Dimensions reflect visual runways and those with no lower than ¾ statute mile approach visibility minimums

As previously mentioned, some of the existing characteristics for Heber City Municipal Airport do not meet the current ARC of B-II. Currently the runway and taxiway centerlines are separated by 233 feet. FAA design standards recommend a separation of 240 feet for a B-II airport.

3.1 Airside Facility Requirements

The airside facilities of an airport are described as the runway configuration, the associated taxiway system, the ramp and aircraft parking area, and any visual or electronic approach navigational aids. Based on airport elevation, temperature, and effective gradient, the existing Runway 3/21 length of 6,900 feet nearly accommodates 100 percent of small aircraft with less than ten passenger seats (based on the FAA Airport Design Program Version 4.2d, *5,637' MSL, 87.3^{O}F*). Recommended runway lengths were determined using the same program, as well as a review of aircraft performance charts.

Description	**Runway Length**
Existing	
Runway 3/21	6,900 feet
Recommended to accommodate:	
Small airplanes (≤ 12,500 lbs.) with less than 10 passenger seats	
75 percent of these small airplanes	4,910 feet
95 percent of these small airplanes	6,950 feet
100 percent of these small airplanes	6,950 feet
Small airplanes with 10 or more passenger seats	6,950 feet
Large airplanes (>12,500 lbs., <60,000 lbs.)	
75 percent of these airplanes at 60 percent useful load	7,170 feet
75 percent of these airplanes at 90 percent useful load	8,920 feet
100 percent of these airplanes at 60 percent useful load	11,320 feet
100 percent of these airplanes at 90 percent useful load	11,320 feet

Heber City Municipal Airport is utilized by both small and large aircraft, ranging from single-engine Cessna, Katana, and Piper aircraft to business jets such as the Gulfstream II and Dassault Falcon 2000. The recommended runway length to accommodate 100 percent of these small aircraft and 75 percent of large aircraft at 90 percent useful load is 8,920 feet; however, existing constraints will likely limit the maximum feasible runway length to less than 8,920 feet. A runway extension will not be evaluated in this study.

The following paragraphs summarize the airport facility needs. Scenarios for improvements or expansion will be addressed in Chapter 4, *Airport Development Alternatives*.

The runway strength is based upon the maximum certificated takeoff weight of the most demanding aircraft (or group of aircraft) that is expected to use the airport on a regular basis. Currently, the strength of Runway 3/21 is reported as 12,500 pounds single wheel gear (SWG). It is recommended that the runway be strengthened to a strength of 60,000 pounds SWG and

DWG to accommodate the C-II and D-II aircraft fleet. It is important to note that heavier aircraft may occasionally utilize the airfield.

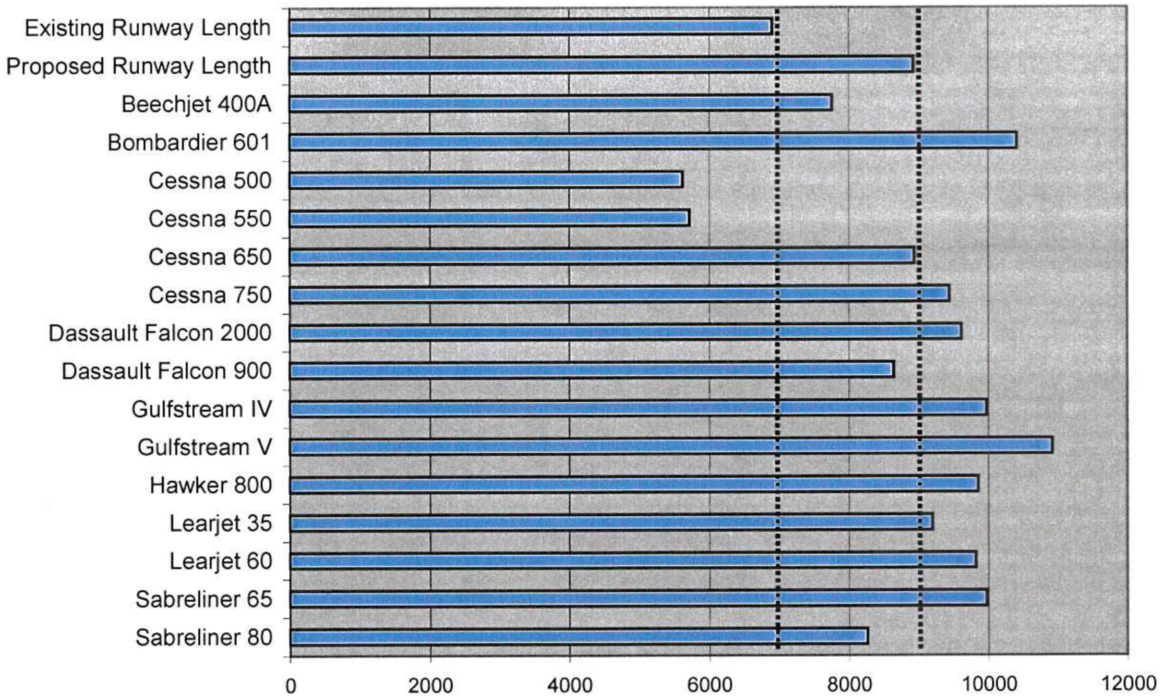


FIGURE 3-1 – AIRCRAFT TAKEOFF DISTANCE

The existing taxiway system at Heber City Municipal Airport consists of a full length parallel taxiway and a series of taxilanes that provide access to hangar facilities. The parallel taxiway is lighted by a combination of inset and mounted taxiway lights. The current runway centerline to taxiway centerline is 233 feet, which is less than the B-II standard. It will be necessary to increase the centerline-to-centerline separation. A 35 foot taxiway width is needed along with a 240 foot separation for B-II design standards or a 35 foot taxiway with 300 foot separation for D-II design standards.

The aircraft apron is located to the south of the runway and parallel taxiway and consists of approximately 66 aircraft tiedowns. A dedicated aircraft parking apron is needed for large B-II, C-II, and D-II aircraft.

The airport also has precision approach path indicators (PAPI-4), an airport beacon, a lighted wind cone and segmented circle, threshold lights, and an automated weather observing station (AWOS-III).

3.2 LANDSIDE FACILITY NEEDS

Landside characteristics of an airport are described as those facilities delineating the interface between the airfield, aircraft storage hangars, the access routes to and from the facility, and the automobile parking capability.

The landside developments currently consist of a series of 31 box hangars, commonly referred to as "hangar row", and 22 box hangars that range in size from small to large. Wasatch Aero Service, the Fixed Base Operator (FBO), is also located on the northeastern edge of the ramp.

Expansion of the existing FBO and/or development of expanded aviation services (such as maintenance, refurbishing, painting, etc.) are expected. Additional aircraft storage hangar development is also anticipated.

Access to Heber City Municipal Airport is provided by Airport Road. Airport Road is connected to the surrounding communities via South Daniels Road, which connects to State Highway 189.

3.3 AIRPORT LAND USE

Heber City Municipal Airport serves the communities of Heber City, Charleston, Daniel, Midway, and Park City. The airport is situated along State Highway 189 to the southwest of Heber City. The majority of airport land is surrounded by agriculture and rural residential lots. In addition there is an industrial park located to the northeast.

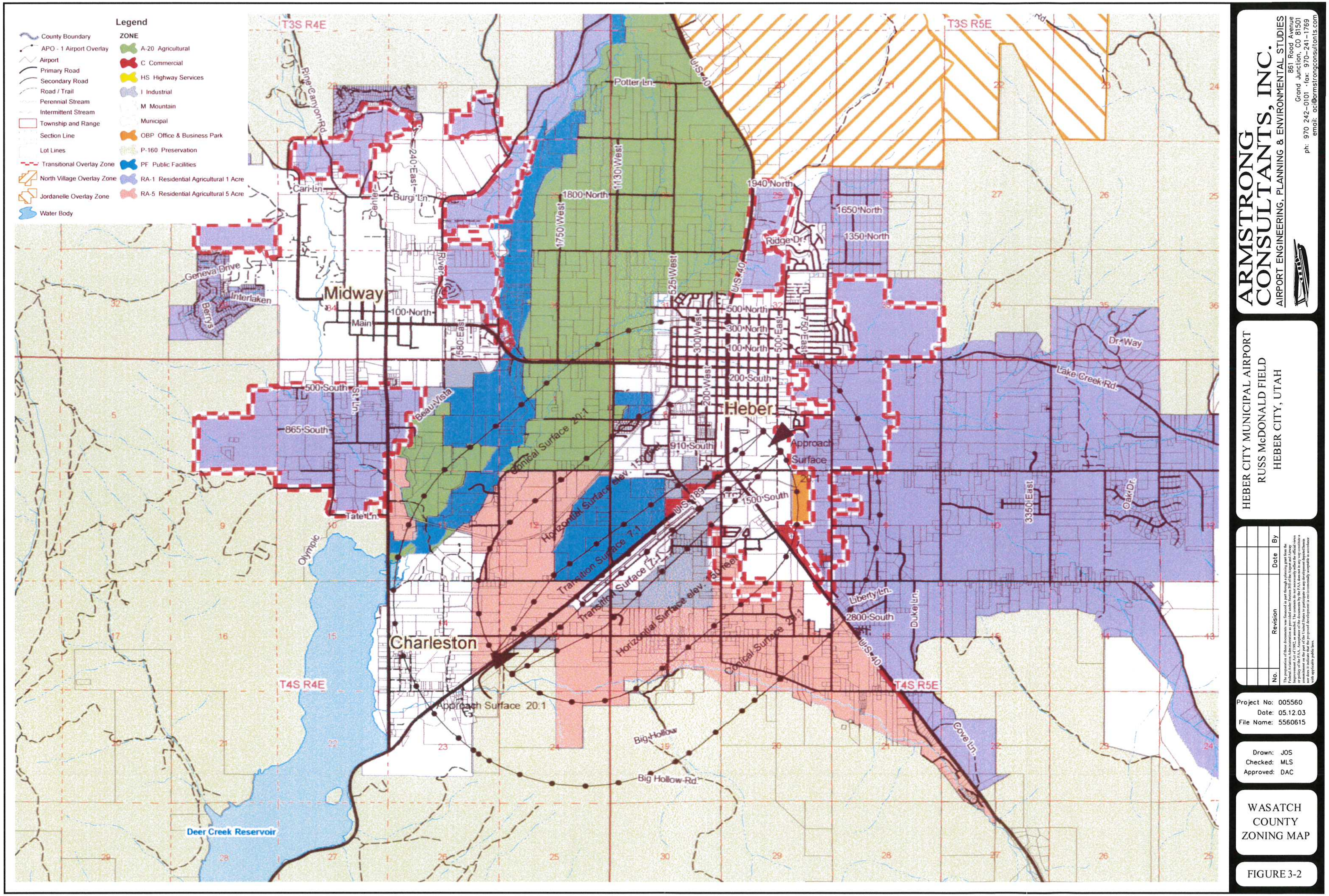
In an attempt to protect the airport and the surrounding areas, Wasatch County Planning Office prepared Wasatch County: Official Zoning Map (16.19), AO-Z Airport Overlay Zone. This plan provides three zones that are to be protected at all airports in Wasatch County:

- Airport Approach Zone – an area at each end of the airport landing strip or take-off strip, broadening from a width of 1,000 feet at the end of the strip to a width of 4,000 feet at a distance of 7,500 feet from the end of such strip, its center line being a continuation of the center line of the strip;
- Airport Transition Zone – a triangular area adjacent to each side of an airport approach zone located with reference thereto as follows: One corner of the transition zone shall be identical with the corner of the approach zone nearest the landing strip; a second corner shall be located at the end of a line, the line extending from the end of the landing strip to a point 1,550 feet from the center line of the landing strip and at right angles thereto; a third corner shall be located at a point along the approach zone boundary line, which point is 7,500 feet distant from the first corner above mentioned; and
- Airport Turning Zone – a circular area surrounding the airport encompassing all of the land lying within a radius of two miles distance from the landing strip of the airport; except that area covered by the airport, the transition zones and the approach zones.

The Zoning Plan also limits buildings, utility lines, structures, or natural features within the Airport Approach Zone to a height of 1 foot for each 20 feet the object is situated from the end of the landing or take-off strip. Objects within the Airport Transition Zone are limited to a height of 1 foot for each 7 horizontal feet and objects within the Airport Turning Zone are limited to a total height of 150 feet.

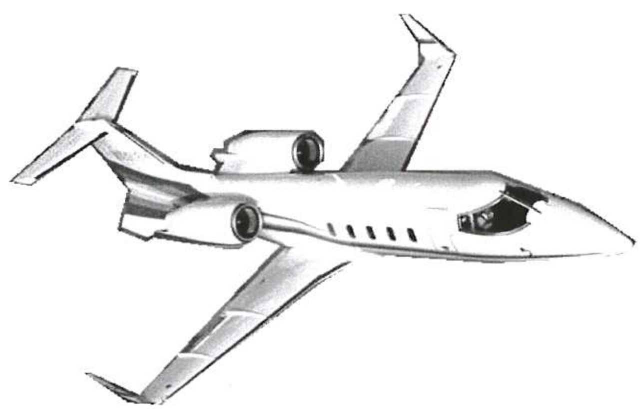
Usage of the land surrounding the airport is restricted to uses that will not create an electrical interference with radio communications between airports and aircraft, make it difficult for flyers to distinguish between airport lights and others, result in glare in the eyes of flyers using the airport, impair visibility in the vicinity of airports, or otherwise endanger the landing or taking off of aircraft.

The figure on the following page illustrates the AO-Z Airport Overlay Zone for Heber City Municipal Airport.


Legend
County Boundary
APO - 1 Airport Overlay
Airport
Primary Road
Secondary Road
Road / Trail
Perennial Stream
Intermittent Stream
Township and Range
Section Line
Lot Lines
Transitional Overlay Zone
North Village Overlay Zone
Jordanelle Overlay Zone
Water Body
ZONE
A-20 Agricultural
C Commercial
HS Highway Services
I Industrial
M Mountain
Municipal
OBP Office & Business Park
P-160 Preservation
PF Public Facilities
RA-1 Residential Agricultural 1 Acre
RA-5 Residential Agricultural 5 Acre
T3S R4E
T3S R5E
T4S R4E
T4S R5E
Midway
Heber
Charleston
Deer Creek Reservoir
U.S. 40
U.S. 189
Potter Ln.
1940 North
1800 North
1650 North
1350 North
500 North
300 North
100 North
100 North
200 South
500 South
865 South
910 South
1500 South
2800 South
Lake Creek Rd.
Big Hollow Rd.
Conical Surface 20:1
Horizontal Surface elev. 150
Transition Surface 7:1
Approach Surface 20:1
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph: 970 242-0101 fax: 970-241-1769
email: acl@armstrongconsultants.com
HEBER CITY MUNICIPAL AIRPORT
RUSS McDONALD FIELD
HEBER CITY, UTAH
No. Revision Date By
Project No: 005560
Date: 05.12.03
File Name: 5560615
Drawn: JOS
Checked: MLS
Approved: DAC
WASATCH COUNTY ZONING MAP
FIGURE 3-2

Chapter 4

AIRPORT DEVELOPMENT ALTERNATIVES



CHAPTER

4

AIRPORT DEVELOPMENT ALTERNATIVES

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

4.0 Alternative Summary

The following table identifies the development alternatives that have been considered for Heber City Municipal Airport:

TABLE 4-1 DEVELOPMENT ALTERNATIVES	
Alternative 0	No Change
Alternative 1	Modify to Meet B-II Standards
1.1	Shift Taxiway Southeast
1.2	Shift Runway Northwest
Alternative 2	Upgrade to Meet D-II Standards
2.1	Relocate Runway & State Highway Northwest
2.2	Convert Runway to Taxiway and Relocate Runway and State Highway Northwest
2.3	Relocate Runway, Taxiway, and various Buildings Southeast
Alternative 3	Relocate Airport

Alternative 0 was eliminated because of safety concerns resulting from the existing non-standard condition discussed in Chapter 2. If the Sponsor elects not to upgrade the airport it will still be necessary to undergo modifications to meet all of the B-II design standards. Alternative 3 was also eliminated as a result of there being no suitable alternative sites available within the valley. Heber City is surrounded by high terrain and development is, therefore, limited by topography. Additionally, Alternative 1.2 and 2.2 have been eliminated from further consideration. Preliminary cost analysis shows that these alternatives are more costly than Alternatives 1.1 and 2.1, respectively, and do not provide any additional benefit for the increased cost.

Therefore, a description, anticipated impacts, and estimated development cost are provided in the following sections for each for the remaining alternatives. Alternative 1.1 addresses those standards that must be complied with in order to meet the existing airport reference code (ARC) of B-II, Figure 4-1 illustrates the layout of this alternative. Alternatives 2.1 and 2.3 address the various alternatives to upgrade the airport facilities to meet an ARC of D-II, illustrations of these alternatives can be found in Figures 4-2 and 4-3, respectively. All figures can be found at the end of this chapter.

4.1 ALTERNATIVE 1.1

As mentioned in the previous chapter, the runway to taxiway centerline separation is not sufficient to meet the FAA recommended standards for an ARC of B-II. Therefore, Alternative 1.1 address the modifications necessary to meet the standard 240 feet.

The economic and noise impact for Alternative 1.1 is of no consequence as the amount of traffic and size of aircraft will not change as a result of the modifications. It is important to note, total operations will continue to rise with the passage of time. These increases will result in increased economic benefit and increased aircraft noise, but are not a direct result of modifying the airport to meet B-II standards. The table showing constrained aircraft operations has been reproduced below. Further discussion of the economic impact is discussed in Chapter 5 and further discussion of the noise impact can be found in Section 4.4 of this chapter.

TABLE 4-2
CONSTRAINED AIRCRAFT OPERATIONS

Year	Turbine Aircraft		Other Operations	TOTAL
	Category A/B	Category C/D		
2001	613	300	37,175	38,088
2006	419	0	48,983	49,402
2011	453	0	56,866	57,319
2016	494	0	66,968	67,462
2021	545	0	80,115	80,660

Description: Alternative 1.1 modifies the existing configuration by shifting the existing taxiway approximately 8 feet to the southeast. This will effectively increase the runway to taxiway separation to meet the FAA recommended separation of 240 feet while maintaining the taxiway object free area (TOFA) of 131 feet. The length of Runway 3/21 will not be increased, nor will the runway be strengthened, as discussed in Chapter 3. Figure 4-1, located at the end of this chapter, illustrates the airfield configuration for Alternative 1.1.

Impacts: Alternative 1.1 will increase the safety and efficiency of the airfield by modifying the existing dimensions to meet B-II design standards. There is adequate room between the future taxiway and existing buildings so that the taxiway relocation will not effect any structures. However, the taxiway relocation will affect approximately 6 tiedowns and just over a 1,000 square yards of apron space. It will be necessary to replace these tiedowns and apron at another location on airport property. There will be an inconvenience during reconstruction of the taxiway due to closures of portions of the taxiway that may require back taxiing on the runway.

Estimated Costs: The estimated development cost of Alternative 1.1 is $1,100,000. Assuming that the FAA and State of Utah will continue to provide funding at 90.94 percent and 4.53 percent, respectively, the remaining sponsor share would be $49,831. Table 4-3 shows a breakdown of development costs.

TABLE 4-3
ALTERNATIVE 1.1 COST ANALYSIS

Description	Total	FAA	State	Sponsor
Reconstruct Taxiway	$ 975,000	$ 886,665	$ 44,168	$ 44,168
Relocate Lighting	$ 95,000	$ 86,393	$ 4,304	$ 4,304
Relocate Apron & Tiedowns	$ 30,000	$ 27,282	$ 1,359	$ 1,359
TOTAL	$ 1,100,000	$ 1,000,340	$ 49,831	$ 49,831

4.2 ALTERNATIVE 2

Alternative 2 addresses the issue of expanding Heber City Municipal Airport to an ARC of D-II; this will allow the airport to meet the needs of the growing number of aircraft operating at the airport that fall into Category C and Category D. The following table summarizes the design criteria that cannot be met with the existing airport configuration and surrounding constraints:

TABLE 4-4 **D-II DEFICIENCIES**	
DESIGN CRITIERIA	D-II
Runway Safety Area (RSA) Width	500'
RSA Length Beyond Runway End	1,000'
Runway Object Free Area (ROFA) Width	800'
ROFA Length Beyond Runway End	1,000'
Runway Protection Zone	1,000'x1,510'x1,700'
Taxiway Object Free Area (TOFA) Width	131'
Runway to Taxiway Centerline Separation	300'

As a result, a change in the configuration of the airport (i.e. runway and taxiway locations) and the relocation of obstacles (i.e. State Highway 189 and hangars) will be necessary to meet the design standards. Alternatives 2.1 and 2.3 have been formulated to meet design standards for an ARC of D-II.

In addition to relocating the runway to the northwest or southeast of its present position, it will also be necessary to relocate the runway to the southwest in order to meet the runway object free area (ROFA). Therefore, both of these alternatives will also require land acquisition. These points are explained in detail with each alternative. Alternative 2 also includes strengthening airport pavements from the existing 12,500 pounds to 60,000 pounds. This will accommodate the increased operations by heavier jet aircraft.

The 65 day-night level (DNL) noise contour associated with increased jet aircraft operations will elongate the contour over approximately the full length of the runway. It is anticipated that the 65 DNL contour will remain almost entirely on airport property. While the contour will remain the same size for each of Alternatives 2.1 and 2.3, it will shift according to the necessary runway relocation. This is illustrated in Figures 4-6 and 4-7, found at the end of this chapter, and further discussed in Section 4.4.

4.2.1 ALTERNATIVE 2.1

Description: Alternative 2.1 upgrades Heber City Municipal Airport to D-II design standards by relocating the runway to the northwest and relocating the highway. This relocation will require the runway be relocated a minimum of 68 feet to the northwest in order to accommodate the 300 foot runway to taxiway centerline separation. In addition, the runway will have to be relocated approximately 1,900 feet to the southwest in order to accommodate the runway object free area to the northeast; with the 1,900 foot shift of the runway, the parallel taxiway will need to be extended 1,900 feet to the southwest to parallel the new runway location. State Highway 189 will need to be relocated a minimum of 400 feet from the relocated runway centerline. Figure 4-2, found at the end of this chapter, illustrates the airfield configuration and highway relocation associated with Alternative 2.1.

Impacts: Alternative 2.1 improvements will necessitate the closure of the airport while the runway surface is being reconstructed. Anticipated closure time will range from two to four months. While the improvements will not require any of the existing airport structures to be relocated there are various privately owned parcels of land and buildings that will need to be acquired, removed, or relocated along with their associated access roads. Table 4-5 provides a summary of the required land. This equates to acquiring approximately 114 acres of land, impacting 21 land owners. State Highway 189 will have to be relocated in order to clear the runway object free area. With the runway shift to the southwest the associated 65 DNL noise contour will also shift to remain nearly centered over the length of the runway.

Table 4-5 Alternative 2.1 Land Acquisition			
	Parcels	Acreage	Residences
Land Acquisition	26	114	5

Estimated Costs: Alternative 2.1 is estimated to cost $16,640,000, resulting in a sponsor share of $753,792. Table 4-6 shows the breakdown of development costs.

TABLE 4-6 ALTERNATIVE 2.1 COST ANALYSIS				
Description	Total	FAA	State	Sponsor
Reconstruct Runway	4,800,000	4,365,120	217,440	217,440
Relocate Lighting & Visual Aids	170,000	154,598	7,701	7,701
Relocate Partial Taxiway	735,000	668,409	33,296	33,296
Relocate Taxiway Lighting	25,000	22,735	1,133	1,133
Land Acquisition	4,050,000	3,683,070	183,465	183,465
Relocate State Highway	6,860,000	6,238,484	310,758	310,758
TOTAL	$ 16,640,000	$ 15,132,416	$ 753,792	$ 753,792

4.2.2 ALTERNATIVE 2.3

Description: Alternative 2.3 upgrades the airport to D-II design standards by relocating the runway, taxiway, fixed base operator (FBO), and 31 box hangars to the south. This will require the runway to be relocated a minimum of 135 feet to the southeast and 975 feet to the southwest. The taxiway will then have to be relocated a minimum of 200 feet to the southeast to provide the FAA recommended 300 foot separation. With the relocation of the runway and taxiway it will also be necessary to relocate the 31 box hangars known as "hangar row", Wasatch Aero FBO, and multiple tie-down spaces and taxilanes in order to maintain the taxiway object free area (TOFA). Figure 4-3, found at the end of this chapter, illustrates the airfield configuration for Alternative 2.3.

Impacts: Alternative 2.3 improvements will require the temporary closure of the airport. Similar to Alternative 2.1, it is anticipated that this closure will be from two to four months. It is recommended that the hangar and FBO reconstruction take place prior to removing the existing facilities so as to avoid any inconvenience to the owners. The improvements will affect various privately owned parcels of land and buildings that will need to be acquired, removed, or relocated along with their associated access roads. Table 4-7 provides a summary of the required land. This equates to acquiring approximately 62 acres of land, impacting 12 land owners.

TABLE 4-7 ALTERNATIVE 2.3 LAND ACQUISITION			
	Parcels	Acreage	Residences
Land Acquisition	12	62	4

Estimated Costs: Alternative 2.3 is estimated to cost $11,900,000, the resultant sponsor share would be $539,070. Table 4-8 shows the breakdown of development costs.

TABLE 4-8 ALTERNATIVE 2.3 COST ANALYSIS				
Description	Total	FAA	State	Sponsor
Relocate Runway	4,800,000	4,365,120	217,440	217,440
Relocate Lighting & Visual Aids	175,000	159,145	7,928	7,928
Relocate Taxiway	1,500,000	1,364,100	67,950	67,950
Relocate Lighting	95,000	86,393	4,304	4,304
Relocate Various Buildings	2,830,000	2,573,602	128,199	128,199
Land Acquisition	2,500,000	2,273,500	113,250	113,250
TOTAL	$ 11,900,000	$ 10,821,860	$ 539,070	$ 539,070

4.3 ALTERNATIVE COMPARISON

Each of the alternatives listed above requires certain facilities to be relocated. The distances identified for the state highway, hangar row, and FBO hangar are the minimum required distances. The following table summarizes those changes.

TABLE 4-9 ALTERNATIVES RELOCATION COMPARISON					
ALTERNATIVE	APPROXIMATE RELOCATION DISTANCES				
	Runway	Taxiway	State Highway	Hangar Row	FBO Hangar
1.1	-	8'	-	-	-
2.1	88'/1,900'	-	400'	-	-
2.3	135'/975'	201'	-	90'	65.5'

The following table summarizes the estimated development cost for each alternative.

TABLE 4-10 ALTERNATIVES COST COMPARISON				
Alternative	Total	FAA	State	Sponsor
1.1	$ 1,100,000	$ 1,000,340	$ 49,831	$ 49,831
2.1	$ 16,640,000	$ 15,132,416	$ 753,792	$ 753,792
2.3	$ 11,900,000	$ 10,821,860	$ 539,070	$ 539,070

4.4 NOISE ANALYSIS

The basic measure of noise is the sound pressure level that is recorded in decibels (dBA). The important point to understand when considering the impact of noise on communities is that equal levels of sound pressure can be measured for both high and low frequency sounds. Generally, people are less sensitive to sound of low frequency than they are to high frequencies. An example of this might be the difference between the rumble of automobile traffic on a nearby highway and the high pitched whine of jet aircraft passing overhead. At any location, over a period of time, sound pressure fluctuates considerably between high and low frequencies. Figure 4-4 depicts a sound level comparison of different noise sources. Further discussion of aircraft noise, sound levels, and day-night average sound level can be found in *Aircraft Noise – How We Measure It and Assess Its Impact*, published by the FAA, and included as Appendix D of this study.

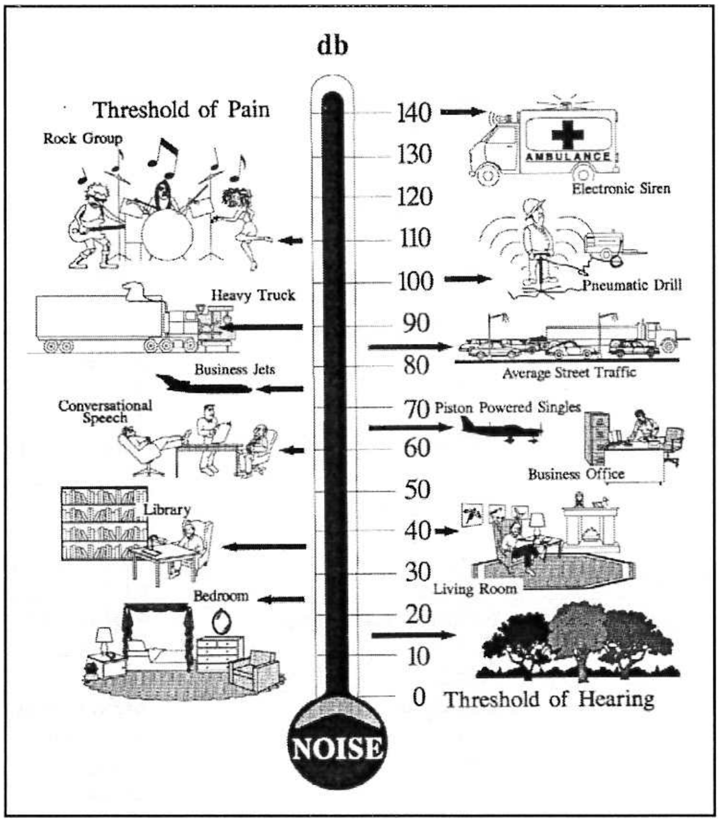


FIGURE 4-4 – SOUND LEVEL COMPARISON

Noise contours for Heber City Municipal Airport were prepared using the FAA Integrated Noise Model (INM) Program, Version 6.0c. The 65 DNL contour was determined for existing conditions, future unconstrained conditions, and future constrained conditions. Typically, all land uses are considered compatible with noise levels less than 65 DNL. The input files include aircraft operational data, flight tracks, runway utilization, and fleet mix. The aircraft operational data and fleet mix and runway utilization and day/night split from the program are summarized in Table 4-11 and 4-12.

TABLE 4-11
SUMMARY OF AIRCRAFT OPERATIONS

Type of Operation	Existing (2001)	Unconstrained (2021)	Constrained (2021)
ITINERANT OPERATIONS			
Single Engine Piston	18,758	41,535	35,817
Multi Engine Piston	712	4,689	4,044
Turboprop	878	2,477	2,136
Turbojet	439	3,716	3,205
Total Itinerant Operations	*20,787*	*52,417*	*45,202*
LOCAL OPERATIONS			
Single Engine Piston	16,634	36,833	31,763
Multi Engine Piston	632	4,159	3,586
Turboprop	18	51	44
Turbojet	9	76	65
Total Local Operations	*17,293*	*41,119*	*35,458*
TOTAL OPERATIONS	**38,088**	**93,536**	**80,660**

TABLE 4-12 RUNWAY UTILIZATION & DAY/NIGHT SPLIT		
	Runway Use Percentage	
	3	21
Operations	50%	50%
Day/Night Split	% Day	% Night
Itinerant Operations	99%	1%
Local Operations	99%	1%

The 65 DNL noise exposure contours for the existing, unconstrained (Alternatives 2.1 and 2.3), and constrained (Alternative 1.1) conditions are depicted in Figures 4-5, 4-6, 4-7, and 4-8 (found at the end of this Chapter). The existing noise contour encompasses approximately 98 acres, the unconstrained forecast noise contour encompasses approximately 118 acres, and the constrained forecast noise contour encompasses approximately 117 acres.

4.5 COMPATIBLE LAND USE

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

The incompatible uses typically consist of medium to high density residential areas, built in close proximity to an existing airfield prior to enactment of suitable land-use zoning legislation. The residents of these developments, with substantial investments in their homes, may view the airport and its activities as a threat to their health, safety, and quality of life.

The issue of aircraft noise is generally the most apparent perceived environmental impact upon the surrounding community. Conflicts may also exist in the protection of runway approach and transitional zones to assure the safety of both the flying public and the adjacent property owners. Adequate land for this use should either be owned in fee, controlled in easements, or protected through zoning.

Federal Aviation Regulation (FAR) Part 150 recommends guidelines for planning land use compatibility within various levels of aircraft noise exposure as summarized in the following table. Although the FAA provides these guidelines, it is the local jurisdictions' responsibility for determining and implementing compatible land uses.

Furthermore, all airport development grants issued by the FAA require that the airport sponsor take appropriate action, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.

TABLE 4-13
LAND USES

Land Use	Yearly day-night average sound level (DNL) in decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodging	Y	N(1)	N(1)	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodging	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y (4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade – general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communications	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing – general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y (8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

**The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or Local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours resets with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.*

Key to Table
SLUCM = Standard Land Use Coding Manual.
Y (Yes) = Land Use and related structures compatible without restrictions.
N (No) = Land Use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes to Table
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected

to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) *Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.*

(3) *Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.*

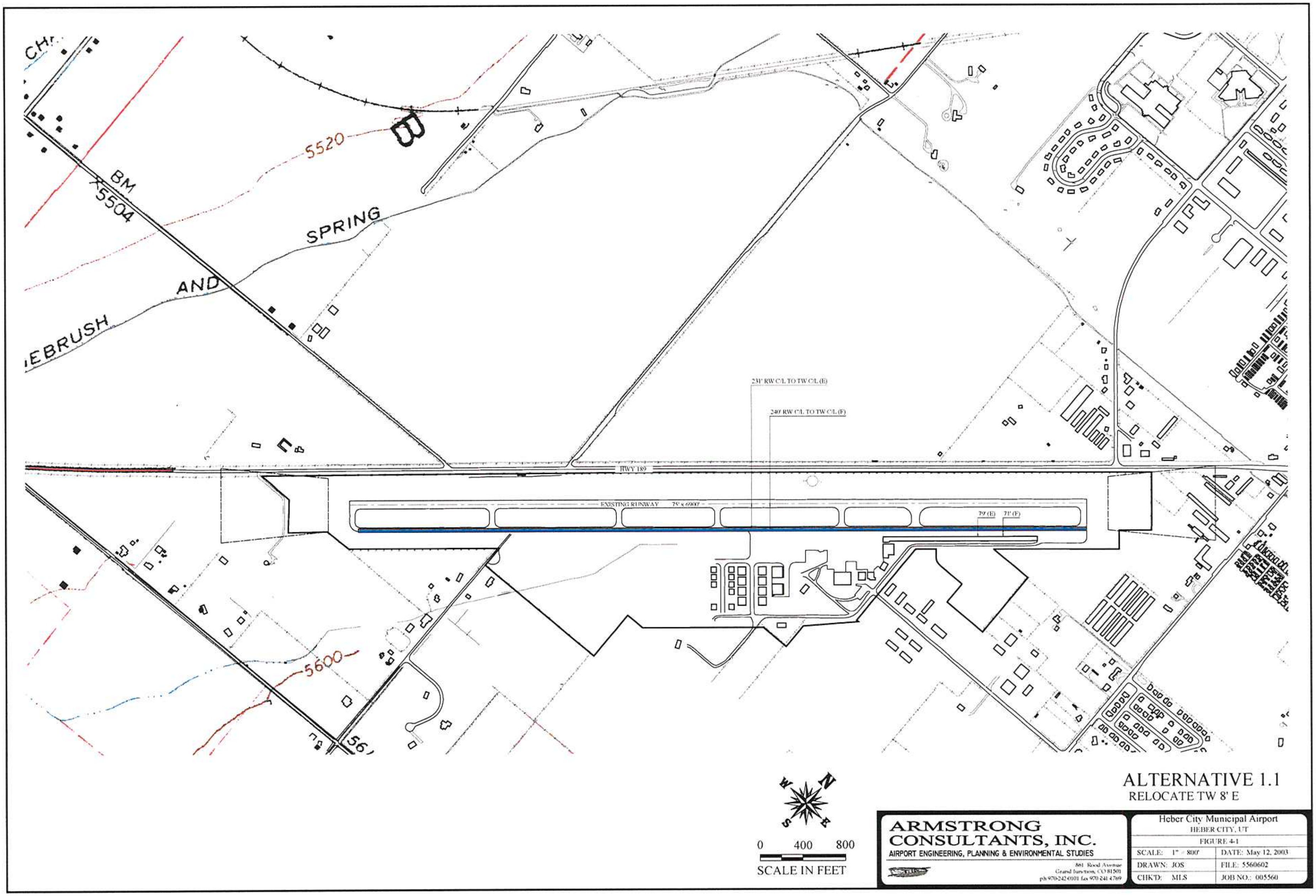
(4) *Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.*

(5) *Land use compatible provided special sound reinforcement systems are installed.*

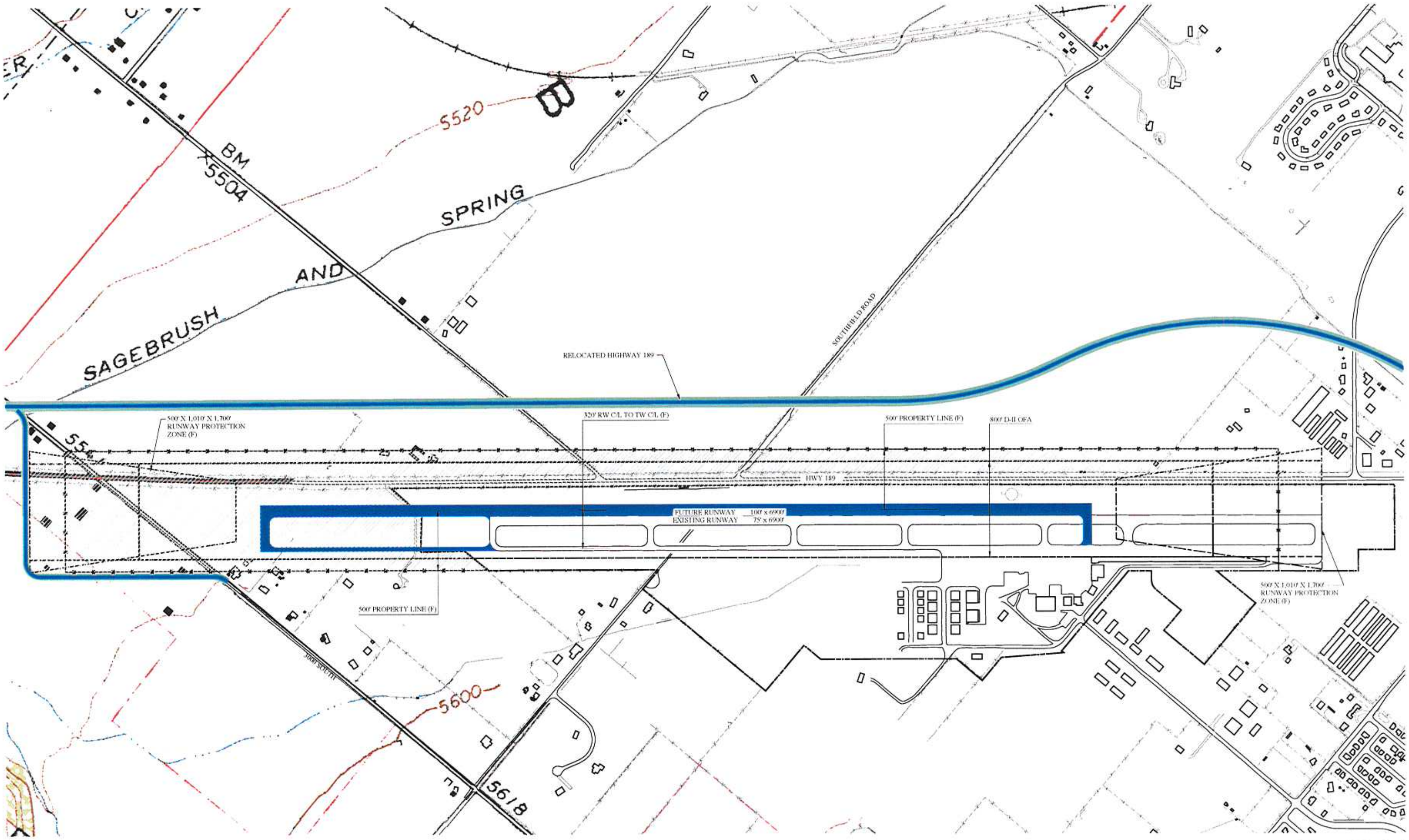
(6) *Residential buildings require a NLR of 25.*

(7) *Residential buildings require a NLR of 30.*

(8) *Residential buildings not permitted.*



ALTERNATIVE 1.1
RELOCATE TW 8' E
231' RW C/L TO TW C/L (E)
240' RW C/L TO TW C/L (F)
HWY 189
EXISTING RUNWAY 75' x 6900'
79' (E) 71' (F)
5520
5600
BM X5504
SPRING
AND
EBRUSH
0 400 800
SCALE IN FEET
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970-242-0101 fax 970-241-4769
Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4-1
SCALE: 1" = 800'
DATE: May 12, 2003
DRAWN: JOS
FILE: 5560602
CHK'D: MLS
JOB NO.: 005560



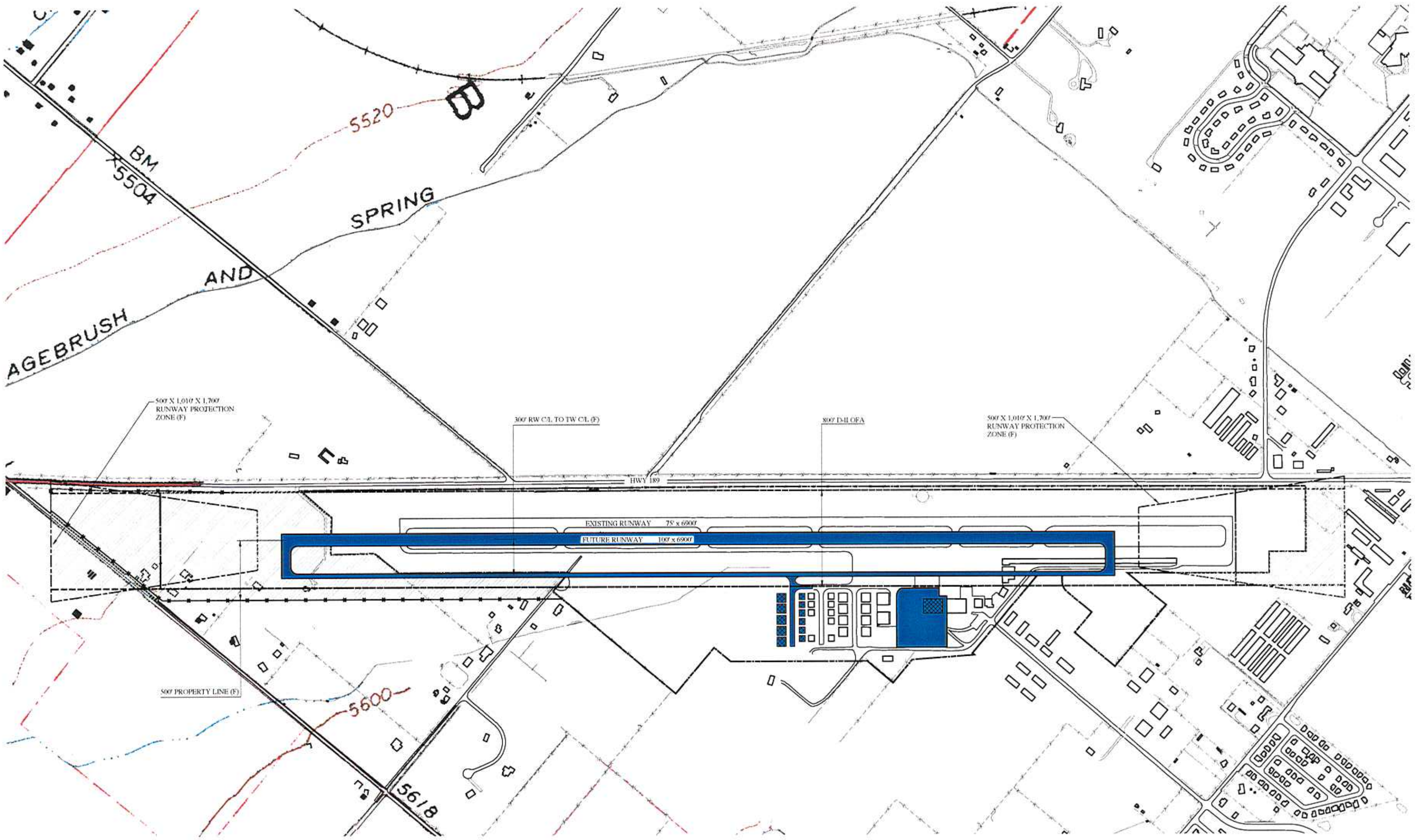
ALTERNATIVE 2.1

RELOCATE RWY 88' W & 1,900' S

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970-242-0101 fax 970-241-1769

Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4-2

SCALE: 1" = 800'	DATE: May 12, 2003
DRAWN: JOS	FILE: 5560604
CHK'D: MLS	JOB NO.: 005560

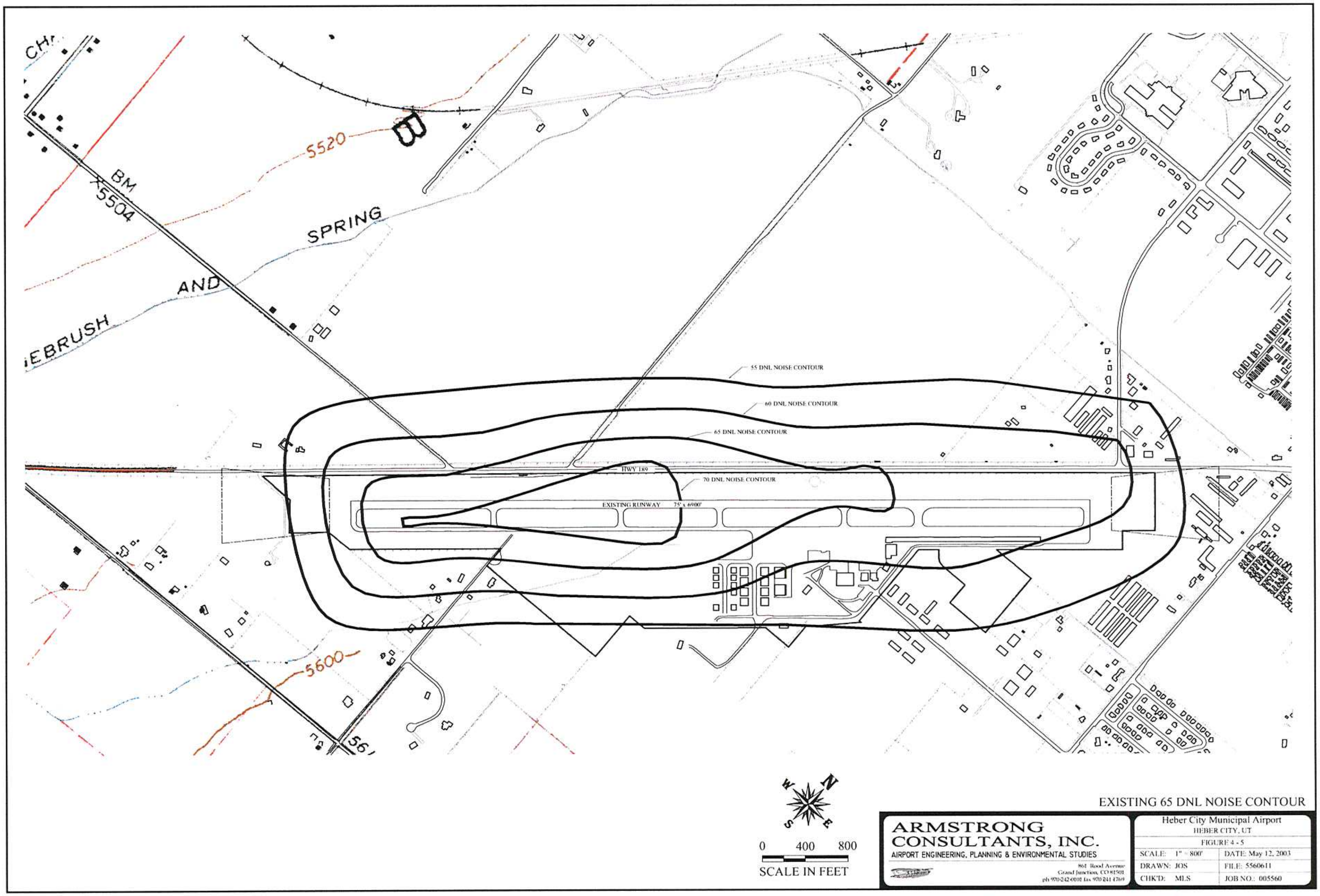


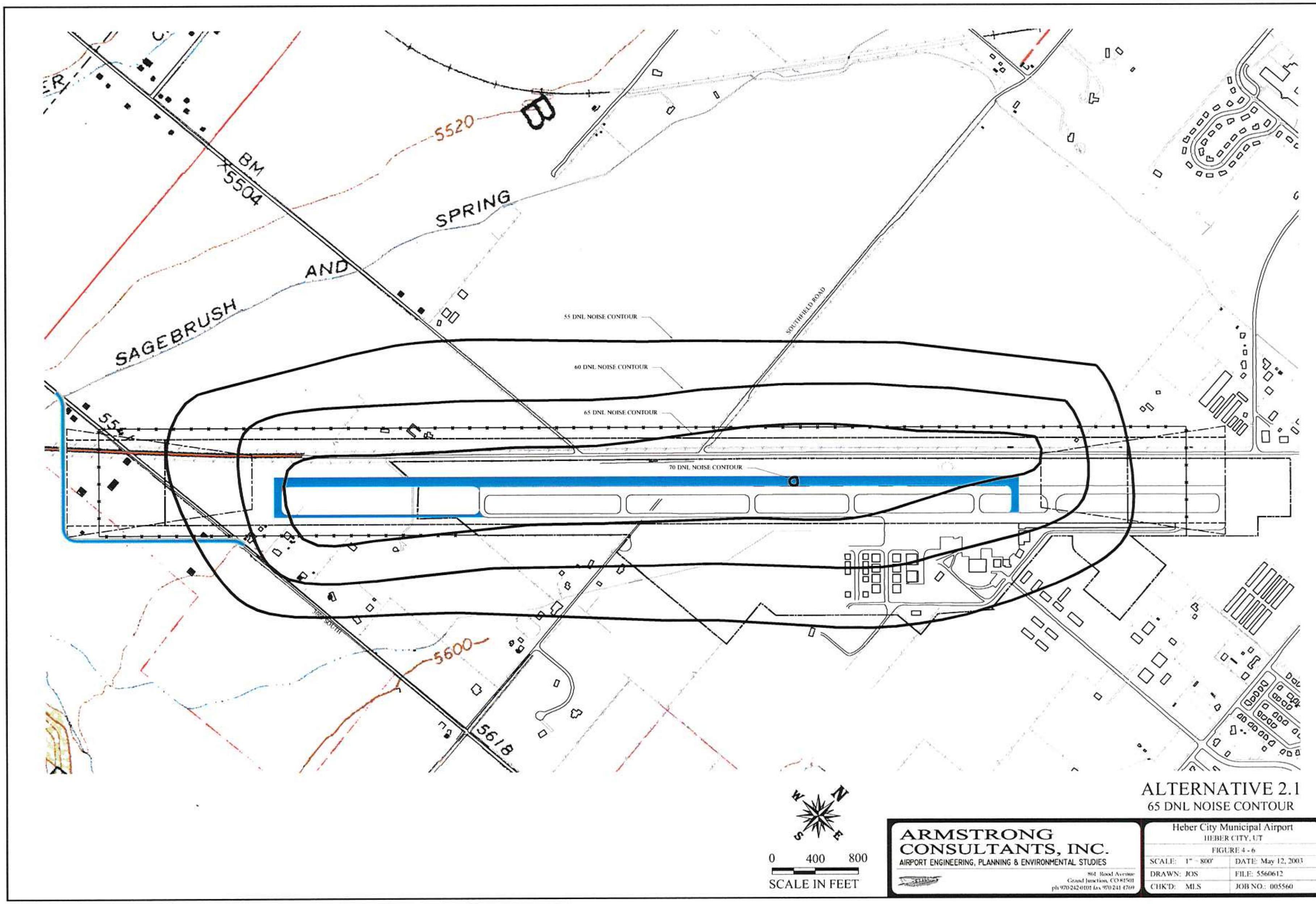
ALTERNATIVE 2.3

RELOCATE RWY 135' E & 975' S

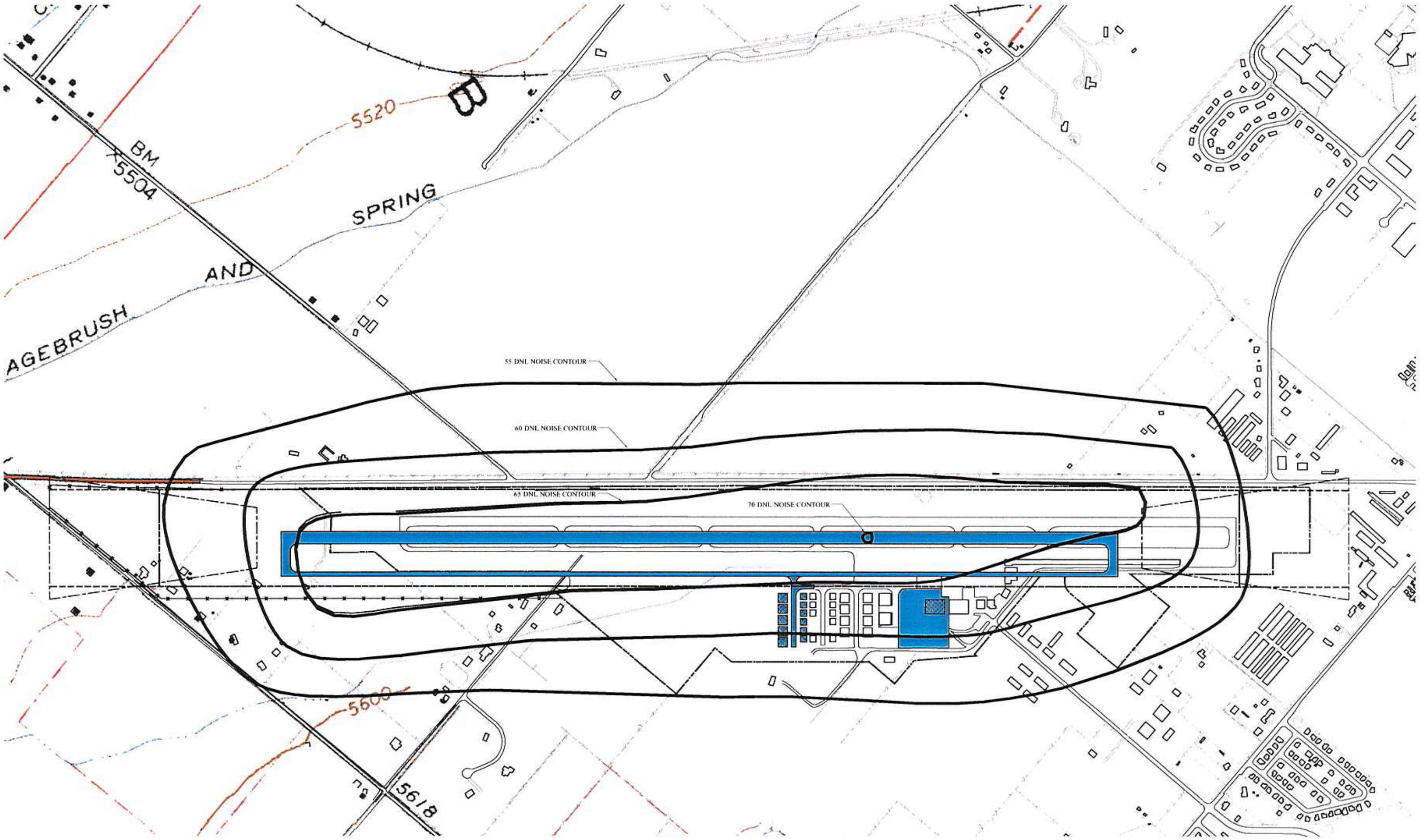
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970-242-0101 fax 970 241 4769

Heber City Municipal Airport HEBER CITY, UT FIGURE 4-3	
SCALE: 1" = 800'	DATE: May 12, 2003
DRAWN: JOS	FILE: 5560606
CHK'D: MLS	JOB NO.: 005560


EXISTING 65 DNL NOISE CONTOUR
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970-242-0101 fax 970-241-1769
Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4 - 5
SCALE: 1" = 800'
DATE: May 12, 2003
DRAWN: JOS
FILE: 5560611
CHK'D: MLS
JOB NO.: 005560
0 400 800
SCALE IN FEET
N
S
E
W
55 DNL NOISE CONTOUR
60 DNL NOISE CONTOUR
65 DNL NOISE CONTOUR
70 DNL NOISE CONTOUR
HWY 189
EXISTING RUNWAY 75' x 6900'
5520
5600
BM
X5504
SPRING
AND
EBRUSH
B



BM
5504
5520
5600
5618
SPRING
AND
SAGEBRUSH
SOUTHFIELD ROAD
55 DNL NOISE CONTOUR
60 DNL NOISE CONTOUR
65 DNL NOISE CONTOUR
70 DNL NOISE CONTOUR
N
S
E
W
0 400 800
SCALE IN FEET
ALTERNATIVE 2.1
65 DNL NOISE CONTOUR
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970 242 0101 fax 970 241 1769
Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4 - 6
SCALE: 1" = 800'
DATE: May 12, 2003
DRAWN: JOS
FILE: 5560612
CHK'D: MLS
JOB NO.: 005560



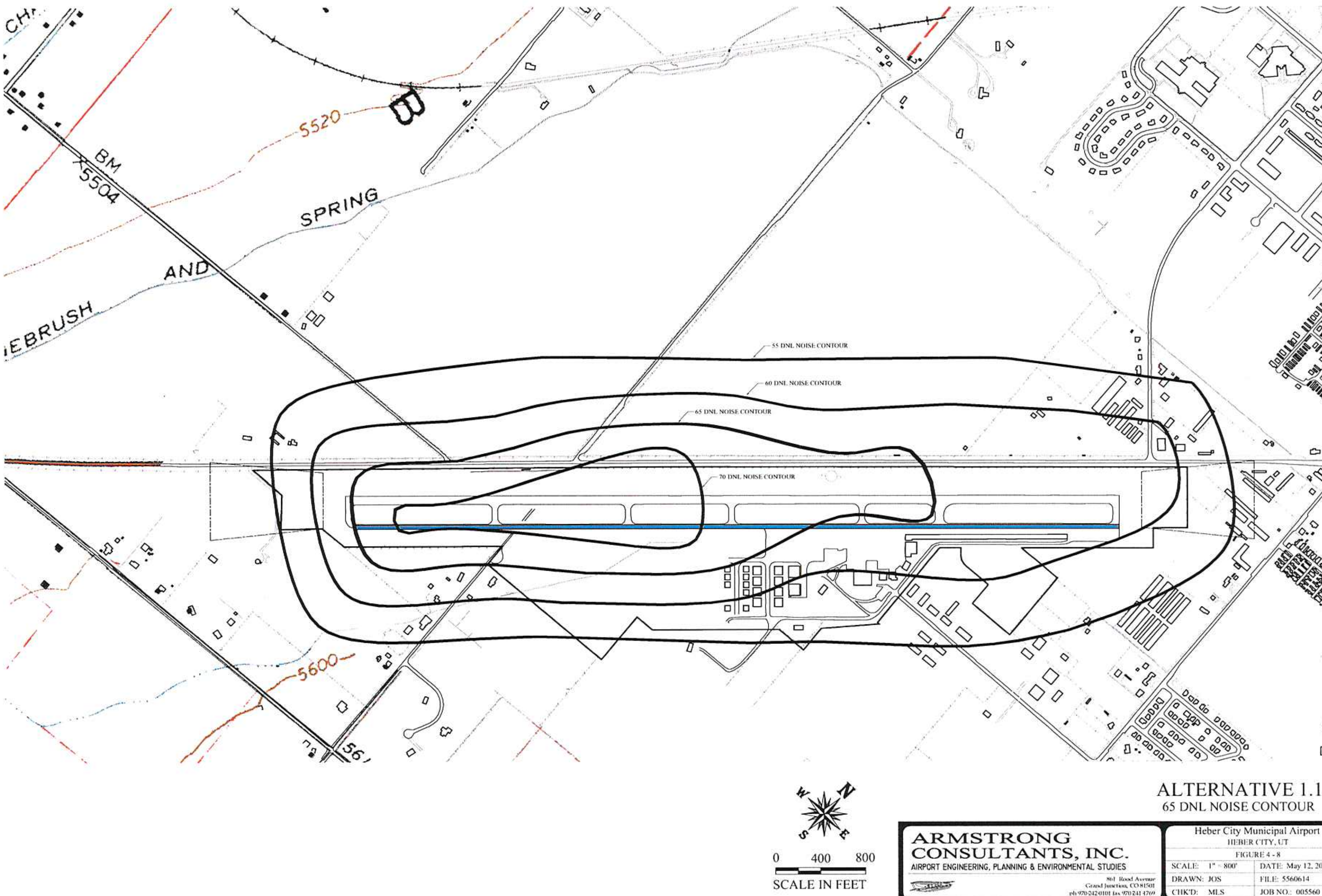
ALTERNATIVE 2.3

65 DNL NOISE CONTOUR

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970-242-0101 fax 970-241-1769

Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4 - 7

SCALE: 1" = 800'	DATE: May 12, 2003
DRAWN: JOS	FILE: 5560613
CHK'D: MLS	JOB NO.: 005560



ALTERNATIVE 1.1
65 DNL NOISE CONTOUR

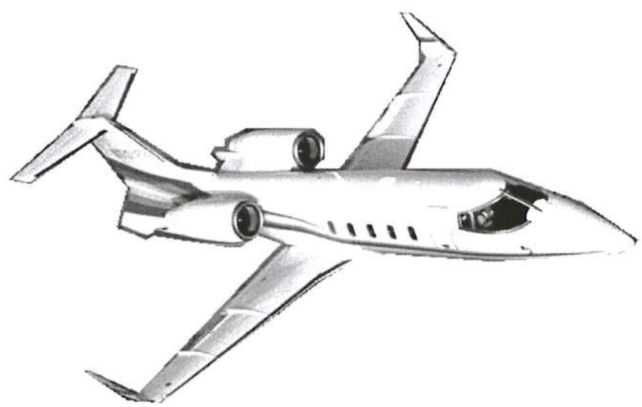
ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING, PLANNING & ENVIRONMENTAL STUDIES
861 Rood Avenue
Grand Junction, CO 81501
ph 970 242 0101 fax 970 241 4769

Heber City Municipal Airport
HEBER CITY, UT
FIGURE 4 - 8

SCALE: 1" = 800'	DATE: May 12, 2003
DRAWN: JOS	FILE: 5560614
CHK'D: MLS	JOB NO.: 005560

Chapter 5

COST-BENEFIT ANALYSIS



CHAPTER

5

COST-BENEFIT ANALYSIS

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

5.0 INTRODUCTION

General Aviation airports have proven to be a vital resource for the community or communities that the airport serves. A comprehensive report, titled *The Economic Impact of Civil Aviation on the U.S. Economy*, conducted in 1991 by Wilbur Smith Associates and updated in April of 1993, found that general aviation's annual economic impact on the nation's economy exceeds $42 billion per year. In 1999, the National Air Transportation Association conducted a study demonstrating the importance of general aviation airports to the United States. According to this study, the State of Utah credited 4,420 jobs and an economic benefit of $278 million to general aviation airports. In most instances, a fully operational general aviation airport can sustain itself and, more often than not, contribute to the economic well-being of the community.

The costs and benefits associated with Heber City Municipal Airport are analyzed in this chapter, in accordance with the costs and benefits based on the constrained and unconstrained forecasts developed in Chapter 2. In doing so, the added cost or benefit of increasing the airport to D-II standards, Alternatives 2, will be evaluated and analyzed based on the increased turbine operations. Throughout this chapter all dollar values, with the exception of historical values, are shown in 2001 constant year dollars.

5.1 BENEFITS

Benefits are the aviation services that a community obtains by developing and maintaining an airport. Benefits differ from economic impact, which is described later. Airports provide a variety of public benefits to the surrounding service area. In the case of Heber City Municipal Airport the surrounding service area is comprised of Heber City, Daniel, Charleston, Midway, and Park City. The most substantial benefit for an airport is the time saved and cost avoided by using air transportation, explained in Section 5.1.1. Other benefits can include the increased levels of safety, comfort and convenience, access that an airport provides to the national airport system, and enhancements to community well being. These benefits cannot be expressed in terms of dollars; however, they can be explained and demonstrated by examples. Benefits are a measure of the improved transportation that the airport provides, and thus reflect the primary motive of a community in operating a public airport.

5.1.1 TRANSPORTATION BENEFITS

The primary benefit of an airport is usually the time saved and cost avoided by travelers who use it over the next best alternative. The following analysis measures the value of time saved and cost avoided by travelers desiring to visit Heber City or the surrounding communities versus Salt Lake City International Airport. The time saved by using Heber City Municipal Airport is the difference between the time for the Salt Lake City trip versus the time for the more direct Heber City trip.

The benefit is the time saved per trip multiplied by the number of passenger trips, all multiplied by the value of the passenger's time. There is also a benefit as a result of the reduced ground travel costs, since by ground the Heber City Municipal Airport is approximately 45 miles closer to Heber City than the Salt Lake City International Airport. For the sake of simplicity, it will be assumed that the flight distances from the originating airport are the same for both airport trips. The total benefit is the sum of the dollar value of the time saved and travel cost reduction. The following equations, derived from the United States Department of Commerce (USDOC) report, *Estimating the Regional Economic Significance of Airports*, express these annual benefits:

Value of Time Saved

Annual Passengers = FGN

Salt Lake City Trip Time = b / P

Heber Trip Time = d / P

Annual Benefit = E [(FG)N][(b/P-d/P)]

Travel Cost Reduction

Annual Ground Trips = GN

Salt Lake City Trip Costs = Qb

Heber Trip Costs = Qd

Annual Benefit = GN(Qb-Qd)

Total Annual Benefit = E[(FG)(b/P-d/P)]+GN(Qb-Qd)

Where the transportation variables are:

Symbol	Variables	Value
G	Itinerant operations per based aircraft per year	*varies*
N	Number of based aircraft at Heber City Municipal Airport	*varies*
d	Ground access distance to Heber City Municipal Airport (miles)	1
E	Passenger time value ($/hour)	*varies*
F	Number of GA passengers per itinerant trip	2.5
P	Car speed Heber City to Salt Lake City (m.p.h.)	70
Q	Car costs, including amortization ($/mile)	*varies*
b	Ground access distance to Salt Lake City International Airport (miles)	45

The values for G and N were derived from the airport inventory data and forecast. The values for E and Q were derived from the typical values provided in the above-referenced report. Variables G, N, E, and Q increase annually as a result of either inflation or the forecasts developed in Chapter 2. The table below lists the values used for each of these variables throughout the forecasting period for both the constrained and unconstrained forecasts.

TABLE 5-1
TRANSPORTATION BENEFIT INTEGERS

Year	Unconstrained				Constrained			
	G	N	E	Q	G	N	E	Q
2001	239	85	35	0.46	239	85	35	0.46
2006	262	105	39	0.52	254	105	39	0.52
2011	295	116	44	0.59	271	116	44	0.59
2016	324	130	50	0.66	284	130	50	0.66
2021	352	148	56	0.74	297	148	56	0.74

The approximate annual dollar value of "time saved" and "reduced ground travel cost" can be calculated by applying these values to the total annual benefit equation. As aviation activity increases at the airport, either as a result of gradual growth in the demand for air transportation or an improvement to the airport, additional benefits will accrue to Heber City and the surrounding communities of Daniel, Charleston, Midway, and Park City.

According to the 1999-2002 Financial Trend Forecaster, the average inflation rate since 1994 has been 2.5 percent. Following the September 11, 2001 terrorist attacks the inflation rate has been significantly lower than the past average. For this analysis the assumption is being made that the average inflation rate will return to the average over the past years; therefore, a 2.5 percent inflation rate per year is used. Accordingly, the transportation benefit has been inflated over the twenty year forecasting period and is shown below in constant dollars for the year 2001 for both the constrained and unconstrained forecasts developed in Chapter 2.

TABLE 5-2
TRANSPORTATION BENEFIT

	UNCONSTRAINED			CONSTRAINED		
Year	Time Saved	Travel Cost	TOTAL	Time Saved	Travel Cost	TOTAL
2001	$ 13,145	$ 411,176	$ 424,321	$ 13,145	$ 411,176	$ 424,321
2006	$ 16,037	$ 628,643	$ 644,680	$ 15,548	$ 609,448	$ 624,996
2011	$ 20,372	$ 887,242	$ 907,614	$ 18,715	$ 815,060	$ 833,775
2016	$ 25,425	$ 1,221,637	$ 1,247,062	$ 22,286	$ 1,070,818	$ 1,093,104
2021	$ 30,937	$ 1,694,127	$ 1,725,064	$ 26,103	$ 1,429,419	$ 1,455,522

5.1.2 SOCIAL BENEFITS

As previously mentioned, some beneficial aspects of airports are significant but difficult to quantify. For example, airports contribute to the prompt diagnosis and treatment of disease. Blood and tissue samples are sent by air to medical facilities for analysis. In addition, airports are vital civil defense facilities and are a key source of relief from natural disasters such as floods. They also support Police, Civil Air Patrol, and National Guard activities and may be used by aircraft involved in pipeline detection of fuel and chemical spills, and forest fire detection and suppression.

As an important part of a rural area's transportation network, an airport is a factor in fostering business. As an indicator of the importance of Heber City Municipal Airport to the business community, the airport provides a base of operations for AH Aero Services LLC; Bald Eagle Realty, Incorporated; Diehl Concept Properties LLC; Independent Imports; JMT Properties; J.R. Miller Enterprises LLC; McM Engineering; Soar Utah, Incorporated; Suisse Management LLC; Summit Aerial Photography; Surefoot LLC; Vayda Transportation LLC; and Wings and Wires Incorporated. The airport also receives regular use by several major businesses, banking, and other corporations.

The airport also provides air access to many recreational users. The recreational uses of general aviation include gliding, flying home built aircraft, and local sightseeing. Recreational uses provide an important source of aviation activity and revenues that help defray the cost of developing and operating the airport.

Finally, there are a variety of commercial activities involving aviation. Air cargo shipments to community airports often are made in support of local manufacturing industries for replacement parts used in production lines and express delivery of small parcels. Many high-value goods are shipped by air, and even relatively low-value, heavy goods are often shipped by air to minimize inventory and warehousing costs. General aviation aircraft are also used for such commercial activities as flight training, agricultural applications (e.g. crop dusting and insect spraying), pipeline and utility line patrols, transportation of checks and records of commercial transactions, air photo and air survey work, access to drilling sites and mineral exploration, and on-demand air taxi and charter services. The current major FBO, Wasatch Aero Services, provides many of these commercial services.

5.2 Economic Impact

Economic impacts measure the importance of aviation as an industry, in terms of the employment it provides and the goods and services it consumes. Aviation activity produces beneficial economic impacts that help to generate and sustain public support of airports. Heber City Municipal Airport adds economic value to the surrounding service area through the spending of money by aviation users and airport employees. Economic impact at an airport is the regional economic activity, employment, and wages that can be attributed directly and indirectly to the operation of the airport. Therefore, to determine the total economic impact of the airport, this analysis will define the direct, indirect, and induced impacts. The economic impacts of Alternatives 2.1 and 2.3, the unconstrained forecasts, will be the same, therefore, impacts are evaluated based on the unconstrained and constrained scenarios.

5.2.1 Direct Impact

Direct impacts are consequences of economic activities carried out at the airport by airport management, FBOs, and other tenants with a direct involvement in aviation. Employing labor, purchasing locally-produced goods and services, taxes, and contracting for airport construction and capital improvements are examples of airport activities that generate direct impacts. The distinguishing factor of a direct impact is that it is an immediate consequence of airport economic activity or, in other words, economic impact that would not have occurred if the airport did not exist.

5.2.2 Indirect Impact

Indirect impacts derive primarily from off-site economic activities that are attributable to the money spent in the community by airport users (i.e. itinerant passengers). These activities include services provided by travel agencies, hotels, restaurants, retail establishments, and attractions. These enterprises are similar to airport businesses in that they employ labor, purchase locally-produced goods and services, and invest in capital expansion and improvements. They are also similar to direct impacts in that they generate economic impact that would not have occurred in the absence of the airport. The distinguishing factor of indirect impacts is that they occur entirely off-site.

Indirect impacts can be estimated by analyzing the number of transient operations, average number of passengers per aircraft, and the average dollar spent per day per visitor.

5.2.3 Induced Impact

Induced impacts are the multiplier effects of the direct and indirect impacts. These are the increases in employment and incomes over and above the combined direct and indirect impacts, created by successive rounds of spending. As successive rounds of spending occur, additional income is produced.

The appropriate multiplier factor depends on the degree of economic self sufficiency of the region, not on the level of airport activity. The more self dependent the region, the greater will be the extent to which expenditure by airports and airport employees keep turning over within the region, creating additional incomes with each new round of spending. On the other hand, the more dependent the region, the more it will spend on goods and services imported into the region from other parts of the United States. The size of the population of the region is a reasonable proxy for degree of self sufficiency, therefore making it is possible to relate multiplier factors to population size. The following recommended factors are provided by the aforementioned USDOC document:

Population	Multiplier Factor
< 100,000	0.5
100,000 – 500,000	0.6
500,000 – 3,000,000	0.75
> 3,000,000	1.0

Based on the present population and the forecasted population from Chapter 2, the population of the Heber City Municipal Airport service area is not currently nor projected to exceed 100,000 over the twenty year period. Therefore, a multiplier factor of 0.5 was used in all calculations.

5.3 Economic Impact Analysis

This analysis examines the total aviation activity at Heber City Municipal Airport and measures its economic importance to the local economy in terms of dollar value. The measurements and documentation of the value of the impacts are shown in 2001 constant dollars. As mentioned previously, Alternative 1.1 was evaluated based on the constrained forecast, while Alternatives 2.1 and 2.3 were evaluated based on the unconstrained forecast.

This economic impact analysis utilizes conventional and accepted methods to quantify the economic benefit of impacts that are directly or indirectly associated with Heber City Municipal Airport. Individual questionnaires were designed for airport businesses, the FBO, and jet aircraft owners to produce the necessary impact data. Sample questionnaires are included in Appendix C. The confidentiality of the respondents was protected during the compiling of this information and, therefore, only industry totals will be shown.

5.3.1 Survey Results

The surveys were mailed in August of 2002 and were received through the end of September 2002. A total of 11 organizations were assumed to have Heber City Municipal Airport related operations and were surveyed. In addition, 90 jet aircraft owners that had operated at the airport in the last 6 months were also surveyed. The response rate is shown below.

Table 5-3
Survey Results Summary

Organization Categories	Number of Surveys Sent	Responses Received	Response Rate
Airport Businesses	11	1	9%
Jet Aircraft Owners	90	13	14%
Fixed Base Operator	1	1	100%
TOTAL	102	15	15%

5.3.2 Direct Impacts

Include:
1) Salaries, taxes, and leases of on-airport businesses, private users, and the City of Heber.
2) Value of time saved and reduced travel cost in travel by aircraft owners having aircraft based at the airport (i.e. transportation benefit).

The following table summarizes the annual direct economic impacts for the unconstrained and constrained alternatives over the twenty-year forecasting period.

TABLE 5-4
DIRECT IMPACTS

	UNCONSTRAINED				CONSTRAINED			
Year	Piston	Turbine	Transp.	TOTAL	Piston	Turbine	Transp.	TOTAL
2001	$ 898,103	$ 333,837	$ 424,321	$ 1,656,261	$ 898,103	$ 333,837	$ 424,321	$ 1,656,261
2006	$ 1,045,547	$ 528,614	$ 644,680	$ 2,218,841	$ 1,044,576	$ 178,663	$ 624,996	$ 1,848,235
2011	$ 1,207,026	$ 617,921	$ 907,614	$ 2,732,561	$ 1,190,522	$ 190,125	$ 833,775	$ 2,214,422
2016	$ 1,396,965	$ 733,584	$ 1,247,062	$ 3,337,611	$ 1,361,489	$ 203,372	$ 1,093,104	$ 2,657,965
2021	$ 1,621,450	$ 883,075	$ 1,725,064	$ 4,229,589	$ 1,562,406	$ 220,437	$ 1,455,522	$ 3,238,365

Note: All figures in 2001 dollars.

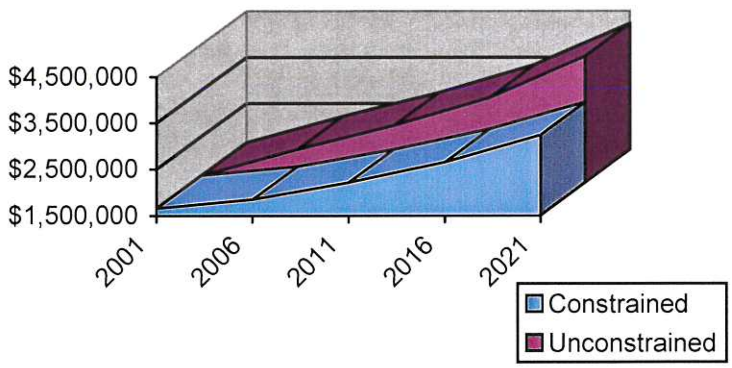


FIGURE 5-1 – DIRECT IMPACTS

As a result of the increased revenue from jet fuel in the unconstrained forecast versus the larger percentage of piston aircraft operations in the constrained forecast, the resultant direct impacts remain relatively close throughout the twenty year forecasting period. The unconstrained forecast does result in an approximate $1.0 million dollar increase over the constrained forecast in the year 2021.

5.3.3 INDIRECT IMPACTS

Include:
1) Number of transient operations per day.
2) Average passengers per piston and turbine aircraft.
3) Average dollar spent per visitor per day.

= { [(transient operations / 2) x average passengers] x average dollar spent per visitor}

The indirect impact shown in the table below was calculated separately, using the formula above and the results from the survey, for piston and turbine aircraft in order to take into account the difference in the average passengers per aircraft (2.5 piston, 4.3 turbine) and the average dollar spent per visitor ($100 piston, $550 turbine). Values for the average passengers per aircraft and dollar spent per visitor for the piston aircraft were taken from United States Department of Commerce (USDOC) report, *Estimating the Regional Economic Significance of Airports*, and the values for turbine aircraft were taken from the results of the conducted survey.

TABLE 5-5 **INDIRECT IMPACTS**						
Year	Unconstrained			Constrained		
	Piston	Turbine	TOTAL	Piston	Turbine	TOTAL
2001	$ 2,426,875	$ 1,087,155	$ 3,514,030	$ 2,426,875	$ 1,087,155	$ 3,514,030
2006	$ 7,494,675	$ 1,982,454	$ 9,477,129	$ 6,910,207	$ 563,533	$ 7,473,740
2011	$ 9,930,729	$ 2,638,166	$ 12,568,895	$ 9,016,202	$ 687,623	$ 9,703,825
2016	$ 13,373,259	$ 3,569,358	$ 16,942,617	$ 11,955,578	$ 848,130	$ 12,803,708
2021	$ 18,292,886	$ 4,899,378	$ 23,192,264	$ 16,103,005	$ 1,057,071	$ 17,160,076

Note: All figures in 2001 dollars

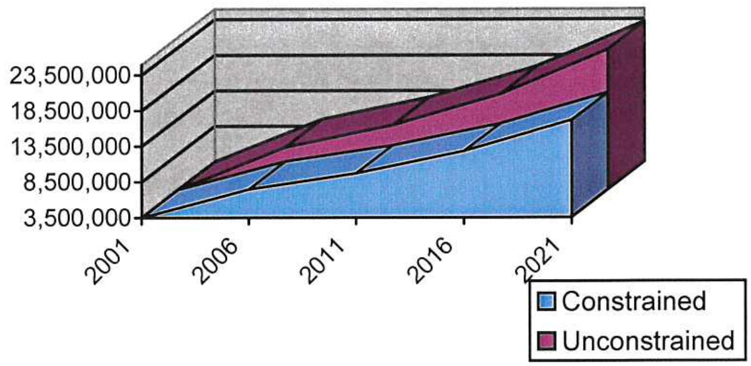


FIGURE 5-2 – INDIRECT IMPACTS

If allowed to grow unconstrained, the airport can expect an annual indirect impact difference of approximately $6.0 million in the year 2021. (Note: The $3.7 million increase that is a result of the indirect benefits of turbine aircraft in the unconstrained forecast is the effect of the limited turbine aircraft that would be allowed to operate at Heber City Municipal Airport under the constrained forecast.)

5.3.4 INDUCED IMPACTS

Include:
1) Direct and indirect impacts.
2) Multiplier Factor.

= [(direct impact + indirect impact) x multiplier]

A multiplier factor of 0.5 was used to calculate the induced impacts shown in the table below:

TABLE 5-6 **INDUCED IMPACTS**		
Year	Unconstrained	Constrained
2001	$ 2,585,145	$ 2,585,145
2006	$ 5,847,985	$ 4,660,988
2011	$ 7,650,728	$ 5,959,124
2016	$ 10,160,144	$ 7,730,837
2021	$ 13,710,927	$ 10,199,221

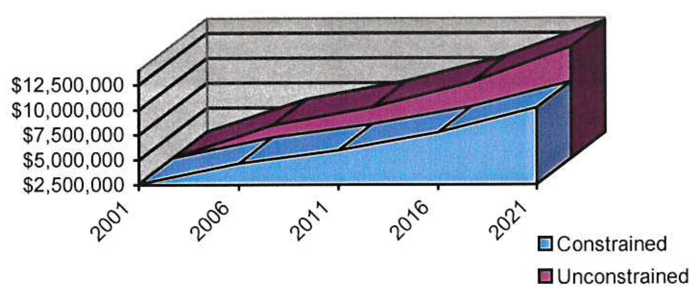


FIGURE 5-3 – INDUCED IMPACTS

5.3.5 TOTAL ECONOMIC IMPACT

The total annual economic impact, summarized below, is calculated by combining the direct, indirect, and induced impacts from the previous sections.

TABLE 5-7 TOTAL IMPACTS		
Year	Unconstrained	Constrained
2001	$ 7,755,436	$ 7,755,436
2006	$ 17,543,955	$ 13,982,963
2011	$ 22,952,184	$ 17,877,371
2016	$ 30,480,342	$ 23,192,510
2021	$ 41,132,780	$ 30,597,662

Note: All figures in 2001 dollars

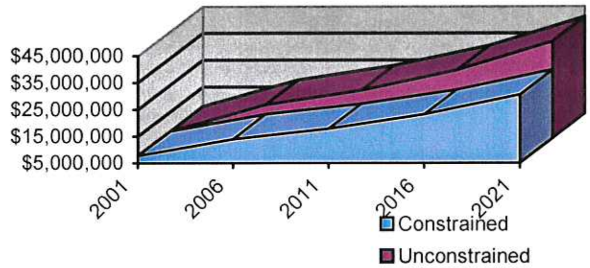


FIGURE 5-4 – TOTAL IMPACT

The Heber City Municipal Airport currently generates an estimated annual economic benefit of over $7.7 million. This is projected to increase to an annual economic benefit of approximately $30.6 million in 2021 with the constrained scenario and over $41.0 million with the unconstrained scenario. The resulting difference in 2021 of approximately $10.4 million is the effect of the increased jet operations that are anticipated to occur if Heber City Municipal Airport upgrades to an ARC of D-II.

5.4 COST IMPACT

Cost is defined as the resources that will be consumed if an objective is undertaken. The value of consumed resources is measured in constant dollars, which makes different cost elements comparable with themselves as well as with the benefits described in the previous section. Costs include all capital, labor, and natural resources necessary to undertake the project whether the costs are borne by governmental units, various components of the total flying public, the general public, or some other particular group. Furthermore, the cost impact for Heber City Municipal Airport will also reflect the costs associated with maintaining and operating the airport.

Incremental costs are those costs that differ between each alternative and can also be referred to as construction costs. Therefore, all incremental costs are accounted for in capital improvement costs. Sunk costs are those costs that have already been consumed and cannot be recovered at the time that the Cost-Benefit Analysis is conducted. There is presumed to be no sunk costs associated with this analysis. The remaining costs are defined and evaluated as follows:

5.4.1 OPPORTUNITY COST

Opportunity cost is the value of the benefits foregone when resources are shifted from satisfying one objective to satisfying another. Project related opportunity costs generally equate to their actual cash outlay, or out-of-pocket costs, including construction costs, wages, fringe benefits, overhead, and other expense items. As previously mentioned, construction costs are accounted for in capital improvements costs.

In the case of Heber City Municipal Airport, the opportunity cost is considered for each forecast, unconstrained and constrained. In the constrained forecast, the opportunity cost is considered to be the loss of economic impact that is a result of the increased number of jet aircraft. Therefore, in the unconstrained forecast, there are no opportunity costs.

5.4.2 OPERATIONS & MAINTENANCE COSTS

Operations costs are those costs associated with operating the airport on a daily basis. These can include salaries and wages, employee benefits, utilities, professional services, insurance, and supplies.

Maintenance costs are those costs associated with maintaining the airport over the course of a year. These costs can include light bulb replacement, pavement maintenance, snow removal, weed control, fence maintenance, building maintenance, and improvements other than buildings.

5.4.3 CAPITAL IMPROVEMENTS

Capital improvements are those costs associated with new construction or facility rehabilitation. In other words, a capital improvement is a permanent addition to the airport's fixed assets of major importance and cost. Under this definition a capital improvement could include land acquisition, construction, reconstruction, renovation, demolition, equipment, and studies necessary to perform the actual project. A capital improvement should possess the following characteristics: serves an essential public purpose; has a long, useful life or significantly extends the useful life of an existing fixed asset; is comparatively expensive and is not of routine nature; and is related to government functions and expenditures.

Capital improvements for Heber City Municipal Airport could include apron construction, access road improvements, hangar construction, lighting, visual aid improvements, or navigational aids.

5.4.4 SOCIAL COSTS

Community members often associate an airport expansion with increased noise and emissions. Other aspects that can affect the perceived quality of life include increased traffic, changes in property values near and surrounding the airport, and relocations associated with airport land acquisition.

Chapter 4 addressed the increased noise levels that can be expected with increased air traffic in accordance with the FAA Integrated Noise Modeling Program. The results of this program illustrate that the increased noise (1 to 5 dCB depending on the alternative) will not significantly affect the property surrounding the airport, although there may be a certain percentage of the population that may be annoyed by the overflights.

Increased aircraft operations will result in increased emission levels; however, the increased emissions are not expected to exceed levels to be considered significant by the FAA.

Residential encroachment on the airport places the most stress on an airport. In many cases, property values are lower for residential areas surrounding an operating airport. The project may have an effect on property values in the vicinity of the airport. Some may argue that property values will decline due to increased noise, while others may argue that property values will increase from induced development resulting from the project. While both positions may hold true to some extent, experience has found that the proximity to an airport has not been a deterrent to development – residential or industrial. The FAA has found it necessary to implement measures to protect the airport from being encroached upon by residential development.

Vehicle traffic would also be expected to increase with the development of the airport; however, increased traffic is not expected to be a significant impact.

Other non-quantifiable social costs must be carefully weighted against the non-quantifiable social benefits in order to compare the perceived level of benefit or cost. In most cases, the perceived benefit or cost will differ greatly amongst community members. The categories mentioned above, along with 18 other categories, will be further evaluated in an Environmental Assessment (EA). An EA is expected to be required to accomplish Alternatives 2.1 or 2.3; however, it is anticipated that Alternative 1.1 will be Categorically Excluded from further environmental analysis.

5.5 Cost Impact Analysis

This analysis examines the total development costs associated with each of the alternatives developed for Heber City Municipal Airport and measures their costs to the local economy in terms of dollar value.

This cost impact analysis utilizes conventional and accepted methods to quantify the cost of impacts that are directly associated with opportunity, operations and maintenance, and capital improvement expenses at Heber City Municipal Airport.

5.5.1 Opportunity Costs

Include: 1) Loss of Profit.

The following table summarizes the difference between the development alternatives in reference to the opportunity costs as explained in Section 5.4.1.

Table 5-8
Opportunity Costs

Alternative	2001	2006	2011	2016	2021
Alternative 1.1	N/A	$ 3,561,032	$ 5,074,813	$ 7,287,832	$ 10,535,118
Alternative 2.1	N/A	N/A	N/A	N/A	N/A
Alternative 2.3	N/A	N/A	N/A	N/A	N/A

Note: Loss of profit is taken from Section 5.3.5

5.5.2 Operations & Maintenance Costs

The following operations costs were recorded by Heber City for the airport from 1999 to 2001:

Table 5-9
Historical Operations Costs

Expenditure	1999	2000	2001
Salaries & Wages	$ 10,885	$ 3,832	$ 2,799
Employee Benefits	$ 2,681	$ 1,643	$ 1,443
Utilities	$ 2,993	$ 1,324	$ 580
Professional Services	$ 1,894	$ 1,340	$ 2,917
Special Supplies	$ 1,300	$ 286	$ 1,271
Insurance	$ 1,909	$ 2,014	$ 2,347
Building	$ 463	$ 0	$ 0
TOTAL	$ 18,225	$ 10,439	$ 11,357

The following table projects the operations costs over the twenty year forecasting period by taking into account the historical trend in expenditures, shown in Table 5-9. As the items included in the operations cost are independent of the number of operations and the increased cost to service the larger D-II airport property and airside pavement surfaces is considered to be less than 5 percent, the same forecast can be used for all of the alternatives.

Table 5-10 Operations Costs					
	2001	2006	2011	2016	2021
Salaries & Wages	$ 2,799	$ 3,163	$ 3,848	$ 4,049	$ 4,580
Employee Benefits	$ 1,443	$ 1,631	$ 1,845	$ 2,087	$ 2,362
Utilities	$ 580	$ 655	$ 741	$ 839	$ 949
Professional Services	$ 2,917	$ 2,988	$ 3,720	$ 4,617	$ 5,730
Special Supplies	$ 1,271	$ 1,436	$ 1,625	$ 1,839	$ 2,080
Insurance	$ 2,347	$ 3,864	$ 6,476	$ 10,853	$ 18,190
Building	$ -	$ -	$ -	$ -	$ -
TOTAL	$ 11,357	$ 13,747	$ 18,255	$ 24,284	$ 33,891

5.5.3 Capital Improvements

The following capital improvement costs were recorded by the City of Heber for the airport from 1999 to 2001:

Table 5-11 Historical Capital Improvement Costs			
Expenditure	1999	2000	2001
Professional Services	$ 142,807	$ 380,187	$ 539,130
Special Supplies	$ 490	$ 0	$ 0
TOTAL	$ 143,297	$ 380,187	$ 539,130

The following table projects the capital improvement costs over the twenty year forecasting period by taking into account the historical trend in expenditures. As no special supplies were included in the historical records it is anticipated that there will continue to be no special supplies in the future. Professional services are anticipated to increase based on inflation. For simplicity, the estimated development costs have been assumed to occur entirely in the year 2006.

Table 5-12 Capital Improvement Costs					
	2001	2006	2011	2016	2021
Alternative 1.1					
Construction Costs	N/A	$ 1,100,000	N/A	N/A	N/A
Professional Services	$ 539,130	$ 749,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	$ 539,130	$ 1,849,426	$ 947,341	$ 1,145,255	$ 1,343,169
Alternative 2.1					
Construction Costs	N/A	$ 16,640,000	N/A	N/A	N/A
Professional Services	$ 539,130	$ 749,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	$ 539,130	$ 17,389,426	$ 947,341	$ 1,145,255	$ 1,343,169
Alternative 2.3					
Construction Costs	N/A	$ 11,900,000	N/A	N/A	N/A
Professional Services	$ 539,130	$ 749,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	$ 539,130	$ 12,649,426	$ 947,341	$ 1,145,255	$ 1,343,169

5.5.4 TOTAL COSTS

The total costs are a result of adding together the opportunity, operations and maintenance, and capital improvement expenditures.

TABLE 5-13
TOTAL COSTS

Alternative (1.1)	2001	2006	2011	2016	2021
Opportunity	N/A	$ 3,561,032	$ 5,074,813	$ 7,287,832	$ 10,535,118
Operations & Maintenance	$ 11,357	$ 13,747	$ 18,255	$ 24,284	$ 33,891
Capital Improvements	$ 539,130	$ 1,849,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	**$ 550,487**	**$ 5,426,203**	**$ 3,631,642**	**$ 5,677,910**	**$ 8,682,159**
Alternative (2.1)	2001	2006	2011	2016	2021
Opportunity	N/A	N/A	N/A	N/A	N/A
Operations & Maintenance	$ 11,357	$ 13,747	$ 18,255	$ 24,284	$ 33,891
Capital Improvements	$ 539,130	$ 17,389,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	**$ 550,487**	**$ 17,403,173**	**$ 965,596**	**$ 1,169,539**	**$ 1,377,060**
Alternative (2.3)	2001	2006	2011	2016	2021
Opportunity	N/A	N/A	N/A	N/A	N/A
Operations & Maintenance	$ 11,357	$ 13,747	$ 18,255	$ 24,284	$ 33,891
Capital Improvements	$ 539,130	$ 12,649,426	$ 947,341	$ 1,145,255	$ 1,343,169
TOTAL	**$ 550,487**	**$ 12,663,173**	**$ 965,596**	**$ 1,169,539**	**$ 1,377,060**

5.6 UNCONSTRAINED/CONSTRAINED COMPARISON

The unconstrained and constrained economic benefits and costs were evaluated based on the forecasts that were developed in Chapter 2. The following table summarizes the annual benefits and costs over a twenty-year period.

TABLE 5-14
COST-BENEFIT COMPARISON

Year	CONSTRAINED			UNCONSTRAINED					
	Alternative 1.1			Alternative 2.1			Alternative 2.3		
	Benefit	Cost	Gain/Loss	Benefit	Cost	Gain/Loss	Benefit	Cost	Gain/Loss
2001	$ 7.8	$ 0.6	$ 7.2	$ 7.8	$ 0.6	$ 7.2	$ 7.8	$ 0.6	$ 7.2
2006	$ 14.0	$ 5.4	$ 8.6	$ 17.5	$ 17.4	$ 0.1	$ 17.5	$ 12.7	$ 4.8
2011	$ 17.9	$ 3.6	$ 14.3	$ 23.0	$ 1.0	$ 22.0	$ 23.0	$ 1.0	$ 22.0
2016	$ 23.2	$ 5.7	$ 17.5	$ 30.5	$ 1.2	$ 29.3	$ 30.5	$ 1.2	$ 29.3
2021	$ 30.6	$ 8.7	$ 21.9	$ 41.1	$ 1.4	$ 39.7	$ 41.1	$ 1.4	$ 39.7

Note: Dollar values are shown in millions and 2001 constant year dollars.

In order to compare the long-term costs and benefits for each of the alternatives it is important to understand the following concepts. The operation and maintenance costs of the airport will not increase as a result of the increased traffic; however, the revenues, as a result of increased fuel sales, will increase directly with the increase in piston and jet aircraft operations. Therefore, the only years that represent an increased cost is the year where development is occurring, 2006. On the contrary, there is an increase in economic benefit each year as a result of the increased operations by jet aircraft lending to increased visitor spending.

The constrained forecast, which takes into account modifying the airport to meet B-II design standards, and the unconstrained forecast, which takes into account upgrading the airport to meet D-II design standards, consistently show economic gains throughout the twenty year forecasting period. The end result over the twenty year forecasting period is an economic trade off in the year 2021 of $17.8 million.

TABLE 5-15 BENEFIT-COST RATIO TEST			
Project Element	Alternative 1.1	Alternative 2.1	Alternative 2.3
Initial Investment	$ 1.1	$ 16.6	$ 11.9
Average Annual Costs	$ 4.8	$ 1.0	$ 1.0
Average Annual Benefits	$ 18.7	$ 24.0	$ 24.0
Useful Life	20 years	20 years	20 years
Total Benefits	$ 374.0	$ 480.0	$ 480.0
Total Costs	$ 97.1	$ 36.6	$ 31.9
Benefit-Cost Ratio	$ 3.9	$ 13.1	$ 15.0

Dollar values are shown in millions and 2001 constant year dollars

5.7 CONCLUSION

General aviation will continue to be a vital resource for Heber City and the surrounding communities of Charleston, Daniel, Midway, and Park City, both in commercial and recreational services. It is anticipated that Heber City Municipal Airport will continue to provide an economic benefit to these communities.

Alternative 2.3 was found to have the highest benefit cost ratio. The implementation of Alternatives 1.1 and 2.3 will be discussed in Chapter 6 including cost share breakdowns and cash flow analysis.

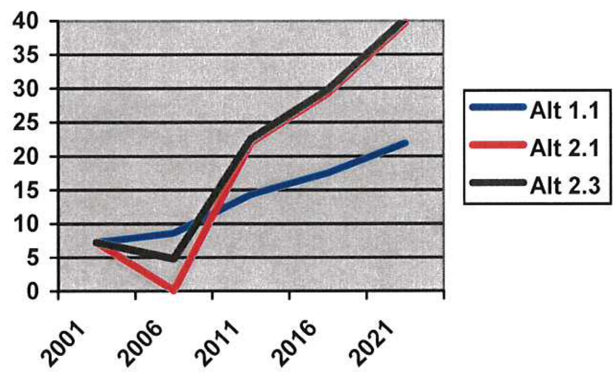
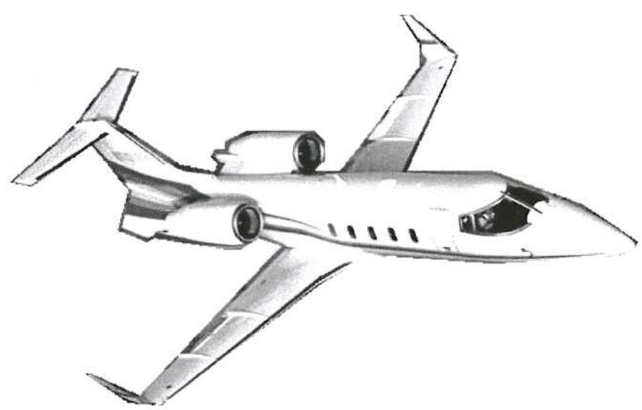


FIGURE 5-5 - ECONOMIC GAIN/LOSS

Chapter 6

PROJECT IMPLEMENTATION



CHAPTER 6

PROJECT IMPLEMENTATION

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

6.0 INTRODUCTION

Alternatives 1.1 and 2.3 have been carried forward and are further evaluated in this chapter based on cost shares and implementation schedules. Alternative 2.1 was eliminated from further consideration as no additional benefit was seen for the increased cost over Alternative 2.3.

6.1 COST SHARE BREAKDOWN

In Utah, projects eligible for Airport Improvement Program (AIP) participation are normally funded at 90.94 percent FAA, 4.53 percent State, and 4.53 percent by the Sponsor. The cost share breakdown for each of the development alternatives is shown in Table 6-1.

TABLE 6-1
COST SHARE BREAKDOWN

ALTERNATIVE 1.1 Description	Total	FAA	State	Sponsor
Reconstruct Taxiway	975,000	886,665	44,168	44,168
Relocate Lighting	95,000	86,393	4,304	4,304
Reconstruct Apron & Tie Downs	30,000	27,282	1,359	1,359
TOTAL	**$ 1,100,000**	**$ 1,000,340**	**$ 49,831**	**$ 49,831**
ALTERNATIVE 2.3 Description	Total	FAA	State	Sponsor
Relocate Runway	4,800,000	4,365,120	217,440	217,440
Relocate Lighting & Visual Aids	175,000	159,145	7,928	7,928
Relocate Taxiway	1,500,000	1,364,100	67,950	67,950
Relocate Lighting	95,000	86,393	4,304	4,304
Relocate Various Buildings	2,830,000	2,573,602	128,199	128,199
Land Acquisition	2,500,000	2,273,500	133,250	133,250
TOTAL	**$ 11,900,000**	**$ 10,821,860**	**$ 539,070**	**$ 539,070**

6.2 HEBER CITY COST ANALYSIS

The following graphs illustrate the revenues and expenses over the 20-year forecasting period based off of recorded historical revenues and expenses.

Based on these historical and projected revenues and expenses, it is anticipated that both Alternative 1.1 and Alternative 2.3 will pay for themselves over the course of the 20-year forecasting period.

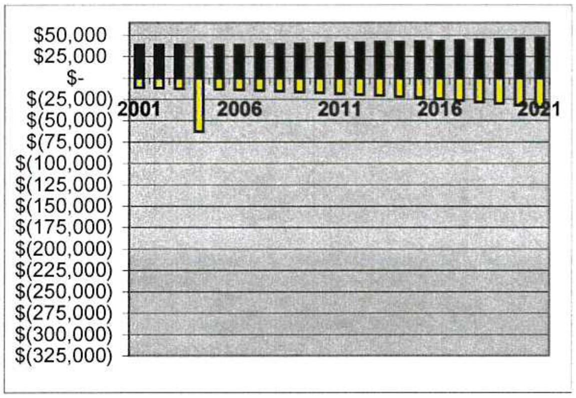


FIGURE 6-1 – ALTERNATIVE 1.1 COST ANALYSIS

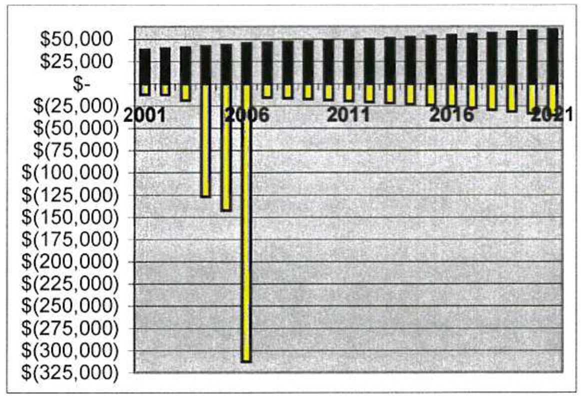


FIGURE 6-2 – ALTERNATIVE 2.3 COST ANALYSIS

6.3 DESTINATION BENEFIT ANALYSIS

The Heber City Municipal Airport not only serves Heber City but it also serves businesses, second home owners, recreation, and resort travelers in the communities of Charleston, Daniel, Midway, and Park City. Therefore, Heber City should strongly consider partnering opportunities for funding the local share project costs with Park City, Summit County, Midway, and other jurisdictions that also benefit from the airport. However, this is not a requirement for proceeding with the project.

In order to allocate cost shares per destination it is necessary to evaluate the amount of the benefit that is realized by each community. While difficult to quantify based on the 15 percent return rate of surveys, it is possible to draw conclusions based on both the forecasts from Chapter 2 and the survey results by breaking down the economic benefit by turbine and piston operations.

6.3.1 Percentage Breakdown by Turbine and Piston Aircraft

According to the survey results, identified in Chapter 5, approximately 53 percent of turbine aircraft traffic's final destination is Park City, 1 percent is Midway, and 46 percent of the traffic's final destination is Heber City.

Piston aircraft can be evaluated based on the location of the business and/or residence of the hangar owner. Of the 11 airport businesses, excluding the FBO, 2 are located in Heber City, 6 in Park City, and 2 are located in other cities. Of the 36 hangars currently leased, 4 owners are located in Heber City, 2 in Midway, 17 in Park City, and 13 are located in other locations. The "Other" category includes locations both within Utah and locations spread throughout the United States; therefore, cost and benefit shares were not applied to these locations. In addition, approximately 29 percent of the total operations by piston aircraft in 2001 were training flights by the FBO, these are also assumed to benefit Heber City. Therefore, it is estimated that the benefit ratio for piston aircraft be broken down as follows: 49 percent Heber City, 6 percent Midway, and 45 percent Park City.

TABLE 6-2
PERCENTAGE BREAKDOWN

	Heber City	Midway	Park City
Turbine Aircraft	46%	1%	53%
Piston Aircraft	49%	6%	45%

6.3.2 Economic Benefit Breakdown by Turbine and Piston Aircraft

Less than 4 percent of existing based aircraft are turbine powered aircraft. Therefore, the cost share breakdown assumes that 49 percent of the piston aircraft economic benefit is staying in Heber City, 6 percent in Midway, and 45 percent in Park City. The economic benefit for turbine aircraft assumes that 53 percent is realized by Park City, 1 percent by Midway, and 46 percent remains in Heber City. The economic benefit for the unconstrained forecast by turbine and piston aircraft is broken down in Table 6-3, and the economic benefit by destination in Table 6-4.

Table 6-3
Economic Benefit

Year	Total Benefit	Turbine	Piston
2001	$ 7.8	$ 2.7	$ 5.1
2006	$ 17.5	$ 6.1	$ 11.4
2011	$ 23.0	$ 8.1	$ 15.0
2016	$ 30.5	$ 10.7	$ 19.8
2021	$ 41.1	$ 14.4	$ 26.7

All values are shown in millions of dollars

Table 6-4
Estimated Economic Impact Shares by Destination

Year	Heber City			Midway			Park City		
	Turbine	Piston	Total	Turbine	Piston	Total	Turbine	Piston	Total
2001	$ 1.26	$ 2.48	$ 3.74	$ 0.03	$ 0.30	$ 0.33	$ 1.45	$ 2.28	$ 3.73
2006	$ 2.82	$ 5.57	$ 8.39	$ 0.06	$ 0.68	$ 0.74	$ 3.25	$ 5.12	$ 8.37
2011	$ 3.70	$ 7.33	$ 11.03	$ 0.08	$ 0.90	$ 0.98	$ 4.27	$ 6.73	$ 10.99
2016	$ 4.91	$ 9.71	$ 14.62	$ 0.11	$ 1.19	$ 1.30	$ 5.66	$ 8.92	$ 14.58
2021	$ 6.62	$ 13.09	$ 19.71	$ 0.14	$ 1.60	$ 1.75	$ 7.62	$ 12.02	$ 19.65

All values are shown in millions of dollars

Based on the cost share breakdown, Heber City is realizing approximately $19.7 million of the economic benefit in the year 2021, Midway is realizing approximately $1.8, and Park City is realizing approximately $19.7 million. Therefore, a reasonable partnership for funding the local share portion of the development costs would be that Heber City and Park City each provide 48 percent and Midway provide the remaining 4 percent of the sponsor share of the development costs. However, the economic benefit to Heber City still exceeds the cost even if Heber City chooses to proceed by funding 100 percent of the local share of $539,070 for Alternative 2.3. It is assumed that if Alternative 1.1 is selected, Heber City will fund the entire local share portion, although this could also be shared by other jurisdictions as well.

Table 6-5, on the following page, breaks down the development cost for each of the alternatives according to FAA, State, Heber City, Midway, and Park City shares as outlined above.

Table 6-5 **Development Cost Breakdown**						
Alternative 1.1						
Description	Total	FAA	State	Heber City	Midway	Park City
Reconstruct Taxiway	975,000	886,665	44,168	44,168	0	0
Relocate Lighting	95,000	86,393	4,304	4,304	0	0
Reconstruct Apron & Tie Downs	30,000	27,282	1,359	1,359	0	0
TOTAL	**$ 1,100,000**	**$ 1,000,340**	**$ 49,831**	**$ 49,831**	**$0**	**$0**
Alternative 2.3						
Description	TOTAL	FAA	State	Heber City	Midway	Park City
Relocate Runway	4,800,000	4,365,120	217,440	104,371	8,698	104,371
Relocate Lighting & Visual Aids	175,000	159,145	7,928	3,805	318	3,805
Relocate Taxiway	1,500,000	1,364,100	67,950	32,616	2,718	32,616
Relocate Lighting	95,000	86,393	4,304	2,066	172	2,066
Relocate Various Buildings	2,830,000	2,573,602	128,199	61,536	5,127	61,536
Land Acquisition	2,500,000	2,273,500	113,250	54,360	4,530	54,360
TOTAL	**$ 11,900,00**	**$ 10,821,860**	**$ 539,070**	**$ 258,754**	**$ 21,563**	**$ 258,754**

6.4 Implementation Schedule

The following implementation schedules take into account not only the development costs listed in Tables 6-6, but also accounts for the Environmental Assessment and land acquisition periods that must be accomplished for Alternative 2.3 prior to construction.

Table 6-6 **Implementation Schedule**		
Alternative 1.1		
Year	Description	Cost
1	Runway Strengthening & Taxiway Construction	$ 1,100,000
	TOTAL	**$ 1,100,000**
Alternative 2.3		
Year	Description	Cost
1	Environmental Assessment*	$ 125,000
2	Land Acquisition	$ 2,500,000
3	Relocate Buildings	$ 2,830,000
4	Construction of Runway & Taxiway	$ 6,570,000
	TOTAL	**$ 12,025,000**

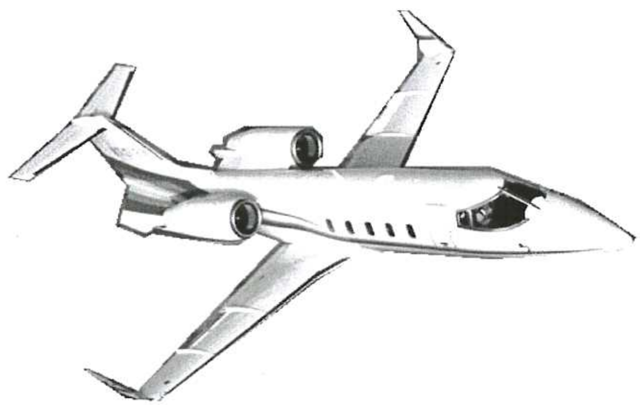
** Go / No-Go decision upon completion of Environmental Assessment*

6.5 Next Steps

The next steps in the process for completion of the Feasibility Study are listed below:

- Sponsor Selection of Preferred Alternative
- Completion of Airport Layout Plan Drawings for Selected Alternative
- Preparation of Compatible Land Use Plans *(Final Task of Feasibility Study)*
- Initiate Appropriate Implementation Schedule, discussed in Section 6.4

Appendix A
ACRONYMS



APPENDIX

A

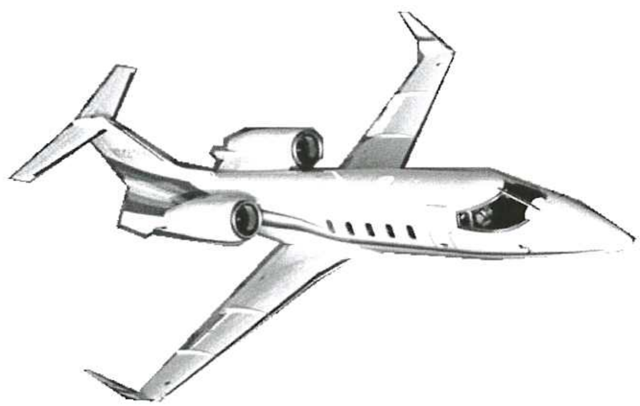
ACRONYMS

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

AC	Advisory Circular
ACI	Armstrong Consultants, Inc.
AGL	Above Ground Level
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ARC	Airport Reference Code
ARP	Airport Reference Point
AWOS	Automated Weather Observation System
BRL	Building Restriction Line
CAT	Category
DBA	Decibel
DME	Distance Measuring Equipment
DNL	Day-Night Level
DWG	Dual Wheel Gear
EA	Environmental Assessment
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FBO	Fixed Base Operator
GA	General Aviation
GAMA	General Aviation Manufacturers Association
GPS	Global Positioning System
HAA	Height Above Airport
INM	Integrated Noise Modeling
MEP	Multi Engine Piston
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MSL	Mean Sea Level
NAVAID	Navigational Aid
NM	Nautical Mile
NPIAS	National Plan of Integrated Airport Systems
OFA	Object Free Area
OFZ	Obstacle Free Zone
OPBA	Operations Per Based Aircraft
PAPI	Precision Approach Path Indicators
REIL	Runway End Identifier Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RWY	Runway
SEP	Single Engine Piston
SWG	Single Wheel Gear
TAF	Terminal Area Forecast
TOFA	Taxiway Object Free Area
TSA	Taxiway Safety Area
TXY	Taxiway
USDOC	United States Department of Commerce
VFR	Visual Flight Rules
WFRC	Wasatch Front Regional Council

Appendix B

GLOSSARY



APPENDIX B

GLOSSARY

HEBER CITY MUNICIPAL AIRPORT FEASIBILITY STUDY

Above Ground Level (AGL)	A height above ground as opposed to MSL (height above Mean Sea Level).
Advisory Circular (AC)	Publications issued by the FAA to provide a systematic means of providing non-regulator guidance and information in a variety of subject areas.
Airport Improvement Program (AIP)	The AIP of the Airport and Airways Improvement Act of 1982 as amended. Under this program, the FAA provide funding assistance for the deign and development of airports and airport facilities.
Aircraft Mix	The number of aircraft movements categorized by capacity group or operational group, and specified as a percentage of the total aircraft movements.
Aircraft Operation	An aircraft takeoff or landing.
Airport	An area of land or water used or intended to be used for landing and takeoff of aircraft, includes buildings and facilities, if any.
Airport Elevation	The highest point of an airport's useable runways, measured in feet above mean sea level.
Airport Hazard	Any structural or natural object located on or near a public airport, or any use of land near such airport, that obstructs the airspace required for flight of aircraft on approach, landing, takeoff, departure, or taxiing at the airport.
Airport Land Use Regulations	Are designed to preserve existing and/or establish new compatible land uses around airports, to allow land use not associated with high population concentration, to minimize exposure of residential uses to critical aircraft noise areas, to avoid danger from aircraft crashes, to discourage traffic congestion and encourage compatibility with non-motorized traffic from development around airports, to discourage expansion of demand for governmental services beyond reasonable capacity to provide services, and regulate the area around the airport to minimize danger to public health, safety, or property from the operation of the airport, to prevent obstruction to air navigation, and to aid in realizing the policies of a County Comprehensive Plan and Airport Master Plan.

Airport Layout Plan (ALP)	A graphic presentation, to scale, of existing and proposed airport facilities, their location on the airport, and the pertinent clearance and dimensional information required to show conformance with applicable standards. To be eligible for AIP funding assistance, an airport must have an FAA-approved ALP.
Airport Master Record, Form 5010	The official FAA document which lists basic airport data for reference and inspection purposes.
Airport Reference Code (ARC)	The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport.
Airport Reference Point (ARP)	The latitude and longitude of the approximate center of the airport.
Airspace	Space above the ground in which aircraft travel; divided into corridors, routes, and restricted zones.
Air Traffic	Aircraft operating in the air or on an airport surface, excluding loading ramps and parking areas.
Approach Surface	A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.
Automated Weather Observing System (AWOS)	This equipment automatically gathers weather data from various locations on the airport and transmits the information directly to pilots by means of computer generated voice messages over a discrete frequency.
Based aircraft	An aircraft permanently stationed at an airport.
Building Restriction Line	A line which identifies suitable building area locations on airports.
Ceiling	The height above the earth's surface of the lowest layer of clouds or other phenomena which obscure vision.
Conical Surfaces	A surface extending outward and upward form the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
Controlled Airspace	Airspace in which some or all aircraft may be subject to air traffic control to promote safe and expeditious flow of air traffic.
Critical/Design Aircraft	In airport design, the aircraft which controls one or more design items such as runway length, pavement strength, lateral separation, etc., for a particular airport. The same aircraft need not be critical for all design items.

Day Night Level (DNL)	24-hour average sound level, including a 10 decibel penalty for sound occurring between 10:00 PM and 7:00 AM
Decibel	Measuring unit for sound based on the pressure level.
Design Type	The design type classification for an airport refers to the type of runway that the airport has based upon runway dimensions and pavement strength.
Federal Aviation Administration (FAA)	The federal agency responsible for the safety and efficiency of the national airspace and air transportation system.
FAR Part 77	A definition of the protected airspace required for the safe navigation of aircraft.
Fixed Base Operator (FBO)	An individual or company located at an airport and providing commercial general aviation services.
Fuel Flowage Fees	A fee charged by the airport owner based upon the gallons of fuel either delivered to the airport or pump at the airport.
General Aviation (GA)	All aviation activity in the United States which is neither military nor conducted by major, national, or regional airlines.
Glider	A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine (FAR Part 1),
Global Positioning System (GPS)	The global positioning system is a space based navigation system which has the capability to provide highly accurate three dimensional position, velocity, and time to an infinite number of equipped users anywhere on or near the Earth. The typical GPS integrated system will provide: position, velocity, time, altitude, steering information, groundspeed and ground track error, heading, and variation. The GPS measures distance, which it uses to fix position, by timing a radio signal that starts at the satellite and ends at the GPS receiver. The signal carries with it, data which discloses satellite position and time of transmission, and synchronizes the aircraft GPS system with satellite clocks.
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.
Horizontal Surface	A horizontal plane 150 feet above the established airport elevation, the perimeter which is constructed by swinging arcs of specified radii form the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs.

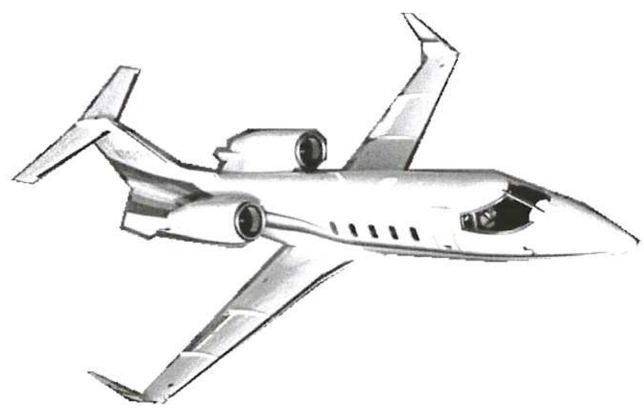
Imaginary Surfaces	Surfaces established in relation to the end of each runway or designated takeoff and landing areas, as defined in paragraphs 77.25, 77.28, and 77.29 of FAR Part 77, *Objects Affecting Navigable Airspace*. Such surfaces include the approach, horizontal, conical, transitional, primary, and other surfaces.
Itinerant Operations	All operations at an airport which are not local operations.
Jet Noise	The noise generated externally to a jet engine in the turbulent jet exhaust.
Knots	Nautical miles per hour, equal 1.15 statute miles per hour.
Large Airplane	An airplane of more than 12,500 pounds maximum certified takeoff weight.
Local Operations	Operations by aircraft flying in the traffic pattern or within sight of the control tower, aircraft known to be arriving or departing from flight in local practice area, or aircraft executing practice instrument approaches at the airport.
Location Identifier	A three-letter or other code, suggesting where practicable, the location name that it represents.
Maneuvering Area	That part of an airport to be used for the takeoff and landing of aircraft and for the movement of aircraft associated with takeoff and landing, excluding aprons.
Master Plan	A planning document prepared for an airport which outlines directions and developments in detail for 5 years and less specifically for 20 years. The primary component of which is the Airport Layout Plan.
Mean/Maximum Temperature	The average of all the maximum temperatures usually for a given period of time.
Mean Sea Level (MSL)	Height above sea level.
Medium Intensity Runway Lights (MIRL)	For use on VFR runways or runway shaving a nonprecision instrument flight rule (IFR) procedure for either circling or straight-in approach.
Minimum Altitude	That designated altitude below which an IFR pilot is not allowed to fly unless arriving or departing an airport or for specific allowable flight operations.

National Airspace System	The common network of United States airspace, navigation aids, communications facilities and equipment, air traffic control equipment and facilities, aeronautical charts and information, rules, regulations, procedures, technical information, and FAA manpower and material.
National Plan of Integrated Airport Systems (NPIAS)	A plan prepared annually by the FAA which identifies, for the public, the composition of a national system of airports together with the airport development necessary to anticipate and meet the present and future needs of civil aeronautics, to meet requirements in support of the national defense, and to meet the special needs of the Postal Service. The plan includes both new and qualitative improvements to existing airports to increase their capacity, safety, technological capability, etc.
NAVAID	A ground based visual or electronic device used to provide course or altitude information to pilots.
Noise	Defined subjectively as unwanted sound. The measurement of noise involve understanding three characteristics of sound: intensity, frequency, and duration.
Noise Contours	Lines drawn about a noise source indicating constant energy levels of noise exposure. DNL is the measure used to describe community exposure to noise.
Noise Exposure Level	The integrated value, over a given period of time of a number of different events of equal or different noise levels and durations.
Non-Precision Instrument	A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in nonprecision instrument approach procedure has been approved.
Notice to Airmen (NOTAM)	A notice containing information (not known sufficiently in advance to publicize by other means concerning the establishment , condition, or change in any component (facility, service, or procedure) of, or hazard in the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.
Object	Includes, but is not limited to, above ground structures, NAVAIDs, people, equipment, vehicles, natural growth, terrain, and parked aircraft.
Object Free Area (OFA)	A two dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except for object whose location is fixed by function.
Obstacle Free Zone (OFZ)	The airspace defined by the runway OFZ and, as appropriate, the inner-approach OFZ and the inner-transitional OFZ, which is clear of object penetrations other than frangible NAVAIDs.

Obstruction	An object which penetrates an imaginary surface described in the FAA's Federal Aviation Regulations (FAR), Part 77.
Parking Apron	An apron intended to accommodate parked aircraft.
Pattern	The configuration or form of a flight path flown by an aircraft, or prescribed to be flown, as in making an approach to a landing
Precision Approach Path Indicators (PAPI)	The visual approach slope indicator system furnishes the pilot visual slope information to provide safe descent guidance. It provides vertical visual guidance to aircraft during approach and landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that they are "on path" if they see red/white, "above path" if they see white/white, and "below path" if they see red/red.
Primary Surface	A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway, but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway.
Rotating Beacon	A visual navaid operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport.
Runway	A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes.
Runway End Identifier Lights (REIL)	REILs are flashing strobe lights which aid the pilot in identifying the runway end at night or in bad weather conditions.
Runway Gradient	The average gradient consisting of the difference in elevation of the two ends of the runway divided by the runway length may be used provided that no intervening point on the runway profile lies more than five feet above or below a straight line joining the two ends of the runway. In excess of five feet the runway profile will be segmented and aircraft data will be applied for each segment separately.
Runway Lighting System	A system of lights running the length of a system that may be either high intensity (HIRL), medium intensity (MIRL), or low intensity (LIRL).
Runway Orientation	The magnetic bearing of the centerline of the runway.
Runway Protection Zone (RPZ)	An area off the runway end used to enhance the protection of people and property on the ground.
Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion form the runway.

Segmented Circle	A basic marking device used to aid pilots in locating airports, and which provides a central location for such indicators and signal devices as may be required.
Small Aircraft	An airplane of 12,500 pounds or less maximum certified takeoff weight.
Taxiway	A defined path established for the taxiing of aircraft from one part of an airport to another.
Terminal Area	The area used or intended to be used for such facilities as terminal and cargo buildings, gates, hangars, shops, and other service buildings, automobile parking, airport motels, restaurants, garages, and automobile services, and a specific geographical area within which control of air traffic is exercised.
Threshold	The beginning of that portion of the runway available for landing.
Touch and Go Operations	Practice flight performed by a landing touch down and continuous takeoff without stopping.
Traffic Pattern	The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off form an airport.
Transitional Surface	These surfaces extend outward and upward at right angles to runway centerline extended at a slope of 7 to 1 form the sides of the primary surface and form the sides of the approach surfaces.
Universal Communications (UNICOM)	A private aeronautical advisory communications facility for purpose other than air traffic control. Only one such station is authorized in any landing area. Service available are advisory in nature primarily concerning the airport services and airport utilization. Locations and frequencies of UNICOMs are listed on aeronautical charts and publications.
Visual Flight Rules (VFR)	Rules that govern flight procedures under visual conditions.
Visual Runway	A runway intended for visual approaches only with no straight-in instrument approach procedure either existing or planned for that runway.

Appendix C
SURVEYS



HEBER MUNICIPAL AIRPORT, HEBER CITY, UTAH
2002 ECONOMIC IMPACT STUDY

Armstrong Consultants, Incorporated, is conducting a survey to develop information concerning Heber Municipal Airport's economic impact upon the community. We are asking all organizations directly involved with aviation and the airport to complete this questionnaire. The data you can furnish will enable us to tell a better story about the value of aviation in your community. This reply will be kept completely confidential, and only industry totals will be released.

We would like the data to be for 2001. If your data is for a different period, please indicate here _______.

GENERAL

Name: ________________________ Phone: ________________________

Title: ________________________ Fax: ________________________

Company: ________________________ Nature of Business: ________________

EMPLOYMENT

Number of Full Time Employees: __________

Number of Part Time Employees: __________ Total Annual Payroll: ________________

REVENUE

Annual Gross Revenue Attributable to Airport: ________________________

Total Av Gas Sales: ________________ Total Jet Fuel Sales: ________________

EXPENDITURE

How much did you spend in the <u>local area</u> for the following:

Fuel, supplies, and equipment: ____________ Advertising: ________________

Charitable contributions: ____________ Capital Expenditures: ____________

Local services (i.e. repair, janitorial, utilities, etc.): ________ Taxes: ________________

MISCELLANEOUS

How many aircraft do you have based at the airport? Single-Engine ________ Multi-Engine ________

Turboprop _______ Turbojet ________ Other ________________

On average, how many landings do you make with your aircraft per week? _______ What percentage of these landings are training flights? _______

In your approximation, what percentage of visitors/customers travel to the following communities:

Heber City _______ Charleston _______ Midway ________ Daniel _________ Park City _______

In your speculation, what is the average number of passengers per non-jet transient aircraft? __________

Please use the space on the following page to provide any additional information you feel is important in conducting our survey.

Please Return To: Armstrong Consultants, Inc.
Attn: Beth Smyk
861 Rood Avenue
Grand Junction, CO 81505
P (970) 242-0101 F (970) 241-1769

FBO

HEBER MUNICIPAL AIRPORT, HEBER CITY, UTAH
2002 ECONOMIC IMPACT STUDY

Armstrong Consultants, Incorporated, is conducting a survey to develop information concerning Heber Municipal Airport's economic impact upon the community. We are asking all organizations directly involved with aviation and the airport to complete this questionnaire. Individual replies will be kept completely confidential, and only industry totals will be released. The data you can furnish will enable us to tell a better story about the value of aviation in the community.

We would like the data to be for 2001. If your data is for a different period, please indicate here _______.

GENERAL (NO CONTACT INFORMATION RELEASED)

Name: ______________________________ Type of Aircraft: ______________________

Phone: ______________________________

OPERATIONS

How often per year do you travel to the Heber City Municipal Airport? ________________

How long, on average, were you in the Valley? ______________________________

SPENDING

On average, how many passengers per trip? ______________________________

How much did an average passenger spend per day? ______________________________

PURPOSE FOR TRIP

What percentage of your trips destinations are in the following communities:

Heber City _______ Charleston _______ Midway _______ Daniel _______ Park City _______

Other __________

What was the purpose of your visit?

☐ Business ☐ Pleasure ☐ Second Home ☐ Other ____________

Please use the following space for any additional information or comments that you feel is important in conducting our survey.

____

____

____

____

____

____

____

Please Return To: Armstrong Consultants, Inc.
Attn: Beth Smyk
861 Rood Avenue
Grand Junction, CO 81501
P (970) 242-0101 * F (970) 241-1769

Heber Municipal Airport, Heber City, Utah
2002 Economic Impact Study

Armstrong Consultants, Incorporated, is conducting a survey to develop information concerning Heber Municipal Airport's economic impact upon the community. We are asking all organizations directly involved with aviation and the airport to complete this questionnaire. The data you can furnish will enable us to tell a better story about the value of aviation in your community. Individual replies will be kept completely confidential, and only industry totals will be released.

We would like the data to be for 2001. If your data is for a different period, please indicate here ______.

General

Name: ______________________ Phone: ______________________

Title: ______________________ Fax: ______________________

Company: ______________________ Nature of Business: ______________________

Employment

Number of Full Time Employees: __________

Number of Part Time Employees: __________ **Total Annual Payroll:** ______________________

Revenue

Annual Gross Revenue Attributable to Airport: ______________________

Expenditure

How much did you spend in the local area for the following:

Fuel, supplies, and equipment: __________ Advertising: __________

Charitable contributions: __________ Capital Expenditures: __________

Local services (i.e. repair, janitorial, utilities, etc.): __________ Taxes: __________

Miscellaneous

Check the box that best describes the airport's relationship to your business:

☐ Essential ☐ Very Helpful ☐ Helpful ☐ No Influence

Did you choose your present location because of the airport? ☐ Yes ☐ No

How many aircraft do you have based at the airport? Single-Engine ________ Multi-Engine ________

Turboprop ________ Turbojet ________ Other ______________

In your approximation, what percentage of visitors/customers travel to the following communities:

Heber City ________ Charleston ________ Midway ________ Daniel ________ Park City ________

To what extent would your employment decrease if the airport did not exist? ______________

Sales? ______________

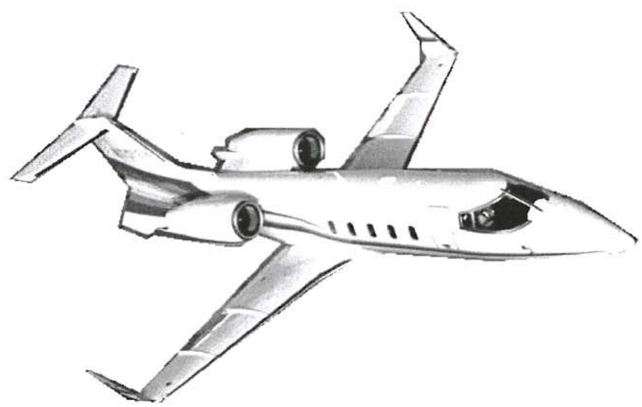
Please use the space on the following page to provide any additional information you feel is important in conducting our survey.

Please Return To:

Armstrong Consultants, Inc.
Attn: Beth Smyk
861 Rood Avenue
Grand Junction, CO 81505
P (970) 242-0101 F (970) 241-1769

Appendix D

AIRCRAFT NOISE: HOW WE MEASURE IT AND ASSESS ITS IMPACTS



For Additional copies of this brochure:

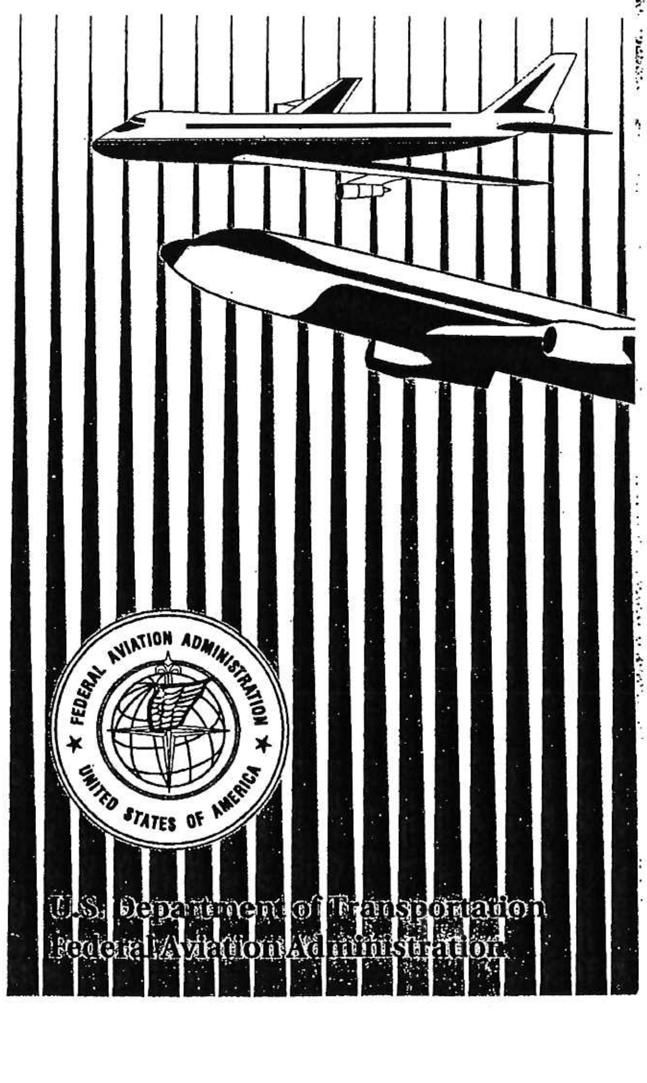
Write:

Office of Environment and Energy (AEE-1)
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

This brochure may be reprinted locally.

Aircraft Noise:

How We Measure It and Assess Its Impact



AIRCRAFT NOISE:

HOW WE MEASURE IT AND ASSESS ITS IMPACT

NOISE – UNWANTED SOUND

Noise is usually regarded as unwanted sound – sound that disturbs our routine activities or peace and quiet, and perhaps causes a feeling of annoyance. Which sounds are NOISE is obvious to each listener, and he or she has no need to measure it. It's there, and it's bothersome.

But those who work to abate noise, to minimize its effects, or to develop quieter vehicles, need to measure noise. And that is not an easy task. Consider sounds typical of a suburban neighborhood on a "quiet" afternoon. If a short time history of those sounds is plotted on a graph, it would look very much like Figure 1.

The sound levels are plotted in units of A-weighted decibels (abbreviated dB, or sometimes dBA), a logarithmic measure of the magnitude of a sound as the average person hears it. The "A-weighting" accounts for the fact that humans do not hear low frequencies and high frequencies as well as they hear middle frequencies, and it corrects for the relative efficiency of the human ear at the different frequencies. A logorithmic measure is used in order to cover efficiently the wide range of sound magnitudes encountered daily.

In this example, the background, or residual sound level in the absence of any identifiable noise sources, is about 45 dB. During roughly three-quarters of the time, the sound level is 50 dB or less. The highest sound level, caused by a nearby motorcycle, is 73 dB, while an aircraft generates a maximum sound level of about 68 dB. The question then becomes: how do we "measure" this variable community noise?

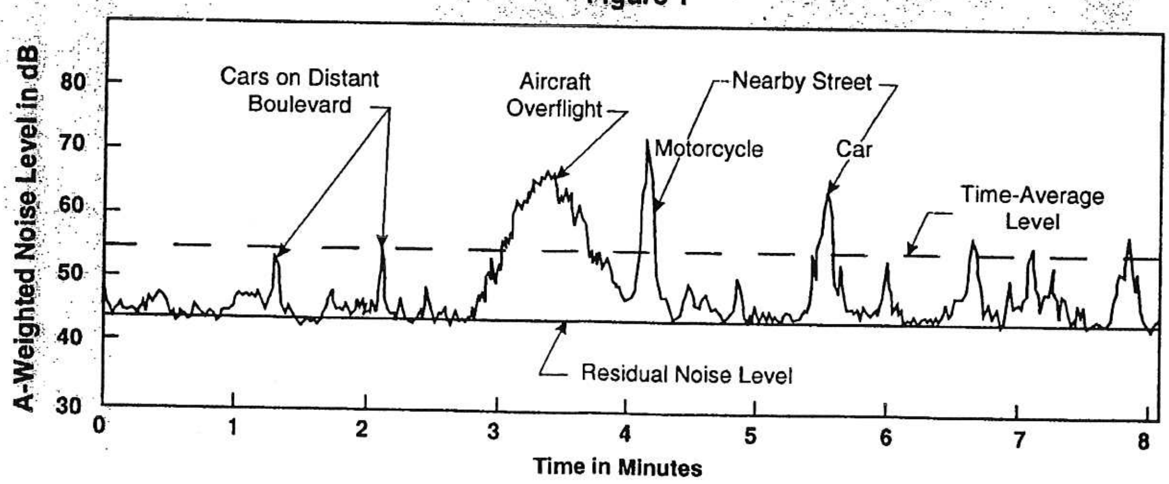
MAXIMUM SOUND LEVEL

One obvious way of describing this sound environment is to measure the maximum sound level – in this case, the nearby motorcycle at 73 dB. But the aircraft sound, although not as loud as the motorcycle, lasts longer. Studies have shown that human response to noise involves both the maximum level and its duration, so the maximum sound level alone is not sufficient to evaluate the effect of noise on people.

SOUND EXPOSURE LEVEL

A second way of describing this sound environment is to measure the sound exposure level (abbreviated SEL), which is the total sound energy of a single sound event and takes into account both its intensity and duration. One way to understand SEL is to think of it as the sound level you would experience if all of the sound energy of a sound event occurred in one second. This normalization to a duration of one second allows the direct comparison of sounds of different durations. In the sample time history in Figure 1, the motorcycle generates an SEL of about 77 dB, while the aircraft generates an SEL of about 81 dB.

Figure 1



EQUIVALENT SOUND LEVEL

The maximum sound levels and sound exposure levels measure individual sound events that may occur only once, or may occur several times during the day in our neighborhood. The number of times these events occur is also important in measuring the noise environment. One way to describe this factor might be to count the number of events per day for which the SELs exceed 80 dB, plus the number which exceed 75 dB, plus the number which exceed 70 dB, and so on. A more efficient way to describe both the number of such events and the sound exposure level of each is the time-average of the total sound energy over a specified period, referred to as the equivalent sound level (symbolized Leq). In the example shown in Figure 1, the time-average sound level is roughly 56 dB. This accounts for all of the sound energy during the sample period, and provides a single-number descriptor in terms of sound energy per second.

DAY-NIGHT AVERAGE SOUND LEVEL

One additional factor is also important in "measuring" a sound environment – the occurrence of sound events during nighttime. People are normally more sensitive to intrusive sound events at night, and the background sound levels are normally lower at night because of decreased human activity. Therefore a "penalty" may be added to sound levels which occur during night hours, to include these factors. By convention, a 10 dB penalty is added to sound levels occurring between 10:00 p.m. and 7:00 a.m. the following morning. The 24-hour average sound level, including this 10 dB penalty, is known as the day-night average sound level (abbreviated DNL). This 10 dB penalty means that one nighttime sound event is equivalent to 10 daytime events of the same level.

COMMUNITY ANNOYANCE

Annoyance is a summary measure of the general, adverse reactions of people to noises which disrupt their daily activities – telephone conversations, TV/radio listening, sleep, or simple tranquility. Currently, the best measure of this reaction is the percentage of people who characterize themselves as "highly annoyed" by long-term exposure to their noise environments.

Extensive research has found that day-night average sound level correlates very well with community annoyance from most environmental noise sources. Figure 2 summarizes the relationship between DNL and percentage of people who said they were highly annoyed by transportation noise, based on 453 surveys conducted worldwide. Some of these studies found that communities report themselves slightly more annoyed by aircraft noise than by surface transportation noises.

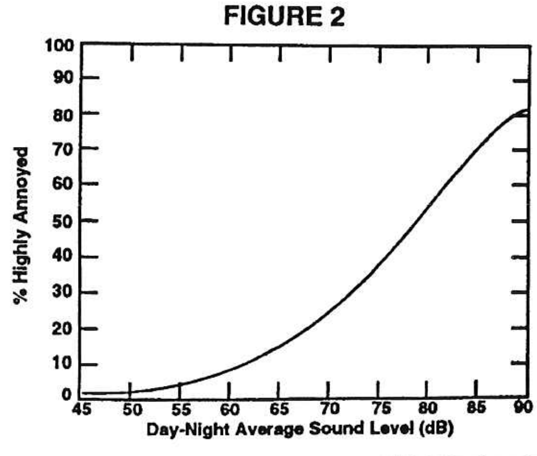
NOISE COMPATIBILITY GUIDELINES

Using this research, federal agencies have adopted certain guidelines for compatible land uses and environmental sound levels. Land use is normally determined by property zoning, such as residential, industrial, or commercial. Noise levels that are unacceptable for homes may be quite acceptable for stores or factories. The Federal Aviation Administration has issued these guidelines as part of its Airport Noise Compatibility Program, found in Part 150 of the Federal Aviation Regulations.

In general, most land uses are considered to be compatible with DNLs that do not exceed 65 dB, although Part 150 declares that "acceptable" sound levels should be subject to local conditions and community decisions. Nevertheless, a DNL of 65 dB is generally identified as the threshold level of aviation noise, and other sources of community noise, which are "significant."

In adopting a threshold criterion for noise impact, we must keep several important factors in mind. First, a day-night average sound level below 65 dB does not mean that no one is annoyed by that level of noise from transportation sources. To the contrary, as shown in Figure 2, about 12 percent of people living with a DNL of 65 dB report themselves to be "highly annoyed". About 3 percent are highly annoyed at a DNL of 55 dB. This is understandable, because the same research on noise effects has found that the physical amount of noise is only one element in feelings of annoyance with environmental noise. Activities which may be disrupted by noise events (study, conversation, listening to music, watching TV, solitude, etc.); beliefs that such noise could be better controlled; attitudes toward the noise maker; and personal fears regarding the source of the noise, are all important factors in people's perception of annoyance. Additionally, a small percentage of people are simply more sensitive to noise than most other people, which a small percentage are little annoyed even at

FIGURE 2



high noise levels. The combination of these factors causes different people to interpret sounds as "unwanted" noise in different ways. A measure of noise impact, such as day-night average sound level, provides a reliable indicator of overall community response, but does not tell how any single individual will respond.

As a result, there is probably no minimum level of transportation noise at which no one is annoyed. General guidelines for noise compatibility identify day-night average sound levels between 55 and 65 dB as "moderate exposure" and as generally acceptable for residential use. Above a DNL of 65 dB, these guidelines identify the noise impact as "significant", and this designation is currently a factor in decisions to provide federal funds for mitigation projects.

Because DNL combines both the intensity and number of single noise events (along with nighttime weighting), it also is not a good estimator of the single-event sound levels which are experienced. For example, a DNL of 65 dB may be generated by any of the following combinations of average sound exposure level and the effective number of those events, where "effective" number is the sum of the number of daytime events plus 10 times the number of nighttime events:

Average SEL	Effective Number of Events	DNL
87.4 dB	500	65 dB
94.4 dB	100	65 dB
97.4 dB	50	65 dB

Consider two communities: one near a large airport, the other near a small one. Both are exposed to a DNL of 65 dB. Although people near the small airport experience only 50 aircraft operations in a day, the average SEL of each of these is about 97 dB. On the other hand, the community near the large airport is impacted by 500 daily operations, but each of these as an average SEL of about 87 dB. This does not invalidate the usefulness of the DNL measure, but should be considered, for example, in determining needs for structural sound insulation.

Some criticism of DNL stems from beliefs that the levels identified with land-use compatibility are too high. Any compatibility guideline, such as a DNL of 65 dB, must represent a balance between that level which is most desirable to protect communities and that which can be achieved with cost-effective mitigation measures and available technology. There is no single criterion which can fit all airports and all communities. Local communities may choose to mitigate impacts below a DNL of 65 dB.

SUPPLEMENTAL MEASURES

A time-average measure of noise impact, such as day-night average sound level, is also criticized because people feel that they are annoyed by individual sound events, rather than some "fictitious" average level. Clearly, people are bothered by individual noise events, but their sense of annoyance increases with the number of those noise events, and those which occur late at night.

DNL provides a combined "measure" of these factors which can be used to evaluate existing and predicted future conditions on an unambiguous, single-number basis. Other measures, such as maximum sound level, or sound exposure level, give valuable supplemental information in analyzing airport noise. For example, as noted above, in designing sound insulation for dwellings and schools, single-event measures are necessary. Nevertheless, day-night average sound level remains the best single measure for assessing the effects of airport noise on communities, and allows a standardized and effective means for measuring transportation noise.

FOR MORE INFORMATION

- "Federal Agency Review of Selected Airport Noise Analysis Issues", Federal Interagency Committee on Noise, August 1992.
- "Updating a Dosage-Effect Relationship for the Prevalence of Annoyance Due to General Transportation Noise", J.Ac.Soc.Am., 89, 221-233 (January 1991).
- "Aviation Noise Effects", Report FAA-EE-85-2, March 1985.
- "Guidelines for Considering Noise in Land-Use Planning and Control", Federal Interagency Committee on Urban Noise, June 1980.
- "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety", U.S. Environmental Protection Agency, March 1974.

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