Airport Master Plan

Storm Lake Municipal Airport (SLB)
Storm Lake, Iowa

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EXECUTIVE SUMMARY

The Airport Master Plan for the Storm Lake Municipal Airport (SLB) evaluates the needs of the existing and future users of the airport over the next 20 years. The Airport Master Plan was last updated in 1993. Since the previous update, FAA standards have changed and there is a need to determine the role the airport will play within the community over the next 20 years. The focus of this update is to evaluate the runway configuration, complete a comprehensive obstruction evaluation, evaluate the potential of the building area, complete a financial feasibility analysis, and involve the public in the process.

The Airport Master Plan is a joint effort between the Storm Lake Airport Commission, City of Storm Lake, and the Federal Aviation Administration (FAA). An Airport Master Plan includes discussion of the existing inventory at the airport, the results of the user survey submitted to the service area around the airport, the forecasts of aircraft activity including based aircraft and operations, the facility recommendations to meet the forecasted needs of the users of the airport, alternatives of the recommended facilities, and the implementation plan. All of these chapters take into consideration the focus areas specific to the Storm Lake Municipal Airport.

The City of Storm Lake is located in northwest Iowa, 69 miles east of Sioux City. It is part of Buena Vista County, situated west of United States Highway 71, north of Storm Lake. The airport is a general aviation facility to the southwest of the City and Storm Lake primarily serving business owners, agricultural sprayers, and recreational pilots that use single-engine and multi-engine propeller driven aircraft in addition to some small business jets.

There are currently 36 based aircraft at the airport. There is an A/D building which includes a hangar for the Fixed Base Operator (FBO), three public T-hangars for based aircraft storage, one public conventional hangar, three private hangars, and six tie-downs available for aircraft parking. There is an automobile parking lot located near the A/D building and 100LL and Jet A fuel are available for aircraft.

The airport has three runways. Primary Runway 17/35 is a concrete runway 5,000 feet long by 75 feet wide. There is a Global Positioning System (GPS) approach to both runway ends, the Runway 35 end being a GPS approach with vertical guidance (LPV). Runway 13/31 is a concrete runway 3,035 feet long by 50 feet wide. There is a 165-foot displaced threshold to the Runway 13 end. Both runway ends are served by visual approaches. Runway 6/24 is a turf runway 1,962 feet long by 95 feet wide.

The aviation forecasts show growth in based aircraft over the next 20 years to 46 aircraft in 2035, which represents a growth of 10 aircraft. The annual operations are estimated to be 12,600 growing to 16,100 over the next 20 years.

Based on the type of aircraft using and proposed to use the airport over the next 20 years, facility recommendations were developed. The business aircraft that use the airport have a need for a precision approach to be developed to Runway 17/35. This will allow aircraft to use SLB the majority of the year. In addition, a runway extension of the Runway 35 end to 6,500 feet would allow aircraft to operate at maximum capacity during wet, icy, or even hot conditions.

The addition of a non-precision approach to crosswind Runway 13/31 would assist smaller aircraft when the crosswind component exceed 10.5 knots on Runway 17/35. To adequately clear State Highway 110, a displaced threshold of 375 feet is required. The landing distance to the Runway 13 end becomes 2,735 feet. To maximize existing airport property and land available, a runway extension to 3,600 feet is proposed for Runway 13/31. This would increase the landing distance available for Runway 13 to 3,200 feet. Runway 6/24 is proposed to remain the same over the next 20 years.

The building area was also evaluated to add additional private hangars for corporate aircraft and an additional T-hangar. An apron expansion and additional aircraft tie-downs were also added to the building area to accommodate the itinerant traffic at the airport. Finally, a snow removal equipment building is

also proposed to store all airport snow removal equipment at SLB.

The final chapter of the Airport Master Plan takes a look at the timing and funding necessary to develop the facilities recommended to accommodate the existing and future users of the airport. Further discussion on the facility requirements, project impacts, and details of the forecast analysis for SLB can be found within the Airport Master Plan document.

20-YEAR PLAN RECOMMENDATIONS

The future projects described in this report address the needs of the airport users over the next 20 years. The timing and order of these future projects will depend on funding availability and user needs. However, all projects are identified in this document to enable the City of Storm Lake to proceed in the right direction to ensure the aviation needs support the growth and development within the community.

The justification and reasoning behind the recommendations listed below are explained within the Master Plan document. Sheet 2 of the Airport Layout Plan located in **Appendix B** depicts the future development proposed at the airport.

- Runway 17/35 recommendations:
  - Extend the runway south an additional 1,500 feet
  - Publish a precision approach to both runway ends
  - Widen the runway from 75 feet to 100 feet
  - Replace the Medium Intensity Runway Lights with High Intensity Runway Lights
  - Update the pavement markings from non-precision approach markings to precision approach markings
  - Install an approach lighting system on the south end of the runway
  - Construct a full parallel taxiway on the east side of the runway

- Runway 13/31 recommendations:
  - Relocate the Runway 13 threshold an additional 210 feet to the southeast
  - Extend the runway an additional 565 feet to the southeast for a total runway length of 3,600 feet
  - Widen the runway from 50 feet to 60 feet
  - Increase the pavement strength from 4,000 pounds single-wheel gear to 12,500 pounds single-wheel gear
  - Publish a non-precision approach to both runway ends
  - Update the pavement markings from visual approach markings to non-precision approach markings
  - Install Runway End Identification Lights and Precision Approach Path Indicators to both runway ends
  - Construct a full parallel taxiway on the east side of the runway

- No changes are recommended to Runway 6/24 over the next 20 years.

- The following is a list of recommendations within the building area:
  - Expand the apron including 11 additional tie-down spaces
  - Update the Arrival/Departure building
  - Add the use of a courtesy car for pilots

  - Additional T-hangar space
  - Areas for private hangar development
  - Construction of a Snow Removal Equipment Building
  - Construction of a perimeter fence

- Update the Airport Zoning regulations to address the changes to each runway identified in the Master Plan.

1. INTRODUCTION

1.1. PURPOSE

An Airport Master Plan is a comprehensive study of an airport and describes the short (0-5 year), mid (5-10 year), and long-term (10-20 year) development plans to meet existing and future aviation demand based on identified airport safety, facility, and aviation system needs. The Airport Master Plan will provide direction and guidance to the airport owner, the City of Storm Lake, regarding future airport preservation and development priorities for the Storm Lake Municipal Airport (FAA identifier: SLB). It will become the City's realistic strategy for the development of the airport considering financial, environmental, and socioeconomic factors. The Federal Aviation Administration (FAA) outlines the requirements and process to prepare an Airport Master Plan through Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*.

1.2. BACKGROUND

The City of Storm Lake last completed an update to the Airport Layout Plan (ALP) in June 2002. An Airport Master Plan was last completed in 2003. This Airport Master Plan will update operations and based aircraft projections so airport development plans can meet the needs of the public utilizing the airport. It is important these improvements and needs maintain compatibility with community land use plans.

The existing ALP will need to be modified to depict the as-built airport development along with the future airport plans recommended in this Airport Master Plan update.

1.3. AREAS OF EMPHASIS

An Airport Master Plan process evaluates many aspects of an airport facility. The following areas of emphasis have been specifically identified by the City of Storm Lake and will be reviewed in greater detail for SLB.

Runway Alternatives

The current ALP shows a future primary runway (Runway 17/35) length of 5,400 feet, in addition to a future crosswind runway (Runway 13/31) length of 3,600 feet. The Airport Master Plan will evaluate existing and foreseeable airport users, the primary runway length, and crosswind runway requirements to meet the needs at SLB. Runway development options will be explored considering local zoning implications; compatibility with community plans; operational effects; airspace obstructions, including Iowa Highway 110; environmental impacts; and cost.

Obstruction Analysis

There are currently airspace obstructions to the FAR Part 77 airspace at SLB. One of these obstructions includes Iowa Highway 110. The Airport Master Plan will complete a comprehensive airspace obstruction analysis for the existing and future airport configuration to best determine any airspace obstructions.

Building Area Plan

The existing building area has room for expansion. A long-term plan for the building area will be developed to evaluate existing and ultimate traffic. There will be a focus on accommodating corporate traffic and opportunities to attract corporate users to the airport to enhance community economic development.

Public Involvement

Engaging the community and stakeholders throughout the planning process is important for the airport to continue to gain support from the community and continue to serve their needs. A public involvement plan has been put in place to consider the broader interests of the general public.

1.4. STRUCTURE OF AN AIRPORT MASTER PLAN

- Existing airport inventory
- Environmental overview
- Aviation activity forecasts
- Capacity and demand analysis
- Facility requirements including alternative analysis
- Implementation plan

1.5. PUBLIC & AGENCY OUTREACH

Outreach is an important aspect of the Airport Master Plan process to solicit input and foster support for the vision of the airport over the next 20 years. The Airport Master Plan is to be used as a guide for decision makers when evaluating existing and future needs of the airport and implementing improvements. Although more detailed justification and funding of individual projects are key components before any development can occur, the Airport Master Plan recognizes the "big picture" potential of the airport and puts an overall plan in place for the future.

There were three primary forms of outreach throughout the Airport Master Plan process.

- Development of a Master Plan Advisory Group (MPAG) – this group met five times throughout the Airport Master Plan process to provide input on the issues, needs, and development for the airport over the next 20 years. The MPAG consisted of members from the Airport Commission, City of Storm Lake staff, Buena Vista County, Fixed Based Operator (FBO) staff, pilots at the airport, City Council representatives, Economic Development Authority representatives, a local business owner and a surrounding land owner. Staff from the various organizations represented the interest of their areas of expertise.

- Airport User Survey – A user survey was distributed to current and potential SLB users. The survey asked respondents how often they use the airport, why they use the airport, and what facilities, services, or airport improvements were needed to increase their use of the airport. This information was used to assist in developing the forecasts and facility requirements.

- Public Open House – After the inventory, forecasts, and alternatives portions of the Airport Master Plan were developed in coordination with the MPAG, a public open house was held to inform the public of the Airport Master Plan process and the selected layout for the 20 year plan for the airport. Approximately 20 people from the public were in attendance. The open house included a forum for those in attendance to ask questions about the project or the airport in general.

In addition to these activities, project meetings were held with FAA throughout the master planning process to ensure participation in and support of the 20 year plan at the airport. Meeting design standards and setting the framework for justification of projects in the future will help the City in receiving funding participation from these agencies as the airport develops.

2. AIRPORT INVENTORY

The existing facilities and conditions at the airport provide the baseline for comparison to implement future safety and capacity airport improvements. Collection of both on-airport and off-airport background information is important so the development of future facilities can be accomplished in partnership with the surrounding community.

2.1. LOCATION

The City of Storm Lake is located in northwest Iowa, 69 miles east of the Sioux City, IA. It is part of Buena Vista County, situated along U.S. Highway 71 and the north shore of Storm Lake. U.S. Highway 71, and Iowa State Highways 7 and 110 are the main routes into the City. **Figure 2-1** at the end of this chapter, shows the regional location of Storm Lake.

Storm Lake Municipal Airport (FAA Identifier: SLB) is located three and a half miles southwest of City Hall. The airport can be accessed via State Highway 110. **Figure 2-2**, at the end of this chapter, shows the local airport location.

Airport property consists of 249.28 acres, owned and operated by the City of Storm Lake. The airport owns an additional 43.88 acres in easement. Field elevation for the airport is 1,062 feet above mean sea level (MSL). The airport's official location is defined by the Airport Reference Point (ARP), which marks the center area of the useable runways at the airport. The ARP for SLB is N 44°51'35.57" latitude and W 94°22'57.03" longitude.

2.2. HISTORY

The Storm Lake Municipal Airport is a public use airport that was constructed in 1965. The airport consists of one primary paved north-south runway, Runway 17/35, and two crosswind runways, Runway 13/31 and 6/24. Throughout the years the airport has taken on many airport improvement projects.

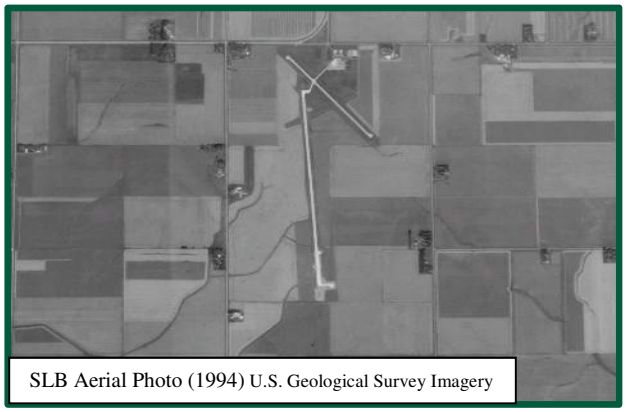
Some of the major milestones in the history of the airport's development are documented below:

1975:	Bart's Flying Service establishes a fixed based operator (FBO) presence on the airport
1978:	The primary runway, Runway 17/35, was constructed to a length of 4,200 feet by 75 feet in width
1981:	Turf Runway 6/34 was reconstructed to a length of 2000 feet and 100 feet in width
1994:	Extension of Runway 17/35 to 5,000 feet
1995:	Terminal apron replaced with concrete pavement
2001:	New hangar development
2001:	Approach taxiway and apron constructed

2.3. SURROUNDING DEVELOPMENT

The City of Storm Lake is located in an agricultural area with in northeastern Iowa. A lake is located within the community.

The Storm Lake Municipal Airport (SLB) is predominately surrounded by agricultural land uses. A few rural residential properties are located near the airport. SLB is surrounded by Iowa 110 to the north, 80th Avenue to the west, and 90th Avenue to the east. The State and County Airport Zoning Map identifies the areas surrounding the airport to be used for agricultural purposes. These land uses are compatible with airport operations.



SLB Aerial Photo (1994) U.S. Geological Survey Imagery

2.4. SOCIOECONOMIC

Socioeconomic information provides background on area population, employment, and income. These measures indirectly identify trends in the airport service area which may contribute to changes in airport activity. Long-term, steady growth of population, employment, and personal income in the airport service area is generally an indication of a healthy local economy and increased aviation demands.

2.4.1. POPULATION

The most recent census shows Storm Lake's population has grown by 5.2% during the 2000 to 2010 decade. This is a higher level of growth than the County (-0.7%) and the State (4.1%) growth rate for the same time period. The average annual growth rate for the last 40 years is .53% per year. Buena Vista County has seen varied growth over the past 40 years. The average annual growth rate since 1970 has been -0.05% (See **Table 2-1**). Despite the decrease in population of Buena Vista County, increasing population trends are expected to continue for the City of Storm Lake.

Table 2-1
Local and Regional Existing and Forecasted Population

Year	City of Storm Lake	Buena Vista County
1970	8,591	20,693
1980	8,814	20,774
1990	8,769	19,965
2000	10,076	20,411
2010	10,600	20,260
Historical Trend (Annual Average)	**0.53%**	**-0.05%**

Source: Iowa Community Indicators Program (Iowa State University)

2.4.2. EMPLOYMENT

Employment is another socioeconomic measure of the vitality of a regional economy and demand for aviation. Significant employment industries in Buena Vista County include manufacturing, government, trade, education and health services, and agriculture according to the Buena Vista 2012 Annual County

Profile. The unemployment rate in Buena Vista County for February 2015 is 3.9%, which was similar to the Iowa rate of 3.8% and the United States average of 5.5%.

According to Storm Lake United, the Economic Development and Chamber of Commerce organization, major employers within the community include the following:

- Tyson
- Sara Lee
- Buena Vista Regional Medical Center (BVRMC)
- SL Community School District
- Buena Vista University
- Wal-Mart
- Meridian Manufacturing
- Rembrandt Enterprises
- Faith Hope & Charity
- Hy-Vee
- Methodist Manner
- Buena Vista County
- King's Pointe Water Park and Resort
- City of Storm Lake
- Fareway Stores

2.4.3. INCOME

Income is another socioeconomic measurement tool which can provide assumptions about new businesses and development. Generally, the higher the income the more likely demand for aviation activities will increase.

Median household income for Buena Vista County, according to the 2013 U.S. Census Bureau American Community Survey, is $46,951, which is lower than the state average of $51,843 and the United States average of $53,046. Iowa has a per capita personal income of $27,027 compared to $28,155 in the United States. Buena Vista County, defined as the airport service area, has a per capita personal income of $22,899.

2.5. AIRPORT ROLE

2.5.1. FEDERAL NPIAS

The National Plan of Integrated Airport Systems (NPIAS) is made up of 3,283 airports, 10 heliports, and 38 seaplane bases that are open for public use. These airports are considered significant to the national air transportation system and are eligible for Federal funding. Airports within the NPIAS are classified as commercial service (primary or non-primary), cargo service, reliever airports, or other general aviation airports.

SLB is classified by Federal Aviation Administration (FAA) as a general aviation airport. Over 2,500 airports are classified as general aviation airports nationwide. General aviation airports economically support local businesses, provide critical community access, allow for emergency response, and provide other specific aviation functions. In 2012, a study was completed by FAA in an effort to classify general aviation facilities titled General Aviation Airports: A National Asset. These airports have been broken down further by FAA as national, regional, local, basic or unclassified facilities within the NPIAS system.

SLB is classified as a local general aviation airport. There are 1,263 local general aviation airports in the national system.

> **Local Airports** are the backbone of our general aviation system with at least one local airport in virtually every state. They are typically located near larger population centers, but not necessarily in metropolitan or micropolitan areas. Local airports account for 38% of the general aviation airports eligible for Federal funding. They also account for 14.7% of the total NPIAS cost. Most of the flying is by piston aircraft in support of business and personal needs. In addition, these airports typically accommodate flight training, emergency services, and charter passenger service. The flying tends to be within a state or immediate region.

2.5.2. STATE SYSTEM PLAN

Each state is responsible for developing a more detailed system plan with development objectives. Iowa Department of Transportation (IADOT) Office of Aviation classifies airports as commercial service, enhanced service, general service, basic service, or local service airports. SLB is classified as a general service airport in the 2010 Iowa Aviation System Plan (SASP).

> **General Service Airport –** These airports have paved primary runways that are 4,000 feet long or greater. These airports can accommodate most general aviation aircraft including small to mid-size business jets, and they serve as a community economic asset. There are 31 general service airports in Iowa.

The SASP identifies projected airport development facility needs for each airport based on its classification. The SASP has identified the following anticipated needs for SLB: an expanded apron, additional tie-downs, additional T-hangars, and overnight hangar storage. Facility requirements will be discussed in further detail in **Chapter 4.0, Facility Requirements**.

2.6. AIRPORT MANAGEMENT

The Storm Lake Municipal Airport is owned and operated by the City of Storm Lake, the airport sponsor. The Assistant City Manager is in charge of managing the airport, while the fixed based operator (FBO) manages the day-to-day operations. The City of Storm Lake provides airport maintenance and upkeep. The Storm Lake City Council, in consultation with the Airport Commission, makes decisions on the management, budgeting, operations, maintenance, and development needs at SLB. The Airport Commission meets once a month and consists of five volunteer members who are appointed by the Mayor.

2.7. AVIATION ACTIVITY

Aviation activity provides a measurement of the number and type of based aircraft and operations at an airport facility. Existing airport operational data is important to provide baseline information to project future activity, which in turn identifies airport facility needs.

Data for non-towered general aviation airports tends to vary. The Airport Master Plan will attempt to provide realistic airport operational figures using an airport user survey and observations from the airport manager. The data below provides a general overview of airport activity at SLB based on existing published data.

2.7.1. BASED AIRCRAFT

Based aircraft are aircraft that are stored at an airport for the majority of the year. They are typically classified by type of aircraft, including single and multi-engine piston aircraft, jet, and ultralight aircraft.

Sources of historical and current based aircraft data include the FAA Terminal Area Forecast (TAF), Airport 5010 Master Record, SASP, as well as local verified records and counts. The FAA TAF does not break down the total number of based aircraft by aircraft type.

Table 2-2 shows current based aircraft estimates from existing sources. The number of based aircraft ranges from 20 to 38.

Table 2-2
Based Aircraft – Existing Sources

Source	Single Engine	Multi-Engine	Jets	Other	Total
FAA TAF (2013)*	N/A	N/A	N/A	N/A	33
FAA 5010 Report (2015)	19	0	1	0	20
SASP (2010)	37	0	1	0	38
Local Count (2015)	35	0	1	0	36

Source: FAA, IADOT Office of Aviation, City of Storm Lake; N/A = Not Available
* FAA TAF is updated in 2015, however 2013 is the most recent non-projected data in the TAF

Based on field inventory conducted by the City of Storm Lake in 2015, the confirmed number of based aircraft at SLB is 36.

2.7.2. AIRCRAFT OPERATIONS

An operation is classified as either a takeoff or a landing. Touch and go training operations count as two operations. Airport operations are typically split into local and itinerant operations. Local operations are defined in FAA's *Forecasting Activity by Airport* as "aircraft operating in the traffic pattern or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport." Itinerant operations are "aircraft operations other than local operations." Aircraft operations are also categorized by the use of the aircraft operating at the airport. Examples of this include commercial, general aviation, and military operations. Sources of historical and current airport operational data include the FAA TAF, Airport 5010 Master Record, and the SASP.

Table 2-3 lists the current airport operations estimates from existing sources.

Table 2-3
Annual Operations – Existing Sources

	Itinerant Operations				Local Operations		
Source	Air Carrier	Air Taxi	General Aviation	Military	General Aviation	Military	Total
FAA TAF (2013)*	0	0	11,139	0	8,461	0	19,600
FAA 5010 Report (2015)	0	0	11,139	0	8,461	0	19,600
SASP (2010)	N/A	N/A	N/A	N/A	N/A	0	13,300

Source: FAA, IADOT Office of Aeronautics; N/A = Not Applicable
* FAA TAF is updated in 2015, however 2013 is the most recent non-projected data in the TAF

The FAA TAF projects annual operations will stay stagnant through 2040 and the SASP forecasts a 1.28% annual growth rate through 2030.

2.8. AIRPORT DESIGN STANDARDS

FAA airport design standards are based on two key components. The first component is the critical aircraft family currently using the airport or proposed to use the airport at least 250 times per year within the next five years. The second component is based on the type of approach developed for each runway end. Both the critical aircraft and the approach type are discussed in the next two sections to determine the design standards to be followed when planning future development at SLB.

2.8.1. CRITICAL DESIGN AIRCRAFT

Airport Reference Code (ARC)

Development of the existing and future facilities at an airport relies upon the identification of the most demanding aircraft type currently utilizing or projected to utilize the airport. FAA defines the critical aircraft as an aircraft, or a family of aircraft, that are expected to conduct at least 500 annual itinerant operations at the airport (one takeoff and one landing is considered two operations).

The Airport Reference Code (ARC) translates the operational and physical characteristics of the aircraft intended to operate at the airport to FAA airport design criteria used at the airport. The ARC is based on three components. The first ARC component, depicted by a letter, is the *Aircraft Approach Category (AAC)* which correlates to aircraft approach speed (operational characteristics). The breakdown of each category can be seen in **Table 2-4**. The second and third components, depicted by a Roman numeral, are the *Airplane Design Group (ADG)* which relates to aircraft wingspan and tail height (physical characteristics). The physical characteristics for each group can be seen in **Table 2-5**.

Table 2-4
FAA Aircraft Approach Category (AAC)

Category	Approach Speed (knots)	Example Aircraft Type
A	< 91	Cessna 172, Piper Warrior
B	91 - < 121	Beech King Air, Cessna Citation I & II
C	121 - < 141	Learjet 35, Gulfstream 550, B-737
D	141 - < 166	B-757, B-747, B-777

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

Table 2-5
FAA Airplane Design Group (ADG)

Group	Wingspan (feet)	Tail Height (feet)	Example Aircraft Type
I	< 49	< 20	Beech Baron 58, Cessna 172
II	49 - < 79	20 - < 30	Beech King Air, Cessna Citation Series
III	79 - < 118	30 - < 45	B-737, DC-9, CRJ-900
IV	118 - < 171	45 - < 60	A-300, B-757, B-767
V	171 - < 197	60 - < 66	B-747, B-777
VI	197 - < 262	66 - < 80	Lockheed C-5A, A-380

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

According to FAA AC 150/5300-13A, *Airport Design*, the ARC does not restrict the type of aircraft that can safely use the airport; the ARC is for planning and design purposes only. The existing design standards at SLB follow ARC B-II standards.

Approach Reference Code (APRC) & Departure Reference Code (DPRC)

An Approach Reference Code (APRC) system is used to determine the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. An APRC identifies the operational capabilities of a runway using the ARC (AAC and ADG) with planned runway approach visibility minimums to establish design standards. Visibility minimums are expressed in Runway Visual Range (RVR) values, in feet, as defined in **Table 2-6**.

The Departure Reference Code (DPRC) describes the current operational capabilities of a runway and associated parallel taxiway with regard to takeoff operations. It is similar to the APRC and is composed of the ARC, but does not include visibility minimums. In addition, a runway may have more than one DPRC designation.

Table 2-6
Runway Visual Range (RVR) values

RVR (feet)	Approach Type	Visibility Minimums
VIS	Visual – no instrument approach	Not applicable
5000	Non-Precision Approach or Approach with Vertical Guidance	No lower than 1 mile
4000	Approach with Vertical Guidance	Lower than 1 mile but not lower than ¾ mile
2400	Precision Approach (Category I)	Lower than ¾ mile but not lower than ½ mile
1600	Precision Approach (Category II)	Lower than ½ mile but not lower than ¼ mile
1200	Precision Approach (Category III)	Lower than ¼ mile

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

The existing APRC for the Runway 17 and Runway 35 end is B-II-5000. The DPRC for both runway ends is B-II. The Runway 13/31 ends have an APRC of B-I-VIS and a DPRC of B-I. The Runway 6/24 ends have an APRC of A-I-VIS and a DPRC of A-I. Both the APRC and DPRC may change over time as improvements are made to each runway such as obtaining lower visibility minimums.

Runway Design Code (RDC)

The Runway Design Code (RDC) signifies the design standards to which the runway is to be built. The RDC is composed of the same three components as the APRC. However, the RDC is based on planned development for each runway and does not have any operational application for the current runway configuration as with the APRC and the DPRC. The RDC will be discussed in greater detail at the end of **Chapter 3.0, Aviation Forecasts**, to determine the runway design standards to be used for the critical aircraft proposed to use the airport over the next 20 years.

2.8.2. APPROACH TYPES

Instrument approach procedures provide arriving pilots with guidance to the airport runway during periods of low visibility. FAA publishes instrument approach procedures defining the horizontal and vertical flight path to land at an airport. Flight visibility and cloud ceiling height minimums are established for each instrument approach procedure based on available navigational aids, airspace obstructions, aircraft equipment, and pilot certification. Visual approaches to a runway have no instrument approach procedure nor do they require additional aircraft or ground equipment. There are three types of instrument approaches:

- Non-Precision Approach – A standard instrument approach procedure with horizontal guidance but no vertical descent guidance. Types of non-precision approaches include localizer, RNAV/GPS (area navigation/global positioning system), RNAV/RNP (area navigation/required navigation), NDB (non-directional beacon), and VOR/TVOR (very high frequency omni-directional range/terminal very high frequency omni-directional range). These type of approaches require additional equipment in the aircraft, but no additional ground-based equipment is needed.

- Approach with Vertical Guidance – An instrument approach procedure providing electronic course and vertical descent guidance. Additional aircraft equipment is typically required. These approaches can utilize ground-based navigational aids such as a glide slope or can be accomplished with only a satellite based navigational aid such as a Localizer Performance with Vertical Guidance (LPV).

- Precision Approach – An instrument approach procedure with both vertical descent guidance and horizontal guidance to the runway. These type of approaches utilize ground based equipment such as an Instrument Landing System (ILS).

Currently, Runway 17/35 has an RNAV (GPS) LPV approach procedure on the Runway 35 end. The Runway 17 end has an RNAV (GPS) approach, but does not have vertical guidance. Both ends have a visibility of one mile. In addition there is an NDB approach to the airport on both ends of Runway 17/35 with 1 mile visibility minimums. Runway 13/31 and Runway 6/24 have visual approaches to each runway end.

The nearest precision approach is available at the Spencer Municipal Airport (SPW) located 34 nautical miles north of SLB. The approach minimums are 200 foot cloud ceiling and 1/2 mile visibility. This approach is a good alternative if weather conditions are below instrument approach minimums at SLB. According to weather data, this occurs 3.63% of the time.

2.9. CLIMATE

Climate considerations for airport planning include wind, temperature, precipitation, cloud cover, and visibility. Iowa experiences a humid continental climate characterized by large seasonal temperature differences. This climate experiences frigid winters and warm summers. Precipitation is generally distributed year-round.

Wind data is important as it helps define runway orientation at an airport. Aircraft are designed to take off and land into the wind. Crosswinds and tailwinds can create a hazardous situation for pilots, particularly those flying smaller aircraft.

The National Climatic Data Center in Ashville, North Carolina collects wind data through an Automated Weather Observation System (AWOS) at the airport. FAA recommends ten years of wind data be collected at the airport site or the closest airport site where data is available. SLB has an AWOS on site that collects wind data. A photo of an AWOS is on the right side of the page. The analysis below includes hourly wind direction and speed observations for the period from January 1, 2003 through December 31, 2012.

The existing wind coverage for the primary runway at SLB is summarized in **Table 2-7**. FAA recommends a primary runway orientation provide 95% wind coverage. When this is not achieved, a crosswind runway may be needed. The allowable crosswind component per RDC is 10.5 knots for RDC A-I; 13 knots for RDC A-II and B-

II; 16 knots for RDC A-III, B-III, C-I through C-III, and D-I through D-III; and 20 knots for RDC A-IV and B-IV, C-IV through C-VI, D-IV through D-VI and E-I through E-VI. The allowable crosswind component at SLB is 13 knots for RDC B-II.

Table 2-7
Wind Coverage

All Weather Wind Coverage				
Crosswind Component	**Runway 17/35**	**Runway 13/31**	**Runway 6/24**	**Combined**
10.5 knots	85.19%	83.28%	83.36%	99.20%
13 knots	91.55%	90.11%	74.36%	99.84%
Instrument Flight Rules Wind Coverage				
Crosswind Component	**Runway 17/35**	**Runway 13/31**	**Runway 6/24**	**Combined**
10.5 knots	79.31%	76.88%	70.89%	98.90%
13 knots	87.49%	85.16%	80.94%	99.81%

Source: National Climatic Data Center for Storm Lake, IA (2006-2015)

The 95% wind coverage is not achieved for aircraft within the B-II, A-II or smaller categories. However, with the addition of the crosswind runways, the 95% wind coverage is achieved. This information will be further evaluated in **Chapter 4.0, Facility Requirements**. Instrument Meteorological Conditions occur approximately 13% of the time at SLB.

Temperature is important in determining required runway length. Warm temperatures cause the air to become less dense, thus requiring aircraft to use more runway length for takeoff. Precipitation also causes contamination of the runway leading to longer runway lengths being required. Cloud cover and visibility influence the need for navigational aids and approach procedures to runways.

The mean maximum temperature in the hottest month, July, is 83 degrees Fahrenheit. Average total annual precipitation is 34.61 inches, with a maximum of 5.6 inches in June. Average annual snowfall is 37 inches.

2.10. AIRSIDE FACILITIES

The airside facilities are airport features that support aircraft operations. These include runways, taxiways, aprons, navigational aids, and visual aids. **Figure 2-3**, at the end of this chapter, depicts existing facilities at the Storm Lake Airport (SLB).

2.10.1. RUNWAYS

There are three different runways at SLB. These are Runway 17/35, Runway 13/31, and a turf Runway 6/24.

Runway 17/35

Runway 17/35 is the primary runway at the airport. This runway is 5,002 feet in length, 75 feet in width, and is concrete. Runway 17/35 is marked with non-precision runway markings delineating the centerline and each threshold. The runway is lit with Medium

Intensity Runway Lights (MIRLs) for better visibility of the pavement edge during night operations or times of inclement weather. There are also runway end identifier lights (REILs) on the Runway 17 end. The runway is relatively flat with an effective gradient, (a measure of elevation change), of 0.59%.

The pavement strength is 30,000 pounds or less in a single-wheel landing gear configuration or 38,000 for a double-wheel landing gear configuration. A runway with this pavement strength is considered a non-utility runway.

The runway is designed to B-II-5000 standards. This signifies the current operation capability of accommodating aircraft with approach speeds up to 121 knots, wingspans up to 79 feet, and runway approach minimums not lower than 1 mile. A picture of Runway 17/35 can be seen on the right side of this page. This runway has GPS and NDB approach procedures to Runway 17 and Runway 35.

Runway 13/31

The other concrete runway is Runway 13/31. At 3,035 feet in length and 50 feet in width, this runway does not intersect Runway 17/35. There is currently a 165-foot displaced threshold on the Runway 13 end because there was not adequate clearance of the approach surface over State Highway 110. A displaced threshold requires pilots landing on Runway 13 to touch-down after the displaced threshold markings to provide the appropriate clearance when flying over State Highway 110. Since the construction of the displaced threshold, standards for the approach/departure surfaces have changed. The clearance over State Highway 100 will be reevaluated in **Chapter 4.0, Facility Requirements**.

This runway has a gradient of 0.3% down on the Runway 13 end and a gradient of 0.4% up in the Runway 31 end. The published weight bearing capacity of this pavement is 4,000 pounds or less for a single-wheel landing gear configuration. This runway is also equipped with MIRLs for runway visibility, night operations, and weather. The runway is designed to B-I-VIS standards. This signifies the current operation capacity of accommodating aircraft with approach speeds up to 121 knots, wingspans up to 49 feet, and visual approaches.

Runway 6/24

Runway 6/24 is turf and is the only runway that is seasonal on the field. The runway is closed November through March, and is 1,962 feet in length and 95 feet in width. The edge of the runway is marked with yellow cones. The runway intersects both Runway 17/35 and Runway 13/31.

2.10.2. AIRPORT VISUAL AIDS

Airport visual aids are important features that provide airport visual references to pilots, especially during low visibility or night operations. The various visual aids available at SLB are summarized below:

Rotating Beacon: A rotating beacon identifies the location of an airport facility to pilots in the air. Most civilian general aviation airports alternate white and green lights from dusk until dawn, and during instrument flight rules (IFR) conditions. The rotating beacon is located north of Runway 13/31 near the building area and airport parking (see **Figure 2-3** at the end of the chapter). A picture of the rotating beacon is located on the right side of this page.

Runway Edge and Threshold Lighting: Runway edge and threshold lights are installed to outline the edges of runways in low-light and restricted visibility conditions. White/amber lights identify the runway edge, while red/green lights identify the runway threshold at each end. Runway lighting systems have three different intensity levels;

low, medium, and high depending on the classification of the runway. SLB has medium intensity runway lighting (MIRL) installed along Runways 17/35 and 13/31. The lights are stake-mounted and are currently in good condition.

Taxiway Edge Lighting/Marking: Taxiway edge lights or markers outline the edges of taxiways. Taxiway lights are blue and have low and medium intensity systems available. Retro-reflective markers, using reflective blue tape mounted on a pole, may be used in lieu of taxiway lighting as a low cost alternative. SLB has taxiway edge lighting installed along the connecting taxiways. The taxiway lights are currently in good condition.

Runway Markings: Runway markings are installed for visual identification of a paved runway during all weather conditions. Markings vary in complexity based on the type of approach for a runway; visual, non-precision instrument, and precision instrument. Runway 17/35 has non-precision runway markings delineating the runway centerline and threshold, while Runway 13/31 has basic, visual approach markings. The runway markings are currently in good condition.

Guidance Signs: Guidance signs provide location, direction, and guidance information to pilots. Mandatory signs are to be placed at intersections with runways to indicate critical holding areas. Guidance signs have been installed at SLB. The signs are in good condition. A picture of a guidance sign is located on the right side of this page.

Runway End Identifier Lights (REILs): REILs are installed to provide rapid and positive identification of the approach end of a runway during night and low visibility conditions. The REILs system consists of two synchronized flashing white strobe lights, located laterally on each side of the runway facing the approach path. SLB has REILs installed at the end of Runway 17.

Visual Glide Slope Indicators (VGSI): VGSI provide vertical guidance to the runway to ensure the proper glide path is maintained for landing. Short Approach Visual Approach Slope Indicator (SVASI), Visual Approach Slope Indicator (VASI), and Precision Approach Path Indicator (PAPI) lights are types of visual aids installed to provide guidance information. SLB has a two-box PAPI system installed on each end of Runway 17/35 (see **Figure 2-3**).

2.10.3. NAVIGATIONAL AIDS

Instrument navigation aids are satellite or ground based equipment established to provide pilots with critical guidance information to the airport environment. With the proper equipment and procedures developed, pilots can use the instrument navigational aids for horizontal and/or vertical guidance to a waypoint or a runway. Navigational aids include:

Very-high frequency Omni-directional Range (VOR): Ground-based facilities that provide distance and radial information used for non-precision en-route and terminal navigation. A VOR station is located near SLB in Spencer, IA. This facility also has Distance Measuring Equipment (DME) to provide distance information to pilots.

Instrument Landing System (ILS): Ground-based facilities (Localizer Antenna, Glide Slope Antenna) that provide distance, horizontal, and vertical guidance information to runway ends where installed. The closest runway with an ILS is located at Spencer Municipal Airport (SPW), 34 nautical miles north of SLB.

Global Positioning System (GPS): Equipment and satellites that enable pilots to navigate to a waypoint without the need for primary ground-based equipment. GPS provides horizontal guidance, but can also provide vertical guidance for instrument approaches with published procedures. GPS with vertical guidance is called Localizer Performance with Vertical Guidance (LPV) procedures. A GPS approach procedure to Runway 17 and 35 has been developed for SLB. Both approaches have LPV capability.

Non-Directional Beacon (NDB): Ground-based facilities that provide horizontal directional guidance to a runway end. SLB has a non-directional beacon (NDB) approach for each end of Runway 17/35. The three NDB antennas are located west of the Runway 17 end. NDBs are currently being decommissioned by FAA in lieu of GPS navigation.

2.10.4. METEOROLOGICAL FACILITIES

Timely weather information is important to the safety of aircraft operations. Pilots can obtain weather information at SLB from the following sources:

Wind Cone: The wind cone is used to indicate wind direction at the airport. The wind cone is located east of Runway 17/35 and southwest of Runway 13/31 near the mid-point of the runway. The wind cone is visible to pilots from either runway end (see **Figure 2-3**). A picture of the wind cone can be seen on the right side of the page.

Automated Weather Observation System (AWOS): An AWOS measures critical meteorological data on-site at airports including wind speed, wind direction, temperature, dew point, cloud coverage and ceiling, visibility, precipitation, and barometric pressure. SLB has an AWOS-3 facility on-site east of the Runway 17/35 midpoint (see **Figure 2-3**). AWOS weather information is communicated to pilots on a frequency, online, and over a dedicated phone line.

2.10.5. TAXIWAYS AND TAXILANES

A taxiway system at an airport provides access to and from the runways, aircraft apron, and hangar facilities. Taxiways are constructed for safety purposes to expedite the flow of departing and arriving aircraft from the runway. A taxiway system consists of parallel taxiways and/or connecting taxiways.

There is no parallel taxiway for either Runway 17/35, Runway 13/31, or the turf Runway 6/24. There is a connector taxiway which connects Runway 17/35, through Runway 13/31, to the building area (see **Figure 2-3**). There are hold lines located on the connector taxiway 200 feet from each runway centerline. This is to ensure aircraft waiting to use the runways are holding far enough back for safe takeoffs and landings to occur. There are Medium Intensity Taxiway Lights (MITL) located at the runway and taxiway intersections.

The turnaround on the Runway 35 end allows aircraft to turn around after taxiing either to the end of the runway for takeoff or back towards the building area after landing. Because there is not a parallel taxiway for pilots to use, the turnaround gives the pilots a safe place to change direction. There are turnarounds on both ends of Runway 13/31 that can be used for aircraft to turn around, however, they are too small for pilots to hold there while other aircraft are using the runway.

Taxilanes are used within the building area to provide access from the apron to the hangars. The existing taxilanes are 20 feet wide.

2.10.6. APRON

The aircraft apron provides an area for aircraft parking, aircraft storage, aircraft movements, fueling operations, and access to the A/D building and other hangars. The existing apron is approximately 10,561 square yards and is located to the northeast of the primary runway (see **Figure 2-3** at the end of this chapter). The apron was reconstructed in 1978 and 1997. There are six in-pavement tie-downs along the south edge of the apron available for aircraft parking. A picture of the apron can be seen on the right side of the page.

2.10.7. PAVEMENT CONDITION

In order to continue to receive federal funding, all airports must implement a pavement maintenance program for any pavement constructed or repaired with federal money. The Iowa DOT Office of Aviation helps airports with this grant assurance by having a research company prepare pavement evaluation reports. All airports within the state are evaluated on a three year cycle. An evaluation update was completed for SLB in April 2016. The evaluation report identifies the Pavement Condition Index (PCI) for each pavement section at the airport. The rating is used to identify pavement improvement needs based on FAA AC 150/5380, Guidelines and Procedures for Maintenance of Airport Pavements, and American Society for Testing and Materials (ASTM) D5340. The pavement ratings are shown in **Table 2-8**.

Table 2-8
PCI Ratings

PCI Rating	Color Code	Work Repair Levels
81 – 100		Preventive Maintenance
66 – 80		
51 – 65		Major Rehabilitation
41 – 50		
0 – 40		Reconstruction

Source: Storm Lake Municipal Airport Pavement Management Report 2010

Periodic pavement rehabilitation projects have been completed at the airport in recent years. **Table 2-9** summarizes the PCI rating for each major pavement section at SLB. These areas are graphically represented in **Figure 2-4** at the end of this chapter.

Table 2-9
Pavement Condition

Pavement Area	Last Construction Date(s)	2016 PCI
Runway 17/35	1978	83/91
Runway 13/31	1971	89
Apron	1978/1997	71/86
Connector Taxiway	1978/1981	75/83
Runway 17/35 Turnaround	1978	94

Source: SLB Pavement Management System (2012), IA/DOT Office of Aviation

All of the pavement at SLB is in good to excellent condition. Continued maintenance of the pavement at the airport is important and part of the FAA grant assurances for the airport.

2.11. LANDSIDE FACILITIES

2.11.1. ARRIVAL/DEPARTURE (A/D) BUILDING

An Arrival/Departure (A/D) building is utilized at a general aviation airport to provide an area for local and transient pilots and passengers to transition to and from the aircraft operations area. The A/D building at SLB was constructed in 1990, see photo on the right side of the page. The building is approximately 2,040 square feet in size. Facilities include restrooms, conference room, office, lounge space for local and transient pilots, and computer access for flight planning. The building is located in close proximity to the hangar and apron area (see **Figure 2-5**, at the end of this chapter, for a detailed layout of the building area).

2.11.2. AUTOMOBILE ACCESS & PARKING

The primary airport access road is located off of State Highway 110. The access road is a concrete surface. There is no controlled access to the airport.

The airport automobile parking lot is paved and has 48 automobile parking stalls in immediate proximity to the A/D building (see **Figure 2-5**). The parking lot is commonly used by airport business employees, visitors, and transient passengers. Airport tenants commonly park their vehicle adjacent to their aircraft storage hangar.

2.11.3. AIRCRAFT STORAGE

Aircraft storage hangars provide indoor storage for aircraft and aircraft tie-downs provide outdoor storage. Hangar facilities at SLB are located on the north side of the apron. Subsequent hangar buildings have been constructed north and northeast of the A/D building and apron area. There are two 6-unit T-hangars and one 7-unit T-hangar at SLB, see photo on the right side of the page. Also, there are 3 private hangars and one public hangar. All enclosed storage spaces are full. In addition to hangar/covered storage, there are six tie-downs available on the apron for outside storage (see-**Figure 2-5**). There are a total of 31 hangar parking spaces available at the airport for based aircraft and visiting pilots.

2.11.4. AIRPORT FUEL SYSTEM

The City of Storm Lake owns and operates the airport fuel facility located on the apron next to the A/D building (see **Figure 2-5**, and the photo on the right side of the page). The facility includes one 12,000 gallon 100LL (100 low lead) below ground fuel tank. The fuel tank is in good condition. There is also a 12,000 gallon below ground Jet A fuel tank. A credit card reader allows for 24-hour self-fueling operations. In the time period of April 1, 2014 to March 31, 2015, 22,410.59 gallons of 100LL and 46,063.51 gallons of Jet A were dispensed.

2.11.5. FIXED BASE OPERATOR (FBO) & OTHER AIRPORT BUSINESSES

A common airport tenant is a fixed based operator (FBO). An FBO is a commercial business providing one or more aviation-related services to the general flying public. Examples of these services include aircraft maintenance, flight instruction, charter services, aircraft fueling, aircraft parking, and hangar storage. Other airport tenants may include aviation related businesses that provide more specialized aeronautical services.

There is an FBO located at SLB. The FBO provides aircraft parts, engine overhauls, aircraft rental, airframe maintenance, flight training, and line services to the people at the airport. The City of Storm Lake has a contract with the FBO to provide field maintenance, fuel services, and greet visitors flying into SLB.

2.11.6. AIRPORT MAINTENANCE

The City of Storm Lake contracts day-to-day operations to the local FBO who is responsible for monitoring the condition of the airport. The FBO coordinates with City staff as needed for snow removal or grass mowing, building repairs, periodic minor pavement repairs, and overall maintenance of the airfield.

Airport maintenance equipment storage is located off-site in the City equipment buildings. The City owns dedicated airport snow removal equipment consisting of a tractor with plow and snow blower.

2.11.7. UTILITIES & DRAINAGE

The Storm Lake Municipal Airport is not connected to City sewer and water. Electrical and natural gas service is available at all buildings at the airport. Telephone and internet service is also available from local phone, cable, and satellite companies.

SLB has a high ridge that transitions the airport from northwest to southeast. The drainage to the west of the ridge flows through drainage ditches to existing waterways in adjacent fields. The drainage on the west flows through both drainage ditches and storm sewer pipes. There is a county drainage district tile which runs through the airport property as well. The storm sewer system on the east drainage basin is discharged into the county tile.

During severe rainfall, or after multiple rain events, there are areas on the airport where standing water occurs. The taxiway from the apron to Runway 13/31 has a county tile running underneath the pavement. There is an intake on the tile to the north of the taxiway. During large storm events, this intake will back up and create standing water in the grass adjacent to the taxiway. In the past, water has overtopped the taxiway during major storm events.

Standing water will also occur west of Runway 13/31 and north of Runway 6/24 after several storm events or during a saturated soil condition. The intake in this area which is connected to the county drain tile will back up and create standing water. This is caused due to the county tile restricting outlet flows to reduce downstream erosion.

2.11.8. FENCING & SECURITY

Airport fencing is installed to deter or prevent unauthorized access by persons or vehicles onto airport property, as well as define outer airport property boundaries. Fencing is also installed for wildlife protection. The existing airport property is fenced near the automobile parking lot. Access from the parking lot to the airfield is uncontrolled.

2.11.9. AIRPORT PROPERTY

Airport property consists of 249.28 acres, owned in fee title by the City of Storm Lake. The City has also acquired 43.88 acres in easement within the runway protection zones and primary surfaces of the runways to protect airport airspace and land use compatibility interests. See **Figure 2-3** at the end of this chapter.

2.12. SURROUNDING LAND USE AND ZONING

Adjacent land use considerations are important in this Master Plan from two perspectives. First, the evaluation of airport improvement alternatives needs to consider existing and future neighboring land uses. Second, development in the vicinity of the airport must meet airport compatibility standards and aviation safety restrictions to protect both the people on the ground and the people in the air.

2.12.1. LAND USE AND GENERAL ZONING INFORMATION

Figure 2-6, at the end of this chapter, provides aerial imagery and depicts general land use zoning information for the airport and surrounding areas. This information was provided by ESRI, Buena Vista County, and Iowa DOT. It can be seen that the area around the airport and south of the City is zoned for agricultural purposes. The Future Land Use Map in the 2009 Buena Vista County Comprehensive Plan shows the area around the airport will remain agricultural land. It is recommended that coordination continue between the City of Storm Lake and Buena Vista County to ensure compatible land uses remain in the areas near the airport.

2.12.2. AIRPORT ZONING

Iowa Code Chapter 329 enables municipalities with airports to adopt, administer, and enforce zoning regulations to prevent airport-related hazards. Under this authority, the City of Storm Lake has adopted Special and Overlay Districts in Article 5 of the Storm Lake Zoning Code. The Airport Zoning Regulations apply overlay zones around the airport to protect people on the ground and the pilots and passengers in the air from incompatible land uses around the airport.

The overlay zones can be seen in **Figure 2-6** at the end of this chapter. Information on the individual zones is provided below:

- **Approach Zone** – intended to provide clear airspace along the approach surface to the runway ends. Clearance heights along the approach surface vary depending on the type of approach to each runway end. The clearance height becomes less restrictive the farther it is from the runway end.
- **Control Zone** – a circular area of airspace extending upward from the ground which is usually five miles in radius. This area has extensions for approach and departure paths.

- **Transitional Zone** – includes those areas that are parallel to the runway pavement and extend upward from the edge of the primary surface and approach surface at a slope of 7:1.
- **Horizontal Zone** – elliptical in shape, the zone protects structures from penetrating a 150-foot ceiling above the airport elevation.
- **Conical Zone** – this area is the outermost zone and has the least number of land use restrictions. The zone begins at the edge of the horizontal overlay and is 4,000 feet in width.

2.13. RADIO CONTROL AIRCRAFT AREA

There is currently an area designated at the airport for radio control aircraft to operate. The area is located east of the existing apron (see Sheet 9 of the Airport Layout Plan in **Appendix B**). There are two grass takeoff areas in this location for the radio control aircraft. Each takeoff area is approximately 300 feet long.

The radio control club is active at SLB. The club meets every Sunday afternoon (outside of winter conditions), to fly their radio control aircraft. This has been an accepted practice by the City of Storm Lake and the people who regularly use SLB.

The radio control aircraft use is for non-commercial hobby use only. The airport is notified of any activity occurring in this area and all current operators of radio control aircraft are pilots.

2.14. ENVIRONMENTAL OVERVIEW

The purpose of this section is to provide a general overview of environmental features which should be considered in the future development of the airport. The intent is not to perform detailed analysis, but rather to assemble readily available information in a systematic manner. More comprehensive environmental analysis would be performed during the National Environmental Policy Act (NEPA) process when a future project becomes justified and triggers this type of review.

Following FAA guidance, the discussion of existing environmental conditions and considerations are provided in the following sections. **Figures 2-7**, at the end of this chapter, depict environmental considerations in and around SLB.

2.14.1. AIR QUALITY CLASSIFICATION

The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) for six pollutants (particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead) termed “criteria pollutants.” There are no non-attainment areas in Buena Vista County. General conformity regulations do not apply to a Federal action in an area that is designated attainment for all six criteria pollutants.

2.14.2. AQUATIC CONCERNS

Airport Drainage

Overall patterns on and in the vicinity of the airport are depicted on **Figure 2-7**, at the end of this chapter. It can be seen that stormwater flows overland to multiple drainage ways which flow away from airport pavements. The eastern portion of the airport drains east and south ultimately to Boyer Creek approximately one mile east of the southern end of Runway 35. The western portion drains west and south to a ditch which flows into Boyer Creek approximately 4.5 miles southeast of the southern end of Runway 17/35. Boyer Creek flows then into the Boyer River approximately 1.5 miles further south. The

Boyer River is ultimately a tributary to the Missouri River which flows approximately 60 miles to the southwest of SLB.

Rivers

As referenced above, airport stormwater drains ultimately to Boyer Creek, which then becomes a tributary to the Boyer River. Boyer Creek is not identified as an impaired water by the Iowa Department of Natural Resources (IA DNR). The Boyer River is not identified as impaired until a point approximately 50 miles southwest of confluence between Boyer Creek and the Boyer River "as the crow flies."

Wetlands

The Clean Water Act affords protection for wetlands by the U.S. Army Corps of Engineers under Section 404 and by the Iowa Department of Natural Resources by Section 401 of the Clean Water Act. Construction, excavation, or filling of wetland habitats may require permit approval, and possibly mitigation of wetland impacts, from both agencies.

Wetlands can often be a significant issue for municipal airport planning and development. The National Wetlands Inventory (NWI) is compiled and maintained by the US Fish and Wildlife Service. This mapping is based on "desktop" information rather than field investigation. As can be seen on **Figure 2-7**, there are no NWI wetlands on the airport and only very limited NWI wetland areas in the vicinity of the airport. While it is unlikely that wetland impacts will represent a significant concern in planning and implementing improvement projects at projects SLB, wetland field review may be required on a project by project basis.

Floodplains

Floodplains are defined in Executive Order 11988, *Floodplain Management*, as:

> "…the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands; including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year."

This definition refers to any area that would be inundated with floodwaters from a 100-year flood. To meet Executive Order 11988, federally approved actions must avoid the floodplain, if a practicable alternative exists. If no practicable alternative exists, actions in a floodplain must be designed to minimize adverse impact to the floodplain's natural and beneficial values. The design must also minimize the potential risks for flood-related property loss and impacts on human safety, health, and welfare.

The airport and its vicinity have not been studied by the Federal Emergency Management Administration (FEMA) to determine floodplain mapping. However, given the terrain and surface waters in the larger project area, it is unlikely that SLB lies within the 100-year floodplain as defined by FEMA.

2.14.3. TERRESTRIAL CONCERNS

Soils

Table 2-10 summarizes soils information for the airport area based on the US Department of Agriculture Natural Resource Conservation Service (NRCS) Web Soil Survey.

Table 2-10
Soils Information

Soil Classification and General Characteristics	Hydrologic Rating	Approximate Percentage of Airport Area
Sac silty clay loam, loam substratum, 2 to 5 percent slopes	C	15
Primghar silty clay loam, 0 to 2 percent slopes	C/D	35
Primghar silty clay loam, 2 to 4 percent slopes	C/D	10
Marcus silty clay loam, 0 to 2 percent slopes	C/D	10
Galva silty clay loam, 2 to 5 percent slopes	C	30

Within the NRCS soils classification system, there are four hydrologic ratings, A through D. Group A soils have the highest infiltration rates, and Group D soils have the lowest infiltration rates. If a soil is assigned to a dual hydrologic group (such as C/D in **Table 2-10**), the first letter is for drained areas (typically with tile systems), and the second is for undrained areas. Without further investigation, it is not known if portions of the airport area are drained in this manner or not.

In general, it can be seen that the soils in the airport area are poorly drained to very poorly drained. This could make stormwater management through infiltration measures challenging.

Prime and Unique Farmlands

The Farmland Protection Policy Act (FPPA) of 1984 (7 USC 4201-4209) as amended, creates the statutory framework for considering important farmlands in Federal decisions. Important farmlands include all pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, statewide, or locally important lands. Using the Farmland Conversion Impact Rating Form (AD-1006), coordination with the local office of the Natural Resource Conservation Service (NRCS) is required to assess the potential significance of farmland impacts. The FAA makes the final determination whether farmland impacts from airport improvement projects are acceptable or not using the AD-1006 form coordination referenced above.

Based on NRCS Web Soil Survey information, most or all of the farmland in the vicinity of the airport is classified as "prime farmland." As defined by the US Department of Agriculture, this is land "that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses."

Contaminated Areas

Federal, State, and local laws regulate hazardous materials use, storage, transport, or disposal. These laws may extend liability to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources.

In reviewing the web-based Contaminated Sites database ("Facility Explorer") maintained by the Iowa Department of Natural Resources (DNR), there are no known leak, spill, waste disposal or other potentially contaminated sites which would be of significant concern when considering improvement projects at SLB.

Habitat-Endangered/Threatened Species

The US Fish and Wildlife Service compiles a list of federally protected species organized by county within the US. The species identified for Buena Vista County, along with their habitat as described by USFWS are summarized in **Table 2-11**.

Table 2-11
Federally Protected Species in Buena Vista County

Species	Habitat
Northern long-eared bat (*Myotis septentrionalis*) Status: Proposed by USFWS for Endangered	Summer habitat include live and dead trees underneath bark, in cavities, or in crevices. Use tree species based on suitability to retain bark or otherwise provide cavities or crevices. Winter habitat for hibernation is in caves and mines.
Topeka shiner (*Notropis topeka*) Status: Endangered	Prairie streams and rivers.
Prairie bush clover (*Lespendeza leptostachya*) Status: Threatened	Dry to mesic prairies with gravelly soil.
Western prairie fringed orchid (*Platanthera praeclara*) Status: Threatened	Wet prairies and sedge meadows.

Based on the information provided above, it appears unlikely that development projects at the airport would have significant impacts to federally protected species, assuming proper design in accordance with applicable regulatory requirements. However further review and coordination with appropriate agencies would be required as part of the NEPA review process for future projects.

2.14.4. CULTURAL RESOURCES

Residential Areas and Civic Features

As can be seen on **Figure 2-7**, SLB is approximately ¾ mile south of the Storm Lake city limits. The airport is completely surrounded by farmland, including farmsteads. The closest non-agricultural residences are approximately one mile to the northeast. These are year-round lake homes along the shore of Storm Lake. The closest residential development within the City of Storm Lake is approximately 1.6 miles directly north of the airport. All Saints Episcopal Church is approximately 1.3 miles directly north of the airport. The closest recreational park to SLB is South Cove Park approximately one mile to the east-northeast. This is a three-acre Buena Vista County Park which is on Storm Lake and contains a picnic shelter and playground equipment.

Historic and Archeological

Based on a review of public access records maintained by the Iowa Office of the State Archeologist, there are no known archaeological sites or historic standing structures on or near SLB which could be impacted by airport development projects. However, further literature review and/or field investigation for cultural resources may be required on a project-by-project basis.

2.14.5. ENVIRONMENTAL SUMMARY FOR ALTERNATIVES EVALUATION

Based on the review summarized under the preceding headings, there are no known notable environmental constraints which need to be accounted for in alternative evaluations as part of this master planning process. The airport is surrounded by prime farmland; however this is not anticipated to be a substantial constraint relative to meeting the purpose and need for individual projects as determined by FAA.

2.15. RECYCLING PLAN

In 2014, a memorandum was published by FAA to provide guidance on preparing airport recycling, reuse, and waste reduction plans. Recycling is an opportunity to reduce the amount of waste disposed of in a landfill. This guidance does not addresses hazardous waste, universal waste, or industrial waste. This section of the Airport Master Plan covers the landfill waste at the airport.

There are currently recycling bins in the Arrival/Departure Building for aluminum, paper products, glass, plastics, and cardboard. This type of material is accepted by both the City of Storm Lake and Buena Vista County. Yard debris such as grass and brush are also accepted for Buena Vista County.

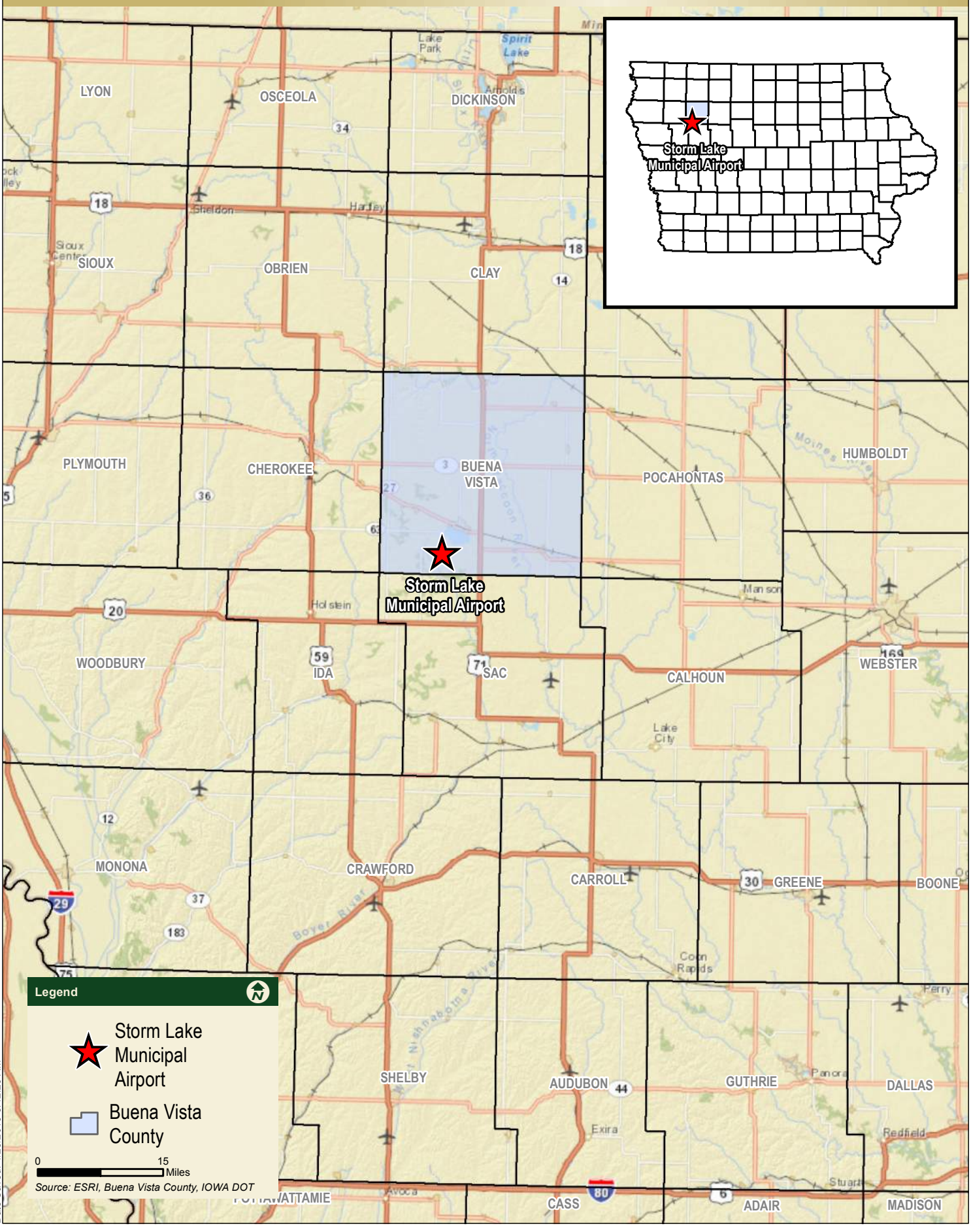
Additional aviation oil, fuel, or other hazardous waste is disposed of properly by the Fixed Base Operator at the airport.

Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-1

Airport Vicinity Map



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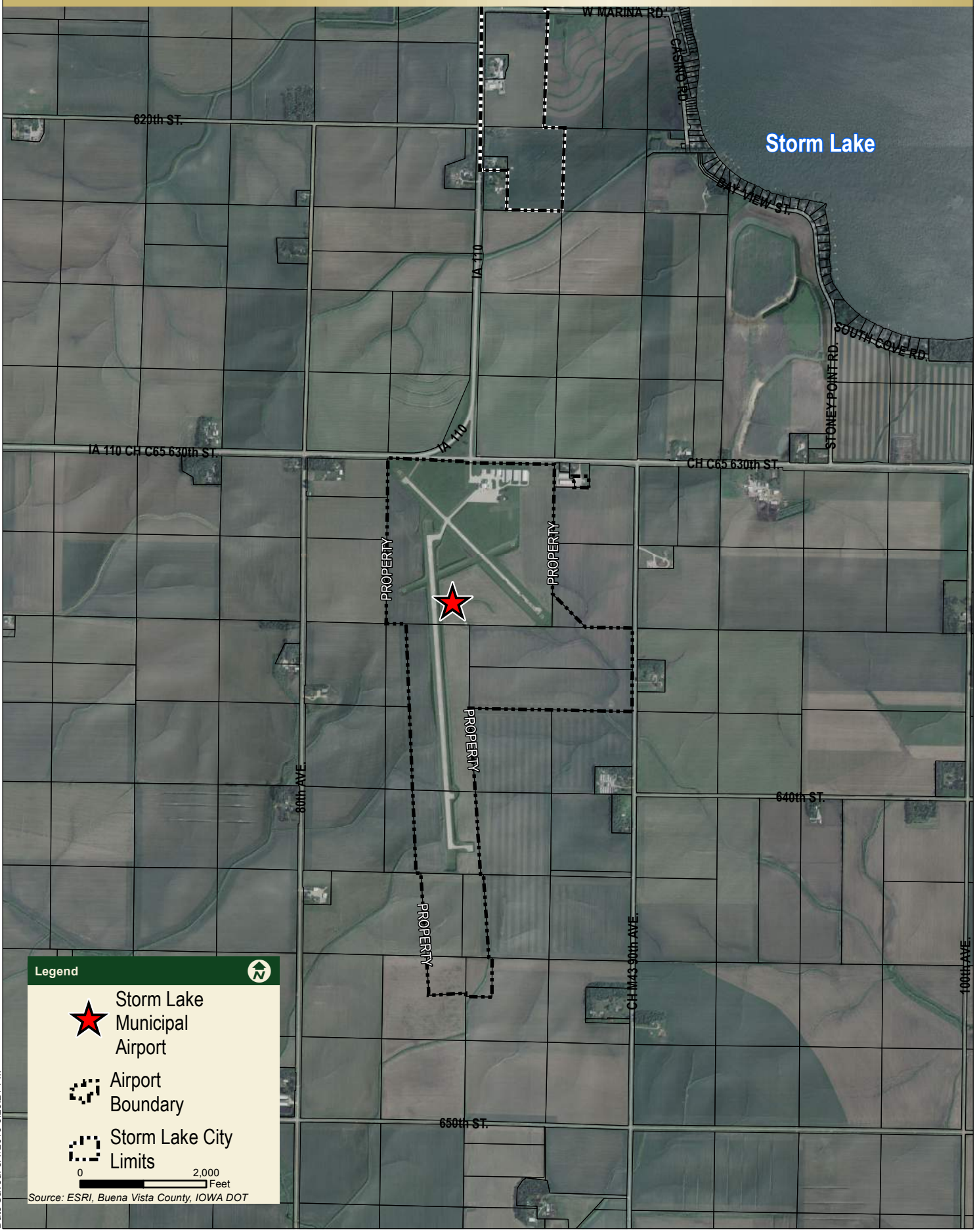
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-2

Airport Location Map



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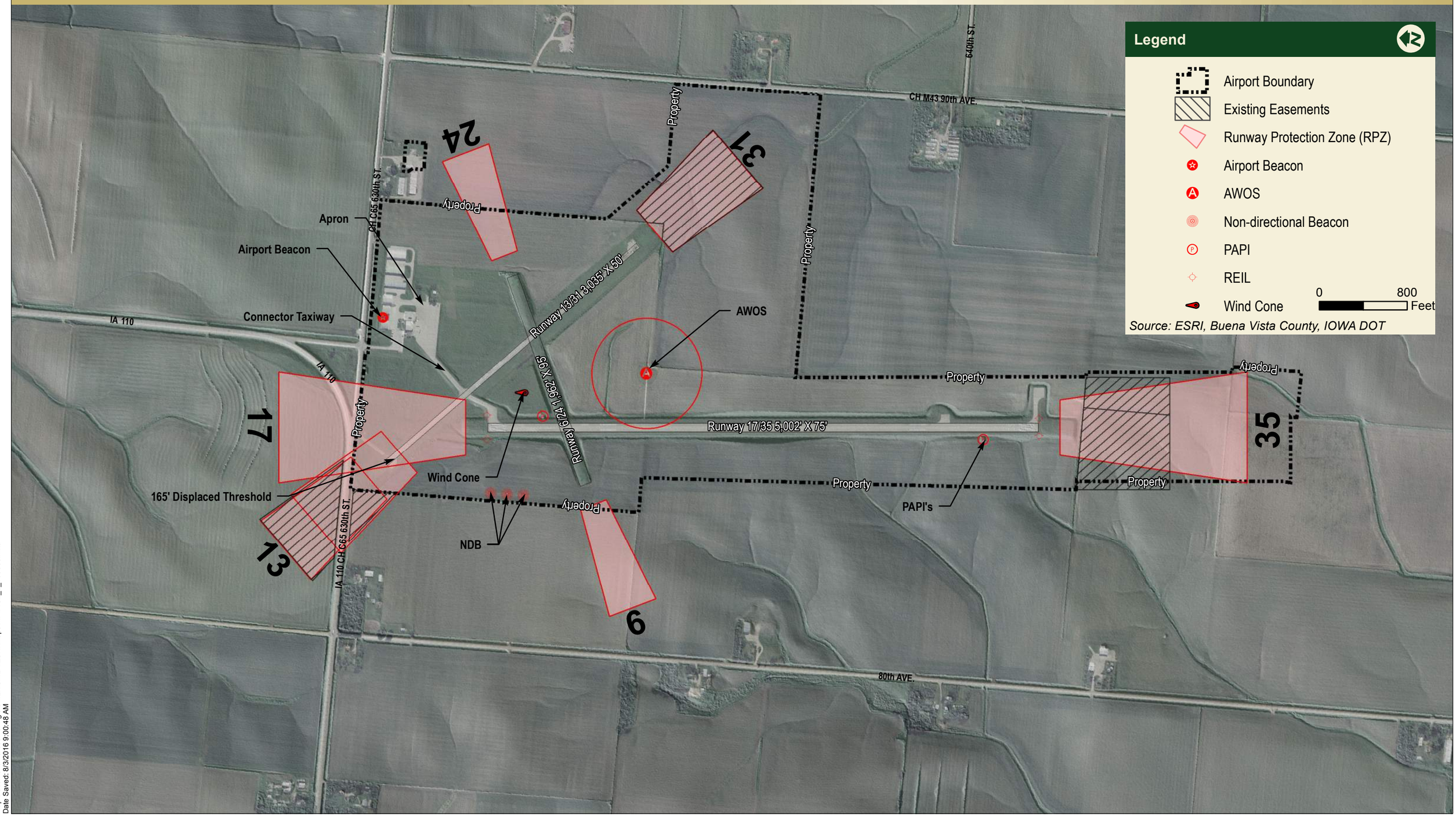
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-3

Existing Airport Layout



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Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-4

2016 Pavement Condition Index (PCI) Rating

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Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-5

Existing Building Area

IA 110

IA 110

BRL 20'

165' Displaced Threshold

Runway 13/31 3,035' X 50'

Runway 17/35 5,002' X 75'

Runway 6/24 1,962' X 95'

Airport/Access Road

PROPERTY

PROPERTY

PROPERTY

PROPERTY

PROPERTY

Private Hangars

T-Hangar

T-Hangar

T-Hangar

Auto Parking

Airport Beacon

A/D Building

FBO Hangar

Apron

Radio Control Aircraft Operations

Connector Taxiway

Wind Cone

BRL 20'

BRL 20'

BRL 20'

BRL 20'

BRL 20'

BRL 20'

Legend

- Runway Protection Zone (RPZ)
- Building Restriction Line (BRL)
- Beacon
- Wind Cone
- Runway Visibility Zone (RVZ)

0 200 Feet

Source: ESRI, Buena Vista County, IOWA DOT

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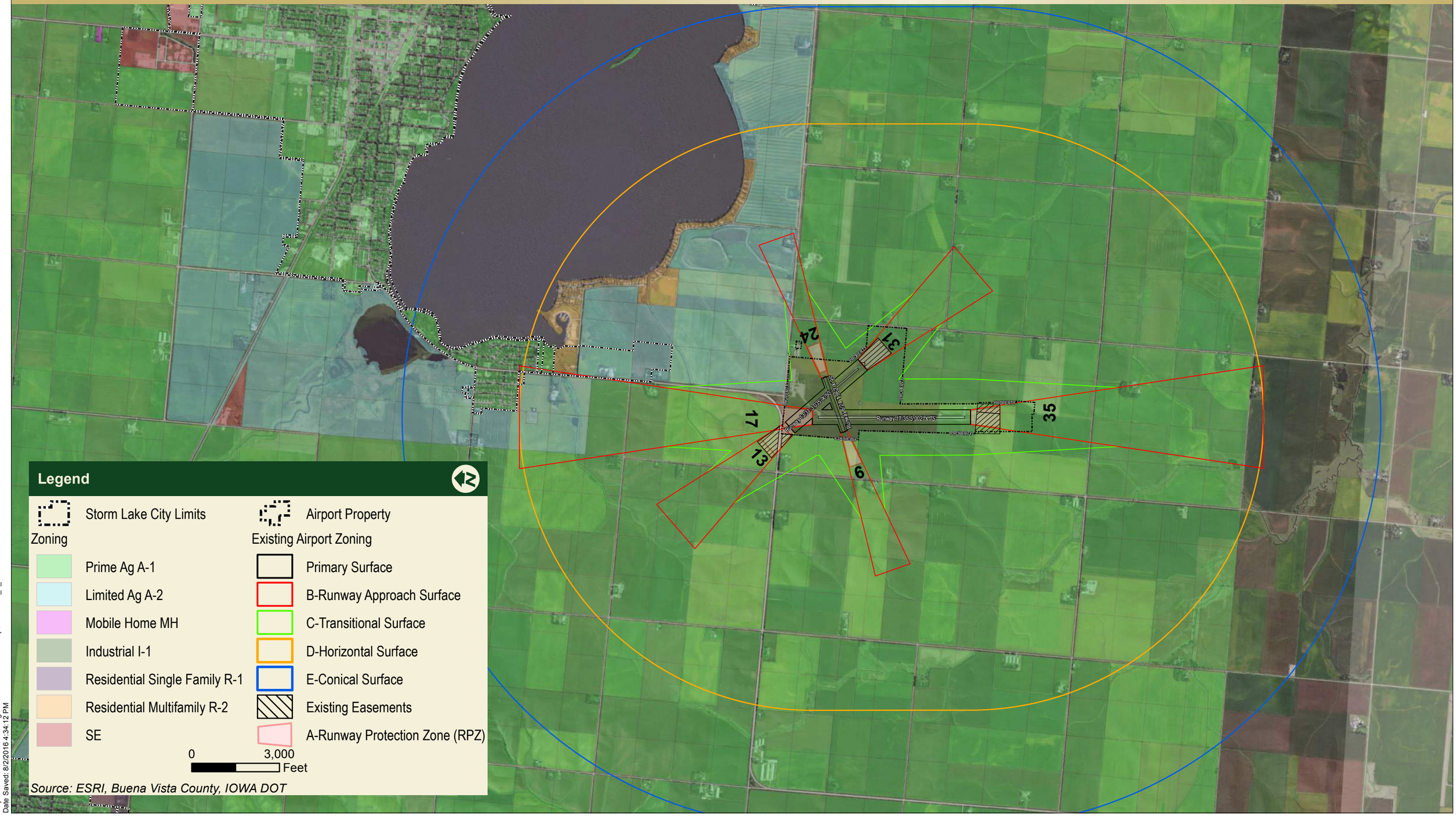
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-6

Airport Zoning & County Zoning Map



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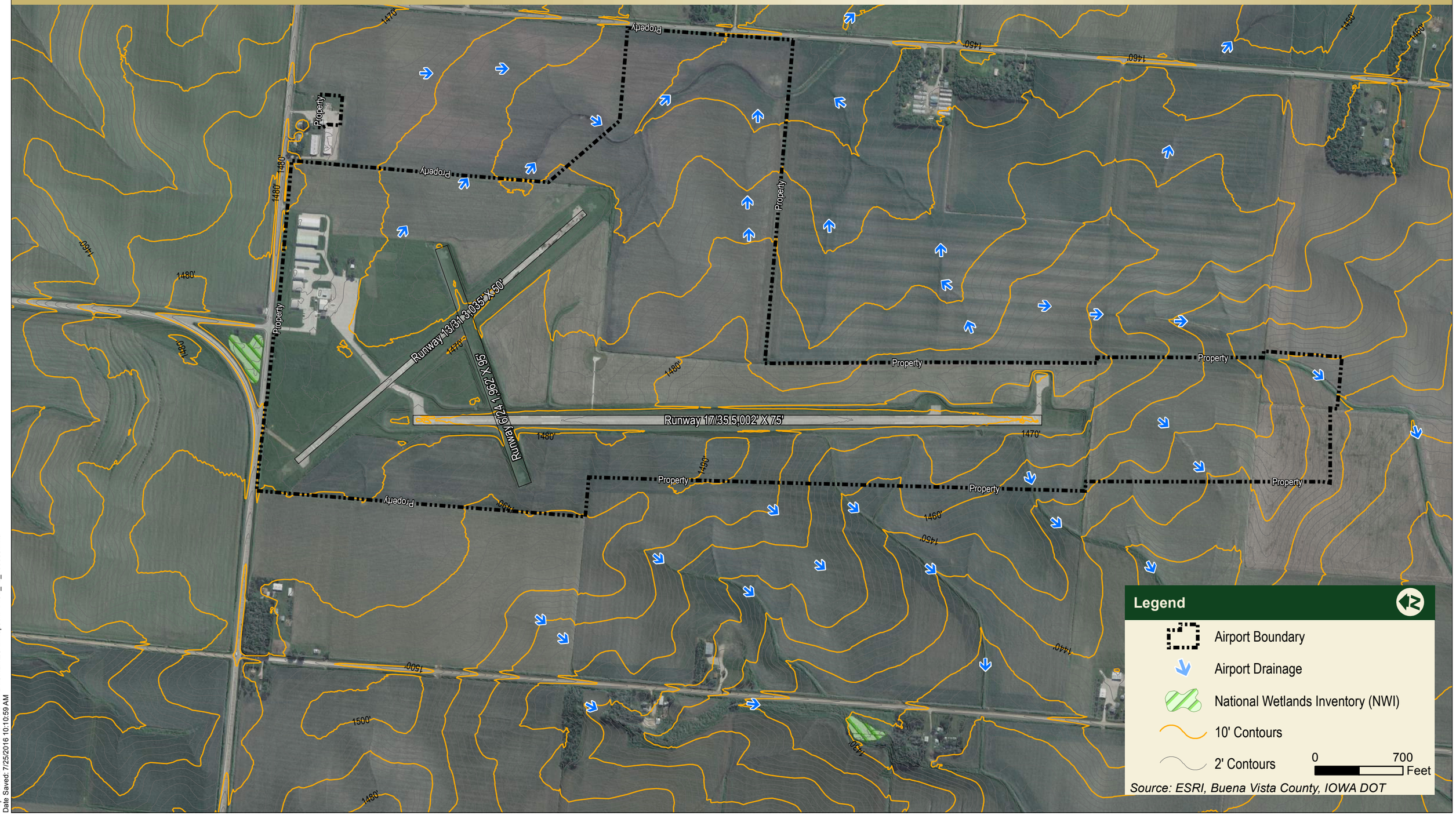
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 2-7

Water Resources



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3. AVIATION FORECASTS

3.1. INTRODUCTION

Evaluation of current and forecasted aviation activity is vital in preparing an Airport Master Plan. Aviation forecasts are necessary to evaluate current and potential future airport facility safety and capacity requirements.

Aviation forecasts are based on numerous factors, including socioeconomic data, local, regional, and national aviation trends, and FAA aviation forecasting methodology. Guidance used to help develop aviation activity forecasts includes the following resources:

- *Forecasting Aviation Activity by Airport* (July 2001), GRA, Inc., prepared for FAA.
- *Model for Estimating General Aviation Operations at Non-Towered Airports Using Towered and Non-Towered Airport Data* (July 2001), GRA, Inc., prepared for FAA.

Forecasts for general aviation airports commonly include based aircraft, annual operations, and critical design aircraft projections over a 20-year planning period. The time period for the forecasts at SLB are from the base year, 2015, through 2035. Based aircraft counts are split by the following aircraft types: single-engine piston, multi-engine piston, turboprop, turbojet, rotorcraft, and experimental aircraft. Annual operations are classified as local or itinerant. *Forecasting Aviation Activity by Airport* defines local operations as "aircraft operating in the traffic pattern or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport." Itinerant operations are defined as operations "other than local operations." Critical design aircraft projections are used to determine the airport design standards.

Forecasts developed are unconstrained; they identify the actual aviation demand for the facility regardless of limiting factors such as hangar availability or runway length, etc. If the aviation forecast differs by more than 10% from what is published in the FAA Terminal Area Forecast (TAF), additional FAA coordination is required.

3.2. AVIATION TRENDS

3.2.1. NATIONAL, REGIONAL & STATE TRENDS

Growth in the business jet and single engine piston market helped general aviation continue the modest growth it has seen in the last four years. Turboprop and multi-engine piston segments slowed to near their 2012 growth levels. According to the General Aviation Manufacturers Association (GAMA), deliveries were up 1.0% in 2014, marking the fourth straight year with an increase in delivered aircraft.

Single-engine piston aircraft shipments increased 6.2%, however with a decline in multi-engine piston shipments of 10%, overall piston shipments increased 4.5%. Turbine aircraft saw good growth in the turbojet category of 12.3%, but saw a decrease of 11.2% in the turboprop category after a strong year in 2013 (13.8% increase).

According to the FAA Aerospace Forecast (2015-2035):

> *"The long term outlook for general aviation is favorable, and near term also looks promising especially for piston aircraft activity which is sensitive to fuel price movements. While it is slightly lower than predicted last year, the growth in business aviation demand over the long term continues."*

Overall, the active general aviation fleet is projected to increase at an average of 0.4% per year for the forecast period with activity increasing by 1.4% per year.

National and Iowa aviation trends can be measured by activity levels published in the FAA Terminal Area Forecasts (TAF). Statewide trends provide a closer look into how the national aviation trends translate on a regional level. Measures of the FAA TAF based aircraft and operations trends are listed in **Table 3-1** and **Table 3-2**.

Table 3-1
2014 FAA TAF – National, Regional, & State Based Aircraft

Year	United States	Central Region	State of Iowa
1990	162,162	8,295	2,057
1995	157,765	8,367	1,959
2000	179,724	10,170	2,130
2005	197,219	10,636	2,489
2010	165,735	8,952	2,151
Historic Trend	**0.11%**	**0.38%**	**0.22%**
2015	169,630	9,806	2,496
2020	176,867	10,057	2,572
2025	184,601	10,341	2,661
2030	192,345	10,618	2,741
2035	200,582	10,908	2,829
2040	209,627	11,223	2,847
Future Trend	**0.85%**	**0.54%**	**0.53%**

Source: FAA Terminal Area Forecast (2015)
Notes: Trend indicates annual growth rate. Central Region includes Iowa, Kansas, Missouri, and Nebraska.

Overall aviation trends show a steady increase in based aircraft for the United States, the Central Region, and in the State of Iowa. Historically, Iowa had a lower based aircraft growth rate than the Central Region, but higher than the United States. The future trend, however, shows Iowa is projected to have a slightly lower growth rate than the Central Region, and a lower growth rate than the United States.

Table 3-2
2013 FAA TAF – National, Regional & State Annual Operations

Year	United States	Central Region	State of Iowa
1990	105,371,481	5,239,967	1,118,888
1995	109,062,416	4,994,926	1,040,325
2000	121,887,515	4,921,995	911,628
2005	115,407,325	4,344,138	848,818
2010	101,340,766	4,659,989	925,960
Historic Trend	**-0.19%**	**-0.58%**	**-0.94%**
2015	98,269,525	4,605,398	918,937
2020	101,569,275	4,674,340	926,380
2025	104,560,049	4,733,150	932,416
2030	108,215,383	4,805,795	939,662
2035	112,171,023	4,884,582	947,911
2040	116,253,711	4,962,870	955,517
Future Trend	**0.67%**	**0.30%**	**0.16%**

Source: FAA Terminal Area Forecast (2015)
Notes: Trend indicates annual growth rate. Central Region includes Iowa, Kansas, Missouri, and Nebraska.

Overall aviation trends show an average annual decrease in operations since 1990, and an increase in future, annual operations for the United States, Central Region, and the State of Iowa.

3.3. USER SURVEY SUMMARY

To assist in determining the number of local aviation operations at SLB, and to help determine local aviation needs and trends, an airport user survey was conducted. A general aviation questionnaire was sent to recreational users or potential users of the airport facility. In addition, a business user survey was sent to 36 known business users of the airport. A copy of the airport user survey and the business user survey are located in **Appendix A**.

The service area for SLB covers the area half way between SLB and the surrounding airports with similar facilities. Since one advantage to flying is reduced travel time, it is assumed that pilots will use the airport closest to their residence that has the facilities to meet their needs. The service area for SLB includes Buena Vista County and the northern half of Sac County, as well as the southeast quadrant of Cherokee County. User Surveys were sent to registered pilots within the service area in addition to registered pilots within the 30 minute drive time of the airport (see **Figure 3-1** at the end of this chapter).

3.3.1. GENERAL USER SURVEY RESULTS

The user survey at SLB was completed August 2015. Of the nearly 200 questionnaires sent out, there were a total of 31 questionnaires returned. This is a return of 15.5% of the surveys exceeding the goal to have 10% of the surveys returned. There were 58 aircraft reported in the 31 surveys, with some respondents owning as many as three aircraft. A summary of the operations reported in the survey are shown in **Table 3-3**.

Table 3-3
User Survey (2015) Annual Operations

Aircraft	Local Ops	Itinerant Ops	Total Operations
58	5,073	1,604	6,677

Source: SLB Airport User Survey (2015)

Of the 58 aircraft reported, 34 were based at SLB (19 surveys). This represents 94.44% of the based aircraft at SLB (34 out of 36 based aircraft). Another nine aircraft were reported as being based at airports within 30 nautical miles of SLB. In total, 49 of the 58 aircraft reported are based in and around SLB. The fleet mix of the reported aircraft can be seen in **Table 3-4**.

Table 3-4
User Survey (2015) Fleet Mix

Type	Number Reported
Single-Engine Piston	50
Multi-Engine Piston	1
Single-Engine Turboprop	5
Multi-Engine Turboprop	1
Helicopter	0
Jet	1
LSA/Ultralight/Glider	0
Total	**58**

Source: SLB Airport User Survey (2015)
Notes: Some survey respondents own more than one aircraft

Most of the reported aircraft were small aircraft and owned by the respondents. Four aircraft were corporate aircraft and six users expressed interest in upgrading their aircraft fleet within five years to either replace aging aircraft or for performance improvements such as increased range, speed, and payload.

Pilots were asked if they use the approaches at SLB. There were 13 pilots who indicated use of the LPV approach to Runway 35, or the RNAV (GPS) approach to Runway 17. Pilots were asked to explain whether the approaches met their needs, and if they did not, what needed to be improved to meet their needs. Two surveys requested precision instrument approaches be published at the airport, and one said they do not feel comfortable using the current approaches.

Runway length was addressed in the survey by asking respondents whether the runway length was adequate for their most demanding aircraft at their desired weight. Runway 17/35 was identified by one survey as not being long enough during wet or icy conditions. Runway 13/31 had three users identify the length as too short during wet or icy conditions, and four said it was too short on hot days. Runway 6/24 had 15 users identify the length as too short during wet or icy conditions, and 15 said it was too short on hot days. The users specified runway lengths from 2,500 feet for crosswind turf Runway 6/24 to 5,500 feet for Runway 17/35 were required to land at the airport. Two users indicated the runway was too short for their most demanding aircraft would have to reduce their fuel to takeoff on the runways. The basis for these requirements were from pilot operating handbooks, company policy, insurance requirements, Part 135 requirements, personal judgment/experience, and standard operating procedures/aero club.

Two pilots indicated they would base their aircraft at SLB if adequate facilities existed such as a heated hangar and a hangar 70 feet deep by 150 feet wide. Five more users indicated they needed more hangar space at SLB, indicating they would want private hangars or box hangars.

In order to gauge the effectiveness of facilities at SLB, respondents rated the airport facilities with regards to their operations at SLB. **Table 3-5** indicates the user responses.

Table 3-5
Survey Question 11: Please rate the airport facilities with regards to your operations at SLB

	Inadequate	Marginal	Adequate	Not Applicable
Runway Length	0	0	31	0
Aircraft storage - T-hangar rental unit	0	1	16	14
Aircraft storage - Conventional hangar development site	2	1	18	10
Aircraft storage - Transient/overnight	5	2	9	15
Aircraft Repair/Maintenance	0	0	25	6
Self Service Fueling	1	1	27	2
Full Service Fueling/Line Service/ Fueling Truck	0	1	13	17
Ground transportation (shuttle, taxi service, rental cars, courtesy car)	4	2	16	9
Pilot Shop	4	3	13	11
Crew Rest Area	3	6	15	7
Flight Training/Instruction	0	1	21	9
Aircraft Charter	1	2	6	22
Business center/meeting facilities	2	4	13	12
Security – Lighting/Fencing (16/31 responses)	0	3	11	2
Snow Removal Services (17/31 responses)	0	2	11	4

Source: SLB Airport User Survey (2015)

Most of the airport facilities were considered adequate by respondents. Facilities that were inadequate to pilots were overnight storage for aircraft, the pilot shop, and ground transportation.

Additional comments included: Fix the self-service fuel – hose too long, trouble with fuel reader, instant receipt (3 comments), need ground transportation (2 comments), better pilot lounge/update terminal building (2 comments), hangar space is limited, hangar area is woefully under-lighted, a taxiway for Runway 17/35, and snow and ice removal can be slow.

3.3.2. BUSINESS USER SURVEY RESULTS

The business user survey at SLB was completed August 2015. There were 36 surveys sent out, and 15 surveys were returned. This is a return of 41.66%. The survey asked businesses how they use general aviation, how often they fly to SLB, and what airport accommodations they use or need at SLB. Some corporate pilots may have responded to a user survey instead of a business user survey, and their survey data is included in the general user survey section.

A summary from the websites of a few of the businesses are listed below:

- Paul Novak MD, PC
    - Paul Novak MD is an emergency medicine specialist. He uses a Piper Arrow, based at Ankeny Regional Airport (IKV), to reach his clients typically traveling 150 nautical miles per trip. He performs approximately 15 flights annually out of SLB. He mentions needing a courtesy car when he arrives at SLB and improved approaches. A picture of a Piper Arrow similar to the one used by Paul Novak MD can be seen on the right side of the page.

- VT Industries (http://www.vtindustries.com/)
    - VT Industries is a family owned producer of countertops and architectural wood. Starting in Holstein, IA in 1956, they have expanded to over nine plant locations across the United States and Canada. They currently have 1,200 full-time employees. VT Industries operates a Cessna Citation 525C (CJ4) based at SLB. A picture of a CJ4, similar to one flown by VT Industries, can be seen on the right side of the page. They perform approximately 120 flights annually out of SLB for site visits, meetings, marketing, checking inventory, and for technical visits. Their clients visit approximately 10 times a year.

- Fast Air Ltd. (http://www.flyfastair.com/)
    - Fast Air owns Manitoba's largest charter fleet of Turboprop, rotary wing, and business jet aircraft. They operate out of Winnipeg James Armstrong Richardson International Airport (CYWG). They operate 20 aircraft, but use the IAI 1124 Westwind to fly into SLB 15-20 times a year (approximately two times a month) carrying an average of four passengers. A picture of an IAI 1124 Westwind aircraft, similar to the one used by Fast Air Ltd. can be seen on the right side of the page. To increase their use of SLB, they

would need a longer Runway 17/35, full service fueling, and overnight storage. One comment is they also need newer computers/printers at the airport with high speed internet for flight/weather planning, stating the current equipment is, "beyond subpar to non-existent."

- Central Bank (https://www.centralbankonline.com/)
    - Central Bank was established in 1877 in Storm Lake, IA. In 1990, a family purchased the bank, and they have grown the bank from one location to over 14 in Iowa. Now, they operate one of the largest community banks in Iowa and currently employ 200 people. Central Bank uses a Daher-Socata TBM-700, similar to the picture on the right side of the page. They fly into SLB approximately 20 times a year and also use their aircraft for travel between branch and customer locations. Typically, the flights average about 150 nautical miles in distance with four passengers per flight. Their clients also use SLB about two times a year.

- Peterson Contractors, Inc. / Reinbeck Motors Co. (http://www.petersoncontractors.com/)
    - A family owned company, Peterson Contractors, Inc. is in the heavy construction business in Reinbeck, IA. Starting in 1964, they currently employ 400 full time and 160 part time employees. Peterson Contractors, Inc. is involved with projects throughout the continental United States. The aircraft they utilize is a Pilatus PC-12 with an average of two passengers per flight. A picture of a Pilatus PC-12 can be seen on the right side of the page. To increase their use of SLB, a longer Runway 17/35 and improved approaches to Runway 17/35 are needed.

- Tyson Foods, Inc. (http://www.tysonfoods.com/)
    - Headquartered in Arkansas, Tyson is one of the largest producers of chicken, beef, pork, and prepared food items in the world. Starting in 1930, they now employ nearly 125,000 individuals, with 1,800 employees in Storm Lake. Due to the size of Tyson's operation, Tyson utilizes a fleet of various Dassault Falcon jets and often charters aircraft to meet their business needs. A picture of a Beechcraft King Air 200, similar to what was used to conduct business for Tyson in Storm Lake, can be seen on the right side of the page. They would like better overnight/transient

aircraft storage, self-service fueling, updated crew rest area and business facilities, and a rental car service at the airport.

3.4. EXISTING BASED AIRCRAFT & ANNUAL OPERATIONS

Previous forecasts provide useful insights into the projected demand at SLB. Both the FAA TAF and the 2010 Iowa State Aviation System Plan (SASP) provide based aircraft and operations forecasts for individual airports. These forecasts provide baseline data to aid in forecasting based aircraft and operations at a local level.

Table 3-6 shows the based aircraft forecasts for SLB from the FAA TAF and the 2010 Iowa SASP.

Table 3-6
Existing Based Aircraft Forecasts

Year	FAA TAF Based Aircraft	2010 Iowa SASP Based Aircraft
2010	37	38
2015	21	40
2020	24	43
2025	27	46
2030	27	49
Trend:	**-1.56%**	**1.28%**

Source: FAA Terminal Area Forecast (2015); Iowa State Aviation System Plan (2010)

In addition to based aircraft, both the TAF and SASP forecast annual operations at SLB for the next 20 years. **Table 3-7** shows the FAA TAF operations forecast data through 2040. The TAF forecasts operations and based aircraft from historical data collected since 1990. The TAF typically shows no growth for most general aviation airports. The current operations were assigned in 2009 and have not changed since.

Table 3-7
FAA TAF Trends (2015)

Year	TAF Itinerant Operations	TAF Local Operations	Total Operations	Based Aircraft	OPBA
2015	11,139	8,461	19,600	21	933
2020	11,139	8,461	19,600	24	817
2025	11,139	8,461	19,600	27	726
2030	11,139	8,461	19,600	27	726
2035	11,139	8,461	19,600	27	726
2040	11,139	8,461	19,600	27	726

Source: FAA Terminal Area Forecast (2015, 2012 data)
Notes: Trend indicates annual growth rate; OPBA = Operations Per Based Aircraft

Table 3-8 depicts the SASP operations data through 2030. The SASP projects airport operations using local, regional, and national data as well as trends for general aviation. The SASP develops its operations based on the growth of based aircraft at a specific airport. The compound annual growth rate for based aircraft at SLB is 1.28%. The number of based aircraft is then multiplied by an accepted number of Operations Per Based Aircraft (OPBA) to determine the annual number of operations at the airport. For airports with 31 to 99 based aircraft, an OPBA of 350 is applied. (Additional discussion on OPBA can be found in **Section 3.6.2**.)

Table 3-8
State Aviation System Plan Operations Forecast (2010)

Year	Total Operations	Based Aircraft	OPBA
2010	13,300	38	350
2015	14,000	40	350
2020	15,050	43	350
2025	16,100	46	350
2030	17,150	49	350

Source: Iowa State Aviation System Plan (2010) for SLB
Notes: OPBA = Operations Per Based Aircraft

3.5. BASED AIRCRAFT FORECAST

Based aircraft demand is typically a product of population, income, and labor force. The baseline for the number and type of based aircraft at SLB was derived from the Iowa Aviation System Plan. The hangar contact list shows 35 single engine aircraft and one jet aircraft based at SLB.

The service area for SLB is shown in **Figure 3-1** at the end of this chapter. To determine trends in the SLB service area, nearby airports were considered and their based aircraft growth rates were evaluated. The average annual growth rate for based aircraft of five nearby airports is 1.26%. The surrounding airports include: Sac City Municipal Airport (SKI); Pocahontas Municipal Airport (POH); Spencer Municipal Airport (SPW); James G Whiting Memorial Field Airport, Mapleton (MEY); and Cherokee County Regional Airport (CKP). The individual growth rates can be seen in **Table 3-9**.

Table 3-9
Based Aircraft Growth Rates of Nearby Airports

SASP Based Aircraft						
Nearby Airports to SLB	Base Year 2010	2015	2020	2025	2030	Annual Growth Rate
Storm Lake (SLB)	38	40	43	46	49	1.28%
Sac City (SKI)	10	11	11	12	13	1.32%
Pocahontas (POH)	22	23	25	27	28	1.21%
Spencer (SPW)	35	37	40	42	45	1.26%
Mapleton (MEY)	11	12	12	13	14	1.21%
Cherokee (CKP)	34	36	38	41	44	1.29%
					Average:	**1.26%**

Source: Iowa State Aviation System Plan (2010)
*SLB is not included in the annual growth rate average

The population of the State of Iowa, and the City of Storm Lake are projected to increase over the next 20 years. In addition, the SASP shows growth in based aircraft over the next 20 years. These are both indications that based aircraft will also continue to grow at SLB. The SASP growth rate of SLB is close to the average growth rate of surrounding airports. Therefore, the average annual growth rate of 1.28% was used to forecast the based aircraft over the 20-year planning period at SLB.

The 20-year planning period shows an increase in based aircraft from 36 aircraft in 2015, to 46 based aircraft in 2035. **Table 3-10** shows the based aircraft forecasts over the next 20 years. Growth of individual aircraft types are shown according to growth rates seen in the General Aviation section of *FAA Aerospace Forecast Fiscal Years 2015-2035*.

Table 3-10
Based Aircraft Forecast

Year	Single Piston	Multi Piston	Turboprop	Turbojet	Helicopter	Ultralight/ Experimental	Total
2015	34	0	1	1	0	0	36
2016	34	0	1	1	0	0	36
2017	35	0	1	1	0	0	37
2018	35	0	1	1	0	0	37
2019	36	0	1	1	0	0	38
2020	36	0	1	1	0	0	38
2021	36	1	1	1	0	0	39
2022	36	1	1	1	0	0	39
2023	37	1	1	1	0	0	40
2024	37	1	1	1	0	0	40
2025	38	1	1	1	0	0	41
2026	38	1	1	1	0	0	41
2027	39	1	1	1	0	0	42
2028	39	1	1	1	0	0	42
2029	39	1	1	2	0	0	43
2030	40	1	1	2	0	0	44
2031	39	1	2	2	0	0	44
2032	40	1	2	2	0	0	45
2033	40	1	2	2	0	0	45
2034	41	1	2	2	0	0	46
2035	41	1	2	2	0	0	46

Source: Bolton & Menk Analysis

3.6. ANNUAL OPERATIONS FORECAST

3.6.1. CONFIRMED OPERATIONS

The lack of an FAA Air Traffic Control Tower does not allow for exact aircraft operation counts at a general aviation airport like SLB. Therefore, FAA Instrument Flight Rules (IFR) flight data from March 2012 – March 2015 was obtained to get an understanding of the larger corporate users at SLB over the past three years. IFR flight data is recorded when pilots file a flight plan with the FAA. It does not take into account fair weather flights, touch and go operations, or flights with flight plans cancelled before landing at the airport. **Table 3-11** shows the confirmed operations from the IFR data from March 2012 to

March 2015 for piston aircraft, and **Table 3-12** shows the total operations by turboprop and turbofan/jet aircraft over the same time period. **Table 3-13** summarizes the operations by Airport Reference Code (ARC). The ARC for the critical design aircraft, the aircraft or family of aircraft performing more than 500 annual operations, will determine the design standards for the airport.

Table 3-11
Aircraft Types and Operations from IFR Data, Piston Operations

Piston Aircraft					
Aircraft	**ARC**	**Total Ops**	**Aircraft**	**ARC**	**Total Ops**
Aviat A-1 Husky	A-I/s	1	Diamond 42 Twin Star	A-I/s	2
Beechcraft 35 Bonanza	A-I/s	21	Experimental	OTH	2
Beechcraft Baron (58)	B-I/s	18	Grumman AA5	A-I/s	2
Beechcraft Bonanza (33)	A-I/s	4	Mooney M20	A-I/s	9
Beechcraft Bonanza (36)	A-I/s	31	Piper Aerostar	A-I/s	2
Bellanca Viking	A-I/s	6	Piper PA 20 Pacer	A-I/s	1
Cessna 162	A-I/s	1	Piper PA 23/27 Aztec	A-I/s	6
Cessna 172 Skyhawk	A-I/s	24	Piper PA 24 Commanche	A-I/s	5
Cessna 177 Cardinal	A-I/s	3	Piper PA 28 Cherokee	A-I/s	45
Cessna 182 Skylane	A-I/s	29	Piper PA 28 Cherokee Arrow	A-I/s	6
Cessna T182 Turbo Skylane	A-I/s	1	Piper PA 28 Dakota/Pathfinder	A-I/s	5
Cessna 206 Stationair	A-I/s	4	Piper PA 28 Turbo Arrow	A-I/s	18
Cessna 210 Centurion	A-I/s	12	Piper PA 31 Navajo	A-I/s	8
Cessna 310	A-I/s	6	Piper PA 32 Saratoga	A-I/s	61
Cessna 340	B-I/s	58	Piper PA 32R Saratoga/Lance	A-I/s	131
Cessna 414 Chancellor	B-I/s	33	Piper PA 34 Seneca	A-I/s	6
Cessna 421 Golden Eagle	B-I/s	41	Piper PA 44 Seminole	A-I/s	2
Cirrus SR20	A-I/s	1	Piper PA 46 Malibu Mirage	A-I/s	24
Cirrus SR22	A-I/s	21	Piper PA-31T3-500 T-1040 Navajo	A-I/s	6
Cosmos Phase III	A-I/s	1	Rockwell Commander 710	A-I/s	2
Cozy MK IV	A-I/s	2	Van's Aircraft RV10	A-I/s	2
Diamond 40 Diamond Star	A-I/s	1	**Total Piston Operations:**		**664**

Source: FlightAware, Mar. 2012 to Mar. 2015
Notes: HELI = Helicopter; OTH = Experimental or Glider; /s = small aircraft; /L – large aircraft greater than 12,500 pounds

Table 3-12
Aircraft Types and Operations from IFR Data, Turbine and Turbofan/Jet Operations

Turboprop Aircraft					
Aircraft	**ARC**	**Total Ops**	**Aircraft**	**ARC**	**Total Ops**
Beechcraft King Air 90	B-II/s	25	Daher-Socata TBM850	A-I/s	2
Beechcraft King Air 100	B-II/s	4	Eurocopter 145	HELI	1
Beechcraft Super King Air 200	B-II/s	83	Piaggio P.180 Avanti	C-I/s	2
Beechcraft Super King Air 300	B-II/L	13	Pilatus PC 12	A-II/s	16
Beechcraft Super King Air 350	B-II/L	8	Piper PA 31T1-620 Cheyenne II	B-I/s	21
Cessna 208 Caravan	A-II/s	2	Piper PA 31T1-620 Cheyenne III	B-I/s	4
Cessna P210 Silver Eagle	A-I/s	1	Piper PA 42 Cheyenne	B-I/s	1
Cessna 425 Conquest I	B-I/s	6	Piper PA 46 Malibu Meridian	A-I/s	8
Daher-Socata TBM700	A-I/s	135	**Total Turboprop Operations:**		**332**
Turbofan/Jet Aircraft					
Aircraft	**ARC**	**Total Ops**	**Aircraft**	**ARC**	**Total Ops**
Aero L39 Albatros	B-I/s	1	Eclipse 500	A-I/s	4
Beechcraft Beechjet	B-I/L	6	IAI 1124 Westwind	C-I/L	32
Bombardier Challenger 300	C-II/L	2	IAI 1126 Galaxy	C-II/L	2
Bombardier Challenger 600	C-II/L	2	IAI Gulfstream G150	C-II/L	8
Cessna Citation CJ1	B-I/s	7	Learjet 35	C-I/L	4
Cessna Citation CJ2	B-II/s	4	Learjet 40	C-I/L	2
Cessna Citation CJ3	B-II/L	9	Learjet 45	C-I/L	8
Cessna Citation CJ4	B-II/L	166	Learjet 55	C-I/L	2
Cessna Citation Excel	B-II/L	2	Learjet 60	C-I/L	20
Cessna Citation II	B-I/L	10	Raytheon Hawker 4000	B-II/L	4
Cessna Citation Mustang	A-I/s	14	Raytheon Hawker 800	B-II/L	4
Cessna Citation Sovereign	B-II/L	1	Raytheon Premier 1	B-I/s	6
Cessna Citation V	B-II/L	62	**Total Turbofan/Jet Operations:**		**384**
Dassault Falcon 10	B-I/L	2	**Total IFR Operations (All Aircraft):**		**1,380**

Source: FlightAware, Mar. 2012 to Mar. 2015

Notes: HELI = Helicopter; OTH = Experimental or Glider; /s = small aircraft; /L – large aircraft greater than 12,500 pounds

Table 3-13
Aircraft ARC and Operations from IFR Data

ARC	Total Ops	ARC	Total Ops
A-I/s	676	C-I/s	2
A-II/s	18	C-I/L	68
B-I/s	196	C-II/L	14
B-I/L	18	HELI	1
B-II/s	116	OTH	2
B-II/L	269		

Source: FlightAware, March 2012 to March 2015
Notes: HELI = Helicopter; /s = small aircraft; /L – large aircraft greater than 12,500 pounds

Information collected from the IFR flight data shows there were 89 unique aircraft that operated at SLB over the three year time period. There were 1,380 flights from these unique aircraft.

Pilots who reported their operations in the user survey confirm their use of SLB. The user survey asked the type of aircraft and how many flights performed annually at SLB in that aircraft. **Table 3-14** shows the confirmed operations from the user survey, and **Table 3-15** shows the total operations by aircraft ARC from the user survey.

Table 3-14
Aircraft Types and Operations from User Survey Responses

Piston Aircraft					
Aircraft	**ARC**	**Total Ops**	**Aircraft**	**ARC**	**Total Ops**
Beechcraft Bonanza (33)	A-I/s	30	Piper PA 12 Super Cruiser	A-I/s	104
Cessna 152	A-I/s	28	Piper PA 17 Vagabond	A-I/s	100
Cessna 172 Skyhawk	A-I/s	1472	Piper PA 25 Pawnee	A-I/s	300
Cessna 182 Skylane	A-I/s	230	Piper PA 28 Cherokee	A-I/s	970
Mooney M20 Eagle	A-I/s	4	Piper PA 28 Dakota/Pathfinder	A-I/s	80
ACA 8KCAB	A-I/s	325	Piper PA 28 Warrior	A-I/s	250
Boeing Sterman	A-I/s	100	Piper Archer PA 28A	A-I/s	50
Ercoupe 415-C	A-I/s	300	Piper PA 32R Saratoga/Lance	A-I/s	150
Grumman Ag Cat	A-I/s	300	PA 36 Pawnee Brave	A-I/s	100
Aeronca Champ	A-I/s	300	Piper PA 46 Malibu	A-I/s	30
Air Tractor 401	A-II/s	1200			
Turboprop Aircraft					
Aircraft	**ARC**	**Total Ops**	**Aircraft**	**ARC**	**Total Ops**
Beechcraft Super King Air 200	B-II/s	20	Piper PA 46 Meridian	A-I/s	2
Daher-Socata TBM850	A-I/s	32			
Turbofan/Jet Aircraft					
Aircraft	**ARC**	**Total Ops**			
Cessna Citation CJ4	B-II/L	200	**Total Operations (All Aircraft):**		6,677

Source: SLB Airport User Survey (2015)
Notes: /s = small aircraft; /L – large aircraft greater than 12,500 pounds

Table 3-15
Aircraft ARC and Operations from User Survey Responses

ARC	Total Ops
A-I/s	5,257
A-II/s	1,200
B-II/s	20
B-II/L	200

Source: SLB Airport User Survey (2015)
Notes: /s = small aircraft; /L – large aircraft greater than 12,500 pounds

There were 25 unique aircraft identified in the user survey. For reference, the following images represent the ARC of aircraft seen at SLB.

A-I small (≤12,500 lbs.): Small, single-engine piston aircraft; few light multi-engine piston aircraft; Example: Mooney M20

A-II: Single-engine turboprop; agricultural aircraft; Example: Air Tractor 602

A-III Large (>12,500 lbs.): Older, piston military or civil service aircraft; large wingspans, slow flying; Example: Douglas DC-3

B-I small (≤12,500 lbs.): Most light multi-engine piston aircraft; Example: Cessna 414

B-I Large (>12,500 lbs.): Small but heavy business jets; Example: North American T-39 Saberliner

B-II Small (≤12,500 lbs.): Light, multi-engine turboprop aircraft; small business jets; Example: Beechcraft C90GTi

B-II Large (>12,500 lbs.): Large turboprop aircraft; mid-large sized corporate jets; Example: Dassault Falcon 2000

B-III Large (>12,500 lbs.): Large corporate jets; large wingspans; Example: Bombardier Global 5000

C-I small (≤12,500 lbs.): Small, fast turboprop aircraft and corporate jets; Example: Piaggio P.180 Avanti

C-I Large (>12,500 lbs.): Small, heavy, and fast corporate jet aircraft; Example: Learjet 55

C-II Large (>12,500 lbs.): Large Corporate Jets; Example: Gulfstream III

Helicopter: Piston and turbine rotorcraft; Example: Bell 412

3.6.2. ANNUAL OPERATIONS FORECAST

Annual operations are the count of both takeoffs and landings at an airport. Baseline (year 2015) airport operations were estimated using FAA approved Operations Per Based Aircraft (OPBA) figures. The OPBA figure is an average that includes both based aircraft and transient aircraft traffic. FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems* recommends 250 operations per based aircraft for rural general aviation airports, 350 operations per based aircraft for busier general aviation airports with more itinerant traffic, and 450 operations per based aircraft for busy reliever airports. The OPBA could be as high as 750 for busy reliever airports with more itinerant traffic, however the order emphasizes the estimates should be refined by comparing to activity levels at similar airports or through a user survey.

SLB is in the 31 to 99 based aircraft category, which is assigned an OPBA of 350. The SASP shows 38 based aircraft in 2010, and multiplying the number of based aircraft by the OPBA yields 13,300 operations in 2010. The current FAA TAF shows 19,600 operations for SLB. Dividing the number of annual operations by the 2015 FAA TAF based aircraft number, 21, yields 933 OPBA.

A large percentage of the operations at SLB are itinerant flights. The TAF shows 57% of operations were itinerant operations. This forecast assumes 60% of all operations are itinerant.

One methodology to develop an OPBA to use at SLB is to compare the OPBA of surrounding airports. The data used for this evaluation is from the SASP. As seen in **Table 3-16**, the average OPBA at these airports is 275.

Table 3-16
Operations Per Based Aircraft at Nearby Airports

Nearby Airports to IOW	Operations Base Year (2010)	OPBA Base Year (2010)	IADOT Estimated Operations (2010)
Storm Lake (SLB)	13,300	350	14,700
Sac City (SKI)	2,500	250	2,500
Pocahontas (POH)	5,500	250	4,500
Spencer (SPW)	12,250	350	15,300
Mapleton (MEY)	2,750	250	3,250
Cherokee (CKP)	11,900	350	11,200
	Average:	**275**	

Source: Iowa State Aviation System Plan (2010) and IADOT Office of Aviation
*SLB is not included in the OPBA average

An OPBA of 275 is lower than 350 suggested for busier general aviation airports. The amount of itinerant traffic into SLB suggests the OPBA should be 350. Using an OPBA of 350 and 36 based aircraft yields 12,600 operations as a baseline in 2015. With the growth in based aircraft over the next 20 years increasing to 46, the annual operations increases to 16,100 (46 x 350).

It is important to forecast operations by aircraft ARC in order to determine what design standards the airport will use. This is determined by the critical design aircraft, or the family of aircraft which exceed 500 operations annually. The baseline for all itinerant aircraft ARCs, not including A-I, came from the IFR flight data. A majority of operations at the airport are ARC A-I aircraft, therefore any remaining operations that could not be confirmed were applied to ARC A-I aircraft. The IFR flight data was the baseline used for determining itinerant operations, and assumed to be 60% of operations by that aircraft type. The remaining 40% was calculated and added to the local operations. There are no based aircraft larger than B-II/L at SLB.

The growth in operations per aircraft ARC was determined by applying the average annual growth rates for activity in certain aircraft categories based on engine type. These activity growth rates were obtained from the *FAA Aerospace Forecast, Fiscal Years 2015-2035, Tables 28 and 29*. ARC A-II aircraft will grow by the total turbine rate of 2.2%, due to a large increase in agricultural activity throughout the country and many agricultural aircraft being A-II; B-I/s and B-II/s grew by the turboprop rate of 1.5%; helicopters grew by the total rotorcraft rate of 2.5%; and B-I/L, B-II/L, C-I/L, and C-II/L grew at the turbojet rate of 2.8%.

The annual operations forecast for SLB over the 20-year planning period is shown in **Table 3-17**.

Table 3-17
Annual Operations Forecast by Aircraft Type

Year	Itinerant									Local						Total
	Small Aircraft					Large Aircraft				Small Aircraft					Large Aircraft	
	A-I	A-II	B-I	B-II	HELI	B-I	B-II	C-I	C-II	A-I	A-II	B-I	B-II	HELI	B-I	
2015	7,350	6	39	39	1	6	90	24	5	2,706	2,100	26	15	0	193	12,600
2016	7,345	6	40	40	1	6	93	25	5	2,654	2,146	26	15	0	198	12,600
2017	7,550	6	40	40	1	6	95	25	5	2,740	2,193	27	15	0	204	12,950
2018	7,545	6	41	41	1	7	98	26	5	2,686	2,242	27	16	0	210	12,950
2019	7,750	7	41	41	1	7	101	27	6	2,770	2,291	28	16	0	216	13,300
2020	7,745	7	42	42	1	7	103	28	6	2,713	2,341	28	16	0	222	13,300
2021	7,949	7	43	43	1	7	106	28	6	2,794	2,393	28	16	0	228	13,650
2022	7,944	7	43	43	1	7	109	29	6	2,735	2,446	29	17	0	234	13,650
2023	8,148	7	44	44	1	7	112	30	6	2,814	2,499	29	17	0	241	14,000
2024	8,142	7	45	45	1	8	115	31	6	2,751	2,554	30	17	0	247	14,000
2025	8,346	7	45	45	1	8	119	32	7	2,828	2,611	30	17	0	254	14,350
2026	8,340	8	46	46	1	8	122	33	7	2,762	2,668	31	18	0	262	14,350
2027	8,543	8	47	47	1	8	125	33	7	2,835	2,727	31	18	0	269	14,700
2028	8,537	8	47	47	1	9	129	34	7	2,767	2,787	32	18	0	276	14,700
2029	8,740	8	48	48	1	9	132	35	7	2,837	2,848	32	18	0	284	15,050
2030	8,944	8	49	49	1	9	136	36	8	2,906	2,911	33	19	0	292	15,400
2031	8,937	8	49	49	1	9	140	37	8	2,833	2,975	33	19	0	300	15,400
2032	9,139	9	50	50	2	10	144	38	8	2,898	3,040	33	19	0	309	15,750
2033	9,132	9	51	51	2	10	148	39	8	2,822	3,107	34	20	0	317	15,750
2034	9,335	9	52	52	2	10	152	41	8	2,884	3,175	35	20	0	326	16,100
2035	9,327	9	53	53	2	10	156	42	9	2,804	3,245	35	20	0	335	16,100

Source: Bolton & Menk estimates

3.7. FUTURE CRITICAL DESIGN AIRCRAFT

3.7.1. RUNWAY DESIGN CODE (RDC) & AIRPORT REFERENCE CODE (ARC)

Most of the existing airport operations at SLB are in small aircraft 12,500 pounds or less. This would include aircraft such as Piper PA-32 Saratoga (RDC A-I) and Pilatus PC-12 (RDC A-II). The user survey and IFR flight data show larger aircraft weighing more than 12,500 pounds operate regularly at the airport. Because user survey data may overlap with IFR flight data, and the user survey data is an estimate by the user, IFR flight data was used to determine there were 715 operations in turboprop and jet aircraft such as the Cessna Citation 525C (RDC B-II/L) from March 2012 to March 2015.

As described in the Airport Inventory Chapter, the existing ARC used when establishing safety dimensional criteria at SLB is B-II, small. There are currently less than 500 operations per year for aircraft in the B-II category. The existing critical design aircraft with greater than 500 itinerant operations is an A-I, small aircraft. However, there are over 500 operations of Group II aircraft based at the airport in addition to a combined local and itinerant operations total greater than 500 for Group B aircraft. Based on this documented data, estimates, and statewide criteria, the future airport configuration should be designed to B-II/Large standards. In addition, the Airport Commission should continue to monitor airport operations and evaluate the needs of current and future airport users.

3.8. SUMMARY

The following points summarize key findings with regard to the based aircraft and general aviation forecasts at SLB:

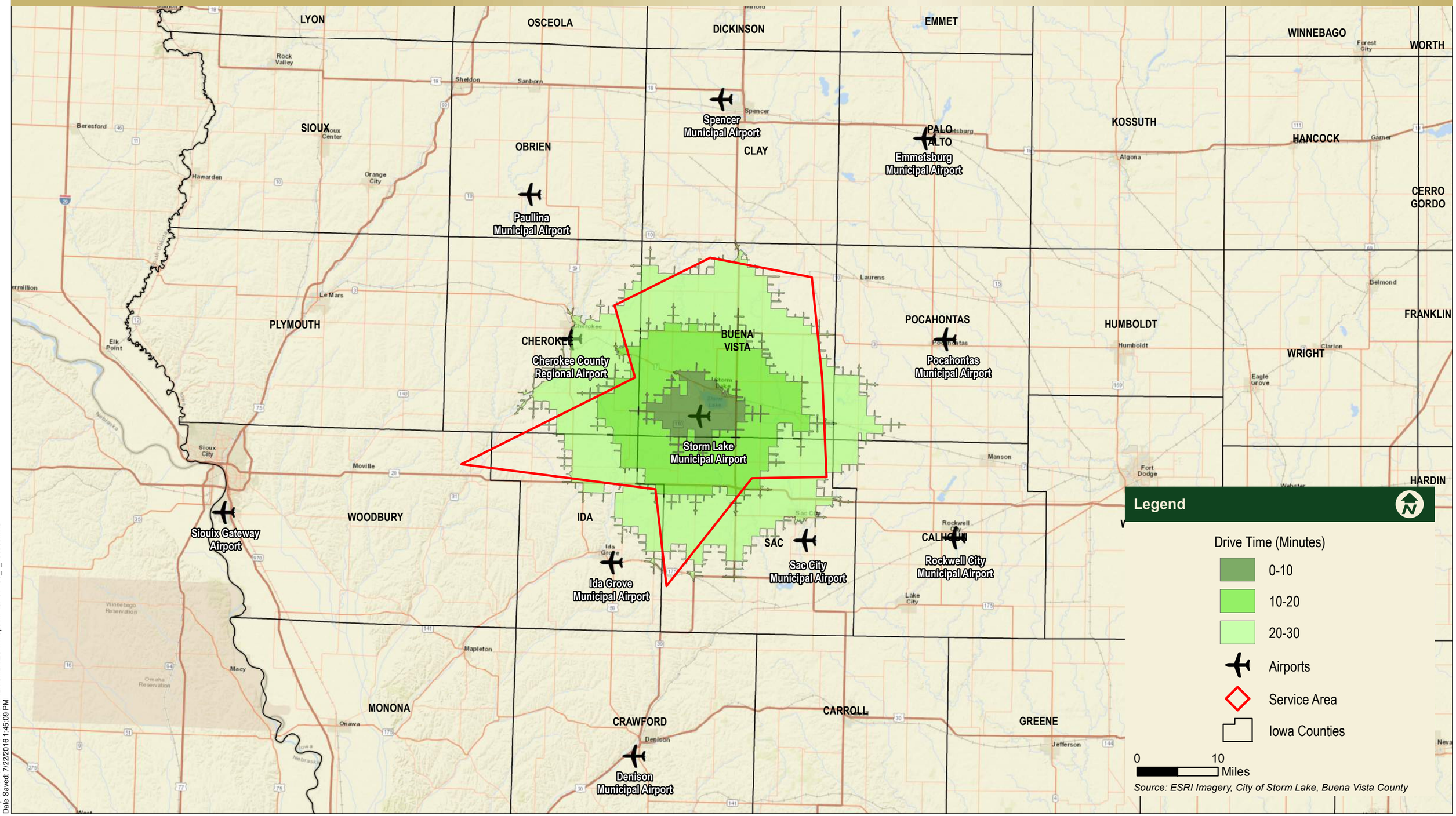
- SLB airport operations are a mix of recreational and business flights. The user survey and business user survey indicated local use of aviation for business travel. These flights provide local travel needs for existing business activities.
- Based aircraft are projected to increase from 36 to 46 by the end of the planning period in 2035. The annual growth rate of based aircraft is 1.28%. This growth rate is comparable to the existing State Aviation System Plan forecasts of nearby airports.
- Baseline aircraft operations are estimated by multiplying an OPBA of 350 times the number of based aircraft to obtain 12,600 operations in 2015. As the number of based aircraft increases over the next 20 years, the annual operations will increase to 16,100 in 2035.
- The existing critical design aircraft is A-I, small, however the airport is currently designed to B-II standards, and based on confirmed operations at the airport, it suggested to remain designed to B-II/Large standards throughout the planning period.

Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 3-1

Service Area & Drive Time



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4. FACILITY REQUIREMENTS

4.1. INTRODUCTION

The Facility Requirements Chapter evaluates the airside, landside, and support facility requirements at the airport based on the results of the user surveys and forecasts. Airside areas for general aviation airports include the runway and taxiway environment, as well as general aviation aircraft parking, storage hangars, and fueling needs. Landside and other airport support facilities include airport support buildings, access roads, parking lots, fencing, and utilities.

Although there are similar infrastructure and operational requirements every Airport Master Plan evaluates, individual airports have different areas of focus to address specific safety related concerns, future facility needs, and/or environmental and planning considerations for the surrounding environment. These specific areas for SLB, both on and off airport property, are identified on **Figure 4-1**, at the end of this chapter. The primary planning considerations at SLB include evaluating the location of the Runway 13 threshold due to a penetration to the Approach/Departure surface, complete a comprehensive obstruction evaluation to identify potential obstructions to the existing and proposed runway design standards, evaluate the building area plan to accommodate corporate and aviation business development, determine ways to maximize funding sources for the airport, and continue to provide opportunities to engage the airport stakeholders and general public in this process.

In addition to addressing the existing conditions at the airport, this chapter evaluates the ability for the airport to accommodate the forecasted demand and meet applicable facility requirements for the users of the airport. These areas will be addressed in the following sections:

- Airfield capacity and delay analysis
- Instrument approaches
- Runway facility requirements
- Airport visual aids & navigational aids
- Meteorological facilities
- Taxiway & taxilane facility requirements
- Apron size and tie-down requirements
- IA State Aviation System Plan (SASP) airside recommendations
- Landside facility requirements
- IA SASP landside recommendations

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13A, *Airport Design*, was referenced for the design standard criteria used to evaluate the impacts of the recommended development throughout the Airport Master Plan and corresponding Airport Layout Plan (ALP). Specific facility requirements are based on aeronautical compliance, demand, or triggering events, rather than specific time periods. This allows the City to use the Airport Master Plan as a tool for decision making and funding prioritization over the next 20 years.

4.2. AIRFIELD CAPACITY & DEMAND ANALYSIS

4.2.1. AIRFIELD CAPACITY

Airfield capacity is defined as the maximum aircraft operations an airfield configuration can accommodate. The FAA metric used to determine reasonable airfield capacity is Annual Service Volume (ASV). ASV is a calculated number that represents a reasonable estimate of an airport's annual operational capacity taking into account differences in runway utilization, weather conditions, and aircraft mix that would be encountered in a year's time.

The ASV is determined by grouping aircraft into classes per FAA AC 150/5060-5, *Airport Capacity and Delay*. These classes identify aircraft based on recommended arrival and departure separation distances (see **Table 4-1**).

Table 4-1
Annual Service Volume Classifications

Aircraft Classification	Maximum Takeoff Weight (lbs.)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small
B	12,500 or less	Multi	Small
C	12,501 – 300,000	Multi	Large
D	Over 300,000	Multi	Heavy

Source: FAA AC 150/5060-5 *Airport Capacity and Delay*

The largest aircraft to utilize SLB includes ASV Class C aircraft (12,501-300,000 lbs.). Examples include the Beechcraft King Air B-300 turboprop and smaller business jets. The aviation forecasts for SLB presented in **Chapter 3.0, Aviation Forecasts** estimate, in the long-term, operations will be comprised of nearly 3.5% ASV Class C airplanes (approximately 550 annual operations), 2% ASV Class B airplanes, and the remaining 94% being ASV Class A airplanes.

FAA AC 150/5060-5, *Airport Capacity and Delay* was used to calculate the ASV for a single-runway scenario at SLB. The runway configuration does not include the crosswind runways at SLB. The crosswind runways are limited to use by small airplanes based on the pavement strength and turf strength of 12,500 pounds single-wheel gear or less. The ASV at SLB is shown in **Table 4-2**.

Table 4-2
Annual Service Volume

2035 Annual Operations	Annual Service Capacity	Percentage
20,250	230,000	8.8%

Source: Bolton & Menk Analysis, FAA AC 150/5060-5, *Airport Capacity and Delay*

Under these conditions, the airfield configuration for one primary runway will adequately meet the capacity demand over the next 20 years.

4.2.2. AIRFIELD DEMAND

The demand of an airfield is a function of the number and location of exit taxiways, the runway configuration, wind, and weather conditions. The methodology for computing the relationship between the demands placed upon an airport versus its capacity is also contained in FAA AC 150/5060-5. In order to facilitate this comparison, computations were made to determine the hourly capacity of a single runway configuration in visual flight rules (VFR) and instrument flight rules (IFR). VFR are when a pilot operates

an aircraft during weather conditions that allow the pilot to see the ground and visually avoid obstructions. IFR are when a pilot operates an aircraft using instruments within the cockpit versus referencing the ground due to the surrounding cloud cover and weather conditions.

Based on the forecasts presented in **Chapter 3.0, Aviation Forecasts**, the peak hourly operations were calculated for the existing 2015 operations and for the future 2035 operations. The national FAA guidance for general aviation airports assumes a single general aviation runway can accommodate 98 operations per hour during VFR conditions and 59 operations per hour during IFR conditions. The FAA guidance also assumes the busiest month at a general aviation airport conducts 14.8% of the annual operations. However, due to the seasonal activity of agricultural aircraft at SLB, the busiest month was assumed to be 20% of annual operations. This equates to 2,520 operations in the busiest month for 2015 and 3,220 operations in 2035. The number of peak operations for the busiest day in the busiest month is 84 (2,520/30) in 2015 and 108 (3,220/30) in 2035. The national FAA guidance also assumes at general aviation airports, the peak hour is 20% of the peak daily operations. Therefore, the peak hourly operations for 2015 are 17 (84 x 0.20) and the peak hourly operations in 2035 are 22 (108 x 0.20). Based on the airport layout and conditions at SLB, the hourly capacity is shown in **Table 4-3**.

Table 4-3
Hourly Capacity

2035 Peak Hourly Operations	VFR Hourly Capacity	VFR Percentage	IFR Hourly Capacity
17	98	17.3%	59

Source: Bolton & Menk Analysis, FAA AC 150/5060-5, *Airport Capacity and Delay*

The vast majority of operations at SLB will occur under VFR conditions. Peak hourly operations will likely never be achieved under IFR conditions. Using these assumptions, the peak operations forecasted within the planning horizon will adequately meet the demand of a single runway during VFR and IFR weather conditions. No significant long-term delays are forecasted.

4.3. INSTRUMENT APPROACHES

Instrument approach procedures provide arriving aircraft with electronic guidance to the airport runway environment during periods of low visibility. SLB experiences weather conditions requiring the use of an instrument approach procedure approximately 3.63% of the time. Visual approaches to a runway have no instrument approach procedure. For instrument approaches, FAA defines the following types of procedures:

- Non-Precision Approach – A standard instrument approach procedure with horizontal guidance to the runway end and no electronic vertical descent guidance. These approaches utilize ground-based or satellite-based navigational aids such as GPS, VOR, and NDB. The definitions for GPS, VOR, and NDB are included in **Section 2.10.3** of this report.
- Approach with Vertical Guidance – An instrument approach procedure providing course and vertical descent guidance. These approaches utilize ground-based glideslope navigational aids or satellite based navigational aids such as a Localizer Performance with Vertical Guidance (LPV).
- Precision Approach – An instrument approach procedure with course and vertical descent guidance and visibility minimums of less than ¾ mile (4,000 foot Runway Visual Range). These approaches utilize ground-based navigational aids as part of an Instrument Landing System (ILS). The two components of an ILS are a localizer antenna for course guidance and glideslope antenna for vertical guidance.

SLB currently has non-precision approaches. These procedures include an Area Navigation (RNAV) Global Positioning System (GPS) to Runway 17/35 with a LPV approach to Runway 35, and a ground-based NDB navigation aid approach to Runway 17/35. Published cloud ceiling minimums are as low as 300 feet above the airport elevation. Published visibility minimums are 1 mile for the approach to Runway 17/35. These GPS approaches are satellite-based and do not rely on ground-based facilities.

Pilots commented in the user survey that a precision approach would be beneficial to the corporate users based at the airport. The next closest airport with a precision approach is the Spencer Municipal Airport which is 34 nautical miles from SLB. Based on discussions with local business pilots, the lack of a precision approach at the airport has required pilots to deviate from SLB, land at the Spencer Municipal Airport and drive back to Storm Lake for business meetings. A precision approach would lower the visibility minimums and cloud ceiling heights at SLB allowing business aircraft operators to use SLB more often.

Adding a precision approach at the airport requires larger safety areas to be cleared of obstructions. The size of the Runway Protection Zone increases with a precision approach from 13.8 acres to 78.9 acres. In addition, the primary surface is 1,000 feet wide instead of 500 feet wide as with a non-precision approach. The location of the airport within an agricultural area allows for proper planning and land use protection for development of a precision approach at the airport (see **Figure 4-2**, at the end of this chapter). The addition of a precision approach to Runway 17/35 is recommended within the 20 year planning period.

Currently Runway 13/31 and Runway 6/24 are visual runways without an approach to the runway ends. These runways are limited to meteorological conditions that meet the minimum requirements for VFR flight. Adding a non-precision instrument approach to Runway 13/31 would allow users to utilize this runway at times when visibility minimums or cloud ceilings are too low to support VFR flight. This would provide increased wind coverage by allowing the use of the crosswind runway (Runway 13/31) during IFR flight conditions. The addition of a non-precision instrument approach to Runway 13/31 is recommended within the 20 year planning period (see **Figure 4-2**, at the end of this chapter). It is also recommended that Runway 6/24 remain as a visual runway.

4.4. RUNWAY FACILITY REQUIREMENTS

Runways at airports need to meet applicable design standards for safe operations and to remain eligible for federal and state funding. These standards are established by regulatory agencies in order to provide for the safe and efficient operation of aircraft on and in the vicinity of an airport. The design standards are based on two components which include the critical design aircraft and the most demanding type of approach established for either runway end.

The primary runway is currently designed to B-II/Large standards based on the critical design aircraft currently using the runway and proposed to use the primary runway over the next 20 years. These requirements are important when determining the design standards for the future development of not only the runways, but the entire airport.

4.4.1. PRIMARY RUNWAY 17/35

Runway Length

Runway length is a critical component to any airport design, as it provides aircraft a defined area for takeoff and landing operations. Runway length requirements are determined by reviewing the needs of the critical design aircraft planned to use the airport for a total of 500 annual operations or more. Aircraft require the most runway length during their takeoff roll. Factors affecting runway length include aircraft performance, aircraft load factor, route length, airport elevation, runway gradient, runway condition, and temperature. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* provides guidance

in determining runway length requirements.

Based on information provided in **Chapter 3.0, Aviation Forecasts**, runway needs are defined by the classification of large airplanes of 60,000 pounds or less. Large aircraft are grouped by percentage of fleet and useful load factor. Seventy-five percent of fleet covers those aircraft up to the 75th percentile in terms of runway length needs. The 100 percent of fleet category contains the remaining 25th percentile of aircraft and therefore, requires greater runway lengths. Useful load factor is the difference in the maximum allowable structural gross weight of an airplane and the operating empty weight. For calculations of runway length, the useful load factor is split into two groups, either 60 percent or 90 percent. Therefore, the runway calculations take into consideration the weight of the aircraft during takeoff operations.

Large aircraft currently using SLB are summarized in **Table 3-12**. Of the 22 large aircraft models documented by the IFR Flight Data, 17 are in the 75 percent of fleet category, and five are in the 100 percent of fleet category. **Table 4-4** gives the recommended runway lengths for SLB for this classification of aircraft.

Table 4-4
Recommended Runway Lengths (airplanes less than 60,000 pounds)

Airport Data	
Airport elevation	1,488' mean sea level
Mean daily maximum temperature of the hottest month	83°F
Maximum difference in runway centerline elevation	4.3 feet
Aircraft Criteria	**Runway Length (feet)**
Large Aircraft of 60,000 pounds or less	
75 percent of fleet at 60 percent useful load	5,500
75 percent of fleet at 90 percent useful load	7,000
100 percent of fleet at 60 percent useful load	5,700
100 percent of fleet at 90 percent useful load	8,300

Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

According to **Table 4-4**, the existing runway length of 5,000 feet for Runway 17/35 is shorter than recommended for 75 percent of fleet at 60 percent useful load. A 90 percent useful load factor would require the runway to be 7,000 feet. A runway extension to 6,500 feet would be adequate for 75 percent of fleet at 90 percent useful load and 100 percent of fleet at 60 percent useful load. A runway extension to 5,500 feet would accommodate the majority of aircraft that use SLB. However, there were five aircraft in the 100 percent of fleet category known to use the airport. A runway extension to 7,000 feet would require closure or relocation of 650th Street south of the airport. The additional land acquisition required with an extension to 7,000 feet is not realistic for the City of Storm Lake. Therefore, to maximize the runway length and the space available for expansion, an extension to 6,500 feet is proposed. A runway length of 6,500 feet also allows business aircraft to operate at maximum capacity during wet, icy, or even hot conditions Due to the location of State Highway 110 to the north, any extension to Runway 17/35 will be to the south (see **Figure 4-3**, at the end of this chapter).

Runway Width

FAA airport design standards require an RDC B-II runway with less than ¾ mile instrument approach minima to have a width of 100 feet. A runway width of 100 feet is also an Iowa State Aviation System Plan (SASP) objective for B-II runways with visibility minimums lower than ¾ mile. It is recommended that Runway 17/35 be widened from 75 feet to 100 feet prior to publication of a precision approach.

Runway Pavement Strength, Type, Condition

Airport pavement strength is based on single wheel and dual-wheel landing gear configurations. The gear configuration determines how the weight is distributed on the pavement. Published weight bearing capacity is a result of the pavement section thickness, materials, and underlying soils. Currently, the published pavement strength for the primary runway at SLB is 30,000 pounds single-wheel gear and 38,000 pounds dual wheel gear.

The maximum gross weight of the future critical design aircraft will continue to be up to but not exceed 30,000 pounds single wheel gear and 38,000 pounds dual wheel gear. Aircraft greater than 38,000 pounds dual wheel gear may use SLB on a non-regular basis. Future pavement design should ensure these operations can be accommodated without jeopardizing the pavement condition.

The 2016 Pavement Condition Index (PCI) report states the concrete runway is in good condition.

Runway Wind Coverage

At 96.37%, the wind coverage of the primary runway currently does satisfy the 95% wind coverage at 13 knots recommended for RDC B-II aircraft. IFR flight data was used to determine there were 715 operations in turboprop and jet aircraft such as the Cessna Citation 525C (RDC B-II/L) from March 2012 to March 2015.

4.4.2. CROSSWIND RUNWAY 13/31

Crosswind Runway 13/31 is a concrete runway 3,035 feet in length and 50 feet wide. There is currently a 165-foot displaced threshold on the Runway 13 end because there was not adequate clearance of the approach surface over State Highway 110. A displaced threshold requires pilots landing on Runway 13 to touch-down after the displaced threshold markings to provide the appropriate clearance when flying over State Highway 110. Since the construction of the displaced threshold, standards for the approach/departure surfaces have changed. To meet standards today, a displaced threshold of 375 feet is required to clear State Highway 110. A picture of the displaced threshold can be seen on the right hand side of the page.

Crosswind Runway Length

The suggested crosswind runway length according to FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* is "100% of the length determined for the lower crosswind capable airplanes using the primary runway." Based on this criteria, Runway 13/31 would need to be extended an additional 1,965 feet to the southeast. This is not a feasible alternative for the airport.

Out of the 31 total user surveys returned, three users identified that the length of Runway 13/31 is too short during wet or icy conditions. Four of the users said the runway was too short on hot days. Aircraft are designed to take off and land into the wind. Crosswinds and tailwinds can create hazardous situations for pilots, particularly those flying smaller aircraft. A crosswind runway is recommended at the airport for safe operation of agricultural sprayers, tail wheel aircraft, and other small aircraft with low approach and takeoff speeds. These smaller aircraft do not need a 5,000 foot runway to conduct safe operations. **Table 4-5** lists the recommended runway length for small aircraft at SLB based on FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Table 4-5
Recommended Runway Lengths (small airplanes)

Airport Data	
Airport elevation	1,488 feet mean sea level
Mean daily maximum temperature of the hottest month	83°F
Maximum difference in runway centerline elevation	4.3 feet
Aircraft Criteria	**Runway Length (feet)**
Small airplanes (with less than 10 passenger seats)	
95% of these small airplanes	3,500
100% of these small airplanes	4,100
Small airplanes with 10 or more passenger seats	4,300

Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

FAA runway length requirements split small airplanes (less than 12,500 lbs.) into three categories to determine runway length. These are defined as the following:

Small Airplanes with less than 10 passenger seats:

- 95 Percent of Fleet - This category applies to airports that are primarily intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. Their inclusion recognizes that these airports in many cases develop into airports with higher levels of aviation activity.
- 100 Percent of Fleet - This type of airport is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.

Small Airplanes with 10 or more passenger seats

- Small airplanes with 10 or more passenger seats (excluding pilot and co-pilot) demand a longer runway to safely serve these type of aircraft, thus these airplanes have their own determined runway length requirements category.

The existing length of 3,035 feet is slightly shorter than the recommended runway length of 3,500 feet for a community with a medium sized population such as Storm Lake. However, to maximize the existing airport property, an extension to 3,600 feet is recommended. This would maximize the runway length without the future RPZ going over 90th Avenue. This keeps the Runway 13 threshold in its current location and takes into consideration the 375-foot displaced threshold (see **Figure 4-4** at the end of this chapter).

Crosswind Runway Width

FAA Airport Design standards recommend a runway width based on the Aircraft Approach Category and Airplane Design Group of the critical aircraft using or proposed to use the runway. Since the purpose of the crosswind runway is to provide adequate wind coverage for small A-I and B-I aircraft, the runway width requirement is 60 feet. The existing width of Runway 13/31 is 50 feet. It is recommended that the runway be widened to 60 feet within the 20 year planning period.

Crosswind Runway Pavement Strength, Type, Condition

Currently, the published pavement strength for Runway 13/31 at SLB is 4,000 pounds single-wheel gear. The pavement is currently in good condition according to the 2016 PCI report. The crosswind runway is used by smaller aircraft the majority of the time. The weight of this group of aircraft is under 12,500 pounds. Aircraft greater than 4,000 pounds single wheel gear may use Runway 13/31 on a non-regular basis. Future pavement design should ensure these operations can be accommodated without jeopardizing the pavement condition. It is recommended that the pavement strength be increased to 12,500 pounds single-wheel gear to accommodate all small aircraft who may use the airport.

4.4.1. CROSSWIND RUNWAY 6/24

Crosswind Runway 6/24 is a turf 1,962 feet in length, 95 feet wide, and is a turf runway. A turf runway is used by agricultural sprayers, tail wheel aircraft, and other small aircraft. Having a turf runway at the airport is a benefit for pilots who are training to receive their pilot's certificate. It also gives pilots of small aircraft another option for landing on a windy day.

Crosswind Runway Length

The results of the user survey indicated 15 users of Runway 6/24 identified the length of the runway as too short during wet or icy conditions, and 15 users identified the length of the runway as too short during hot days. Based on review of several aircraft manufacturing manuals and discussions with the existing users of the crosswind runway, a runway length of 2,500 feet is desired. Runway 6/24 does not meet the recommended runway length. However, because there is another option for a crosswind runway, it is recommended the length of the turf runway remain as it is over the next 20 years.

AC 150/5300-13A, *Airport Design*, provides guidance on installing either a strip of concrete or frangible cones along each threshold of the turf runway in order to maintain an accurate location of the runway ends. Many times during mowing operations or when opening the runway after winter months, the threshold locations can shift. Marking the ends with either a strip of concrete or frangible cones can ensure that the airspace evaluation remains valid for each runway end. The frangible cones must stay out of the 20:1 approach slope and the concrete can only be 1.5 inches above the surrounding grade.

Crosswind Runway Width

FAA Airport Design standards recommend a runway width based on the Aircraft Approach Category and Airplane Design Group of the critical aircraft using or proposed to use the runway. It is recommended that the turf runway be as wide as the Runway Safety Area (RSA) so the takeoff/landing surface is available for all aircraft out to the RSA width. The existing width of Runway 6/24 is 95 feet. It is recommended that the width of Runway 6/24 be increased to 120 feet for the 20 year planning period.

Crosswind Runway Pavement Strength, Type, Condition

The existing turf on Runway 6/24 is in good condition. Because there is another paved crosswind runway available for airport users, it is proposed that the runway remain a turf runway over the next 20 years.

4.5. AIRPORT VISUAL AIDS & NAVIGATIONAL AIDS

Airport visual aids are a necessary component to provide pilots with the proper guidance within the immediate airport environment. As discussed in the Airport Inventory chapter, there are several visual aids at the airport. This section will identify if any airport visual aids need to be added, changed, or upgraded based on the needs of the existing and future users of the airport.

- The existing runway edge lights on Runway 17/35 are Medium Intensity Runway Lights (MIRLs). MIRLs are recommended for runways with night procedures and/or visibility minimums one mile or greater. If the visibility minimums drop below one mile, High Intensity Runway Lights (HIRLs) are required. HIRLs should be installed within the 20-year planning period.
- The existing non-precision markings on Runway 17/35 will need to be changed to precision markings when the approaches to each runway end are changed. In addition, the markings on Runway 13/31 will need to be changed to non-precision approach markings when the approaches to each runway end are added.
- Installation of Glide Slopes and Localizers will be needed to both Runways 17 and 35 in order to meet the precision instrument runway criteria.
- SLB has taxiway edge lighting installed along the connecting taxiways.
- Runway End Identifier Lights (REILs) are installed at SLB on both ends of Runway 17/35. These lights provide rapid and positive identification of the approach end of a runway during night and low visibility conditions. It is recommended that REILs be added to Runway 13/31 when the non-precision approaches are published on each runway end.
- It is recommended that either a strip of concrete or frangible cones be installed along each threshold of the turf crosswind Runway 6/24 in order to maintain an accurate location of the runway ends. However, runway markings such as runway numbers or threshold location bars will not be painted on the turf runway.
- There are currently 2-light Precision Approach Path Indicators (PAPIs) for both runway ends of Runway 17/35 at SLB. These type of lights provide glide path guidance to pilots during landing operations. It is recommended that the 2-light PAPIs be replaced with 4-light PAPIs at the end of their useful life. It is also recommended that PAPIs be added to each end of Runway 13/31 when the non-precision approaches are published on each runway end.
- The existing NDB approach to the airport is an older approach procedure. FAA has been working on decommissioning these types of approaches and removing the NDB antennas. It is recommended to leave the NDB approach until it no longer works or FAA decommissions it at SLB.

No additional visual aids or navigational aids are recommended at SLB over the next 20 years.

4.6. METEOROLOGICAL FACILITIES

SLB has a wind cone located east of Runway 17/35 near the intersection to Runway 13/31. The wind cone is visible to pilots using all three runways. It is recommended the wind cone remain in this location over the next 20 years.

The existing AWOS must be kept clear of agricultural operations within 100 feet of the tower, clear of objects above the 30-foot sensor height within 500 feet, and clear of high objects or structures within

1,000 feet of the system. The AWOS is located east of Runway 17/35 south of the wind cone. It is recommended the AWOS remain in this location over the next 20 years.

4.7. TAXIWAY & TAXILANE FACILITY REQUIREMENTS

4.7.1. TAXIWAY REQUIREMENTS

The existing taxiway system at SLB consists of one connector taxiway, 40 feet wide, from the end of Runway 17, across Runway 13/31, to the existing building area (see **Figure 2-3**). Taxiway facilities at an airport are established to enhance the safety and efficiency of airfield operations. There are no parallel taxiways at the airport. A full parallel taxiway prohibits the need for aircraft to back taxi on an active runway after landing or prior to takeoff.

The publication of a precision approach to Runway 17/35 requires the runway to have a full parallel taxiway. This is due to aircraft being able to land on the runway when visibility minimums are less than ¾ mile. Once aircraft land they can exit onto the parallel taxiway to taxiway back to the building area. This will keep slower speed aircraft off the runway. A parallel taxiway is recommended for runways with a non-precision approach, such as what is recommended for Runway 13/31. Therefore, it is recommended that a parallel taxiway also be construction to Runway 13/31 when the non-precision approaches are established to the runway end.

The runway to taxiway centerline separation distance and the taxiway safety area dimensions are defined by the critical aircraft and type of approaches proposed to be used at the airport over the next 20 years. The future critical design aircraft for Runway 17/35 is RDC B-II and the future approaches are proposed to be precision with less than 3/4 mile visibility minimums. Based on this criteria, the parallel taxiway should be constructed 300 feet from the runway centerline. The taxiway object free area (TOFA) width is 131 feet centered on the taxiway centerline to ensure proper wing tip clearance. Only objects necessary for air navigation may be placed within the TOFA (see **Figure 4-5** at the end of this chapter).

The future critical design aircraft for Runway 13/31 is RDC B-I and the future approaches are proposed to be non-precision with greater than or equal to one mile visibility minimums. Based on this criteria, the parallel taxiway should be constructed 225 feet from the runway centerline. Because there are larger aircraft that may use the runway when the crosswind component is too high for the primary runway, it is recommended the runway centerline to parallel taxiway centerline separation be 240 feet for RDC B-II aircraft. There is adequate space for construction at this separation between the runway and the existing building area (see **Figure 4-5** at the end of this chapter).

Taxiway width, fillet, and curve design are based on the Taxiway Design Code (TDG) of the critical aircraft identified for use on the parallel taxiway. The TDG is based on the width of the main gear of the aircraft and the distance between the cockpit and main gear of the critical design aircraft. The classification for taxiway development at SLB is TDG-2. The taxiway width for this group of aircraft is 35 feet. It is recommended that both parallel taxiways be constructed 35 feet wide.

There is no specifically marked taxiway to the turf crosswind runway. Most pilots use the existing pavement to access the crosswind runway and then back taxi on the crosswind runway to access the runway ends. The turf crosswind runway is designed to RDC A-I-visual standards. The runway to taxiway centerline separation for this type of aircraft is 150 feet. It is recommended a future turf parallel taxiway be constructed 150 feet north of the crosswind runway centerline in order to access each runway end without taxiing on the runway.

4.7.2. TAXILANE REQUIREMENTS

While taxiways provide access from the active runway to the building areas, taxilanes provide access to hangars and other facilities throughout the building area. Taxilanes are not as wide nor do they require the same safety area widths as taxiways due to aircraft operating at lower speeds.

There are two groupings of aircraft that are in the existing hangars or do business at SLB. The TDG for the type of aircraft using the hangar area at the airport is TDG-1B and TDG-2. Based on the fillet design tables for taxiways, the minimum recommended taxilane width for TDG-1B aircraft is 25 feet and the taxilane width for TDG-2 aircraft is 35 feet. The taxilane object free area used to maintain adequate wing tip clearance between hangars is based on the ADG of the critical aircraft and should be 79 feet for ADG I aircraft and 115 feet for ADG II aircraft.

The majority of separation distances in the existing building area meet TDG-1B standards. Any new taxilanes constructed in the building area should meet the width and separation distance standards as mentioned above. The 20 year building area plan in the ALP depicts the different separation standards and taxilane access within the building area (see **Appendix B**). The ALP may show more development than necessary within the 20 year planning period, however, this provides a plan in the event hangar growth occurs more rapidly than expected.

4.8. APRON SIZE & TIE-DOWN REQUIREMENTS

An aircraft apron provides an area for aircraft parking, aircraft movements, fueling operations, and access to the hangar area. The apron space requirements are developed according to local trends and FAA design standards. The existing apron is 10,651 square yards and provides six tie-downs.

Aircraft Tie-Downs

An analysis of the overall tie-down and apron size requirements was completed to determine the future needs at the airport. The peak number of operations on the busiest day of the year at SLB were used to calculate the number of tie-down spaces needed in the base year and also at the end of the 20 year planning period. This will ensure there are adequate tie-down spaces available at any time throughout the year. The demand at the airport was calculated at the beginning of this chapter. In 2015, the peak number of operations on the busiest day is 84. Itinerant aircraft represent 60% of the operations or 51 operations or 26 aircraft on the busiest day of the year. It is assumed 50% of itinerant aircraft that use the airport on the busiest day will stay and park at the airport for a total of 13 tie-downs needed in 2015. There are currently six tie-downs at the airport on the existing pavement. Due to the location of the existing fuel system, there is not enough space to add additional tie-downs to the apron without blocking aircraft from getting to the existing hangars. Therefore, the existing apron will need to be expanded to accommodate the additional tie-down spaces recommended.

The same formula was used to determine the number of tie-downs necessary at the end of the 20 year planning period. The peak number of monthly operations at the airport in 2035 is 3,220. Therefore, there are approximately 108 operations per day by 54

aircraft on the busiest day of the year. If 50% of the itinerant aircraft that use the airport on the busiest day stay and park at the airport, 17 tie-downs will be needed in 2035.

As mentioned previously, additional apron space is needed before tie-downs can be added to the building area. There are currently 6 tie-down spaces available for ADG-I aircraft at SLB. Eleven tie-down spaces are needed to accommodate the growth over the next 20 years. Adding apron space can accommodate 20 ADG-I aircraft and three ADG-II aircraft. This will be more than adequate for the 20 year planning period. The building area plan on the ALP depicts the future tie-down locations (see **Appendix B**). The ALP may show more development than necessary within the 20 year planning period, however, this provides a plan in the event based aircraft growth occurs more rapidly than expected.

Apron Size

General aviation apron space requirements necessitate an assessment of the number of aircraft tie-downs, airplane types, wingtip clearances, and aircraft maneuverability.

Existing apron facilities at the airport consist of a main 10,561 square yard area for parking, aircraft tie-downs, fueling, and general aircraft circulation. FAA size factors for apron space assume 960 square yards of apron space to accommodate both the aircraft and a taxilane for ADG-I airplane and 1,385 square yards to accommodate both the aircraft and a taxilane for an ADG-II airplane. To accommodate ADG-II aircraft, an apron of 14,159 square yards is recommended for the existing conditions increasing to 18,257 square yards in 2035. The existing apron should be expanded within the 20 year planning period to accommodate future demands including parking for ADG-II aircraft. Actual apron size will be based on meeting local constraints and maneuverability requirements. The apron depicted on the ALP is 12,425 square yards and depicts 14 additional tie-downs for ADG-I airplanes and three additional tie-downs for ADG-II airplanes. A copy of the Apron Size Calculations for Transient Aircraft is included in **Appendix C**.

4.9. IA STATE AVIATION SYSTEM PLAN (SASP) AIRSIDE RECOMMENDATIONS

The SASP gives a top down approach to looking at the needs of the aviation system in Iowa. Although the Airport Master Plan process is a more in depth look at a specific airport, the SASP recommends basic needs for the airport based on how the airport serves the aviation system as a whole within the state.

SLB is classified as a General Service airport in the SASP. General Service airports such as SLB have a paved and lighted primary runway 4,000 feet or greater length. These airports are capable of accommodating single-engine aircraft, multi-engine aircraft, and small to mid-sized business jets depending on runway length. These airport types are a community economic asset and serve a variety of roles including emergency medical flights, recreational flying, flight training, and business travel flights in support of local businesses.

The recommendation for SLB within the SASP is to:

- Expand the apron to park 100% of the average itinerant daily flights
- Construct hangars for 100% of based aircraft
- Construct overnight storage for transient aircraft

These recommendations reflect what has been discussed in the previous sections and will be depicted on the ALP (see **Appendix B**).

4.10. LANDSIDE FACILITY REQUIREMENTS

Building area facilities at a general aviation airport support airfield operations providing aircraft storage, fueling operations, aviation services, Arrival/Departure (A/D) building space, and automobile parking. Overall facility requirements should be designed to accommodate ARC B-II aircraft to meet existing and future critical aircraft requirements. Areas designed to exclusively serve smaller aircraft will also be depicted on the ALP (see **Appendix B**).

4.10.1. ARRIVAL/DEPARTURE (A/D) BUILDING

General aviation A/D buildings provide an area for local and transient pilots and passengers to transition to and from the aircraft operations area. The existing A/D building is 2,040 square feet in size and was constructed in 1990. The facilities within the A/D building include restrooms, conference room, office, and computer access for flight planning. The facilities noted in the User and Business Survey in **Chapter 3, Aviation Forecasts**, suggest a need for a better pilot lounge/updated terminal building, faster internet for pilot planning, new computers, and new printers.

Public space requirements are designed around the number of passengers (including the pilot) during the peak hours of operations at the airport. A general average of one pilot and one passenger per general aviation flight can be assumed. A general aviation A/D building requires approximately 50 square feet per passenger for circulation, waiting area, management/operations space, public conveniences, concessions area, and storage. The recommended size of the A/D building is based on the peak hourly operations of 17 in 2015 and 22 in 2035. Assuming two persons per flight, the existing activity at SLB requires an 850 square foot building increasing to 1,100 square feet within the 20 year planning period. The existing A/D building of 2,040 square feet is adequate for the 20 year planning period.

There were multiple discussions during the Master Plan Advisory Group meetings regarding the A/D building as the gateway to the community for people flying to Storm Lake. The A/D building has not been updated since it was constructed in 1990. The group recommended some updates to the inside of the building to make it more welcoming to visitors. The group also recommended updating the pilot facilities and equipment for pilots to be comfortable during their stay. Because this building is the gateway to the community, the group discussed adding brochures and information about the community in the main entrance to the building to give visitors an opportunity to visit the attractions and restaurants in the area.

4.10.2. AIRPORT ACCESS & AUTOMOBILE PARKING

Access

The entrance to SLB is located on the north side of the airport accessible via State Highway 110. The airport entrance road is paved and provides access to the automobile parking lot adjacent to the A/D building. The access road is adequate to serve the existing and projected needs of the airport.

There is also a need for the City of Storm Lake or FBO to provide ground transportation to pilots flying into the airport. Most general aviation provide a courtesy car for pilots to use for free. The only requirement is that they fill the car back up with gas before returning to the airport. Most communities can cover the insurance on this type of service through City insurance policies. This is a service that appeals to many pilots flying to the airport. It allows them to drive to town for lunch or other services while waiting for their customers to come back to the airport for the return flight.

Parking

An airport needs to provide adequate automobile parking to accommodate pilots, employees, visitors, and passengers. The existing automobile parking lot is paved and has 48 automobile parking stalls in immediate proximity to the A/D building and Fixed Based Operator (FBO). There are currently 36 based aircraft at SLB. The airport meets the requirements in the Iowa Aviation System Plan which recommends that a General Service airport has a paved entrance road and available parking by the A/D building.

On-site aviation businesses also require additional vehicular parking needs for employees and their visitors. Generally, an automobile parking area should provide five parking spaces for each service offered with additional spaces for employee parking. The ALP depicts additional automobile parking spaces at the airport. However, the City of Storm Lake should continue to monitor parking availability for future businesses locating at the airport.

4.10.3. AIRCRAFT STORAGE

Aircraft are typically stored in conventional box hangars, or T-hangar structures on the airport. Currently, SLB has two public 6-unit T-hangar buildings, one 7-unit T-hangar, one public conventional hangar, and three private conventional hangars.

Planning considerations for hangar facilities include the appropriate number and type of hangars to accommodate the projected based aircraft, hangar owner/tenant needs, and geographic/environmental constraints. Aircraft storage needs are driven by the based aircraft forecast and the type of aircraft storage demand.

Currently, most of the based aircraft at SLB utilize T-hangar units for storage. Demand for T-hangar space is assumed to remain strong as it is economical for the user. Currently, there are 36 based aircraft and only 31 hangar parking spaces. It is recommended that addition hangar space is available to accommodate the existing and future needs of based aircraft users.

Building area alternatives were developed to accommodate the existing needs of the airport but to also understand the potential of the building area and determining the appropriate location for various hangar types and other building area needs. Two building alternatives were developed for SLB. The building areas were planned to maximize the available space, regardless of demand, to ensure the most infrastructure can be planned.

The Building Area Alternative 1 is divided into areas based on taxi design groups (see **Figure 4-6** at the end of this chapter). The north end has two T-hangars proposed near the existing T-hangar buildings and three conventional hangars for ADG-I aircraft. Directly to the east and west of the A/D building is the ADG-II hangar area intended for corporate aircraft. With an expanded apron, there will be tie downs for ADG-I and ADG-II aircraft. From the apron is a new

taxiway that is built to TDG-2 standards. This allows for development to the east of the ramp which is not constrained to TDG-1B regulations. The SRE building is proposed along the entrance road.

The Building Area Alternative 2 is shown on **Figure 4-7**, at the end of this chapter. To the east of the A/D building is an ADG-II hangar intended for corporate aircraft. Further to the east of the apron area is the ADG-I and ADG-II hangar area. Relocating the taxiway allows object free clearances wide enough for TDG-2 aircraft. One ADG-I T-hangar is proposed south of the existing T-hangars north of the existing taxiway. In this alternative, there are more conventional ADG-I hangar areas is proposed east of the existing T-hangars. A Snow Removal Equipment (SRE) building is proposed along the entrance road to allow access to SRE without going through unpaved snow to access the equipment. This alternative also allows the radio control activity at the airport to remain.

The Master Plan Advisory Group selected Alternative 2 as the preferred alternative for the building area. This alternative is depicted on the ALP (see **Appendix B**). Actual demand for T-hangars and conventional hangars is dependent on the airport sponsor and individual hangar owner preferences. The future building are depicted on the ALP may show additional hangar development beyond the 20 year planning period. This is beneficial to show the potential of the building area should additional user needs occur.

4.10.4. AIRPORT FUELING SYSTEM

Fuel storage requirements are based on the average forecasted number of annual operations and fuel sales data for the airport. Based on national estimates, an anticipated fuel consumption rate of three gallons per piston aircraft operation for 100LL fuel and a consumption rate of five gallons per turbine aircraft operation for Jet A fuel is common at general aviation airports similar in size to SLB.

The existing peak month operations, discussed in **Section 4.2.2**, for piston aircraft is 1,350 operations (2,250 operations in the busiest month x 60%). At three gallons per operation, the peak month storage for 100LL fuel is 4,050 gallons. The ultimate peak month piston operations will be 1,932 operations (3,220 x 60%) requiring a peak month storage for 100LL fuel of 5,796 gallons.

Turbine operations comprise 30% of the total operations at SLB. Due to the high volume of turbine operations by agricultural aircraft during the growing season, the peak month operations for turbine aircraft is expected to be 40% of the total turbine operations in a year. The existing peak month operations for turbine aircraft will be 900 operations (2,250 x 40%). At five gallons per operation, this will require 4,500 gallons of Jet A fuel storage. The ultimate peak month turbine operations will be 1,288 operations (3,220 x 40%) requiring a peak month storage for Jet-A fuel of 6,440.

The existing fuel facility at SLB is located on the main apron and consists of a below-ground 12,000 gallon 100LL tank and an below-ground 12,000 gallon Jet A tank. The fuel storage requirements are sufficient to accommodate existing and future demand at the airport over the next 20 years.

4.10.5. AIRPORT MAINTENANCE

The City of Storm Lake does not store airport maintenance equipment at the airport. An airport maintenance and snow removal equipment storage building on airport property is recommended. This

structure would be located near the entrance road to allow for each vehicle access during snow events. A snow removal equipment storage building of 60 feet by 60 feet will be adequate to store the airport snow removal equipment and attachments. The proposed location for the SRE building is shown in **Figure 4-7** at the end of this chapter and is depicted on the ALP (see **Appendix B**).

4.10.6. AIRPORT PROPERTY

Airport property consists of 249.28 acres, owned in fee by the City of Storm Lake. In addition, the City has acquired 43.88 acres in easement within the Runway 17 and 35 approach to the primary runway. The future property acquisition needs include the land needed for expansion of the primary and crosswind runway (see **Appendix B**).

4.10.7. FENCING & SECURITY

SLB does not have any wildlife or security fencing on airport property. A perimeter fence may be used at smaller general aviation airports to deter malicious activity or help prevent wildlife from accessing the airport. Current FAA policy is to install minimal fencing to delineate the airport property and deter trespassers. Small general aviation airports are encouraged to have a site visit completed by a wildlife biologist to look for evidence of hazardous wildlife activity. The biologist may recommend a full 12 month Wildlife Hazard Assessment which in turn would be used to develop a Wildlife Hazard Mitigation Plan. The Airport Sponsor would be expected to follow any recommended mitigations from the Wildlife Hazard Mitigation Plan. These efforts may be eligible for funding through federal entitlement dollars however, this is not guaranteed. The ALP depicts a 10-foot high perimeter fence for airspace purposes, should the need for perimeter fencing ever be necessary.

4.10.8. STATE AIRPORT ZONING

The existing Airport Zoning Regulations were adopted for the airport from Iowa Code Chapter 329. This enables municipalities with airports to adopt, administer, and enforce zoning regulations to prevent airport-related hazards. Under this authority, the City of Storm Lake has adopted Special and Overlay Districts in Article 5 of the Storm Lake Zoning Code. The Airport Zoning Regulations apply overlay zones around the airport to protect people on the ground and the pilots and passengers in the air from incompatible land uses around the airport. The City of Storm Lake will need to update the Airport Zoning Regulations to accompany an extension to the primary and crosswind runways. When the ordinance is amended the City should be sure to reserve the authority to deny proposals that receive an FAA determination of "No Hazard" if the proposal increases instrument approach procedure minimums. The updated zoning requirements for the future runway configurations can be seen on **Figure 4-8** at the end of this chapter and are depicted on the ALP (see **Appendix B**).

4.11. IA SASP LANDSIDE RECOMMENDATIONS

At SLB, landside recommendations in the SASP include:

- Maintaining the terminal building
- Maintaining a paved entrance road and parking
- Provide staffing during business hours and on-call hours
- Maintain courtesy car and provide car rental

These recommendations reflect what has been discussed in the previous sections and will be depicted on the ALP (see **Appendix B**).

4.12. SUMMARY

The following points summarize the key facility requirements at SLB:

- Critical design aircraft is expected to remain ARC B-II/Large within the 20 year planning period. Most of the aircraft types using SLB will be ARC A-I small aircraft.
- A precision approach will be planned for Runway 17/35 and a non-precision approach will be placed for the paved crosswind Runway 13/31.
- A runway extension to 6,500 feet is being planned for Runway 17/35 to accommodate the development space at the airport and the business aircraft currently using the airport. A runway extension to 3,600 feet is proposed for the paved crosswind Runway 13/31.
- Building area improvements include additional T-hangar and conventional hangar development in addition to an expanded apron area, additional tie-downs, and perimeter fencing.
- An SRE building is proposed to store maintenance and snow removal equipment. It will be located along the entrance road.

Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-1

Planning Considerations Map

Develop a plan to maximize on-airport land uses to attract business development

Airspace Obstructions to be analyzed to maintain safe airport

Potential Improvements need to be realistic to implement and consider available financial resources

Airport Plans need to be compatible with community development

Engage airport stakeholders and the general public throughout the planning process

Need to determine local business needs to enhance role of airport in community as an economic development tool

Evaluate options for hangars and aviation business development within the building area

640th ST.

CH M43 90th AVE.

CH C65 630th ST

IA 110

IA 110 CH C65 630th ST

Runway 13/31 3,035' X 50'

Runway 6/24 1,962' X 95'

Runway 17/35 5,002' X 75'

24

31

17

35

13

6

Legend

- Buena Vista County Parcels
- Runway Protection Zone (RPZ)

0 800 Feet

Source: ESRI Imagery, City of Storm Lake, Buena Vista County

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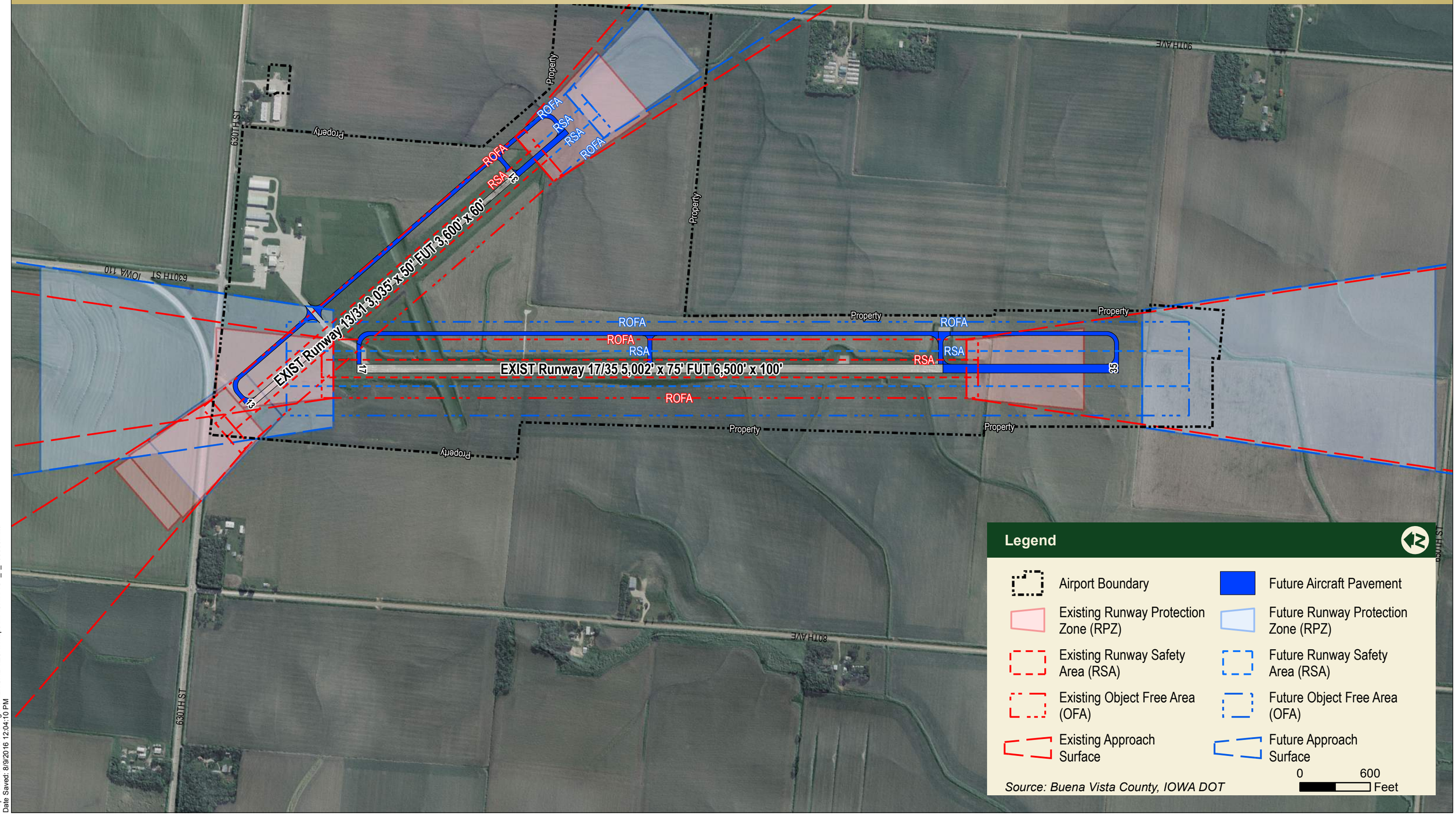
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-2

Future & Existing Runway 17/35 &13/31



Legend

- Airport Boundary
- Existing Runway Protection Zone (RPZ)
- Existing Runway Safety Area (RSA)
- Existing Object Free Area (OFA)
- Existing Approach Surface
- Future Aircraft Pavement
- Future Runway Protection Zone (RPZ)
- Future Runway Safety Area (RSA)
- Future Object Free Area (OFA)
- Future Approach Surface

Source: Buena Vista County, IOWA DOT

0 600 Feet

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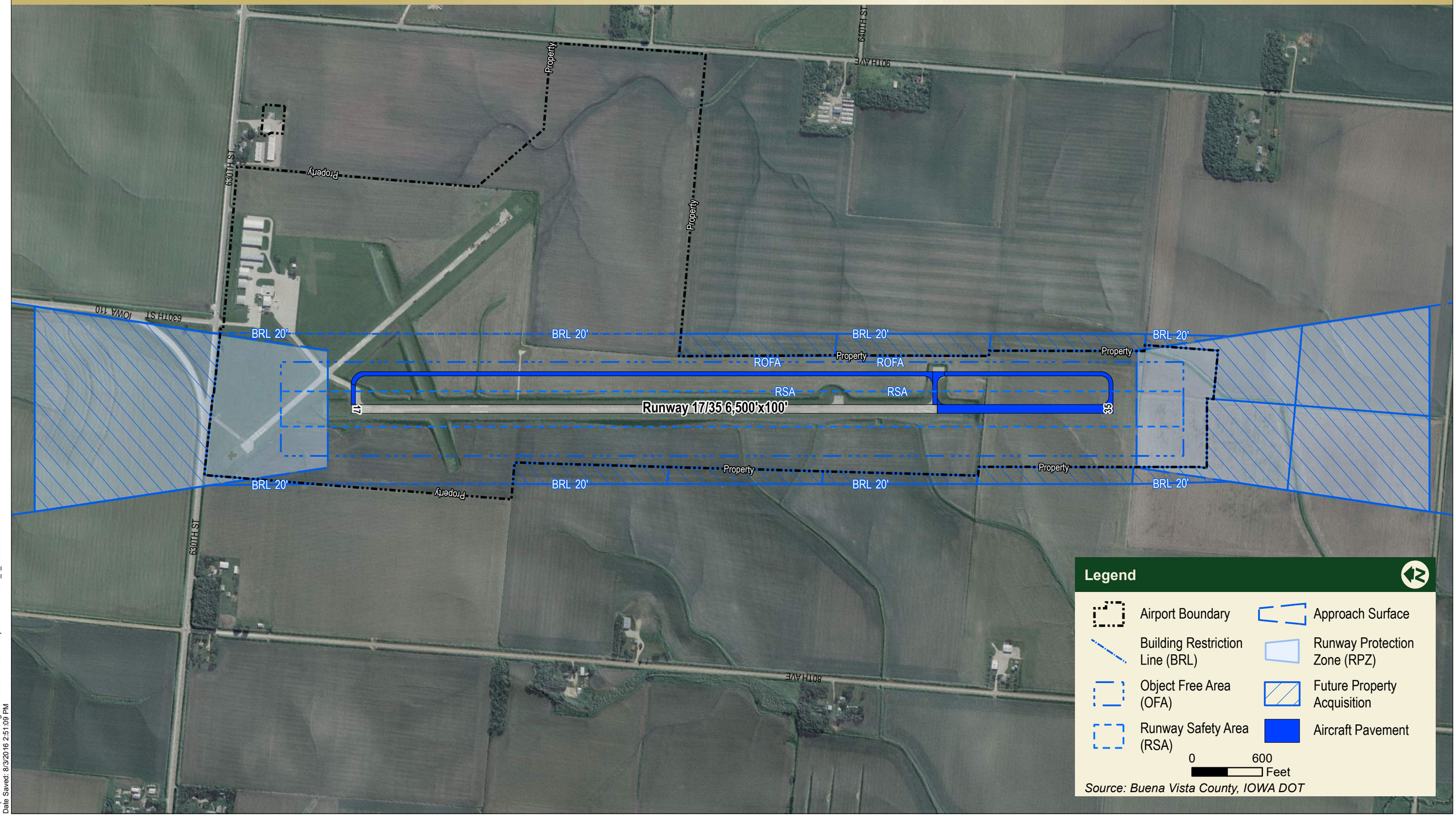
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-3

Future Runway 17/35



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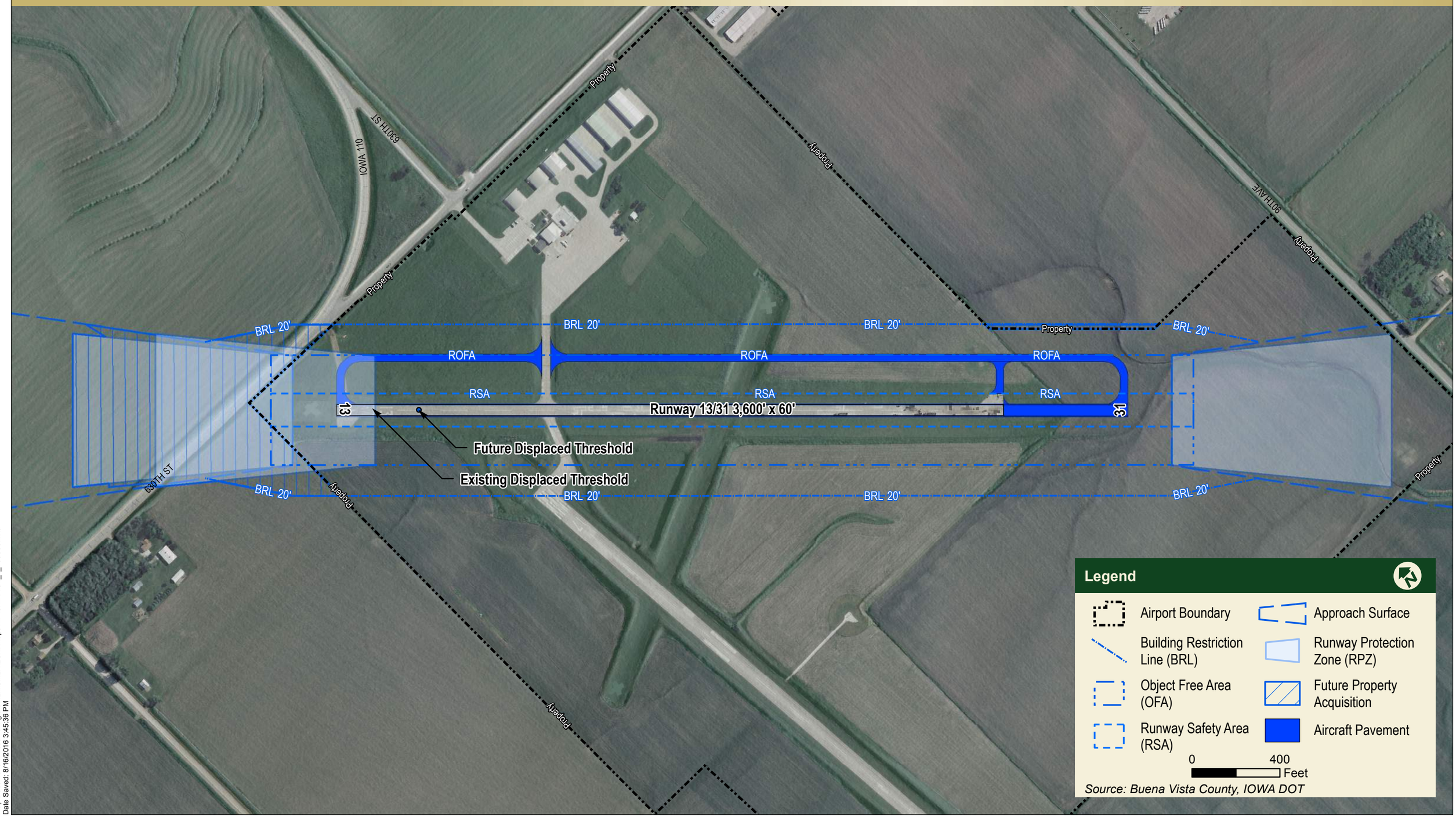
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-4

Future Runway 13/31



Legend

- Airport Boundary
- Approach Surface
- Building Restriction Line (BRL)
- Runway Protection Zone (RPZ)
- Object Free Area (OFA)
- Future Property Acquisition
- Runway Safety Area (RSA)
- Aircraft Pavement

0 400 Feet

Source: Buena Vista County, IOWA DOT

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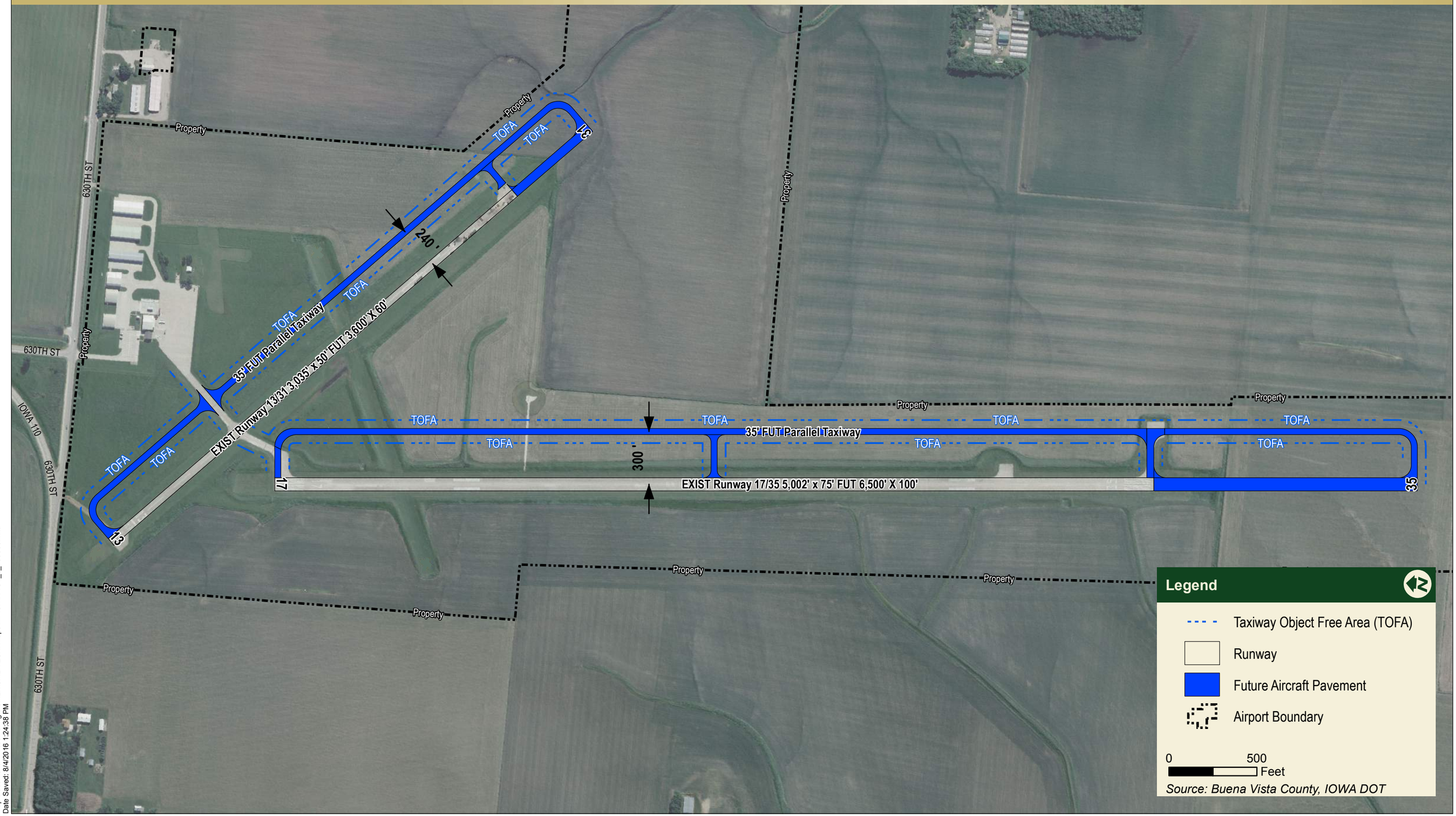
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-5

Full Parallel Taxiways



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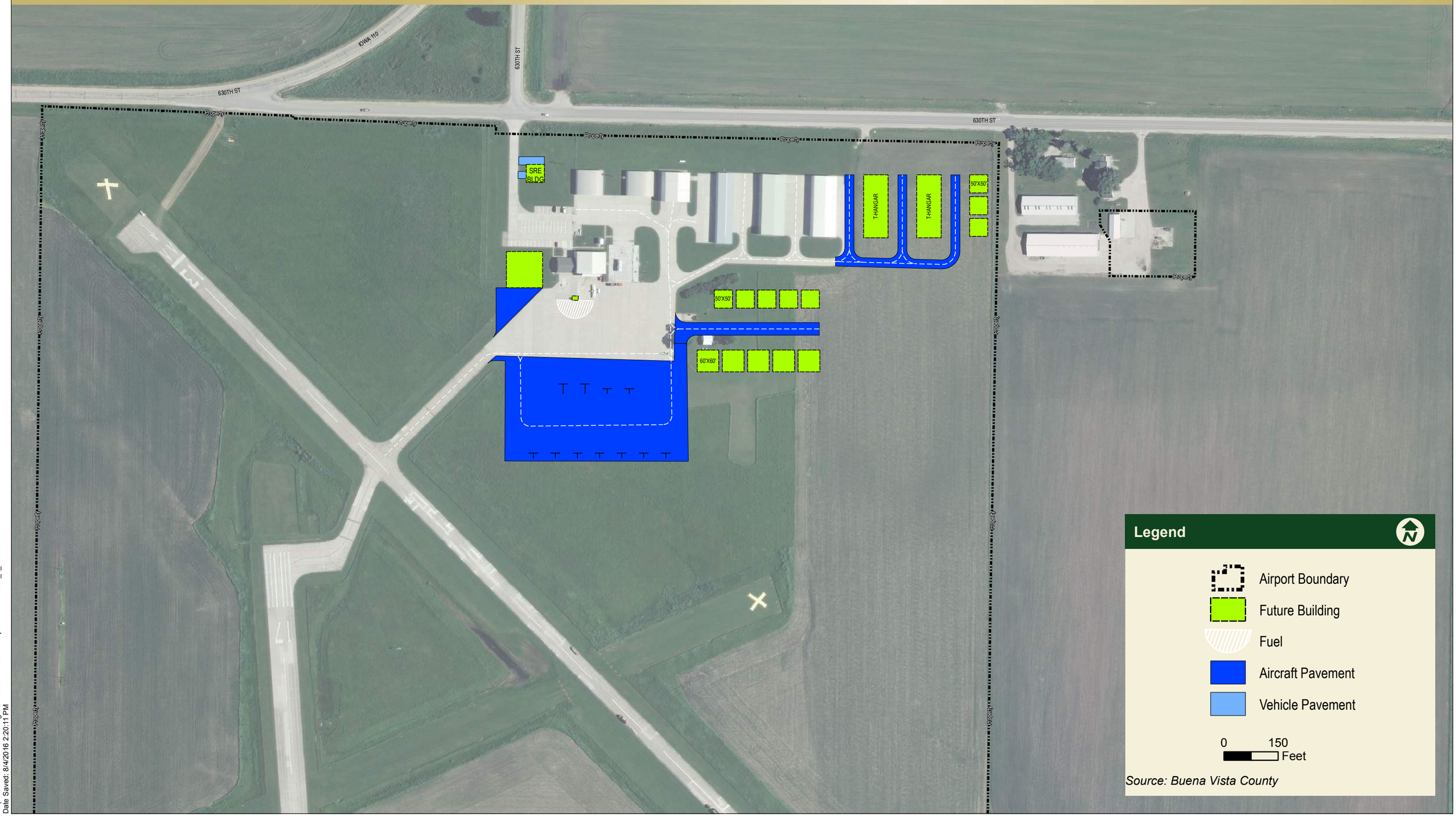
Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-6

Building Alternative 1



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Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-7

Building Alternative 2

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Storm Lake IA

Storm Lake Municipal Airport (SLB)

Figure 4-8

Future & Existing Airport Zoning

Legend

- Airport Boundary
- City of Storm Lake
- A-Existing Runway Protection Zone (RPZ)
- A-Future Runway Protection Zone (RPZ)

Existing Airport Zoning

- Primary Surface
- B-Runway Approach Surface
- C-Transitional Surface
- D-Horizontal Surface
- E-Conical Surface

Future Airport Zoning

- Primary Surface
- B-Runway Approach Surface
- C-Transitional Surface
- D-Horizontal Surface
- E-Conical Surface

0 4,000 Feet

Source: ESRI, Buena Vista County, IOWA DOT

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5. IMPLEMENTATION & FINANCIAL ANALYSIS

This chapter presents the financial implementation analysis for the Storm Lake Municipal Airport (SLB) and will examine various facets of the airport's financial operating condition. In addition, this chapter examines SLB's historic operating revenues and expenses, and provides 10-year projections of future financial results. The projections of airport revenues and expenses focus on two of the three planning periods of this Airport Master Plan's Capital Improvement Program (CIP): short-term (present -5 years) and mid-term (6-10 years). These planning periods are used to identify the ability of the airport to contribute to the local share of the anticipated costs, as required. It should be noted that SLB's Airport Master Plan CIP is used as a guideline, and that capital projects should be undertaken when demand warrants and funding becomes available.

The overall approach for the development of the Implementation & Financial Analysis included the following elements:

- Gathered and reviewed key airport documents related to historical financial results, capital improvement plans, and operating budgets
- Interviewed key airport management personnel to gain an understanding of the existing operating and financial environment, as well as the overall financial management philosophy
- Reviewed the Airport Master Plan CIP, cost estimates, and development schedule anticipated for the planning period in order to project the overall financial requirements for the program
- Determined and analyzed the sources and timing of capital funding available to meet the financial requirements for funding the CIP
- Analyzed historical and budgeted operating expenses, developed operations and maintenance expense assumptions, and projected future operating costs for the planning period
- Analyzed historical and budgeted operating revenues, developed operating revenue assumptions, and projected future operating revenues for the planning period
- Completed results of the analysis and evaluation in a Financial Plan Summary that provides conclusions regarding the financial practicality of the CIP

5.1. CAPITAL FUNDING SOURCES

The development of the Airport Master Plan CIP is anticipated to be funded from several sources. These sources include federal grants, state grants, net operating revenue/cash reserves, and other funding sources. Each of these funding sources are described in the following sections.

5.1.1. FEDERAL AVIATION ADMINISTRATION (FAA) FUNDING

To promote the development of airports to meet the nation's needs, the federal government embarked on a Grants-In-Aid Program to units of state and local government after the end of World War II. Following multiple earlier versions of federal funding programs, the Airport Improvement Program (AIP) was established through the Airport and Airway Improvement Act of 1982. The initial AIP provided funding legislation through fiscal year 1992, but since then, it has been authorized and appropriated on a yearly or even quarterly basis. Funding for the AIP is generated through taxes on airline tickets, freight waybills, international departure fees, and general aviation fuel sale taxes.

AIP grants include entitlement dollars, which are allocated among airports by a formula that is driven by passenger enplanements and by discretionary grants that are awarded in accordance with specific guidelines. Generally, primary airports receive entitlements based on the number of enplaning passengers

and landed cargo weights, while non-primary airports, which include general aviation airports, receive a set entitlement amount per year (currently up to $150,000) and may also be eligible for state apportionments. The total amount of state apportionment is based on an area/population formula for the state, while the amount of non-primary entitlements is computed from the needs list for the particular airport in the published National Plan of Integrated Airport Systems (NPIAS). Federal Airport Improvement Funds must be spent on FAA-eligible projects as defined in FAA Order 5100.38C "Airport Improvement Program (AIP) Handbook." The handbook and the latest authorization, *Modernization and Reform Act of 2012*, state that:

- An airport must be included in the current version of the NPIAS;
- Non-primary entitlement funds of up to $150,000 per year can be accumulated for up to four years;
- The federal portion of AIP grants is 90% for all general aviation airports; and
- If an airport has no airside improvement needs, entitlement funds can be used for certain landside projects.

Under the Modernization and Reform legislation and based on its inclusion in the NPIAS, SLB is eligible to receive entitlements of up to $150,000 per year (the maximum) through 2036. But again note that the allocation of AIP discretionary funding is not guaranteed and is based on a project priority ranking method the FAA uses to award grants based on a project's priority and importance to the national airport and airway system. For the SLB CIP, this financial plan assumes discretionary grant awards totaling $2.2 million during the short-term period (years 1-5), $4.3 million during mid-term (years 6-10), and $9.1 million for the long-term period (years 11-20).

5.1.2. IOWA DEPARTMENT OF TRANSPORTATION (DOT) – OFFICE OF AVIATION GRANTS

State grants for aviation projects in Iowa are administered through the Office of Aviation of the Iowa Department of Transportation (DOT). State funding is available for all publicly owned airports in Iowa primarily through two funding programs – the Airport Improvement Program (AIP) and the Vertical Infrastructure Program. The Iowa Transportation Commission approves annual funding allocations and approves project selections for these two programs.

The Office of Aviation's AIP program funds aviation safety programs, and aviation planning and development projects. The Vertical Infrastructure program funds landside development and renovation of terminals, hangars, maintenance buildings, and fuel facilities for both commercial service and general aviation airports. For the SLB CIP, it is not anticipated that any state funding grants will be utilized.

5.1.3. NET OPERATING REVENUES/CASH RESERVES

Currently, the airport has limited cash reserves (Airport Fund) and annual net operating revenues (including the annual city contribution directed to the Airport Fund) to provide funding for the development of capital projects not eligible for federal funding. The analysis assumes a restricted application of these sources to capital projects to ensure that positive year-end cash balances are maintained.

5.1.4. OTHER FUNDING

Another potential source of funds for airport improvements is from private investors. Private investors may construct needed facilities as part of a lease agreement with the airport that will allow time to amortize their investments. This type of funding is particularly suitable for corporate hangar development and other privately owned projects.

5.2. FINANCIAL ANALYSIS & IMPLEMENTATION PLAN

This section, along with the tables presented at the end of the chapter, provides the analysis and results of evaluating financial reasonableness of implementing the SLB Airport Master Plan CIP during the planning period through 2036.

5.2.1. ESTIMATED PROJECT COSTS AND DEVELOPMENT SCHEDULE

A listing of capital improvement projects has been assembled based on the preferred development alternative for SLB established in **Chapter 4.0, Facility Requirements**. This project list has been coordinated with the Airport Layout Plan (ALP) drawing set and the CIP, both of which should be continuously updated by airport management and the FAA, as required. Generally, the CIP itself has three primary purposes:

- Identify improvement projects that will be required at an airport over a specific period of time;
- Estimate the order of implementation of the projects included in the plan; and
- Estimate the total costs and funding sources of the projects.

It is important to note that as the CIP progresses from project planning in the current year to projects planned in future years, the plan becomes less detailed and more flexible. Additionally, the CIP is typically modified on an annual basis as new projects are identified; projects change; and financial environments evolve.

For SLB, **Table 5-1** presents a summary of the proposed capital improvement projects over the 20-year planning period, broken down into three phases, representing short-term (2017-2021), mid-term (2022-2026), and long-term (2027-2037) planning horizons. **Table 5-2** breaks down each of the proposed improvements listed **Table 5-1** into their appropriate planning periods and include estimates of the funding source eligibility for each project. Note that the estimates contained in these tables were derived from analyzing similar projects, but should be re-evaluated at the time of project initiation. When combined, the 20-year CIP for SLB represents $18.7 million in development projects, which is currently eligible for federal participation at 90%.

Table 5-1
Capital Improvement Plan Summary

Project	Short-Term (2017-2021) Total	Mid-Term (2022-2026) Total	Long-Term (2027-2037) Total	Program Total
AIRFIELD				
Runway 13 Additional Displaced Threshold	$57,000	$0	$0	$57,000
Runway 35 Extension & Widening	$0	$2,950,000	$0	$2,950,000
Relocate PAPIs and REILs	$0	$150,000	$0	$150,000
Publish Precision Approach	$0	$90,000	$0	$90,000
Parallel Taxiway Construction (east side of RWY 17/35)	$0	$0	$4,735,000	$4,735,000
Runway 31 Extension & Widening	0	$0	$1,500,000	$1,500,000
Parallel Taxiway Construction (northeast side of RWY 13/31)	0	$0	$2,600,000	$2,600,000
Perimeter Fencing	0	$0	$250,000	$250,000
SUBTOTAL	***$57,000***	***$3,190,000***	***$9,085,000***	***$12,332,000***
GENERAL AVIATION AREA				
Apron Expansion	$1,550,000	$0	$0	$1,550,000
Partial Taxilane Construction - East Hangar Expansion	$400,000	$0	$0	$400,000
Construct 6-Unit T-Hangar	$965,000	$0	$0	$965,000
Remaining Taxilane Construction - East Hangar Expansion	$0	$0	$480,000	$480,000
Parking Lot Expansion	0	$0	$92,000	$92,000
Snow Removal Equipment (SRE) Building	0	$0	$500,000	$500,000
SUBTOTAL	***$2,915,000***	***$0***	***$1,072,000***	***$3,987,000***
PLANNING/ENVIRONMENTAL STUDIES/LAND ACQUISITION				
Environmental Assessment	$0	$100,000	$260,000	$360,000
Land Acquisition	$0	$1,840,000	$240,000	$2,080,000
SUBTOTAL	***$0***	***$1,940,000***	***$500,000***	***$2,440,000***
CAPITAL IMPROVEMENT PROGRAM TOTALS	**$2,972,000**	**$5,130,000**	**$10,657,000**	**$18,759,000**

Source: Bolton & Menk, Inc.
Prepared: June 2016

Table 5-2
Capital Improvement Plan Summary by Planning Period and Funding Type

Project	Estimated Capital Costs	FAA Eligible	State Share	Local Share
SHORT-TERM (2017-2021)				
Runway 13 Additional Displaced Threshold	$57,000	$51,300	$0	$5,700
Apron Expansion	$1,550,000	$1,395,000	$0	$155,000
Partial Taxilane Construction - East Hangar Expansion	$400,000	$360,000	$0	$40,000
Construct 6-Unit T-Hangar	$965,000	$868,500	$0	$96,500
MID-TERM (2022-2026)				
Environmental Assessment	$100,000	$90,000	$0	$10,000
Land Acquisition	$1,840,000	$1,656,000	$0	$184,000
Runway 35 Extension & Widening	$2,950,000	$2,655,000	$0	$295,000
Relocate PAPIs and REILs	$150,000	$135,000	$0	$15,000
Publish Precision Approach	$90,000	$81,000	$0	$9,000
LONG-TERM (2027-2037)				
Environmental Assessment	$80,000	$72,000	$0	$8,000
Parallel Taxiway Construction (east side of RWY 17/35)	$4,735,000	$4,261,500	$0	$473,500
Remaining Taxilane Construction - East Hangar Expansion	$480,000	$432,000	$0	$48,000
Parking Lot Expansion	$92,000	$82,800	$0	$9,200
Snow Removal Equipment (SRE) Building	$500,000	$450,000	$0	$50,000
Environmental Assessment	$100,000	$90,000	$0	$10,000
Land Acquisition	$120,000	$108,000	$0	$12,000
Runway 31 Extension & Widening	$1,500,000	$1,350,000	$0	$150,000
Parallel Taxiway Construction (northeast side of RWY 13/31)	$2,600,000	$2,340,000	$0	$260,000
Environmental Assessment	$80,000	$72,000	$0	$8,000
Land Acquisition	$120,000	$108,000	$0	$12,000
Perimeter Fencing	$250,000	$225,000	$0	$25,000
Total	**$18,759,000**	**$16,883,100**	**$0**	**$1,875,900**

Source: Bolton & Menk, Inc.
Prepared: June 2016

The following tables (**Table 5-3** through **Table 5-5**) provide the Airport with project details to help determine other project elements that would need to be completed with the chosen capital improvement such as environmental documentation. The table also provides the project purpose and scope, which was described in detail earlier in the Airport Master Plan. The tables are grouped based on short-term development, mid-term development and long-term development. In addition **Figure 5-1**, **Figure 5-2**, and **Figure 5-3**, at the end of this chapter, give a visual depiction of the timing of each of the project.

Table 5-3
Capital Improvement Plan Project Descriptions – Short-Term Development (2017-2021)

Project Name:	**Runway 13 Additional Displaced Threshold (2017)**
Project Scope:	Increase the displaced threshold on Runway 13 from 165 feet to 375 feet (210 additional feet)
Project Purpose:	There is not adequate distance between the Runway 13 threshold and Iowa Highway 110 to clear the visual area surface. Therefore, the threshold must be displaced further to avoid a penetration to the visual area surface
Interrelated Projects:	None
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$57,000** Federal funding (90%) = $51,300 Local funding (10%) = $5,700

Project Name:	**Apron Expansion (2018)**
Project Scope:	Expand the existing aircraft parking apron 13,000 square yards
Project Purpose:	The existing apron is at capacity. The apron expansion will allow additional tie-down spaces for ADG I and ADG II aircraft
Interrelated Projects:	None
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$1,550,000** Federal Funding (90%) = $1,395,000 Local funding (10%) = $155,000

Project Name:	**Partial Taxilane construction - east hangar expansion (2020)**
Project Scope:	Construction of 1,020 linear feet of taxilanes to access new T-hangar and half of the private hangars east of the existing building area
Project Purpose:	The existing hangars are at capacity. Requests have been made for space to develop additional hangars. Construction of the taxilanes will allow access to these areas
Interrelated Projects:	Construction of hangars in the existing building area
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$400,000** Federal Funding (90%) = $360,000 Local funding (10%) = $40,000

Table 5-3
Capital Improvement Plan Project Descriptions – Short-Term Development (2017-2021), Cont.

Project Name:	Construct a 6-unit T-hangar (2021)
Project Scope:	Construct a 6-unit T-hangar
Project Purpose:	To accommodate pilots on the hangar waiting list
Interrelated Projects:	Construction of the taxilanes east of the existing hangars
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$965,000** Federal funding (90%) = $868,500 Local funding (10%) = $96,500

Source: Bolton & Menk, Inc.
Prepared: June 2016

Table 5-4
Capital Improvement Plan Project Descriptions – Mid-Term Development (2022-2026)

Project Name:	Environmental Assessment (2022)
Project Scope:	This project involves the examination of potential environmental impacts associated with the land acquisition, construction, and navigational aid relocation for a 1,500-foot extension to Runway 35 and widening of the entire runway to 100 feet
Project Purpose:	This project is necessary to satisfy the local, state, and federal environmental regulations and the National Environmental Policy Act of 1969 (NEPA) of the proposed action. All projects will be justified in the Purpose and Need section of the report
Interrelated Projects:	Construction of the runway extension and relocation of the navigation aids used on the runway
Special Considerations:	None
Estimated Cost:	**$100,000** Federal Funding (90%) = $90,000 Local funding (10%) = $10,000

Project Name:	Land Acquisition (2023)
Project Scope:	Acquire 151.9 acres of land for the building restriction line and Runway Protection Zone to extend the Runway 35 end 1,500 feet
Project Purpose:	Control of the safety areas around the runway is required to ensure no incompatible development occurs within these areas
Interrelated Projects:	Construction of the runway extension and relocation of the navigation aids used on the runway
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2022
Estimated Cost:	**$1,840,000** Federal Funding (90%) = $1,656,000 Local funding (10%) = $184,000

Table 5-4
Capital Improvement Plan Project Descriptions – Mid-Term Development (2022-2026), Cont.

Project Name:	Runway 35 Extension & Widening (2024)
Project Scope:	Extend the Runway 35 end 1,500 feet for a total runway length of 6,500 feet and widen the entire runway to 100 feet
Project Purpose:	To meet the needs of the existing and future users of the airport
Interrelated Projects:	Relocation of the PAPIs and REILs
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2022
Estimated Cost:	**$2,950,000** Federal Funding (90%) = $2,655,000 Local funding (10%) = $295,000

Project Name:	Relocate PAPIs and REILs (2024)
Project Scope:	Relocate the PAPIs and REILs
Project Purpose:	Due to the runway extension, the PAPIs and REILs on the Runway 35 end will need to be relocated
Interrelated Projects:	Construction of the runway extension project
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2022
Estimated Cost:	**$150,000** Federal Funding (90%) = $135,000 Local funding (10%) = $15,000

Project Name:	Publish a precision approach (2025)
Project Scope:	Publish a precision approach to Runway 17/35
Project Purpose:	To allow for approaches to the airport during lower minimum weather days
Interrelated Projects:	Construction of the runway extension project
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2022
Estimated Cost:	**$90,000** Federal Funding (90%) = $81,000 Local funding (10%) = $9,000

Source: Bolton & Menk, Inc.
Prepared: June 2016

Table 5-5
Capital Improvement Plan Project Descriptions – Long-Term Development (2027-2037)

Project Name:	**Environmental Assessment (2027)**
Project Scope:	This project involves the examination of potential environmental impacts associated with the construction of a full parallel taxiway to Runway 17/35
Project Purpose:	This project is necessary to satisfy the local, state, and federal environmental regulations and the National Environmental Policy Act of 1969 (NEPA) of the proposed action. All projects will be justified in the Purpose and Need section of the report
Interrelated Projects:	Construction of the full parallel taxiway to Runway 17/35
Special Considerations:	None
Estimated Cost:	**$80,000** Federal Funding (90%) = $72,000 Local funding (10%) = $8,000

Project Name:	**Parallel taxiway construction (2028)**
Project Scope:	Construct a full parallel taxiway (6,500' x 35') on the east side of Runway 17/35 including two additional connector taxiways
Project Purpose:	A full parallel taxiway prevents aircraft from back taxiing on the runway. This allows for safer aircraft operations when entering and exiting an active runway
Interrelated Projects:	None
Special Considerations:	Necessary mitigation will be determined through the environmental process completed in 2027
Estimated Cost:	**$4,735,000** Federal Funding (90%) = $4,261,500 Local funding (10%) = $473,500

Project Name:	**Remaining Taxilane construction - east hangar expansion (2030)**
Project Scope:	Construction of 1,293 linear feet of taxilanes to access remaining private hangars in the extended east building area
Project Purpose:	The existing hangars are at capacity. Requests have been made for space to develop additional hangars. Construction of the taxilanes will allow access to these areas
Interrelated Projects:	Construction of hangars in the existing building area
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$480,000** Federal Funding (90%) = $432,000 Local funding (10%) = $48,000

Table 5-5
Capital Improvement Plan Project Descriptions – Long-Term Development (2027-2037) Cont.

Project Name:	Parking lot expansion (2032)
Project Scope:	The existing parking lot will need to be expanded to accommodate the growth in based aircraft operators at the airport
Project Purpose:	To expand the vehicle parking lot for based aircraft operators, visitors, and business operators
Interrelated Projects:	Runway extension and
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$92,000** Federal funding (90%) = $82,800 Local funding (10%) = $9,200

Project Name:	Snow Removal Equipment (SRE) Building (2032)
Project Scope:	Construct a Snow Removal Equipment Building
Project Purpose:	Construction of a SRE building will allow equipment to be stored inside and provide easy access to the equipment by City staff
Interrelated Projects:	This is a stand-alone project
Special Considerations:	A Categorical Exclusion will be required before the project begins
Estimated Cost:	**$500,000** Federal Funding (90%) = $450,000 Local funding (10%) = $50,000

Project Name:	Environmental Assessment (2033)
Project Scope:	This project involves the examination of potential environmental impacts associated with the widening of Runway 13/31 to 60 feet and the construction of a runway extension and full parallel taxiway
Project Purpose:	This project is necessary to satisfy the local, state, and federal environmental regulations and the National Environmental Policy Act of 1969 (NEPA) of the proposed action. All projects will be justified in the Purpose and Need section of the report
Interrelated Projects:	Widening Runway 13/31 in addition to construction of a runway extension and full parallel taxiway
Special Considerations:	None
Estimated Cost:	**$100,000** Federal Funding (90%) = $90,000 Local funding (10%) = $10,000

Table 5-5
Capital Improvement Plan Project Descriptions – Long-Term Development (2027-2037) Cont.

Project Name:	Land Acquisition (2034)
Project Scope:	Acquire 9.85 acres of land for the Runway 13 Runway Protection Zone
Project Purpose:	Control of the safety areas around the runway is required to ensure no incompatible development occurs within these areas
Interrelated Projects:	Widening and extending Runway 13/31 in addition to construction of a full parallel taxiway
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2033
Estimated Cost:	**$120,000** Federal Funding (90%) = $108,000 Local funding (10%) = $12,000

Project Name:	Runway 31 Extension & Widening (2035)
Project Scope:	Extend the Runway 31 end 565 feet for a total runway length of 3,600 feet and widen the runway from 50 feet to 60 feet
Project Purpose:	To meet the design standards and needs of the existing and future users of the airport
Interrelated Projects:	Construction of a full parallel taxiway to Runway 13/31
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2033
Estimated Cost:	**$1,500,000** Federal Funding (90%) = $1,350,000 Local funding (10%) = $150,000

Project Name:	Parallel taxiway construction (2035)
Project Scope:	Construct a full parallel taxiway (3,600' x 35') on the northeast side of Runway 13/31 including one additional connector taxiway
Project Purpose:	A full parallel taxiway prevents aircraft from back taxiing on the runway. This allows for safer aircraft operations when entering and exiting an active runway
Interrelated Projects:	None
Special Considerations:	Necessary mitigation will be determined through the environmental process completed in 2033
Estimated Cost:	**$2,600,000** Federal Funding (90%) = $2,340,000 Local funding (10%) = $260,000

Table 5-5
Capital Improvement Plan Project Descriptions – Long-Term Development (2027-2037) Cont.

Project Name:	Environmental Assessment (2036)
Project Scope:	This project involves the examination of potential environmental impacts associated with the acquisition of property within the Runway 6/24 Runway Protection Zones and construction of a perimeter fence around the airport property
Project Purpose:	This project is necessary to satisfy the local, state, and federal environmental regulations and the National Environmental Policy Act of 1969 (NEPA) of the proposed action. All projects will be justified in the Purpose and Need section of the report
Interrelated Projects:	Land acquisition in the Runway 6/24 Runway Protection Zones and construction of a perimeter fence around airport property
Special Considerations:	None
Estimated Cost:	**$80,000** Federal Funding (90%) = $72,000 Local funding (10%) = $8,000

Project Name:	Land Acquisition (2037)
Project Scope:	Acquire 12.54 acres of land for the Runway Protection Zones for Runway 6/24
Project Purpose:	Control of the safety areas around the runway is required to ensure no incompatible development occurs within these areas
Interrelated Projects:	None
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2036
Estimated Cost:	**$120,000** Federal Funding (90%) = $108,000 Local funding (10%) = $12,000

Project Name:	Perimeter fence (2037)
Project Scope:	Construction of a perimeter fence around airport property
Project Purpose:	To prevent wildlife and other encroachment onto airport property
Interrelated Projects:	None
Special Considerations:	Necessary mitigation will be determined through the environmental process being completed in 2036
Estimated Cost:	**$250,000** Federal Funding (90%) = $225,000 Local funding (10%) = $25,000

Source: Bolton & Menk, Inc.
Prepared: 2016

5.2.2. AIRPORT OPERATING REVENUES AND EXPENSES

An important consideration in examining the feasibility of the recommended development plan included in the Airport Master Plan is the sponsor's ability to fund the local share of project costs. Airport revenues are typically generated through leases and user fees charged by the airport for the facilities and services that are provided. These fees are typically established by the airport based on market conditions and vary from airport- to- airport. Further, these fees or revenue are maintained by the airport solely for use on airport-related activities and follow the policies of the Federal Aviation Administration (FAA) under Order 5190.6B (FAA Airport Compliance Manual) *Chapter 15, Permitted and Prohibited Uses of Airport Revenue*. Airport operating revenues are collected at SLB from the following primary sources:

- Airport Gasoline –The fuel receipts accounted for 73.5% of airport-generated revenue in 2015.
- Airport Hangar Rent – Hangar rents currently account for 9.5% of the total airport revenue.
- Airport Ag Sales - The lease of 261 acres for the growing and harvesting crops on airport property accounts for nearly 17% of the revenues received by the airport in 2015.

At most airports, landside facility development and levels of aviation activity are usually the primary factors affecting airport-operating revenues. As additional development occurs at SLB and as the number of based aircraft and itinerant aircraft operations increases, it is likely that SLB's operating revenues will increase in a corresponding fashion. Similarly, as land values fluctuate so will the income associated with the farm leases (Airport Ag Sales). Projections of future Airport operating revenues will be outlined in the next section, *Airport Financial Plan*.

Airport operating expenses are comprised of the day-to-day costs incurred by the airport sponsor in the operation of SLB. Included in operating expenses are salaries, benefits, supplies, services and capital outlay that include equipment and projects. Salaries and benefits have stayed relatively constant throughout the period. Other expenditures such as capital outlays for projects are unpredictable and were not examined because they vary on an annual basis and are typically funded primarily through federal and state grants.

Table 5-6 presents a summary of SLB revenues, expenses, and operating income for fiscal years 2010 through 2015. The City of Storm Lake's fiscal year starts July 1st. Revenues from airport operations are derived from the following:

- Airport Gasoline – This revenue category captures the revenue from selling aircraft fuel.
- Airport Hangar Rent – Revenues generated from hangar leases and fees.
- Airport Ag Sales – These revenues are from farm leases to grow crops.
- Airport Utilities – These revenues include the Fixed Based Operator's (FBO) portion of utilities (water and electricity) used at the airport.
- Capital Improvement Projects – These are the revenues associated with the federal and state grant share of capital improvement projects.

Airport operating expenses are made up of the following items including transfers out:

- Salaries/Overtime– This includes salary costs of airport workers/staff. In October 2014, the airport manager retired and it was determined that other city staff would assume responsibilities

for mowing and snow removal at the airport. Airport management responsibilities will be contracted to the FBO.

- Repairs/Maintenance Bldg. – This includes hangar and terminal building expenses.
- Vehicle Repair – This includes maintenance/repair expenses related to the courtesy car located at the airport for pilots and visiting passengers to use.
- Electric Service – This includes electricity expenses for the airport.
- Telecommunications – This includes telephone and Internet expenses for the airport.
- Operator Contract – This category captures the contract expenses for the FBO.
- Contractual Services – This includes maintenance services that cannot be conducted by City or FBO staff. When actual FY2015 financial data is available for City staff providing mowing and snow removal services, these services will be included in this category. For Budgeted FY2016 an estimated $10,000 was included as a placeholder for these services until actual figures are determined.
- Supplies – This includes supplies for the terminal building such as bathroom supplies, pilot lounge supplies, etc.
- FICA/IPERS/Worker's Comp Insurance/Unemployment – This category includes the benefits associated with airport workers/staff.
- Capital Improvement Projects – These are transfers to the airport's share of capital improvement projects.

Table 5-6
Historic Airport Operating Revenues, Expenses, and Income

Categories	FY2010	FY2011	FY2012	FY2013	FY2014	FY 2015	FY2016 Budget
Operating Revenues							
Public Safety							
Airport Gasoline	$202,123.14	$169,089.91	$386,678.68	$379,750.68	$408,178.71	$313,428.64	$380,000.00
Public Works							
Airport Hangar Rent	$25,545.00	$23,695.00	$25,690.00	$25,855.00	$34,260.00	$40,554.00	$24,000.00
Airport Ag Sales	$24,840.00	$27,900.00	$64,233.00	$87,602.36	$85,598.64	$71,707.00	$85,000.00
Airport Utilities	$3,559.00	$731.02	$720.00	$720.00	$950.45	$960.00	$1,080.00
Capital Improvement Projects							
Airport RPZ		$0.00	$0.00	$1,538,125.65	$199,311.00		
Airport Parking Lot	$7,621.00						
Airport Electrical Vault Proj.		$121,270.00					
Fuel Sysem Rehab - State Rev				$0.00	$84,448.00		
Fuel System Rehab - Local Rev				$100.00			
Runway 13-31 Rehab - State Rev						$0.00	$366,154.90
Chautauqua Bldg. Demo - State Rev						$0.00	
Airport ALP - Federal Revenue							$135,000.00
FBO/Corporate Hangar	$0.00						
Total Operating Revenues	*$263,688.14*	*$342,685.93*	*$477,321.68*	*$2,032,153.69*	*$812,746.80*	*$426,649.64*	*$991,234.90*
Operating Expenditures							
General Fund - Public Works							
Salaries	$6,928.64	$6,470.10	$6,080.00	$6,922.20	$2,588.10	$4,669.80	$0.00
Overtime	$0.00	$0.00	$0.00	$87.15	$0.00	$0.00	$0.00
Repairs/Maintenance Bldg	$13,798.53	$8,763.81	$8,267.25	$7,130.81	$11,953.17	$7,930.28	$11,540.00
Vehicle Repair	$614.29	$5,270.18	$3,593.57	$1,984.89	$798.09	$4,958.87	$2,500.00
Electric Service	$5,569.67	$7,341.67	$7,711.50	$8,151.84	$7,322.10	$7,683.79	$8,200.00
Telecommunications	$1,408.80	$1,587.66	$1,597.17	$1,590.06	$1,506.41	$1,423.61	$1,929.60
Operator Contract	$35,418.04	$35,106.36	$35,808.48	$36,524.64	$58,740.00	$59,565.10	$59,760.00
Contractual Services	$11,407.87	$10,823.38	$8,389.24	$34,520.17	$14,609.98	$15,192.98	$25,037.00
Merchandise for Resale	$191,098.64	$165,120.48	$345,099.07	$338,946.74	$348,219.05	$256,547.30	$340,000.00
Supplies	$12,060.06	$4,546.26	$4,074.56	$2,200.96	$3,791.52	$4,635.85	$3,870.00
Fleet Allocation	$8,750.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bldg Capital Improvements	$2,914.45	$0.00	$2,884.35	$0.00	$0.00	$13,514.00	$0.00
Special Levy Fund - Public Works							
FICA	$530.08	$494.94	$465.10	$536.26	$580.50	$357.23	$0.00
IPERS	$460.78	$449.68	$490.66	$607.71	$677.61	$417.01	$0.00
Worker's Comp Insurance	$488.24	$482.48	$357.25	$386.95	$543.93	$413.67	$0.00
Unemployment	$52.97	$72.74	$0.00	$0.00	$0.00	$0.00	$0.00
Capital Improvement Projects							
Airport RPZ	$260.00	$42,806.82	$1,210,363.11	$592,464.71	$85,015.00		
Airport Electrical Vault Proj.	$108,671.53	$7,274.25					
FBO/Corporate Hangar	$1,502.94						
Fuel System Rehab - Construction				$133,555.20			
Fuel System Rehab - Engineering				$17,280.00	$1,220.00		
Fuel System Rehab - Legal/Admin				$446.40			
Runway 13/31 Rehab - Constr						$0.00	$100,000.00
Runway 13/31 Rehab - Engineer					$51,334.00	$11,173.25	$0.00
Runway 13/31 Rehab - Leg/Admin					$3,483.20	$3,440.00	
Chautauqua Bldg Demo					$10,700.00	$35,439.26	
Chautauqua Bld Demo - Admin					$522.50	$46.79	
Airport ALP - Engineering						$13,460.00	$130,000.00
Airport ALP - Legal/Admin						$393.75	
Total Operating Expenditures	*$401,935.53*	*$296,610.81*	*$1,635,181.31*	*$1,183,336.69*	*$603,605.16*	*$434,382.54*	*$682,836.60*
Net Operating Income (Loss)	**$138,247.39**	**$46,075.12**	**$1,157,859.63**	**$848,817.00**	**$209,141.64**	**$7,732.90**	**$308,398.30**

Source: City of Storm Lake 2010, 2011, 2012, 2013, 2014, and 2015 Budgets
Prepared: December 2015

For the purposes of this financial analysis, the ability of SLB to generate revenues and cover operating costs is a top concern. From a historical perspective, operating revenues have sufficiently covered operating expenditures in the last 4 years. It is important to note that during this time period, the availability of land used for agricultural purposes has accounted for a significant portion of each year's operating revenue beginning in 2012 and has allowed the airport to maintain a positive operating income each year since 2012. Beginning in FY2016, the airport will no longer fund an airport manager position at the airport and instead has included a placeholder value under "Contractual Services" for City staff that will be responsible for mowing and removing snow at the airport, as well as, the FBO assuming management responsibilities under the "Operator Contract" line item (see **Table 5-6**). Further, it is this

historical information, which will form the baseline of projecting financial information conducted in subsequent sections.

5.2.2.1. INDIRECT REVENUE

It is important to note that, in addition to direct operating revenues generated at SLB from leases and fuel flowage fees, SLB also generates indirect revenues. Indirect revenues include those generated by taxes on real property improvements and business personal property, including aircraft. The airport has numerous tenants and aviation-related businesses that accounted for 31.5 jobs[1] within the local community in 2009. The State of Iowa and City of Storm Lake both receive a significant amount of indirect revenues from SLB and the total economic impact realized in the area generated by the activity at SLB equates to more than $2.89 million each year as determined by the *2009 Iowa Economic impact of Aviation Study* conducted by the Iowa Department of Transportation's Office of Aviation.

5.2.3. PROJECTED AIRPORT OPERATING REVENUES AND EXPENSES

The continued growth of SLB, in terms of activity, tenants, new leases and facility development, will impact the airport's operating revenues and expenses over the planning period. Actual future financial outcomes will be determined by a variety of factors, many of which are impossible to identify at the current time. However, the projections developed in this evaluation depict future airport operating revenues and expenses based on recent financial results, budgeted revenues and expenses for 2016, and activity and tenant growth trends identified in previous chapters.

Projections of future airport operating revenues and expenses at SLB are presented in **Table 5-7**. The following information for operating revenues was established through close consideration of historical trends, as well as proposed airport development initiatives and how they might impact those future revenues. In most cases, revenue projections resulted from normal growth factors refined to more closely reflect the circumstances of SLB.

[1] Iowa Economic Impact of Aviation Study, 2009

Table 5-7
Projected Airport Operating Revenues and Expenses

	FY2016 (Budget)	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
Operating Revenues											
Airport Gasoline	$380,000	$388,740	$397,681	$406,828	$416,185	$425,757	$435,549	$445,567	$455,815	$466,299	$477,024
Airport Hangar Rent	$24,000	$24,552	$25,117	$25,694	$26,285	$26,890	$27,508	$28,141	$28,788	$29,450	$30,128
Airport Ag Sales	$85,000	$86,955	$88,955	$91,001	$93,094	$95,235	$97,426	$99,666	$101,959	$104,304	$106,703
Airport Utilities	$1,080	$1,105	$1,130	$1,156	$1,183	$1,210	$1,238	$1,266	$1,295	$1,325	$1,356
Total Operating Revenues	*$490,080*	*$501,352*	*$512,883*	*$524,679*	*$536,747*	*$549,092*	*$561,721*	*$574,641*	*$587,857*	*$601,378*	*$615,210*
Operating Expenditures											
Salaries	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Overtime	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Repairs/Maintenance Bldg	$11,540	$11,805	$12,077	$12,355	$12,639	$12,930	$13,227	$13,531	$13,842	$14,161	$14,486
Vehicle Repair	$2,500	$2,558	$2,616	$2,676	$2,738	$2,801	$2,865	$2,931	$2,999	$3,068	$3,138
Electric Service Telecommunications	$8,200	$8,389	$8,582	$8,779	$8,981	$9,187	$9,399	$9,615	$9,836	$10,062	$10,294
Operator Contract	$1,930	$1,974	$2,019	$2,066	$2,113	$2,162	$2,212	$2,263	$2,315	$2,368	$2,422
Contractual Services	$59,760	$61,134	$62,541	$63,979	$65,451	$66,956	$68,496	$70,071	$71,683	$73,332	$75,018
Merchandise for Resale	$25,037	$25,613	$26,202	$26,805	$27,421	$28,052	$28,697	$29,357	$30,032	$30,723	$31,430
Supplies	$340,000	$347,820	$355,820	$364,004	$372,376	$380,940	$389,702	$398,665	$407,835	$417,215	$426,811
Fleet Allocation	$3,870	$3,959	$4,050	$4,143	$4,239	$4,336	$4,436	$4,538	$4,642	$4,749	$4,858
Bldg Capital Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
FICA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
IPERS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Worker's Comp Insurance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Unemployment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Operating Expenditures	*$452,837*	*$463,252*	*$473,907*	*$484,806*	*$495,957*	*$507,364*	*$519,033*	*$530,971*	*$543,184*	*$555,677*	*$568,457*
Net Operating Income	**$37,243**	**$38,100**	**$38,976**	**$39,873**	**$40,790**	**$41,728**	**$42,688**	**$43,670**	**$44,674**	**$45,701**	**$46,753**

Source: Marr Arnold Planning
Prepared: June 2016

The projected operating revenues presented in **Table 5-7** are based on historical year-end financial results from FY2012-FY2015 and budgeted revenues for FY2016. Operating revenues are projected to increase from a budgeted $490,080 in 2016 to $615,210 by 2026.

5.2.4. FINANCIAL PLAN SUMMARY

The primary goal is for Storm Lake Municipal Airport to evolve into a facility that will best serve the transportation needs of the region while simultaneously developing into a self-sustaining economic generator for the City of Storm Lake. This Airport Master Plan Update can best be described as being the road map to helping the airport achieve these goals. But it should be recognized that planning is a continuous process that does not end with the completion of the Airport Master Plan in that the fundamental basic issues that have driven this Airport Master Plan will remain valid for many years. Therefore, the ability to continuously monitor the existing and forecast status of airport activity will be a key ingredient in maintaining the applicability and relevance of this study.

In order to realize those goals through the successful implementation of airport development projects, sound and measured decisions by the City of Storm Lake must be made. Two of the most important factors in influencing the decision to move forward with a specific improvement are airport activity and funding timing. Both factors must be considered in the implementation of this Airport Master Plan in that while airport activity levels provide the "why" in the establishment of airport improvements, the time of funding provides the "how." Through the course of this Airport Master Plan effort, the "why" has been discussed in detail in the previous chapters. This chapter has addressed the "how" by detailing the practical financial realities required to implement this overall airport development program. However, it cannot be understated that although every effort has been made to in this effort to conservatively estimate when facility development may be needed, aviation demand will ultimately dictate when facility improvements need to be accelerated or delayed.

For SLB, the Financial Plan Summary presented in **Table 5-10** includes projection totals for operating revenues, operating expenses, capital expenditures, capital outlay, capital project funding, and cash flow that result from the projections presented in **Table 5-7**.

Previous sections of this analysis provided a practical approach for scheduling capital expenditures to match the availability of capital financing. Based on the assumptions identified within the previous sections, implementation of the Airport Master Plan CIP is financially possible, subject to the availability of AIP discretionary grant awards. The reasonableness of funding the capital program can be characterized by the level of identified funding indicated in each phase of the program. Throughout the entire planning period 100% of the funding sources have been identified.

Key assumptions supporting the financial plan relate to the availability and timeliness of the funding sources that have been indicated. Continuation of the FAA AIP Entitlement Program at authorized funding levels is essential. Receiving AIP discretionary grants of $2.2 million during the short-term, $4.3 million during the mid-term, and $9.1 million during the long-term as indicated previously, are critical to the financial feasibility of implementing these projects. Without this level of discretionary funding, these projects are not feasible and would have to be delayed or cancelled unless another source of funds could be acquired.

Tables 5-8 through **5-10** present the detailed financial analysis for the implementation of SLB's Airport Master Plan CIP.

Table 5-8
Actual, Budgeted, and Projected Operating Revenues

Categories	FY2010 Actual	FY2011 Actual	FY2012 Actual	FY2013 Actual	FY2014 Actual	FY 2015 Revised	FY2016 Budgeted	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Operating Revenues																	
Public Safety																	
Airport Gasoline	$202,123.14	$169,089.91	$386,678.68	$379,750.68	$408,178.71	$313,428.64	$380,000.00	$388,740.00	$397,681.02	$406,827.68	$416,184.72	$425,756.97	$435,549.38	$445,567.01	$455,815.06	$466,298.80	$477,023.67
Public Works																	
Airport Hangar Rent	$25,545.00	$23,695.00	$25,690.00	$25,855.00	$34,260.00	$40,554.00	$24,000.00	$24,552.00	$25,116.70	$25,694.38	$26,285.35	$26,889.91	$27,508.38	$28,141.07	$28,788.32	$29,450.45	$30,127.81
Airport Ag Sales	$24,840.00	$27,900.00	$64,233.00	$87,602.36	$85,598.64	$71,707.00	$85,000.00	$86,955.00	$88,954.97	$91,000.93	$93,093.95	$95,235.11	$97,425.52	$99,666.31	$101,958.63	$104,303.68	$106,702.66
Airport Utilities	$3,559.00	$731.02	$720.00	$720.00	$950.45	$960.00	$1,080.00	$1,104.84	$1,130.25	$1,156.25	$1,182.84	$1,210.05	$1,237.88	$1,266.35	$1,295.47	$1,325.27	$1,355.75
Capital Improvement Projects																	
Airport RPZ				$1,538,125.65	$199,311.00												
Airport Parking Lot	$7,621.00																
Airport Electrical Vault Proj.		$121,270.00															
Fuel Sysem Rehab - State Rev					$84,448.00												
Fuel System Rehab - Local Rev				$100.00													
Runway 13-31 Rehab - State Rev							$366,154.90										
Chautauqua Bldg. Demo - State Rev																	
Airport ALP - Federal Revenue							$135,000.00										
Runway 13 Additonal Displaced Threshold								$57,000.00									
Apron Expansion									$1,550,000.00								
Partial Taxilane Construction - East Hangar Expansion											$400,000.00						
Construct 6-Unit T-Hangar												$965,000.00					
Environmental Assessment													$100,000.00				
Land Acquisition														$1,840,000.00			
Runway 35 Extension (1,500')															$2,950,000.00		
Relocate PAPIs and REILs															$150,000.00		
Publish Precision Approach																$90,000.00	
Total Operating Revenues	*$263,688.14*	*$342,685.93*	*$477,321.68*	*$2,032,153.69*	*$812,746.80*	*$426,649.64*	*$991,234.90*	*$558,351.84*	*$2,062,882.93*	*$524,679.24*	*$936,746.86*	*$1,514,092.04*	*$661,721.16*	*$2,414,640.74*	*$3,687,857.48*	*$691,378.20*	*$615,209.90*

Source: Marr Arnold Planning and City of SLB City Budgets
Prepared: June 2016

Table 5-9
Actual, Budgeted, and Projected Operating Expenditures

Categories	FY2010 Actual	FY2011 Actual	FY2012 Actual	FY2013 Actual	FY2014 Actual	FY 2015 Revised	FY2016 Budgeted	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Operating Expenditures																	
General Fund - Public Works																	
Salaries	$6,928.64	$6,470.10	$6,080.00	$6,922.20	$2,588.10	$4,669.80	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Overtime	$0.00	$0.00	$0.00	$87.15	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Repairs/Maintenance Bldg	$13,798.53	$8,763.81	$8,267.25	$7,130.81	$11,953.17	$7,930.28	$11,540.00	$11,805.42	$12,076.94	$12,354.71	$12,638.87	$12,929.57	$13,226.95	$13,531.17	$13,842.38	$14,160.76	$14,486.46
Vehicle Repair	$614.29	$5,270.18	$3,593.57	$1,984.89	$798.09	$4,958.87	$2,500.00	$2,557.50	$2,616.32	$2,676.50	$2,738.06	$2,801.03	$2,865.46	$2,931.36	$2,998.78	$3,067.76	$3,138.31
Electric Service	$5,569.67	$7,341.67	$7,711.50	$8,151.84	$7,322.10	$7,683.79	$8,200.00	$8,388.60	$8,581.54	$8,778.91	$8,980.83	$9,187.39	$9,398.70	$9,614.87	$9,836.01	$10,062.24	$10,293.67
Telecommunications	$1,408.80	$1,587.66	$1,597.17	$1,590.06	$1,506.41	$1,423.61	$1,929.60	$1,973.98	$2,019.38	$2,065.83	$2,113.34	$2,161.95	$2,211.67	$2,262.54	$2,314.58	$2,367.82	$2,422.28
Operator Contract	$35,418.04	$35,106.36	$35,808.48	$36,524.64	$58,740.00	$59,565.10	$59,760.00	$61,134.48	$62,540.57	$63,979.01	$65,450.52	$66,955.89	$68,495.87	$70,071.28	$71,682.92	$73,331.62	$75,018.25
Contractual Services	$11,407.87	$10,823.38	$8,389.24	$34,520.17	$14,609.98	$15,192.98	$25,037.00	$25,612.85	$26,201.95	$26,804.59	$27,421.10	$28,051.78	$28,696.97	$29,357.00	$30,032.21	$30,722.96	$31,429.58
Merchandise for Resale	$191,098.64	$165,120.48	$345,099.07	$338,946.74	$348,219.05	$256,547.30	$340,000.00	$347,820.00	$355,819.86	$364,003.72	$372,375.80	$380,940.45	$389,702.08	$398,665.22	$407,834.52	$417,214.72	$426,810.66
Supplies	$12,060.06	$4,546.26	$4,074.56	$2,200.96	$3,791.52	$4,635.85	$3,870.00	$3,959.01	$4,050.07	$4,143.22	$4,238.51	$4,336.00	$4,435.73	$4,537.75	$4,642.12	$4,748.89	$4,858.11
Fleet Allocation	$8,750.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bldg Capital Improvements	$2,914.45	$0.00	$2,884.35	$0.00	$0.00	$13,514.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Special Levy Fund - Public Works																	
FICA	$530.08	$494.94	$465.10	$536.26	$580.50	$357.23	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
IPERS	$460.78	$449.68	$490.66	$607.71	$677.61	$417.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Worker's Comp Insurance	$488.24	$482.48	$357.25	$386.95	$543.93	$413.67	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Unemployment	$52.97	$72.74	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Capital Improvement Projects																	
Airport RPZ	$260.00	$42,806.82	$1,210,363.11	$592,464.71	$85,015.00												
Airport Electrical Vault Proj.	$108,671.53	$7,274.25															
FBO/Corporate Hangar	$1,502.94																
Fuel System Rehab - Construction				$133,555.20													
Fuel System Rehab - Engineering				$17,280.00	$1,220.00												
Fuel System Rehab - Legal/Admin				$446.40													
Runway 13/31 Rehab - Constr						$0.00	$100,000.00										
Runway 13/31 Rehab - Engineer					$51,334.00	$11,173.25	$0.00										
Runway 13/31 Rehab - Leg/Admin					$3,483.20	$3,440.00											
Chautauqua Bldg Demo					$10,700.00	$35,439.26											
Chautauqua Bld Demo - Admin					$522.50	$46.79											
Airport ALP - Engineering						$13,460.00	$130,000.00										
Airport ALP - Legal/Admin						$393.75											
Apron Expansion									$1,550,000.00								
Partial Taxilane Construction - East Hangar Expansion											$400,000.00						
Construct 6-Unit T-Hangar												$965,000.00					
Environmental Assessment													$100,000.00				
Land Acquisition														$1,840,000.00			
Runway 35 Extension (1,500')															$2,950,000.00		
Relocate PAPIs and REILs															$150,000.00		
Publish Precision Approach																$90,000.00	
Total Operating Expenditures	*$401,935.53*	*$296,610.81*	*$1,635,181.31*	*$1,183,336.69*	*$603,605.16*	*$434,382.54*	*$682,836.60*	*$463,251.84*	*$2,023,906.63*	*$484,806.49*	*$895,957.04*	*$1,472,364.05*	*$619,033.42*	*$2,370,971.19*	*$3,643,183.53*	*$645,676.75*	*$568,457.31*

Source: Marr Arnold Planning and City of SLB City Budgets
Prepared: June 2016

Table 5-10
Financial Plan Summary

Categories	FY2010 Actual	FY2011 Actual	FY2012 Actual	FY2013 Actual	FY2014 Actual	FY 2015 Revised	FY2016 Budgeted	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Operating Revenues																	
Public Safety																	
Airport Gasoline	$202,123.14	$169,089.91	$386,678.68	$379,750.68	$408,178.71	$313,428.64	$380,000.00	$388,740.00	$397,681.02	$406,827.68	$416,184.72	$425,756.97	$435,549.38	$445,567.01	$455,815.06	$466,298.80	$477,023.67
Public Works																	
Airport Hangar Rent	$25,545.00	$23,695.00	$25,690.00	$25,855.00	$34,260.00	$40,554.00	$24,000.00	$24,552.00	$25,116.70	$25,694.38	$26,285.35	$26,889.91	$27,508.38	$28,141.07	$28,788.32	$29,450.45	$30,127.81
Airport Ag Sales	$24,840.00	$27,900.00	$64,233.00	$87,602.36	$85,598.64	$71,707.00	$85,000.00	$86,955.00	$88,954.97	$91,000.93	$93,093.95	$95,235.11	$97,425.52	$99,666.31	$101,958.63	$104,303.68	$106,702.66
Airport Utilities	$3,559.00	$731.02	$720.00	$720.00	$950.45	$960.00	$1,080.00	$1,104.84	$1,130.25	$1,156.25	$1,182.84	$1,210.05	$1,237.88	$1,266.35	$1,295.47	$1,325.27	$1,355.75
Capital Improvement Projects																	
Airport RPZ				$1,538,125.65	$199,311.00												
Airport Parking Lot	$7,621.00																
Airport Electrical Vault Proj.		$121,270.00															
Fuel Sysem Rehab - State Rev					$84,448.00												
Fuel System Rehab - Local Rev				$100.00													
Runway 13-31 Rehab - State Rev							$366,154.90										
Chautauqua Bldg. Demo - State Rev																	
Airport ALP - Federal Revenue							$135,000.00										
Runway 13 Additonal Displaced Threshold								$57,000.00									
Apron Expansion									$1,550,000.00								
Partial Taxilane Construction - East Hangar Expansion											$400,000.00						
Construct 6-Unit T-Hangar												$965,000.00					
Environmental Assessment													$100,000.00				
Land Acquisition														$1,840,000.00			
Runway 35 Extension (1,500')															$2,950,000.00		
Relocate PAPIs and REILs															$150,000.00		
Publish Precision Approach																$90,000.00	
Total Operating Revenues	***$263,688.14***	***$342,685.93***	***$477,321.68***	***$2,032,153.69***	***$812,746.80***	***$426,649.64***	***$991,234.90***	***$558,351.84***	***$2,062,882.93***	***$524,679.24***	***$936,746.86***	***$1,514,092.04***	***$661,721.16***	***$2,414,640.74***	***$3,687,857.48***	***$691,378.20***	***$615,209.90***
Operating Expenditures																	
General Fund - Public Works																	
Salaries	$6,928.64	$6,470.10	$6,080.00	$6,922.20	$2,588.10	$4,669.80	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Overtime	$0.00	$0.00	$0.00	$87.15	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Repairs/Maintenance Bldg	$13,798.53	$8,763.81	$8,267.25	$7,130.81	$11,953.17	$7,930.28	$11,540.00	$11,805.42	$12,076.94	$12,354.71	$12,638.87	$12,929.57	$13,226.95	$13,531.17	$13,842.38	$14,160.76	$14,486.46
Vehicle Repair	$614.29	$5,270.18	$3,593.57	$1,984.89	$798.09	$4,958.87	$2,500.00	$2,557.50	$2,616.32	$2,676.50	$2,738.06	$2,801.03	$2,865.46	$2,931.36	$2,998.78	$3,067.76	$3,138.31
Electric Service	$5,569.67	$7,341.67	$7,711.50	$8,151.84	$7,322.10	$7,683.79	$8,200.00	$8,388.60	$8,581.54	$8,778.91	$8,980.83	$9,187.39	$9,398.70	$9,614.87	$9,836.01	$10,062.24	$10,293.67
Telecommunications	$1,408.80	$1,587.66	$1,597.17	$1,590.06	$1,506.41	$1,423.61	$1,929.60	$1,973.98	$2,019.38	$2,065.83	$2,113.34	$2,161.95	$2,211.67	$2,262.54	$2,314.58	$2,367.82	$2,422.28
Operator Contract	$35,418.04	$35,106.36	$35,808.48	$36,524.64	$58,740.00	$59,565.10	$59,760.00	$61,134.48	$62,540.57	$63,979.01	$65,450.52	$66,955.89	$68,495.87	$70,071.28	$71,682.92	$73,331.62	$75,018.25
Contractual Services	**$11,407.87**	**$10,823.38**	**$8,389.24**	**$34,520.17**	**$14,609.98**	**$15,192.98**	**$25,037.00**	$25,612.85	$26,201.95	$26,804.59	$27,421.10	$28,051.78	$28,696.97	$29,357.00	$30,032.21	$30,722.96	$31,429.58
Merchandise for Resale	$191,098.64	$165,120.48	$345,099.07	$338,946.74	$348,219.05	$256,547.30	$340,000.00	$347,820.00	$355,819.86	$364,003.72	$372,375.80	$380,940.45	$389,702.08	$398,665.22	$407,834.52	$417,214.72	$426,810.66
Supplies	$12,060.06	$4,546.26	$4,074.56	$2,200.96	$3,791.52	$4,635.85	$3,870.00	$3,959.01	$4,050.07	$4,143.22	$4,238.51	$4,336.00	$4,435.73	$4,537.75	$4,642.12	$4,748.89	$4,858.11
Fleet Allocation	$8,750.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bldg Capital Improvements	$2,914.45	$0.00	$2,884.35	$0.00	$0.00	$13,514.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Special Levy Fund - Public Works																	
FICA	$530.08	$494.94	$465.10	$536.26	$580.50	$357.23	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
IPERS	$460.78	$449.68	$490.66	$607.71	$677.61	$417.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Worker's Comp Insurance	$488.24	$482.48	$357.25	$386.95	$543.93	$413.67	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Unemployment	$52.97	$72.74	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Capital Improvement Projects																	
Airport RPZ	$260.00	$42,806.82	$1,210,363.11	$592,464.71	$85,015.00												
Airport Electrical Vault Proj.	$108,671.53	$7,274.25															
FBO/Corporate Hangar	$1,502.94																
Fuel System Rehab - Construction				$133,555.20													
Fuel System Rehab - Engineering				$17,280.00	$1,220.00												
Fuel System Rehab - Legal/Admin				$446.40													
Runway 13/31 Rehab - Constr						$0.00	$100,000.00										
Runway 13/31 Rehab - Engineer					$51,334.00	$11,173.25	$0.00										
Runway 13/31 Rehab - Leg/Admin					$3,483.20	$3,440.00											
Chautauqua Bldg Demo					$10,700.00	$35,439.26											
Chautauqua Bld Demo - Admin					$522.50	$46.79											
Airport ALP - Engineering						$13,460.00	$130,000.00										
Airport ALP - Legal/Admin						$393.75											
Apron Expansion									$1,550,000.00								
Partial Taxilane Construction - East Hangar Expansion											$400,000.00						
Construct 6-Unit T-Hangar												$965,000.00					
Environmental Assessment													$100,000.00				
Land Acquisition														$1,840,000.00			
Runway 35 Extension (1,500')															$2,950,000.00		
Relocate PAPIs and REILs															$150,000.00		
Publish Precision Approach																$90,000.00	
Total Operating Expenditures	***$401,935.53***	***$296,610.81***	***$1,635,181.31***	***$1,183,336.69***	***$603,605.16***	***$434,382.54***	***$682,836.60***	***$463,251.84***	***$2,023,906.63***	***$484,806.49***	***$895,957.04***	***$1,472,364.05***	***$619,033.42***	***$2,370,971.19***	***$3,643,183.53***	***$645,676.75***	***$568,457.31***
NET OPERATING REVENUES/(EXPENSES)	**-$138,247.39**	**$46,075.12**	**-$1,157,859.63**	**$848,817.00**	**$209,141.64**	**-$7,732.90**	**$308,398.30**	**$95,100.00**	**$38,976.30**	**$39,872.75**	**$40,789.83**	**$41,727.99**	**$42,687.74**	**$43,669.55**	**$44,673.95**	**$45,701.45**	**$46,752.59**

Source: Marr Arnold Planning and City of SLB City Budgets
Prepared: June 2016

Storm Lake Municipal Airport (SLB)

Storm Lake, IA

Figure 5-1

Short-Term
Present-5 Years

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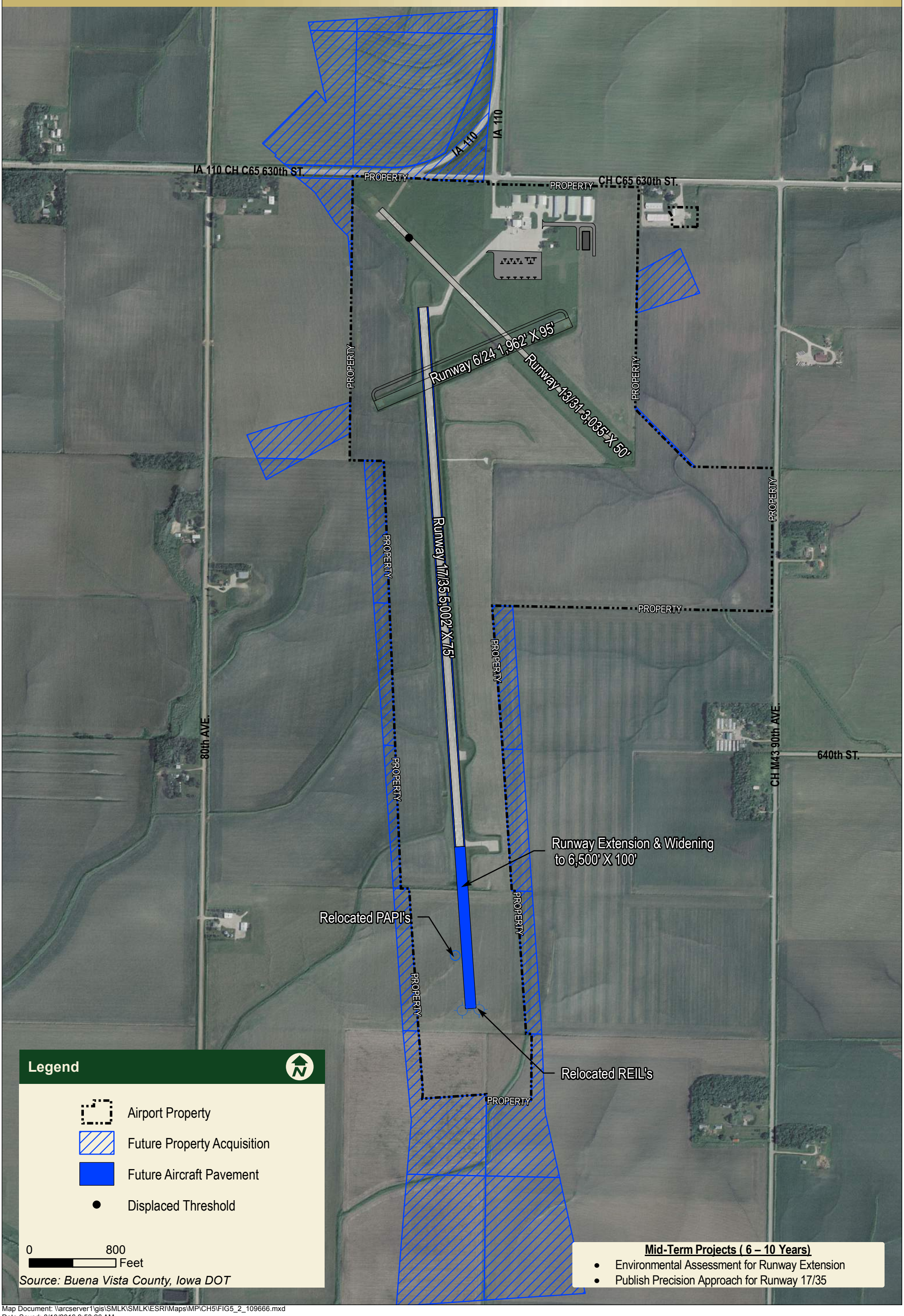
Storm Lake Municipal Airport (SLB)

Storm Lake, IA

Figure 5-2

Mid-Term
6-10 Years



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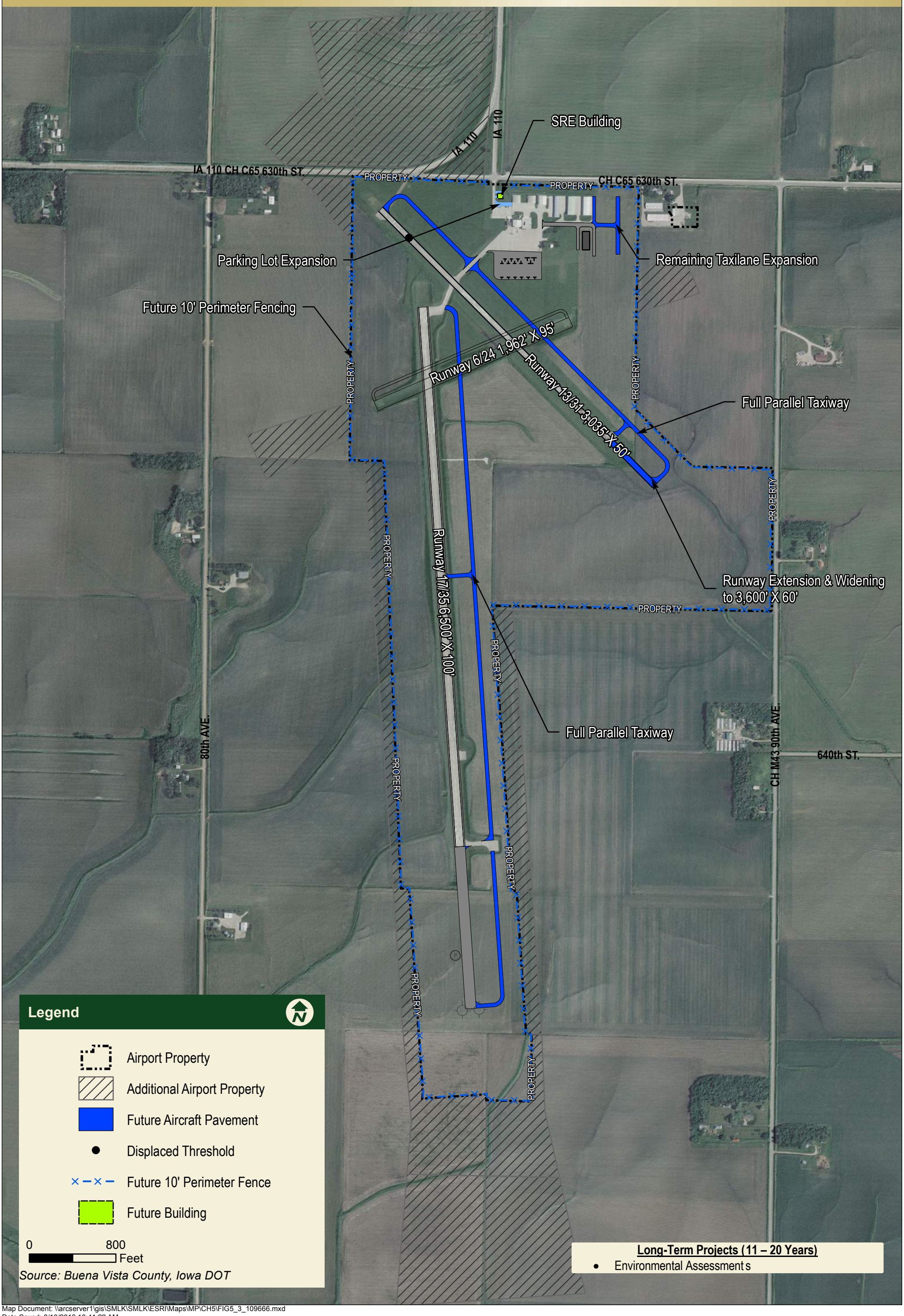
Storm Lake Municipal Airport (SLB)

Storm Lake, IA

Figure 5-3

Long-Term
11-20 Years



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APPENDIX A
USER SURVEYS

AIRPORT USER SURVEY
STORM LAKE MUNICIPAL AIRPORT
AIRPORT MASTER PLAN

The Storm Lake Municipal Airport (SLB) is preparing an Airport Master Plan to evaluate airport facilities to better serve the economic vitality of the Storm Lake community and surrounding area. The data collected in this survey will assist in making decisions for the improvement of the airport. No identifying information (contact information, N-numbers, etc.) will be published in the Airport Master Plan document. The survey can be completed by-hand or online. An online version of this survey is available at: https://www.surveymonkey.com/s/SLBAirportUsersSurvey or by scanning the QR code to the right.

Please return this survey, or direct any questions to:

Justin Yarosevich, Assistant City Manager
620 Erie Street
Storm Lake, IA 50588

Phone: (712) 732-8000
Fax: (712) 732-4114
E-mail: justin@stormlake.org

Please complete the following survey to the best of your ability:

1. How do you utilize general aviation aircraft?

☐ Own ☐ Fractional/Shared Ownership ☐ Other (Please Specify) _____
☐ Rent ☐ Corporate Owned-Aircraft
☐ Lease ☐ Flying Club

2. Do you base your aircraft at SLB? ☐ Yes ☐ No

If no, and you own an aircraft, where is it based? _____

If adequate facilities existed, would you base your plane at SLB? ☐ Yes ☐ No

What additional facilities would you need to base your plane at SLB? _____

3. What type of aircraft do you use when flying? If you use more than one aircraft, please include it here:

Aircraft Make/Model	N-Number (Optional)

The following questions are about your flight operations at SLB:

*An operation is defined as either a takeoff or a landing. A **single visit** to an airport is comprised of **two operations**, arriving at the airport, and later departing from the airport. An "itinerant" operation is a landing or takeoff of an airplane traveling from one airport to another airport at least 20 nautical miles away. Local operations include flights to local practice areas, touch-and-go operations within the traffic pattern, and agricultural aerial application operations.*

4. Please estimate your annual operations at SLB for each aircraft listed above:

Local Operations	Itinerant Operations

5. Are you considering an upgrade to your aircraft fleet in the next five years? ☐ Yes ☐ No

If yes, please indicate the following:

Aircraft Make/Model	Annual Operations at SLB	Reason for Upgrade

6. Are the runway lengths available at SLB adequate for your most demanding aircraft at desired weight?

	Adequate if wet/icy?		Adequate if hot?	
Runway 17/35 (5,002 feet)	☐ Yes	☐ No	☐ Yes	☐ No
Runway 13/31 (3,035 feet)	☐ Yes	☐ No	☐ Yes	☐ No
Runway 6/24 (1,962 feet)	☐ Yes	☐ No	☐ Yes	☐ No

(OVER)

AIRPORT USER SURVEY
STORM LAKE MUNICIPAL AIRPORT
AIRPORT MASTER PLAN

If no, what runway length would you require to land at SLB? _____

7. Do you currently make aircraft load concessions to operate at SLB? ☐ Yes ☐ No
   If yes, what concessions do you make? _____

8. Please indicate the basis of your runway length requirements:
   ☐ Pilot Operating Handbook ☐ Insurance Requirement
   ☐ Company Policy ☐ Other (Please Specify)_____

9. Do you use the existing instrument approaches? ☐ Yes ☐ No
   If the approaches do not meet your needs, please explain:_____

10. Are you in need of additional hangar space at SLB? ☐ Yes ☐ No
    If yes, what type of hangar do you prefer? ☐ T-Hangar ☐ "Box" Hangar ☐ Private Hangar Site

11. Please rate the airport facilities in with regards to your operations at SLB:

	Inadequate	Marginal	Adequate	Not Applicable
Runway Length	○	○	○	○
Aircraft Storage – T-Hangar Rental Unit	○	○	○	○
Aircraft Storage – Conventional Hangar Development Site	○	○	○	○
Aircraft Storage – Transient/Overnight	○	○	○	○
Aircraft Repair/Maintenance	○	○	○	○
Self Service Fueling	○	○	○	○
Full Service Fueling/Line Services/Fueling Truck	○	○	○	○
Ground Transportation (Shuttle, Taxi Service, Rental Cars, Courtesy Car)	○	○	○	○
Pilot Shop	○	○	○	○
Crew Rest Area	○	○	○	○
Flight Training/Instruction	○	○	○	○
Aircraft Charter	○	○	○	○
Business Center/Meeting Facilities	○	○	○	○
Security – Lighting/Fencing	○	○	○	○
Snow removal services	○	○	○	○

12. Please list other facilities you need to operate at SLB or need to improve your experience at SLB:

_____

_____

13. Please provide any additional comments or concerns about Storm Lake Municipal Airport:

_____

_____

CONTACT INFORMATION (OPTIONAL)

Please provide the following information pertaining to the individual who completed this survey.

Name: _____

Company/Affiliation:_____

Address:_____

_____

Phone: _____E-mail:_____

May we contact you with any specific questions about this user survey? ☐ Yes ☐ No

NOTE: If your company or related vendors/clients operate from SLB, we kindly request you forward this survey to these individuals.

The City of Storm Lake thanks you for completing this Airport User Survey! Please contact Justin Yarosevich, Assistant City Manager, at justin@stormlake.org with any questions.

Please Return by April 24, 2015

City of Storm Lake
Storm Lake Municipal Airport (SLB)
620 Erie Street
Storm Lake, IA 50588
Phone (712) 732-8000 Fax (712) 732-4114

Dear Airport Business Survey Recipient:

The City of Storm Lake, Iowa is conducting an Airport Master Plan study for the Storm Lake Municipal Airport. This study will analyze the existing and future airport facility needs and determine a 20-year development plan. The City is conducting an airport business survey to determine the current and projected airport business activity as well as facility needs.

Storm Lake Municipal Airport currently has two paved runways, Runway 17/35 (5,002 feet long, 75 feet wide) with a GPS non-precision instrument approach on both ends, and Runway 13/31 (3,035 feet long, 50 feet wide). There is also one turf runway, Runway 6/24 (1,962 feet long, 95 feet wide). There are 40 based aircraft, and nearly 20,000 annual operations. The City is evaluating airport enhancements primarily to meet safety, facility, and future capacity needs.

We need your help to provide us information on your activity and facility needs. Your detailed and accurate responses to this operator survey will help us identify usage to help justify FAA funding for future improvements. Any supporting documentation demonstrating a need for improvements such as a runway extension or building development is also very useful. Your efforts here are very important to the accuracy and viability of this Master Plan study.

We request that you please complete the survey online at the following address by **April 24, 2015**: https://www.surveymonkey.com/s/SLBBusinessUserSurvey. If you choose to complete the paper version or have additional information to submit, please return it to the address below.

Justin Yarosevich, Assistant City Manager
620 Erie Street
Storm Lake, IA 50588
Phone (712) 732-8000
Email: justin@stormlake.org

Please contact me with any questions you have regarding this airport operator survey. On behalf of the City of Storm Lake, we thank you in advance for your efforts.

Sincerely,

Justin Yarosevich,
Assistant City Manager

BUSINESS USER AIRPORT SURVEY
STORM LAKE MUNICIPAL AIRPORT (SLB)
AIRPORT MASTER PLAN

The Storm Lake Municipal Airport (SLB) is preparing an Airport Master Plan to evaluate airport facilities to better serve the economic vitality of the Storm Lake community and surrounding area. The data collected in this survey will assist in making decisions for the improvement of the airport.

The survey can be completed by-hand or online. An online version of this survey is available at: https://www.surveymonkey.com/s/SLBBusinessUserSurvey or by scanning the QR code to the right:

Please return this survey, or direct any questions to:

Justin Yarosevich, Assistant City Manager
620 Erie Street
Storm Lake, IA 50588

Phone: (712) 732-8000
Fax: (712) 732-4114
E-mail: justin@stormlake.org

CONTACT INFORMATION

Please provide the following information pertaining to the individual who completed this survey.

Business Name: _____

Address: _____

_____

Phone: _____ E-mail: _____

Respondent's Name/Title: _____/_____

May we contact you with any specific questions about this user survey? ☐ Yes ☐ No

NOTE: If your company or related vendors/clients operate from SLB, we kindly request you provide us with their information so we may reach out to them to get their feedback about the airport.

COMPANY INFORMATION

This business is: ☐ Directly Involved in Aviation ☐ Not Involved in Aviation

Number of employees: Full time: _____ Part time: _____

Please describe your business and how it uses aviation, if applicable:

_____

BUSINESS AIR TRAVEL

1. Does your company use air travel (commercial or general avaition)? ☐ Yes (Company) ☐ Yes (Clientele) ☐ No
   If yes, what type? ☐ Commercial Airline ☐ Air Charter ☐ Company Aircraft
2. Do you use SLB for business purposes? ☐ Yes ☐ No
   If yes, how many times per year do you arrive using SLB? _____times/year
   If you don't use SLB, why not? ☐ No air travel needs ☐ Other
3. Does your clientele use SLB for business purposes? ☐ Yes ☐ No
   If yes, how many times per year do clients arrive using SLB? _____times/year
   If your clientele don't use SLB, why not? ☐ No air travel needs ☐ Other
4. How does your company have access to a general aviation airplane? (Check all that apply)
   ☐ Own
   ☐ Rent
   ☐ Lease
   ☐ Fractional/Shared Ownership
   ☐ Other_____
5. What type of aircraft does your company operate:
   Make:_____ Model:_____ N-Number (Optional):_____
6. At what airport is this airplane based? _____
7. Please describe the typical flights to SLB based on the questions below:
   - Average business-related flights to SLB per month? _____
   - Average number of passengers per flight? _____
   - Average flight distance? _____

(Over)

BUSINESS USER AIRPORT SURVEY
STORM LAKE MUNICIPAL AIRPORT (SLB)
AIRPORT MASTER PLAN

- Most frequent destinations to and from SLB:

  1:_____ 2:_____ 3:_____

8. What is the projected future business-related use of SLB:

☐ Increase ☐ Decrease ☐ Remain the same

AIRPORT ACCOMMODATIONS

	Yes	No	
9. Are you aware of the services available to you at SLB?	○	○	
	Yes	**No**	**N/A**
10. Is the location of SLB convenient for your business?	○	○	○
11. If you answered 'No' to question 9, please state why the location is not convenient for your business.	_____		
12. Would you base your corporate aircraft at SLB if hangars and/or sites for hangar development were available?	○	○	○
13. If you answered 'Yes' to question 13, please state what hangar size you would require (Example: 80 ft by 80 ft):	_____		
14. If hangar sites with direct airfield access were available, would your company be interested in locating or expanding its corporate use of SLB?	○	○	○
15. Would a longer Runway 17/35 increase your ability to use SLB?	○	○	○
16. Would improved approaches to Runway 17/35 increase your ability to use SLB?	○	○	○
17. When you are unable to use SLB, what airport is used as an alternate?	_____		

AIRPORT FACILITIES

18. Please rate airport facilities and equipment with regards to your operations at SLB:

	Inadequate	Marginal	Adequate
Runway Length	○	○	○
Aircraft Storage – Transient/Overnight	○	○	○
Aircraft Repair/Maintenance	○	○	○
Self Service Fueling	○	○	○
Full Service Fueling/Line Services/Fueling Truck	○	○	○
Ground Transportation (Shuttle, Taxi Service, Rental Cars, Courtesy Car)	○	○	○
Pilot Shop	○	○	○
Crew Rest Area	○	○	○
Flight Training/Instruction	○	○	○
Aircraft Charter	○	○	○
Business Center/Meeting Facilities	○	○	○
Airport Security – Lighting/Fencing	○	○	○
Snow Removal Services	○	○	○

19. Please list other facilities you need to operate at SLB or need to improve your experience at SLB:

_____

_____

20. Please provide any additional comments or concerns about the Storm Lake Municipal Airport:

_____

_____

The City of Storm Lake thanks you for completing this Airport Business User Survey! Please contact Justin Yarosevich, Assistant City Manager, at justin@stormlake.org with any questions.

Please Return by April 24, 2015

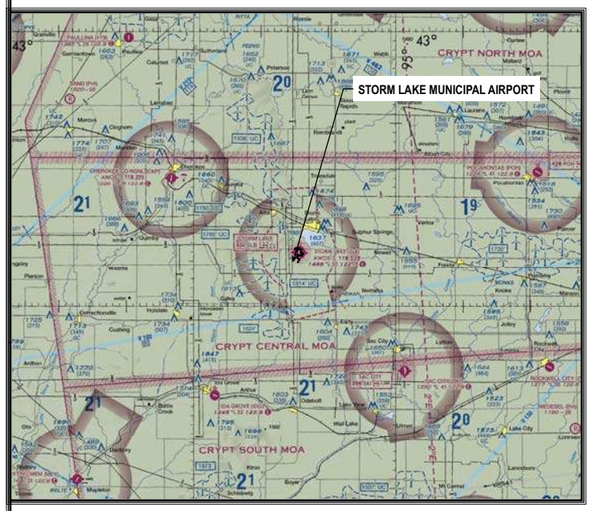
APPENDIX B
AIRPORT LAYOUT PLAN

AIRPORT LAYOUT PLAN

STORM LAKE MUNICIPAL AIRPORT (SLB)

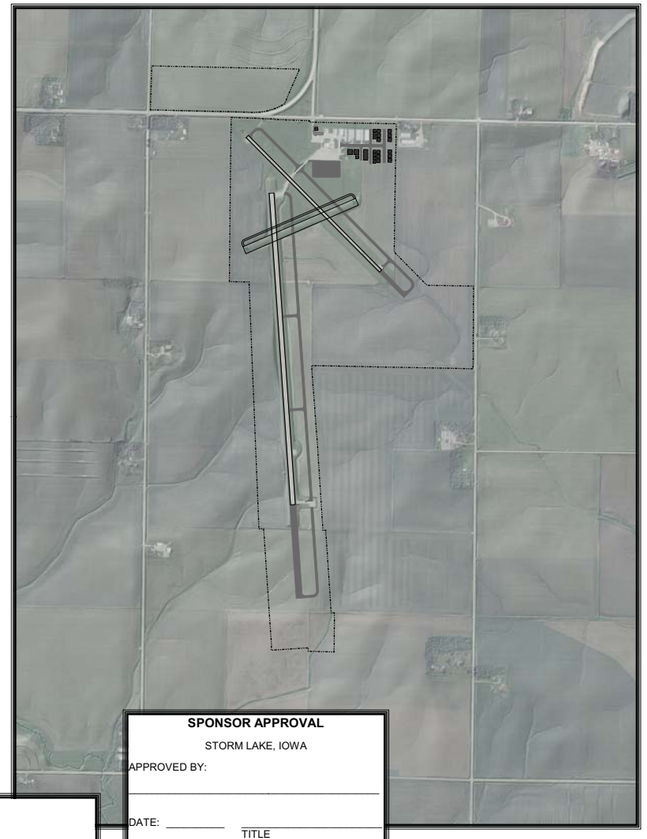
STORM LAKE, IA

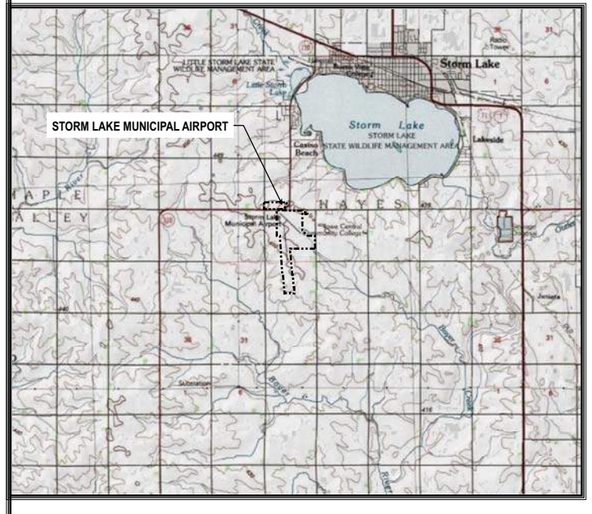
FAA APPROVAL LETTER



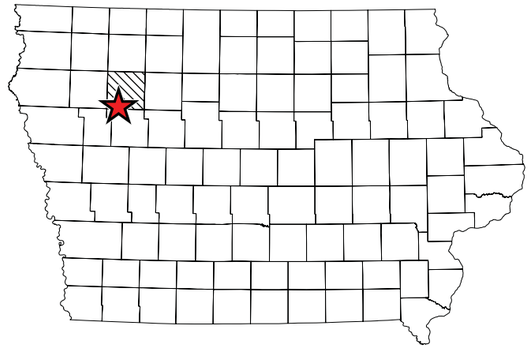
LOCATION MAP

INDEX TO SHEETS





VICINITY MAP



BUENA VISTA COUNTY, IA

SPONSOR APPROVAL

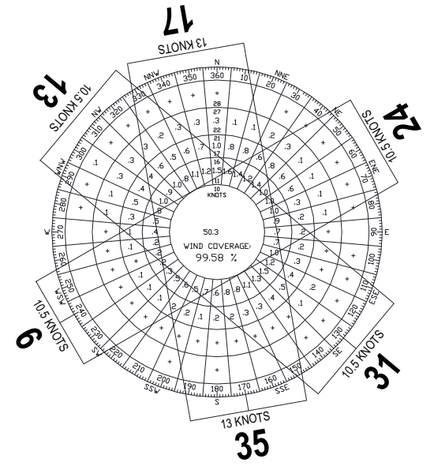
STORM LAKE, IOWA

APPROVED BY: _____

DATE: _____ _____ TITLE

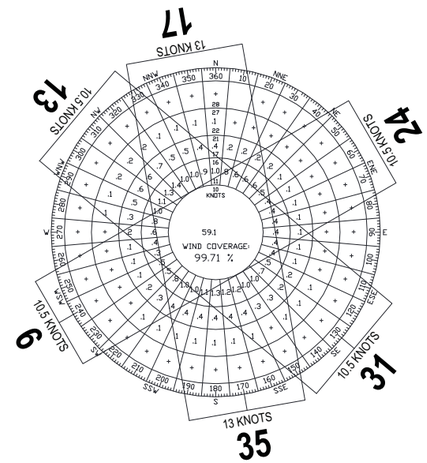
On behalf of Bolton & Menk, Inc. this Airport Layout Plan (ALP) was prepared for the Storm Lake Municipal Airport according to the applicable Advisory Circulars, the current version of the ARP SOP 2.00 ALP Checklist, and accurately depicts the proposed use of airspace at the time of submittal. The ALP conforms with FAA design standards, except as noted.

DATE: JUNE 9, 2016 MELISSA R. UNDERWOOD



INSTRUMENT FLIGHT RULES (IFR) WINDROSE

17/35 13 KNOTS
13/31 10.5 KNOTS
6/24 10.5 KNOTS



ALL WEATHER WINDROSE

17/35 13 KNOTS
13/31 10.5 KNOTS
6/24 10.5 KNOTS

ALL WEATHER WIND COVERAGE				
CROSSWINDS	RUNWAY 17/35	RUNWAY 13/31	RUNWAY 6/24	COMBINED
10.5 KNOTS	85.19%	83.28%	83.36%	99.20%
13 KNOTS	91.55%	90.11%	74.36%	99.84%
INSTRUMENT FLIGHT RULES				
CROSSWINDS	RUNWAY 17/35	RUNWAY 13/31	RUNWAY 6/24	COMBINED
10.5 KNOTS	79.31%	76.88%	70.89%	98.90%
13 KNOTS	87.49%	85.16%	80.94%	99.81%

SOURCE: NATIONAL CLIMATIC DATA CENTER FOR STORM LAKE, IA (2006-2015)

AIRPORT DATA TABLE

		EXISTING	FUTURE
NPIAS SERVICE LEVEL:		GENERAL AVIATION	GENERAL AVIATION
IA SASP SERVICE ROLE:		GENERAL SERVICE	GENERAL SERVICE
MEAN MAXIMUM TEMPERATURE HOTTEST MONTH:		JULY 83° F	JULY 83° F
AIRPORT ELEVATION (NAVD88):		1,487.9'	1,487.9'
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83):	LATITUDE	42° 35' 50.05" N	42° 35' 44.72" N
	LONGITUDE	95° 14' 26.40" W	95° 14' 25.25" W
AIRPORT REFERENCE CODE:		B-II	B-II
AIRPORT NAVAIDS:		NDB, BEACON	BEACON
MISCELLANEOUS FACILITIES:		AWOS, MIRLs, REILs, PAPIs, WIND CONE	AWOS, HIRLs, REILs, PAPIs, MITLs, LOC, GS, MALSR, WIND CONE

Storm Lake Jump Right In!

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

GREGORY BROUSSARD — REG NO. 21974 — DATE: AUG 1, 2016

BOLTON & MENK

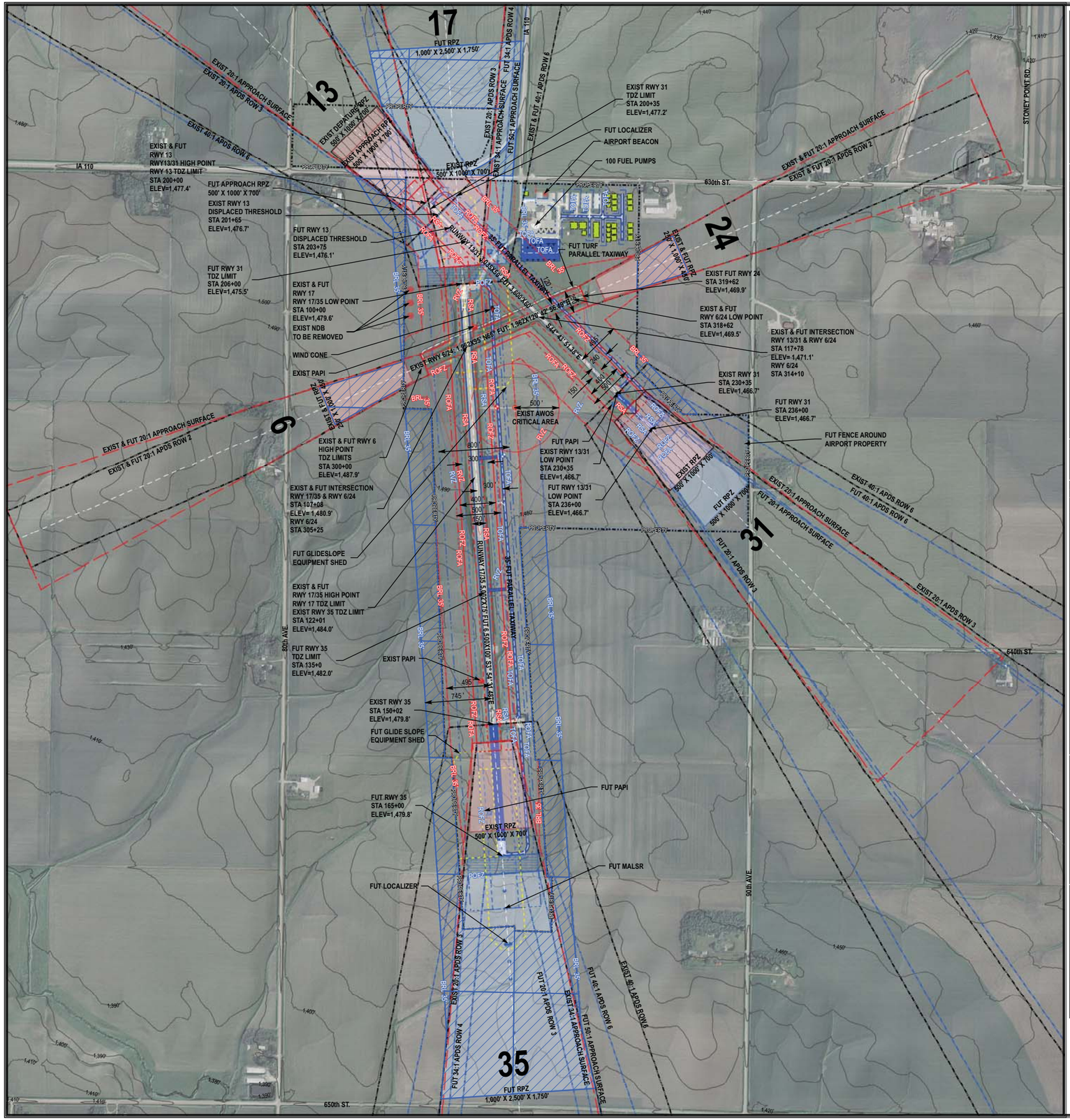
REVISIONS

DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO: T51.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRU

TITLE SHEET

SHEET 1 OF 11



RUNWAY DATA TABLE

	RUNWAY 17/35	
	EXISTING	FUTURE
RUNWAY LENGTH & WIDTH	5,002' X 75'	6,500' X 100'
RUNWAY GRADIENT	0.00%	SAME
RUNWAY TYPE	OTHER-THAN-UTILITY	SAME
PAVEMENT TYPE	CONCRETE	SAME
PAVEMENT STRENGTH	38,000 LBS DWG; 30,000 LBS SWG	SAME
RUNWAY LIGHTING	MIRL	HIRL
RUNWAY MARKING	NON-PRECISION	PRECISION
14 CFR PART 77	C 34:1	PIR 50:1/40:1
APPROACH TYPE	NON-PRECISION	PRECISION
RUNWAY DESIGN CODE (RDC)/RUNWAY REFERENCE CODE (RRC)	B-II-5000	B-II-2400
RUNWAY NAVAIDS	PAPIs, REILs, GPS, NDB	PAPIs, REILs, GPS, LPV, ILS, LOC, GS
TYPE OF AERONAUTICAL SURVEY	VERTICALLY GUIDED	SAME
VISIBILITY MINIMUMS	≥ 1 MILE	< 3/4 MILE
WIND COVERAGE	91.55%	SAME

FAA RUNWAY PROTECTION ZONE (RPZ) DIMENSIONS

	RUNWAY	BASE	LENGTH	OUTER WIDTH
EXIST	17	500'	1,000'	700'
	35	500'	1,000'	700'
FUT	17	1,000'	2,500'	1,750'
	35	1,000'	2,500'	1,750'
EXIST & FUT	13	500'	1,000'	700'
	31	500'	1,000'	700'
EXIST & FUT	6	250'	1,000'	450'
	24	250'	1,000'	450'

RUNWAY SAFETY AREA (RSA)

EXISTING		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17/35	150'	300'
13/31	150'	300'
6/24	120'	0'
FUTURE		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17/35	300'	600'

RUNWAY OBJECT FREE AREA (ROFA)

EXISTING		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17/35	500'	300'
13/31	500'	300'
6/24	250'	0'
FUTURE		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17/35	800'	600'

RUNWAY OBSTACLE FREE ZONE (ROFZ)

EXISTING & FUTURE		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17/35	400'	200'
13/31	400'	200'
6/24	250'	0'

PRECISION OBSTACLE FREE ZONE (POFZ)

FUTURE		
RUNWAY	WIDTH	LENGTH BEYOND RUNWAY END
17	800'	200'
35	800'	200'

TERPS DEPARTURE SURFACE

	RUNWAY	BASE	LENGTH	OUTER WIDTH
EXISTING & FUTURE	17/35	1,000'	10,200'	6,466'
	13/31	1,000'	10,200'	6,466'

RUNWAY END COORDINATES

EXISTING		
RUNWAY	LATITUDE	LONGITUDE
17	42° 36' 3.83" N	95° 14' 31.89" W
35	42° 35' 14.62" N	95° 14' 25.96" W
13	42° 36' 12.70" N	95° 14' 37.36" W
31	42° 35' 51.85" N	95° 14' 8.23" W
6	42° 35' 54.71" N	95° 14' 37.45" W
24	42° 36' 2.74" N	95° 14' 13.58" W
13 DISPLACED THRESHOLD	42° 36' 11.57" N	95° 14' 35.78" W
FUTURE		
RUNWAY	LATITUDE	LONGITUDE
35	42° 34' 59.87" N	95° 14' 24.19" W
31	42° 35' 47.96" N	95° 14' 2.80" W
13 DISPLACED THRESHOLD	42° 36' 10.12" N	95° 14' 33.76" W

RUNWAY END STATION AND ELEVATION

EXISTING		
RUNWAY	STATION	ELEVATION
17	100+00	1,479.6'
35	150+02	1,479.8'
13	200+00	1,477.4'
31	230+35	1,466.7'
6	300+00	1,487.9'
24	319+62	1,469.9'
13 DISPLACED THRESHOLD	201+65	1,476.7'
FUTURE		
RUNWAY	STATION	ELEVATION
35	165+00	1,479.8'
31	236+00	1,466.7'
13 DISPLACED THRESHOLD	203+75	1,476.1'

TOUCHDOWN ZONE (TDZ) LIMITS

EXISTING			
RUNWAY	TDZ LIMITS	STATION LOCATION	ELEVATION
17	100+00 TO 130+00	122+01	1,484.0'
35	150+02 TO 120+02	122+01	1,484.0'
13	200+00 TO 230+35	200+00	1,477.2'
31	230+35 TO 200+35	200+35	1,477.2'
6	300+00 TO 319+62	300+00	1,469.9'
24	319+62 TO 300+00	300+00	1,469.9'
FUTURE			
35	165+00 TO 135+00	135+00	1,482.0'
31	236+00 TO 206+00	206+00	1,475.5'

AIRPORT REFERENCE POINT (ARP)

	EXISTING	FUTURE
LATITUDE	42° 35' 50.05" N	42° 35' 44.72" N
LONGITUDE	95° 14' 26.40" W	95° 14' 25.25" W

DEVIATION FROM FAA DESIGN STANDARDS

APPROVAL DATE	CASE NUMBER	MODIFICATION	DESCRIPTION
NONE REQUIRED			

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATIONS

KEY	DESCRIPTION	PENETRATION	ELEVATION
NONE			

TAXIWAY/TAXILANE DATA TABLE

	EXISTING	FUTURE
TAXIWAY WIDTH	35'	SAME
TAXIWAY SAFETY AREA WIDTH	79'	SAME
TAXIWAY OBJECT FREE AREA WIDTH	131'	SAME
TAXIWAY EDGE SAFETY MARGIN	7.5'	SAME
TAXIWAY SHOULDER WIDTH	15'	SAME
TAXIWAY DESIGN GROUP (TDG)	TDG-1	TDG-1 / TDG-2
TAXILANE WIDTH (ADG I / ADG II)	25'/35'	SAME
TAXILANE OBJECT FREE AREA WIDTH (ADG I / ADG II)	79'/115'	SAME

RUNWAY DATA TABLE

RUNWAY 13/31		RUNWAY 6/24
EXISTING	FUTURE	EXISTING / FUTURE
3,035' X 50'	3,600' X 60'	EX: 1,962' X 95' / FUT:1,962' X 120'
0.35%	0.30%	0.92%
UTILITY	SAME	UTILITY
CONCRETE	SAME	TURF
4,000 LBS SWG	SAME	TURF
MIRL	SAME	NONE
VISUAL	NON-PRECISION	CONES
B(V) 20:1	SAME	A(V) 20:1
VISUAL	NON-PRECISION	VISUAL
B-I-VIS	B-I-5000	AI-VIS
NONE	PAPIs, REILs	NONE
NOT VERTICALLY GUIDED	VERTICALLY GUIDED	NONE
VISUAL	≥ 1 MILE	VISUAL
83.28%	SAME	83.36%

CRITICAL AIRCRAFT DATA TABLE

RUNWAY 17/35 EXISTING & FUTURE	
AAC-ADG	B-II
RUNWAY STRENGTH	38,000 LBS. DWG; 30,000 LBS. SWG
APPROACH SPEED	91 - < 121 KNOTS
WINGSPAN	49' - < 79'
TAIL HEIGHT	20' - < 30'
RUNWAY 13/31 EXISTING & FUTURE	
AAC-ADG	B-I
RUNWAY STRENGTH	4,000 LBS. SINGLE WHEEL GEAR (SWG)
APPROACH SPEED	91 - < 121 KNOTS
WINGSPAN	< 49'
TAIL HEIGHT	< 20'
RUNWAY 6/24 EXISTING & FUTURE	
AAC-ADG	A-I
RUNWAY STRENGTH	TURF
APPROACH SPEED	< 91 KNOTS
WINGSPAN	< 49'
TAIL HEIGHT	< 20'

DECLARED DISTANCES

	RUNWAY 17/35	
	EXISTING	FUTURE
TAKEOFF RUN AVAILABLE (TORA)	5,002'	6,500'
TAKEOFF DISTANCE AVAILABLE (TODA)	5,002'	6,500'
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	5,002'	6,500'
LANDING DISTANCE AVAILABLE (LDA)	5,002'	6,500'
	RUNWAY 13/31	
	EXISTING	FUTURE
TAKEOFF RUN AVAILABLE (TORA)	3,035'	3,600'
TAKEOFF DISTANCE AVAILABLE (TODA)	3,035'	3,600'
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	3,035'	3,600'
LANDING DISTANCE AVAILABLE (LDA)	13=2,870' 31=3,035'	13=3,225' 31=3,600'
	RUNWAY 6/24	
	EXISTING	FUTURE
TAKEOFF RUN AVAILABLE (TORA)	1,962'	1,962'
TAKEOFF DISTANCE AVAILABLE (TODA)	1,962'	1,962'
ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	1,962'	1,962'
LANDING DISTANCE AVAILABLE (LDA)	1,962'	1,962'

EXISTING LEGEND:

- AIRPORT PROPERTY
- EASEMENT
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY VISIBILITY ZONE (RVZ)
- AWOS CRITICAL
- AIRPORT REFERENCE POINT (ARP)
- AIRPORT ROTATING BEACON
- AWOS
- NON-DIRECTIONAL BEACON
- PAPI
- REIL
- WIND CONE
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUISITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- PRECISION OBSTACLE FREE (ZONE)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- NAVAID CRITICAL AREAS
- RUNWAY VISIBILITY ZONE (RVZ)
- TAXIWAY OBJECT FREE AREA (TOFA)
- BUILDING RESTRICTION LINE (BRL)
- AIRPORT REFERENCE POINT (ARP)
- AIRCRAFT PAVEMENT
- VEHICLE PAVEMENT
- BUILDING
- LOCALIZER
- MALS
- RUNWAY ALIGNMENT INDICATOR LIGHT
- PAPI
- REIL
- FENCE (10')

N W E S

NOTE: NAVD88 VERTICAL CONTROL DATUM & NAD83 COORDINATE SYSTEM WAS USED FOR THIS ALP SET.

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC DECLINATION EPOCH YEAR=2010

FEET

0 600 1,200 1,800

Stowlake Jump Right In!

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

GREGORY BROUSSARD
REG NO. 21974
DATE: AUG 1, 2016

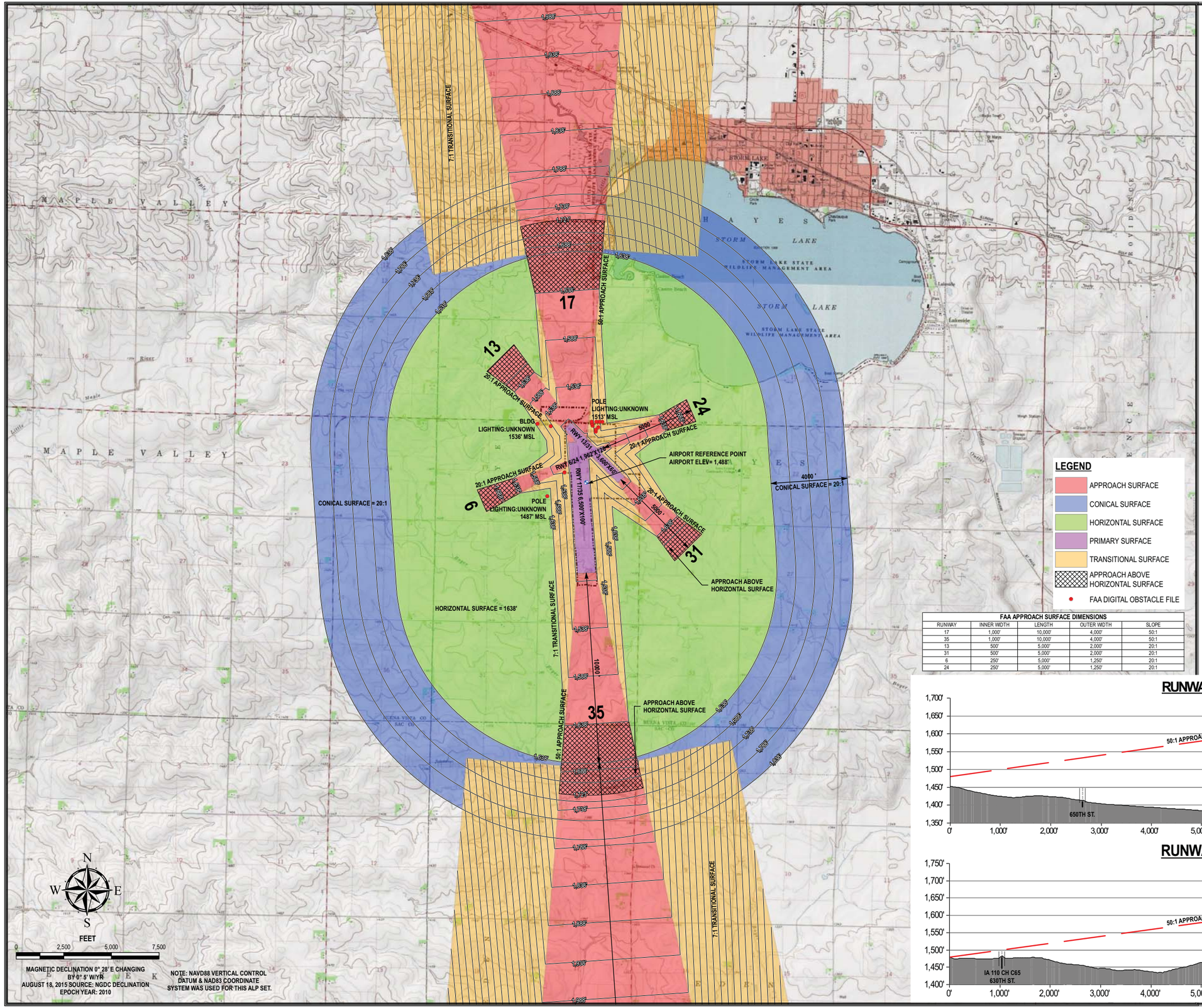
BOLTON & MENK ENGINEERS & SURVEYORS

REVISIONS	DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO.: 151.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRJ

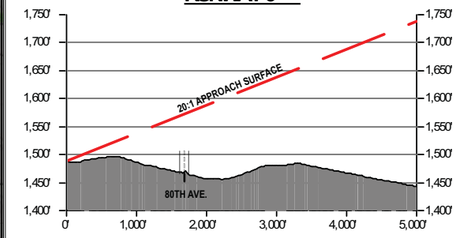
AIRPORT LAYOUT PLAN

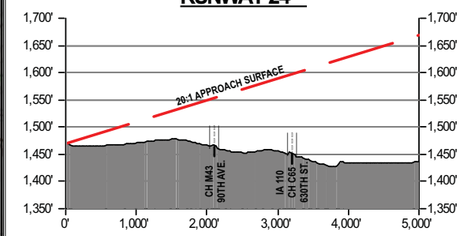
SHEET 2 OF 11

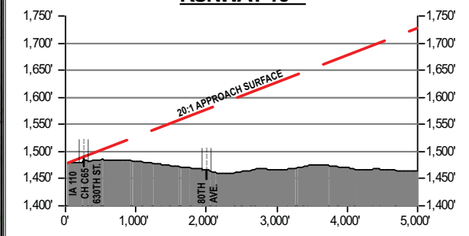


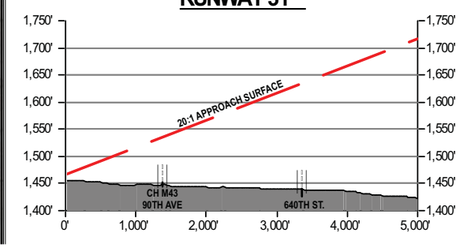
FAA APPROACH SURFACE DIMENSIONS

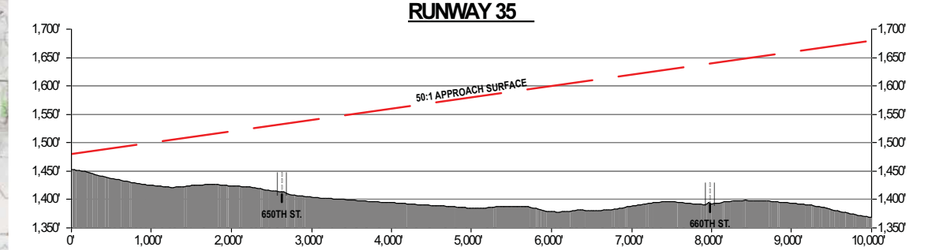
RUNWAY	INNER WIDTH	LENGTH	OUTER WIDTH	SLOPE
17	1,000'	10,000'	4,000'	50:1
35	1,000'	10,000'	4,000'	50:1
13	500'	5,000'	2,000'	20:1
31	500'	5,000'	2,000'	20:1
6	250'	5,000'	1,250'	20:1
24	250'	5,000'	1,250'	20:1

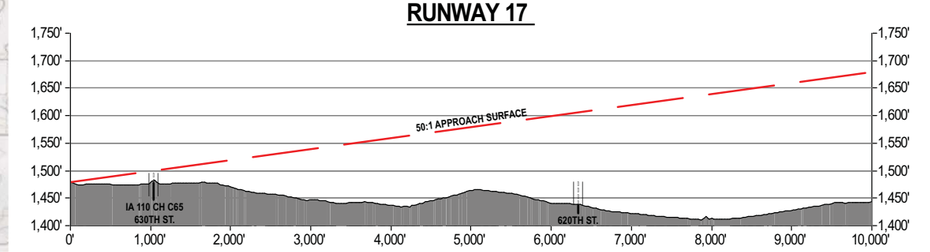












N
W E
S
FEET
0 2,500 5,000 7,500

MAGNETIC DECLINATION 0° 28' E CHANGING BY 0° 5' W/YR
AUGUST 18, 2015 SOURCE: NGDC DECLINATION
EPOCH YEAR: 2010

NOTE: NAVD88 VERTICAL CONTROL DATUM & NAD83 COORDINATE SYSTEM WAS USED FOR THIS ALP SET.

Storm Lake
Jump Right In!

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

Gregory Broussard

GREGORY BROUSSARD
REG NO. 21974 DATE: AUG 1, 2016

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

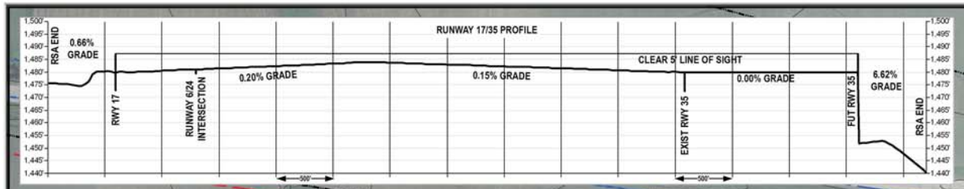
REVISIONS

DATE	BY	CHANGE

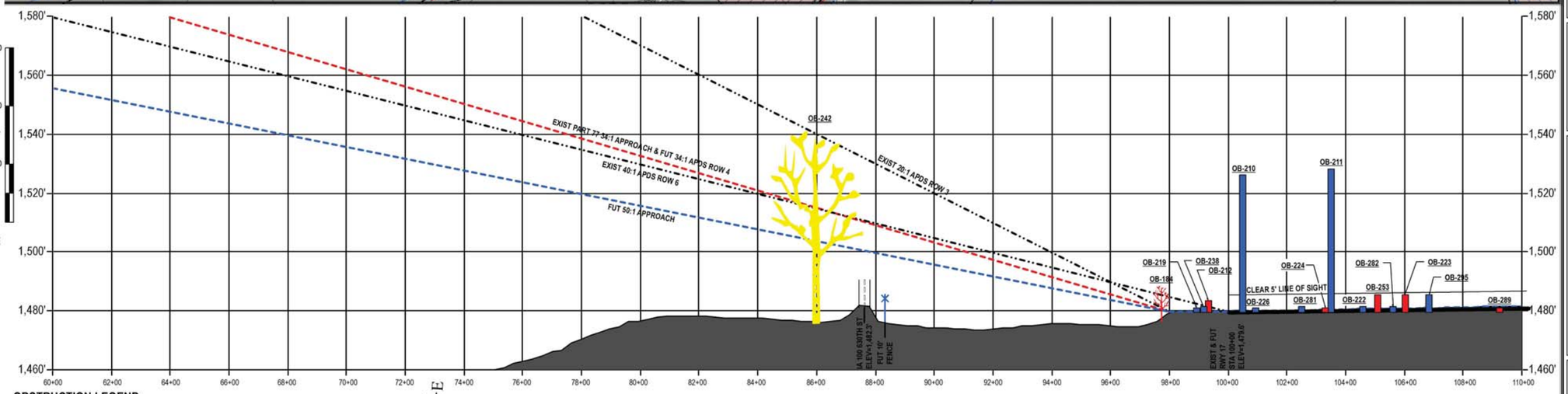
BOLTON & MENK, INC.
PROJECT NO: 151.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRU

FAR PART 77 IMAGINARY SURFACES

SHEET 3 OF 11



EXISTING OBSTRUCTIONS									
ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-184	TREE	1,488.2'	1,481.2'	7.0	1,482.2'	5.9'	1,480.9'	2.7'	TO BE REMOVED WITH NEXT GRANT
OB-212	BUSH	1,482.4'	1,479.6'	2.8			1,481.9'	0.5'	TO BE REMOVED WITH NEXT GRANT
OB-223	GROUND	1,481.2'	1,480.9'	4.9					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-224	GROUND	1,481.3'	1,480.3'	1.0					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-242	TREE	1,342.6'	1,479.9'	1.4'			1,314.9'	27.7'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURE
OB-253	BUSH	1,483.8'	1,480.4'	3.4'					TO BE REMOVED WITH NEXT GRANT
OB-289	GROUND	1,482.8'	1,481.5'	1.3					TO BE GRADED WITH NEXT RUNWAY PROJECT
FUTURE OBSTRUCTIONS									
ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-210	POLE	1,507.2'	1,493.6'	33.6'					TO BE REMOVED WHEN NDB DECOMMISSIONED OR PRECISION APPROACH PUBLISHED
OB-211	POLE	1,529.2'	1,497.1'	32.1'					TO BE REMOVED WHEN NDB DECOMMISSIONED OR PRECISION APPROACH PUBLISHED
OB-238	GROUND	1,480.2'	1,479.9'	0.6'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-222	GROUND	1,483.1'	1,480.6'	2.5'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-226	GROUND	1,479.8'	1,479.9'	0.1'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-238	GROUND	1,481.3'	1,479.9'	1.4'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-242	TREE	1,342.6'					1,314.9'	27.7'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURE
OB-281	GROUND	1,482.4'	1,480.7'	2.3'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-282	GROUND	1,486.1'	1,480.7'	3.4'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-295	GROUND	1,483.2'	1,480.7'	2.5'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED
OB-289	GROUND	1,486.8'	1,481.0'	5.8'					TO BE GRADED WHEN PRECISION APPROACH IS PUBLISHED



DATE OF OBSTRUCTION SURVEY: JUNE, 2015

EXISTING LEGEND:

- AIRPORT PROPERTY
- EASEMENT
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY VISIBILITY ZONE (RVZ)
- AWOS CRITICAL AREA
- BUILDING RESTRICTION LINE (BRL)
- AIRPORT ROTATING BEACON
- NON-DIRECTIONAL BEACON
- PAPI
- REIL
- WIND CONE
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUSITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- PRECISION OBSTACLE FREE (ZONE)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- NAVAID CRITICAL AREAS
- RUNWAY VISIBILITY ZONE (RVZ)
- TAXIWAY OBJECT FREE AREA (TOFA)
- BUILDING RESTRICTION LINE (BRL)
- AIRCRAFT PAVEMENT
- VEHICLE PAVEMENT
- BUILDING
- LOCALIZER
- PAPI
- REIL
- FENCE (10')

FEET: 60, 40, 20, 0

OBSTRUCTION LEGEND:

- EXIST PART 77/APDS
- FUT PART 77/APDS
- DEPARTURE SURFACE

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC DECLINATION EPOCH YEAR=2010

NOTE: NAVD88 VERTICAL CONTROL DATUM & NAD83 COORDINATE SYSTEM WAS USED FOR THIS ALP SET.

N E S W

FEET 0 200 400 600

Stormlake Municipal Airport
Jump Right In!

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Gregory Broussard

GREGORY BROUSSARD — REG NO. 21974 — DATE: AUG 1, 2016

BOLTON & MENK, INC. — Consulting Engineers & Surveyors

REVISIONS

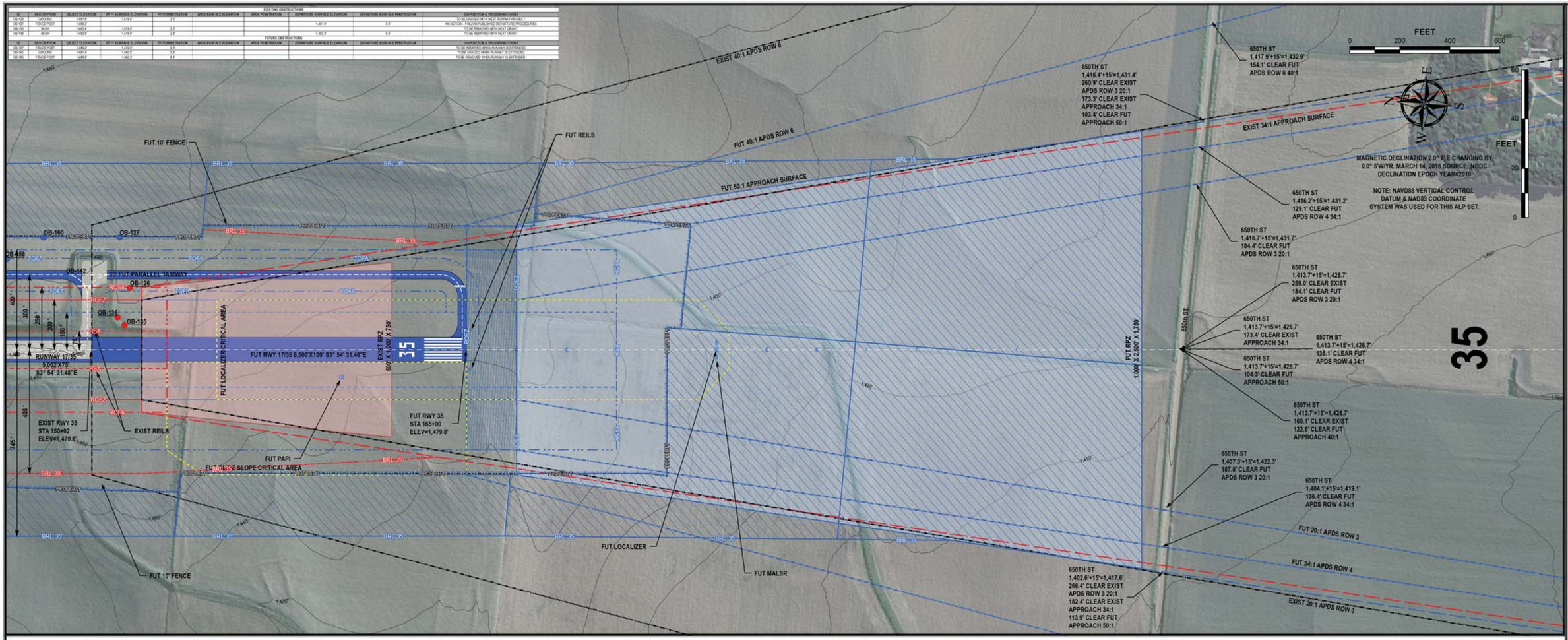
DATE	BY	CHANGE

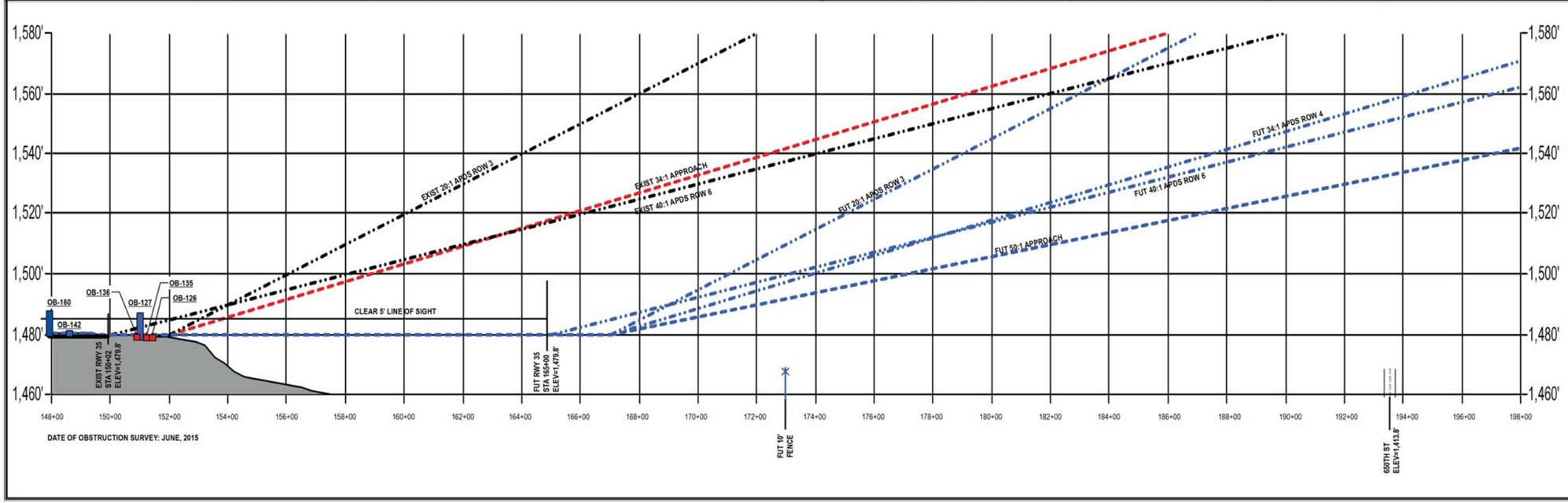
BOLTON & MENK, INC. — PROJECT NO: 151.109666 — DATE: AUGUST 1, 2016 — DESIGNED BY: MRU

EXISTING & FUTURE RUNWAY 17 APPROACH PLAN & PROFILE

SHEET 4 OF 11

EXISTING OBSTRUCTIONS									
ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-126	GROUND	1,481.6'	1,479.8'	2.2'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-127	FENCE POST	1,488.2'					1,481.9'	0.3'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-135	BUSH	1,482.4'	1,479.8'	2.6'					TO BE REMOVED WITH NEXT GRANT
OB-136	BUSH	1,482.8'	1,479.8'	2.9'			1,482.5'	0.3'	TO BE REMOVED WITH NEXT GRANT
FUTURE OBSTRUCTIONS									
ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-137	FENCE POST	1,489.2'	1,479.8'	9.3'					TO BE REMOVED WHEN RUNWAY IS EXTENDED
OB-142	GROUND	1,481.4'	1,480.5'	0.9'					TO BE GRADED WHEN RUNWAY IS EXTENDED
OB-160	FENCE POST	1,488.8'	1,480.5'	8.3'					TO BE REMOVED WHEN RUNWAY IS EXTENDED





EXISTING LEGEND:

- AIRPORT PROPERTY
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- BUILDING RESTRICTION LINE (BRL)
- REIL
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUSITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- PRECISION OBSTACLE FREE (ZONE)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- TAXIWAY OBJECT FREE AREA (TOFA)
- NAVAID CRITICAL AREAS
- BUILDING RESTRICTION LINE (BRL)
- AIRCRAFT PAVEMENT
- LOCALIZER
- PAPI
- REIL
- MALS
- RUNWAY ALIGNMENT INDICATOR LIGHT
- FENCE (10')

OBSTRUCTION LEGEND:

- EXISTING PART 77/APDS
- FUTURE PART 77/APDS

Stormlake Municipal Airport — Jump Right In!

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Gregory Brousard

GREGORY BROUSARD — REG NO. 21974 — DATE: AUG 1, 2016

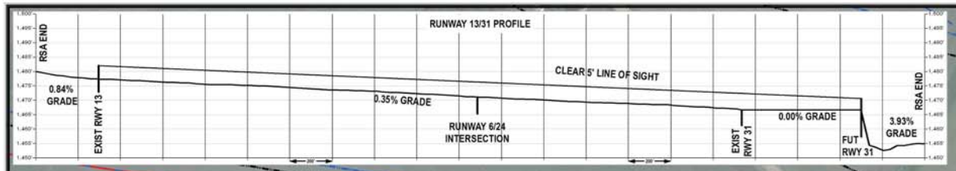
BOLTON & MENK, INC. Consulting Engineers & Surveyors

REVISIONS			
DATE	BY	CHANGE	

BOLTON & MENK, INC. — PROJECT NO: 151.109666 — DATE: AUGUST 1, 2016 — DESIGNED BY: MRU

EXISTING & FUTURE RUNWAY 35 APPROACH PLAN & PROFILE

SHEET 5 OF 11



13

EXISTING OBSTRUCTIONS

ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-001	PRIMARY ROAD	1,488.0	1,488.8	9.9'	1488.2	1.8'	1,481.0	9.9	THRESHOLD TO BE DISPLACED AN ADDITIONAL 210' TO CLEAR ROAD
OB-005	GROUND	1,475.5	1,477.8	1.9'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-006	GROUND	1,477.9	1,477.2	0.7'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-007	GROUND	1,480.7					1,480.8'	0.1'	TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-009	GROUND	1,480.3					1,479.8'	0.7'	TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-016	GROUND	1,476.8'	1,475.8'	1.0'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-020	GROUND	1,474.7'	1,473.8'	0.8'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-111	PRIMARY ROAD	1,488.8'					1,481.7'	15.1'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-119	GROUND	1,480.8'					1,480.5'	0.3'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-184	TREE	1,488.2'	1,474.8'	13.4'					TO BE REMOVED WITH NEXT GRANT
OB-191	TREE	1,543.2'	1,538.4'	6.8'			1,502.2'	43.0'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-192	BUILDING	1,515.9'					1,502.4'	13.5'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-193	TREE	1,529.4'					1,488.8'	29.6'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-194	TREE	1,553.8'	1,538.8'	15.0'			1,504.6'	49.2'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-200	TREE	1,555.0'	1,550.3'	4.7'			1,504.9'	50.1'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-232	TREE	1,556.3'					1,506.6'	51.7'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-233	TREE	1,560.9'					1,510.3'	50.6'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-251	PRIMARY ROAD	1,488.0'	1,487.4'	7.6'			1,484.6'	10.4'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES

FUTURE OBSTRUCTIONS

ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-001	PRIMARY ROAD	1,488.0'	1,488.8'	9.9'			1,486.1'	1.9'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-111	PRIMARY ROAD	1,488.8'					1,485.3'	10.9'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-191	TREE	1,543.2'	1,538.4'	6.8'			1,506.9'	36.9'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-192	BUILDING	1,515.9'					1,510.9'	8.9'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-193	TREE	1,529.4'					1,504.4'	25.0'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-194	TREE	1,553.8'	1,538.8'	15.0'			1,509.3'	44.5'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-200	TREE	1,555.0'	1,550.3'	4.7'			1,509.5'	45.5'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-232	TREE	1,556.3'					1,511.3'	47.0'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-233	TREE	1,560.9'					1,514.9'	46.0'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-234	TREE	1,563.7'					1,511.7'	52.0'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-235	TREE	1,570.5'					1,516.8'	53.7'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-251	PRIMARY ROAD	1,488.0'	1,487.4'	7.6'			1,488.7'	0.7'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES

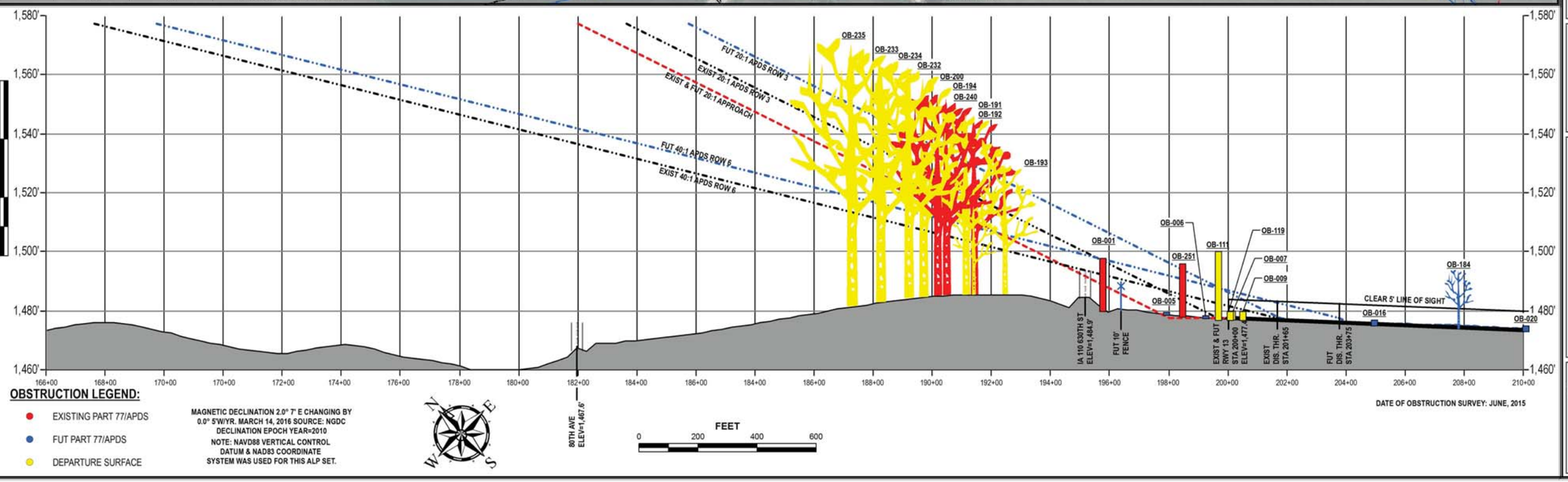
EXISTING LEGEND:

- AIRPORT PROPERTY
- EASEMENT
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY VISIBILITY ZONE (RVZ)
- BUILDING RESTRICTION LINE (BRL)
- NON-DIRECTIONAL BEACON
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUSITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY VISIBILITY ZONE (RVZ)
- NAVAID CRITICAL AREAS
- TAXIWAY OBJECT FREE AREA (TOFA)
- BUILDING RESTRICTION LINE (BRL)
- AIRCRAFT PAVEMENT
- VEHICLE PAVEMENT
- BUILDING
- LOCALIZER
- PAPI
- REIL
- FENCE (10')

60 40 20 0 FEET



DATE OF OBSTRUCTION SURVEY: JUNE, 2015

OBSTRUCTION LEGEND:

- EXISTING PART 77/APDS
- FUT PART 77/APDS
- DEPARTURE SURFACE

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC
DECLINATION EPOCH YEAR=2010
NOTE: NAVD88 VERTICAL CONTROL DATUM & NAD83 COORDINATE SYSTEM WAS USED FOR THIS ALP SET.

N W E S

0 200 400 600 FEET

Stormlake Municipal Airport
Jump Right In!

REVISIONS

DATE	BY	CHANGE

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Gregory Broussard

GREGORY BROUSSARD
REG NO. 21974 DATE: AUG 1, 2016

BOLTON & MENK, INC.
PROJECT NO: 151.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRJ

EXISTING & FUTURE RUNWAY 13 APPROACH PLAN & PROFILE

SHEET 6 OF 11

EXISTING OBSTRUCTIONS

ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-043	GROUND	1,469.0'	1,458.9'	0.1'					TO BE GRADED WITH NEXT RUNWAY PROJECT
OB-044	TREE	1,481.5'	1,466.7'	14.8'					TO BE REMOVED WITH NEXT GRANT
OB-058	TREE	1,536.9'					1,513.3'	23.2'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-065	TREE	1,533.3'					1,516.0'	17.3'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES

FUTURE OBSTRUCTIONS

ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-058	TREE	1,536.9'	1,521.7'	14.9'			1,498.2'	37.4'	TO BE REMOVED WHEN RUNWAY EXTENSION IS CONSTRUCTED
OB-059	TREE	1,536.7'					1,534.3'	1.4'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES
OB-065	TREE	1,533.3'					1,501.8'	31.4'	NO ACTION - FOLLOW PUBLISHED DEPARTURE PROCEDURES

430TH AVE
1,458.7'+15'=1,473.7'
25.8' CLEAR EXIST
APDS ROW 6 40:1

430TH AVE
1,457.2'+15'=1,472.2'
16.1' CLEAR FUT
APDS ROW 6 40:1

EXIST 40:1 APDS ROW 6

FUT 40:1 APDS ROW 6

FUT 10' FENCE

430TH AVE
1,454.6'+15'=1,469.6'
72.4' CLEAR EXIST
APDS ROW 3 20:1
71.5' CLEAR EXIST
APPROACH 20:1

OB-065

EXIST RWY 31
STA 239+35
ELEV= 1,466.7'

FUT RWY 31
STA 236+00
ELEV= 1,466.7'

OB-058

430TH AVE
1,453.9'+15'=1,468.9'
48.9' CLEAR FUT
APDS ROW 3 20:1
47.6' CLEAR FUT
APPROACH 20:1

430TH AVE
1,449.5'+15'=1,464.5'
100.3' CLEAR EXIST
APPROACH & APDS ROW 3 20:1
72.0' CLEAR FUT
APPROACH & APDS ROW 3 20:1

430TH AVE
1,449.5'+15'=1,464.5'
56.2' CLEAR EXIST
APDS ROW 6 40:1

430TH AVE
1,449.5'+15'=1,464.5'
42.1' CLEAR FUT
APDS ROW 6 40:1

430TH AVE
1,449.3'+15'=1,464.3'
108.6' CLEAR FUT
APDS ROW 3 20:1
109.2' CLEAR FUT
APPROACH 20:1

430TH AVE
1,449.3'+15'=1,464.3'
132.6' CLEAR EXIST
APDS ROW 3 20:1
132.6' CLEAR EXIST
APPROACH 20:1

EXIST 20:1 APDS ROW 3

EXIST 20:1 APPROACH

FUT 20:1 APDS ROW 3

FUT 20:1 APPROACH

CH MA3 90th AVE

640th ST.

31

EXIST RWY 13/31
3,3035X50' S44° 43' 51.38"E

FUT RWY 13/31
565' EXTENSION

FUT PARALLEL TAXIWAY

EXIST RPZ
500' X 1,000' X 700'

FUT RPZ
500' X 1,000' X 700'

FUT PAPI

FUT REILS

OB-043

OB-044

OB-059

EXIST AWOS CRITICAL AREA

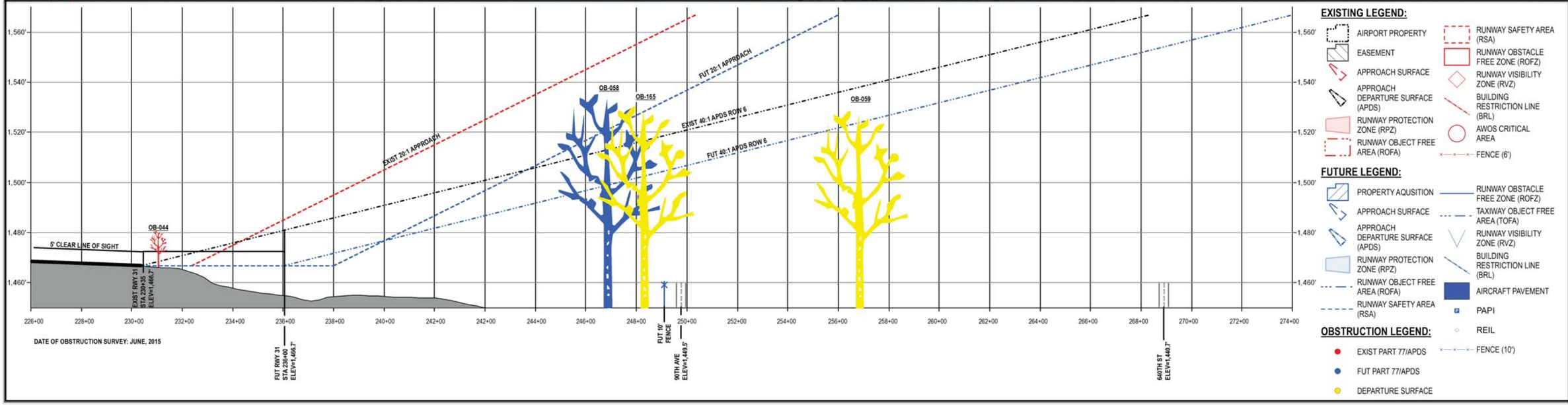
FUT 10' FENCE

FEET
0 200 400 600

FEET
60 40 20 0

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NODC DECLINATION EPOCH YEAR=2010

NOTE: NAVD88 VERTICAL CONTROL DATUM & NAD83 COORDINATE SYSTEM WAS USED FOR THIS ALP SET.



EXISTING LEGEND:

- AIRPORT PROPERTY
- EASEMENT
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY VISIBILITY ZONE (RVZ)
- BUILDING RESTRICTION LINE (BRL)
- AWOS CRITICAL AREA
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUSITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- TAXIWAY OBJECT FREE AREA (TOFA)
- RUNWAY VISIBILITY ZONE (RVZ)
- BUILDING RESTRICTION LINE (BRL)
- AIRCRAFT PAVEMENT
- PAPI
- REIL
- FENCE (10')

OBSTRUCTION LEGEND:

- EXIST PART 77/APDS
- FUT PART 77/APDS
- DEPARTURE SURFACE

Stormlake Jump Right In!

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

Gregory Brouward

GREGORY BROUSSARD
REG NO. 21974 DATE: AUG 1, 2016

BOLTON & MENK

REVISIONS

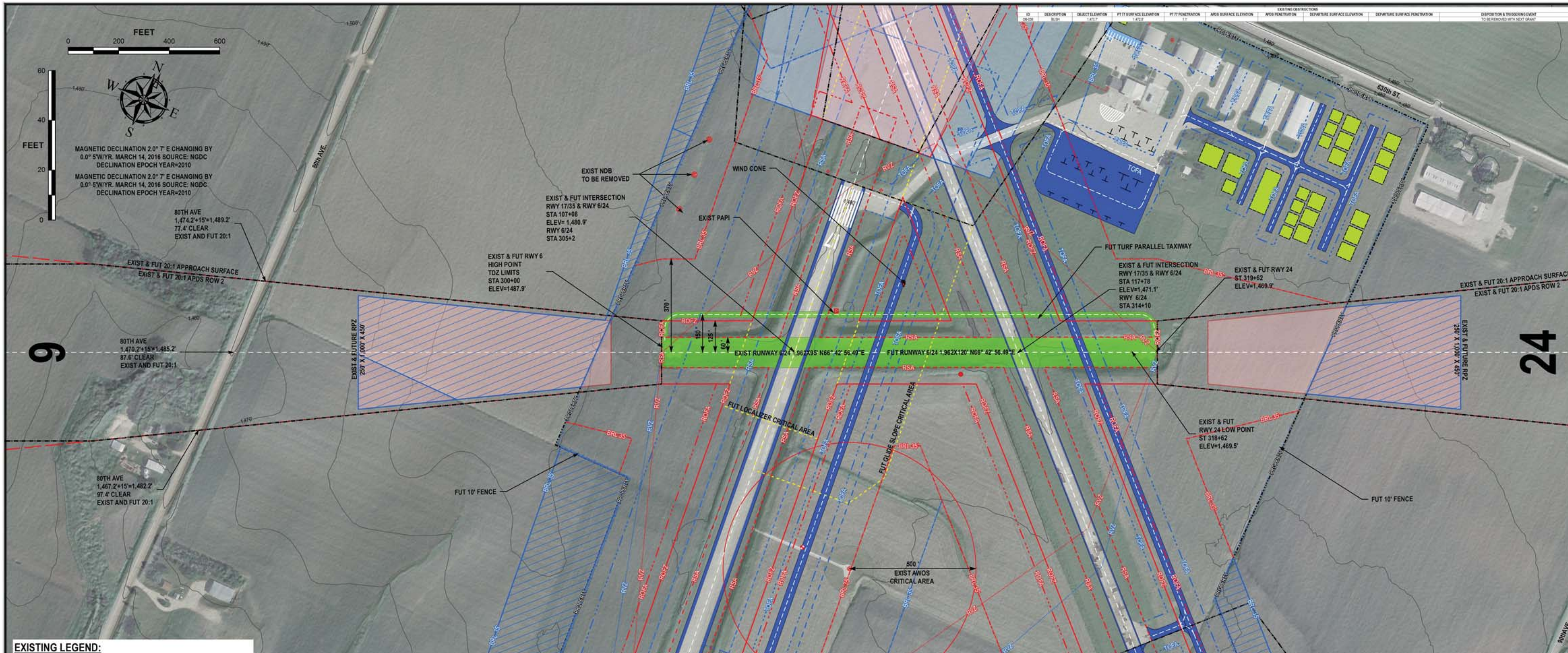
DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO: T51.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRU

EXISTING & FUTURE RUNWAY 31 APPROACH PLAN & PROFILE

SHEET 7 OF 11

EXISTING OBSTRUCTIONS									
ID	DESCRIPTION	OBJECT ELEVATION	PT 77 SURFACE ELEVATION	PT 77 PENETRATION	APDS SURFACE ELEVATION	APDS PENETRATION	DEPARTURE SURFACE ELEVATION	DEPARTURE SURFACE PENETRATION	DISPOSITION & TRIGGERING EVENT
OB-036	BUSH	1,473.7'	1,472.6'	1.1'					TO BE REMOVED WITH NEXT GRANT

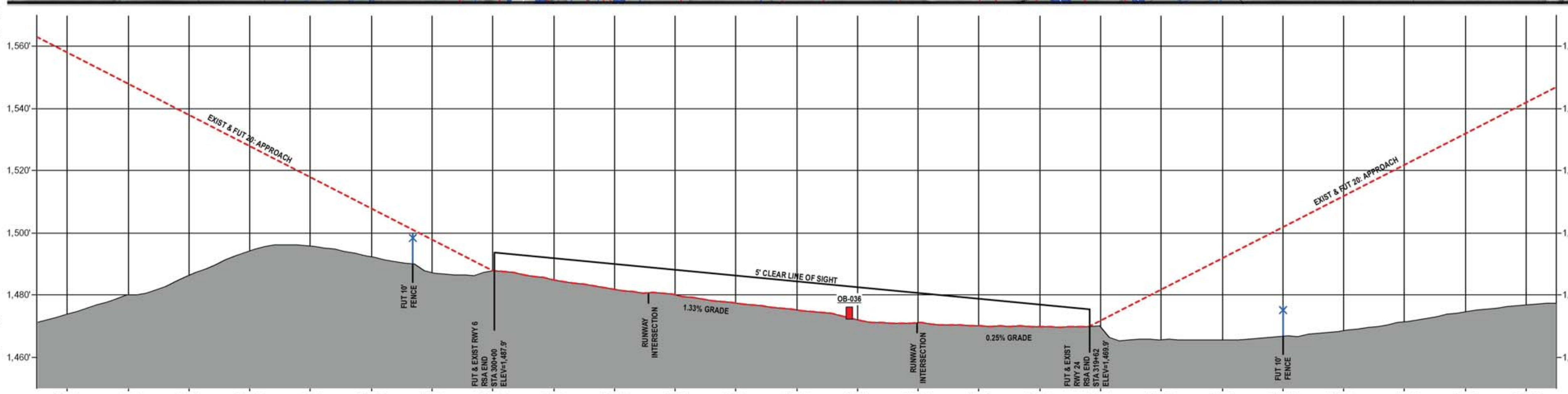


EXISTING LEGEND:

- AIRPORT PROPERTY
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- BUILDING RESTRICTION LINE (BRL)
- RUNWAY VISIBILITY ZONE (RVZ)
- AWOS CRITICAL AREA
- AIRPORT REFERENCE POINT (ARP)
- AIRPORT ROTATING BEACON
- AWOS
- NON-DIRECTIONAL BEACON
- PAPI
- REIL
- WIND CONE
- FENCE (6')

FUTURE LEGEND:

- PROPERTY AQUSITION
- APPROACH SURFACE
- APPROACH DEPARTURE SURFACE (APDS)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY VISIBILITY ZONE (RVZ)
- NAVAID CRITICAL AREAS
- BUILDING RESTRICTION LINE (BRL)
- AIRPORT REFERENCE POINT (ARP)
- AIRCRAFT PAVEMENT
- TURF RUNWAY
- VEHICLE PAVEMENT
- BUILDING
- PAPI
- FENCE (10')



DATE OF OBSTRUCTION SURVEY: JUNE, 2015

OBSTRUCTION LEGEND:

- EXIST PART 77/APDS

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Gregory Broussard
GREGORY BROUSSARD
REG NO. 21974 DATE AUG 1, 2016

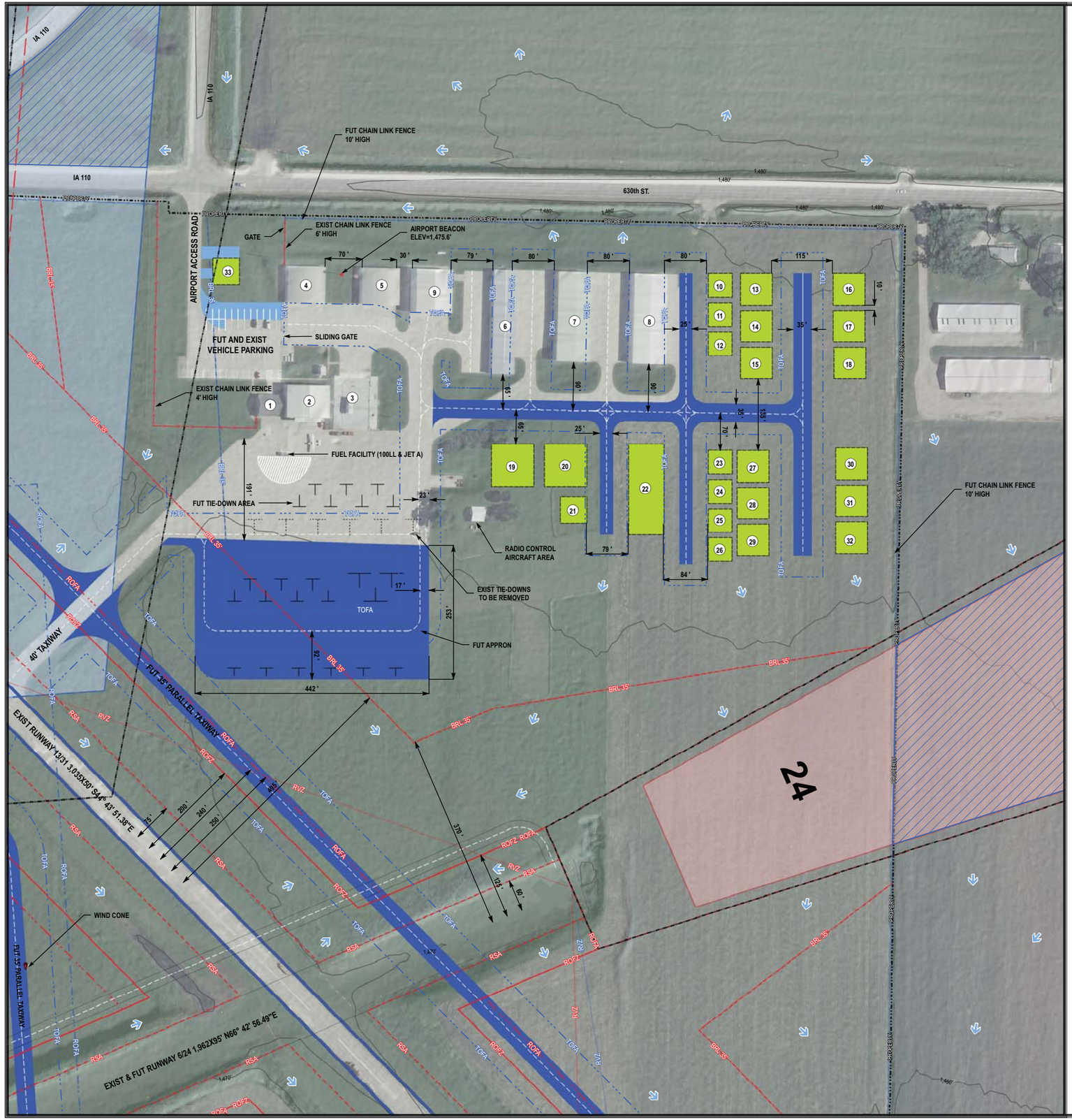
BOLTON & MENK Engineers & Surveyors

REVISIONS		
DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO. T51.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRU

EXISTING & FUTURE RUNWAY 6/24 APPROACH PLAN & PROFILE

SHEET 8 OF 11



EXISTING BUILDING TABLE			
ID	EST. TOP ELEV.	DESCRIPTION	DISPOSITION
1	1,490'	A/D BUILDING	TO REMAIN
2	1,495'	FBO OFFICE	TO REMAIN
3	1,505'	MAINTENANCE EQUIPMENT STORAGE	TO REMAIN
4	1,493'	4-UNIT CAROUSEL HANGAR	TO REMAIN
5	1,493'	4-UNIT CAROUSEL HANGAR	TO REMAIN
6	1,494'	6-UNIT T-HANGAR	TO REMAIN
7	1,496'	6-UNIT NESTED T-HANGAR	TO REMAIN
8	1,497'	6-UNIT NESTED T-HANGAR	TO REMAIN
9	1,503'	PRIVATE SINGLE UNIT HANGAR	TO REMAIN

FUTURE BUILDING TABLE			
ID	EST. TOP ELEV.	DESCRIPTION	DISPOSITION
10	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
11	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
12	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
13	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
14	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
15	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
16	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
17	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
18	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
19	1,518'	FUTURE 80' X 80' HANGAR	TO BE CONSTRUCTED
20	1,518'	FUTURE 80' X 80' HANGAR	TO BE CONSTRUCTED
21	1,518'	FUTURE 50' X 50' HANGAR	TO BE CONSTRUCTED
22	1,513'	FUTURE 6-UNIT 67' X 171' HANGAR	TO BE CONSTRUCTED
23	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
24	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
25	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
26	1,513'	FUTURE 45' X 45' HANGAR	TO BE CONSTRUCTED
27	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
28	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
29	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
30	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
31	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
32	1,518'	FUTURE 60' X 60' HANGAR	TO BE CONSTRUCTED
33	1,518'	FUTURE SRE BUILDING	TO BE CONSTRUCTED

EXISTING LEGEND:

- AIRPORT PROPERTY
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAY OBJECT FREE AREA (ROFA)
- RUNWAY VISIBILITY ZONE (RVZ)
- BUILDING RESTRICTION LINE (BRL)
- AIRPORT BEACON
- WIND CONE
- FENCE (6')
- TIE-DOWN
- AIRPORT DRAINAGE

FUTURE LEGEND:

- BUILDING
- VEHICLE PAVEMENT
- AIRCRAFT PAVEMENT
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBSTACLE FREE ZONE (ROFZ)
- RUNWAU OBJECT FREE AREA (ROFA)
- RUNWAY VISIBILITY ZONE (RVZ)
- TAXIWAY OBJECT FREE AREA (TOFA)
- BUILDING RESTRICTION LINE (BRL)
- FENCE (10')
- TIE-DOWN

N W E S

FEET 0 100 200 300

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC DECLINATION EPOCH YEAR=2010

Stormlake Jump Right In!

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GREGORY BROUSSARD — REG NO. 21974 — DATE: AUG 1, 2016

BOLTON & MENK, INC. Engineers & Surveyors

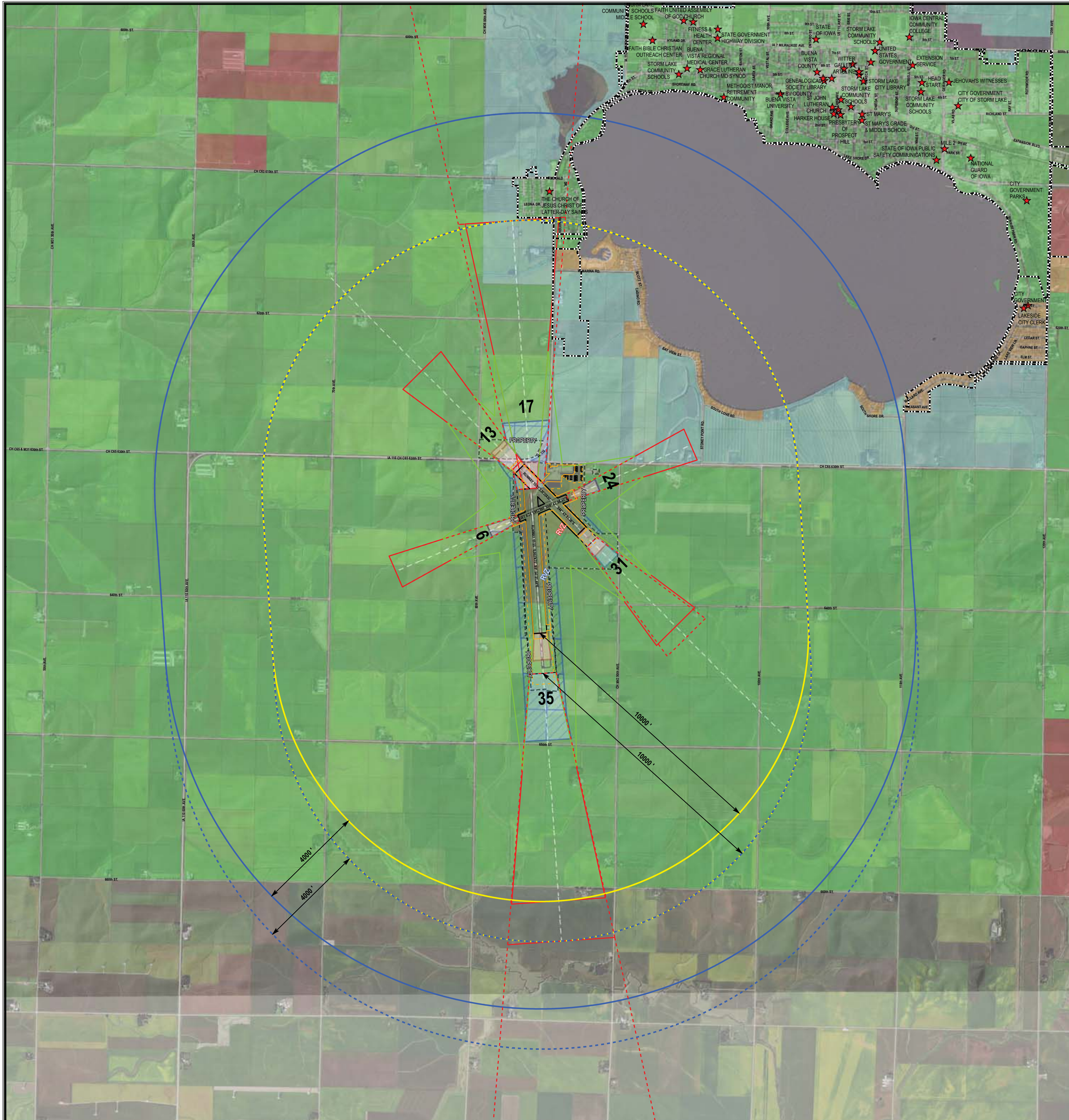
REVISIONS

DATE	BY	CHANGE

BOLTON & MENK, INC. — PROJECT NO.: 151.109666 — DATE: AUGUST 1, 2016 — DESIGNED BY: MRU

EXISTING & FUTURE BUILDING AREA PLAN

SHEET 9 OF 11



REVISED ORDINANCE OF THE CITY OF STORM LAKE, COUNTY OF BUENA VISTA.

c. Use Restrictions

Notwithstanding any other provisions of Section 550, no use may be made of land or water within the City of Storm Lake, Buena Vista County, or Sac County in such a manner as to interfere with the operation of any airborne aircraft. The following special requirements shall apply to each permitted use:

1. All lights or illumination used in conjunction with street, parking signs or uses of land structures shall be arranged and operated in such a manner that is not misleading or dangerous to aircraft operating from the Storm Lake Municipal Airport or in the vicinity thereof.

2. No operations from any use shall produce smoke, glare or other visual hazards within three (3) statute miles of any useable runway of the Storm Lake Municipal Airport.

3. No operations from any use in the City of Storm Lake, Buena Vista County or Sac County, shall produce electronic interference with navigation signals or radio communication between airport and aircraft.

LAND USE LEGEND:

- PRIME AGRICULTURE A-1
- LIMITED AGRICULTURE A-2
- MOBILE HOME MH
- INDUSTRIAL I-1
- RESIDENTIAL SINGLE FAMILY R-1
- RESIDENTIAL MULTIFAMILY R-2
- SPECIAL EXCEPTION

SOURCE: BUENA VISTA COUNTY LAND USE

EXISTING LEGEND:

- INSTITUTIONS
- CITY OF STORM LAKE
- AIRPORT PROPERTY
- CROP RESTRICTION LINE
- RUNWAY VISIBILITY ZONE (RVZ)
- A -RUNWAY PROTECTION ZONE (RPZ)
- PRIMARY SURFACE
- B-RUNWAY APPROACH SURFACE
- C-TRANSITIONAL SURFACE
- D-HORIZONTAL SURFACE
- E-CONICAL SURFACE

FUTURE LEGEND:

- PROPERTY AQUSITION
- RUNWAY VISIBILITY ZONE (RVZ)
- CROP RESTRICTION LINE
- AIRCRAFT PAVEMENT
- VEHICLE PAVEMENT
- BUILDING
- A - RUNWAY PROTECTION ZONE (RPZ)
- PRIMARY SURFACE
- B-RUNWAY APPROACH SURFACE
- C-TRANSITIONAL SURFACE
- D-HORIZONTAL SURFACE
- E-CONICAL SURFACE

N W E S

FEET

0 2,000 4,000 6,000

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC DECLINATION EPOCH YEAR=2010

Storm Lake Jump Right In!

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Gregory Broussard

GREGORY BROUSSARD

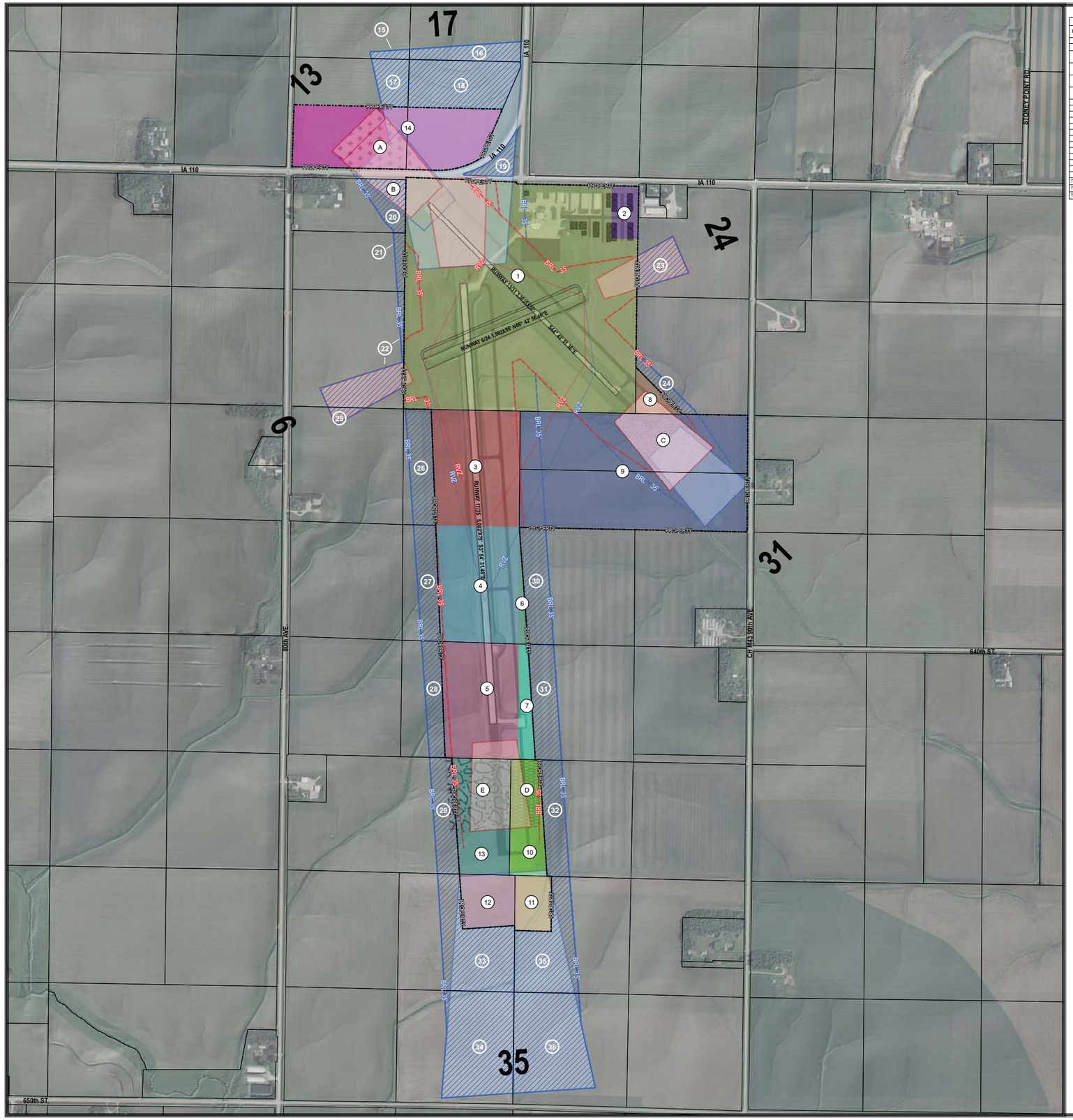
REG NO. 21974 DATE: AUG 1, 2016

REVISIONS		
DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO: T51.109666
DATE: AUGUST 1, 2016
DESIGNED BY: MRU

LAND USE & ZONING

SHEET **10** OF **11**



EXISTING PROPERTY TABLE

PARCEL	DESCRIPTION	APPROXIMATE SIZE (ACRES)	GRANTOR	AIP/STATE PROJECT #	COUNTY RECORD BOOK	COUNTY RECORD PAGE	ACQUISITION DATE	CONVEYANCE INSTRUMENT	NOTES
1	FEE	155.72		LOCAL				WARRANTY DEED	
2	FEE	4.28	BECKER MANUFACTURING COMPANY	LOCAL	50	446	6/20/1978	WARRANTY DEED	
3	FEE	29.51	FOELL, VERNON, RAUSCH, DORRIS & RODNEY	LOCAL, STATE (PROJ.NO. 405-76-11-S) & FEDERAL (FAA PROJ.NO. 5-19-0088-01)	49	477	1/31/1977	WARRANTY DEED	
4	FEE	27.59	FOELL, VERNON, RAUSCH, DORRIS & RODNEY	LOCAL, STATE (PROJ.NO. 405-76-11-S) & FEDERAL (FAA PROJ.NO. 5-19-0088-01)	49	476	1/31/1977	WARRANTY DEED	
5	FEE	25.73	FOELL, VERNON, RAUSCH, DORRIS & RODNEY	LOCAL, STATE (PROJ.NO. 405-76-11-S) & FEDERAL (FAA PROJ.NO. 5-19-0088-01)	49	475	1/31/1977	WARRANTY DEED	
6	FEE	1.66	CARLSON, IVERSON, MOVALL, & MOHR	LOCAL, STATE (PROJ.NO. 17-0088-0007) FEE TITLE ACQUISITION OF FORMER EASEMENT	21	949	1994	WARRANTY DEED	
7	FEE	4.79	CARLSON, IVERSON, MOVALL, & MOHR	LOCAL, STATE (PROJ.NO. 17-0088-0007)	21	950	1994	WARRANTY DEED	
8	FEE	3.19	LAYTON & REBECCA ZYLSTRA	3-19-0088-07	12	0099	1/12/2012	WARRANTY DEED	
9	FEE	78.47	REBECCA ZYLSTRA	3-19-0088-08	12	0098	1/13/2012	WARRANTY DEED	
10	FEE	11.37	ERVIN & SHIRLEY PICKHINKE	3-19-0088-07	12	1291	1/13/2012	WARRANTY DEED	
11	FEE	5.95	ROBERT & CANDACE MADICH	3-19-0088-07	12	1004	2/9/2012	WARRANTY DEED	
12	FEE	8.31	LARRY & SHERYL CARLSON	3-19-0088-09	13	9021	2013	WARRANTY DEED	
13	FEE	18.72	NICHOLAS & KIM FOELL	3-19-0088-07	12	1295	2013	WARRANTY DEED	
14	FEE	32.60	ANDREW SWANSON	3-19-0088-09	13	2133	2013	WARRANTY DEED	
A	EASEMENT	8.62	ANDREW SWANSON	LOCAL & STATE (PROJ.NO. 17-0088-0003)	13	2133	1994	CLEAR ZONE EASEMENT	SEE NOTE 7
B	EASEMENT	1.73	WILLIAM P & MARY A KESTEL	LOCAL & STATE (PROJ.NO. 17-0088-0003)	28	670	1984	CLEAR ZONE EASEMENT	
C	EASEMENT	15.14	CITY OF STORM LAKE	LOCAL & STATE (PROJ.NO. 17-0088-0003)	12	98	1994	CLEAR ZONE EASEMENT	SEE NOTE 4
D	EASEMENT	5.12	CITY OF STORM LAKE	LOCAL & STATE (PROJ.NO. 17-0088-0007)	12	1291	1994	CLEAR ZONE EASEMENT	SEE NOTE 5
E	EASEMENT	13.27	CITY OF STORM LAKE	LOCAL & STATE (PROJ.NO. 17-0088-0007)	12	1295	1994	CLEAR ZONE EASEMENT	SEE NOTE 6
TOTAL FEE:		451.77							
TOTAL EASEMENT:		43.88							
TOTAL:		407.89							

FUTURE PROPERTY TABLE

PARCEL	DESCRIPTION	APPROXIMATE SIZE (ACRES)	GRANTOR	JUSTIFICATION	ACQUISITION DATE
15	FEE	0.96	SWANSON RICHARD P	RUNWAY 17 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
16	FEE	4.98	SWANSON RICHARD P	RUNWAY 17 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
17	FEE	4.51	SWANSON ANDREW J	RUNWAY 17 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
18	FEE	14.67	SWANSON ANDREW J	RUNWAY 17 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
19	FEE	2.51	RIGHT OF WAY	RUNWAY 17 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
20	FEE	4.91	KESTEL WILLIAM P REV TRUST	RUNWAY 13/31 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
21	FEE	1.65	KESTEL WILLIAM P REV TRUST	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
22	FEE	7.62	KESTEL WILLIAM P REV TRUST	RUNWAY 6 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
23	FEE	4.86	ZYLSTRA LAYTON	RUNWAY 24 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
24	FEE	2.51	ZYLSTRA LAYTON	RUNWAY 13/31 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
25	FEE	0.98	FOELL RICHARD A	RUNWAY 6 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
26	FEE	8.25	FOELL RICHARD A	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
27	FEE	7.11	FOELL RICHARD A	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
28	FEE	5.97	FOELL RICHARD A	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
29	FEE	7.54	FOELL NICHOLAS RICHARD	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
30	FEE	9.00	PICKHINKE ERVIN S	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
31	FEE	8.87	PICKHINKE ERVIN S	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
32	FEE	7.60	PICKHINKE ERVIN S	RUNWAY 17/35 BUILDING RESTRICITON LINE ACQUISITION	TO BE ACQUIRED
33	FEE	17.13	CARLSON, LARRY G	RUNWAY 35 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
34	FEE	21.27	CARLSON, LARRY G	RUNWAY 35 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
35	FEE	14.49	MADICH CANDACE	RUNWAY 35 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
36	FEE	20.86	MADICH CANDACE	RUNWAY 35 PROTECTION ZONE ACQUISITION	TO BE ACQUIRED
TOTAL:		157.39			

NOTES:

1. PARCEL 8 IS REFERENCED AS "E" ON THE ACQUISITION PLAT.
2. PARCEL 9 IS REFERENCED AS "F" ON THE ACQUISITION PLAT.
3. PARCEL 11 IS REFERENCED AS "C" ON THE ACQUISITION PLAT.
4. EASEMENT REFERENCED AS PARCEL C (1994) IS NOW PART OF PARCEL 9 THAT WERE ACQUIRED IN FEE (2012).
5. EASEMENT REFERENCED AS PARCEL D IS NOW PART OF PARCEL 10 THAT WAS ACQUIRED IN FEE (2012).
6. EASEMENT REFERENCED AS PARCEL E IS NOW PART OF PARCEL 13 THAT WAS ACQUIRED IN FEE (2012).
7. EASEMENT A IS NOW PART OF PARCEL 14 THAT WAS ACQUIRED IN EASEMENT – (SURFACE & OVERHEAD) (2013).

EXISTING LEGEND:

- AIRPORT PROPERTY
- PARCELS
- RUNWAY PROTECTION ZONE (RPZ)
- BUILDING RESTRICTION LINE (BRL)
- RUNWAY VISIBILITY ZONE (RVZ)

FUTURE LEGEND:

- FUTURE PROPERTY AQUSITION
- RUNWAY PROTECTION ZONE (RPZ)
- BUILDING RESTRICTION LINE (BRL)
- RUNWAY VISIBILITY ZONE (RVZ)

PROPERTY LEGEND:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, A, B, C, D, E

MAGNETIC DECLINATION 2.0° 7' E CHANGING BY 0.0° 5'W/YR. MARCH 14, 2016 SOURCE: NGDC DECLINATION EPOCH YEAR=2010

Stormlake Jump Right In!

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA

GREGORY BROUSSARD — REG NO. 21974 — DATE: AUG 1 2016

BOLTON & MENK, INC. Consulting Engineers & Surveyors

REVISIONS

DATE	BY	CHANGE

BOLTON & MENK, INC.
PROJECT NO.: 151.109686
DATE: AUGUST 1, 2016
DESIGNED BY: MRJ

AIRPORT PROPERTY INVENTORY MAP

SHEET 11 OF 11

APPENDIX C
APRON SIZE CALCULATIONS FOR TRANSIENT AIRCRAFT

Apron Size Calculations for Transient Aircraft

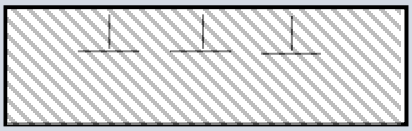
Airport	Storm Lake Municipal Airport
Location	Storm Lake, Iowa

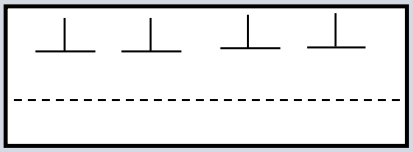
Existing Apron
square yards → 10561

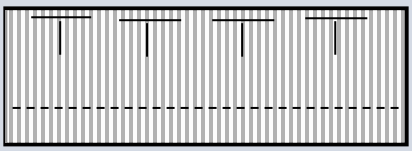
Calculations are based upon guidance established within Appendix 5 to AC 150/5300-13. User may calculate size of apron based upon total annual ops or user may develop an estimate of annual operations based upon number of based aircraft.

	Based Aircraft	OR	Total Annual Ops
1. Calculate the total annual operations			
Enter number of based aircraft →	36		
Enter number of operations per aircraft [1] →	350		
Total Annual Operations →	**12,600**		**12,600**
2. Busiest Month (% of Annual Ops) [2]			
Enter % of Annual Ops that occur in busiest month →	20		
Busiest Month Operations →	**2,520**		**2,520**
3. Busiest Day (10%>Avg Day)			
Enter Busiest Month (e.g. August) →	Jun		
Avg Day Busy Month →	**84**		**84**
Busiest Day 10% > avg. day →	**92**		**92**
4. # Itinerant Aircraft			
Enter % of Itinerant Operations [3] →	60		
# Itinerant Aircraft operations →	**55**		**55**
# Itinerant Aircraft Landing Operations →	**28**		**28**
Enter % of Itinerant Operations on ground →	50		
# Itinerant AC on ground (assume 50%) →	**14**		**14**
5. Apron area			
# square yards per aircraft [4] →	1075		
Apron Area (sq yds) →	**14,900**		**14,900**
6. Planned Apron (10%>)			
# square yards →	**16,389**		**16,389**

NOTES:
1. Ops/Based Aircraft:
   Small GA-250 Med GA-350 Reliever-450 Busy Reliever-750
2. Amount of activity can be determined from fuel sales or from actual operations counts. For example if month with highest fuel sales accounts for 20% of annual sales, use 20% of annual as busy month. If actual traffic counts available, use those.
3. Assume 50% of operations are itinerant if no records are available.
4. Planning areas shown assume 10' clearance between wingtips. Taxilane @ edge places taxilane on edge of apron.
5. Users requiring assistance or reasonable accommodation may contact the FAA Central Region at 816-329-2600.







Apron Area	w/o Taxilane	w/Taxilane @ edge	w/Taxilane
Group I	360	755	960
Group II	490	1,075	1,385